

location	
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reviser	
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Key site characteristics

elevation	
slope	
aspect	
relief position	
morphodynamics	
geology	

Climatic characteristics

mean annual temperature	
mean annual precipitation	

Additional remarks

disturbance, degradation, melioration

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Ecosystem and management type

original		current	
past		planned	

Key soil properties		level: 0 (low) - 5 (high)				comments
		current	scenarios			
			planned	
inherent	total soil depth					
	stone content					
	clay content					
	sand content					
manageable	soil organic matter content*					
	bulk density					
	pH					
	nutrient level					
	biological activity					type and thickness of organic layers:

* in mineral soil

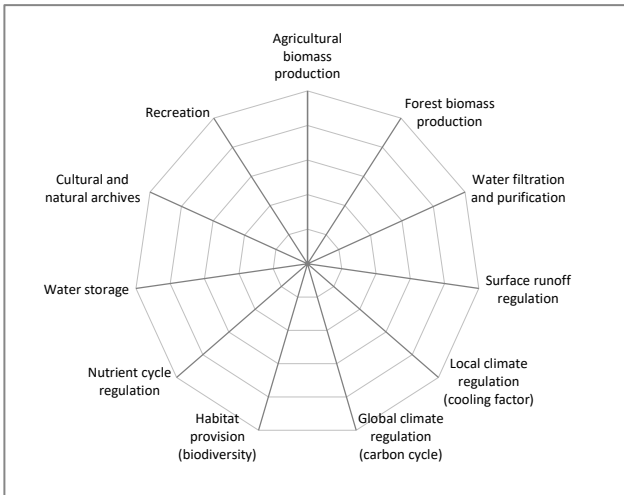
Estimating the provision of Soil Ecosystem Services for different ecosystem and management types

level: 0 (low) - 5 (high)

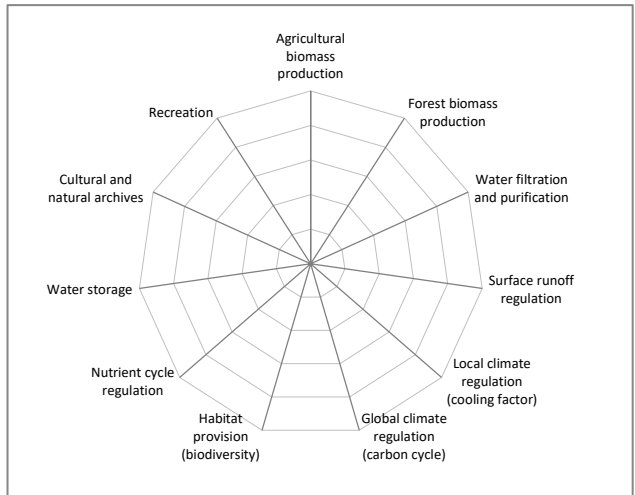
		Ecosystem and management type				comments	
		current	planned		
Ecosystem Services	Category**	Soil Ecosystem Service					
			Provisioning	Agricultural biomass production			
			Forest biomass production				
	Regulating		Water filtration and purification				
			Surface runoff regulation				
			Local climate regulation (cooling factor)				
			Global climate regulation (carbon cycle)				
	Supporting		Habitat provision (biodiversity)				
			Nutrient cycle regulation				
			Water storage				
	Cultural		Cultural and natural archives				
			Recreation				

** Ecosystem service categories as defined in the Millenium Ecosystem Assessment

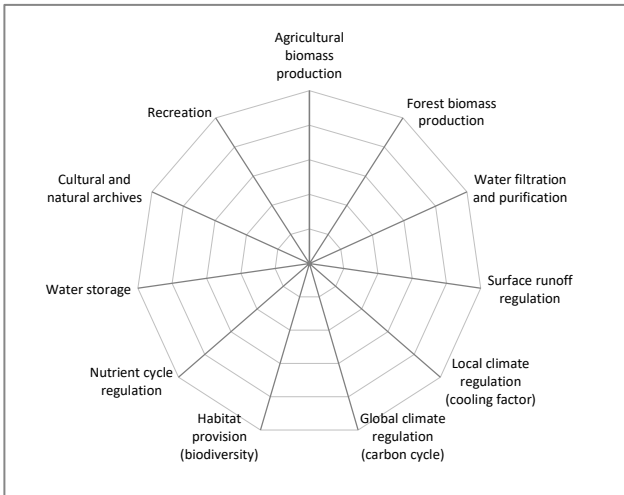
current ecosystem and management type



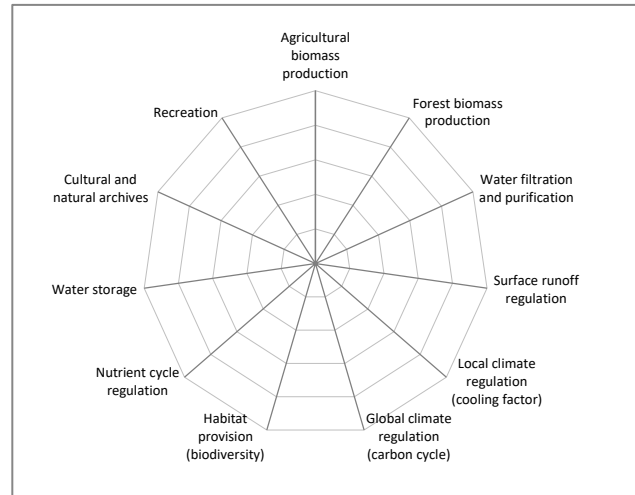
planned ecosystem and management type



ecosystem and management type: ...



ecosystem and management type: ...



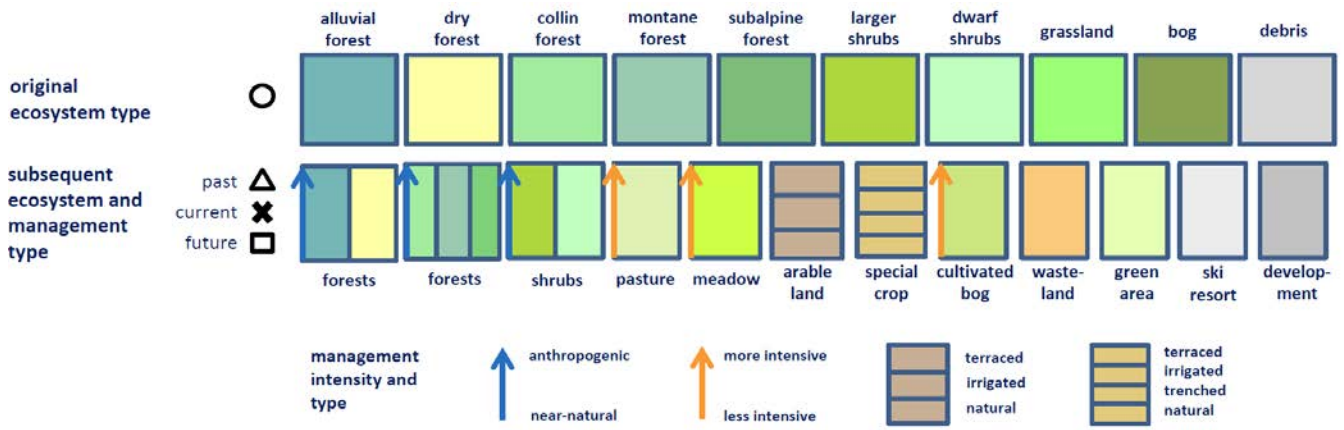


Figure 1: Orientation scheme for estimating the original ecosystem type and subsequent ecosystem and management types

		Key soil properties									
		total soil depth	stone content	clay content	sand content	soil organic content	bulk density	pH	nutrient level	biological activity	
Soil Ecosystem Services	Provisioning	Agricultural biomass production	↖	↖	↖	↖	↖	↖	↖	↖	↖
		Forest biomass production	↖	↖	↖	↖	↖	↖	↖	↖	↖
	Regulating	Water filtration and purification	↖	↖	↖	↖	↖	↖	-	-	↖
		Surface runoff regulation	↖	↖	↖	↖	↖	↖	-	-	↖
		Local climate regulation	↖	↖	↖	↖	↖	↖	-	-	-
	Supporting	Global climate regulation	↖	↖	-	-	↖	↖	-	-	↖
		Habitat provision (biodiversity)	↖	↖	↖	↖	↖	↖	↖	↖	↖
		Nutrient cycle regulation	↖	↖	↖	↖	↖	↖	↖	↖	↖
	Cultural	Water storage	↖	↖	↖	↖	↖	↖	-	-	-
		Cultural and natural archives	↖	-	-	-	peatsoils	-	-	-	negative impact
Recreation		↖	↖	↖	↖	↖	↖	-	-	-	

- ↖ the higher the soil property value, the better the service provision
- ↗ the lower the soil property value, the better the service provision
- ↖-↗ optimum range of the soil property regarding the service provision
- no relevant influence of the soil property on the service provision

Background: dark green: high importance of soil property; green: medium importance of soil property; light green: low importance of soil property regarding the service provision; yellow: depends on a special aspect of service, e.g. touristic activity.

Figure 2: Supporting matrix to link key soil properties with selected Soil Ecosystem Services



A short user's guide

Purpose: This 'Soil Ecosystem Service Estimation Sheet' can be used in the field at a soil profile to estimate the contribution of soils to eleven selected Ecosystem Services depending on key soil properties.

Structure and explanation

Page 1

Location and Reviser should be named in order to document where and by whom the estimation sheet was filled out.

Key site characteristics are important as some information, e.g. slope, will directly influence the service provision, whereas others are also important to understand the respective pedogenesis.

Climatic characteristics are also relevant for some Soil Ecosystem Services. For example, the mean annual temperature can influence the demand (e.g. local climate regulation) and the provision (e.g. agricultural biomass production) of the services.

Ecosystem and management type serves to collect information about the man-made history and development of the site. Thereby, 'ecosystem and management type' contains not only information on land use, but it also allows differentiating within one land use according to specific management practices. 'Original' refers to the natural ecosystem type, 'past' (if applicable) to the traditional ecosystem and management type that was maintained for a considerable time (often since the medieval settlement expansion) before the current one, 'current' describes what we see right now and 'planned' (if applicable) refers to the most likely next ecosystem and management type. Figure 1 serves as a support to differentiate ecosystem and management types.

Key soil properties are the most important information that we need in order to estimate Soil Ecosystem Services. They can be subdivided into 'inherent' (white) and 'manageable' (grey) soil properties. The latter can be influenced by humans depending on land use and management practices. The properties are either estimated or measured and directly classified on a scale from 0 (low) to 5 (high). The classification should be made at least for the current ecosystem type and management. It is also helpful to estimate the soil properties if the ecosystem and management type would be changed, e.g. for a former (original, traditional) or several planned ecosystem types of managements.

In the block **Estimating the provision of Soil Ecosystem Services for ecosystem and management types** the levels of service provision - from 0 (low) to 5 (high) - can be filled in. According to the classified key soil properties, the Soil Ecosystem Service can be estimated for several scenarios. Figure 2 serves as a support.

The diagrams allow depicting the estimated levels of service provision from *Estimating the provision of Soil Ecosystem Services for different potential ecosystem and management types* as rays. The length of the ray should be directly proportional to the level of service provision. All Soil Ecosystem Services are arranged clockwise but there is no special relationship between two neighbouring services.

The purpose of this page is to support the decision in estimating the levels of service provision.

Figure 1 illustrates how ecosystems can be managed. It helps to take into account, what the original ecosystem probably looked like and which factors must be considered in order to understand some site characteristics and their influence on the current or a potential future ecosystem and management type.

Figure 2 is a support for the transformation of estimated or measured key soil properties into a level of service provision. The cross-table provides two sorts of information per 'soil property'-'Soil Ecosystem Service'-pair. Firstly, mini graph symbols show in which way the soil property is determining the service. There are three options for the maximal service provision: a) max. property value, b) min. property value, c) optimum property value. Secondly, the background colour shows how much influence the soil property has on the service provision. The darker the green, the higher the influence. A yellow background stands for the ambiguous cases, where it depends strongly on the specific aspect of a service, which soil property value would be the optimum. The cross-table serves as an orientation for the majority of cases but some special cases might show other relationships.