



Mapping of ecosystems and their services –  
Latvian coastal ecosystems within  
**«LIFE Ecosystem Services» project**  
**LIFE13ENV/LV/000839**

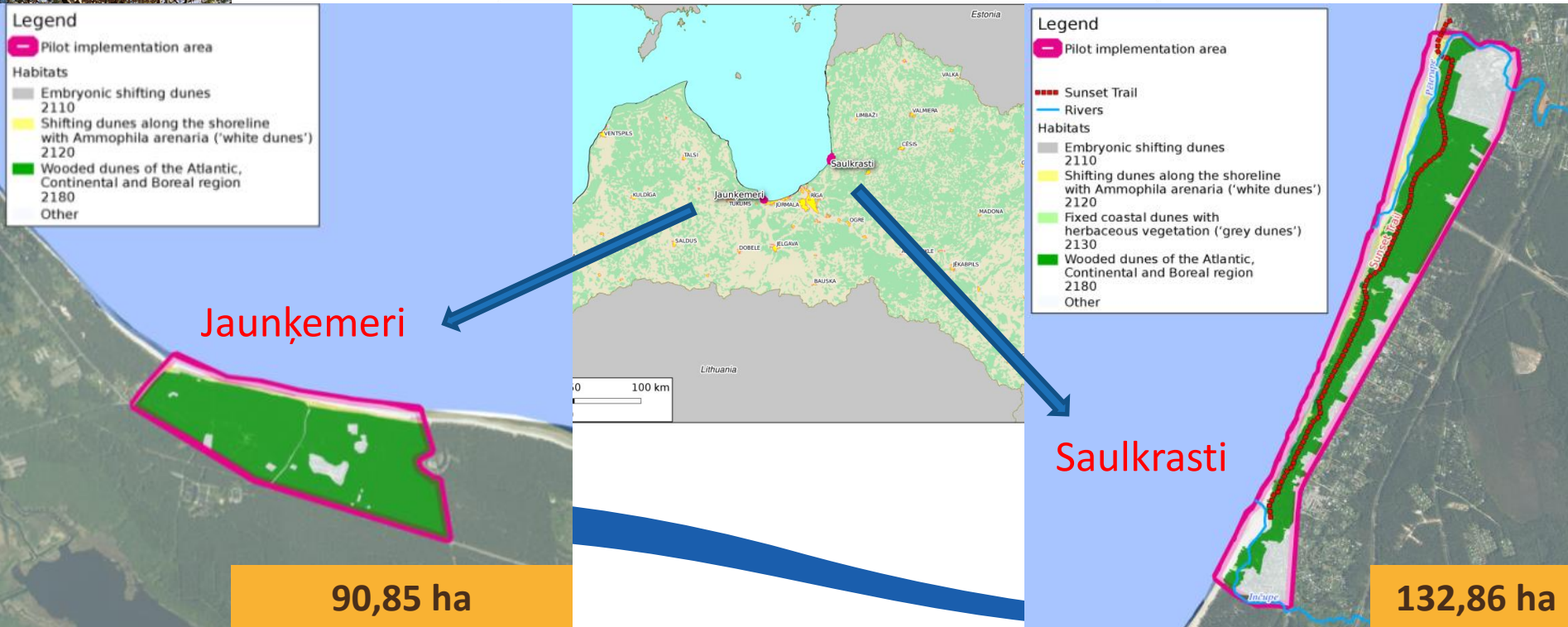
**Course “An Introduction to Ecosystem Service Theory  
and Practices”**

**LUA, Jelgava, 03.11.2016.**





# Project implementation areas





2015-2016

# ES mapping and assessment steps

Development of typology of the ecosystems/land cover classes for the assessment needs

Identification of the coastal ES according to the CICES

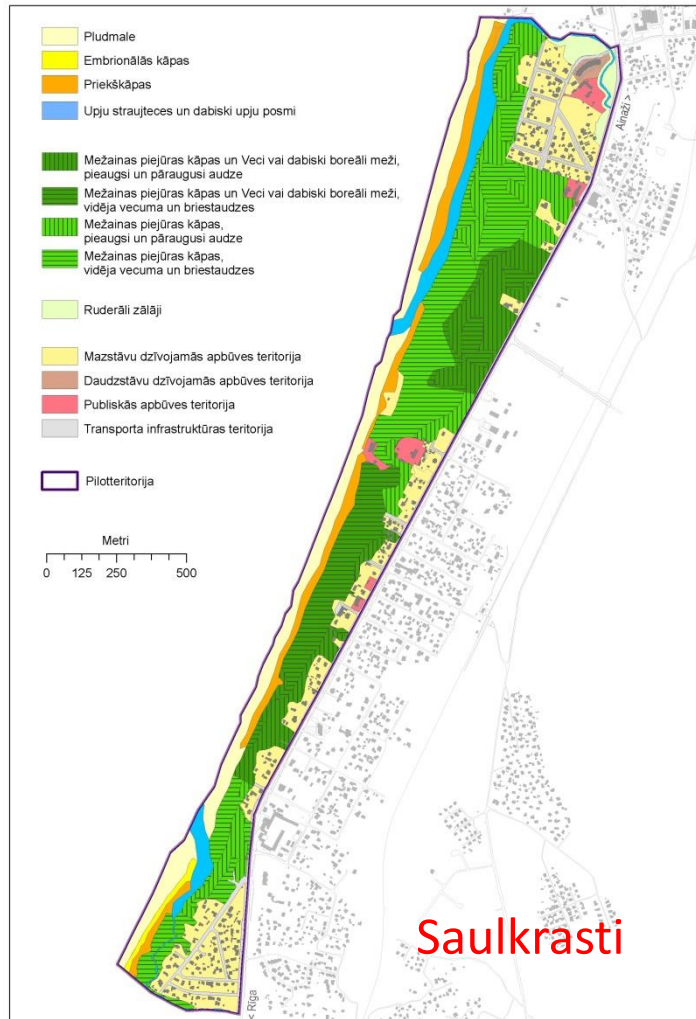
To select robust indicators for mapping and assessment of ES

To develop a scoring system for assessment of ES provisioning by collecting data and information from literature and available data bases on the indicator values

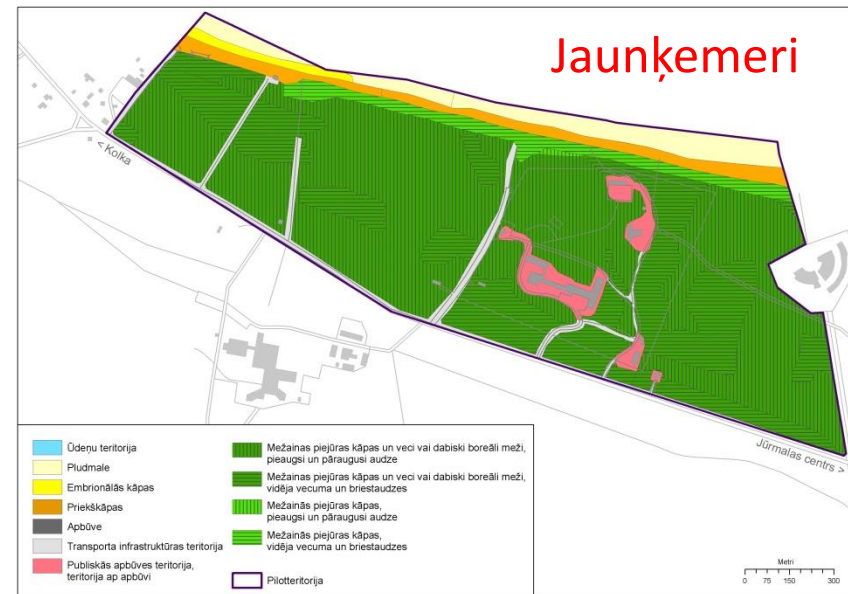
To provide an assessment in a relative scale from 0-5 for each ecosystem/land cover type in the pilot areas







# Basic maps creation





# Ecosystems quality assessment

The national methodology on the species and habitat mapping was used

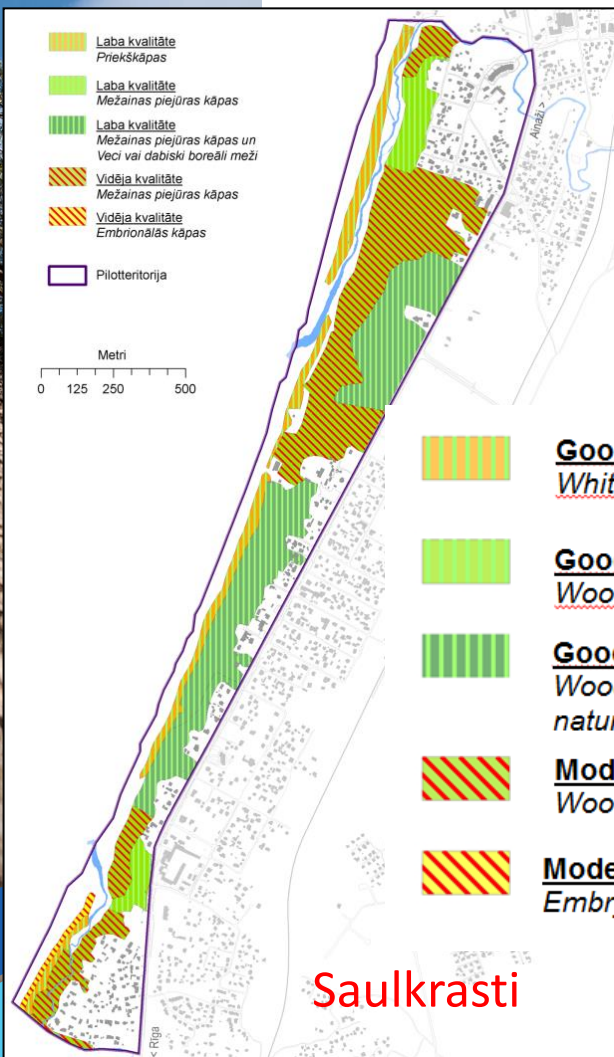
[http://www.daba.gov.lv/public/lat/dati1/vides\\_monitoringa\\_programma/#inventmetodika](http://www.daba.gov.lv/public/lat/dati1/vides_monitoringa_programma/#inventmetodika)



Structure, functions and processes as well as species occurrence in habitats has been assessed



# Ecosystems quality assessment – results (I)



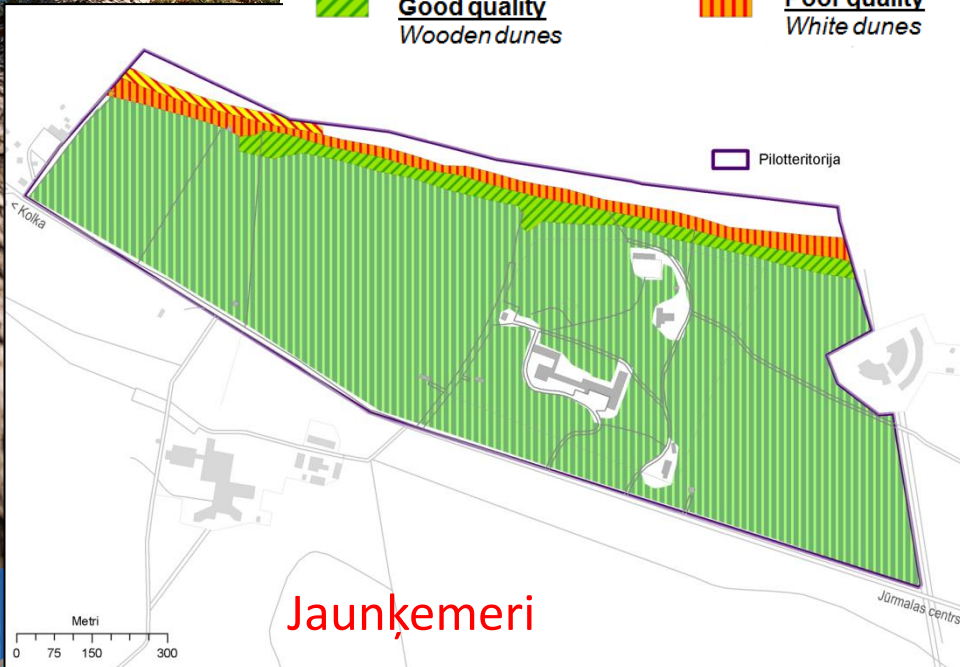
Ecosystem	Subsystem/Habitat type	Area (ha)
Beach	Sandy beach	16.4
Dunes	Embryonic shifting dunes (2110)	0.85
	White dunes (2120)	8.38
Forests	Wooden dunes (2180)	36.24
	Wooden dunes (2180) including natural and pine forests (9010)	24.48
Inland waters	Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation (3260)	7.42
Urban	Buldings, infrastructure, ruderal habitats	39.08





# Ecosystems quality assessment – results (II)

-  **High quality**  
Wooden dunes including natural and pine forests
-  **Moderate quality**  
Embryonic shifting dunes
-  **Good quality**  
Wooden dunes
-  **Poor quality**  
White dunes



Ecosystem	Subsystem/Habitat type	Area (ha)
Beach	Sandy beach	5.55
Dunes	Embryonic shifting dune (2110)	0.82
	White dunes (2120)	3.85
Forests	Wooden dunes (2180)	3.92
	Wooden dunes (2180) including natural and pine forests (9010)	68.92
Urban	Buldings, infrastructure, ruderal habitats	10.54



2015-2016

# ES mapping and assessment steps

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# ES identification

The ecosystem services identification and classification was based on the **Common International Classification of Ecosystem Services (CICES)** and taking into account information about structure of ecosystems and expert knowledge about them.

<http://cices.eu/>



Section	Division	Group	Class
Provisioning	Nutrition	Biomass	Wild plants and their outputs
	Materials	Biomass	Fibres and other materials from plants for direct use or processing
	Energy	Biomass-based energy sources	Plant-based resources
Regulation & Maintenance	Mediation of waste, toxics and other nuisances	Mediation by ecosystems	Sequestration and accumulation by ecosystems
			Mediation of smell/noise/visual impacts
	Mediation of flows	Mass flows	Mass stabilisation and control of erosion rates
		Gaseous / air flows	Storm protection
	Maintenance of physical, chemical, biological conditions	Lifecycle maintenance, habitat and gene pool protection	Pollination and seed dispersal
		Soil formation and composition	Decomposition and fixing processes
		Atmospheric composition and climate regulation	Micro and regional climate regulation
			Global climate regulation by reduction of greenhouse gas concentrations
Cultural	Physical and intellectual interactions with biota, ecosystems, and land-/seascapes [environmental settings]	Physical and experiential interactions	Physical use of land-/seascapes in different environmental settings
		Intellectual and representative interactions	Educational
			Heritage, cultural



2015-2016

# ES mapping and assessment steps

Development of  
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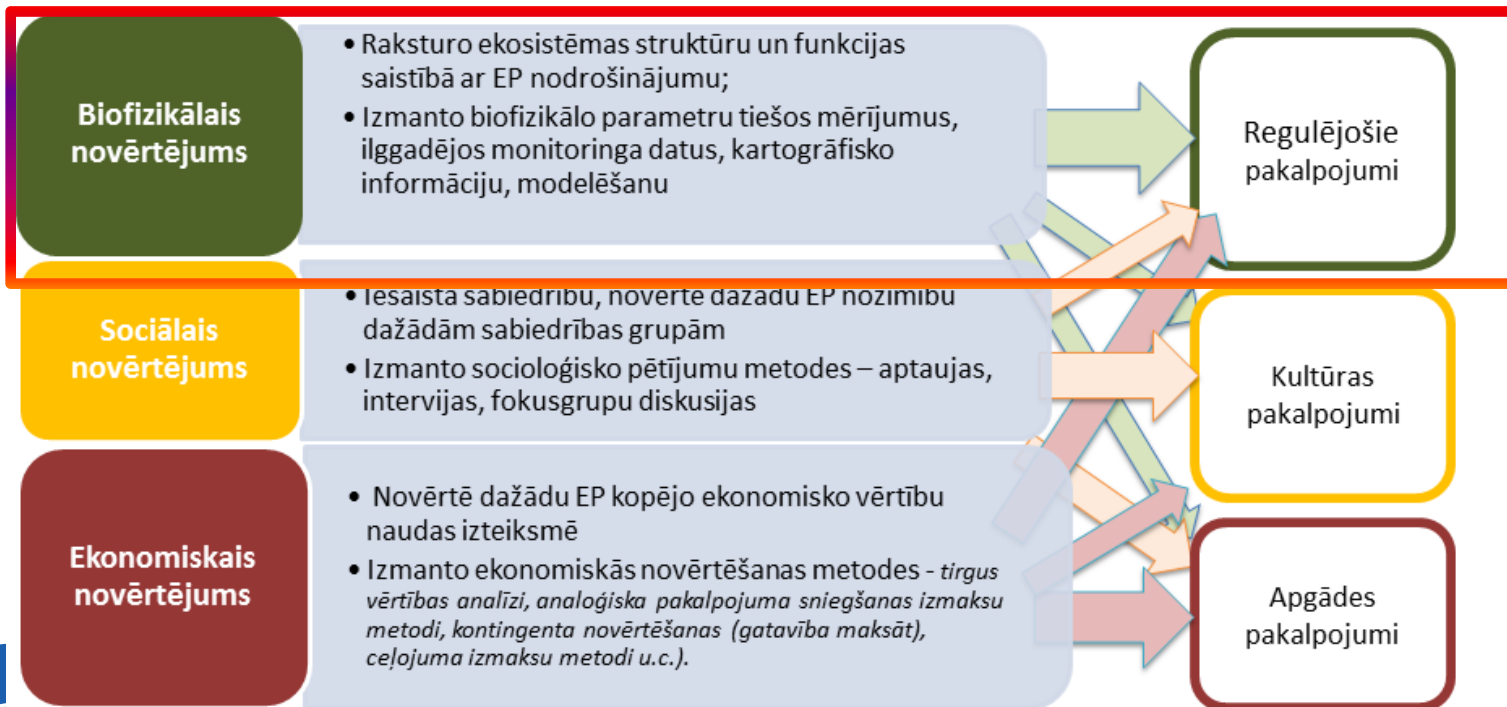
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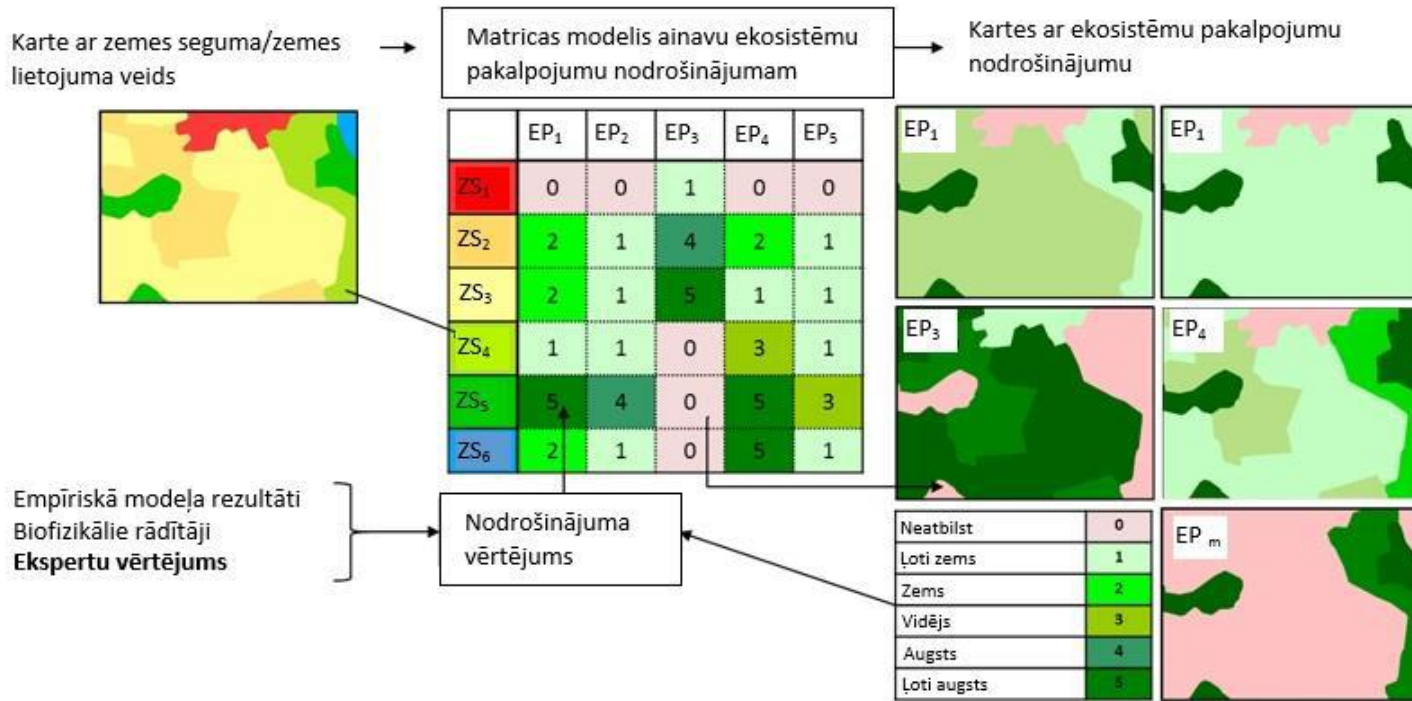
# ES assessment method used



Ecosystem services assessment methods (by A. Ruskule)



# ES assessment method used



Concept of ecosystem services assessment matrix developed by B. Burkhard  
(picture source: Jacobs et al. 2014)



# ES assessment indicators and scoring system

## 5 point scoring system:

- Individual and specific for each indicator
- More than one criteria can be used

Plant-based resources

- Potentially harvestable timber volume for bioenergy

Sequestration and accumulation by ecosystems

- Soil capacity to sequester and accumulate of nutrients

Mediation of smell/noise/visual impacts

- Stand density

Storm protection

- Vegetation type

Physical use of land-/seascapes in different environmental settings

- Leisure (active and passive) potential



Examples of indicators use for some ES assessment





2015-2016

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# ES assessment matrix creation

**Relative 5 point scale:**

**0 – not provided**

**1 – very low value**

**2 – low value**

**3 – moderate value**

**4 – high value**

**5 – very high value**

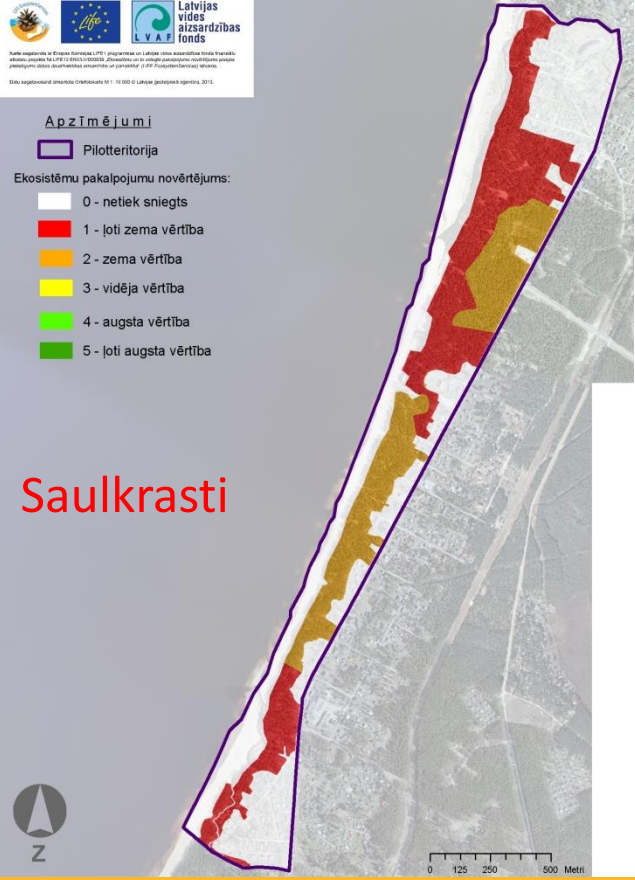


Klase	Indikators	Smiļaina Pludmale	Kāpas		Meži	
			Embriionālās kāpas	Priekškāpas	Mežainās piejūras kāpas	
					vidēja vecuma un briestaudze	pieaugušas un pāraugušas audzes
Savvaļas augi, sēnes, aļģes un to produkti	Meža ogu raža	0	0	0	1	3
Savvaļas zivis (upes)	Nēģu murdu skaits	0	0	0	0	0
Šķiedras un citi materiāli no augiem, aļģēm un dzīvniekiem tiešai izmantošanai vai pārstrādei	Potenciāli iegūstamais koksnes krājas apjoms	0	0	0	1	2
Šķiedras un citi materiāli no augiem, aļģēm un dzīvniekiem tiešai izmantošanai vai pārstrādei	Ārstniecības augi	0	0	0	1	1
Augu valsts izcelsmes resursi	Potenciāli iegūstamā koksnes biomasas enerģētikas vajadzībām	0	0	0	1	1
Piesaites un uzkrāšanas procesi ekosistēmās	Augsnes spēja barības vielu piesaistē un uzkrāšanā	1	1	1	2	2
Piesārņojuma atšķaidīšana saldūdens ekosistēmā	Piesārņojuma atšķaidīšanas spēja upē	0	0	0	0	0
Trokšņu mazināšana	Audzes biežība	0	0	0	4	3
Erozijas kontrole: veģentācijas segums, kas aizsargā sauszemes ekosistēmas	Sanešu apjoms mūsdienu eolās akumulācijas reljefā	0	1	2	0	0
Bufurfunkcija un masu plūsmas vājināšana	Sanešu apjoms	4	0	0	0	0

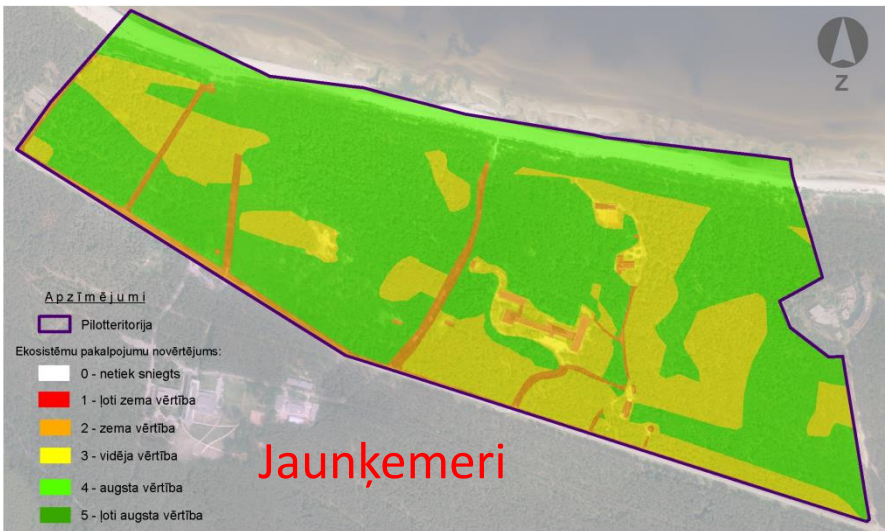


- Apzīmējumi**
- Pilotteritorija
- Ekosistēmu pakalpojumu novērtējums:**
- 0 - netiek sniegts
  - 1 - ļoti zema vērtība
  - 2 - zema vērtība
  - 3 - vidēja vērtība
  - 4 - augsta vērtība
  - 5 - ļoti augsta vērtība

## Saulkrasti



# Generation of ES maps



## Jaunkēmeri

*ES Physical use of land-/seascapes in different environmental settings*

*ES Fibres and other materials from plants for direct use or processing*





Karte sagatavota ar Eiropas Komisijas LIFE programmas un Latvijas vides aizsardzības fonda finansējumu.  
Atbalsta projekts Nr. LIFE13 ENV/LV/000839. Izstrādājis un izpildījis projekta vadītājs, projekta pavadītājs un projekta izpildītājs.  
Projekta izpildītājs: Latvijas vides aizsardzības fonda administrācija, projekta pavadītājs: JSC "Pārvalde" (Pārvalde) un projekta izpildītājs: JSC "Pārvalde" (Pārvalde).

#### Apzīmējumi

Pilotteritorija

EP kategoriju (apgādes, regulējošo un kultūras) vidējo vērtību summa

- 0 - 1.0
- 1.1 - 2.0
- 2.1 - 3.0
- 3.1 - 4.0
- 4.1 - 5.0
- 5.1 - 6.0

Saulkrasti



0 125 250 500 Metri

# Aggregated assessment of ES

$$EP_i = \overline{EP}_A + \overline{EP}_R + \overline{EP}_K$$

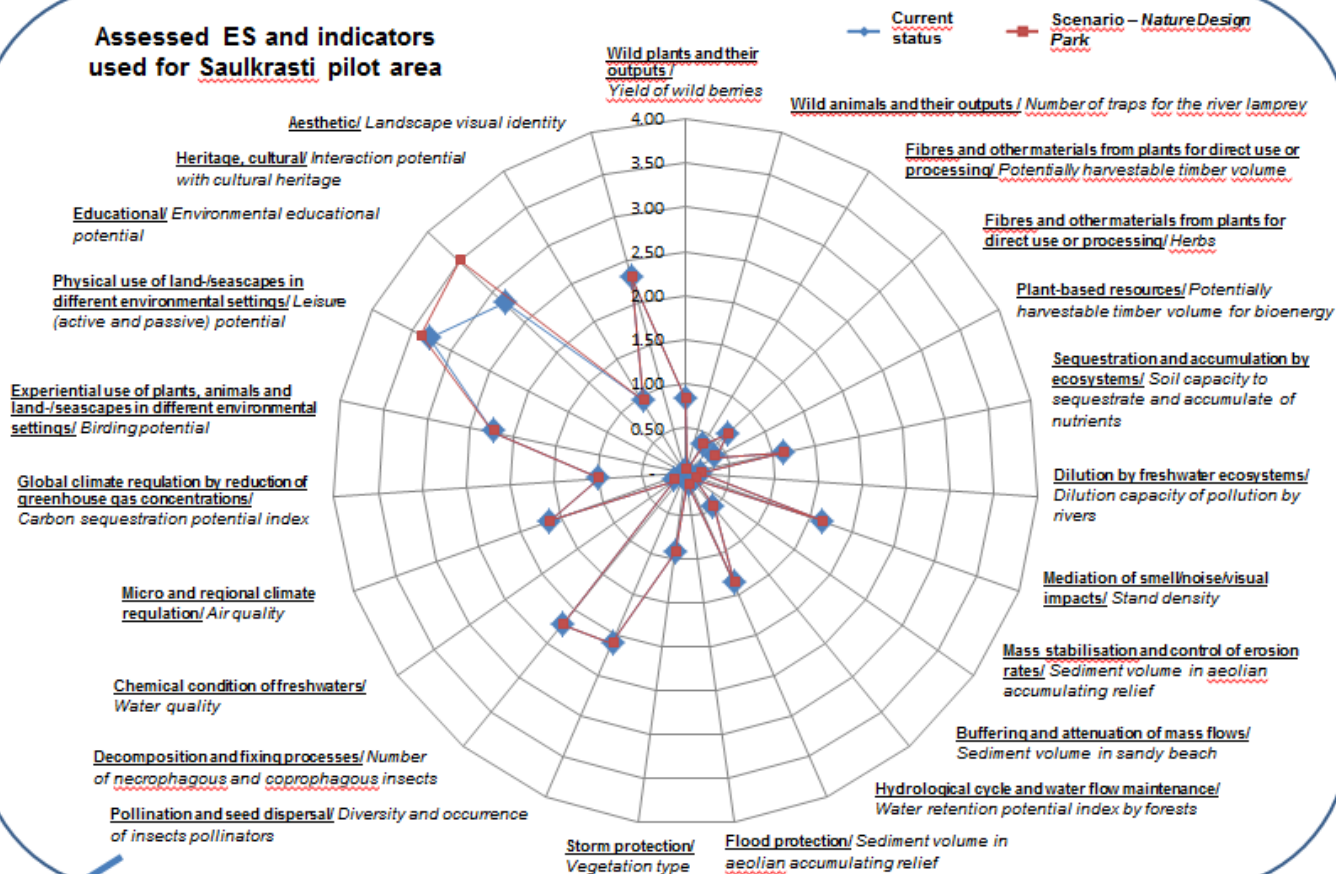
$EP_i$  – total ecosystem service assessment  
 $EP_A$  – average assessment value of provision ecosystem services  
 $EP_R$  – average assessment value of regulating ecosystem services  
 $EP_K$  – average assessment value of cultural ecosystem services.

Forest ecosystem - most valuable in both areas



# Development scenarios assessment

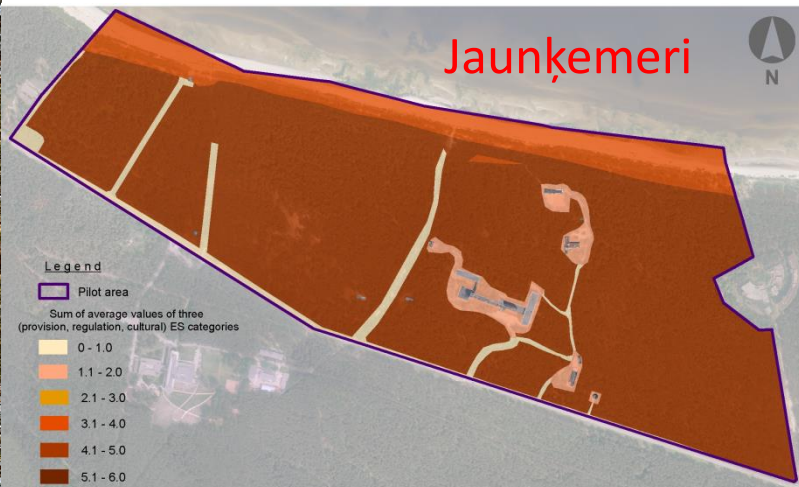
## Assessed ES and indicators used for Saulkrasti pilot area



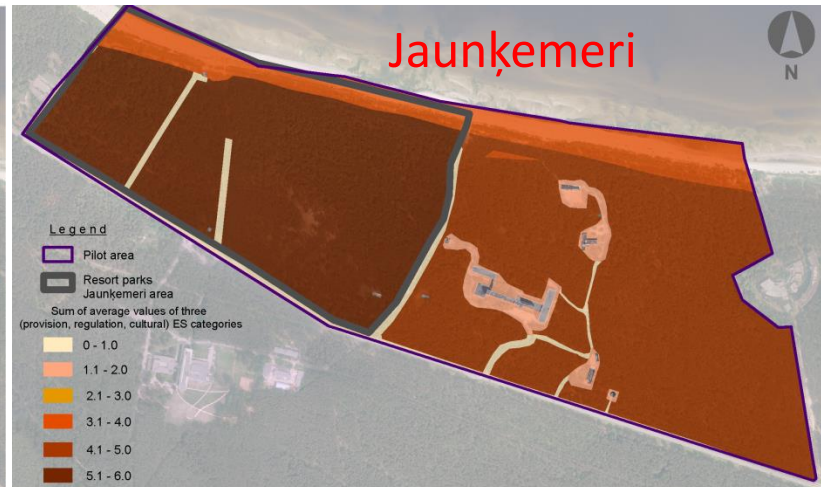




# Development scenarios assessment



Aggregated assessment of current status



Aggregated assessment after scenario implementation





# Thank you!



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