

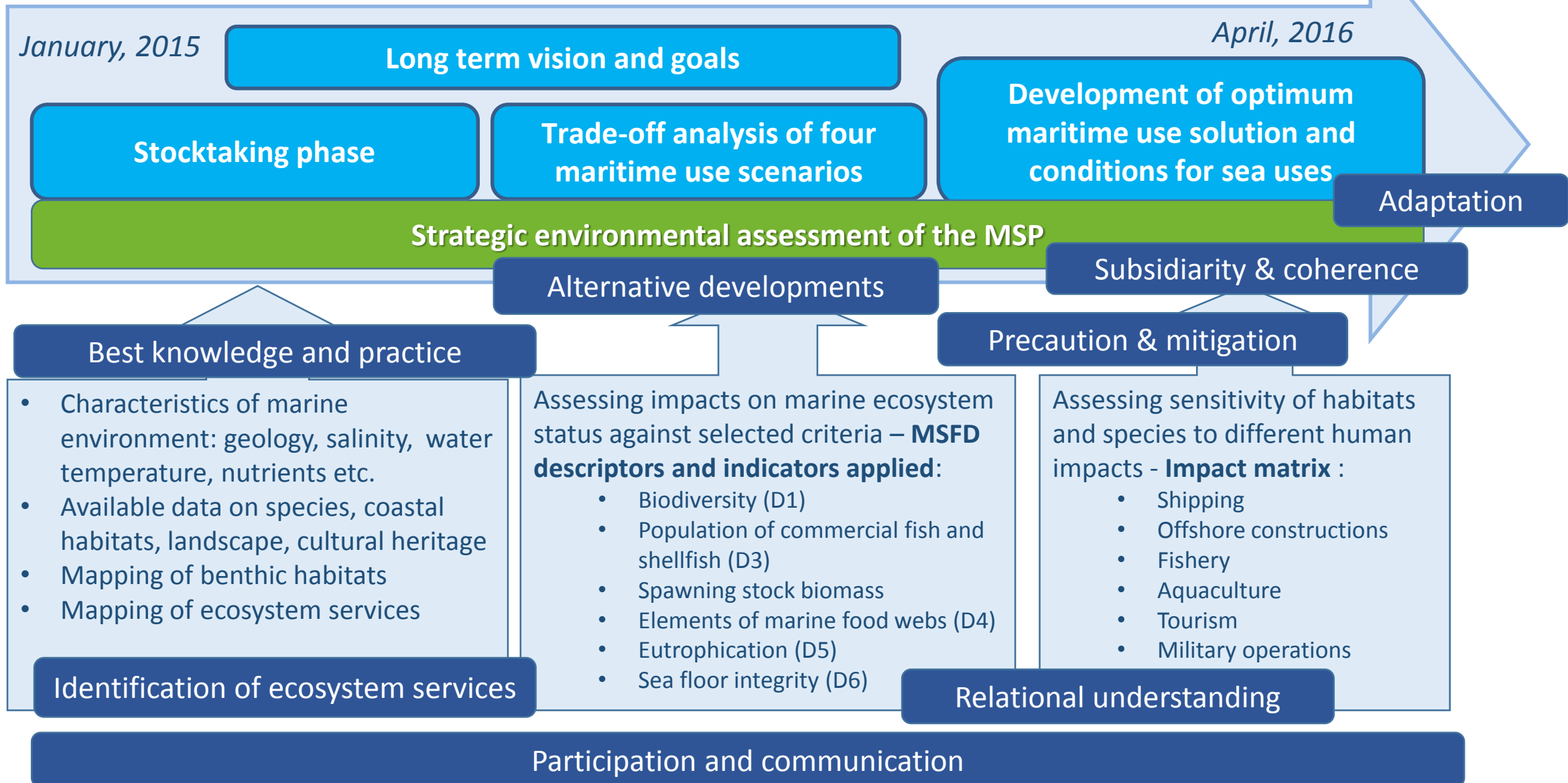


The Ecosystem Approach in Latvian MSP

Anda Ruskule

Senior MSP Practitioner at Baltic Environmental Forum (BEF)

Implementation of the ecosystem approach in Latvian MSP

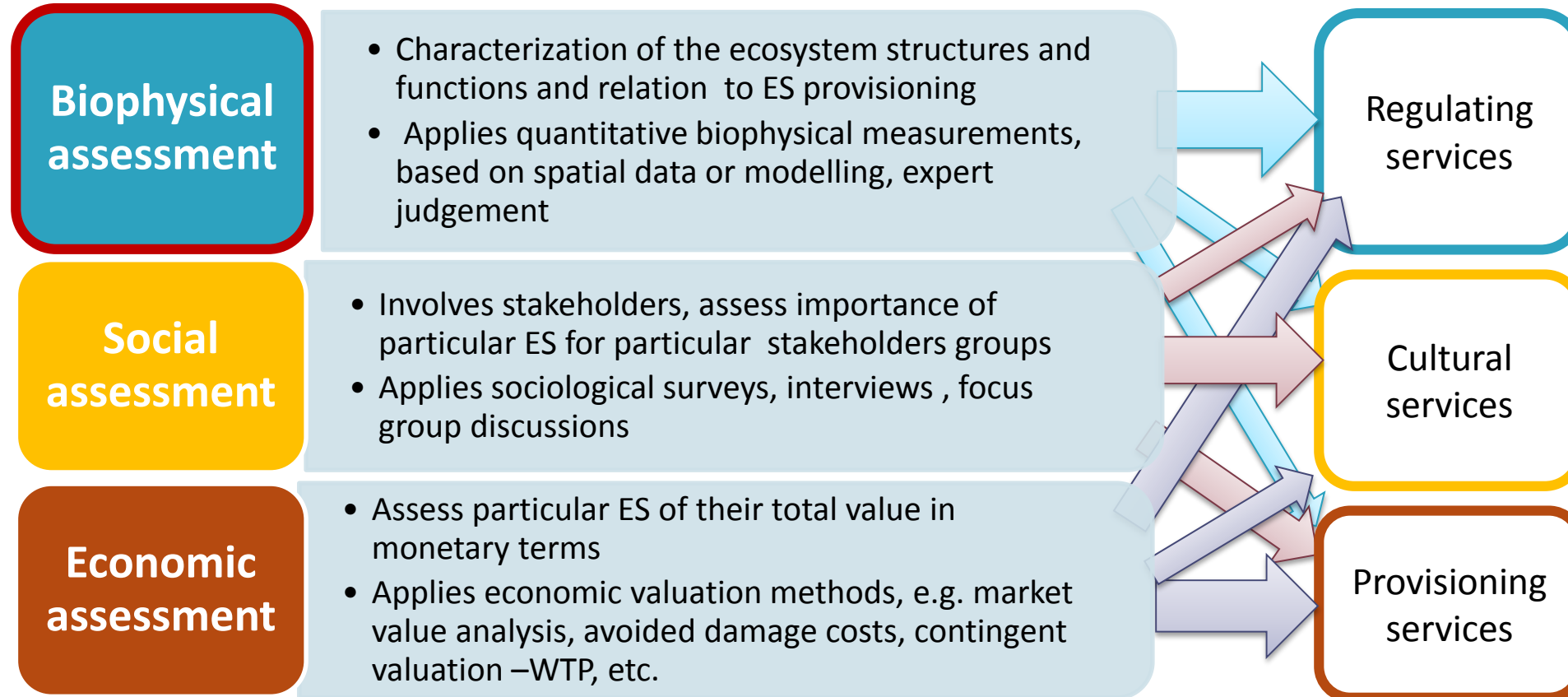


Mapping of marine ecosystem and services

Ecosystem service assessment approaches

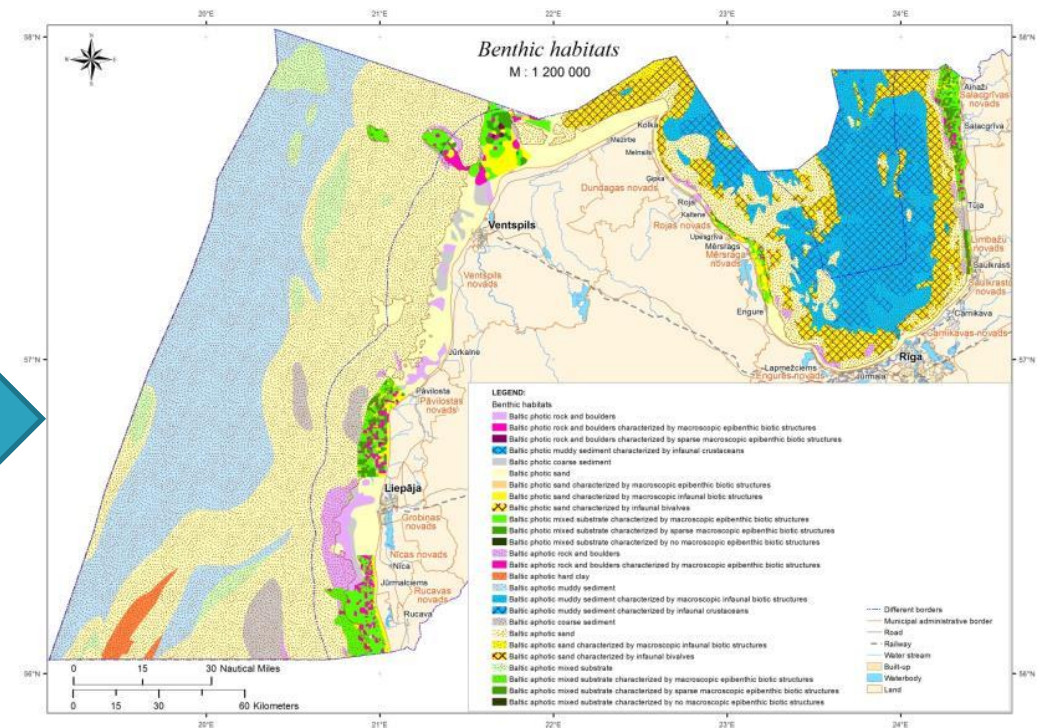
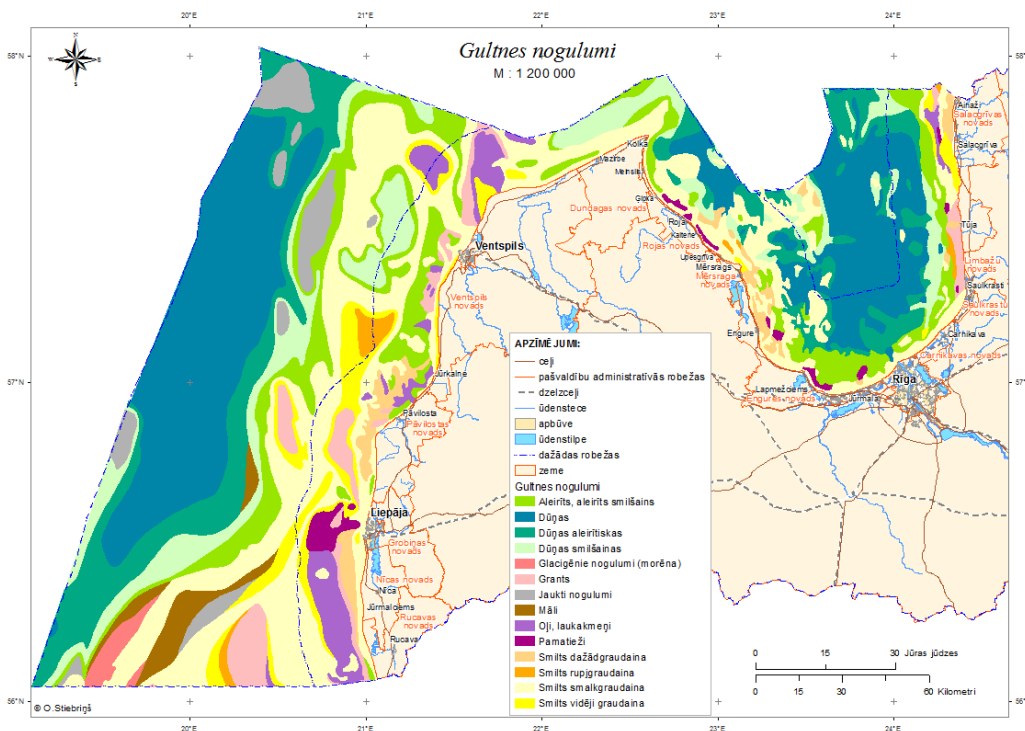


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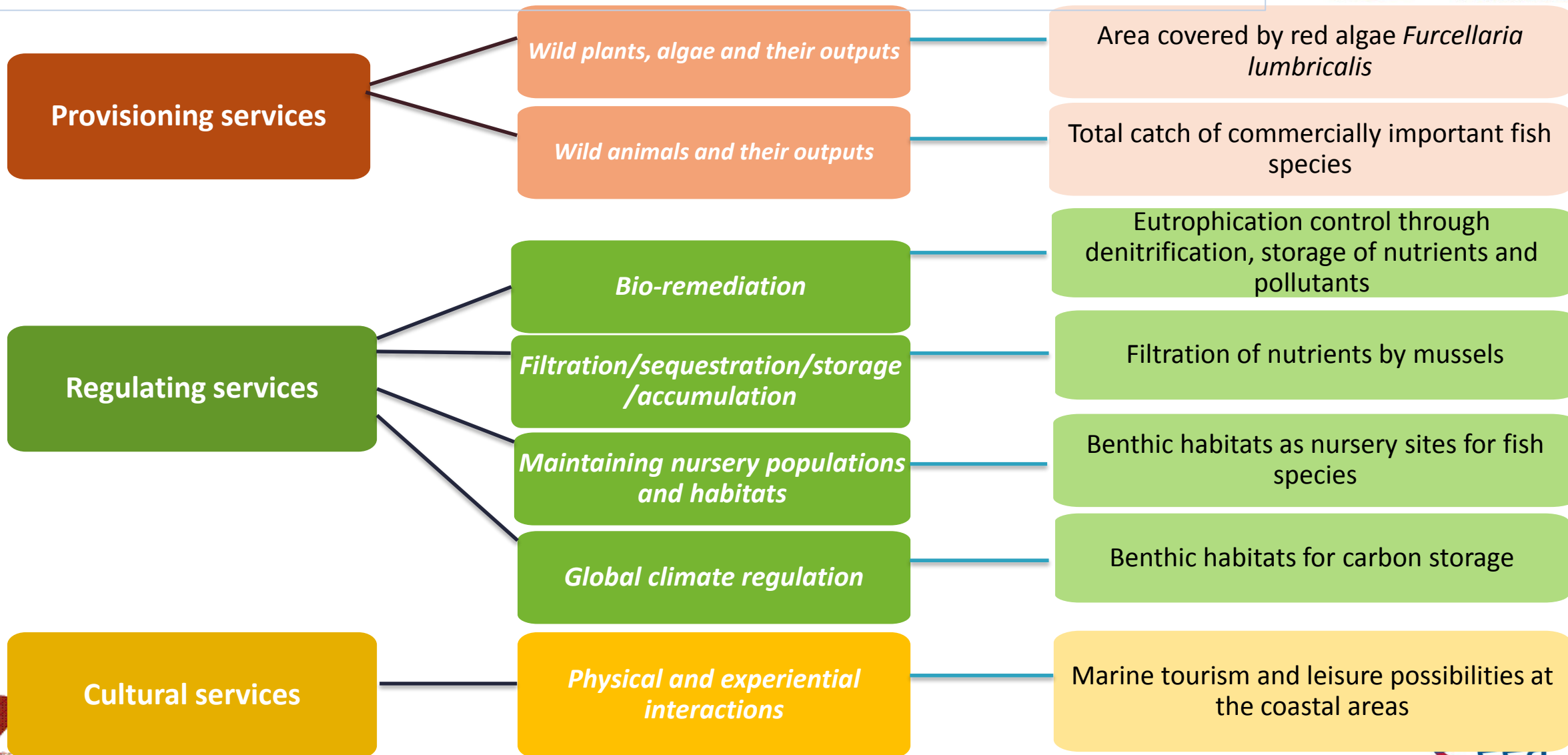


Development benthic habitat map

- ★ **Habitat classification using HELCOM HUB, 2013**, including levels 3 - defined according to substrate; level 4 - community structure; level 5 - typical communities
- ★ Spatial and biophysical data applied:
 - Sea bottom sediment map
 - Secchi depth and bathymetry data
 - Benthic biology data (field observations)



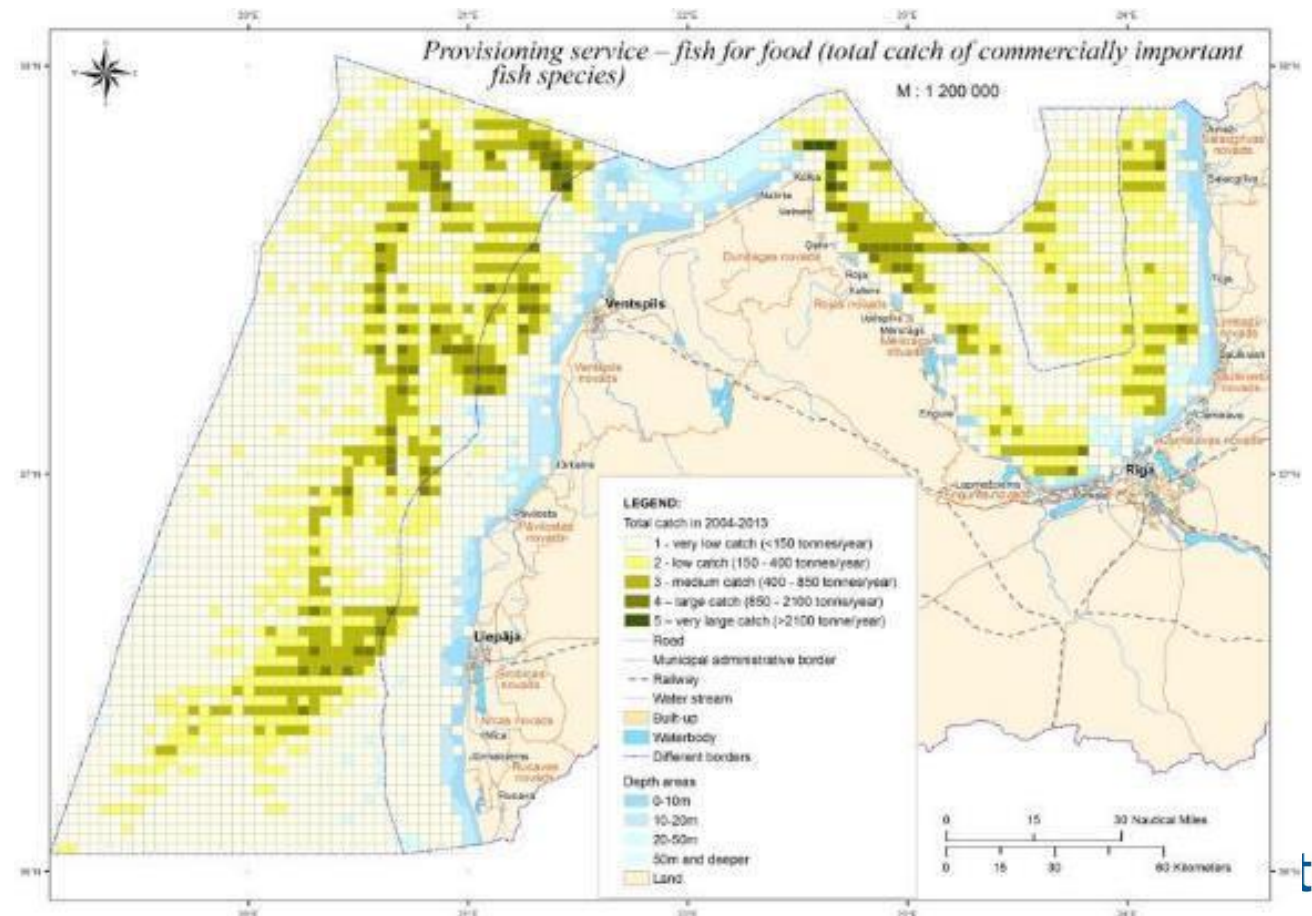
Identification of ecosystem services (CICES v4.3)



Mapping of provisioning services

★ **Wild animals and their outputs - fish for food:** the total catch of commercially important fish species in the open sea within 10 years period

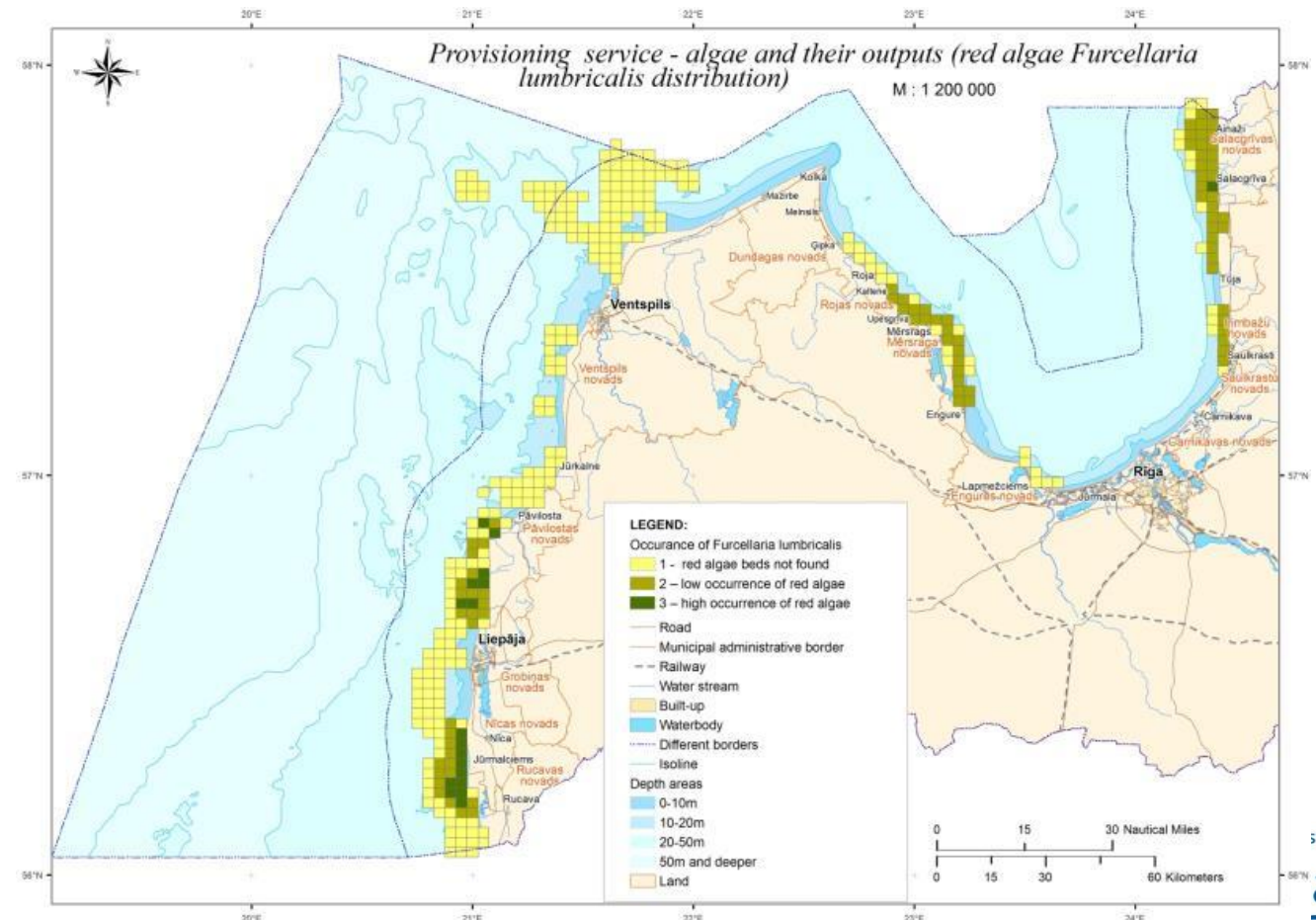
- **mapping based on statistical data** from fishery logbooks
- values presented in scale 1-5



Mapping of provisioning services

★ **Wild plans, algae and their outputs - red algae *Furcellaria lumbricalis* beds,** potentially to be used in food industry, pharmacy, etc.

- **Mapping based on expert knowledge on benthic habitats suitable for growth of red algae + field survey data (coverage of species - % of area unit)**
- values presented in scale 1-3 (1 - habitat suitable for species, but no occurrence detected; 2- low occurrence detected; 3- high occurrence detected)



Mapping of regulating services

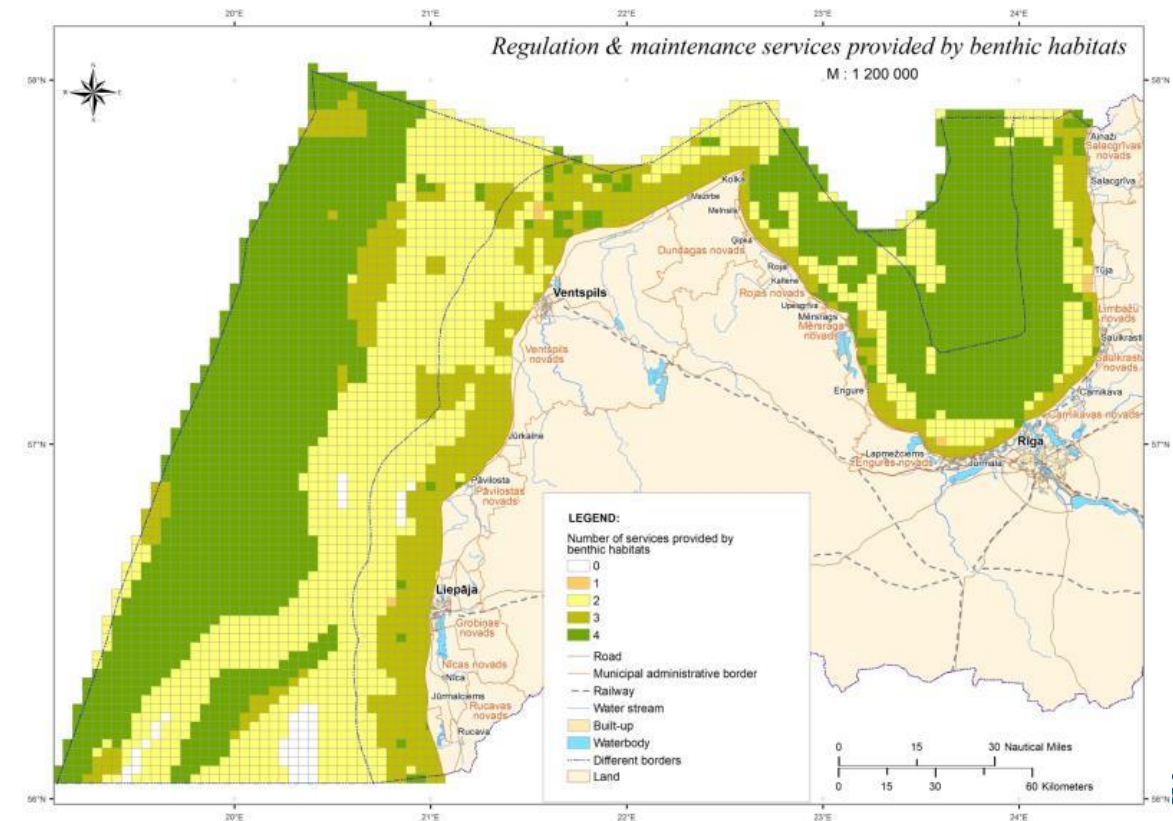
★ 6 regulation and maintenance service maps

- Bio-remediation:
- Filtration of nutrients by animals (mussels)
- Maintaining nursery populations and habitats - nursery sites for fish species
- Global climate regulation - carbon storage

- eutrophication control through denitrification
- eutrophication control through storage of nutrients
- storage of pollutants

Mapped based benthic habitat map - *using the habitats types as proxy for distribution of the ecosystem service:*

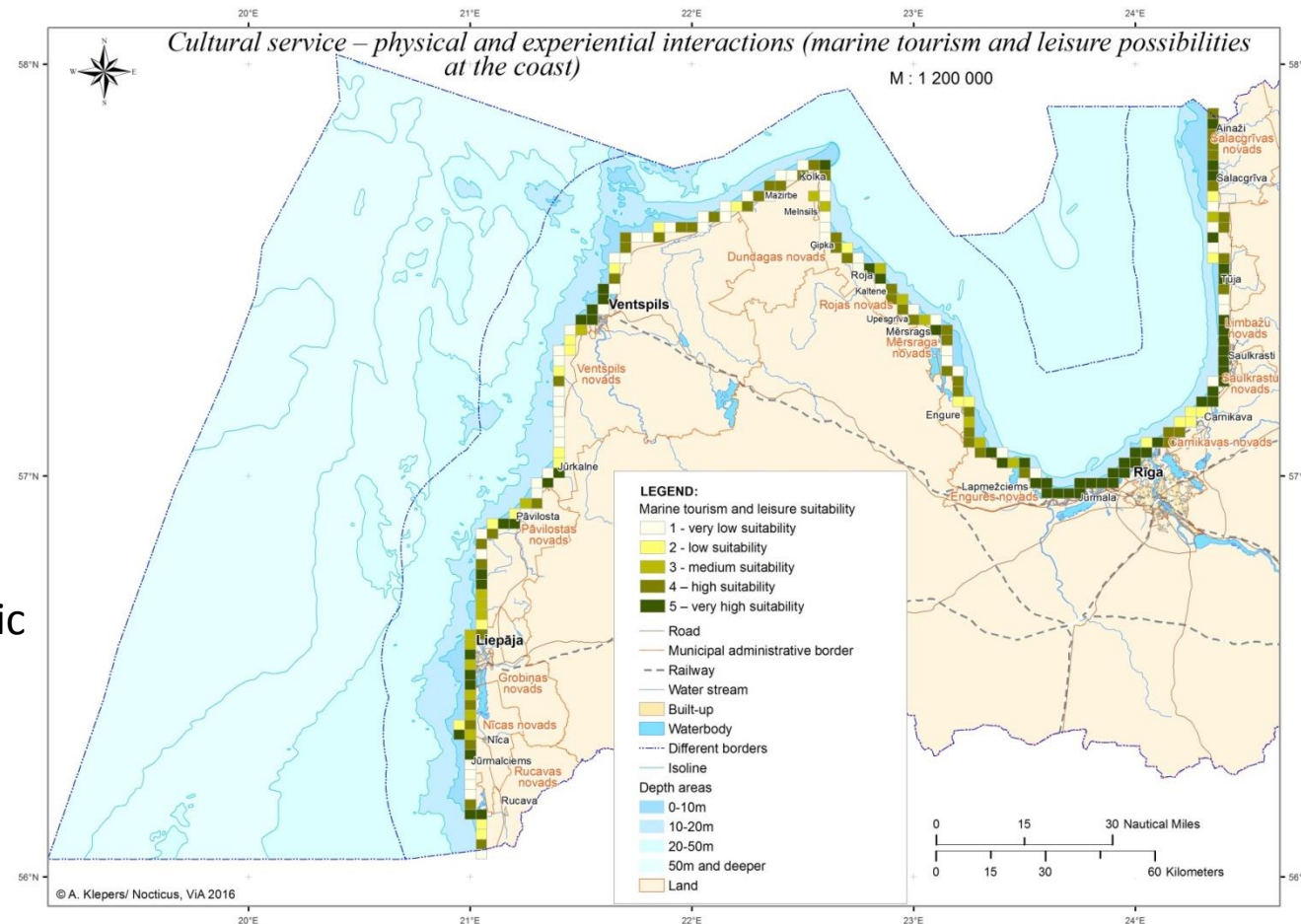
- Potential supply of ES within each habitat type assessed based on expert knowledge
- Binary assessment: does the particular habitat type provide the particular service or not – 0/1
- Summary map: number of ES provides by benthic habitat type/grid cell



Mapping of cultural services

★ *Physical and experiential interactions - Marine tourism and leisure possibilities at the coastal areas*

- **Based on expert knowledge and field observations**
- suitability of each grid for cell marine tourism and leisure activities at the coast assessed based on combination of several criteria:
 - number of visitors (survey data);
 - suitability of the area (or best place) for particular tourism or leisure activity/life style (e.g. angling, bird watching, kiteboard, etc.);
 - accessibility – presence of parking lots and public access roads near the coast
- Assessment results presented in scale 1-5 (from 1- very low suitability to 5 – very high suitability)



Assessing impacts of alternative scenarios and proposed sea use solutions

Two approaches in assessment of ecological impacts

- **Semi-qualitative assessment of impacts against selected criteria and indicators :**
 - Reducing of human pressure and ensuring of GES (**applying MSFD indicators**)
 - Maintenance of biodiversity and ecosystem stability
 - Decrease of GHG emissions
 - Increase of the share of RES
- **Spatial assessment of impacts on:**
 - specific features of marine ecosystem (benthic habitats and species)
 - provision of ecosystem services

Trade-off assessment of scenarios against selected criteria and indicators



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- Reducing of human pressure and ensuring of GES
- Maintenance of biodiversity and ecosystem stability
- Decrease of GHG emissions
- Increase of the share of RES



	A	B	C	D
Economic impact	1,2	1,0	0,8	1,0
Social impact	0,8	1,5	0,3	0,8
Impact on environment and climate change	-0,5	-0,8	0,8	0,5
Transboundary impact	0,6	-0,2	1,0	1,0
Average value	0,5	0,4	0,7	0,8

- 2 Significant negative impact
- 1 Slightly negative impact
- 0 No impact
- 1 Slightly positive impact
- 2 Significant positive impact

Applied MSFD descriptors and indicators in assessing scenarios and proposed sea use solutions

Descriptors	Indicators	Expected impact of proposed sea use solutions
Biodiversity (D1)	<i>Share of marine protected areas from all marine waters (%)</i>	☺ Expected increase
	<i>Conservation status of protected habitat types</i>	☺ Change of the status from “bad” to “good”
	Benthic Quality Index BQI	☺ Potential reduction of nutrient loads by introducing algae and mussels aquaculture
Population of commercial fish and shellfish (D3)	Spawning stock biomass	Nutria impact
Elements of marine food webs (D4)	Zooplankton mean size vs. total stock	☺ Potential reduction of nutrient loads by introducing algae and mussels aquaculture
Eutrophication (D5)	Nutrient (N, P) loads in surface waters from point sources	☺ Potential reduction of nutrient loads by introducing algae and mussels aquaculture
	Summer chlorophyll a concentration	
	Depth distribution of <i>Fucus vesiculosus</i> and <i>Furcellaria lumbricalis</i>	
Sea floor integrity (D6)	Population structure of <i>Macoma balthica</i>	☹ Possible negative impact dues to continuation of demersal trawling

Sea use impact matrix applied for spatial assessment of impacts



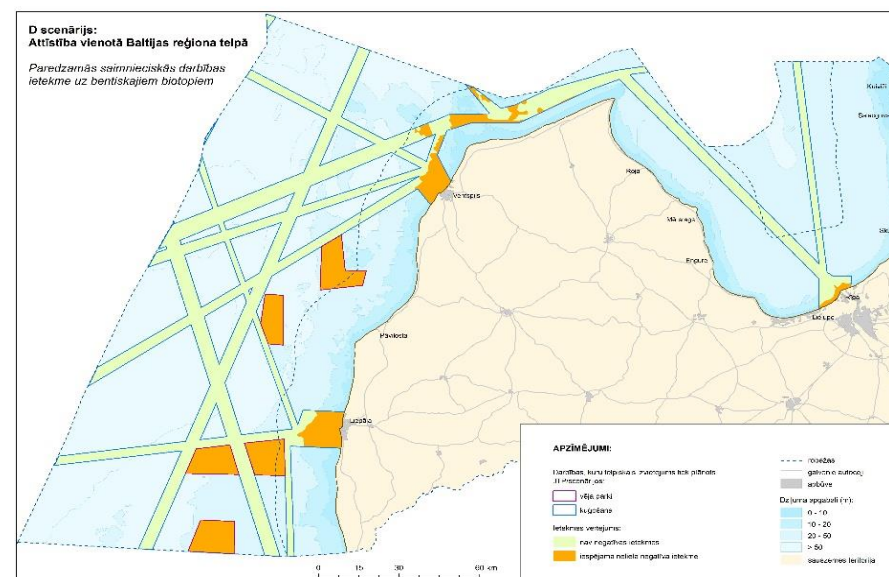
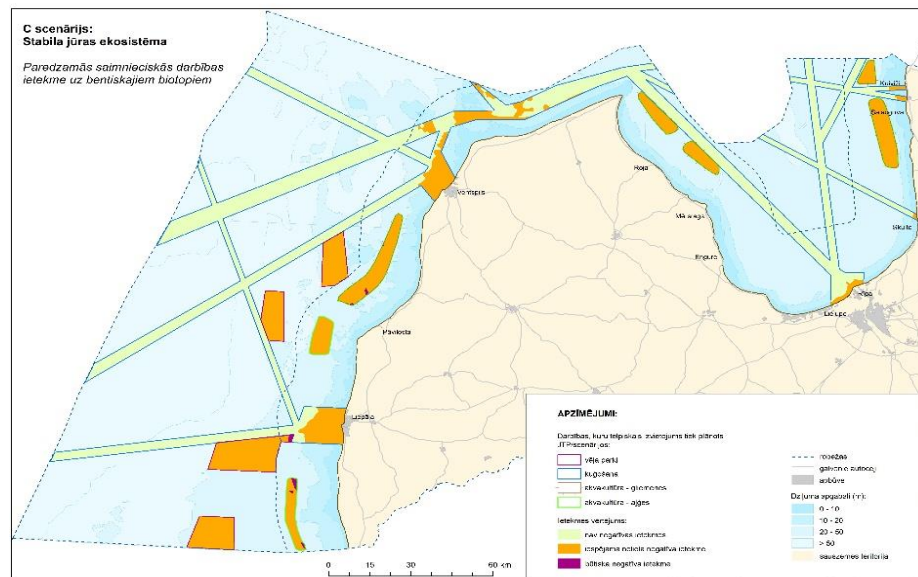
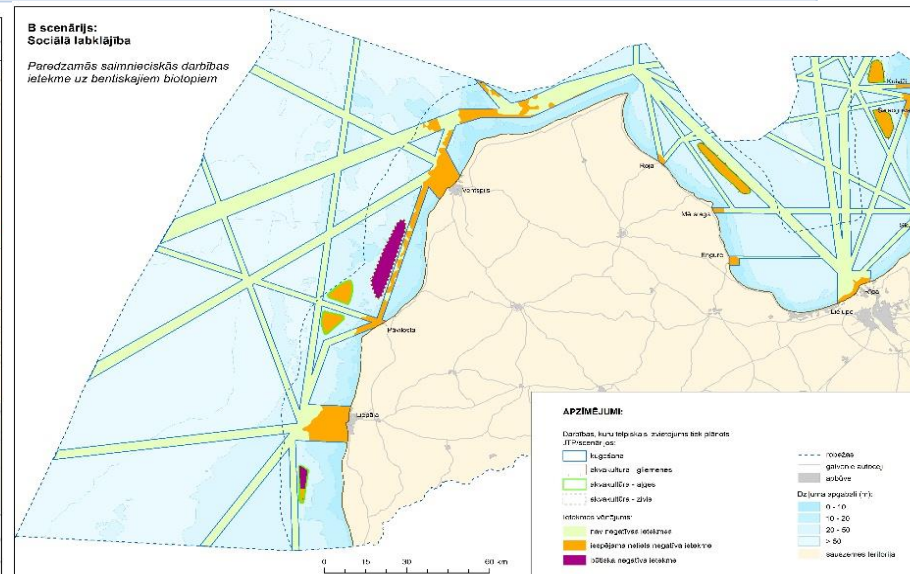
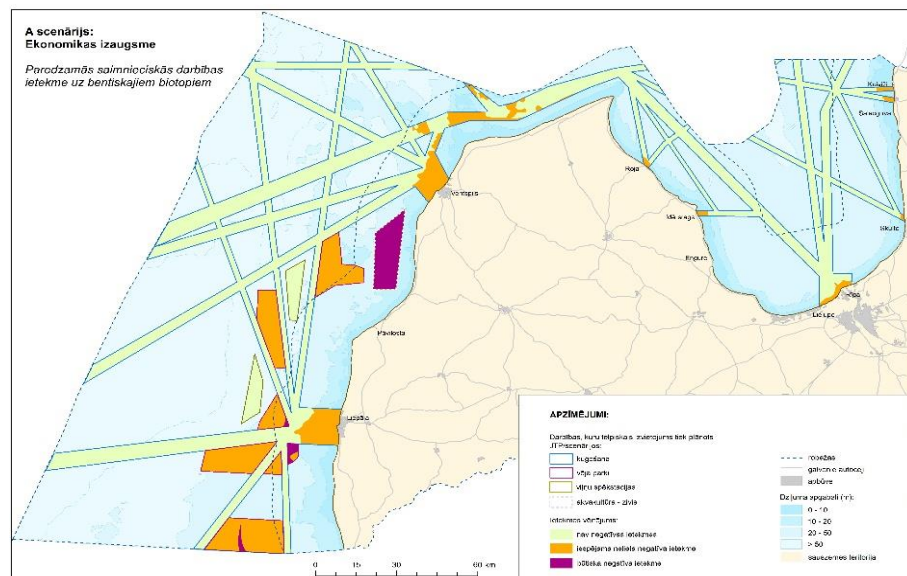
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Sea uses that are planned by MSP

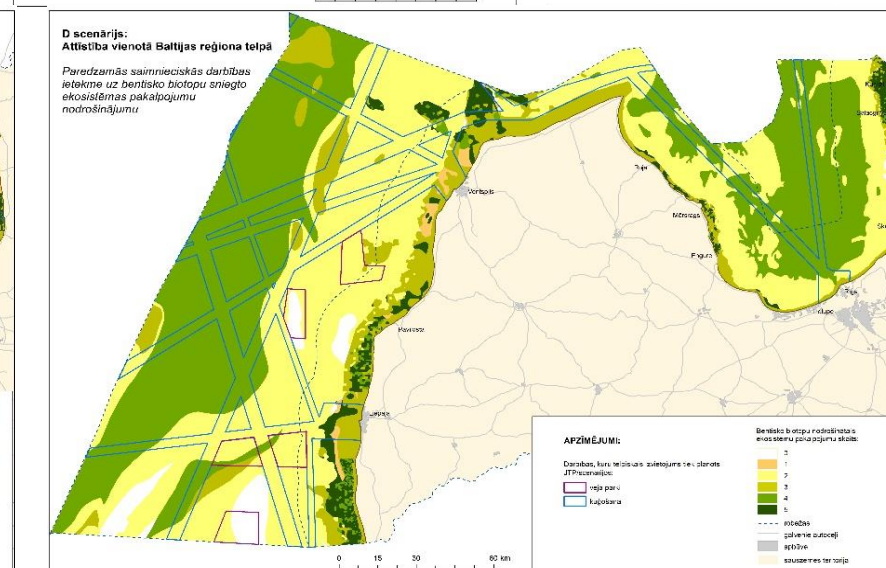
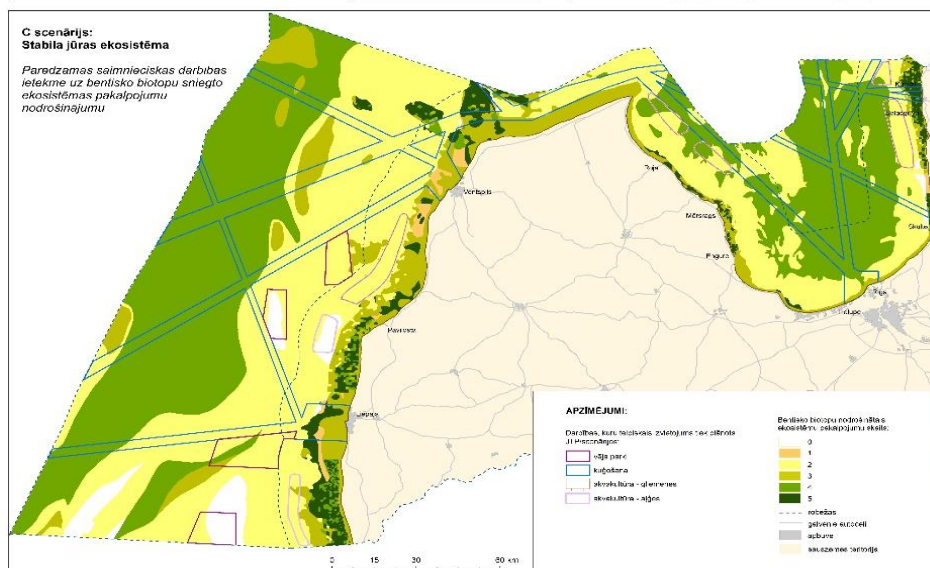
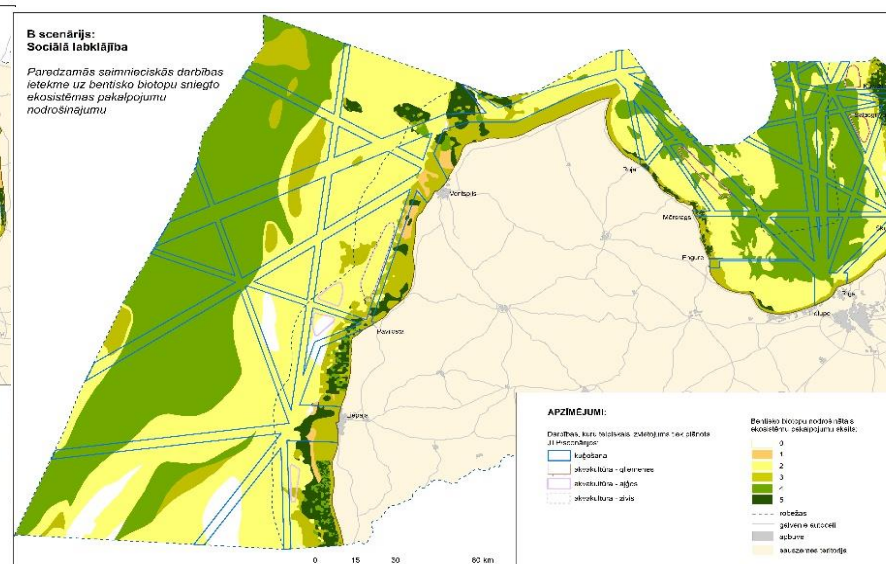
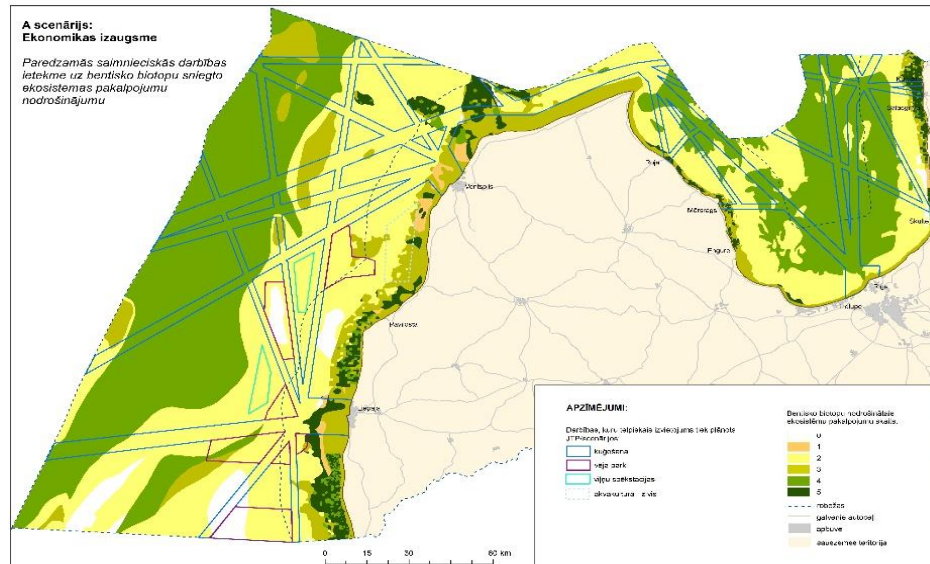
Benthic habitats

	Shipping	Encourage areas	Dredging	Dumping sites	Off-shore wind energy	Wave energy	Cables	Oil extraction	Aquaculture -fish	Aquaculture - algae	Aquaculture - mussels	Bathing sites	Kite-board	Angling	Diving	Motorboats	Coastal fishery	Open sea fishery with pelagic trawl	Open sea fishery with benthic trawl	Open sea fishery with passive gears	Military training areas	Coastline protection- beach nourishment
AA.A: Baltijas jūras fotiskās zonas klintājs un laukakmeņi	1	1	1	2	2	1	1	1	2	2	1	0	0	0	1	1	1	2	2	2	1	2
AA.A1: Baltijas jūras fotiskās zonas klintājs un laukakmeņi ar makroskopisko epibentosu	1	1	1	2	2	1	1	1	2	2	1	0	0	0	1	1	1	2	2	2	1	2
AA.A2: Baltijas jūras fotiskās zonas klintājs un laukakmeņi ar retu makroskopisko epibentosu	1	1	1	2	2	1	1	1	2	2	1	0	0	0	1	1	1	2	2	2	1	2
AA.H3N: Baltijas jūras fotiskās zonas dūņu nogulumi ar vēžveidīgo infaunu	1	1	1	1	1	0	1	1	2	2	1	0	0	0	0	1	1	1	2	1	1	1
AA.I: Baltijas jūras fotiskās zonas rupjgraudainie nogulumi	1	1	1	1	1	0	1	1	2	2	1	0	0	0	0	1	1	1	2	1	1	1
AA.J: Baltijas jūras fotiskās zonas smiltis	1	1	1	1	1	0	1	1	2	2	1	0	0	0	0	1	1	1	2	1	1	1
AA.J1: Baltijas jūras fotiskās zonas smiltis ar makroskopisko epibentosu	1	1	1	2	1	0	1	1	2	2	1	0	0	0	1	1	1	1	2	1	1	1
AA.J3: Baltijas jūras fotiskās zonas smiltis ar makroskopisko infaunu	1	1	1	1	1	0	1	1	2	2	1	0	0	0	0	1	1	1	2	1	1	1
AA.J3L: Baltijas jūras fotiskās zonas smiltis ar gliemeņu infaunu	1	1	1	1	1	0	1	1	2	2	1	0	0	0	0	1	1	1	2	1	1	1
AA.M1: Baltijas jūras fotiskās zonas jaukts substrāts ar makroskopisko epibentosu	1	1	1	2	2	1	1	1	2	2	1	0	0	0	1	1	1	2	2	2	1	2
AA.M2: Baltijas jūras fotiskās zonas jaukts substrāts ar retu makroskopisko epibentosu	1	1	1	2	2	1	1	1	2	2	1	0	0	0	1	1	1	2	2	2	1	2
AA.M4: Baltijas jūras fotiskās zonas jaukts substrāts bez makrobentosa	1	1	1	1	2	1	1	1	2	2	1	0	0	0	0	1	1	2	2	2	1	2
AB.A: Baltijas jūras afotiskās zonas klintājs un laukakmeņi	0	1	1	2	2	1	1	1	2	2	1	0	0	0	1	0	0	2	2	2	1	2
AB.A1: Baltijas jūras afotiskās zonas klintājs un laukakmeņi ar makroskopisko epibentosu	0	1	1	2	2	1	1	1	2	2	1	0	0	0	1	0	0	2	2	2	1	2
AB.B: Baltijas jūras afotiskās zonas morēna	0	1	1	1	2	1	1	1	2	2	1	0	0	0	0	0	0	2	2	2	1	2
AB.H: Baltijas jūras afotiskās zonas dūņu nogulumi	0	0	1	1	1	0	1	1	2	2	1	0	0	0	0	0	0	1	2	1	1	1
AB.H3: Baltijas jūras afotiskās zonas dūņu nogulumi ar makroskopisko infaunu	0	0	1	1	1	0	1	1	2	2	1	0	0	0	0	0	0	1	2	1	1	1
AB.H3N: Baltijas jūras afotiskās zonas dūņu nogulumi ar vēžveidīgo infaunu	0	0	1	1	1	0	1	1	2	2	1	0	0	0	0	0	0	1	2	1	1	1
AB.I: Baltijas jūras afotiskās zonas rupjgraudainie nogulumi	0	0	1	1	1	0	1	1	2	2	1	0	0	0	0	0	0	1	2	1	1	1
AB.J: Baltijas jūras afotiskās zonas smiltis	0	0	1	1	1	0	1	1	2	2	1	0	0	0	0	0	0	1	2	1	1	1
AB.J3: Baltijas jūras afotiskās zonas smiltis ar makroskopisko infaunu	0	0	1	1	1	0	1	1	2	2	1	0	0	0	0	0	0	1	2	1	1	1
AB.J3L: Baltijas jūras afotiskās zonas smiltis ar gliemeņu infaunu	0	0	1	1	1	0	1	1	2	2	1	0	0	0	0	0	0	1	2	1	1	1
AB.M: Baltijas jūras afotiskās zonas jaukts substrāts	0	0	1	2	1	0	1	1	2	2	1	0	0	0	0	0	0	1	2	1	1	1
AB.M1: Baltijas jūras afotiskās zonas jaukts substrāts ar makroskopisko epibentosu	0	0	1	2	1	0	1	1	2	2	1	0	0	0	1	0	0	1	2	1	1	1
AB.M2: Baltijas jūras afotiskās zonas jaukts substrāts ar retu makroskopisko epibentosu	0	0	1	2	1	0	1	1	2	2	1	0	0	0	1	0	0	1	2	1	1	1
AB.M4: Baltijas jūras afotiskās zonas jaukts substrāts bez makrobentosa	0	0	1	2	1	0	1	1	2	2	1	0	0	0	0	0	0	1	2	1	1	1

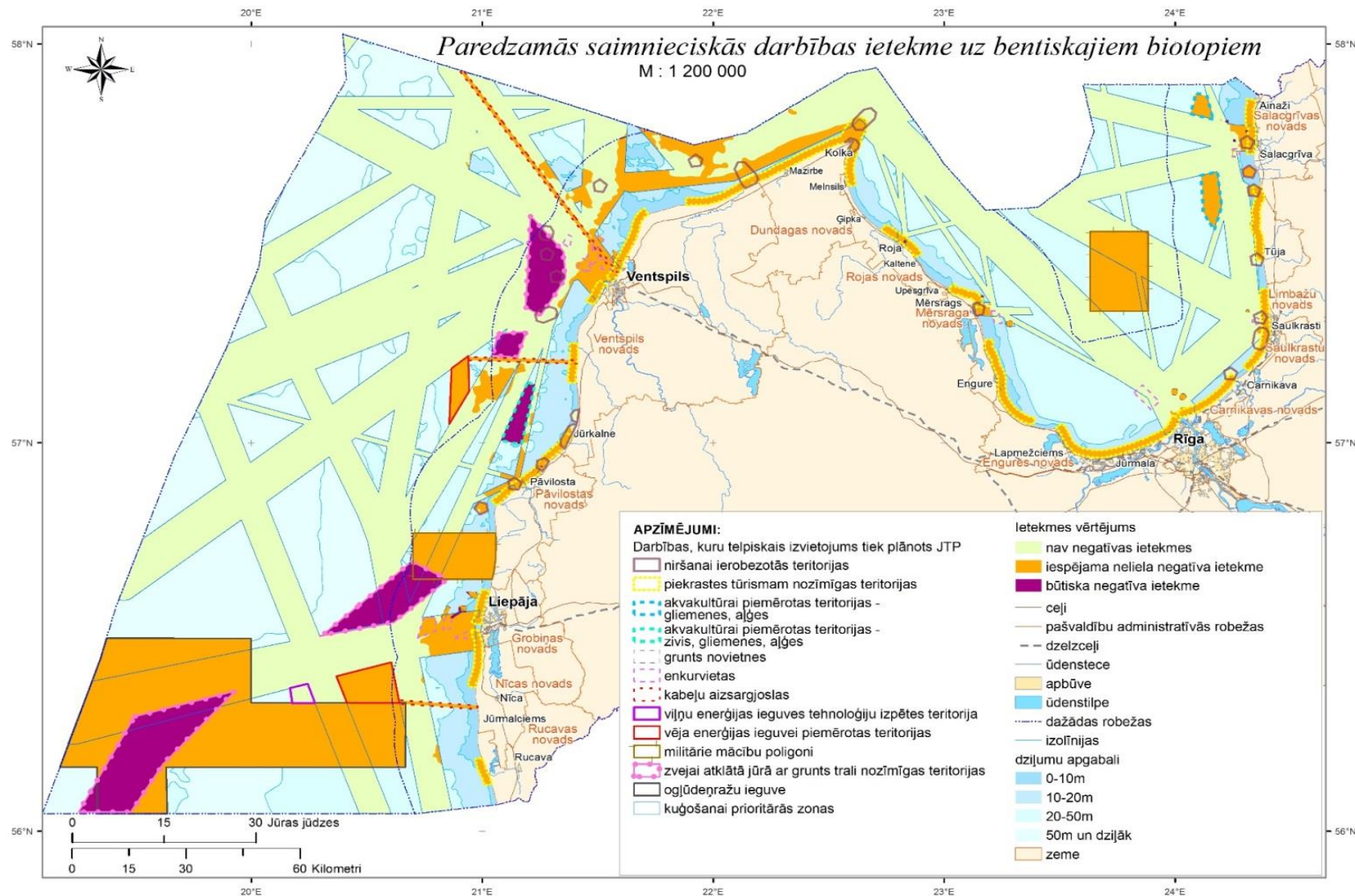
Impacts of scenarios to benthic communities



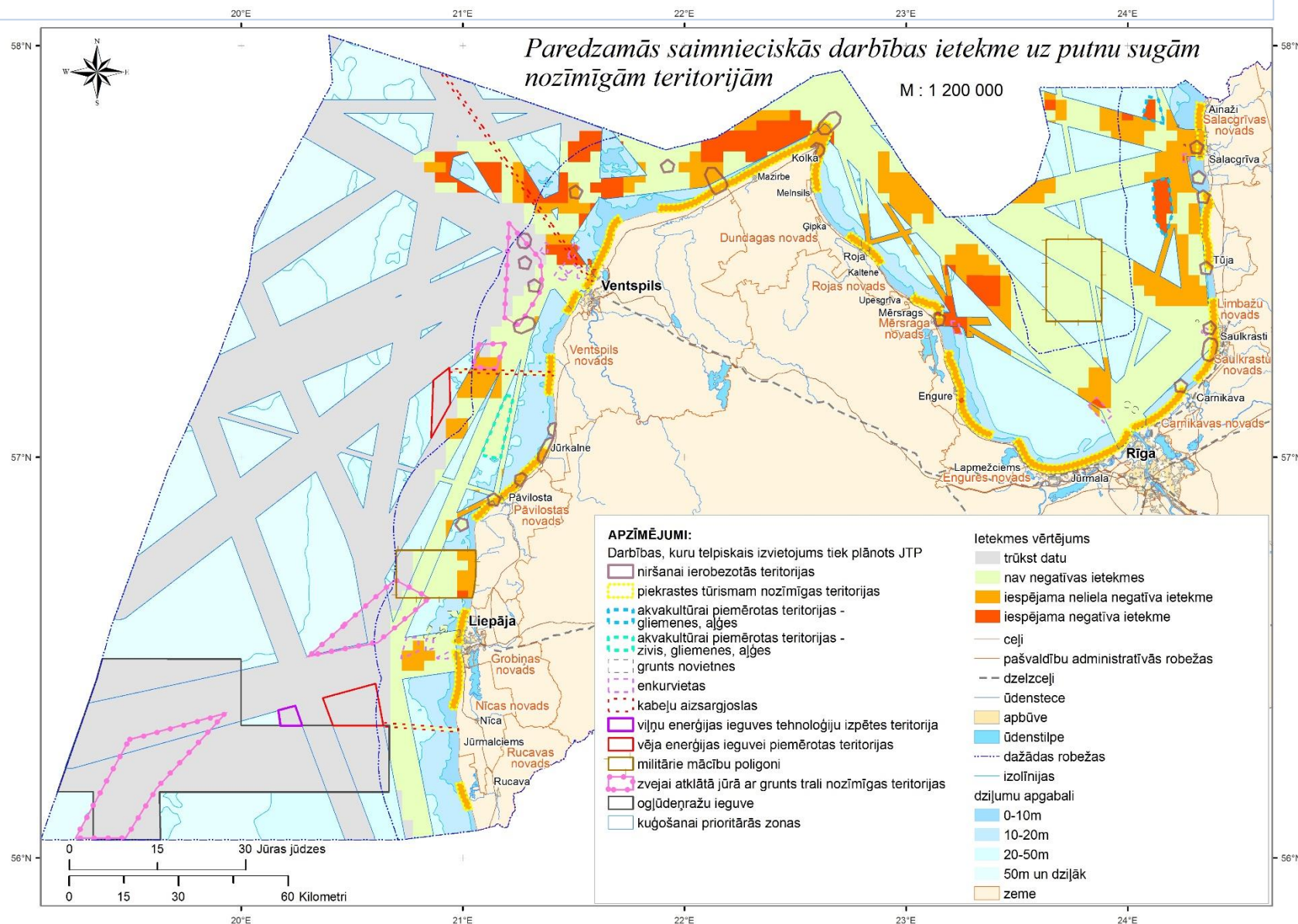
Impacts to ecosystem services provided by benthic habitats



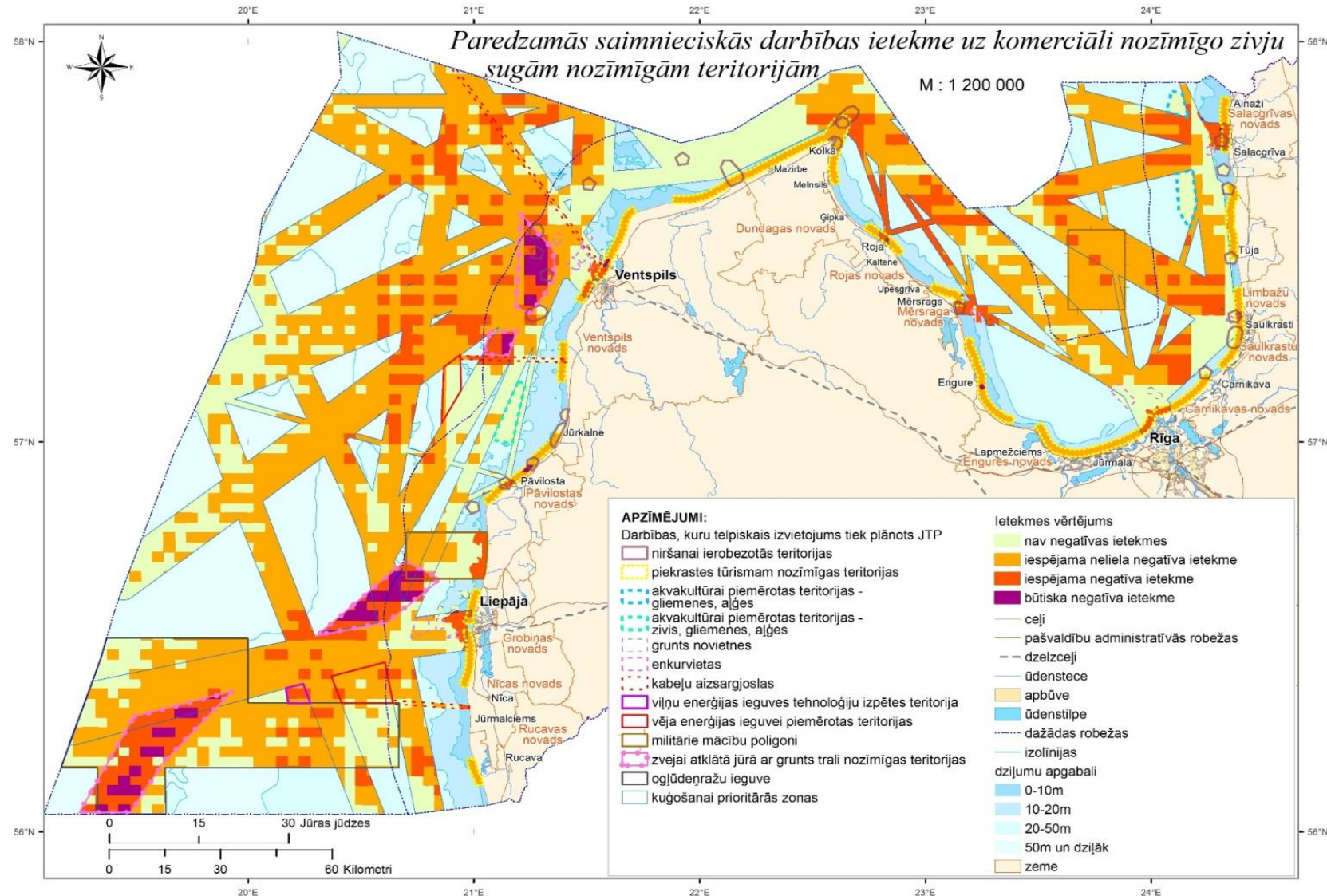
Impacts of proposed sea use solution to benthic habitats



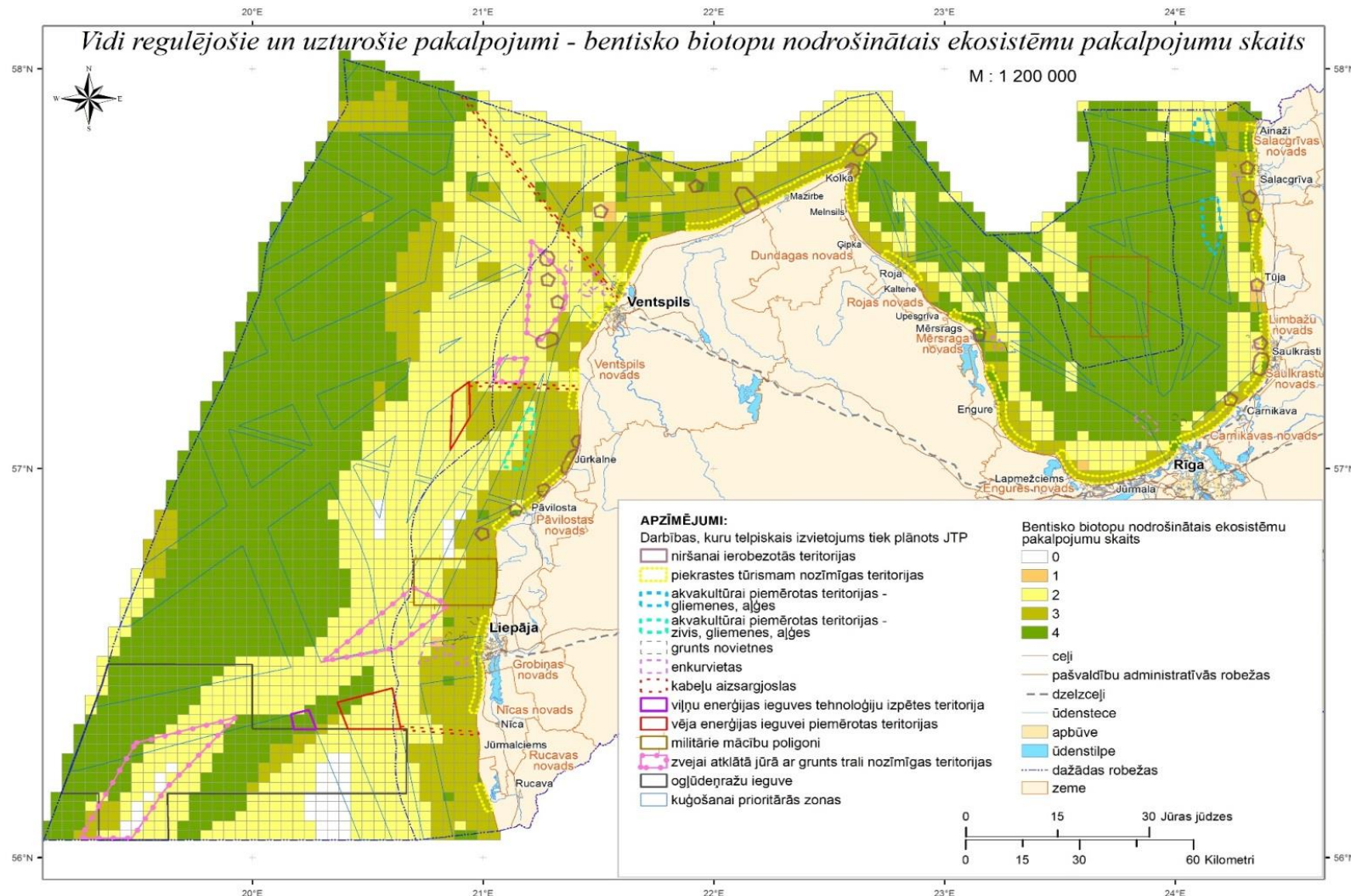
Impacts of proposed sea use solution to areas important for bird species



Impacts of proposed sea use solution to areas important for fish species



Impacts of proposed sea use solution to areas important for regulating services



Thank you!

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