Mapping marine ecosystem services in Latvia

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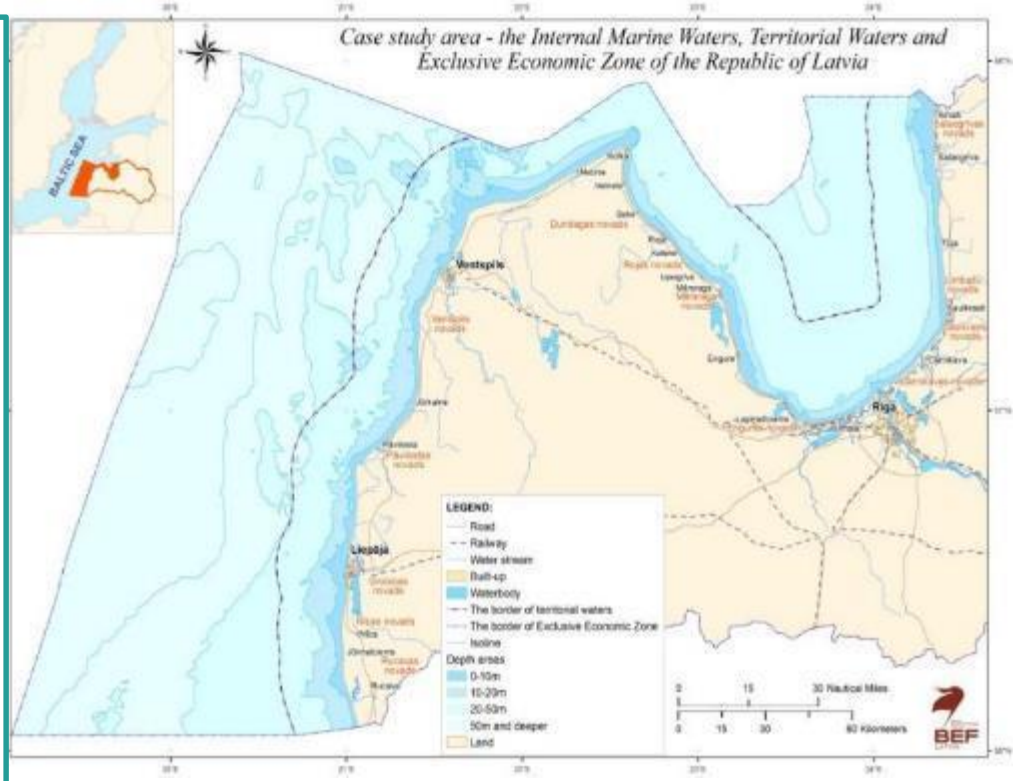
EU Horizon 2020 Coordination and support action

MSP for Latvian marine waters

- **Legislation for MSP adopted in 2012:**
  - A long-term (12 years) spatial development planning document
  - Defines the permitted use of the sea and conditions for development
- **1st version and SEA: 2015-2016** *developed by contracted consortium lead by BEF*
- **2nd version (consolidated version): 2016-2018** *developed by the Ministry of Environmental Protection and Regional Development, based on input of the Baltic Scope and Baltic Lines projects*
- **SEA of the 2nd version: June- July 2018** *to be developed by BEF*
- **Autumn 2018:** To be submitted to the Government for adoption

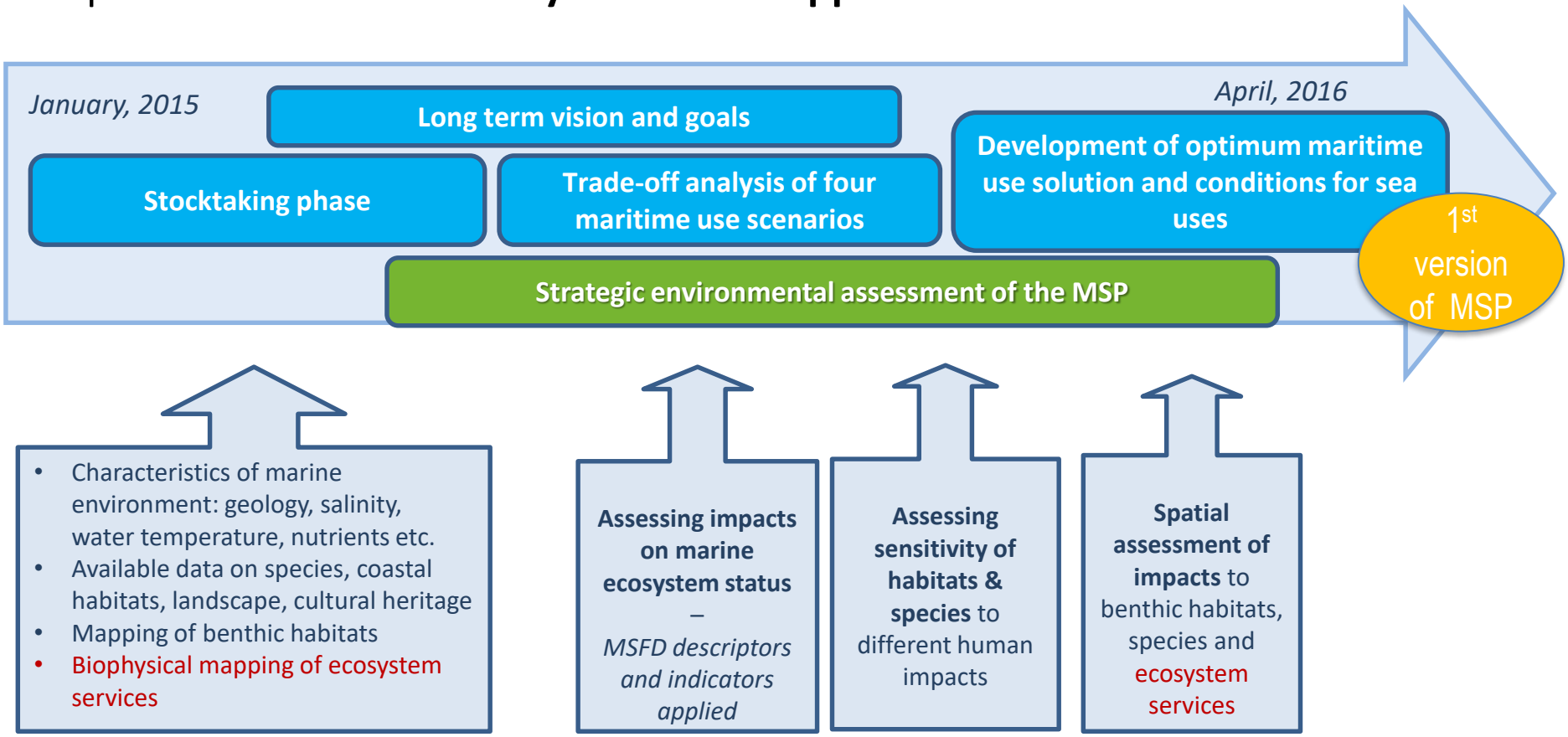


Latvian MSP area:

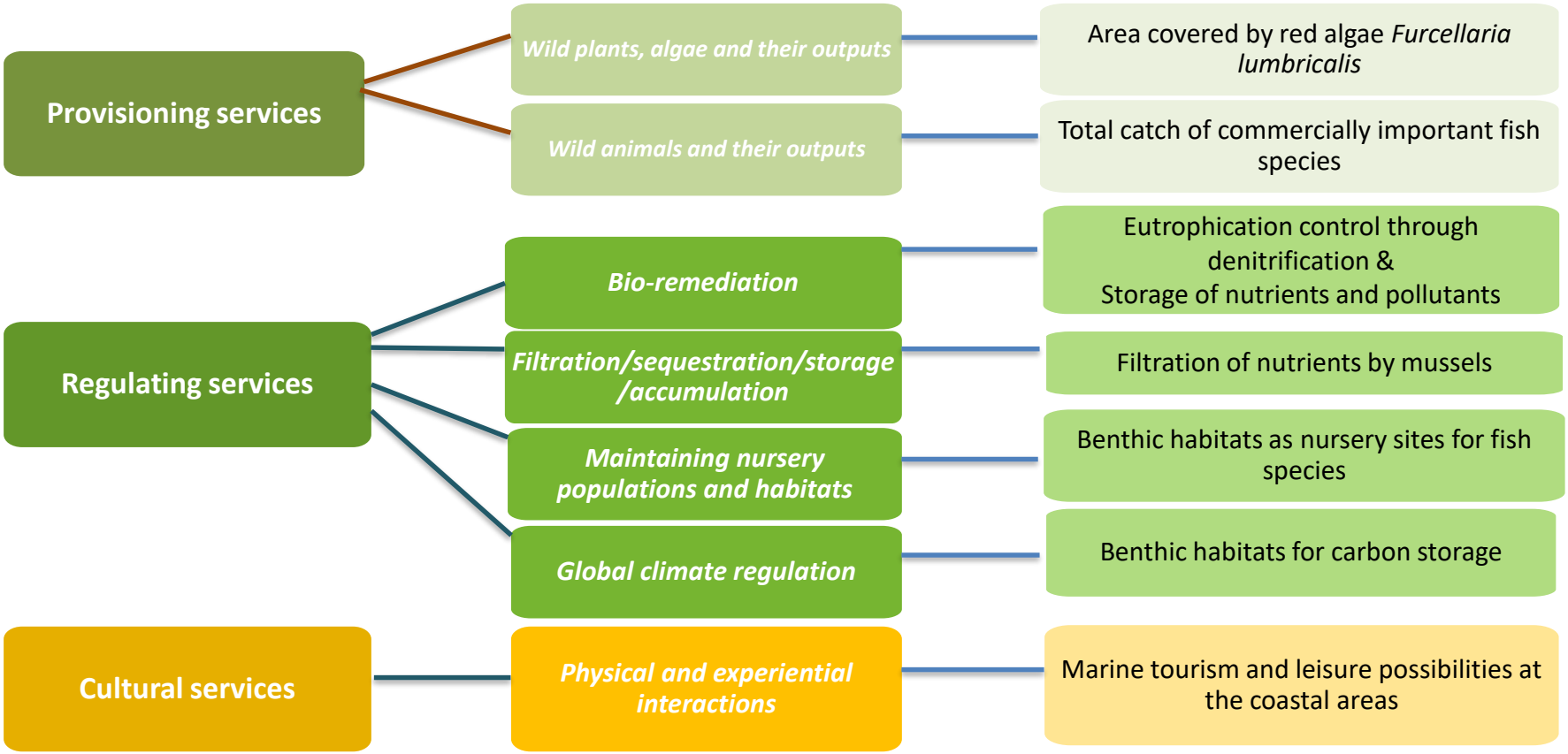
- *Internal Waters, Territorial Waters and Economic Exclusive Zone of Latvia (28 518 km²)*
- *7% of the Baltic Sea*
- *Neighboring with Estonia, Sweden and Lithuania*

Development of the 1st draft of the Latvian MSP

Mapping and assessment of ecosystem services as one of the tasks in implementation of the **ecosystem based approach in MSP**



Identification of ecosystem services (CICES v4.3)



Tiered approach to ecosystem service mapping

Tier 1

- **Look-up tables (linking ES values to land cover) + expert knowledge**
  - ➢ Latvia MSP: mapping of regulating services based on distribution of benthic habitats

Tier 2

- **Expert knowledge + causal relationships + extrapolation of primary data (field survey data linked to spatial information)**
  - ➢ Latvian MSP: mapping of provisioning and cultural services

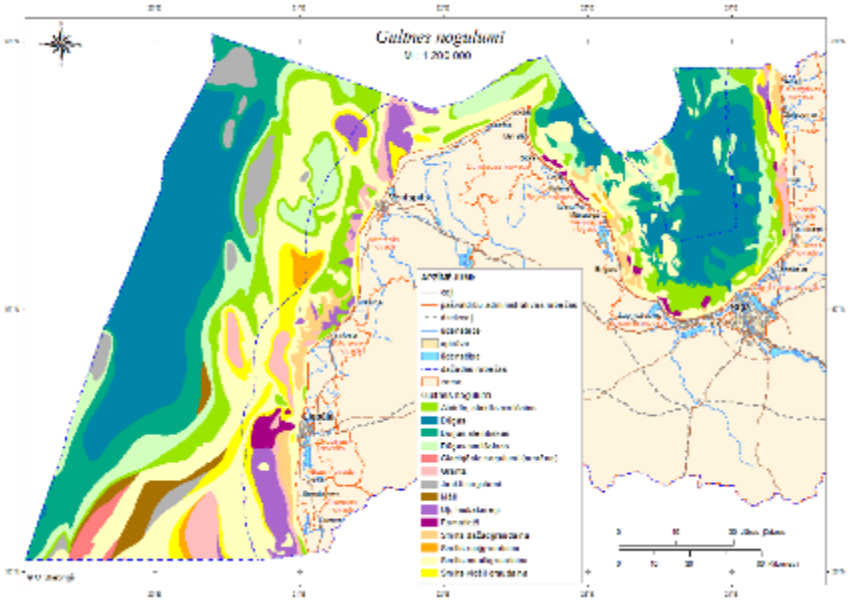
Tier 3

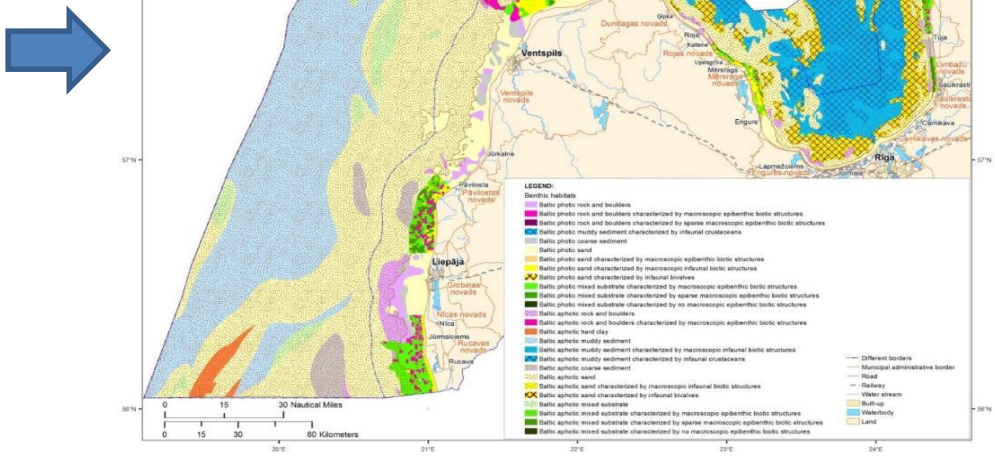
- **Regression and socio-ecological system models**
  - ➢ Latvian MSP: not applied

Development benthic habitat map

- **Spatial and biophysical data applied**:
  - Sea bottom sediment map
  - Secchi depth and bathymetry data
  - Benthic biology data (field observations)

- **Habitat classification using HELCOM HUB, 2013**, including level 3 - defined according to substrate; level 4 - community structure; level 5 - typical communities

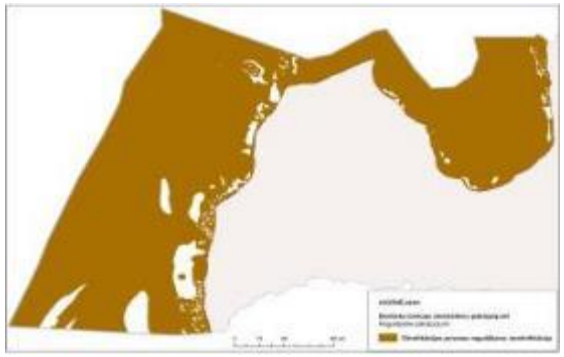




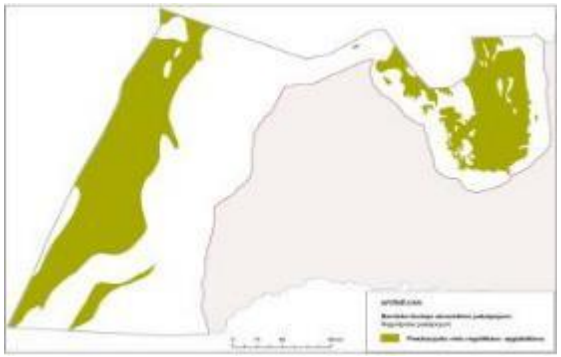
Mapping of regulating services

- Look-up table developed with experts from the Institute of Aquatic Ecology
  - **benthic habitats types as proxy for distribution of the ecosystem service**
  - ES supply potential assessed based on expert knowledge (binary scale – 0/1)

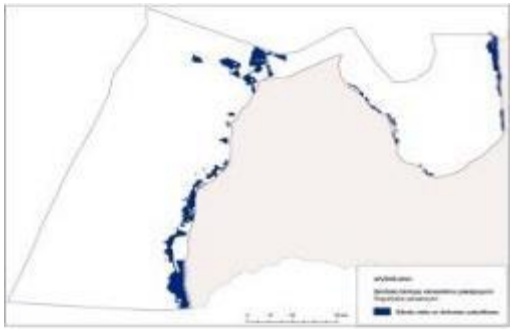
Eutrophication control: denitrification



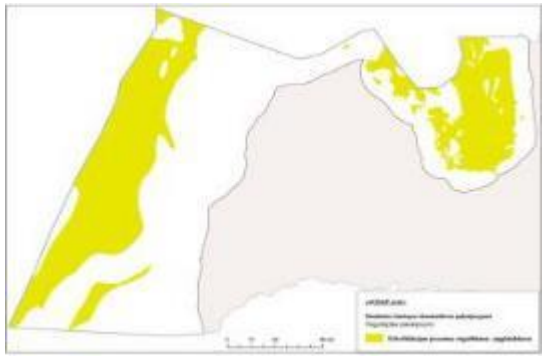
Storage of pollutants



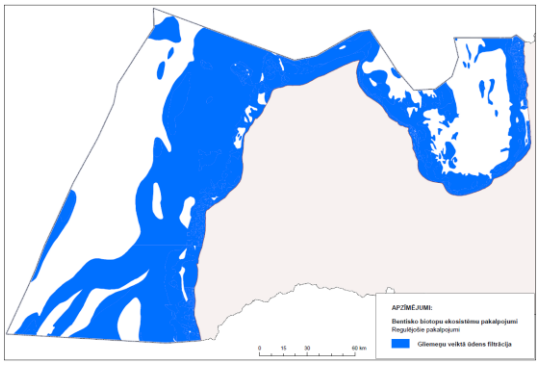
Nursery sites for fish



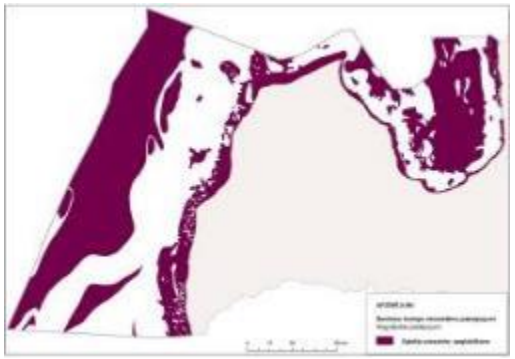
Eutrophication control: storage of nutrients



Filtration of nutrients by mussels

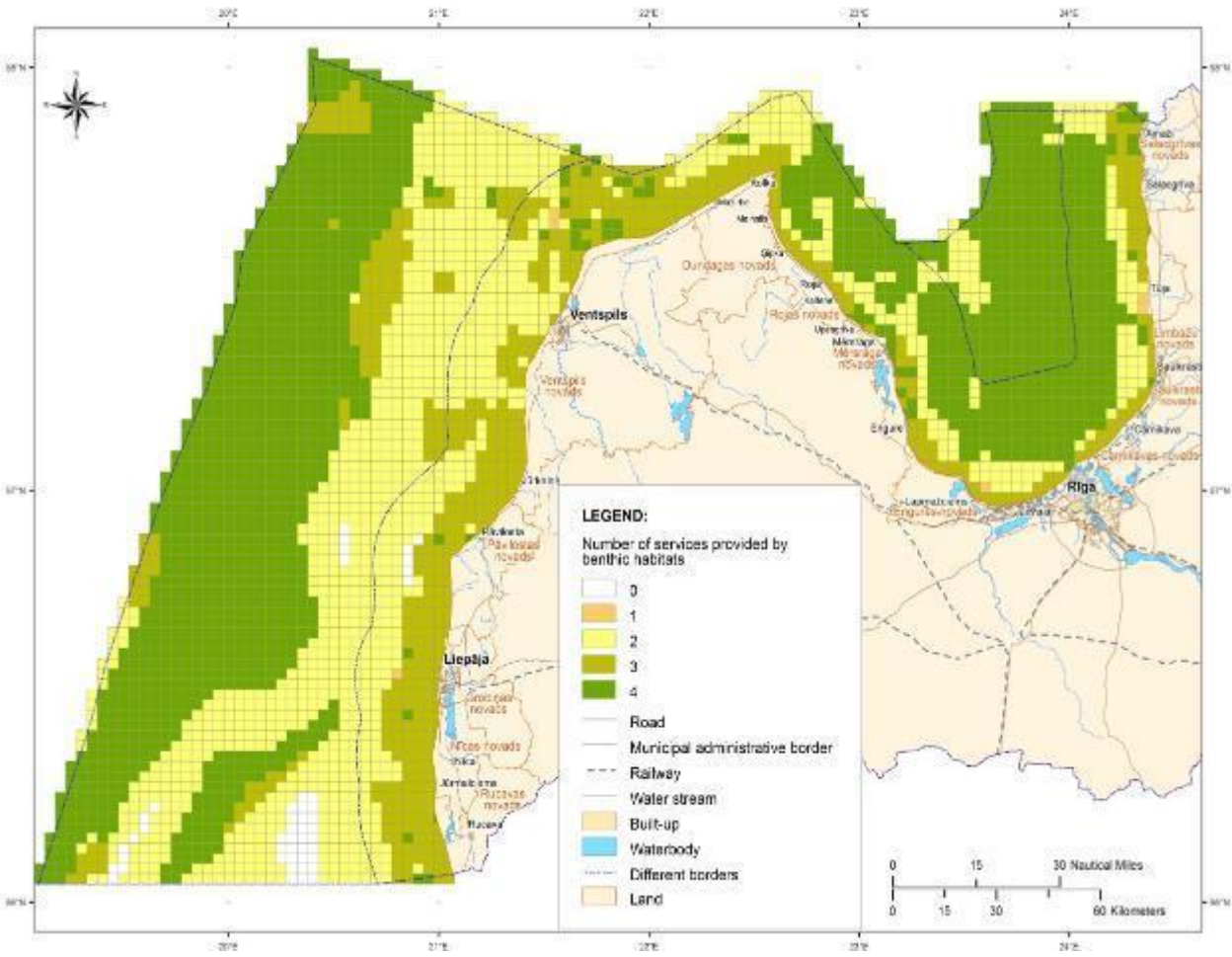


Carbon storage



Mapping of regulating services

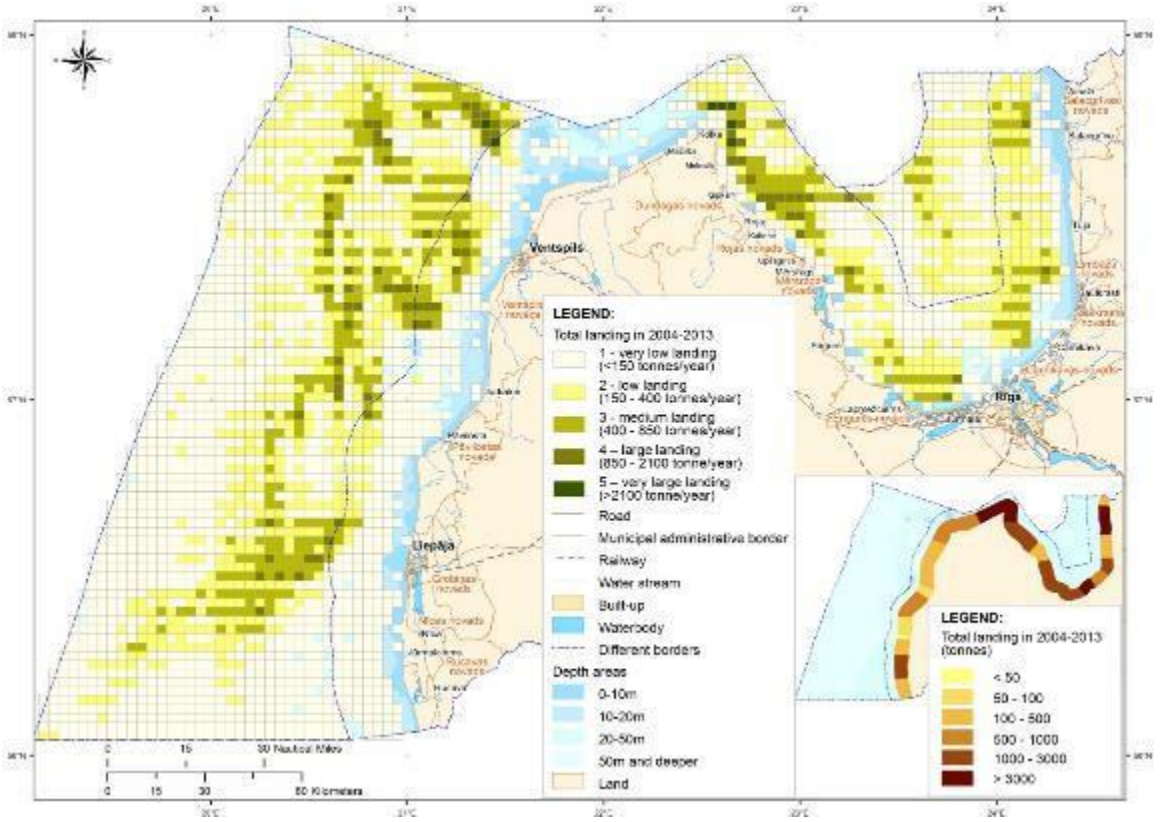
Summary map:
number of ES provides by bethic habitat type per grid cell



Mapping of provisioning services

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

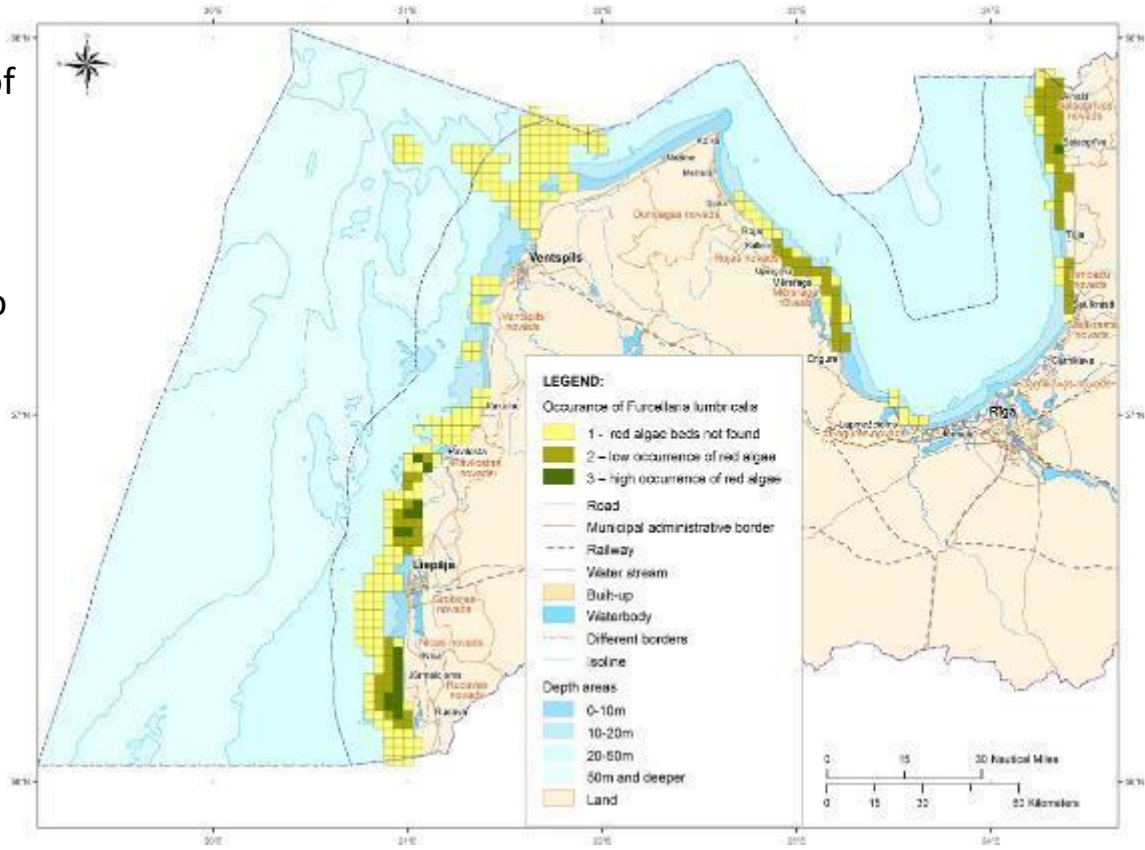
- **mapping based on statistical data** from fishery logbooks
- estimating the total value of fish landing from the grid cell per species, year and number fishing effort
- values presented in scale 1-5



Mapping of provisioning services

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

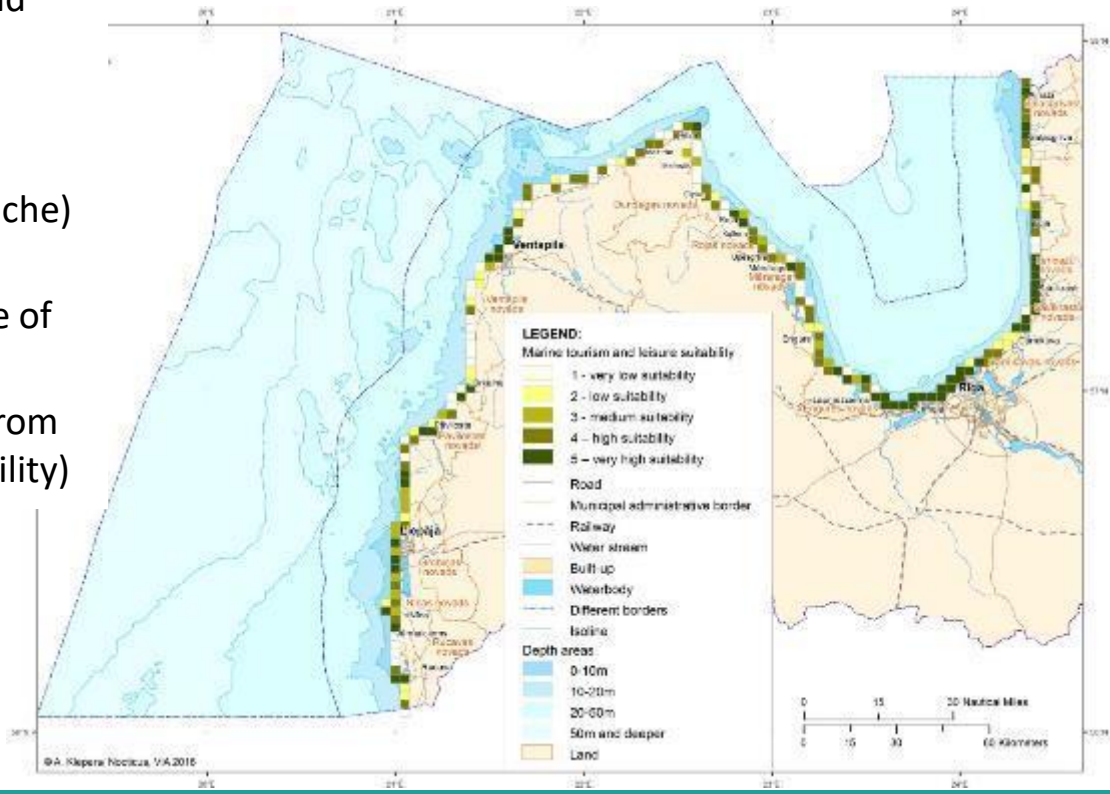
  - Mapping based on **expert knowledge** on benthic habitats suitable for growth of red algae **+ field survey data** (coverage of species - % of area unit)
  - Method: Spatial Proxy model; Tier 2
  - values presented in scale 1-3:
    - 1 - habitat suitable for species, but no occurrence detected
  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



Mapping of cultural services

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

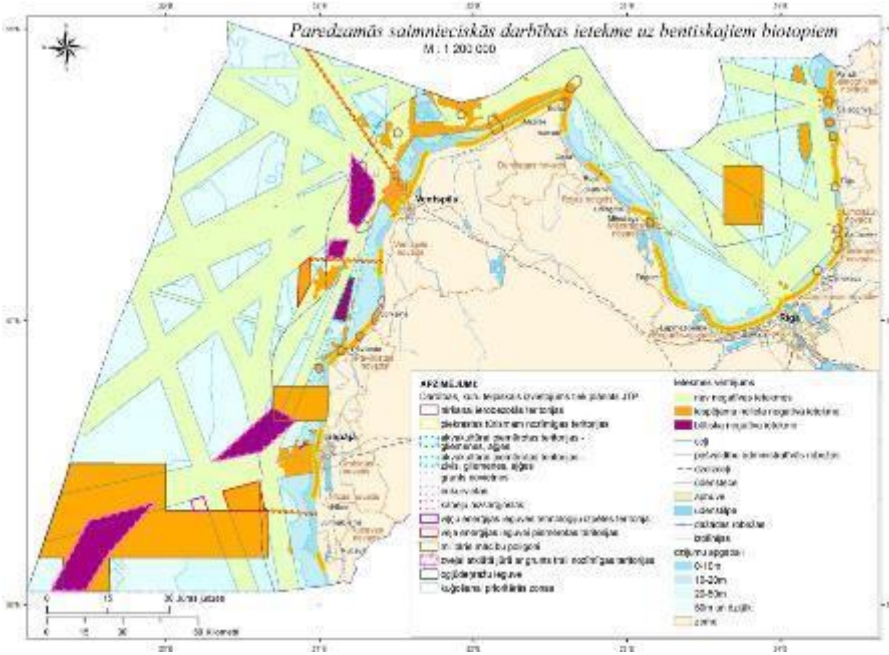
- **Based on expert knowledge and field observations**
- Criteria applied to assess the suitability of each grid for cell marine tourism and leisure activities :
  - **accessibility** (presence of parking lots and public access roads near the coast)
  - **proximity to densely populated areas** (potential recreational demand)
  - **suitability of the area** for a particular (niche) tourism or leisure activities;
  - **recreational use** (intensity of attendance of tourists or one-day visitors);
- Assessment results presented in scale 1-5 (from 1- very low suitability to 5 – very high suitability)

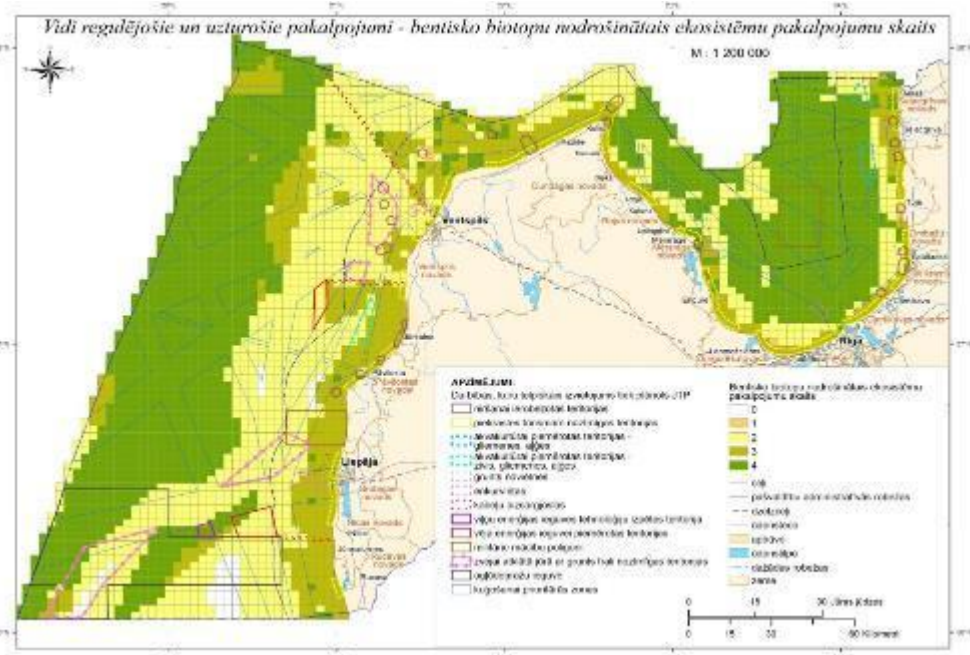


Application of MAES results for SEA

Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA directive):

- **Environmental Report** - the likely significant **effects on the environment** of implementing the plan are identified, described and evaluated.





Impacts of proposed sea use solution to benthic habitats and related ecosystem services

Main challenges & conclusions

Challenges in mapping of marine ES:

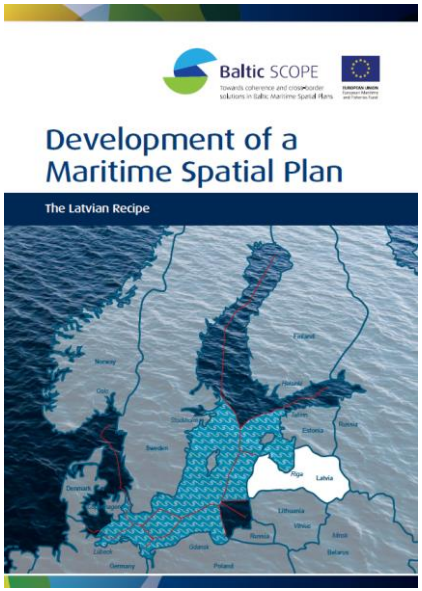
- Three-dimensional character of the marine ecosystem
- Lack of field data on ecosystem condition and ES supply due to high costs or marine field surveys
- Insufficient understanding of the ecological functions and processes behind many ES or difficulties to quantify them
- Difficulties in addressing the complexity of marine social-ecological systems
- Difficulties to define the link between bio-physical features of ecosystem and cultural ES

High uncertainty for applying results in decision making

Conclusions and way forward:

- Mapping of marine ES for MSP is still considered as a novel approach
- EU support required for mapping of benthic habitats & marine ecosystem condition
- High demand for integrated planning tool(s) that includes assessment of the marine ecosystem condition, cumulative impacts and ES supply

More information on ecosystem service mapping in Latvian MSP:



Baltic SCOPE:

- K. Veidemane, A. Ruskule, S. Sprukta, 2017. **Development of a Marine Spatial Plan: The Latvian Recipe.** Available at: **www.balticscope.eu**

Publication in Journal of Biodiversity Science, Ecosystem Services & Management:

- K. Veidemane, A. Ruskule, S. Strake, I. Purina, J. Aigars, S. Sprukta, D. Ustups, I. Putnis, A. Klepers. (In review). **Application of the Marine Ecosystem Services Approach in the Development of the Maritime Spatial Plan of Latvia.**

Thank you for your attention!

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JŪRAS TELPISKAIS PLĀNOJUMS

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