Gefördert durch:

Bundesministerium
für Digitales
und Verkehr

aufgrund eines Beschlusses
des Deutschen Bundestages

Digital hydromorphological Twin of the trilateral Wadden Sea

TrilaWatt

Stakeholder Workshop

Product Development & Pilot Case Studies

Zakaria Mohamed, Wadden Sea Forum

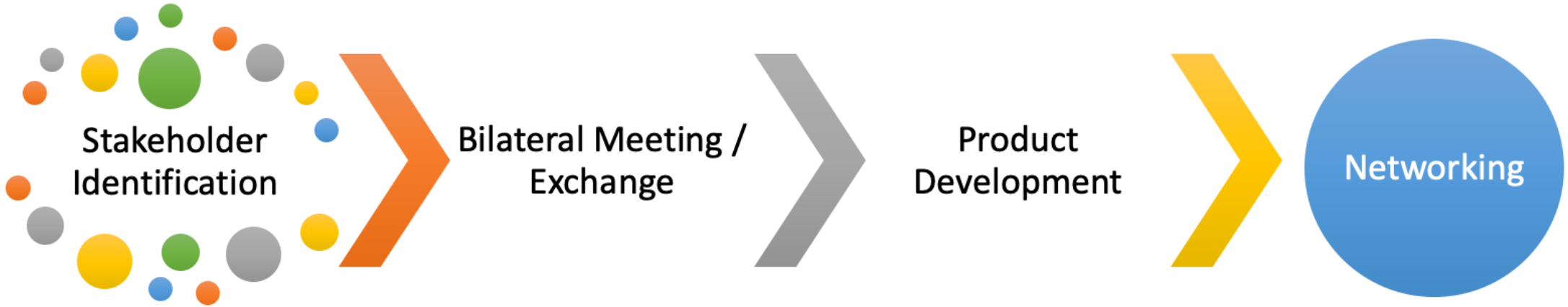
mFUND 19F2206C-TrilaWatt

16.02.20223

Quelle: BAW

Product Development & Pilot Case Studies

Stakeholder Engagement Process



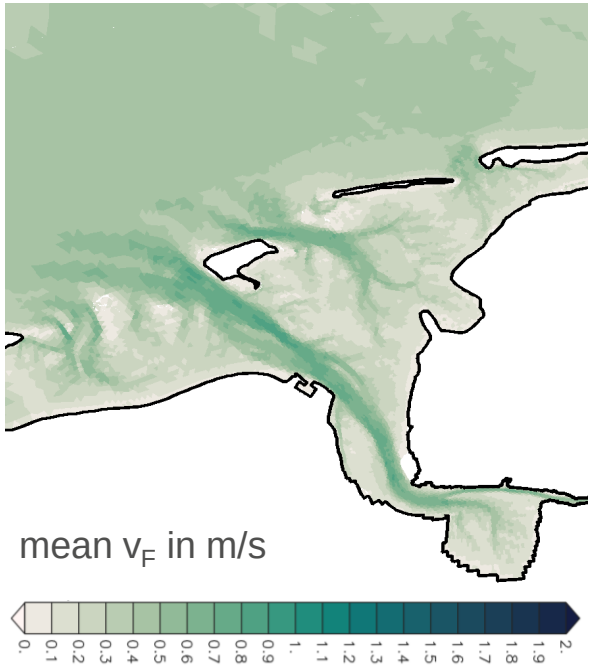
TrilaWatt Application : Tidal Characteristics

Examples for Simulation / Analyses (Products / Processing)

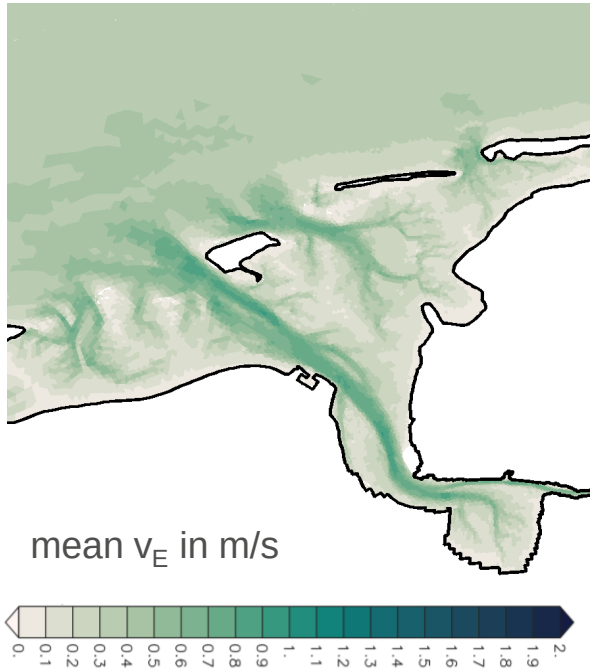
Outer Ems (NL+D): Tidal characteristic numbers / values (2010)

- Tidal characteristic numbers of currents: **(V_{Fmean}, V_{Emean}, V_{Fmax}, V_{Emax},)**

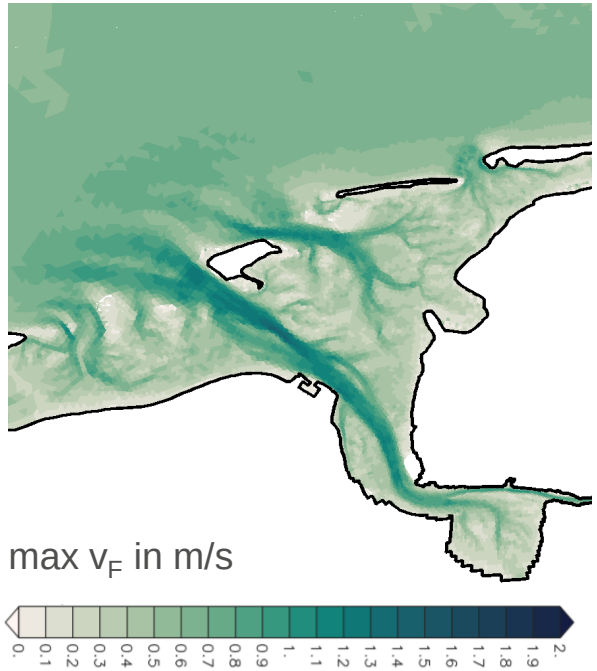
mean current during flood [m/s]



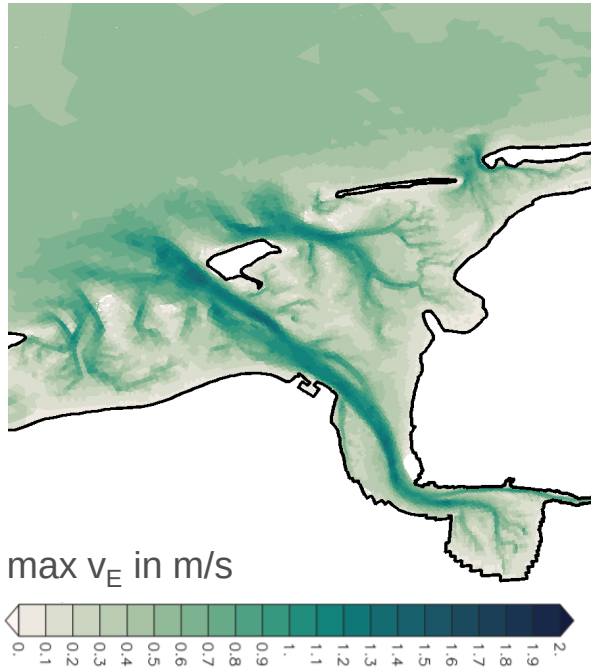
mean current during ebb [m/s]



maximum flood current [m/s]



maximum ebb current [m/s]



TrilaWatt Application : Tidal Characteristics

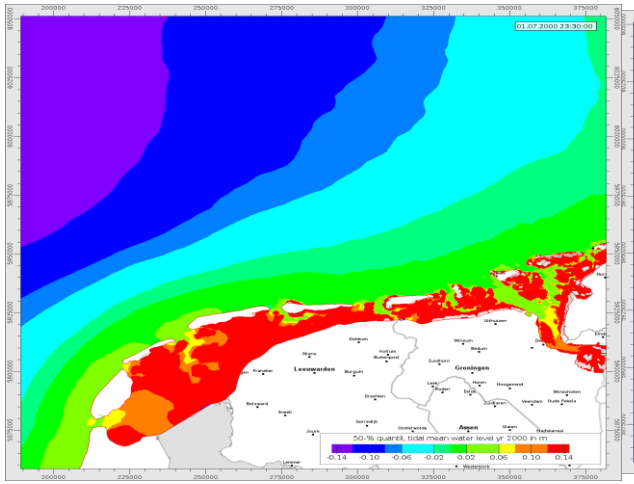
Tidal parameters are needed for :

- Marine spatial planning,
- Coastal and offshore construction projects,
- Ecological tasks, i.e Habitat identification

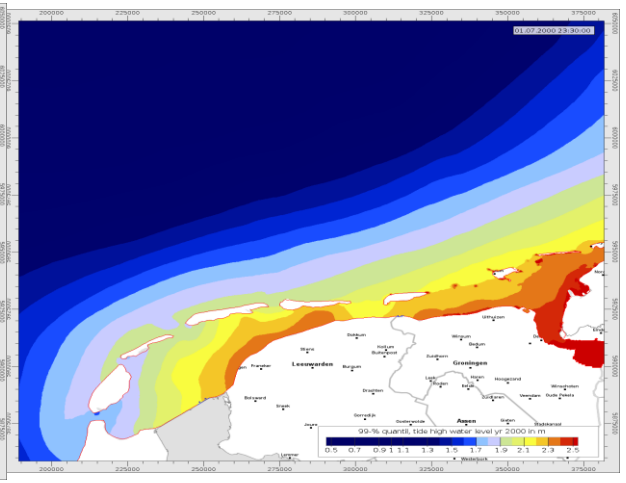
Support these tasks with numerical simulation results from the entire trilateral Wadden Sea area i.e

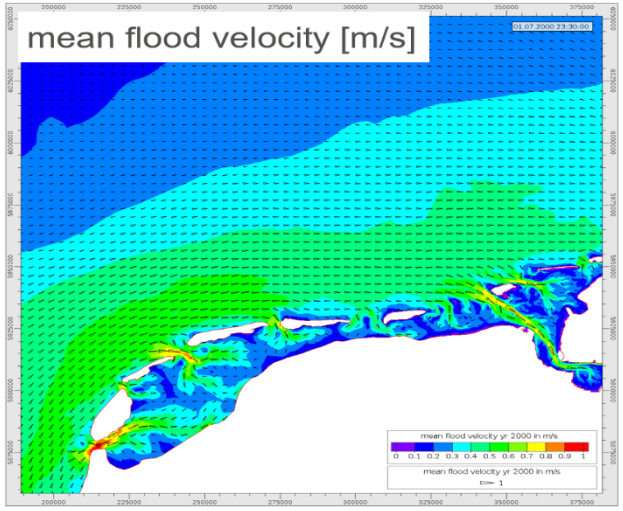
- Tidal range, Salinity
- Peak sea surface elevation
- Mean, peak, and residual flood ,
- current velocity, and bed shear stress

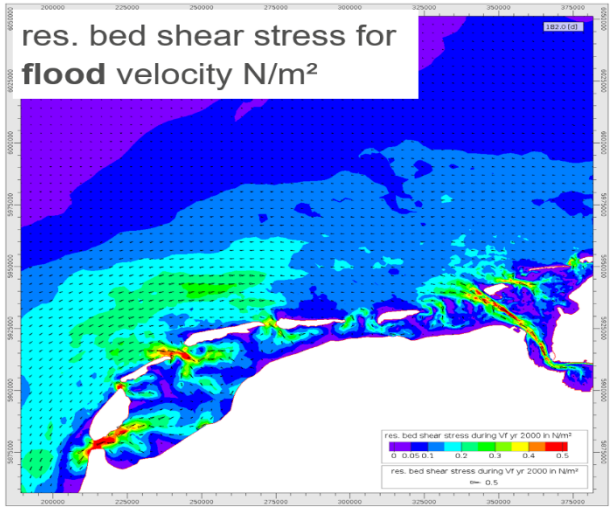
50% quantile tidal range [m]



99% quantile high water level [m]



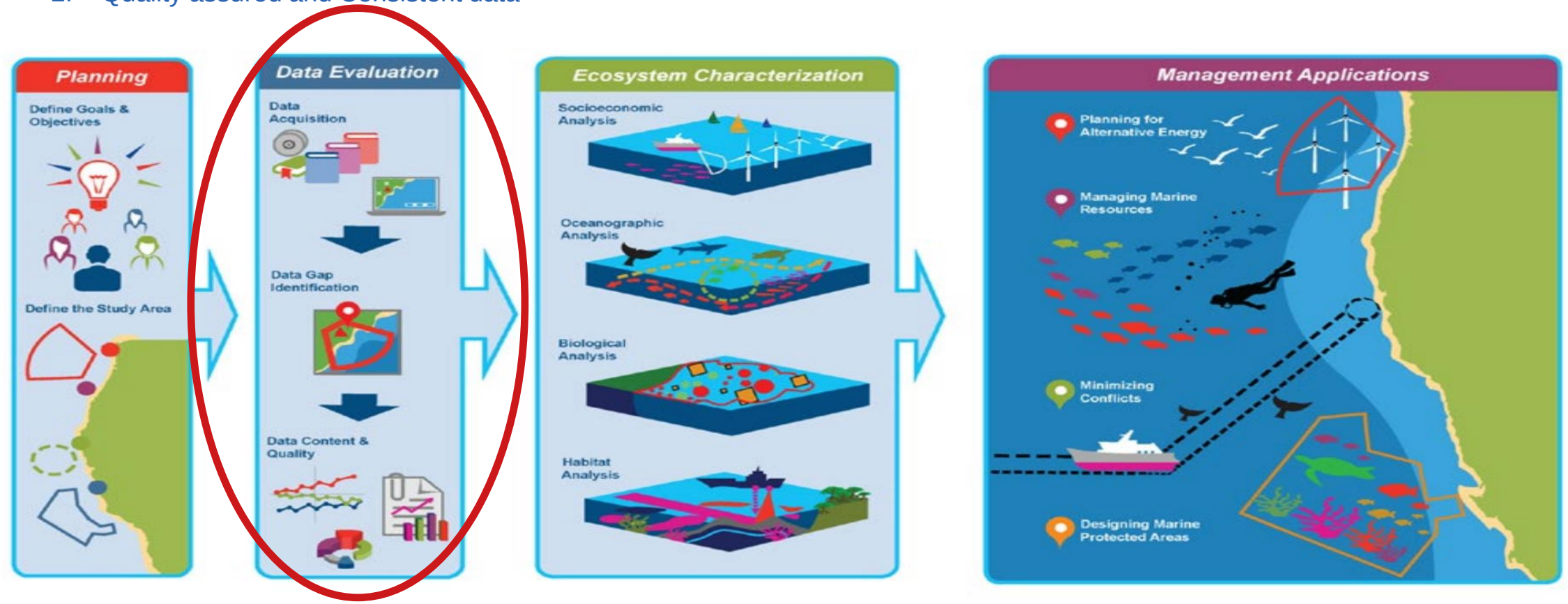




TrilaWatt Application : A Tool To support Marine Spatial Planning

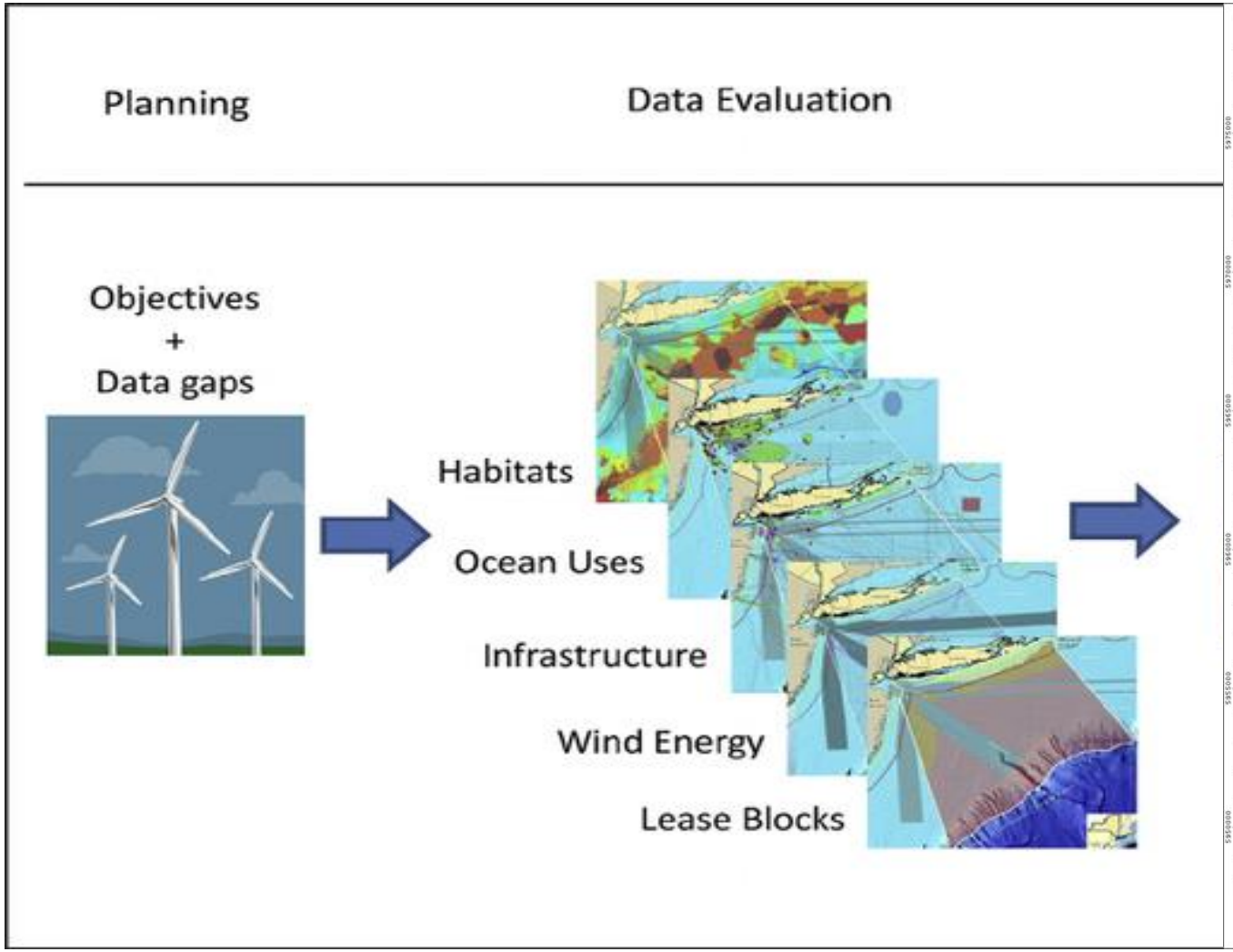
The assistance systems that facilitates:

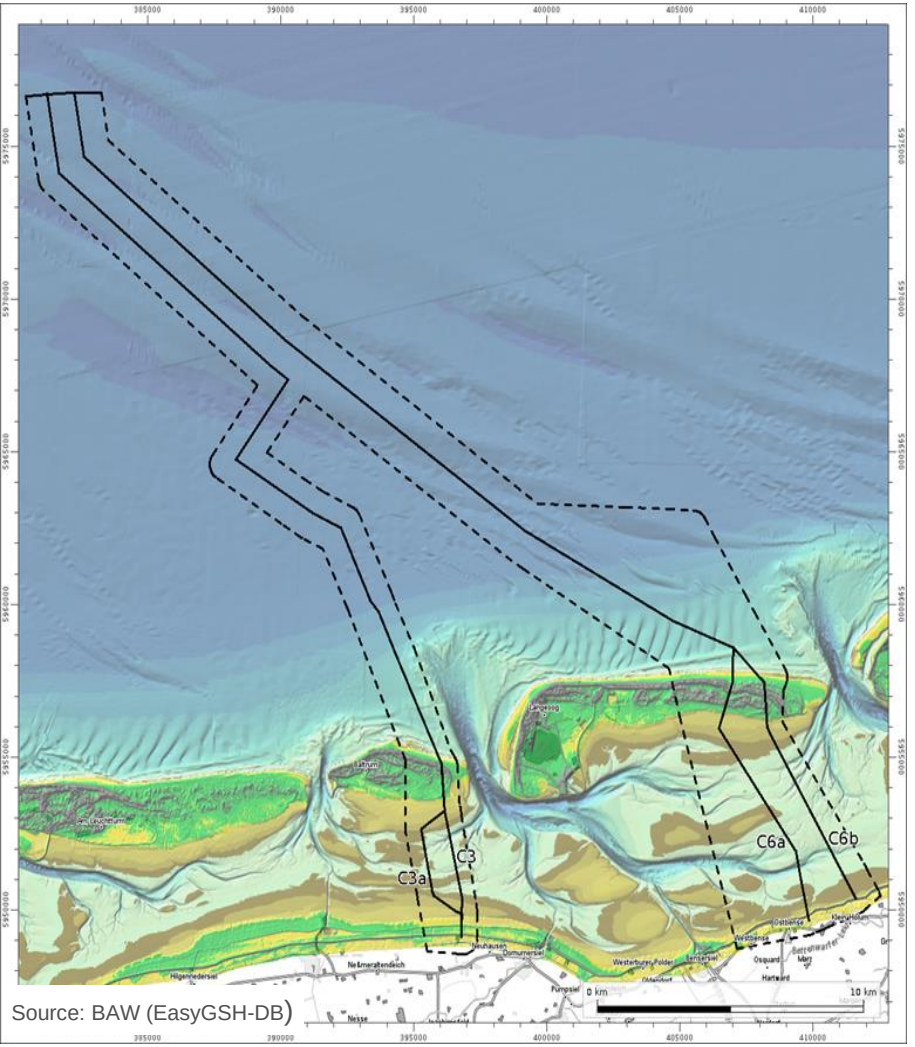
1. Planning procedures for the development of Offshore Projects
2. Quality assured and Consistent data



Source : O'Hagan, Anne Marie. 2020 State of the Science Report, Chapter 11: Marine Spatial Planning and Marine Renewable Energy. United States: N. p., 2020. Web. doi:10.2172/1633204.

TrilaWatt Application : A Tool To support Marine Spatial Planning



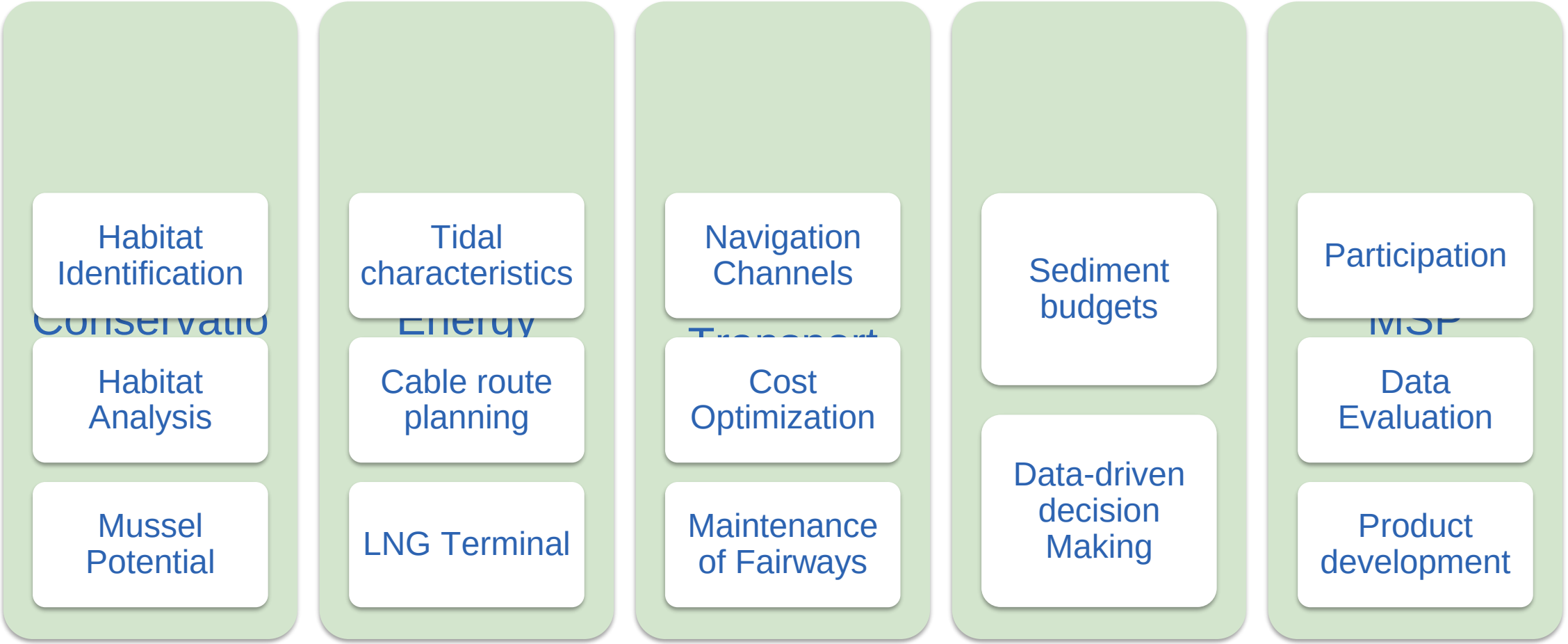


Source: BAW (EasyGSH-DB)

Source : O'Hagan, Anne Marie. 2020 State of the Science Report, Chapter 11: Marine Spatial Planning and Marine Renewable Energy. United States: N. p., 2020. Web. doi:10.2172/1633204.

Product Development: Example Use-Cases

Sector Based Application of the TrilaWatt Data products



End

Thank You for your Attention

slido

Where are you joining us today?

ⓘ Start presenting to display the poll results on this slide.

slido

Do you Consider your organization / project as a Data Producer or Data User

ⓘ Start presenting to display the poll results on this slide.

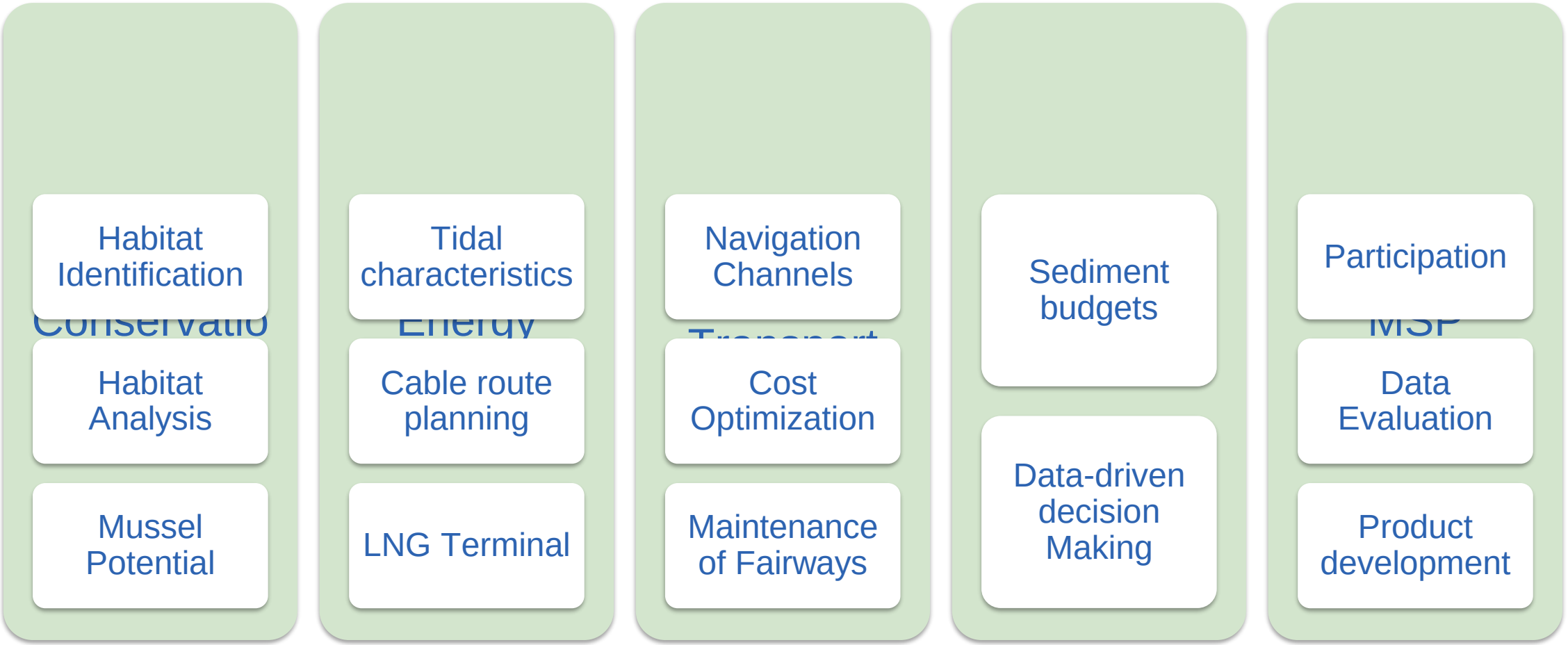
slido

What kind of products do you wish for?

ⓘ Start presenting to display the poll results on this slide.

Product Development: Example Use-Cases

Sector Based Application of the TrilaWatt Data products



Questions for Stakeholders

Can the TrilaWatt Data be useful to the initiatives or projects that you are engaged?

Questions for Stakeholders

Would you like to share with us your projects and initiatives to jointly identify potential synergies?

End

Thank You for your Attention

Mussel Potential Analysis

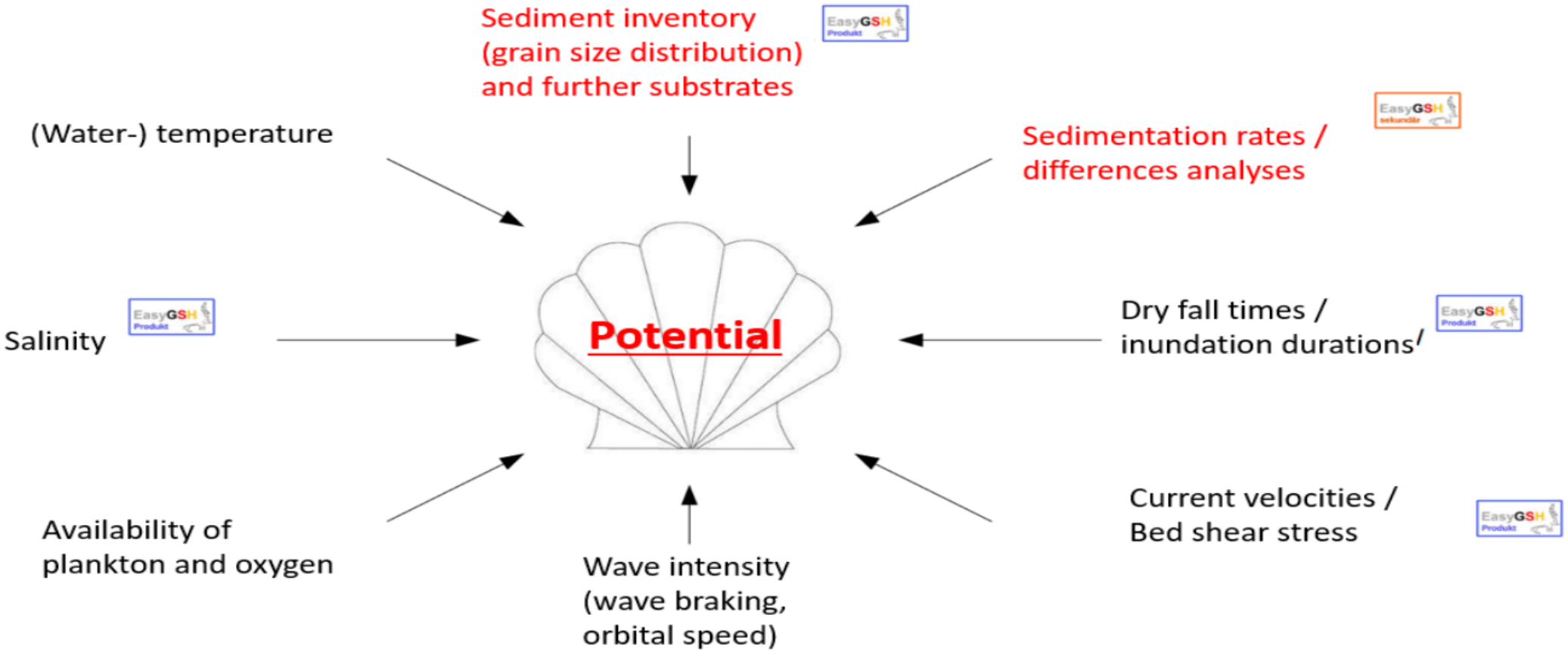


Figure 63: Influencing factors for the settlement and persistence of blue mussel beds.

Source: Scientific Final Research Report 2020 for mFund Project: EasyGSH-DB

TrilaWatt Application: Habitat Types

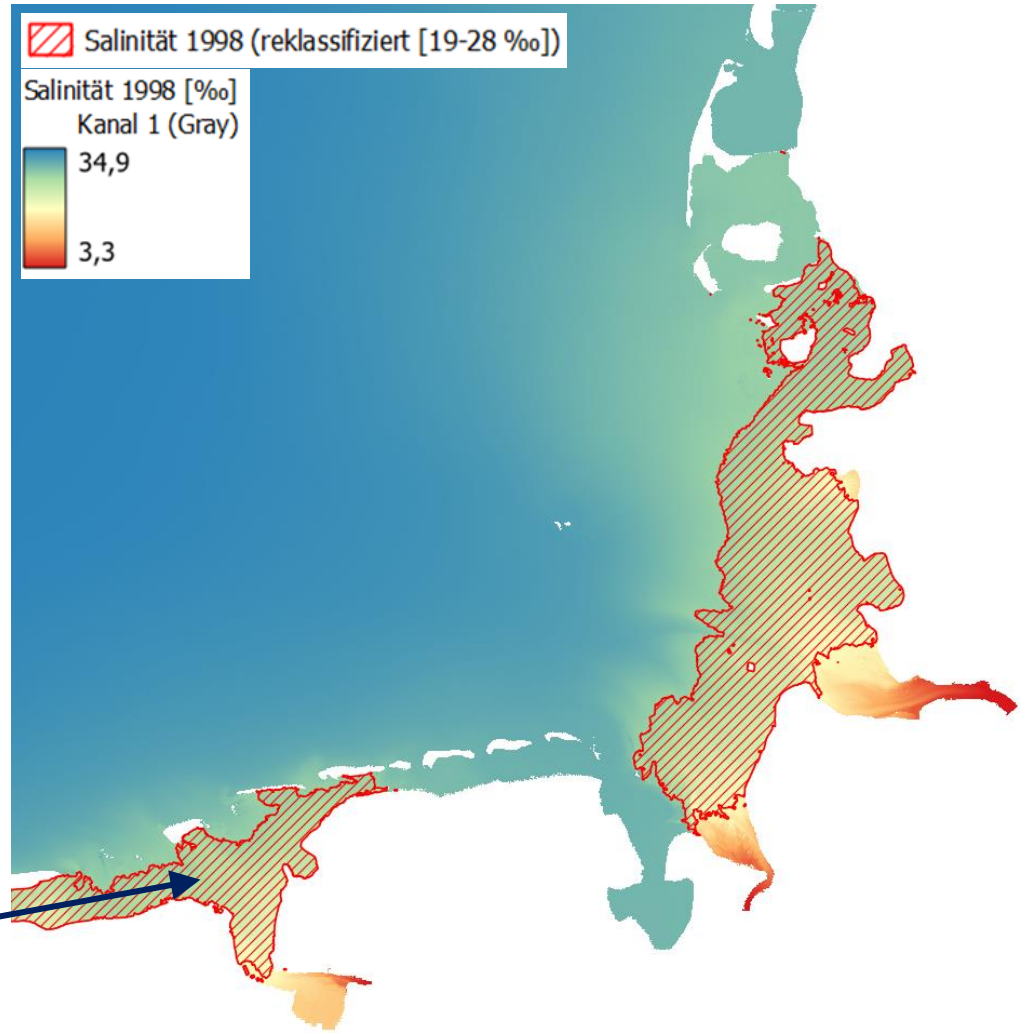
WPS to Assess Salt Concentration

Sample mussel potential map

* Salinity limits: ~19-28 ‰

	Eulitorale Muschelvorkommen		
Umweltparameter	*Minimum*	*Maximum*	*Median*
Erosions- / Sedimentationsrate [m / Jahr]	**-0,2**	**0,7**	–
Sedimentverteilung d50 [mm]	**0,079**	0,652	0,175
rel. Trockenfalldauer / Tide [%]	0	**42,210**	14,163
mittl. Ebbestrom [m/s]	**0,025**	**0,311**	0,155
mittl. Flutstrom [m/s]	**0,023**	**0,317**	0,153
Orbitalgeschwindigkeit [m/s]	**0,074**	**0,504**	0,290
Bodenschubspannung Ebbe [N/m²]	**0,026**	**0,979**	0,259
Bodenschubspannung Flut [N/m²]	**0,026**	**1,309**	0,213
Wellenintensität / -brechen [W/m²]	0	**0,21**	0,001
Salinität [°/₀₀]	**18,676**	27,717	24,379

Result WPS processing



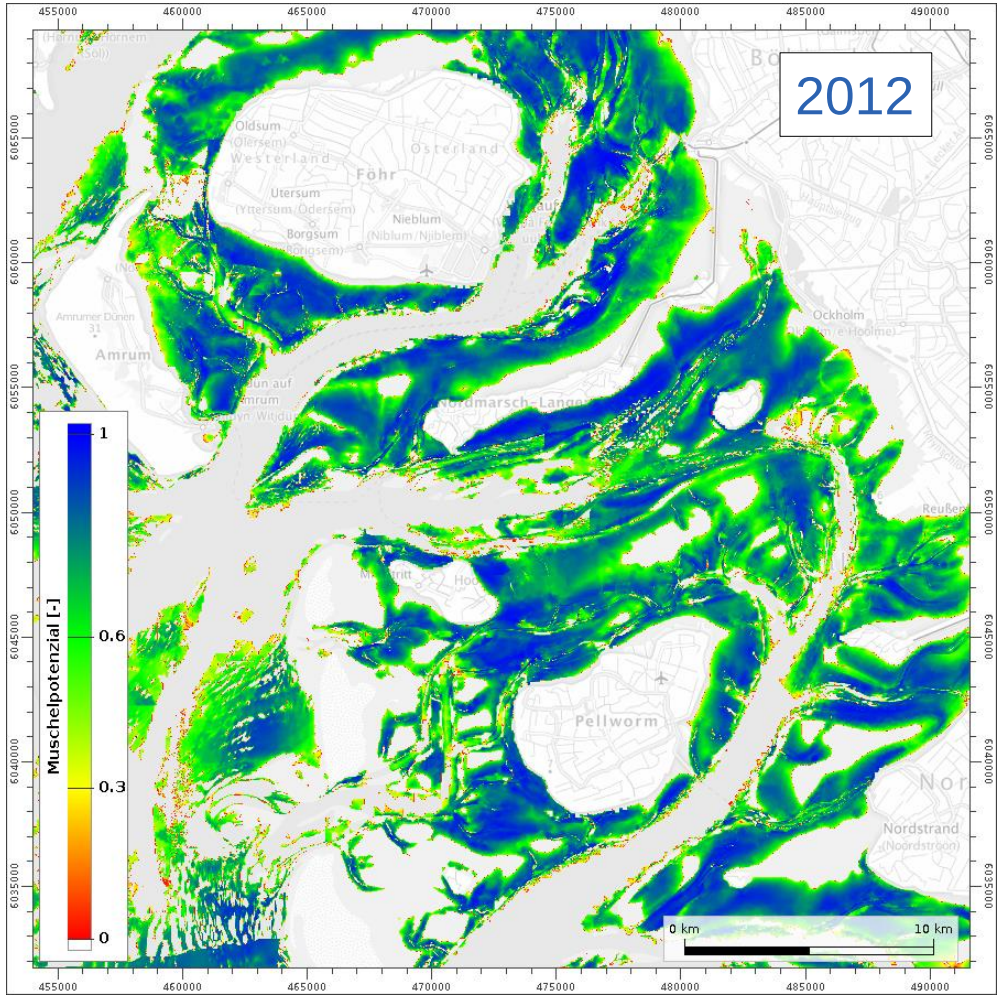
Application: Risk and Potential analysis

Risks Maps

- Erosion
- Siltation

Potential Maps

- Shell Settlement
- Seagrass Settlement

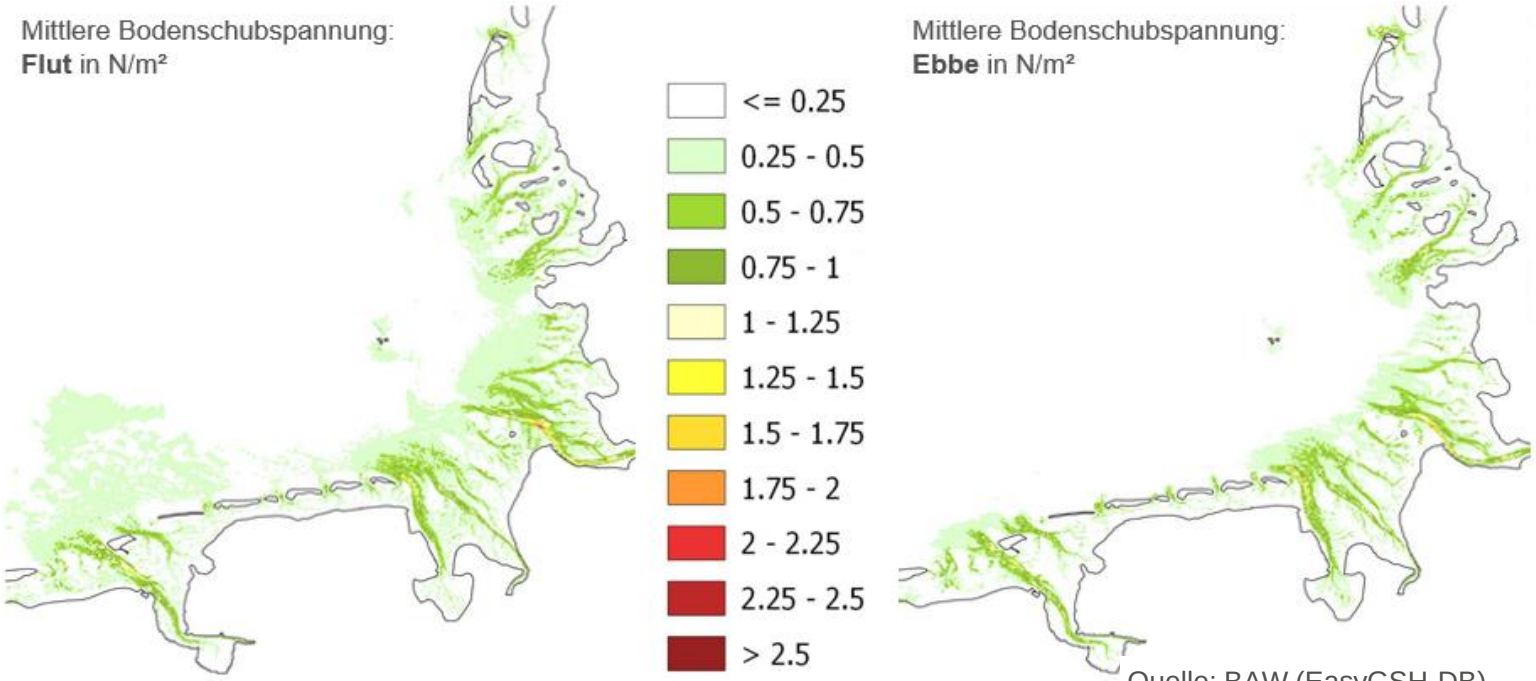


Shell potential map
[EasyGSH-DB / BIWA-WATT]

Mussel beds: Occurrence

Where can mussel beds settle at all and why do they stay there (stable)?

- Flow velocities and bottom shear stresses:analyzes (vfm, vEm, vFMx, vemx,dewB)
- Morphological stability map(Difference smallest/largest depth z)
- Determination of minimum water depth (Tnw, min z)
- Salinity limits



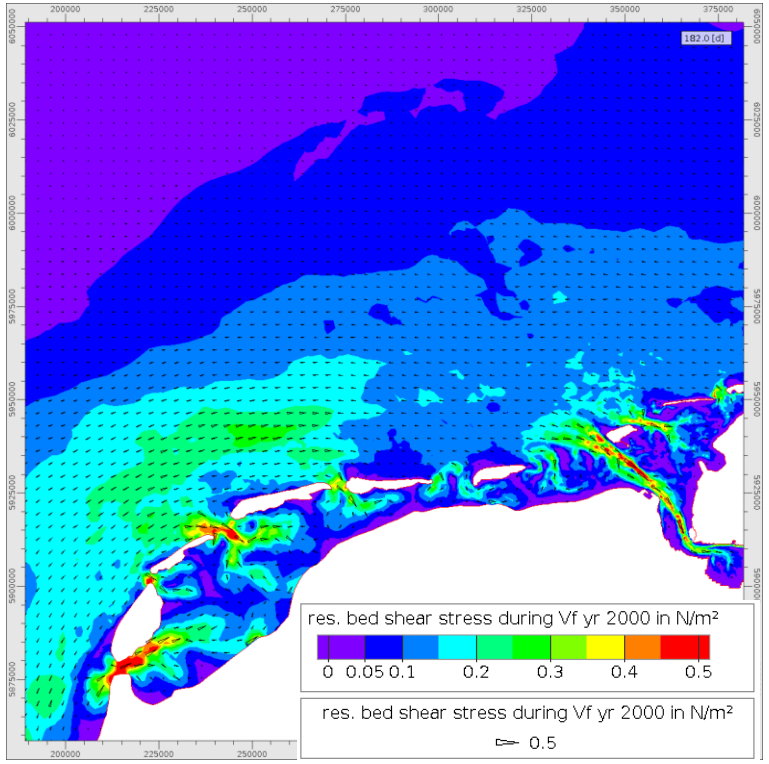
Quelle: BAW (EasyGSH-DB)

Examples for Simulation / Analyses (Products / Processing)

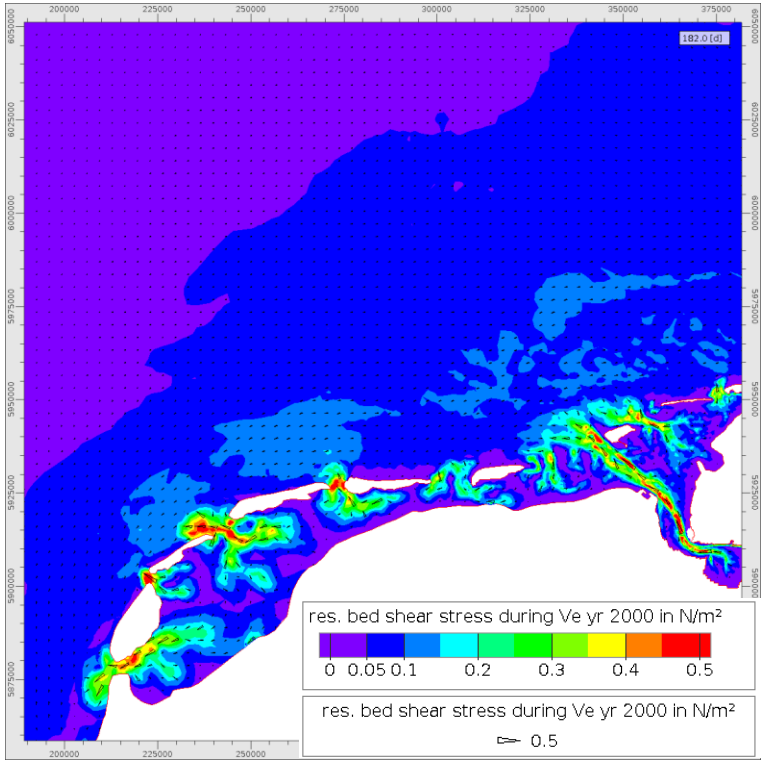
Texel till Ems: Tidal characteristic numbers / values

- Tidal characteristic numbers of bed shear stress **(tau_B)** and salinity **(PSU_m)**

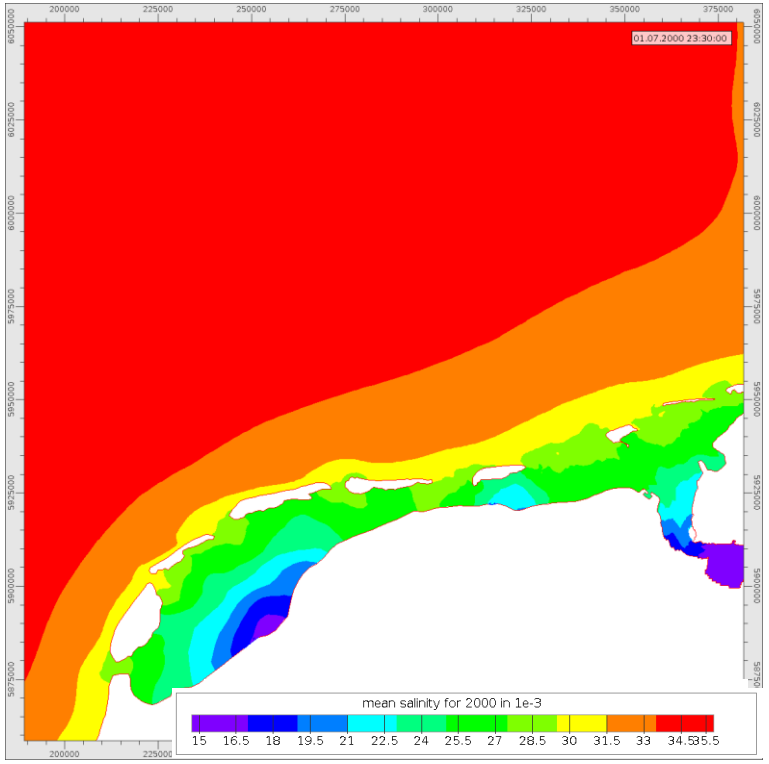
res. bed shear stress for **flood** velocity N/m²



res. bed shear stress for **ebb** velocity N/m²



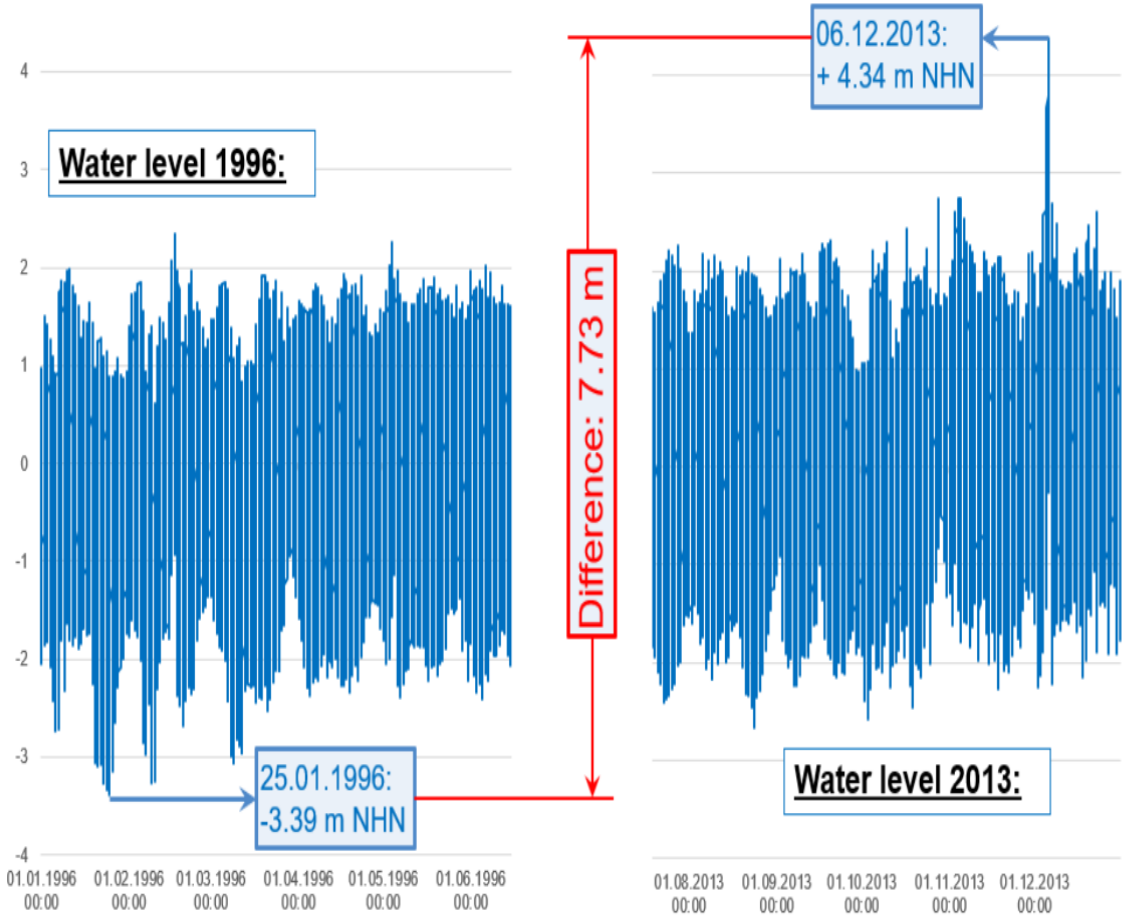
mean salinity (yr 2000) [1e-03]



TrilaWatt Application : Planning of LNG Terminal Wilhelmsahaven

Research products of EasyGSH / TrilaWatt have been a helpful basis for the urgent and rapid planning of an LNG terminal (at and beside the construction site):

- Homogenized yearly bathymetries for a period from 1996 till 2015
- Difference bathymetry from 2015 to 1996 as morphodynamic implication
- Sedimentologic behavior
- Analyses of water level (min, max, tidal range, …)
- Analyses of velocities (min, max, flood / ebb, …)
- Wave parameters (fastening of facility)



Max& Min Water Level analysis : at the LNG Terminal Location