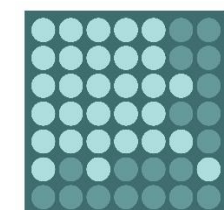


Supported by:



on the basis of a decision
by the German Bundestag



TrilaWatt

Digital hydromorphological twin of the Trilateral Wadden Sea TrilaWatt

Kick-Off-Meeting

A. Ullwer (BMDV)

A. Plüß, F. Ahlhorn, P. Milbradt, F. Simmering, R. Lehfeldt

16.02.2022



Agenda

1. Welcome by the BMDV, introduction of participants
2. Overview of mFUND and integration of the project into the funding program (BMDV)
3. Presentation of the project consortium
4. Presentation of the project
5. Discussion and questions from participants

Introduction

Overview of *mFUND*

- Status of *mFUND*
- Funding target
- Cooperation of the mFUND projects



Supported by:



on the basis of a decision
by the German Bundestag

Integration of the project into the funding program of BMDV

- Funding line
- Requirements
 - Data innovation
 - Big-Data
- Publications

Introduction

Introduction of participants

- Federal Waterways Engineering and Research Institute – Hamburg (BAW)
- smile consult GmbH – Hannover
- planGIS - Leer
- Wadden Sea Forum – Wilhelmshaven



Introduction of the speakers

- BAW: Andreas Plüß, Rainer Lehfeldt
- smile consult: Peter Milbradt
- planGIS: Frank Simmering
- Wadden Sea Forum: Frank Ahlhorn

Presentation of the associated partners

○ Stakeholders from the Netherlands, Denmark and Germany

- Rijkswaterstaat
- Danish Coastal Authority
- Common Wadden Sea Secretariat

○ German institutions

- State Office for Coastal Protection, National Park and Marine Protection – Schleswig-Holstein (LKN-SH)
- State Office for Agriculture, Environment and Rural Areas – Schleswig-Holstein (LLUR)
- Lower Saxony State Agency for Water Management, Coastal Defense and Nature Conservation (NLWKN)
- Federal/State working group North and Baltic Sea (BLANO, hydromorphology)



Source: BAW (Fedderwarder Priel)

Project presentation – an overview

Initial problem / genesis

- The **Wadden Sea World Heritage Site** forms the largest tidal flat system in the world, in which **dynamic processes** occur largely undisturbed. It stretches along the Danish, German and Dutch coasts of the North Sea.
- Very **different user interests** (maritime and energy industries, fisheries and, last but not least, tourism) require
 - **integrated monitoring** and **understanding** of the system
 - coordinated efforts and **planning**.
- There are large amounts of data in the trilateral Wadden Sea that are
 - distributed or dispersed,
 - not homogenized and
 - difficult to be researched.
- There is a lack of **suitable tools** for navigation, interdisciplinary overlay as well as analyses for different purposes.



[www.waddensea-worldheritage.org]

Product catalog from the previous project EasyGSH-DB (I)

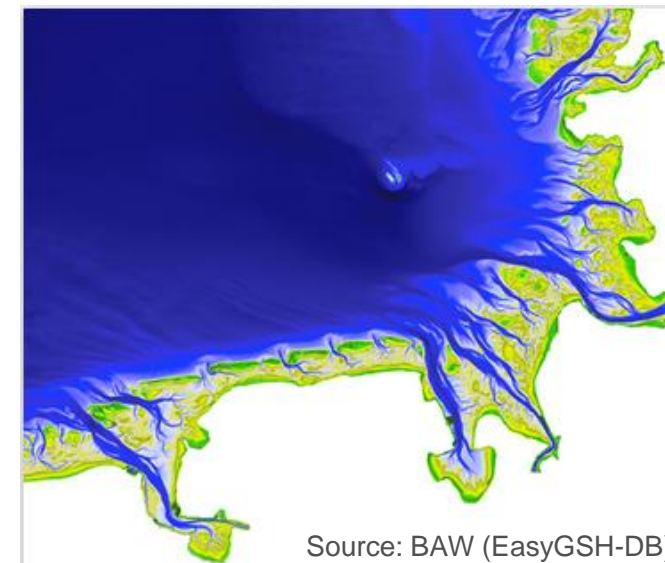
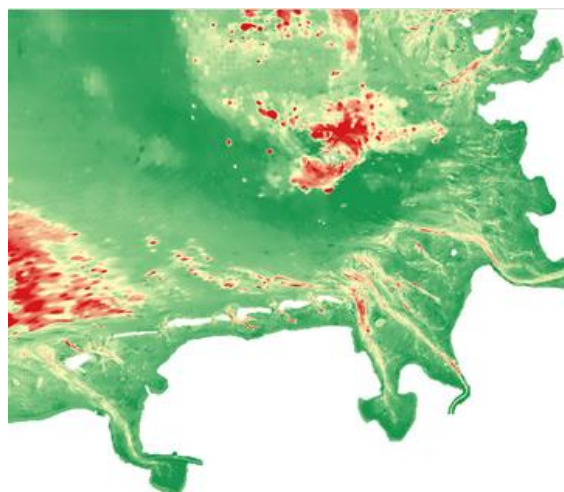
Available standard products 1996-2016

○ **Geomorphology:** (https://mdi-de.baw.de/easygsh/EasyEN_DownloadG)

- Bathymetry (over a wide area)
- Morphological drive
- Morphological space
- Bathymetric contour lines

○ **Sedimentology:** (https://mdi-de.baw.de/easygsh/EasyEN_DownloadS)

- Petrographic maps
- D50-grids /-contour lines
- Sorting
- Inclination/skeweness
- Porosity
- Sedimentology (CSV)



Source: BAW (EasyGSH-DB)



Project ▾ Maps ▾ Download ▾ Information portal Publications ▾ Gallery

Hydrodynamic

All data sets for hydrodynamics have on-the-fly generated preview images, metadata and data sets, click on desired format to download.

Select year:

1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015

Product catalog from the previous project EasyGSH-DB (II)

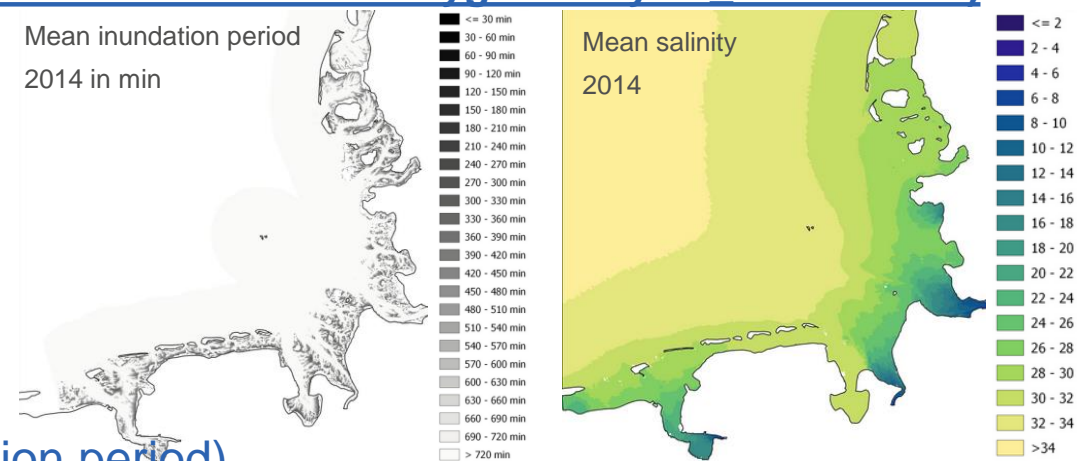
Available standard products 1996-2016 (https://mdi-de.baw.de/easygsh/EasyEN_DownloadS)

○ Hydrodynamics

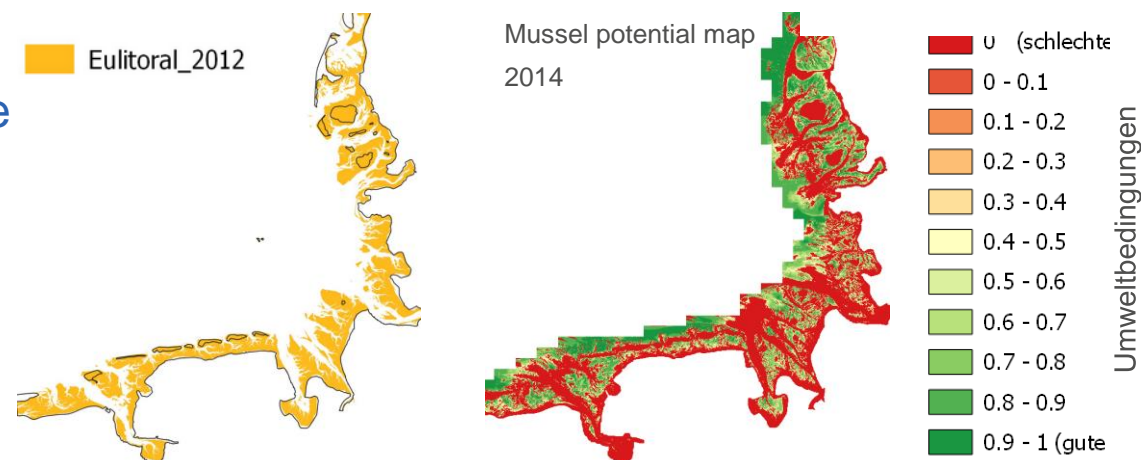
- Tidal characteristics of the water level
- Tidal characteristics of current speed
- Tidal characteristics of salinity
- Tidal characteristics of bottom shear stress
- Long-term parameters of salinity
- Long-term characteristics of the water level (inundation period)
- Harmonic analyses of the water level
- Characteristic values of the sea state
- Long-term characteristic values of the sea state

○ Prototype Products

- Eulitoral (2002, 2012)
- Tidal flats (2004, 2014)
- Mussel potential map (2012)



Source: BAW (EasyGSH-DB)





EasyGSH-DB

Creation of application oriented synoptic reference data on geomorphology, sedimentology and hydrodynamics in the German Bight

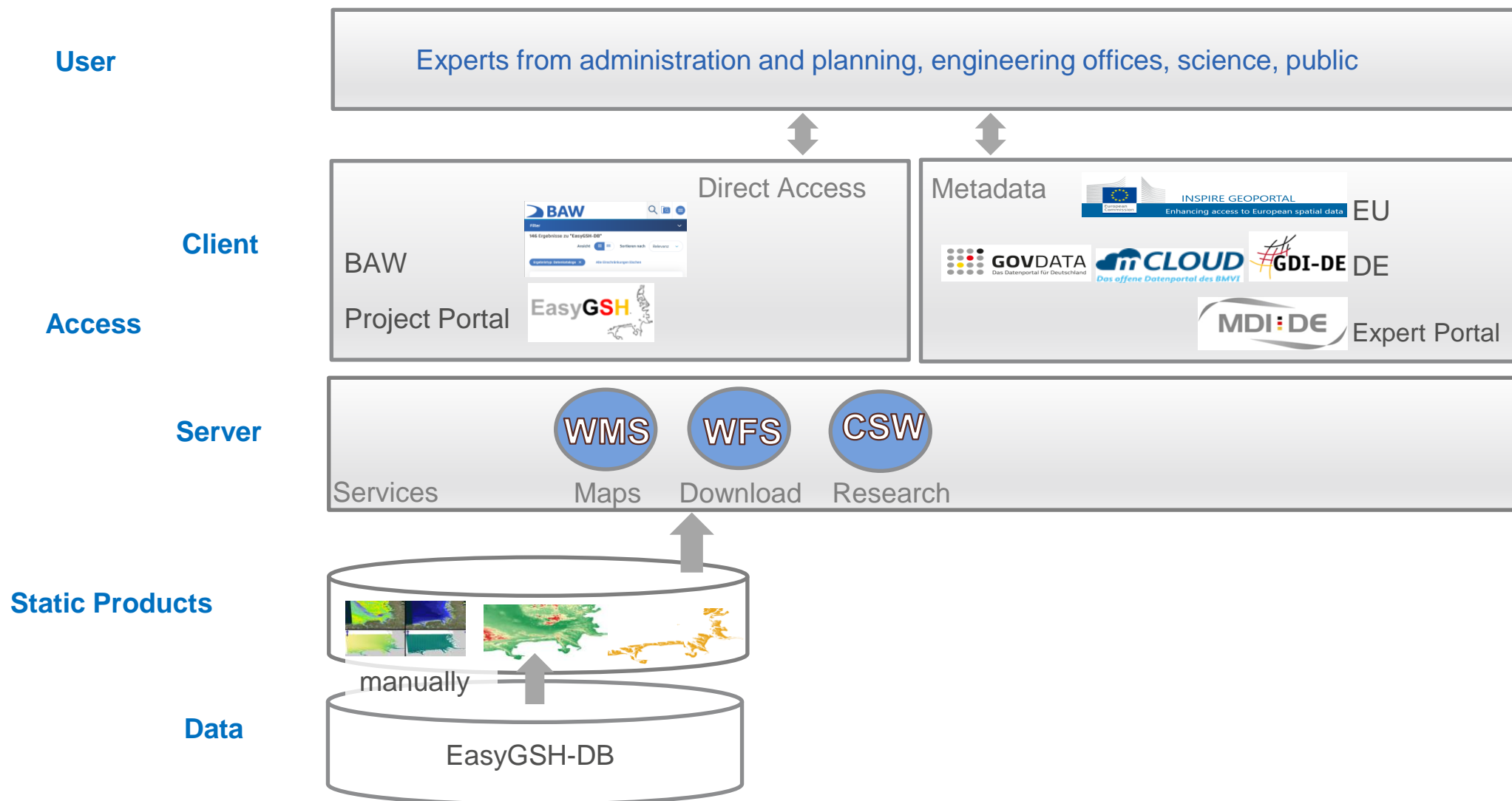
The coastal area of the German Bight is characterized by diverse formation of islands, mud flats, tufts and estuaries. As a result, complex, non-linear transformations of tidal and sea processes from open North Sea to the coast and into estuaries take place.

This hydro-, sediment- and morphodynamically active area is intensively used as settlement area, as recreational area, as nature reserve and also as economic area. In particular, for the Marine Strategy Framework Directive (MSFD) (2008) comprehensive data on hydrographic changes should be provided. In order to continue to ensure an environmentally friendly supply and to ensure legal and planning security for infrastructure projects in marine and coastal zone, it requires interdisciplinary and continuous research to expand the knowledge of natural environment, natural process chains and their response to anthropogenic interventions.

[Maps](#) [Download](#) [Closing event](#)

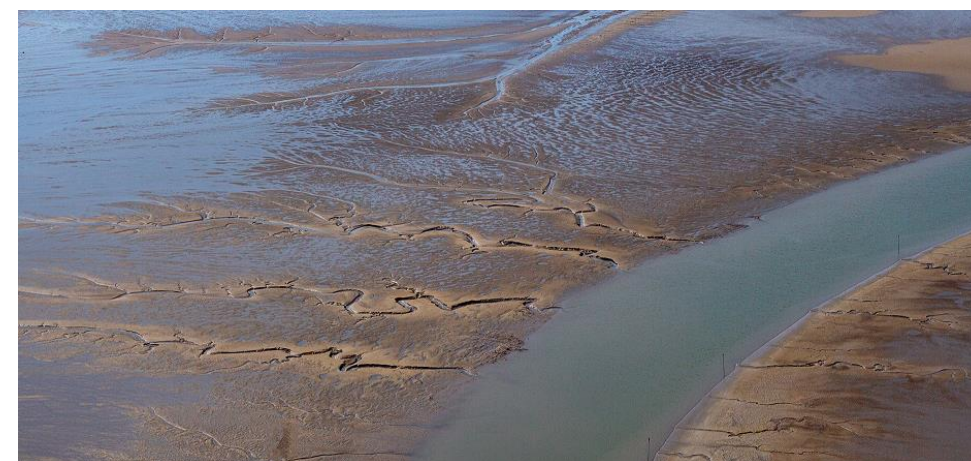
Source: BAW (EasyGSH-DB)

Existing infrastructure



Climate impact monitoring: Morphology

- Monitoring of changes in the morphology of the coasts of Schleswig-Holstein caused by climate change and relevant for coastal protection, recurrent reporting obligation
- Design of specification sheets
- **Data** compilation, quality assurance, .. (field data, tidal characteristics, ..)
- Performing **analyses** on the base data
- **Presentation of results** and visualization
- Periodic **reporting**



Source: BAW (Wattbefliegung)

Application of climate impact monitoring

Klimafolgenmonitoring Berichtskennblatt



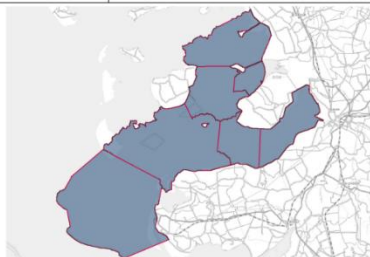
Jährliche Änderung der mittleren Geländehöhe des Intertidals

Norderhever - Heverstrom mit Tümlauer Bucht, Nordsee
2013 - 2019

I. Herkunft	
1. Verfasser	
2. Organisation	Landesbetrieb für Küstenschutz, Nationalpark und Meeresschutz Schleswig-Holstein (LKN.SH)
3. Anschrift	Herzog-Adolf-Straße 1 25813 Husum

II. Einordnung

1. Gebiet	Nordsee
2. Messstation-/Bereich	Norderhever - Heverstrom mit Tümlauer Bucht



3. Teilgebiete/-profile	-
4. Bezugspegel	Pellworm-Anleger
5. Zeitliche Einordnung	2013 (Referenz) 2019 (Auswertung)
6. Parameter	Watteinzugsgebiete
7. Bedeutung	Das Wattenmeer sorgt durch die Verringerung der Wassertiefe für eine Reduzierung der Wellenhöhen und damit auch der Wellenenergie, die bei Sturmflut auf die Deiche einwirkt und besitzt somit eine Schutzfunktion für die Deiche.

III. Eingangsdaten

1. Profil-/Gebietsdatensatz	7320_pol_Flaechenmessungen_KFM.shp
-----------------------------	------------------------------------

1

Stand 15. February 2022

Klimafolgenmonitoring Berichtskennblatt



Jährliche Änderung der mittleren Geländehöhe des Intertidals

Norderhever - Heverstrom mit Tümlauer Bucht, Nordsee
2013 - 2019

2. Höhenmodell-Datenbasis	DGM_10x10m_2013.grd (2013) DGM_10x10m_2019.grd (2019)
3. Tidekennwerte (10-jährige gld. Mittel)	MTnw (2013): -1,6640 m NHN MTnw (2019): -1,6560 m NHN MThw (2013): 1,4890 m NHN MThw (2019): 1,5120 m NHN

IV. Hauptindikator

1. Definition	Jährliche Änderung der mittleren Geländehöhe des Intertidals in den Grenzen von 2013 und 2019				
2. Methodenbeschreibung	In zusammengefassten Watteinzugsgebieten werden die Intertidalbereiche beider Jahre in den Grenzen definiert durch die Tidekennwerte je von Auswerte- und Referenzjahr ermittelt. Die Änderung der mittleren Geländehöhe wird jahresnominiert als Hauptindikator ausgewertet. Eine positive Änderung bedeutet eine Vergrößerung der mittleren Watthöhe innerhalb der jeweiligen Bezugsgrenzen.				
3. Auswertung	<table border="1"> <thead> <tr> <th>Intertidalgrenzen 2013</th> <th>Intertidalgrenzen 2019</th> </tr> </thead> <tbody> <tr> <td>0,3996 mm/a</td> <td>0,5175 mm/a</td> </tr> </tbody> </table>	Intertidalgrenzen 2013	Intertidalgrenzen 2019	0,3996 mm/a	0,5175 mm/a
Intertidalgrenzen 2013	Intertidalgrenzen 2019				
0,3996 mm/a	0,5175 mm/a				

4. Darstellung



5. Beschreibung der Entwicklung	
---------------------------------	--

2

Stand 15. February 2022

Klimafolgenmonitoring Berichtskennblatt



Jährliche Änderung der mittleren Geländehöhe des Intertidals

Norderhever - Heverstrom mit Tümlauer Bucht, Nordsee
2013 - 2019

V. Nebenindikatoren			
Definition	Wert	Einheit	Ort
Mittlere Höhe des Intertidals (Grenzen von 2019)	-0,1066	m	Norderhever - Heverstrom mit Tümlauer Bucht
Mittlere Höhe des Subtidals (Grenzen von 2019)	-7,7881	m	Norderhever - Heverstrom mit Tümlauer Bucht
Fläche des Intertidals (Grenzen von 2019)	265.093.800	m ²	Norderhever - Heverstrom mit Tümlauer Bucht
Fläche des Subtidals (Grenzen von 2019)	332.174.500	m ²	Norderhever - Heverstrom mit Tümlauer Bucht

3

Stand 15. February 2022

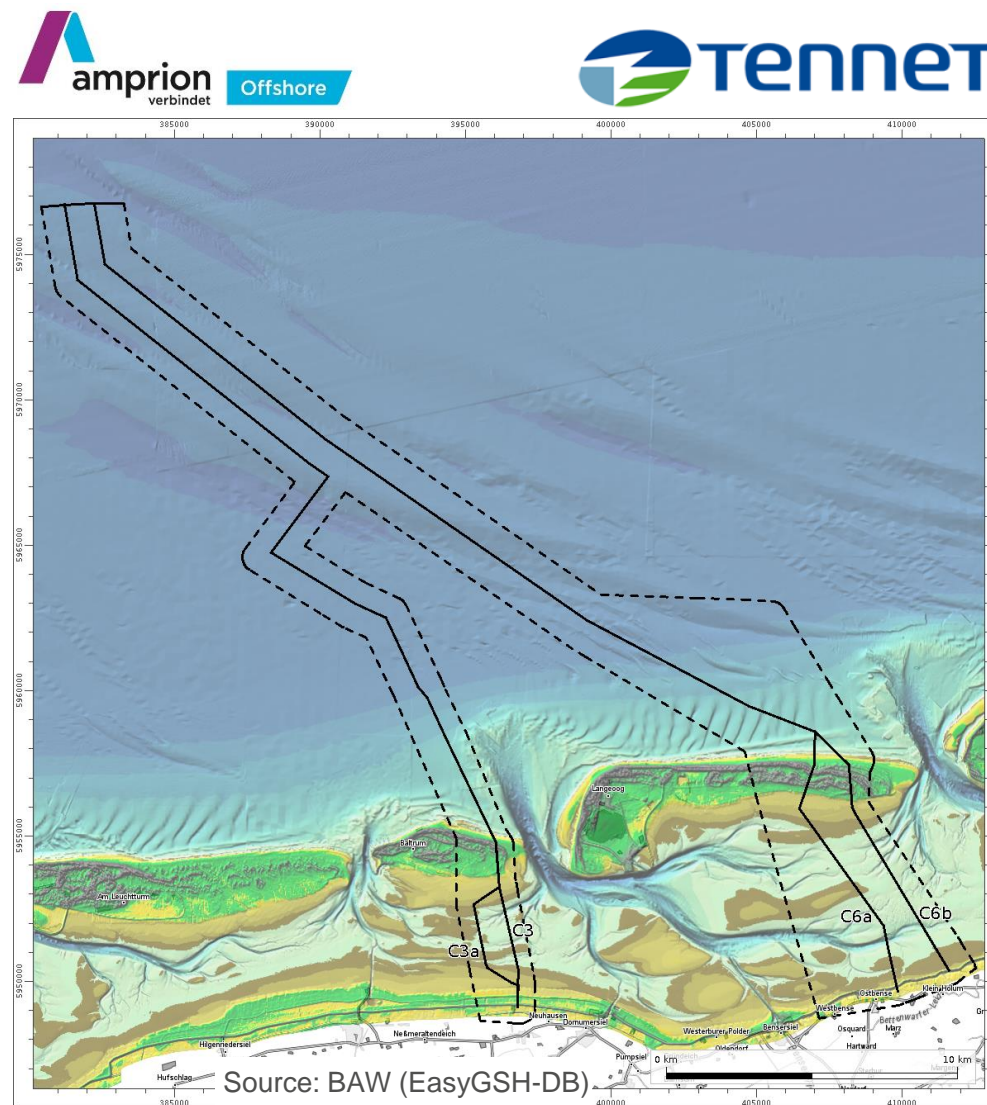
Reporting specification sheets
Morphology:
6 for the North Sea
3 for the Baltic Sea

TrilaWatt initial situation

Route finding and optimization

- Development and morphodynamics of the route corridors Baltrum and Langeoog for the “Seetrassen 2030” project
- Compile **Data**, quality assurance, (survey data,..)
- Perform **analysis** on the base data
- **Optimization** of the route depth
- **Presentation** of results and visualization
- **Reporting**

Study area and preferred routes

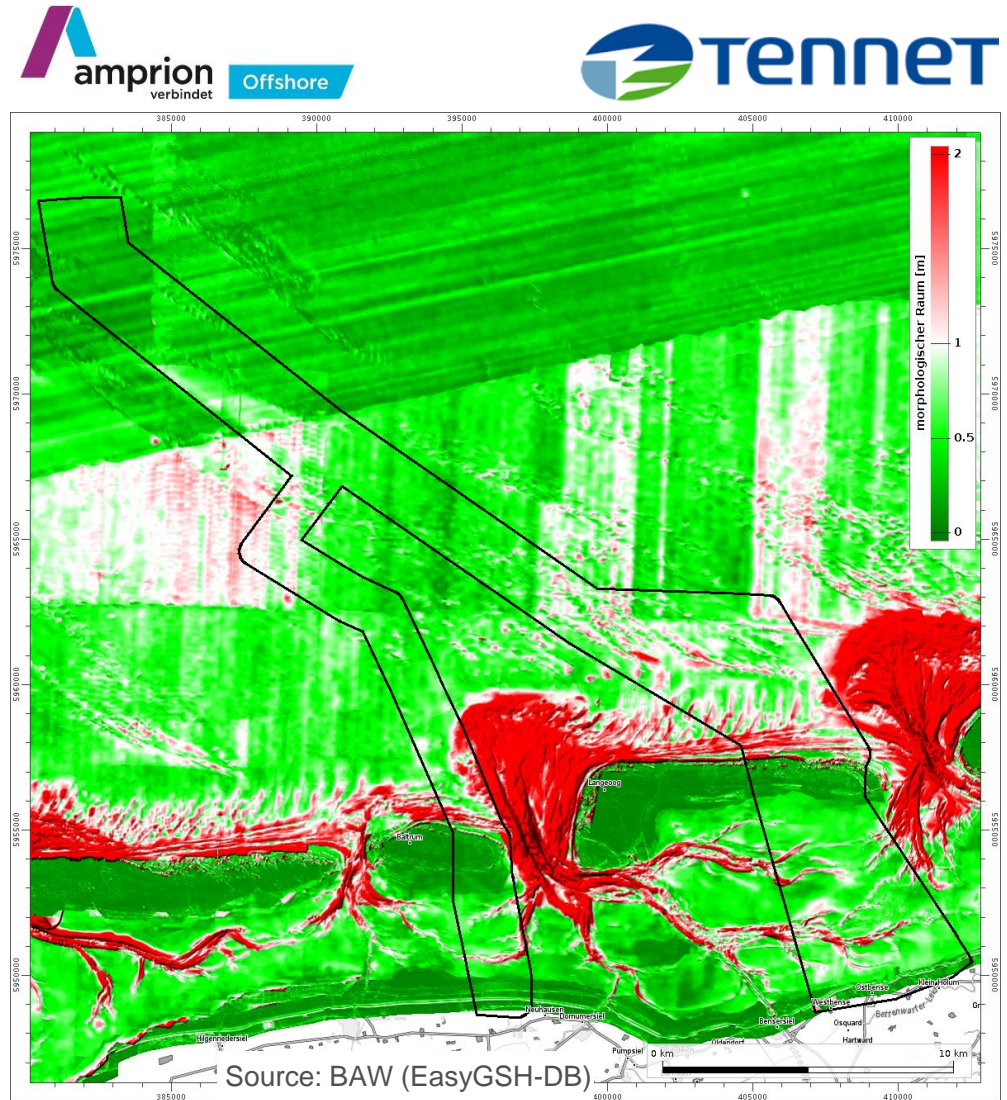


Route finding and optimization

Route position with regard to depth

- Determination of **morphological stability map** (space between smallest and largest measured depth z)
Stable to Unstable
- Determination of **minimal z**
- **Safe installation** depth results from minimal z
 and
 required coverage
- Consider the **allowed curvature radii** of the cables
- Determination of **necessary excavation** to the current position of the water bottom

Study area
and
preferred routes



Target groups

Examples: Operators and users - Trilateral Wadden Sea area (enumeration)

- Administrative units at different levels related to the Wadden Sea and the sea in general
- Research, e.g. Coastal Engineering
- Private economy, e.g. service providers for water and coastal water construction, energy network operators
- Concrete examples:
 - National Park Administrations/LKN.SH
 - Office for Regional State Development/LLUR
 - TenneT/Amprion
 - Waterways and Shipping Authority
 - Danish Coastal Authority
 - Rijkswaterstaat
 - Deltares
 - Trilateral Wadden Sea Cooperation

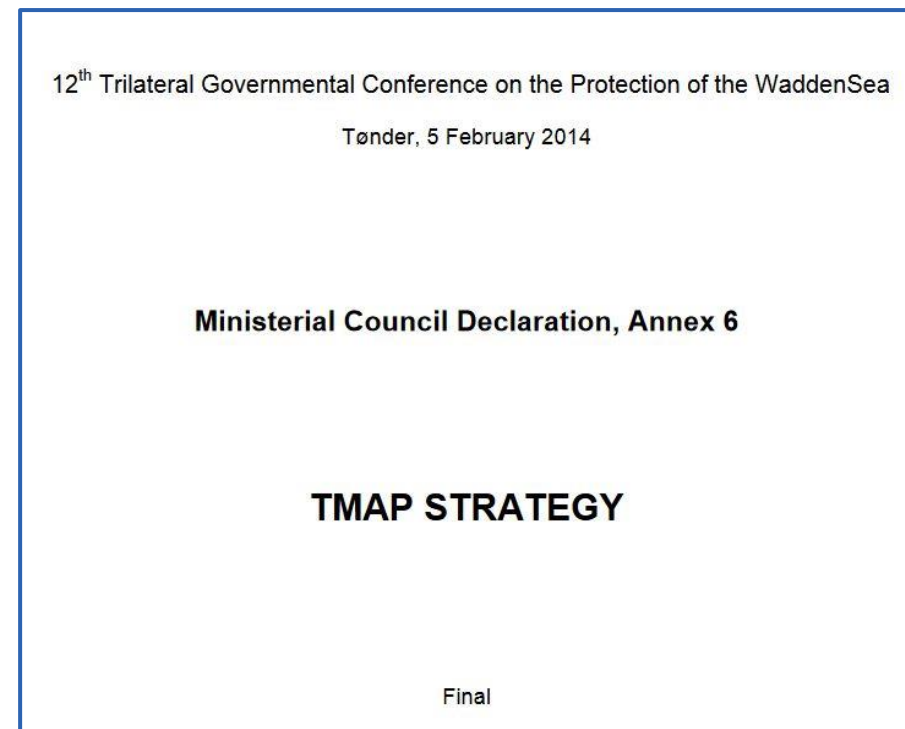


(Source: Herman Verheij)

Target groups

Specification: Data producer/handler and users - Trilateral Wadden Sea Cooperation

- Trilateral Monitoring and Assessment Programme (TMAP) should ...
 - ... support reporting for the EU and for World Heritage status
 - ... enable an integrative assessment for the application of the ecosystem approach in Wadden Sea protection



Target groups

Specification: Data producer/handler and users - Trilateral Wadden Sea Cooperation

- Trilateral Monitoring and Assessment Program (TMAP)
- Quality Status Report (2017)
-> „update in progress“
- Trilateral Initiative:
"Wadden Sea Sediment solutions –
Community of Understanding"



Photo: Rijkswaterstaat, NL (<https://beeldbank.rws.nl>). Zuiderduin 2011.

Target groups

Specification: Data producer/handler and users - Trilateral Wadden Sea Cooperation

- Trilateral Monitoring and Assessment Programme (TMAP)
- Quality Status Report (2017)
-> „update in progress“
- Trilateral Initiative:
„Wadden Sea Sediment solutions -
Community of Understanding“



Target groups

Specification: Data producer/handler and users - Trilateral Wadden Sea Cooperation

- Trilateral Monitoring and Assessment Programme (TMAP)
- Quality Status Report
- Trilaterale Initiative -> „Community of Understanding – Sediment Solutions“

- Digital Twin of Biology of the Wadden Sea -> NIOZ (NL)



Source: CWSS

Data and services

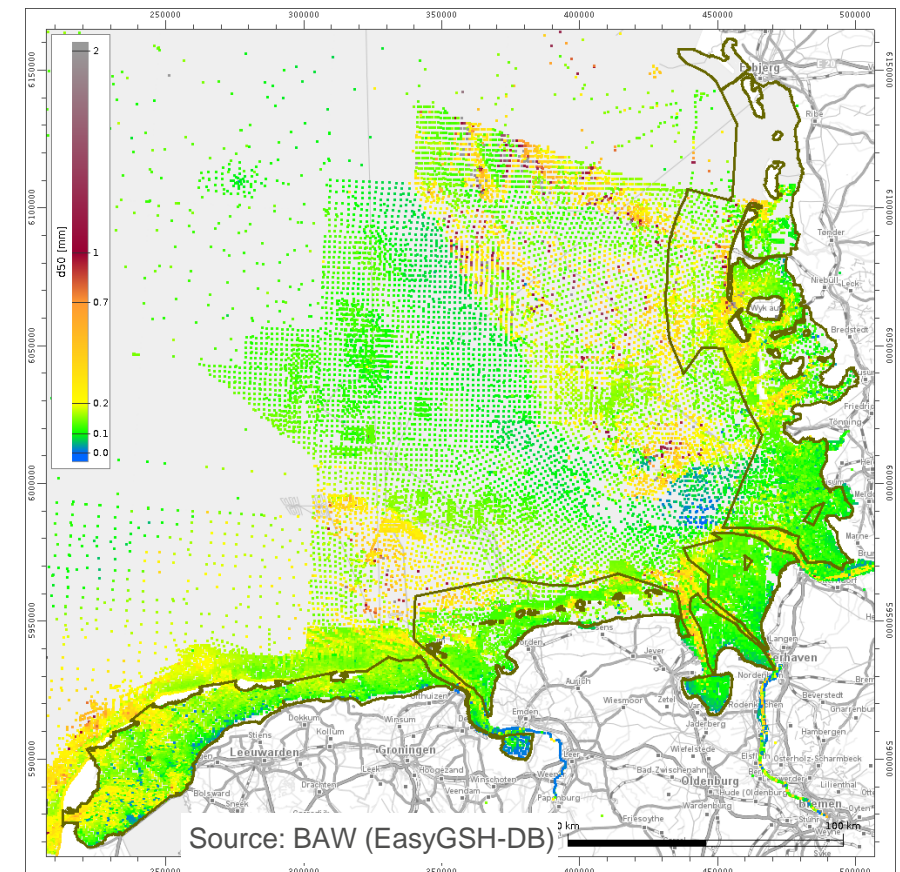
Homogenization and expansion of the data and product database

- Expansion and updating of the data and product database
- Optimization of data management using Big Data technology
- Quality management and assessment
- High reference and position systems

Homogenization and extension of services

- Partial automation through services
- Expanding and updating the services, including integration of Dutch & Danish services

Surface sediment samples
Status at project start



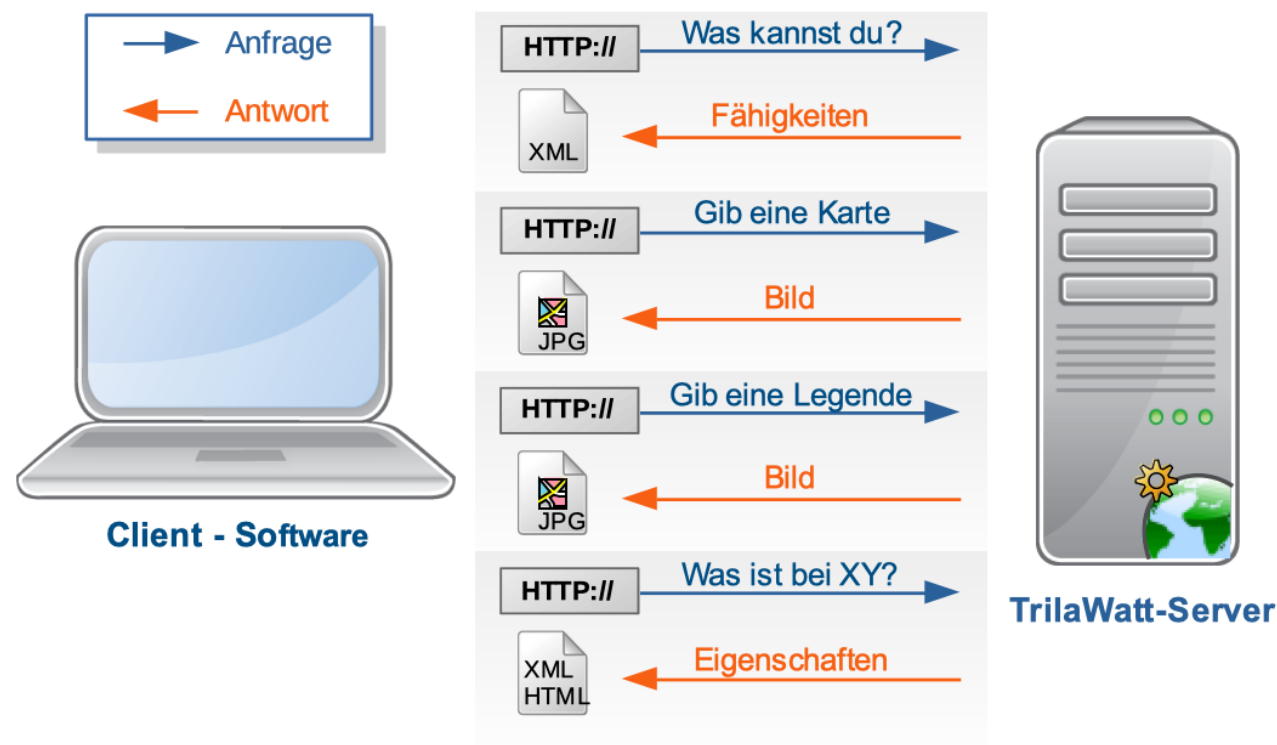
Methods and workflows

Method Library

- Directly on the basic and product data
- Web Map Service (WMS)
- Indirect via Web Processing Service (WPS)
- Templates and software components
- Development of process chains

WPS - Workflow

- Specification of interface definitions
- Development of templates and schemes
- Prototype realization of WPS process chains



Communication scheme of an OGC Web service

Server software



- + Widespread
- + WPS request builder
- + WPS process chaining



- + NetCDF support
- + Time series analysis with map selection
- + CSV download

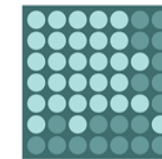
RichWPS



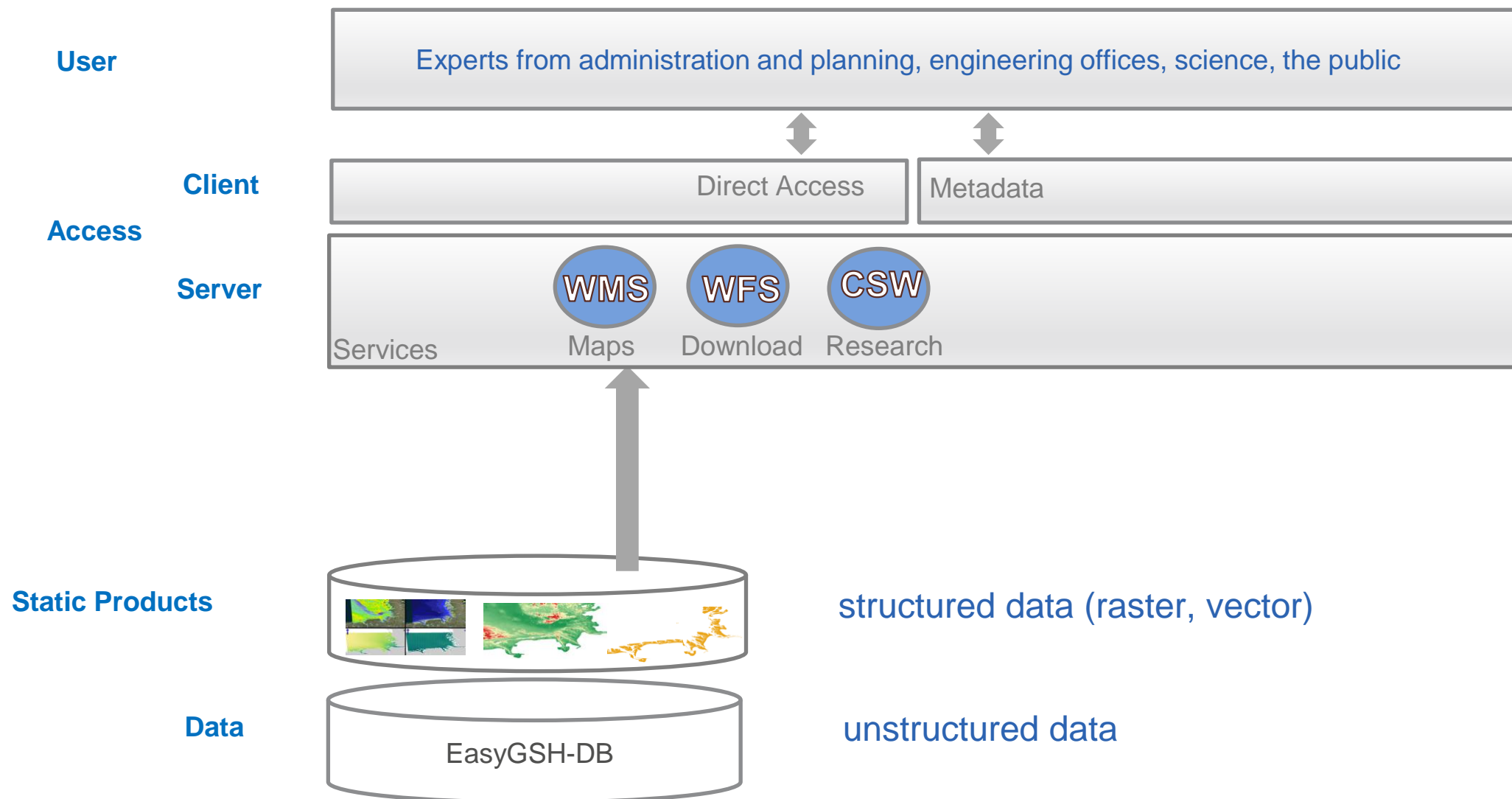
- + WPS processing with reporting
- + Prototype: macrophyte assessment

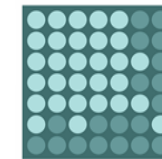


- + Big data handling
- + Extensive WPS operations
- + Datacubes / NetCDF

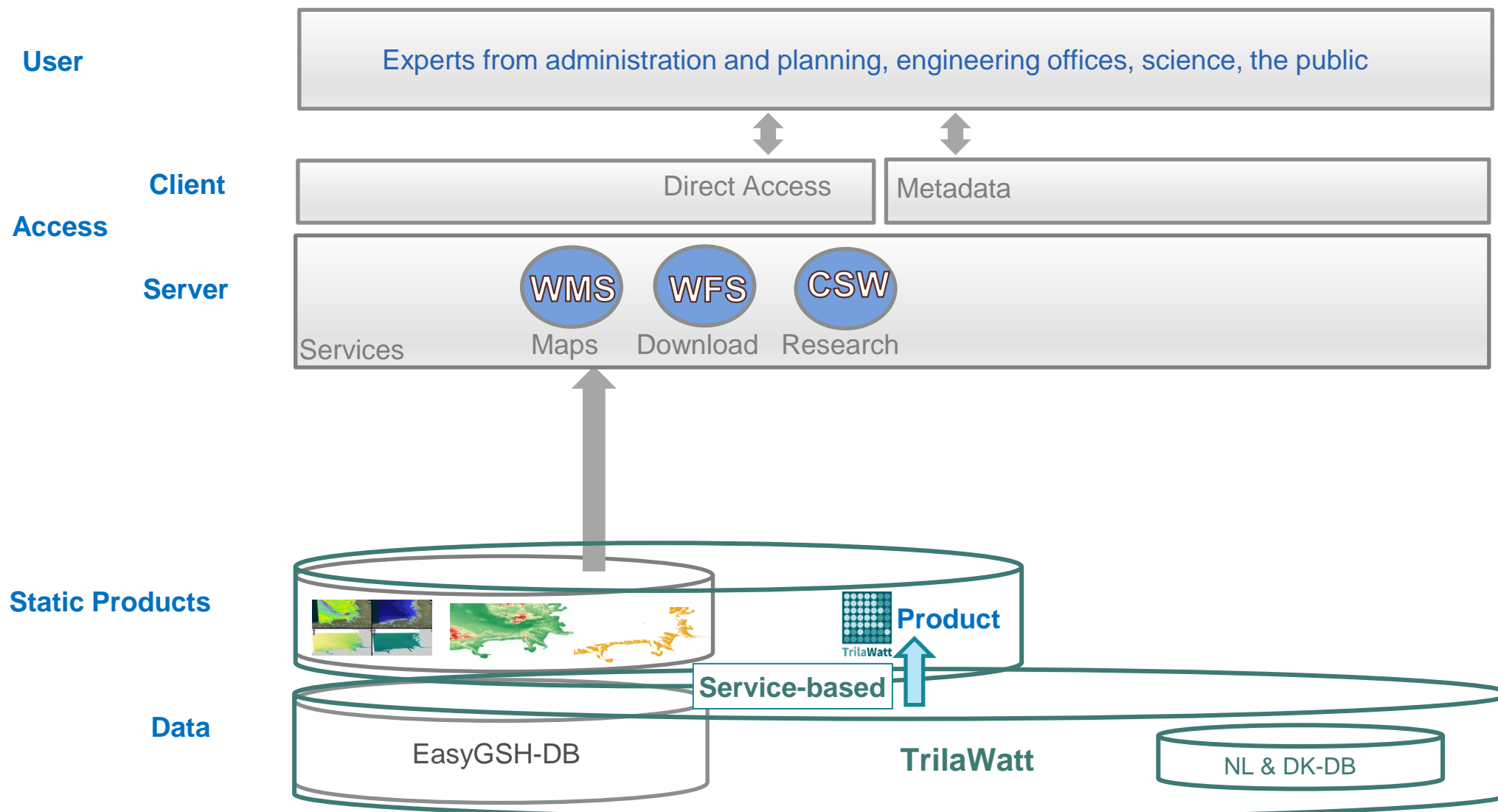


Existing infrastructure

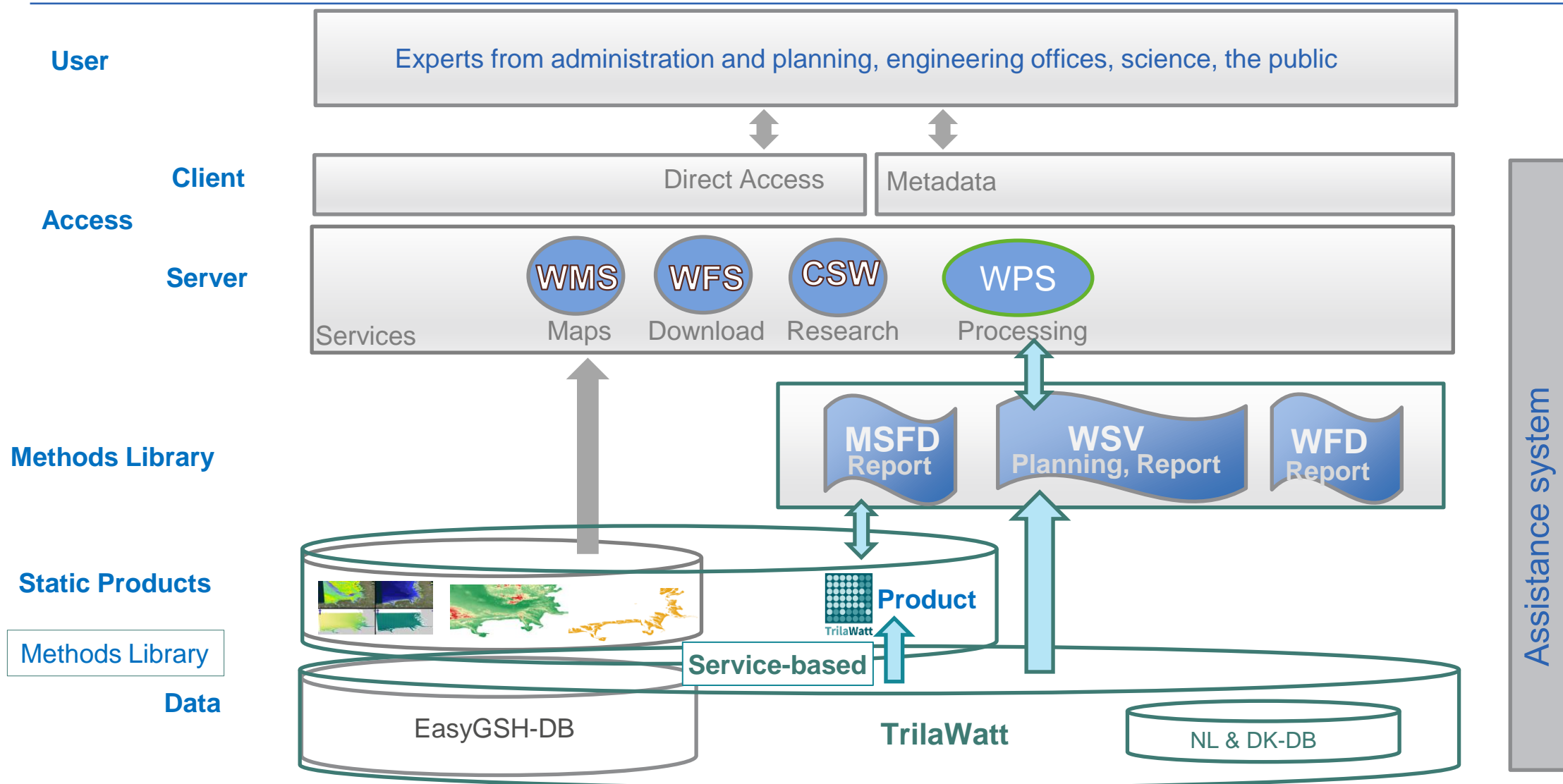


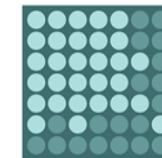


TrilaWatt infrastructure: Database



TrilaWatt infrastructure: Methods





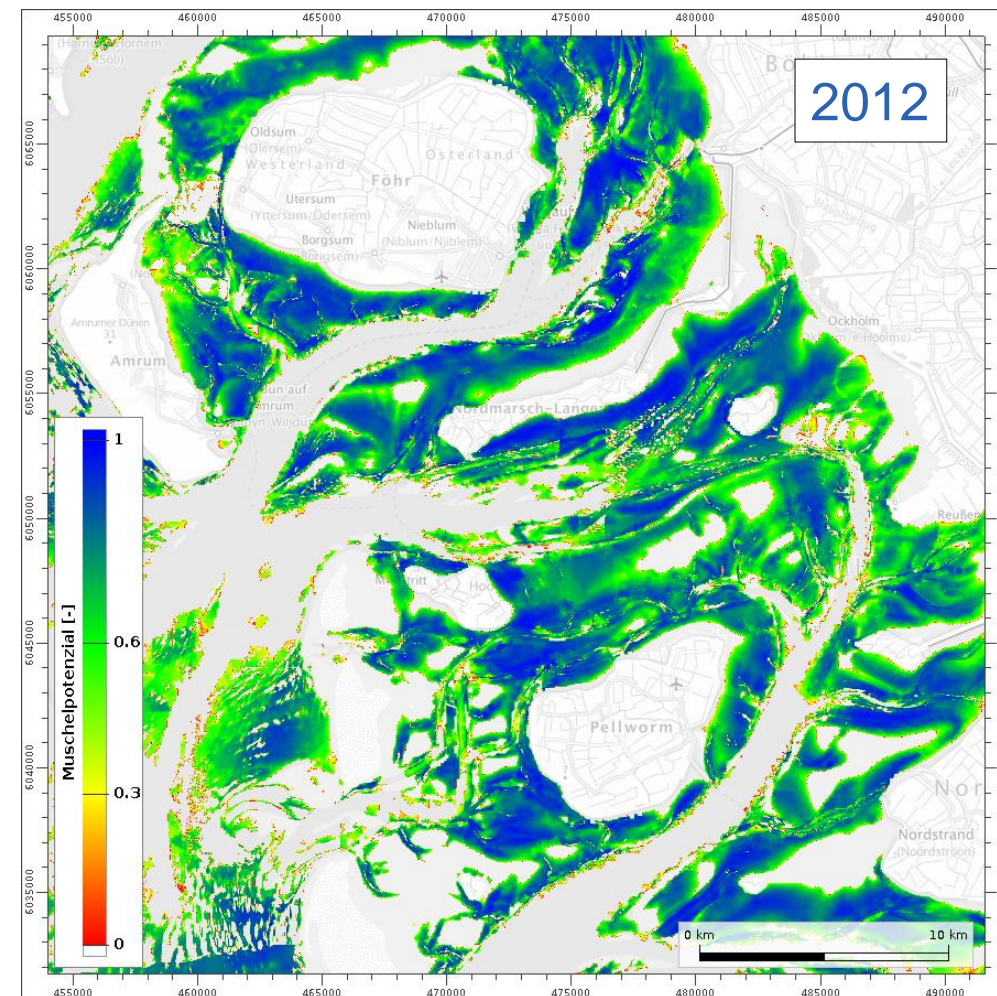
Application: Risk and potential analysis

Risk maps

- Erosion
- Siltation

Potential maps

- Shell Settlement
- Seagrass Settlement



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


Methodology: Process automation

Use of Web Processing Services (WPS)

Sample mussel potential map

* Salinity limits: ~19-28 ‰

Umweltparameter	Eulitorale Muschelvorkommen		
	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/m ²]	0,026	0,979	0,259
Bodenschubspannung Flut [N/m ²]	0,026	1,309	0,213
Wellenintensität / -brechen [W/m ²]	0	0,21	0,001
Salinität [‰]	18,676	27,717	24,379



The screenshot shows the GeoServer WPS Request-Builder interface. The 'Prozess wählen' (Process selection) dropdown is set to 'ras:RangeLookup'. The 'Prozessparameter' (Process parameters) section is configured as follows:

- coverage***: GridCoverage2D
- Input raster**: RASTER_LAYER (dropdown) and tw:1998_100m_mean_salinity_50q (dropdown)
- band - Integer**: Source band to use for classification (default is 0)
- ranges - Range(0-2147483647)**: Specifier for a value range in the format (START ; END). START and END values are optional. [and]
- outputPixelValues - int(0-2147483647)**: Value to be assigned to corresponding range
- noData - Double**: Value to be assigned to pixels outside any range (defaults to 0)
- Prozessergebnisse**: reclassified* - GridCoverage2D
- Generate**: Generate image/tiff (dropdown)
- Authentifizierung**: Authentifizieren (andernfalls werden die Anfragen als anonymous ausgeführt)

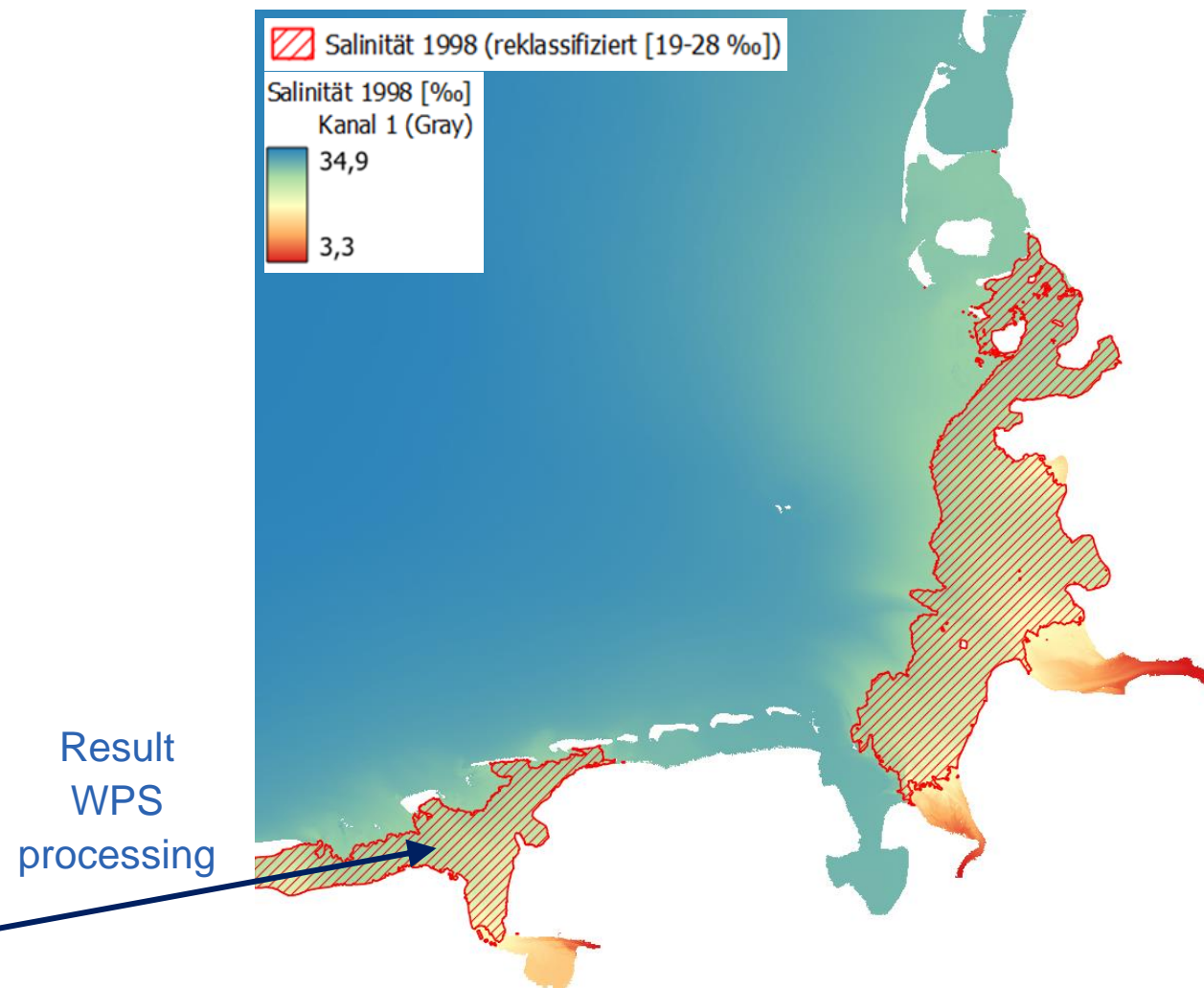
Buttons at the bottom include 'Prozess ausführen' and 'XML für Prozessparameter und -ergebnisse generieren'.

WPS to assess salt concentration

Sample mussel potential map





* Salinity limits: ~19-28 ‰

	Eulitorale Muschelvorkommen		
<i>Umweltparameter</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Median</i>
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/m ²]	0,026	0,979	0,259
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Wellenintensität / -brechen [W/m ²]	0	0,21	0,001
Salinität [‰]	18,676	27,717	24,379

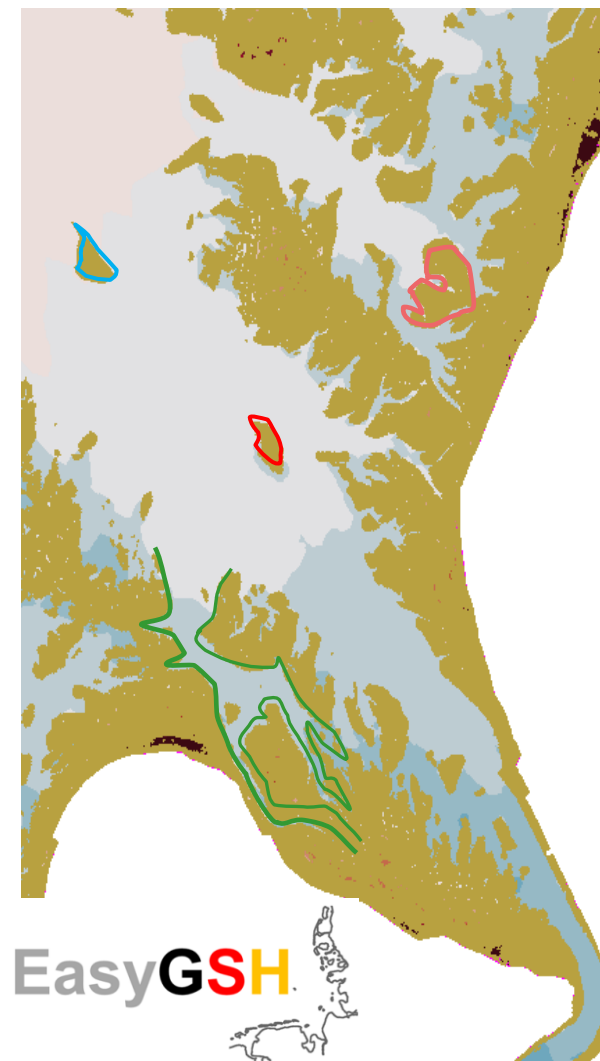


Application of mudflat edges from satellite imaging



-  Wurster Watt
-  Tegeler Plate
-  Robbenplate
-  Fedderwarder Priel

DLR-image:
 3.8.2013 - 17⁰² UTC
 Pixel resolution:
 3 m



HN-Simulation:
 3.8.2013-17⁰⁰ UTC
 Grid resolution:
 400 - 500 m, with
 SubGrid \approx 30 m

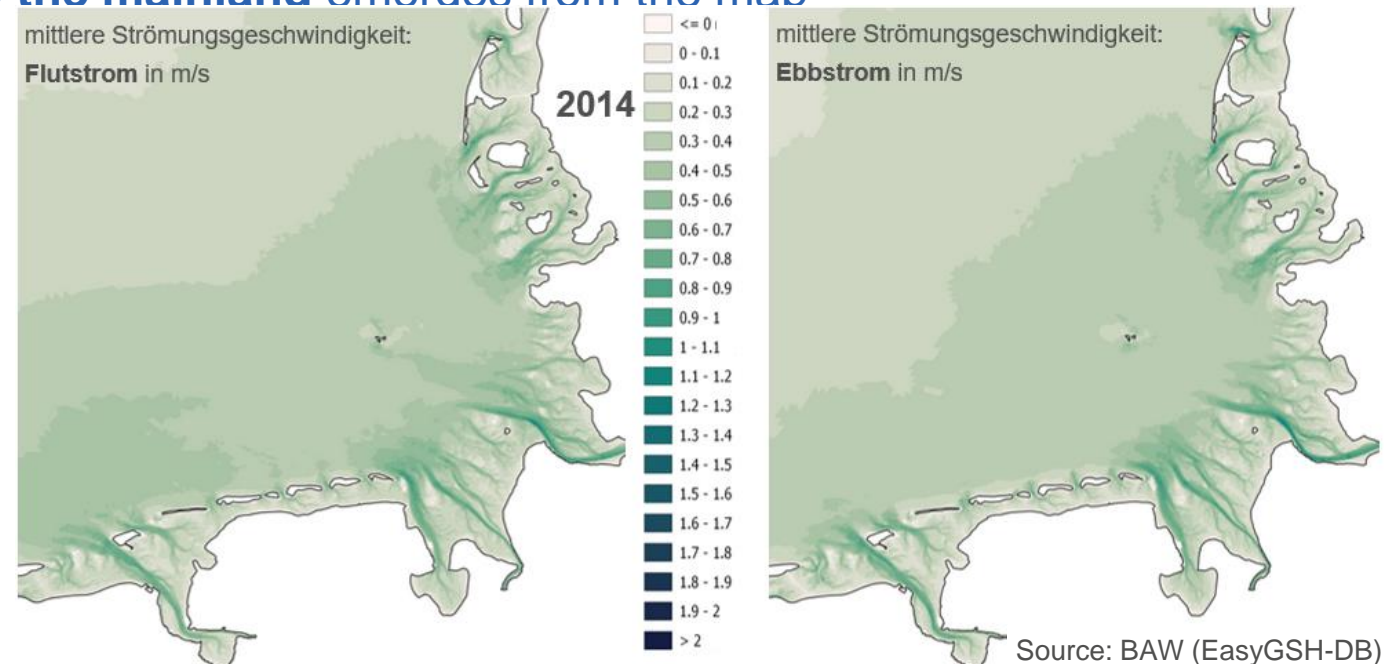
Application: Green Energy

Site search for tidal energy plants

GFC

GREEN FINANCE CORP.

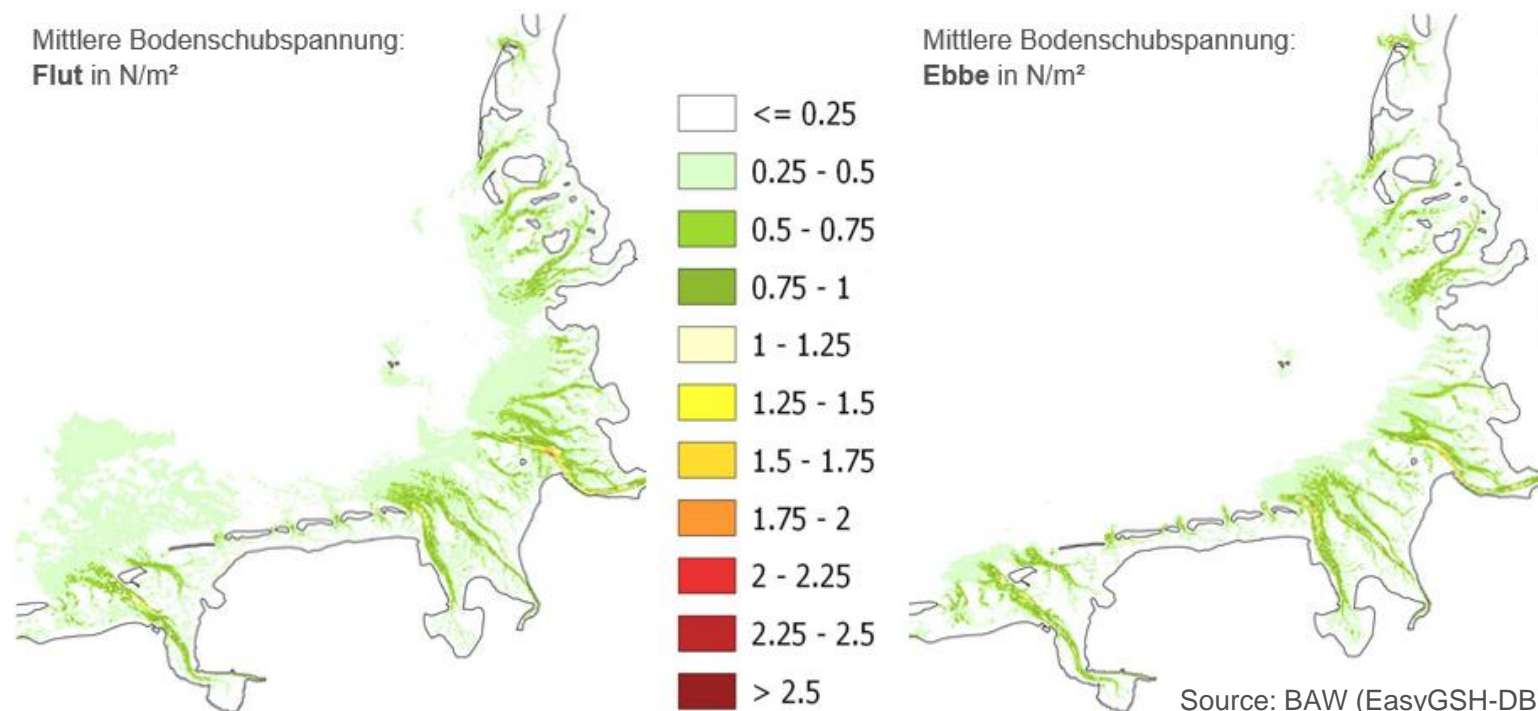
- Finding the necessary tidal current intensity: **Analyses (V_{Fm} , V_{Em} , V_{Fmx} , V_{Emx})**
- **Safe Installation depth: Morphological Stability map** (Difference smallest/largest depth z)
- Determination of minimum water depth (**TIw, min z**)
- **Site selection concerning distance to the mainland emerges from the map**



Application: Habitat types

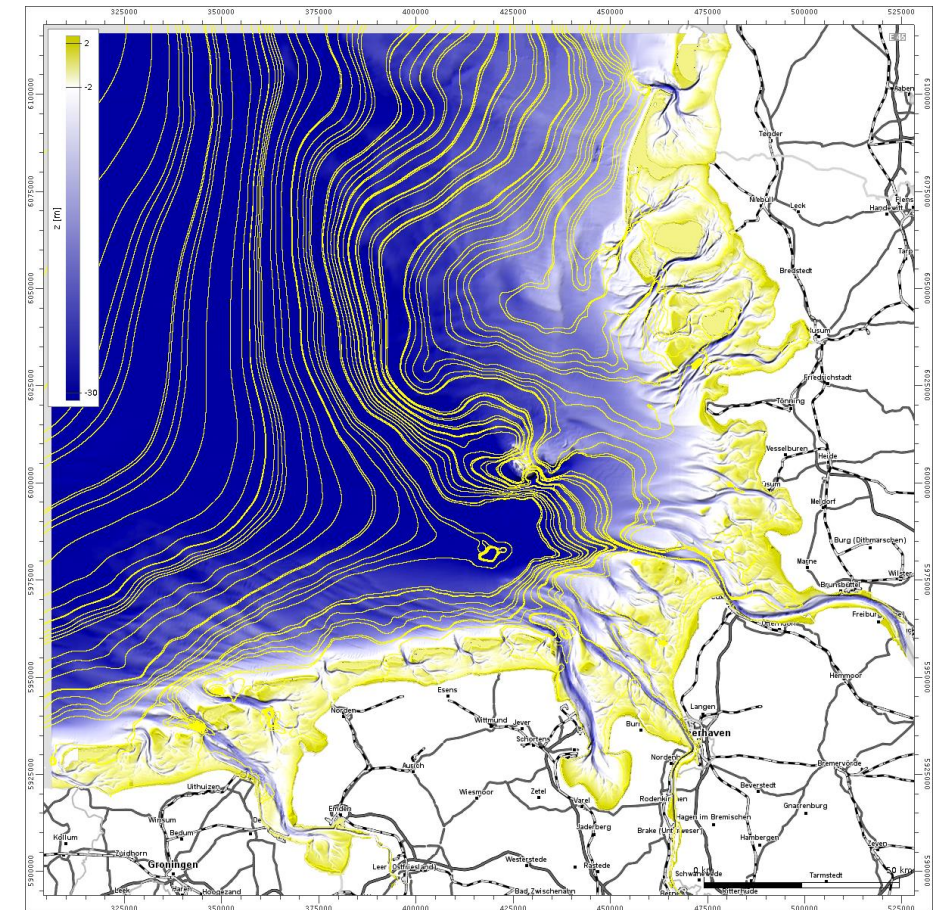
Mussel beds: Occurrence and population

- Flow velocities and bottom shear stresses: **analyses** (V_{Fm} , V_{Em} , V_{Fmx} , V_{emx} , τ_B)
- **Morphological stability map** (difference smallest/largest depth z)
- Determination of **minimum water depth** (T_{lw} , $\min z$)



Expected project results

- Synoptic, QS - secured and freely available data base
 - geodata + simulations + analyses
 - bilingual metadata and services
- Data innovation
 - Big-Data-/Smart-Data-management
- Assistance system
 - schemata processing
 - semi-automatic product generation
- Generic infrastructure
 - networked
 - interdisciplinary
- Practice-oriented application
 - material for reporting requirements



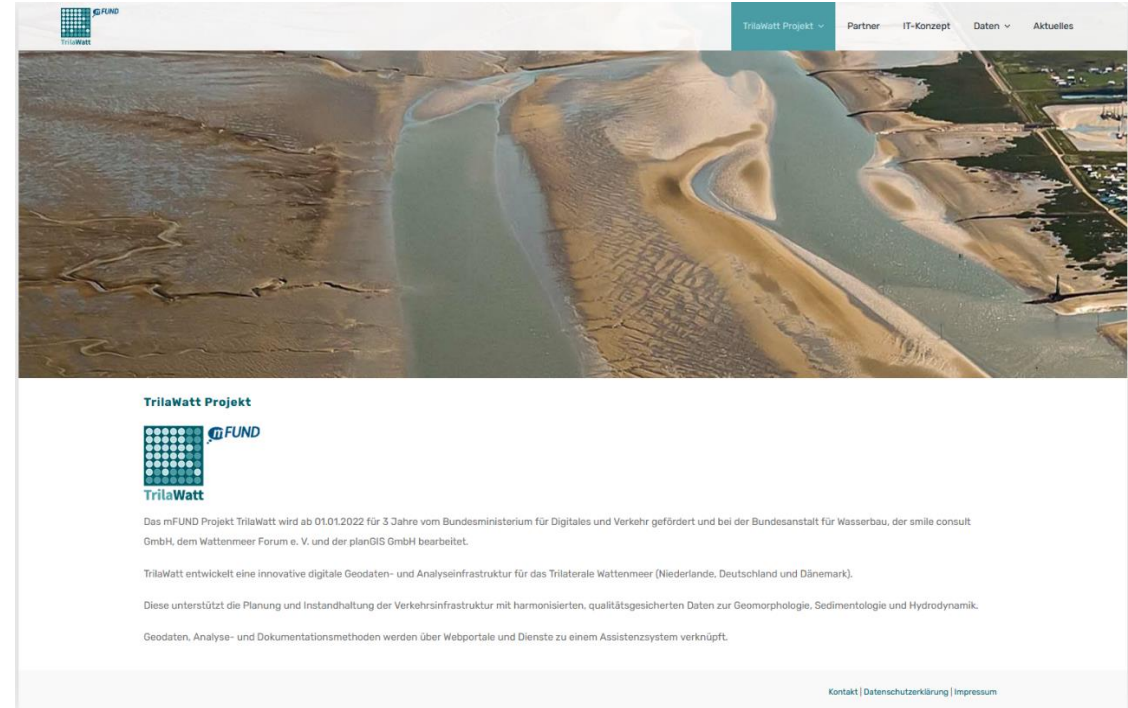
resulting streamlines 2006 [EasyGSH-DB]

Technical networking

- TrilaWatt web portal
 - Project details
 - direct access to database and data products
 - TrilaWatt cloud

- Marine Data Infrastructure Germany MDI-DE
 - Metadata for data and services
 - Catalog search (Catalog Service Web)
 - Map-viewer (Web Map Service)
 - Download (Web Feature Service)
 - Processing (Web Processing Service)
 - MDI-DE working groups

- Trilateral Wadden Sea cooperation



<https://trilawatt.eu/>

Integration into the Marine Data Infrastructure Germany

Search for data and services
by harvesting of standardized metadata

International



National



Subject / Expert Portal



Project Portal



Search and find data in the MDI-DE

Using EasyGSH-DB as an example

The screenshot shows the MDI-DE Geoportal interface. At the top, there is a search bar with the text 'bathymetry 2005' and navigation options like 'Info', 'Basemap', and 'DE'. Below the search bar is a map of the German coast, with a blue rectangular box highlighting a specific area. The map shows bathymetry data with a color scale from light blue (shallow) to dark blue (deep). Labels for various coastal locations are visible, including Emsbürg, Kiel, Cuxhaven, Wilhelmshaven, Bremerhaven, Emden, Hamburg, Lübeck, and Wismar.

Below the map is the 'Result Center' panel. It contains a search bar with 'Items 1-39 of 39: 10 | 25 | 50' and a list of search results. The first result is 'EasyGSH-DB: Bathymetrie 2005' with the following details:

- EasyGSH-DB: Bathymetrie 2005**
- Publisher: Bundesanstalt für Wasserbau, smile consult GmbH, smile consult GmbH
- Catalog: MDI-DE (IGE)
- Abstract: Definition: "Bathymetrie" bezeichnet die Vermessung der topographischen Gestalt der Sohle eines Gewässers. Der Begriff wird auch oft – analog zum Wort "Topographie" – synonym für die Gestalt der Gewässersohle verwendet. Gewässer in diesem Zusammenhang ...
- Type: Dataset

The second result is 'Bathymetrie Deutsche Bucht Modelgitterpunkte (Projekt Aufmod) 2005' with the following details:

- Bathymetrie Deutsche Bucht Modelgitterpunkte (Projekt Aufmod) 2005**
- Publisher: Bundesamt für Seeschifffahrt und Hydrographie (BSH)
- Catalog: MDI-DE Katalog
- Abstract: Raumzeitliche Interpolationen jährlicher Tiefen ueber den Zeitraum 1982-2012. Fuer jeden Jahres-Tiefendatensatz sind 2 Parameter zur Vertrauenswuerdigkeit des interpolierten Tiefenwertes angegeben: Confidence und zeitlicher Abstand zur naechst gelegenen ...
- Type: Dataset

The third result is 'Bathymetrie Deutsche Bucht Modelgitterpunkte (Projekt Aufmod) 1988' with the following details:

- Bathymetrie Deutsche Bucht Modelgitterpunkte (Projekt Aufmod) 1988**
- Publisher: Bundesamt für Seeschifffahrt und Hydrographie (BSH)

At the bottom of the interface, there is a footer with navigation links like 'Theme Gallery', 'Result Center', 'Table of contents', 'Legend', 'Terms of Use', 'Imprint', 'Serviceoverview MDI-DE', 'Accessibility', and 'Report Accessibility issue'. A scale bar and coordinate information are also visible.

<https://mdi-de.org>

Search and find data in the *mCLOUD*

Using EasyGSH-DB as an example



Über mCLOUD Blog FAQ Kontakt

Bathymetrie 2005

RAUMBEZUG (2) ^



ZEITBEZUG (2) v

2 Datensätze

Sortieren nach

Relevanz v

EasyGSH-DB: Bathymetrie 2005

Definition:

“Bathymetrie” bezeichnet die Vermessung der topographischen Gestalt der Sohle eines Gewässers. Der Begriff wird auch oft – analog zum Wort “Topographie” – synonym für die Gestalt der Gewässersohle verwendet. Gewässer in diesem Zusammenhang sind Meere, Flüsse oder geschlossene Binnengewässer. Im Rahmen des Projektes EasyGSH handelt es sich bei bathymetrischen Datensätzen um solche, die die Höhenverteilung in der Deutschen Bucht inklusive der

Bereitgestellt durch

smile consult GmbH (smile)

Art des Datenzugangs

[ZIP](#) / [GeoTIFF](#) / [Shape](#) / [WFS](#) / [WCS](#) / [GML](#) / [WMS](#)

Aktualität der

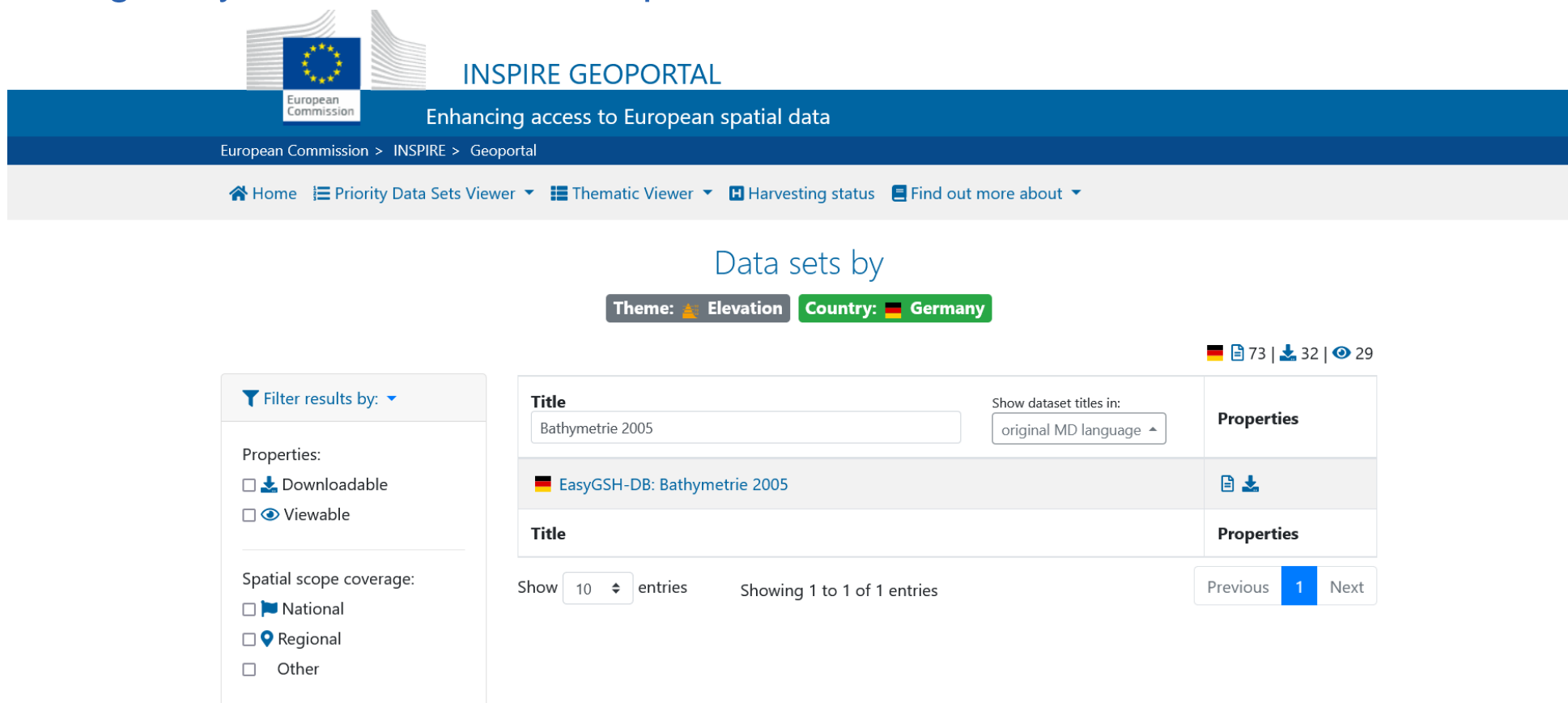
Datensatzbeschreibung

13.10.2020

<https://www.mcloud.de>

Search and find data in the INSPIRE Geoportal

Using EasyGSH-DB as an example



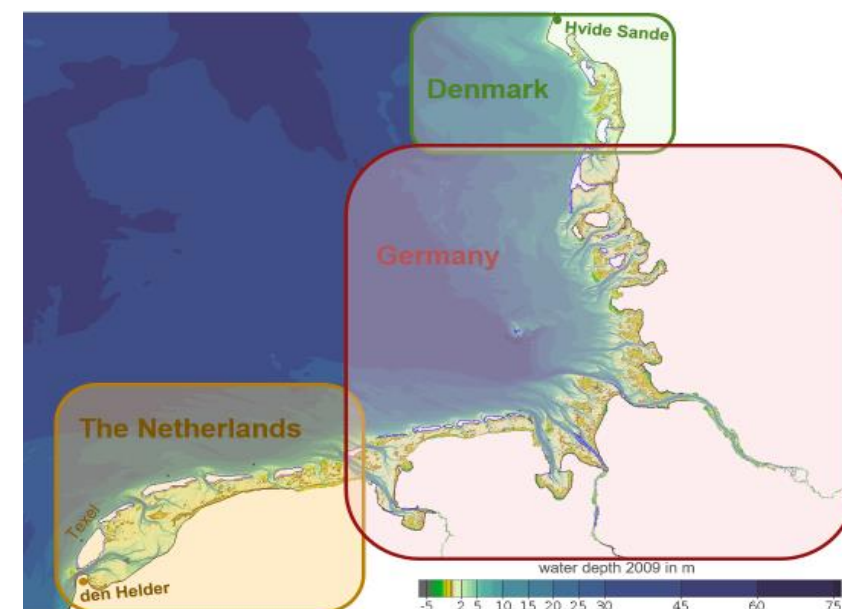
The screenshot shows the INSPIRE Geoportal interface. At the top, there is a navigation bar with the European Commission logo and the text 'INSPIRE GEOPORTAL Enhancing access to European spatial data'. Below this is a breadcrumb trail: 'European Commission > INSPIRE > Geoportal'. A secondary navigation bar contains links for 'Home', 'Priority Data Sets Viewer', 'Thematic Viewer', 'Harvesting status', and 'Find out more about'. The main content area is titled 'Data sets by' and shows filters for 'Theme: Elevation' and 'Country: Germany'. A statistics bar indicates 73 datasets, 32 downloads, and 29 views. On the left, a 'Filter results by' sidebar includes options for 'Properties' (Downloadable, Viewable) and 'Spatial scope coverage' (National, Regional, Other). The main results area shows a single entry: 'Bathymetrie 2005' with a dropdown menu set to 'original MD language'. Below the entry, there is a 'Show 10 entries' dropdown and 'Showing 1 to 1 of 1 entries'. A pagination bar shows 'Previous 1 Next'.

<https://inspire.ec.europa.eu>

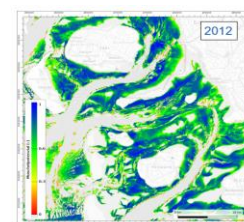
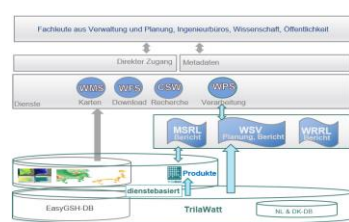
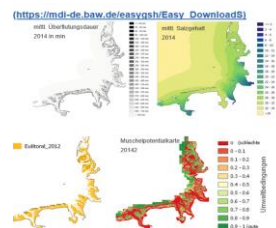
Project execution/ management

Next Steps

- Trilateral **stakeholder analysis** - Identification of potential data users, data holders and other users
- Questions and tasks - Identification of **pilot applications** together with the stakeholders
- Involvement of **interested users** in the joint processing of the respective question/task
- Data retrieval and database extension
- Data **harmonization**
- Establish data **interoperability**

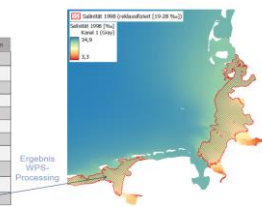


- works on **international level** on a **coherent database** for the **Trilateral Wadden Sea Cooperation**
- creates **consistent, quality-assured data records**
- develops services-based **methods** for **automated reporting**
- makes the developed **results** and **products** available via **known data portals**
- would like to encourage **users** from different sectors to become "problem owners" and to seek **cooperation with the TrilaWatt consortium**
- offers the opportunity to work on **selected issues concerning the trilateral Wadden Sea Area**



Beispiel Muschelpotenzialkarte
* Gewässweite Mittelwert -19,29 ‰

Umweltparameter	Eutrophie Muschelpotenzial		
	Minimum	Maximum	Mittelwert
Erreichte / Sedimentationsrate (g / Jahr)	0,3	0,7	-
Sedimentverteilung 450 (mm)	0,079	0,052	0,175
rel. Trockenfallzeit / Jahr (%)	0	42,209	14,343
mittl. Chlorophyll a (µg/L)	0,003	0,042	0,106
mittl. Fluorid (mg/L)	0,023	0,317	0,153
Ordnungszahl (mg/L)	0,074	0,304	0,200
Bodenschlammgehalt Erde (mg/L)	0,026	0,979	0,209
Bodenschlammgehalt Flut (mg/L)	0,026	1,309	0,213
Wellenenergie / Bereich (mg/L)	0	0,21	0,003
Mittelwert (g)	18,676	27,717	24,175

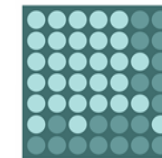


Suche nach Daten und Diensten durch Harvesten von standardisierten Metadaten



Webportal





Discussion and questions in the group of participants

Discussion (All)

- Form
- Goals
- Content
- Communication
- Deployment
- Usage
- Perspectives

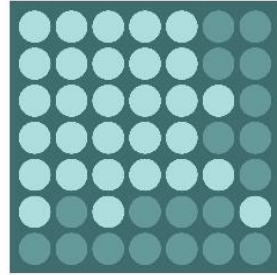
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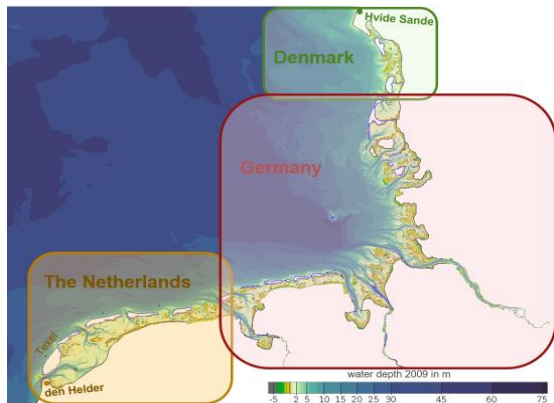
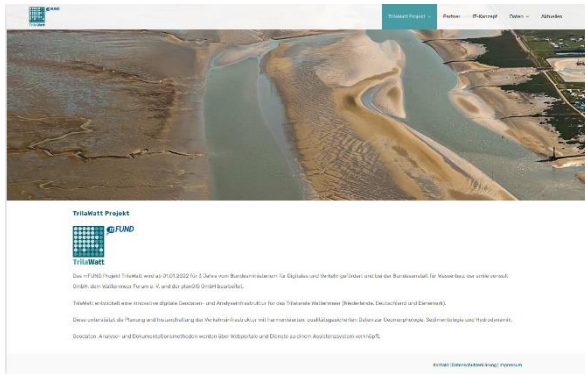
Passcode: watt

Supported by:



TrilaWatt

on the basis of a decision
by the German Bundestag



Source: TrilaWatt

Thank you for your interest
and attention!

Federal Waterways Engineering and
Research Institute
Bundesanstalt für Wasserbau
22559 Hamburg

www.baw.de

thank you!
hartelijk dank!
mange tak!