NewSea

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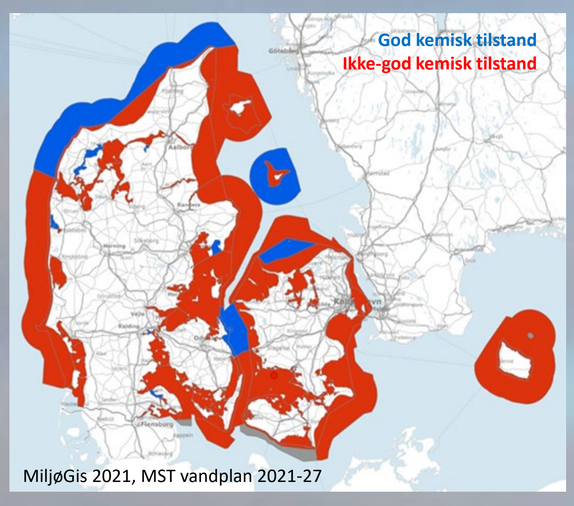
[2]- Department of Environmental Science, Aarhus University

[3]- Danish Board of Technology

New concept for integrated assessment of pollution sources in the Sea (NewSea)

Nyt koncept til integreret miljøvurdering af forureningskilder i havet

NewSea project **aims** at developing **a new concept** including several tools **for assessing distribution and effects** of **hazardous substances** (HS) discharged from point sources to **coastal waters**



MiljøGis 2021, MST vandplan 2021-27









Examples of various point sources of hazardous substances in coastal waters in different countries, e.g. industrial facilities in proximity to marine areas and rivers, marine traffic and waste water drains.

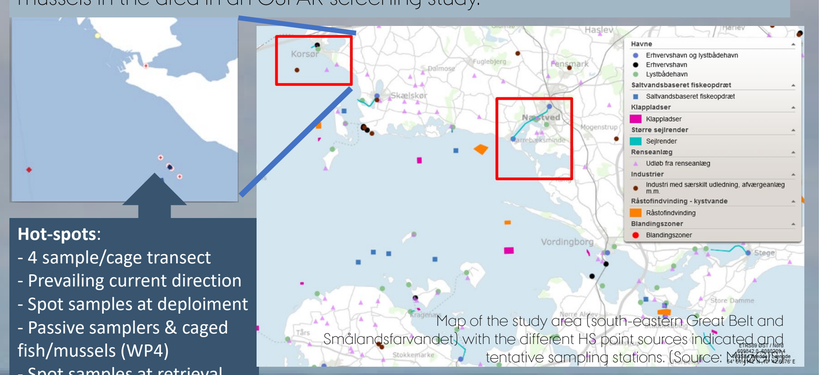
WP1: Societal relevance and engagement

- To inform relevant, local stakeholder groups and citizens on research activities, planned participatory processes, and project outcome.
- To inform and engage relevant, local stakeholder groups, citizens, and policy makers on the issues of polluting sources in the local environment
- To provide input and democratic legitimization for new assessment and governance practices in regulation and management of HS in the sea.
- To inform policymakers on a local, regional, and national level on potential new assessment and governance practices in environmental regulation.

WP2: Point sources and current levels

- Identification of relevant point sources of HS and potential risks in the South-Eastern Great Belt and Smålandsfarvandet. Selection of focus areas and key HS.

- To provide concentration levels in spot samples and passive samplers averaged over 14-21 days as input to models (WP3) and deploy passive samplers for collecting realistic mixtures for toxicity testing (WP4), together with measured levels in fish, mussels, and seals.
- To combine the passive sampling with advanced chemical screening techniques and compare with recent non-target screening results for fish and mussels in the area in an OSPAR screening study.



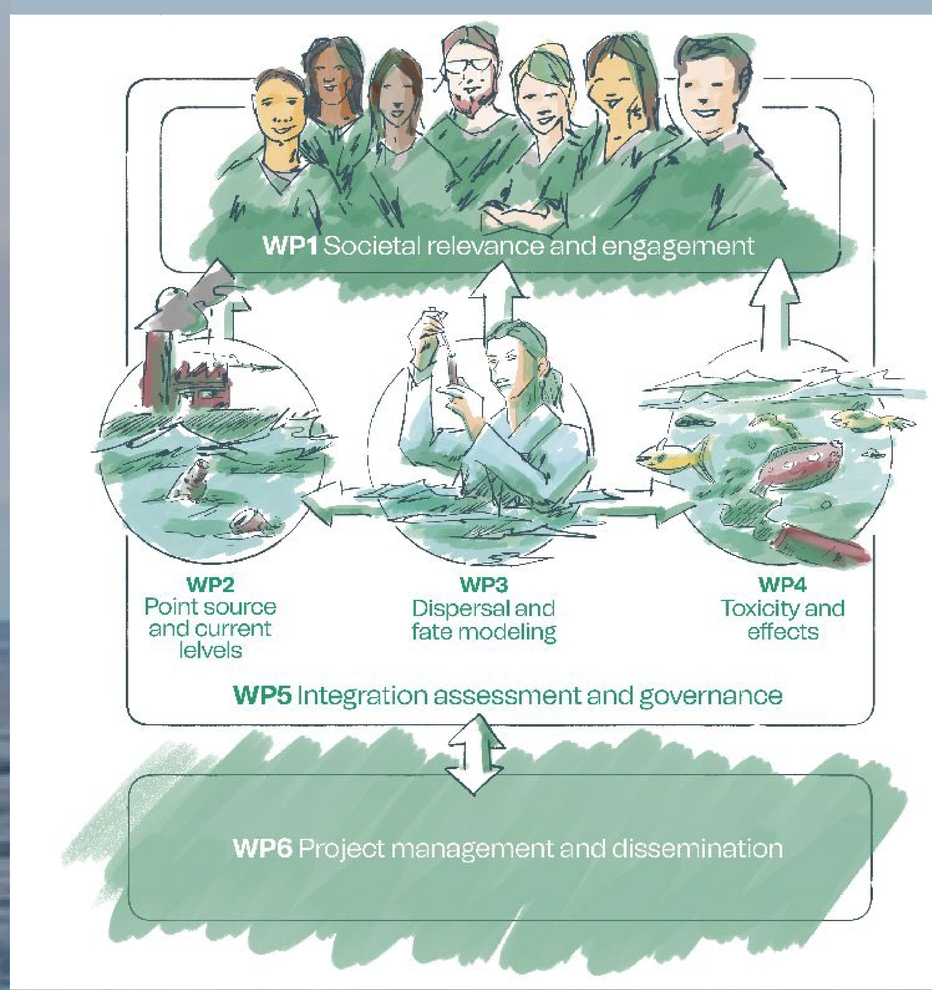
Map of the study area (south-eastern Great Belt and Smålandsfarvandet) with the different HS point sources indicated and tentative sampling stations. (Source: MiljøGIS)

Hot-spots:
- 4 sample/cage transect
- Prevailing current direction
- Spot samples at deploiment
- Passive samplers & caged fish/mussels (WP4)
- Spot samples at retrieval



Passive samplers for water concentrations
- Metals DGT
- PFOS DGT
- NTA/effects

Calibration/control of model output:
- Samples of metals/PFOS etc. for calibrating the models,
- Passive samples for time - integrated sampling
- CTD profiles at random samples and temperature logs
- Sediment and biota samples for drainage and biologically available content



WP4: Toxicity and effects

- To develop and implement effect-based methods of impact assessment

- To integrate biological and chemical measurements and dispersal modelling to study environmental levels and effect of substances in marine coastal ecosystems

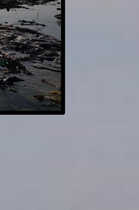
- To test an integrated approach combining advanced chemical screening techniques and mixture toxicity risk assessment

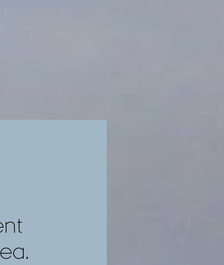
The total MIXture TOXicity of the environmental emissions from point sources

- *In situ/ in vivo*: indicator organisms exposed in cage studies and natural populations: tissues, extracts
- *In vitro*: extracts from environmental matrices used in transefcted cell cultures and embryo assays. E.g. ER-CALUX (OECD 455), AR-CALUX (OECD 458).

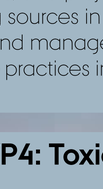
Effects measurements:

- Reproduction effects
- Endocrine disruption
- Oxidative stress
- Immmunological effects
- Dioxin-like activity
- Cytotoxicity
- Physiological parameters

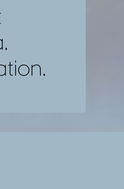














WP3: Dispersal and fate modelling

- To develop a pollution modelling tool that can track discharged HS in coastal waters

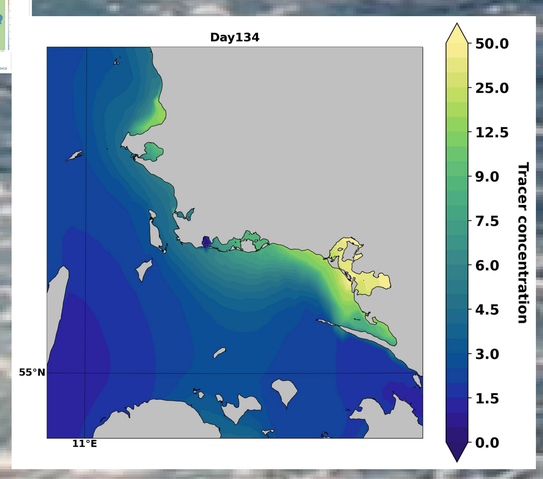
- To estimate the dispersal of HS in coastal waters, their fate, and combined toxicity in the environment

- To conduct scenarios together with stakeholders on how to obtain a clean sea



FlexSem:

https://marweb.bios.au.dk/flexsem/Default.aspx



Modelled dispersal of tracer released from point sources.

WP5: Integrated assessment and governance

- To compile the results from WP2, WP3 and WP4 in accordance to assess distribution and effects of HS discharged from several point sources to coastal waters

- To combine the tools and develop a new concept for assessing distribution and effects of HS discharged from several point sources to coastal waters

NewSea outcomes:

- More accurate determination of the current chemical status

- Identify the most important point sources and environmentally hazardous substances

- Determine the spread, fate and toxicity of the emitted substances

- Identify knowledge and data gaps

- Support a future integrated environmental assessment

- Finding solutions to achieve a good chemical condition under the Water Framework Directive

- Involve citizens, stakeholders, managers and politicians in the development of new policy and regulatory recommendations

Advisory board

1. **The Environmental Protection Agency** (Miljøstyrelsen).
2. **Local Government Denmark** (Kommunernes Landsforening).
3. **Region Zealand** (Region Sjælland).
4. **KIMO Denmark** (Kommunernes Internationale Miljøorganisation).
5. **Danish Nature Conservation Association** (Danmarks Naturfredningsforening).
6. **Green Transition Denmark** (Rådet for Grøn Omstilling).
7. **Ocean Institute** (Tænketanken Hav).
8. **The Belt Sea Fisheries Association** (Bælternes Fiskeriforening).
9. **Danish Small-Scale Fishermens's Producer Organisation** (Foreningen for Skånsomt Kystfiskeri).

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Web: https://projects.au.dk/newsea