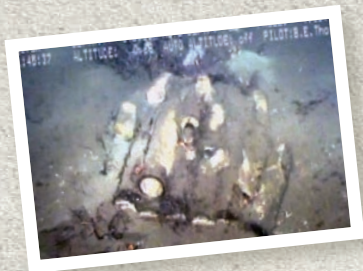


CONTEXT

An underwater toxic legacy

After World War II, about 50,000 tonnes of chemical munitions were dumped in the Baltic Sea, mostly bombs and shells. They contain chemical warfare agents (CWAs) such as mustard, tear and nerve gas.



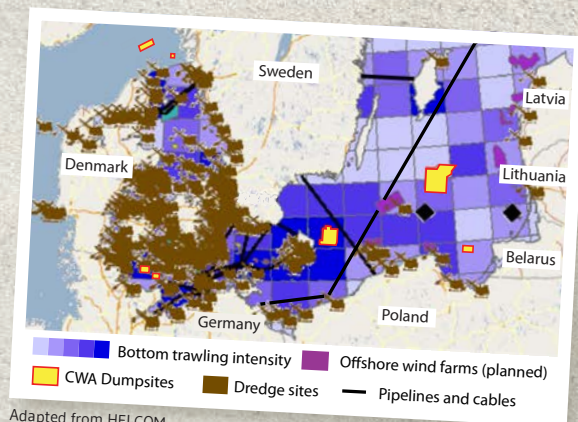
Official dumpsites are located near the island of Bornholm in the Gotland basin, near the Little Belt in Denmark and at the Skagerrak Strait. Some munitions were also thrown overboard while ships were en route. During

the cold war, munitions were also disposed of at an unofficial dumpsite in the Gdansk Deep off the Polish coast.

Increasing risks

These munitions pose a threat if the CWAs are released as shells corrode. Our knowledge about the extent and rate of corrosion and the ecological effects of CWAs on the marine environment is still limited.

Pressure to exploit Baltic Sea resources is growing. New technologies now enable sea bottom activities in more remote areas (trawler fishing, construction projects, wind farms, etc.) and space is increasingly being claimed within contaminated areas. Fishermen may be especially at risk. In the event of a mechanical disturbance, a large scale leakage could pose a serious biohazard.



Adapted from HELCOM

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Project duration

September 2011 - March 2014

Project budget

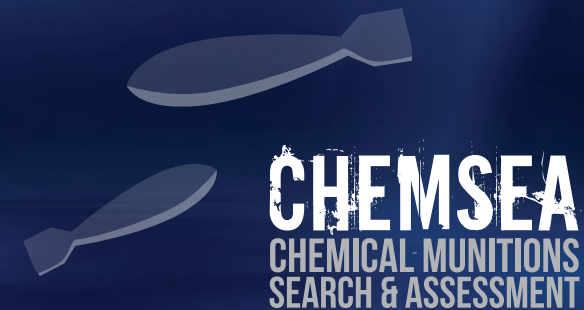
| | |
|------------------------|----------------|
| ERDF co-finance: | € 3,62 million |
| Partner contributions: | € 0.97 million |
| Total project budget: | € 4,59 million |



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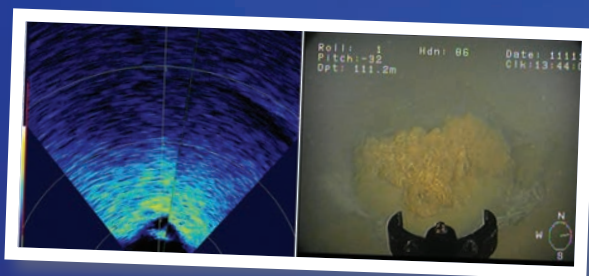


CHEMSEA IN ACTION

Assessing the problem

CHEMSEA will inventory all knowledge about location and characteristics of official and unofficial munition dumpsites as well as documentation of accidental CWA fishing.

Through a series of field surveys, munitions will be detected and mapped using sonars, echosounders and magnetometers directed from vessels and remotely operated vehicles. The rates of munition corrosion will be estimated.



CHEMSEA will investigate the natural conditions at the dumping sites, such as temperature, depth, sediment type and near-bottom currents, as these factors play a role during the dispersion of chemicals. The concentrations of chemicals in sediments and biota will be analysed. Throughout this work, partners will optimise and inter-calibrate the methods for munitions detection and analysis.

The project will produce new GIS maps with information on location and state of munitions, environmental site conditions, contaminated sediments, maritime security data, reports of accidental catching, archive photos and hydroacoustic and visual imagery.

Evaluating the risk

CHEMSEA will conduct laboratory and field studies and exposures with fish and shellfish species to understand the accumulation and biological effects (biomarkers) of the CWAs.

CWA fate and transport will be studied to estimate effects of various potential leakage situations. CHEMSEA will create models to predict contaminant concentrations and transport patterns. Different scenarios will be tested and their probability assessed.

Based on these models, CHEMSEA will estimate the potential environmental and economic impacts of the most likely scenarios.



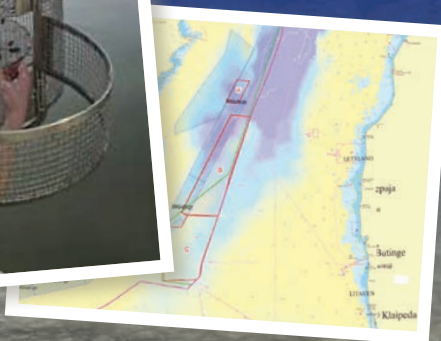
Planning for the future

CHEMSEA will undertake a review of existing national and regional legislation concerning chemical munitions. Unified guidelines will then be proposed for handling recovered munitions, disposing contaminated sediments and exploiting marine resources in contaminated areas.

CHEMSEA will also propose designation of CWA contaminated areas to update nautical maps for navigation and for permit issuing purposes.

The project will finally produce a region-wide contingency plan for the event of a major leakage of CWA substances to minimise ecological and economic impacts.

Results obtained in the project will be passed to HELCOM and to local coastal and maritime management authorities. CHEMSEA will also create a permanent Baltic CWA advisory body to provide advice for maritime administrations.



PROJECT PARTNERS

Poland

- Institute of Oceanology of the Polish Academy of Sciences (IO PAN)
- Polish Naval Academy (PNA)
- Military University of Technology (MUT)

Finland

- Finnish Institute for Verification of the Chemical Weapons Convention (VERIFIN)
- Finnish Environment Institute (SYKE)

Germany

- Johann Heinrich von Thünen Institute (vTI), Institute of Fisheries Ecology (FOE)
- Alfred Wegener Institute for Polar and Marine Research (AWI)

Lithuania

- Lithuanian Environmental Protection Agency (LEPA)

Sweden

- Swedish Defence Research Agency (FOI)
- Swedish Maritime Administration (SMA)
- European CBRNE Center

