# Reintroduction of the Native oyster to the German Bight: a focus on seed supply and spat recruitment

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Introduction: Reintroduction!

The European flat oyster (*Ostrea edulis* Linnaeus, 1758) is considered a keystone species with special ecological functions in its typical species community and habitat. Due to the fishing pressure as well as due to continuing bottom trawling, responsible for the loss of settlement substrate, the functional extinction of European oyster stocks was recorded in the 20th century for the German Bight. A feasibility study (Gercken & Schmidt 2014) revealed chances for the restoration of oyster beds by reintroduction, which would re-establish not only the species but also its characteristic biocoenosis and essential ecosystem services.
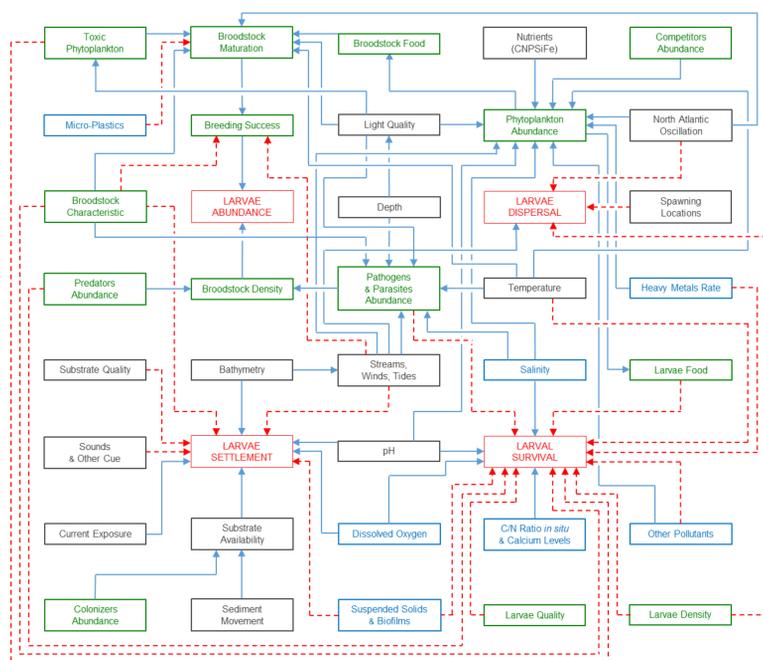

Recruitment Significance

The sustainable success of restoration and the development of *O. edulis* beds is based on population increase and recruitment rates. In this specific case of a species reintroduction, intensity and variability of recruitment must be observed, analyzed and will be optimized initially. Proposed optimizations for high spat recruitment:

- Viable supply of donor population
- Selection of suitable areas & connectivity
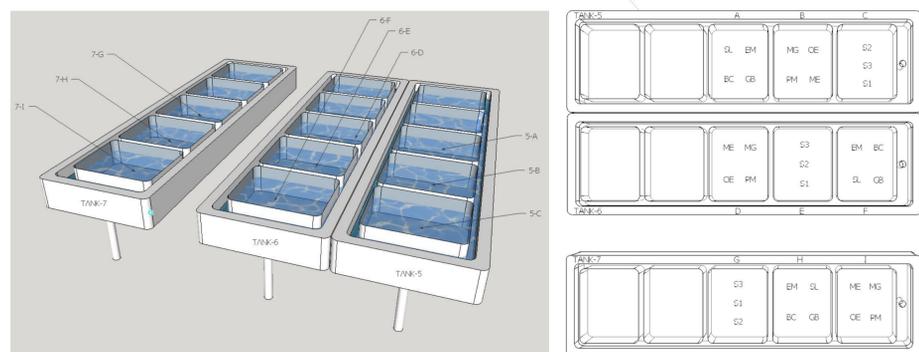- Assessment of alternative substrates

Figure 1. Drivers of spat recruitment intensity in the German North Sea: conceptual diagram of the four main parameters and their associated potential factors (Biological, Chemical, Physical). Arrows indicate expected major interactions and influences of selected environmental factors. Red dashed line arrows show research topics of the project RESTORE (2016-2019).

Donor Population

Objective: Preservation of a high genetic diversity to the population. High suitability and qualification of seed oysters for long-term restoration. Ideal adaptation to future environmental conditions.
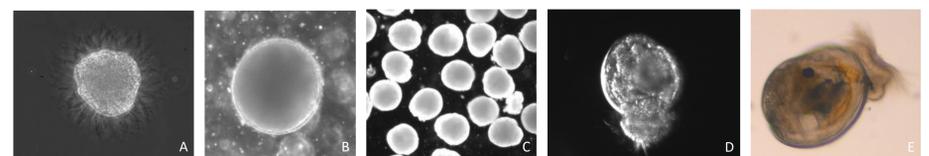
Figure 2. A[1]: Spermatozeugma (±60 μm); B[1]: Oocyte? (±129 μm); C[1]: White-larvae (±135 μm); D[1]: Grey-larvae (±180 μm); E: Eyed-larvae (±240 μm).

Alternative Substrates

Objective: Comparison of larval settlement performance on selected, ecologically valuable materials.

Figure 3. Diagram of the experimental basins in downwelling systems and the experimental plan. Approach *in vitro* in the Experimental Site of Argenton (France) in collaboration with the French Research Institute for Exploitation of the Sea (08.2017).

Suitable Areas & Connectivity

Objectives: Evaluation of different larval dispersal scenarios by using a German North Sea hydrodynamic model. Relation to factors that condition larval survival, settlement success and genetic variability.

References.
Gercken, J. & Schmidt, A. 2014. Current status of the European oyster (Ostrea edulis) and possibilities for restoration in the German North Sea. BfN-Script 379
[1]Suquet Marc, Queau Isabelle, Le Grand Jacqueline, Ratiskol Dominique, Pouvreau Stephane (2017). Caractéristiques biologiques des gamètes et larves d'huître plate européenne (Ostrea edulis): données préliminaires. R.INT/RBE/PFOM/LPI/Station d'Argenton.