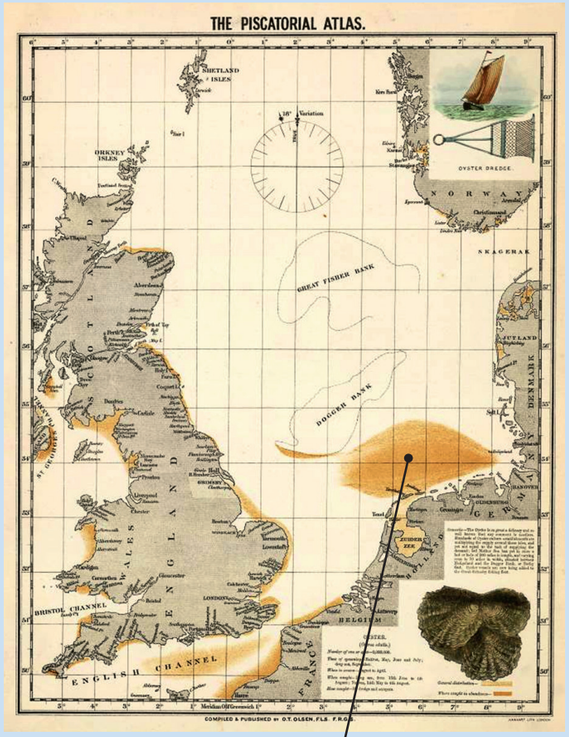
History: overfishing led to population collapse

Historically, the native oyster was widely distributed in the German North Sea, from the North and East Frisian Wadden Sea (first mentioned as early as 1241) to the Heligoland oyster beds and to offshore oyster grounds in the German Bight. A large and densely populated oyster bed was recorded at a depth of some 30 metres in the southern German Bight. There used to be a highly diverse ecosystem with species communities that largely centred on oysters. Shells washed up on North Sea beaches still refer to the once huge size of this oyster bed.
Native oyster populations collapsed in the mid-20th century after the introduction of motorised fishing vessels and the intensification of fishing across Europe. Especially large individuals were harvested for human consumption in great numbers. Yet it is the large individuals which produce most eggs, and without them the population ceases to be self-sustaining. Harvesting also removed the substrate for young oysters, which after the larval stage floating in the water settle preferentially on a surface consisting of oyster shells. The reef structures became depleted and other stress factors such as extremely cold winters, sediment deposition and disease further depleted the population.

Distribution of the European flat oyster *(Ostrea edulis)* c. 1833



Oyster ground in the open North Sea, c. 1883

The map shows the oyster beds in the North Sea including areas belonging to neighbouring countries.
Map from the Olsen's Piscatorial Atlas of 1883, with citation.

The yellow colouration indicates areas with oyster beds:

Light brownish:	widespread
Dark brownish:	areas where oysters frequently harvested

BfN Bundesamt für Naturschutz

AWI

Further information is available on the BfN and AWI project websites:
www.bfn.de/en/activities/marine-nature-conservation/marine-arten/artenschutzprojekte/restoration-of-the-european-flat-oyster.html
www.awi.de/en/science/biosciences/shelf-sea-system-ecology/main-research-focus/european-oyster.html

www.bfn.de/... **www.awi.de/...**

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Hope for the European flat oyster

Return of a former native species to the German North Sea

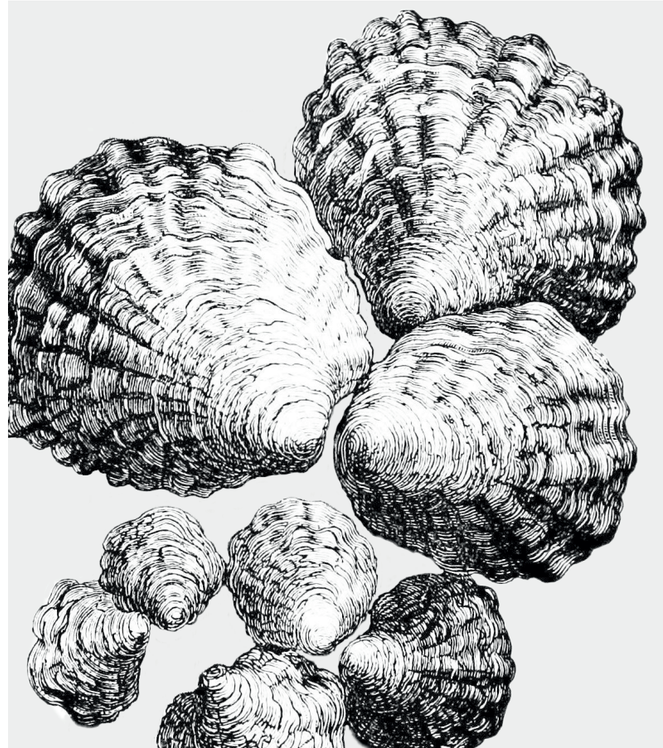


Photo: B. Pogoda

Profile of the European flat oyster

Name:	European flat oyster Scientific name: *Ostrea edulis* French: Huître plâte German: Europäische Auster
Size & age:	up to approx. 15 cm up to 30 years; sexually mature at 3–4 years
Appearance:	Shape roundish to oval. Left/lower valve convex, right/upper valve almost flat and fitting inside the left valve to close it. The flat oyster takes its name from its shape.
Habitat:	Deep marine habitats at 30–50 metres below the surface; also found just below the low water line. Preferentially colonises substrate composed of oyster shells.
Status:	Now very rare in Europe due to massive overfishing; included in the OSPAR List of Threatened and/or Declining Species and Habitats for the North-East Atlantic.
Ecosystem services:	Enhancement of biodiversity; provides food, protection and habitat for numerous species; improvement of water quality; reduction of toxic algal blooms; mediation of benthic-pelagic coupling; binding of loose sediment; coastal protection.
A delicacy?	Most oysters harvested for human consumption in Europe come from oyster farms in countries such as France, the United Kingdom, the Netherlands, and Germany (Isle of Sylt in the North Sea). The majority of farmed oysters are Pacific oysters; cultivation of the European flat oyster (Belon oyster) is rare.

The European flat oyster: rare & endangered

As a key species with a special ecological function the European flat oyster *(Ostrea edulis)* plays an important role in the North Sea ecosystem. Stocks of this indigenous oyster species are now rare in the wild and the few that do exist are endangered. **In the German North Sea, where it was historically widespread, the European flat oyster has been classified as functionally extinct since the mid-20th century.** Individual live specimens are only rarely found and the species is on the Red List of endangered species. Recolonisation is evidently prevented by on-going operation of intensive bottom trawl fishery.

Oyster reefs: biodiversity hotspots

The European flat oyster grows slowly and forms specific, highly biodiverse ecological communities with numerous other invertebrate animals and fish species, many of which are on the Red List themselves. As a habitat, oyster beds provide food, protection and refuge, and also serve as a nursery for numerous fish species. Such biogenic reefs – meaning reefs formed by living organisms – have become very rare in the North Sea. **A single oyster can filter up to 240 litres of sea water a day!** As it does so, it feeds on plankton organisms such as microalgae and organic particles floating in the water. By filtering large volumes of water oysters also improve water quality and help locally to reduce toxic algal blooms.


Photo: S. Pouvreau/Ifremer


Photo: B. Pogoda

Researching and protecting a key species: BfN's engagement

The German Federal Agency for Nature Conservation (BfN) is committed to protect and investigate this very rare oyster species in Germany and Europe. At national level, BfN commissioned and evaluated a feasibility study on possibilities and chances for restoration of the European flat oyster in the German North Sea.
For the implementation in the field the research project RESTORE, jointly conducted with the Alfred Wegener Institute, is developing and testing restoration methods for a long-term restoration programme. A basic requirement is the exclusion of all seabed-modifying activities such as bottom trawling or sand and gravel extraction at planned restoration sites. This requirement could be met in marine protected areas within the German Exclusive Economic Zone once such activities would be excluded here.
The long-term goal of BfN's efforts is to establish a healthy stock of European flat oysters in the German North Sea and, to the greatest extent possible, restoration of biodiverse, biogenic reefs – a unique form of ecosystem in our marine waters.

For further information, the feasibility study (BfN-Skripten 379) and other documents for download, please visit the BfN website.

www.bfn.de/...

RESTORE project: check-up for restoration

RESTORE is a multi-year testing and development project launched in April 2016 for the restoration of the European flat oyster *(Ostrea edulis)* in the German North Sea. The project brings together researchers from the **Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research (AWI)** and the **BfN Marine Nature Conservation Department** in the development and offshore testing of methods for the restoration of oyster stocks in the German North Sea.

The work packages are:

- Reviewing the legal framework;
- Knowledge transfer with international oyster restoration projects and establishing a European network;
- Investigating oyster biology;
- Finding suitable areas for recolonisation (site selection);
- Identification of suitable seed-oyster sources and sub-strate technology;
- Field experiments with oysters of various age and different size classes to study their growth, fitness and health condition in the wild;
- Engaging potential stakeholders: e.g. fishery and mariculture.

The project outcome will provide the basis for developing a long-term restoration programme for the European flat oyster in German waters.

Young seed-oysters for recolonisation tests.


Photo: B. Pogoda