Bivalves in the Oosterschelde & Grevelingen Lake

The Oosterschelde and the Grevelingen Lake form two unique saltwater environments in Zeeland where bivalve molluscs play a central role. These shellfish are not only vital to the ecosystem but also to the regional economy and aquaculture. Both native and introduced species can be found here, each with its own role, distribution, and impact.

What are bivalves?

Bivalves are a class within the molluscs (Mollusca) that are distinguished by their characteristic body structure:

- They have two valves (shells) connected by a hinge
- They lack a head and radula (rasping tongue)
- They filter food from the water via their gills
- They live in salt or fresh water, often burrowing or attaching themselves to a substrate

Well-known representatives in Zeeland include **mussels, oysters, cockles, scallops, and razor clams**.

Important species in Zeeland

Oysters

- *Japanese oyster (Crassostrea gigas)*: Invasive exotic, highly successful in intertidal areas. Important for aquaculture, but also ecologically influential.
- *European flat oyster (Ostrea edulis)*: Native species, extremely rare. With reintroduction projects underway due to its vulnerability and slow growth.

Mussels

- *Common mussel (Mytilus edulis)*: Economically important, widely cultivated in the Oosterschelde and Grevelingen. Filters water and provides a key ecosystem service.

Other notable bivalves

Besides the well-known mussels and oysters, the Oosterschelde and Grevelingen host a rich diversity of other bivalves. These species each play their own role in the ecosystem and respond differently to human activity, invasive species, and climate change. Below is an overview of some remarkable species, arranged from common to rare:

American razor clam (Ensis leei / E. directus)

- Status: Common since the 1980s, also called razor blade or knife handle.
- Origin: North America, likely spread via ballast water
- Ecological impact: Forms dense populations, affecting sediment structure and competing with cockles

Baltic tellin (Macoma balthica)

- **Occurrence**: Common in silty soils, especially along mudflats and shallow zones
- **Ecological role**: Important food source for waders and migratory birds such as curlew and bar-tailed godwit
- **Behaviour**: Lives buried with siphons at the surface; filters and deposit-feeds

Cockle (Cerastoderma edule)

- **Occurrence**: Widespread in brackish to salt water, typically on sandy flats
- **Fishery**: Commercial fishery present, with monitoring against overfishing
- **Characteristic**: A spherical, firm shellfish measuring 2-5 cm with 22-28 ribs without spines, buried in sand and mud bottoms of shallow water.

Manila clam (Ruditapes philippinarum)

- **Distribution**: Rapid increase in the Oosterschelde and Grevelingen since 2005
- **Habitat**: Intertidal flats, often among oyster reefs
- **Use**: Cultivated in aquaculture; valued as an edible shellfish
- This **invasive exotic** established itself in the Oosterschelde from 2005 and expanded into the Grevelingen

Soft-shell clam (Mya arenaria)

- **Occurrence**: Mainly in soft sediments in sheltered areas
- **Lifestyle**: Burrows deeply; difficult to detect without sediment research
- **Features**: Strong shell with an elliptical form (a pointed front and rounded back). The outer surface shows irregular concentric growth lines. The valves do not close completely at either end, hence the name “soft-shell clam”. Shell length up to 15 cm, white to yellowish-white in colour.
- **Edibility**: Eaten locally, particularly in fish soups and chowders

Subtruncate surf clam (Spisula subtruncata)

- **Occurrence**: Dominant in sandy parts of the North Sea and at the mouth of the Oosterschelde
- **Ecological function**: Food source for flatfish such as plaice and sole
- **Features**: Shell roughly triangular, more rounded on one side than the other
- **Dynamics**: Sensitive to seabed disturbance and sand extraction

Queen scallop (Aequipecten opercularis)

- **Distribution**: Sporadically found alive in the Eastern Scheldt, especially since the late 1990s near the estuary and Zeelandbrug. Practically absent in the Grevelingen.
- **Behaviour**: Can actively swim away by rapidly closing the valves. Has a row of small, pale blue eyes along the mantle line to detect movement and light.
- **Habitat**: Found both on hard substrates (such as rocks and shell banks) and loose on sandy bottoms in deeper water.
- **Special feature**: Also called the "jewels" of the Eastern Scheldt due to its distinctive colour patterns and ability to swim away when threatened by sea stars, among other things.
- **Versus variegated mantle**: larger (up to 8-10 cm), uniform to subtly coloured, wide ribs (~20), especially near estuary/Zeeland bridge.

Yoldia clam (Yoldia limatula)

- **Newcomer**: Present in the Western Scheldt and Grevelingen since 2019
- **Habitat**: Oxygen-poor depths (13–17 m); filters via long siphon
- **Origin**: North America; occupies empty niches in impoverished sediments

Lesser heart cockle (Acanthocardia paucicostata)

- **Status**: Rare, but occasionally found in the Oosterschelde
- **Origin**: Southern European waters, possibly introduced via imports
- **Habitat**: Buried in shallow sandy beds with low currents
- **Present** in the Oosterschelde since 1999

Variegated scallop (Mimachlamys varia)

- **Distribution:** Since ~2018 in the Grevelingen, sometimes locally abundant; rare in the Oosterschelde.
- **Behaviour:** Can swim briefly; has mantle eyes; smaller than the queen scallop.
- **Habitat:** Deeper, oxygen-rich hard substrate, often near oyster beds.
- **Distinctive:** Colourful shell (yellow–brown, purple, red) with 30–35 fine ribs; up to 6 cm.
- **Versus wide mantle**: smaller (up to 6 cm), much more colourful, fine ribs (30-35), recent and locally sudden presence.