

UNDERWATER LIFE IN THE WADDEN SEA

DISCOVERING THE HIDDEN DIVERSITY

Species'
profiles for
multipliers

This compilation of underwater species cards is based on a previously unpublished project by the Schleswig-Holstein Wadden Sea National Park Authority with support from Schutzstation Wattenmeer. The concept, many of the photographs, and the species profile texts were made available to the International Wadden Sea School to develop a World Heritage edition featuring selected species for use in educational activities across the Wadden Sea region.

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www.waddensea-worldheritage.org
www.nationalpark-wattenmeer.de
www.wwf.de/watt
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Species profiles for presenting the underwater world in the Wadden Sea National Park and World Heritage Site

The Wadden Sea is home to a rich and fascinating underwater world: plaice, herring, shrimp, and many other species live hidden within the Wadden Sea and the adjoining open North Sea – yet they play a central role in the functioning of this unique ecosystem. As a nursery ground, feeding area, and refuge, the Wadden Sea is indispensable for many marine animals. This is one of the key reasons why it has been recognised as a UNESCO World Heritage Site.

During sea creature catching tours, aquarium visits, or even when crossing a tidal creek on a mudflat walk, visitors can experience this hidden habitat up close. The species profiles presented here help to vividly and accessibly convey information about typical species. They support educators and nature guides in sparking curiosity, illustrating ecological interconnections, and effectively communicating the significance of the Wadden Sea for the underwater world.

Those who are familiar with this biodiversity are more likely to support its protection – going beyond the existing conservation provided by national parks and other protected areas within the Wadden Sea. The underwater world of the Wadden Sea is also under threat: climate change, microplastics, overfishing, and other human-induced factors are placing increasing pressure on many species. What happens far out at sea often begins in our daily lives – through fish consumption, plastic use, or the choice of sustainable products. When visitors not only marvel during guided tours but also come to understand how everything is interconnected, the willingness to take personal responsibility grows. In this way, a close-up encounter with a shrimp or fish can lead to the realisation that every contribution matters – for the protection of the seas and the preservation of the Wadden Sea's fascinating underwater world.

We wish you great success and enjoyment in using the species profiles,



Anja Szczesinski
WWF Wadden Sea Office



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Photo: Jasmin Karl

Guidance for using the species cards

	World Heritage key value
	Facts
	Habitat
	Lifestyle
	Use & protection
	Fascinating facts / Good to know
	Did you know?

Guidelines for handling live animals during sea creature tours

Sea creature tours offer a unique glimpse into the fascinating underwater world of the Wadden Sea. Encountering marine life up close can strengthen appreciation of these habitats and inspire more conscious fish consumption.

- The following practical tips support respectful and responsible handling of marine animals on board.

Before the catch – inform your guests:

- Animals are temporarily brought up from the seabed to be observed and experienced.
- Careful handling is required – guests can contribute by listening carefully and passing animals along quickly and gently.

Key principles:

- **Quick and gentle:** View sensitive species briefly and return them swiftly.
- **Keep them in water:** Transparent containers allow natural, stress-free viewing.
- **Limit touching:** Only allow handling of robust species (e.g. shore crabs).
- **Keep cool:** Top up with fresh seawater if temperatures exceed 20 °C.
- **Return gently:** Release animals from the stern with minimal drop height (e.g. in a bucket).



Photo: Martin Stock/LKN.SH

Animal groups – brief, hands-on advice

Short &
practical

Fish

- **View first** – they are very delicate.
- **Avoid touching** – their protective slime coat is sensitive.
- **Round-bodied fish** (e.g. smelt, cod, gobies) are pressure-sensitive. Release as soon as possible.
- **Flatfish** are hardier – show them quickly, then release.

Starfish & Echinoderms (e.g. sea urchins)

- Best **kept in water** and shown in a clear dish.
- Gentle underwater **touching** is allowed.

Jellyfish

- **Stinging species** can harm other animals – remove immediately.
- **Harmless species** (e.g. comb jellies) can be shown in a container.

Shrimps

- **Very heat-sensitive** – keep cool, release soon after the fish.

Hermit crabs

- **Hardy**, but may abandon their shell – gently return if possible.

Crabs

- Generally **robust**; small shore crabs are good for children to handle.
- Caution: swimming and edible crabs can **pinch** hard!

EUROPEAEN EEL



European eel

Anguilla anguilla



The Wadden Sea World Heritage Site plays an important role in the life of the eel as part of its migration route (“Swimway”) between inland waters and the open sea.



Europæisk ål



Europäischer Aal



Paling
(Europese aal)

Photo: Rainer Borchering

				
Size: Females up to 1.4 m and 6 kg; males max. 0.5 m. Lifespan: Typically 8–12 years; >60 years possible (females mature at approx. 12–15 years, males at 6–9). Appearance: Snake-like, elongated, cylindrical body; dorsal, tail, and anal fins form a continuous fin fringe; upturned mouth.  The eel undertakes the longest known spawning migration of any fish – around 5,000 km.	Distribution: Europe, Asia Minor, North Africa. Occurrence: Coasts of the Atlantic, Mediterranean, Black Sea, North Sea, and Baltic Sea. Habitat: Migrates upriver, even crosses land at night; older eels are present year-round, especially noticeable in autumn; lives for years/decades in freshwater; typical inhabitant of land-water transitional zones, can occupy even the smallest tidal creeks, channels, or ditches.	Diet: Predatory, feeds on small animals, fish, carrion (its shape and colour change depending on its diet – distinguishing between broad-headed and narrow-headed eels). Reproduction: Spawns in the Sargasso Sea (Atlantic, near Central America); migrates 5,000 km between spawning grounds and river habitats; mature eels take about one year to migrate, surviving solely on fat reserves; larvae take ~3 years to return; after spawning (females release several million eggs), the adults die.	Use: Edible fish (despite being currently highly endangered). Protection: Decline since 1970 due to overfishing (including of young “glass eels”) and river barriers; the European eel is “critically endangered” in the North and Baltic Seas; cannot be bred in aquaculture, all stocking measures use glass eels fished in countries like Spain and France; multimillion-Euro black market in glass eels, with a large portion of the European catch “disappearing” to Asia	The eel is known by different names at different life stages: Glass eel: From larval stage in the Sargasso Sea to entry into European freshwater. Yellow eel: While growing in freshwater. Silver eel: As a mature adult on its way back to the Sargasso Sea.

EELPOUT



Eelpout

Zoarces viviparus



In the underwater world of the Wadden Sea World Heritage Site, site-faithful fish like the viviparous eelpout find a permanent habitat – many individuals probably spend their entire lives in this unique ecosystem.



 Ålekvabbe
 Aalmutter
 Puitaal

Photo: Rainer Borchering

				
Size: 20–30 cm, up to 45 cm. Lifespan: Up to 4 years. Appearance: Similar species is the butterfish (with dorsal spots); front body thicker than an eel or butterfish.  The viviparous eelpout gives birth to live young.	Occurrence: Common year-round resident fish; North Sea; western Baltic Sea (requires at least 5‰ salinity); probably the most common fish in the Wadden Sea in winter. Habitat: Found on various substrates, prefers mussel beds or rocky reefs; bottom-dwelling and site-faithful.	Diet: Predatory; feeds on shrimp and small fish. Reproduction: Viviparous (gives birth to live young); after 4 months of gestation, gives birth to 30–400 young (~5 cm long) in shallow waters between January and March. Development: Juveniles are independent immediately; sexually mature after 1 year.	Threats: Not currently endangered, but sensitive to warming and low oxygen. Frequently caught as bycatch in shrimp fisheries.	The name “eelpout” comes from a historical misunderstanding: due to its visual similarity to eels and the long-mysterious origins of eels, it was once believed to be the eel’s mother – hence the misleading name. Only about 2 % of bony fish species give birth to live young. In the Wadden Sea, the eelpout is the only species to do so. The eelpout is used in environmental chemistry research.

THREE-SPINED STICKLEBACK



Three-spined stickleback

Gasterosteus aculeatus



The stickleback is a typical representative of the Wadden Sea's underwater world. It depends on ecological connectivity between the saline waters of the Wadden Sea and the fresh-water habitats of nearby marshlands for reproduction.



Photo: Rainer Borchering



Trepigget
hundesteijle



Dreistachliger
Stichling



Driedoornige
stekelbaars

				
Size: 4–8 cm, rarely up to 11 cm in the sea. Lifespan: Usually only 2 years, rarely 3; sexually mature after 1 year. Appearance: 3 dorsal spines. Males become bright red during the mating season in spring. Similar species: nine-spined stickleback (with 8–12 dorsal spines).	Distribution: Northern hemisphere coasts from Alaska to the Black Sea; found in both sea and freshwater throughout Europe. Occurrence: North Sea population migrates to rivers and streams in spring, returns to the sea in autumn. Habitat: Regular winter guest and transient in the Wadden Sea; rarely present in summer.	Diet: Active predator; eats small animals, fish eggs; larger prey torn apart in schools. Reproduction: Males build a spherical nest from plant material and perform a courtship dance to entice females to lay eggs.	Predators: Fish and birds (despite the spines). Use: Occasionally kept as aquarium fish. Threats: Not endangered, but populations are impacted as dykes and sluices block migration routes between the Wadden Sea and freshwater.	The name <i>Gasterosteus aculeatus</i> means “spiny one with bony plates on the belly.” Sticklebacks migrating to the sea become highly silvery, probably for camouflage. They may be transported to small waters by ducks’ feet. A stickleback can find its way back to its nest from over 10 m away.



The stickleback
builds nests and
performs a court-
ship dance.

HERRING



Herring

Clupea harengus



The Wadden Sea World Heritage Site is an important nursery for herring. Juveniles find optimal conditions to grow before migrating into the open North Sea. Thus, the Wadden Sea plays a major role in maintaining herring populations.



Sild



Hering



Haring

Photo: Rainer Borchering

				
Size: Up to 40 cm, usually only 10 cm in the Wadden Sea. Lifespan: Up to 20–25 years. Appearance: Similar species include sprat (pelvic fin starts under the front edge of the dorsal fin) and sardine (radial stripes on the gill cover).	Distribution: North Atlantic, from Greenland to Brittany; North and Baltic Seas (up to 6‰ salinity); many local races. Occurrence: Various herring populations across the North Sea with different spawning times and areas. Habitat: Nursery in the Wadden Sea (many juveniles from various sources year-round); some adults migrate in for spawning.	Behaviour: Schooling fish, plankton feeder; near the surface at night, on the seabed by day; avoids high temperatures. Reproduction: Up to 50,000 eggs per female, glued to the seabed, often on algae; sexually mature after 5–8 years.	Use: Important food fish; various stocks are overfished. Predators: Key food source for larger fish and marine mammals; essential chick food for terns. Threats: Very sensitive, never survives being caught in nets.	There are around 200 species in the herring family, including sardines, anchovies, and anchoveta. One-third of all fish caught globally belong to this family. Young herrings sometimes beach themselves in summer. Harbour porpoises enjoy eating herring (but also other fish). After the Dutch IJsselmeer was dammed, the local herring stock died out – and with it, the bottlenose dolphin population in the area. Herring maintain contact in their schools acoustically by releasing air bubbles from their anuses.



Herring “talk” to each other with bubbles.

PLAICE

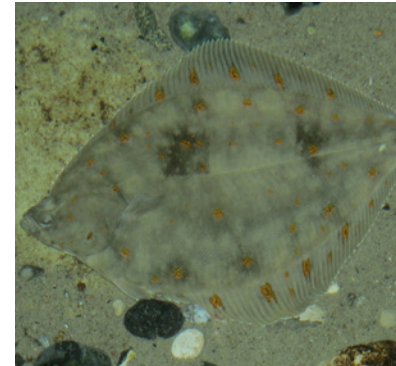


Plaice

Pleuronectes platessa



The Wadden Sea World Heritage Site is an important nursery area for plaice. After spawning in the open North Sea, the juvenile fish migrate into the shallow Wadden Sea. There, they find abundant food and protection from predators. In this way, the Wadden Sea makes a vital contribution to the preservation of this ecologically important fish species.



 Rødspætte
 Scholle
 Schol

Photo: Rainer Borchering

				
Size: Formerly (with little fishing pressure) up to 1 metre. Lifespan: Up to 50 years. Appearance: Flatfish with orange spots. Similar species include the lemon sole (with a curve in the lateral line near the pectoral fin) and the flounder (with rough skin along the lateral line and fin edges).	Distribution: Coasts of the North Atlantic, North Sea, western Baltic Sea. Habitat: Spawns in winter in the south-western North Sea; larvae are carried into the Wadden Sea by circular currents in April, where they are common as juveniles in their first (and sometimes second) year.	Diet: Eats shrimp, worms, and soft-shelled mussels; an ambush predator but also hunts in very shallow water at night. Behaviour: Buries itself in sand during the day and can match its colour to the seabed. Reproduction: Females lay 50,000 to 600,000 eggs; larvae are symmetrical, transforming into flatfish through asymmetrical facial growth; from May, 1 cm long juveniles can be found in tidal pools; begin tidal migrations once temperatures exceed 23 °C.	Use: Important food fish. Threats: Large numbers of juvenile plaice die as bycatch in shrimp fisheries. Bottom trawling by flatfish trawlers causes severe damage to the North Sea seabed.	The name <i>Pleuronectes platessa</i> means “flattest side-swimmer”, referring to the sideways transformation of juvenile fish into flatfish. Plaice can migrate up to 30 km per day. Young plaice in the Wadden Sea prefer to eat the tail ends of lugworms and the siphons of mussels. Plaice skin was once used to produce a fine leather. Historically, plaice lived up to 50 years, weighed up to 7 kg, and reached nearly 1 metre; today, due to fishing pressure, they rarely live beyond five years.

Plaice are also known as “golden flounder” because of their orange spots.

SEA SCORPION



Sea scorpion

Myoxocephalus scorpius



The sea scorpion is a resident fish of the underwater world in the Wadden Sea World Heritage Site and is thought to spend its entire life here and in the adjacent coastal waters of the North Sea.



 Almindelig ulk
 Seeskorpion
 Zeedonderpad

Photo: Rainer Borchering

				
Size: Up to 35 cm. Lifespan: Up to 6 years. Appearance: Similar species is the shorthorn sculpin (with four rather than two gill spines, and one or two small barbels at the corners of the mouth).	Distribution: Coastal waters of the North Atlantic from northern Spain via Iceland to New York, down to depths of 100 m. Habitat: Lives among rocks, mussel beds, seaweed; common resident in the Wadden Sea; sensitive to heat, moves to deeper water in summer; baby fish from 1 cm in spring around mussel beds.	Diet: Fish, shrimp, shore and swimming crabs; ambush predator with a large mouth, catches prey as long as itself and swallows them gradually. Reproduction: Internal fertilisation; eggs laid in winter; male guards the egg mass for one month; larvae live in the plankton and from March settle at mussel beds in the Wadden Sea.	Population: Relatively common. Threats: Bycatch in shrimp fisheries.	The sea scorpion gets its name from its fearsome appearance. Unlike real scorpions, it has no venom, but its flared gill spines make it a tough meal for predators. It can lighten or darken its skin tone significantly over several hours to blend in with its surroundings. When catching large prey, the fish's tail can sometimes stick out of its mouth for hours, until the meal has digested enough to move further down the gut.



The sea scorpion has spines – but is harmless.

HOKKNOSE



Hooknose

Agonus cataphractus



The hooknose is a sedentary fish in the underwater world of the Wadden Sea World Heritage Site. It spends most of its life in coastal zones, demonstrating how valuable the Wadden Sea is as a permanent habitat for specialised species.



Panserulk



Steinpicker



Harnasmannetje

Photo: Rainer Borchering

				
Size: 12–15 cm. Lifespan: Up to 4 years. Appearance: Broad front body, large pectoral fins, narrow tail stem; body covered in bony plates – unmistakable.	Distribution: Northern France to the North Cape and Iceland, western Baltic Sea. Habitat: From the tidal zone down to 300 m depth; prefers sandy and structured seabeds; common resident in the Wadden Sea, leaves the area to spawn.	Diet: Hunts small shrimp, crabs, and fish; uses barbels to detect buried prey. Movement: Propels itself forward with strong pectoral fins. Reproduction: Migrates towards Heligoland between December and February; attaches egg clumps with up to 2,000 yellow eggs to seaweed; long egg development; sexually mature at 2 years.	Threats: None currently known; probably survives shrimp fishery bycatch thanks to its bony armour. Use: Dried specimen known as a “weather fish” used to indicate humidity – tilts more or less when hung by a string depending on moisture.	The name <i>Agonus cataphractus</i> roughly means “armoured jointless one”, referencing the fish’s distinctive, armoured body. In German, “Steinpicker” refers to its habit of resting among stones. The Dutch name “Harnasmannetje” (little armoured man) and English name “hooknose” also highlight its notable features. Its resemblance to the sturgeon is coincidental and not due to “primitive” evolutionary traits.



The hooknose is often found on the seabed among stones.

SMELT



Smelt

Osmerus eperlanus



The smelt is a migratory fish of the underwater world in the Wadden Sea World Heritage Site. It spawns in river estuaries and thus depends on intact transitional waters between the sea and inland areas.



 Smelt
 Stint
 Spiering

Photo: Rainer Borchering

				
Size: Up to 30 cm, rarely 35 cm. Lifespan: Occasionally up to 9 years. Identification: Unmistakable due to its smell of cucumber (“the smelt smells” – English name comes from “smell”).	Distribution: Atlantic coast from Spain to Norway. Occurrence: Coastal zones of the North and Baltic Seas, into river estuaries. Habitat: Common throughout the Wadden Sea year-round; abundant in river mouths in spring.	Diet: Hunts shrimp and small fish in the water column near the seabed. Reproduction: Up to 40,000 eggs, spawns in April on sandy riverbeds (e.g. Elbe); sexually mature at 2 years; usually spawns only once before dying, otherwise older fish return to the sea in May, juveniles follow in autumn (6–8 cm).	Predators: Fatty fish, vital chick food for nesting common terns in the Elbe estuary, where it is the most common species. Threats: Often caught as by-catch in shrimp fisheries, does not survive; loss of spawning grounds; sediment disturbance and oxygen-depleted zones due to dredging and river deepening (e.g. Elbe) also harmful. Use: Formerly caught in large quantities in the Elbe for consumption, as fertiliser, animal feed, and baitfish.	The cucumber-like smell is caused by the same molecule released by damaged cucumbers: trans-2-cis-6-nonadienal. This substance has antibacterial properties and may form part of the immune system of smelt and related fish.



Freshly caught smelt smell like cucumber.

COMMON COCKLE

Common cockle

Cerastoderma edule



The common cockle occurs in large numbers in the Wadden Sea World Heritage Site and is emblematic of the high production of animal biomass in this unique ecosystem. As a key food source for many coastal birds, it is a vital link in the short but highly productive food chains of the Wadden Sea.



 Almindelig hjertemusling
 Essbare Herzmuschel
 Kokkel

Photo: Rainer Borchering

				
Size: Up to 7 cm. Appearance: Young specimens are often yellowish or brownish with dark spots; older individuals have a white shell, sometimes with a dark rear end.	Distribution: From the North Atlantic to the Mediterranean. Occurrence: Shallow Baltic Sea and river estuaries with salinity as low as 3 ‰. Habitat: buried in the tidal flats, about 1.5 times shell length deep.	Diet: Filters plankton from the water. Reproduction: Females release up to 50,000 eggs into the water in May; after a three-month larval phase, they develop into juvenile cockles.	Abundance: Probably the most common bivalve species in the Wadden Sea. Predators: Numerous coastal birds and humans. Protection: Cockle fishing significantly damages tidal flat habitats and reduces food availability for species such as oystercatchers and eider ducks. It is banned in Germany's national parks but still permitted by hand in the Netherlands.	A 3 cm cockle filters about 2.5 litres of water per hour. The two closely spaced openings of the siphons can sometimes be seen in the mudflats. Cockles do not grow in winter and may freeze to death in harsh ice conditions.



Cockles are probably the most abundant mussels in the Wadden Sea and a favourite food for many birds.

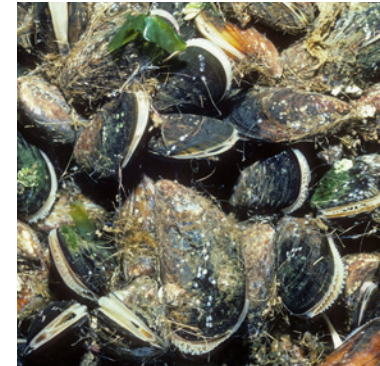
BLUE MUSSEL

Blue mussel

Mytilus edulis



The blue mussel is not only an important food source in the Wadden Sea World Heritage Site, but also forms extensive reefs (mussel beds) that provide valuable habitats for numerous other species. In this way, it significantly contributes to the biodiversity and ecological structure of this special marine ecosystem.



 **Blåmusling**
 **Miesmuschel**
 **Mossel**

Photo: Klaus Janke

				
Size: 5–10 cm. Lifespan: 3–5 (up to 10) years. Appearance: Black-blue-white shell, sometimes brown, occasionally with dark “rays”; interior lined with nacre.	Occurrence: Wadden Sea, Atlantic, Mediterranean	Diet: Plankton filter feeder. Fully grown mussels filter about 2l/h and up to 20l/d Reproduction: Female mussels produce 5–12 million eggs in spring. Development: Larvae drift for about a month, then attach to a hard substrate and choose a permanent location after six weeks.	Role: Forms large mussel beds, creating a unique habitat within the Wadden Sea. Different animals and plants settle on this hard substrate than elsewhere in the tidal flats. Blue mussels filter a large portion of plankton from the water. They are consumed by humans and harvested in significant quantities from parts of the Wadden Sea. Threats: Mussel fishing and aquaculture impact natural populations. In areas where mussel seeding is still allowed, new mussel beds may be damaged. The import of seed mussels can introduce invasive species. Most natural mussel beds in the intertidal zone are now overgrown by the invasive Pacific oyster. Predators: oystercatchers, gulls, crabs, starfish, and humans.	Blue mussel beds provide a habitat for a wide range of other animals and plants and are thus ecosystem engineers. They attach themselves to each other or to substrates with byssal threads produced by a gland in their foot. The inner nacre layer can produce small pearls when sand becomes embedded.

Blue mussels
are key shapers of
their ecosystems.

BALTIC TELLIN



Baltic tellin (Baltic macoma)

Macoma baltica



The Baltic tellin is found in large numbers in the Wadden Sea World Heritage Site and, like the common cockle, reflects the high animal biomass and short food chains of this dynamic ecosystem. As a key food source for many coastal birds, it plays a central role in the Wadden Sea's ecological network.



Østersø-
musling



Rote Bohne



Nonnetje

Photo: Hans-Ulrich Rösner

				
Size: Up to 3 cm. Lifespan: Up to 7 years in the tidal flats, up to 25 years in the deeper North Sea. Appearance: Usually red or yellow inside, often outside as well – the most colourful bivalve in the Wadden Sea; iron compounds can also give green, blue, or black colouring, often in rings.	Development: Larvae grow up in muddy tidal flats; in late autumn, juvenile mussels drift on a mucus thread with the ebb tide out into the North Sea, where they are safer from birds.	Diet: Feeds on plankton and breathes through a flexible siphon up to 10 cm long; a second siphon expels the filtered water just below the sediment surface, protecting it from predators.	Predators: An important prey item for wading birds, especially the red knot, which swallows them whole and crushes them in its muscular gizzard. The inhalant siphon (protruding from the sediment) is frequently attacked by fish and continuously regrows.	The Baltic tellin prefers cold conditions: it only grows and filters at temperatures below 15 °C and can survive frost. Between 200 and 2,000 individuals can be found per square metre of mud-flat.



Baltic tellins
also come in white
and yellow.

AMERICAN RAZOR SHELL

American razor shell

Ensis leei (*E. directus*, *E. americanus*)



In the Wadden Sea World Heritage Site, the main goal is to allow natural processes to proceed as undisturbed as possible and to preserve native biodiversity. The introduction of invasive species such as the American razor shell conflicts with this objective.



Photo: Rainer Borchering



Amerikansk
knivmusling



Amerikanische
Schwertmuschel



Amerikaanse
zwaardschede



Size: Up to 17 cm .

Lifespan: Up to 5 years.

Appearance: Sword-handle-like shape; outer shell brown to reddish-grey with leathery skin, inner shell pearly.



Occurrence: North and Baltic Seas

Habitat: In the Wadden Sea, mostly near the low tide line; easily freezes in icy winters. In fine sandy North Sea substrate at depths of 3–18 metres.



Diet: Filters plankton

Movement: Lives just beneath the surface; in danger, it quickly retracts into deeper sediment using its long digging foot. This foot also allows it to leap and swim underwater.



Predators: Important food for the common scoter. American razor shells are eaten in some countries, but harvesting them generally damages the seafloor.



Originally from American waters, the species was probably introduced to the North Sea in the 1970s via ballast water from ships. It is now abundant in the Wadden Sea.

Some sea and shorebird species have learned to use it as a food source.

In spring, mass die-offs of the species often occur; the cause remains unknown.



Razor shells
can swim and jump
underwater.

PACIFIC OYSTER



Pacific oyster

Magallana/Crassostrea gigas



In the Wadden Sea World Heritage Site, the main goal is to allow natural processes to proceed as undisturbed as possible and to preserve native biodiversity. The introduction of invasive species such as the pacific oyster conflicts with this objective.



 Stillehavsøsters
 Pazifische Auster
 Janpanse oester

Photo: Rainer Borchering

				
Size: Up to 40 cm, fast-growing. Lifespan: Up to 30 years. Appearance: Elongated, banana-shaped curve, sharp-edged, usually grey or brownish-green; shell edge coarsely wavy with usually 5–7 ridges.	Origin: East Asia (Japan/China), introduced to Europe for aquaculture Occurrence: Intertidal zones of the North Sea, sometimes in deeper waters Habitat: Colonizes all kinds of hard substrates (mussel shells, harbour walls, groynes)	Diet: Filters plankton from the water (approx. 1 litre per hour) Reproduction: Spawns in July–August at water temperatures above 22 °C; eggs and sperm are released into the water and fertilized there – 50–100 million eggs per spawning.	Use: Extensively cultivated worldwide (in the Wadden Sea, only around List/Sylt). Impact: Probably the most problematic invasive species in the Wadden Sea. Offers little ecological value for birds, strong competitor to blue mussels, which now rarely form beds without Pacific oysters. Their rough shells also spread many other non-native species.	The species name <i>Crassostrea gigas</i> translates to “giant thick oyster,” a reference to its thick, irregular shell. Many individuals grow together, forming large reefs. Their sharp-edged shells make mudflat walking hazardous, often harming feet and shoes.



You often need shoes for mudflat hiking also because of Pacific oysters.

EUROPEAN OYSTER



European oyster

Ostrea edulis



The European oyster was once a natural part of the underwater world in the area now known as the Wadden Sea World Heritage Site but disappeared long before its designation due to severe overfishing. If reintroduction efforts in the North Sea succeed, and there are sufficiently large fishing-free zones in the Wadden Sea, this ecologically important species could one day return to its original habitat.



Europæisk østers



Europäische Auster



Platte oester

Photo: Hans-Ulrich Rösner

				
Size: 12–18 cm diameter. Lifespan: Up to 40 years. Appearance: Almost circular to elliptical, flat; the left valve (attached to the substrate) is more convex than the right (lid). Usually light grey, sometimes light brown or greenish.	Distribution: Eastern Atlantic coast from Norway to the Mediterranean, down to about 80 m depth Occurrence: Extinct in the North Sea and Wadden Sea, but reintroduction efforts by BfN and AWI have been ongoing for several years Habitat: Requires at least 15 °C water temperature and a salinity of 19 ‰	Diet: Filters plankton, but without a siphon Reproduction: Hermaphrodite; changes sex depending on water temperature. Temporary females absorb sperm through gill water, fertilizing eggs internally. Development: Larvae hatch after two weeks, first living in plankton, then settling on hard substrate.	Threats: Heavily overfished and endangered across Europe (Red List Germany: “critically endangered”). A parasitic protozoan introduced from California (<i>Bonamia</i>) kills many native oysters. The species is sensitive to water pollution.	The European oyster became extinct in the Wadden Sea around 1930 due to overfishing. Shells found today on tidal flats range from 95 to 10,000 years old. In 1877, Kiel professor Karl Möbius coined the term biocenosis (community of organisms) based on oyster beds – a foundational ecological concept.

European oyster shells are time capsules from the past.

SHORE CRAB



Shore crab

Carcinus maenas



The Common shore crab is a frequent resident of the underwater world in the Wadden Sea World Heritage Site and plays a dual ecological role: as a predatory hunter of small animals and as prey for fish and birds, it is an important part of the natural food web in this dynamic ecosystem.



 Strandkrabbe
 Strandkrabbe
 Strandkrab

Photo: Hans-Ulrich Rösner

				
Size: Males up to 7 cm, females up to 5.5 cm. Appearance: Male has three visible triangular segments on the folded abdomen; female has five rounded segments. Movement: Mostly walks sideways.	Distribution: Along all European coasts, on sandy and rocky shores. Habitat: Migrates with the tides in summer onto tidal flats and returns to tidal creeks at low tide; overwinters in deeper waters. One of the most common native large crustaceans in the Wadden Sea, alongside the swimming crab.	Diet: Omnivorous; uses claws to crack open prey like mussels. Defence: Can shed limbs or claws when threatened; quickly hides from danger, but large males may stand their ground. Growth: Regularly moults to grow; can regenerate lost limbs in 2–3 moults.	Key species in the Wadden Sea ecosystem: frequent, a major predator of mussels and other crabs, and important prey for coastal birds. On hard substrates, competes with invasive rock crabs, which are smaller but have larger claws.	Notable for its sideways movement, allowing equal speed in both directions – improving escape chances. The Low German name “Dwarslöper” (“side-runner”) comes from this behaviour. Body colour varies widely and adapts to the environment due to predation pressure: light-coloured individuals are more common on sand, olive-green ones among seaweed. Young crabs (up to 1.5 cm) can also swim using paddle-like legs, like their swimming crab relatives.



The shore crab is the sideways runner of the crab world.

COMMON BROWN SHRIMP



Common brown shrimp

Crangon crangon



The common brown shrimp is a key species in the underwater world of the Wadden Sea World Heritage Site: It plays a central role in the food web – as both a predator of small animals and as prey for fish and coastal birds. However, intensive and widespread fishing of it conflicts with the conservation goals of the Wadden Sea, which seek to maintain natural processes and biodiversity.



Hestereje



Nordseegarnele



Gewone garnaal

Photo: Rainer Borchering

				
Size: Max. 9.5 cm. Lifespan: 1–5 years. Appearance: yellowish or brownish but translucent; 10 pairs of legs (5 for walking, 5 for swimming). Females are slightly larger than males.	Distribution: From the White Sea (Russia) to the Atlantic coast of South Africa Habitat: In summer, it matures in the Wadden Sea (nursery grounds!); in winter, it retreats to deeper waters in the open North Sea	Behaviour: Nocturnal ambush predator – waits for food to approach (e.g., small crustaceans, worms). Development: Regular moulting needed to grow Reproduction: From about one year old, up to three times a year. Defence: Buries itself in sand to avoid predators “Chameleon of the Wadden Sea”: can change colour using pigment cells (red, black, white) to match its surroundings.	Key species in the Wadden Sea ecosystem: frequent, important predator of small animals, and major food source for fish and coastal birds Threats: Intensive shrimp fishing causes “growth overfishing”, meaning individuals are smaller than in the past. Warming seas from climate change may alter species communities, leading to a sharp decline in North Sea shrimp populations.	The North Sea shrimp has many regional names, e.g., Granat or Porren. Most commonly referred to as “Krabbe” when served peeled on a sandwich. The journey is long – most shrimp are peeled in Morocco. Shrimp fishing is part of life along the North Sea coast – but since it is still practiced across much of the Wadden Sea, it hinders the goal of undisturbed natural development. A balance between protection and use has yet to be achieved.

Most people know the North Sea shrimp as “Krabbe.”

COMMON HERMIT CRAB



Common hermit crab

Pagurus bernhardus



In the Wadden Sea World Heritage Site, hermit crabs are a characteristic part of the underwater world. They rely on the availability of empty snail shells for protection – an example of the complex interrelationships within this ecosystem.



Photo: Rainer Borchering



Almindelig
eremitkrebs



Gewöhnlicher
Einsiedlerkrebs



Gewone
heremietkreeft



Appearance: Yellow, brown, or red in colour.

Identification: Right claw significantly larger than the left; inner edge of the right, solid claw part is red-dish-brown.



Habitat: Young individuals live in shallow water, older ones in deeper areas, where the common whelk is more frequently found.



Behaviour: Lives in empty snail shells up to the size of a common whelk. When threatened, the crab retreats into the shell. As it grows, it searches for a larger shell and moves into it.

Diet: Filter feeder, scavenger, and predator.

Reproduction: In spring, the female lays 1,000–30,000 eggs, fertilized inside the shell by sperm drawn in with water currents. The larvae live in plankton for several weeks.



Threats: None known.



The scientific name translates to “Bernhard Fat-Tail,” referring to both the species’ soft abdomen and Saint Bernard of Clairvaux, a hermit monk from the 12th century.

Hermit crabs often live in symbiosis with the sea anemone *Calliactis*. It can enlarge the shell opening, so the crab doesn’t need to relocate as often. The anemone benefits from better access to food through the crab’s mobility.



The hermit crab’s claws adapt to the shape of the shell opening to seal it optimally.

COMMON STARFISH



Common starfish

Asterias rubens



The starfish is an important resident of the underwater world in the Wadden Sea World Heritage Site, playing a significant role both as predator and prey.



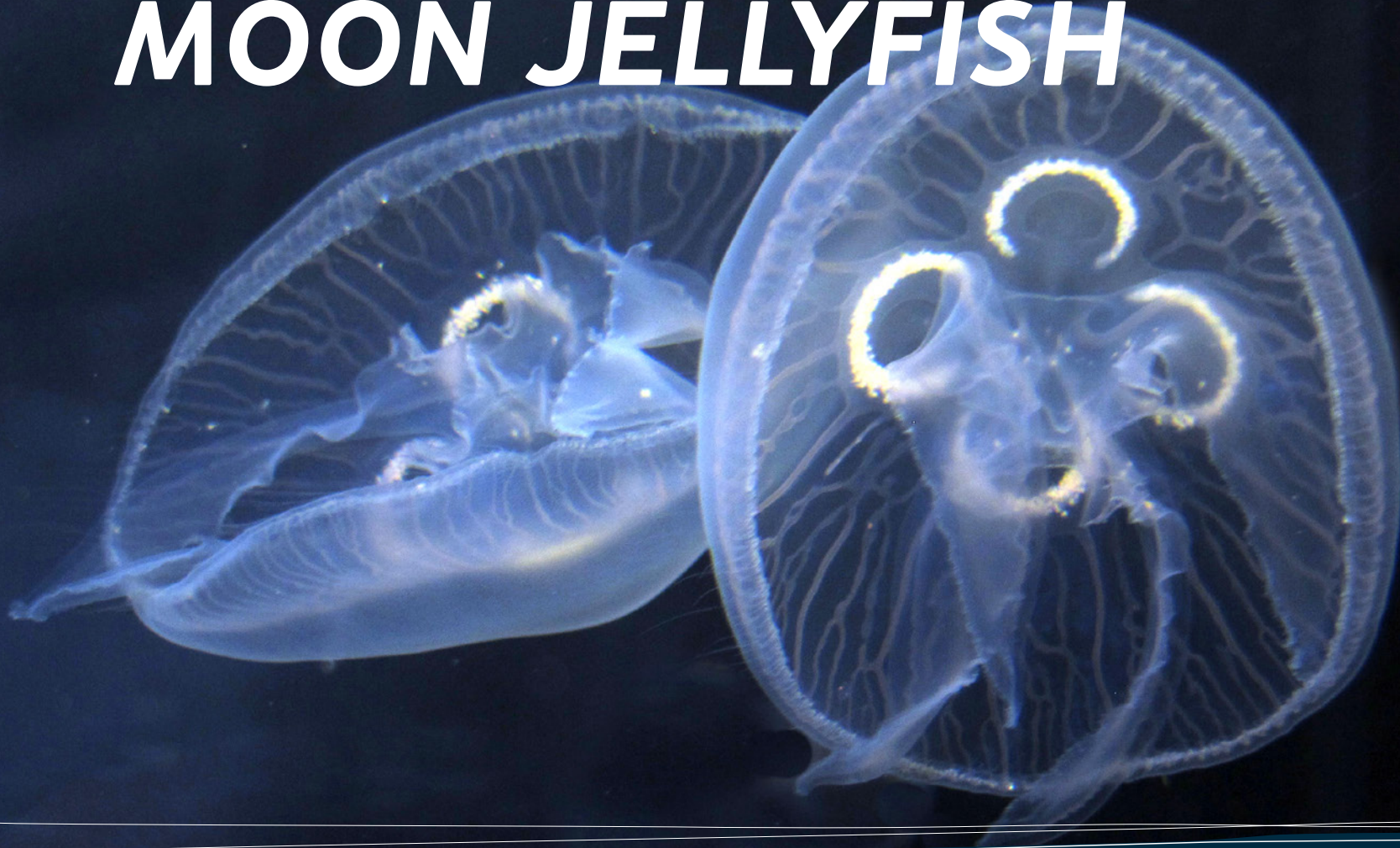
 Almindelig søstjerne
 Seestern
 Zeester

Photo: Rainer Borchering

				
Size: Up to 50 cm; up to 6 kg. Lifespan: Between 5 and 30 years; reaches sexual maturity at around 2–4 years. Appearance: Usually 5 arms; coloration typically orange-red, sometimes blue-violet or brownish depending on the region.	Distribution: Atlantic coasts of Europe and North America, also in the western Baltic Sea. Habitat: In the permanently submerged areas of the Wadden Sea, prefers mussel beds. In exposed tidal flats it hides, for example under mussels or similar.	Diet: Predator of mussels, snails, and sometimes care-less crabs or fish. Opens shells with a short, powerful pull of its arms or by prying them open for hours. Digests food externally by extending its stomach through its mouth into the opened shell and releasing digestive fluids. Development: Separate sexes; gametes released in spring; planktonic larval phase lasts 3 months.	Predators: Gulls, eider ducks, larger starfish, and sunstars. Competition: Disliked by mussel farmers due to high mussel consumption.	Starfish have no brain; all organs are arranged in rings or radial symmetry, and all arms are equal. At the tip of each arm is a tiny dark eyespot capable of distinguishing light from dark. They can regenerate lost arms but often die from injuries during trawling. Different species have varying numbers of arms (e.g., the crown-of-thorns starfish can have up to 23). In times of food shortage, starfish can exhibit “negative growth” – they shrink.

Starfish can “see” using the tips of their arms.

MOON JELLYFISH



Moon jellyfish

Aurelia aurita



The moon jellyfish is a resident of the underwater world in the Wadden Sea World Heritage Site and closely connects this unique coastal ecosystem with the open North Sea.



 Øregople
 Ohrenqualle
 Oorkwal

Photo: Rainer Borchering

				
Classification: True jellyfish (Scyphozoa). Size: 20–30 cm. Lifespan: Up to 1 year. Appearance: Flat, transparent, colourless bell; four ring-shaped gonads (“ears”) – white in males, red in females; four gelatinous oral arms that do not reach the bell margin. Tentacles on the edge contain many stinging cells. Composed of 98 % water.	Distribution: North Sea, Baltic Sea up to the Åland Islands; present mainly during the warmer half of the year, like all true jellyfish.	Development: Larvae develop into 2–3 mm stalked polyps on the seafloor. In spring, each polyp produces 10–20 disk-shaped young jellyfish (ephyrae). Locomotion: Very slow swimmers, drifting with the current (plankton = “that which drifts”). Elegant pulsating movements with flowing edge tentacles. Diet: Captures zooplankton.	Threats: None known. However, mass blooms may indicate eutrophication (due to high plankton levels) and overfishing (due to lack of natural predators like fish).	Moon jellyfish are found worldwide in several species that are only distinguishable genetically. Along the bell margin there are 8 small sensory structures with eye spots; opposite the mouth is a balance organ. Moon jellyfish are harmless to humans. But caution is advised with other North Sea jellyfish such as the lion’s mane jellyfish and blue jellyfish, whose stinging cells can cause pain on contact.

Jellyfish only appear in summer – in winter, they survive as polyps on the seabed.

BARREL JELLYFISH

Barrel jellyfish

Rhizostoma octopus



In the Wadden Sea World Heritage Site, the barrel jellyfish is an impressive summer visitor, reflecting the high productivity of the plankton-rich North Sea.



Lungegople



Wurzelmundqualle

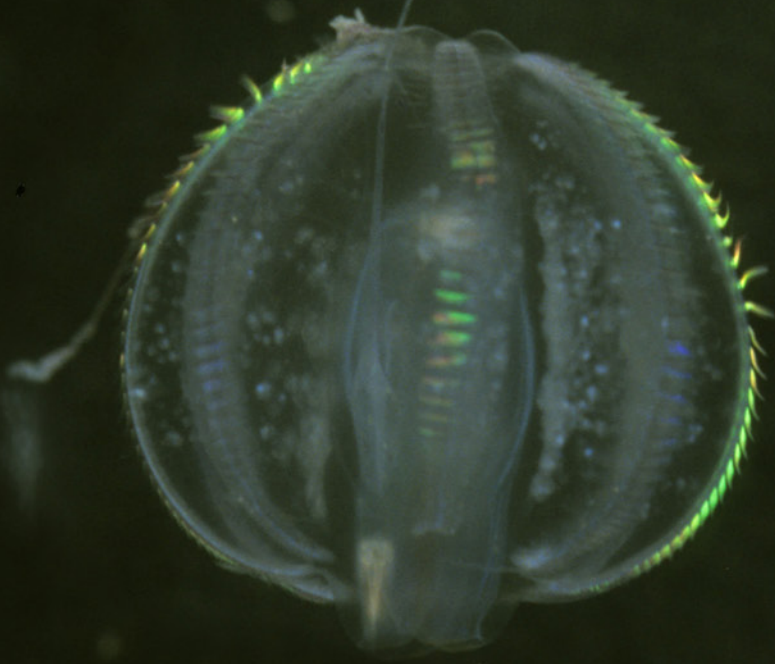


Zeepaddestoel

Photo: Rainer Borchering

				
Size: ≥ 30 cm. Lifespan: 6 month. Appearance: Bell firm and cartilaginous, blue with a violet rim and strongly arched; underside with a thick tuft of 8 curled feeding arms.. Consists of about 98 % water. Because of its thick feeding arms, the barrel jellyfish is also called the “frilly mouthed jellyfish”.	Distribution: North Sea, Skagerrak, and northern Kattegat. Common in summer. Habitat: Open seawater; often stranded in the Wadden Sea. Resting stages (polyps) live attached to stones on the seabed.	Movement: Very slow, current-driven swimmers (belong to the plankton, from Greek “drifters” or “wanderers”. Nutrition: A filtering apparatus of slimy tentacles catches tiny plankton organisms. Development: A multi-year polyp about 5 mm in size lives sessile on the seabed and forms the medusae (jellyfish) in spring, which grow into large jellyfish within just a few months.	Not dangerous to humans. The gelatinous connective tissue in its bell resembles human collagen and may therefore have medical potential. A related jellyfish species is pickled in Thailand and eaten in strips.	The amphipod <i>Hyperia galba</i> is transparent in summer and nibbles on jellyfish bells as a parasite, letting itself be carried around. In winter it is brown and lives on the seabed.

SEA GOOSEBERRY



Sea gooseberry

Pleurobrachia pileus



The sea gooseberry is a species of comb jelly, an important component of the plankton in the North Sea and in the Wadden Sea World Heritage Site.



 Stikkelsbærgople
 Seestachelbeere
 Zeedruif

Photo: Rainer Borchering

				
Size: up to 2 cm. Lifespan: up to 1 year. Appearance: Oval to spherical and transparent; eight longitudinal “ribs” of tile-like ciliary plates used for locomotion; two tentacles can be withdrawn into the body. Relatively firm, initially retains its shape out of water.	Distribution: Atlantic Ocean, North Sea and Baltic Sea up to the Åland Islands (Sweden). Habitat: Occasionally abundant on the tidal flats; can strand in large numbers.	Nutrition: Catches planktonic crustaceans with two long tentacle threads bearing 100–200 fine side filaments with sticky “lasso cells.” The tentacles act like sticky flypaper, are brought to the mouth by “somersaults,” and the prey is moved into the stomach. Reproduction: Hermaphrodite; first reproduces at 1 mm with few eggs, later at 1 cm with many eggs and sperm.	Common; can consume the zooplankton needed by fish larvae.	Paddling ciliary plates break sunlight into rainbow colours (like a prism). Unlike many other comb jellies, the sea gooseberry does not bioluminesce at night. Its main predator is the melon jellyfish Beroe, which eats comb jellies up to its own size.



The sea gooseberry “senses” the presence of hermit crabs, shrimps, and shore crabs and then avoids the seabed.

COMPASS JELLYFISH



Compass jellyfish

Chrysaora hysoscella



The compass jellyfish is a striking species in the underwater world of the Wadden Sea World Heritage Site. It is a seasonally migrating jellyfish that benefits from the productive conditions of the North Sea.



Kompasgople



Kompassqualle



Kompaskwal

Photo: Rainer Borchering

				
Size: up to 20 cm. Lifespan: up to 1 year. Appearance: Yellowish bell with light brown rim, V-shaped markings, long tentacles, and long pale reddish oral arms. Consists of about 98 % water.	Distribution: Washed ashore mainly in summer with east winds, when deep water rises near the coast and brings large swarms of jellyfish. Habitat: Often stranded on tidal flats and beaches. The larvae live on stones or shells on the seabed.	Development: Starts as a swimming larva. In spring, the small polyp divides into about 20 flat discs, each of which becomes a jellyfish.	More frequent and earlier occurrences indicate ocean warming.	An Arctic relative of the compass jellyfish can reach a diameter of up to 2 m.



Juvenile horse mackerel shelter among the tentacles of the compass jellyfish, just as clownfish do among anemone tentacles.

LION'S MANE JELLYFISH



Lion's mane jellyfish

Cyanea capillata



The feared lion's mane jellyfish is part of the plankton in the underwater world of the North Sea and the Wadden Sea World Heritage Site.



Rød brandmand



Gelbe Nesselqualle



Gele haarkwal

Photo: Rainer Borchering

				
Size: 35–50 cm in diameter, up to 2 m bell width in the Arctic. Appearance: The jellyfish's bell has 8 lobes. Its roughly 800 tentacles, when fully extended, can reach 15 times the bell diameter – up to 5 metres in the North Sea! The bell consists of 99 % water and is glassy clear except for a thin, intensely coloured layer in the centre of the animal. The colour varies from yellow to red; entirely white individuals are rare.	Distribution: One or several species of this appearance occur in cool coastal regions of the Atlantic and Pacific Oceans in the Americas, Australia, and Europe, extending into the western Baltic Sea and the Arctic Ocean. Appears only in summer, at the earliest from February.	Nutrition: Its stinging venom paralyzes prey, which is then transported to the central mouth opening and digested. Development: The polyp lives for several years on the seabed and produces young jellyfish multiple times.	The lion's mane jellyfish can painfully spoil summer swimming fun. Skin that touches its transparent tentacles may redden and hurt for hours. Helpful measures: rinse the affected area with saltwater and then cover it with shaving foam (usually available from lifeguards). When stranded, the jellyfish retracts its tentacles underneath. Touching the upper side is harmless. Israeli researchers have developed an inhibitor for all stinging cells, which is added to sunscreens to protect swimmers from jellyfish stings.	The tentacles can still sting painfully even without the jellyfish body attached. Various juvenile fish protected by mucus live among the tentacles and even steal prey. In a Sherlock Holmes story, the lion's mane jellyfish appears as a killer of a man and a dog, although it is not deadly. When stinging cells fire, the harpoon-like venom spine is launched with an acceleration of $50,000 \text{ km/s}^2$ – nearly fifty times faster than a bullet – giving it enough force to penetrate even the chitin shells of crustaceans.

The discharge of stinging cells is the fastest known natural reaction.

BLUE JELLYFISH



Blue jellyfish

Cyanea lamarckii



The blue jellyfish is a typical component of the plankton in the North Sea and the Wadden Sea World Heritage Site.



Blå brandmand



Blaue Nesselqualle



Blauwe haarkwal

Photo: Rainer Borchering

				
Size: 15–20 cm in diameter, rarely up to 30 cm. Appearance: The bell has 8 lobes and may be blue, brown, green, yellowish, or almost colourless. Its roughly 400 tentacles can reach up to 1 metre in length when fully extended. The bell consists of 99% water and is glassy clear except for a thin, intensely coloured layer in the centre of the animal.	Distribution: Europe extending into the western Baltic Sea and the Arctic Ocean. Usually appears in early summer, occasionally from February.  The discharge of stinging cells is the fastest known natural reaction.	Nutrition: Spreads out its tentacles and lets itself sink to catch zooplankton, especially smaller jellyfish. Development: The polyp lives for several years on the seabed and produces young jellyfish multiple times.	Stings less severely than the lion's mane jellyfish but may disrupt swimming in June when jellyfish and torn-off tentacles drift in nearshore waters. Occurs mainly with east or south winds, when surface water is pushed away and deeper water containing jellyfish wells up along the coast.	For a long time it was unclear whether all colourful "lion's mane" jellyfish belonged to one species, but the lion's mane jellyfish has 8×100 tentacles, while the blue has only 8×50 – so they are two separate species. Inside the stinging cells, the osmotic pressure is estimated at 140 bar. A car tyre has 2.4 bar. When stinging cells fire, the harpoon-like venom spine accelerates at $50,000 \text{ km/s}^2$ – almost fifty times faster than a bullet – allowing it to pierce even crustacean shells.

ROUGH HYDROID / SNAIL FUR

Rough hydroid / Snail fur

Hydractinia echinata



The partnership between the spiny hydroid and the hermit crab is an excellent example of symbiosis between two animal species in the Wadden Sea World Heritage Site.



 Pindsvinepolyp

 Stachelpolyp

 Ruwe zeerasp

Photo: Rainer Borchering

				
Size: Calcified spines 1 mm high; polyps 2–4 mm high. Appearance: Brown, spiny crust covering snail shells inhabited by hermit crabs; can completely cover and even enlarge the shell. Living colonies have dense clusters of pink polyp heads.	Distribution: Western and eastern Atlantic Ocean, Mediterranean Sea, western Baltic Sea, North Sea. Almost always lives in symbiosis on the shell of a hermit crab.	Development: Larvae settle and form crusts only on snail shells that contain a hermit crab. The larva identifies a suitable shell by the scent of bacteria associated with the crab. Nutrition: The colony forms feeding polyps that pick up small animals from the seabed when the crab moves around.	Symbiosis with hermit crabs: the spiny hydroid can enlarge the shell's opening, meaning the crab does not need to switch shells as often; the crab carries the hydroid around, improving its food supply.	The spines of the hydroid crust protect the colony from a specialized small sea slug (<i>Cuthona nana</i>) that grazes on the polyps but cannot reach between the spines. In those protected areas, the polyps can regenerate quickly. Also called snail fur because it covers snail shells like a fur.



The spiny hydroid and the hermit crab are true partners – a rarity in nature.

BRITTLE STARS

Brittle stars

Ophiuroidea



Brittle stars are rarely seen inhabitants of the underwater world of the Wadden Sea World Heritage Site.



 Slangestjerner
 Schlangensterne
 Slangsterren

Photo: Rainer Borchering

				
Size: 12–13 cm. Lifespan: up to 5 years. Appearance: Small central disc; 5 long, slender arms. 3–4 species occur near the coast (<i>Ophiura</i>, <i>Ophiotrix</i>, <i>Amphipholis</i>).	Distribution: Avoid the tidal flats that fall dry but may be washed from deeper tidal channels onto the flats or the beach. The “fragile brittle star” (<i>Ophiotrix</i>) can be found sitting on washed-up sponge clumps.	Nutrition: Hide in the sand during the day and search for food at night. Growth on the seabed, carrion, and plankton are transported to the mouth in the centre of the disc by tiny suction cups. Strong teeth in the mouth opening crush the food; the rest is spat out. Locomotion: Crawl along the seabed by pushing themselves forward with their arms.	Very common on some deeper seabeds; serve as food for certain fish and sea stars.	They have luminous gland cells on their spines that emit light when an arm is bitten off – startling predators. Arms bitten off by predators can regrow within a few months. They have brood pouches in the angles between their arms where they “brood” five fully developed young each. Sometimes storms wash thousands of brittle stars ashore, and some crawl back toward the sea.



If you place a brittle star upside down on your hand, it will flip itself over.

GREEN SEA URCHIN

Green sea urchin

Psammechinus miliaris



The green sea urchin is a typical bottom-dwelling species in the underwater world of the Wadden Sea World Heritage Site, preferring firm ground.



Tangborre



Strandseeigel



Gewone zeeappel

Photo: Rainer Borchering

				
Size: 3–5 cm. Lifespan: probably 3–5 years. Appearance: Flattened shell; spines green-brown and blunt. In the Wadden Sea it is almost unmistakable.	Distribution: European coasts from Portugal to Norway. Habitat: In the Wadden Sea, deeper tidal channels with firm ground.	Nutrition: Scrapes algae, barnacles, and other growth off stones with its sharp teeth. Locomotion: Walks on its movable spines like on stilts or crawls using its numerous tube feet. Development: In spring, females and males release their eggs and sperm into the water simultaneously.	Eaten by fish with strong jaws and by large crabs. Probably negatively affected by bottom trawl fisheries. Harmless to humans – lacks the sharp or venomous spines of some tropical species.	Has no real brain, only a thickened ring of nerve cells. Its complicated chewing apparatus, with five constantly growing and self-sharpening teeth, is called “Aristotle’s lantern,” named after Aristotle, who first described it. Uses its long tube feet to carry seashells around as camouflage. Between the spines are 'movable bristles with tiny pincer-like tips that keep the spine coat clean.



COMMON SWIMMING CRAB



Common swimming crab

Liocarcinus holsatus



 Glat svømmekrabbe
 Schwimmkrabbe
 Gewone zwemkrab

Photo: Rainer Borchering



The agile swimming crab is one of the important predators in the underwater world of the Wadden Sea World Heritage Site.

				
Size: Up to 6 cm carapace width. Lifespan: 3–5 years. Appearance: Carapace grey-pink to bluish; claws with longitudinal ridges; final segment of the hind legs broadened like paddles.	Distribution: European coasts from Greece to Iceland. Habitat: North Sea seabed down to the low-tide line; avoids exposure during ebb tide.  Remains of swimming crabs are often found in gull pellet casts.	Nutrition: Predatory; feeds on bottom-dwelling animals such as mussels and worms, but also on shrimp and fish. Often lies buried in the sand waiting for prey, with only its eyes visible; catches fish by swimming up from behind and below. Reproduction: Females lay up to 15,000 orange eggs in summer and “brood” them beneath their folded tail.	Frequently caught as bycatch in crab fisheries.	When held by both claws, it tries to escape by wildly paddling “in reverse”. Hence one of its nicknames: “flying crab”. Young swimming crabs are sometimes found among cooked shrimp.

MYSID SHRIMP

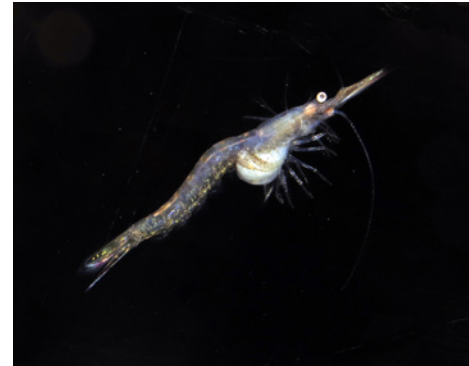


Mysid shrimp

Mysis spec.



Mysid shrimp are not easy to see but are important links in the food web of the Wadden Sea World Heritage Site.



Pungreje



Schwebegarnele



Aasgarnaal

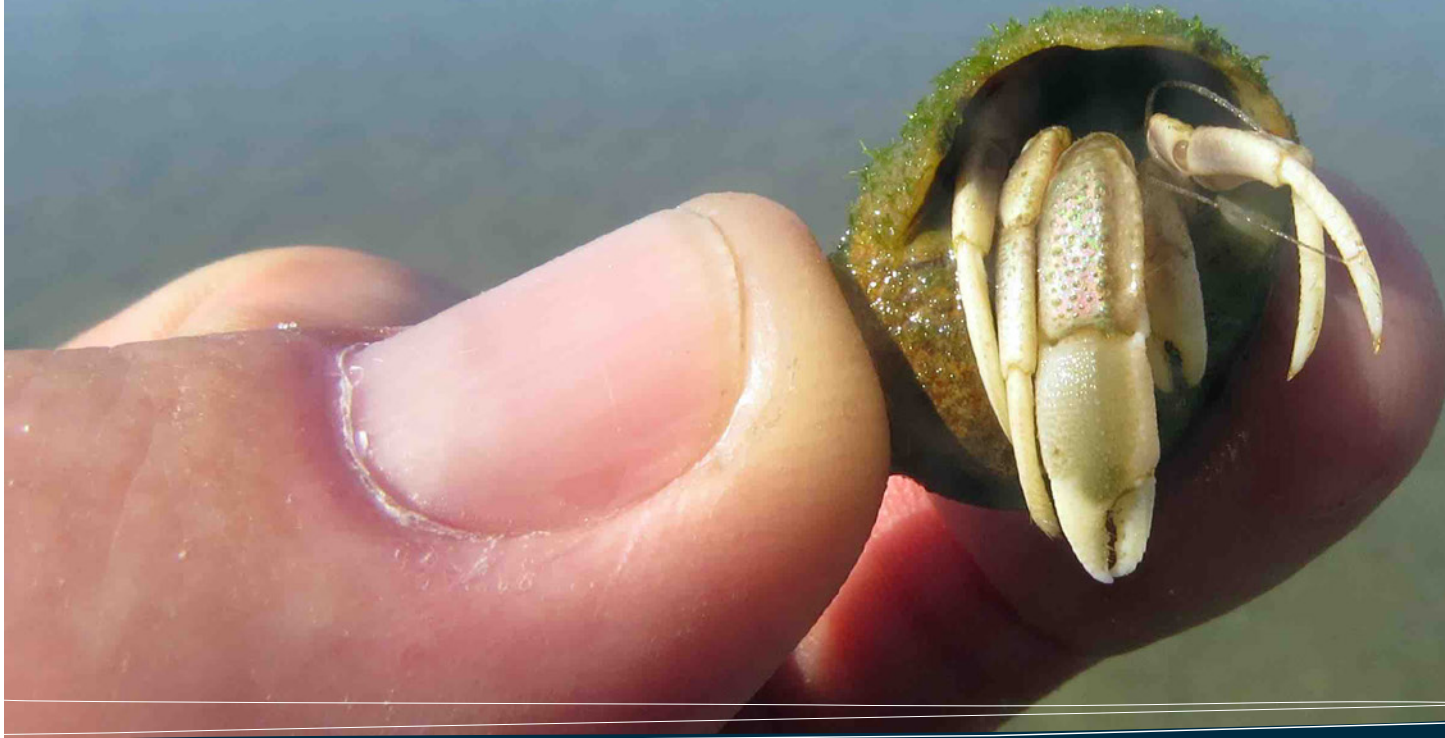
Photo: Rainer Borchering

				
Size: 0.3–2.5 cm. Appearance: Glass-like transparent.	Lives in swarms among seagrass and algae.	Nutrition: Filter feeder; consumes the smallest organic particles and organisms. Development: Eggs and young develop in a protective brood pouch.	Part of the zooplankton > important food for fish. Very popular as frozen aquarium food.	Similar in lifestyle and appearance to krill in the Arctic oceans, but krill can grow up to 7 cm and are not closely related.



The mysid shrimp is also called the glass shrimp.

LONG-CLAWED HERMIT CRAB



Long-clawed hermit crab

Pagurus longicarpus



Photo: Rainer Borchering

-  Langhåndet Heremitkrebs
-  Langarm-Einsiedlerkrebs
-  Gemaskerde heremietkreeftjee



In the Wadden Sea World Heritage Site, the main goal is to allow natural processes to proceed largely undisturbed and to preserve native biodiversity. The introduction of invasive species, such as the long-clawed hermit crab, threatens this balance.

				
Size: 2.5 cm. Appearance: Grey, green, or white; usually in beach snail shells. Identification: Second segment of the right claw elongated, iridescent green when alive; claw fingers entirely white.	Original distribution: North American Atlantic coast Origin: Originally from the western Atlantic (= "American hermit crab").	Nutrition: Scavenger and omnivore; eats carrion, algae, and detritus. Reproduction: Late March–October (peak in April).	Predators include birds, snails, squid, and other crabs.	First recorded in Jade Bay in 2018, and in Schleswig-Holstein Wadden Sea in 2020. Probably introduced via larvae in ship ballast water. Crabs require appropriately sized shells: too large = too heavy, too small = insufficient protection, no growth > intraspecific competition.



Long-clawed hermit crabs fight other hermits for larger, more suitable shells.

SAND GAPER



Sand gaper

Mya arenaria



The large sand gaper clam lives buried deep in the sediment of the Wadden Sea World Heritage Site, filtering large amounts of water to feed on plankton.



Almindelig
Sandmusling



Sandklaffmuschel



Strandgaper

Photo: Rainer Borchering

Size: up to 15 cm = largest native bivalve; up to 240 g. Lifespan: up to 20 years. Appearance: Oval shells; fresh shells have a thin grey outer layer, older shells are snow-white or yellow, brown, or grey from iron deposits. Left valve with spoon-shaped tooth in the hinge, right valve with corresponding socket.	Distribution: Inhabits all temperate coasts of the Northern Hemisphere. Origin: Japan; also common in North America, probably introduced to Europe by Vikings around 1050. Habitat: Sandy tidal flats or shallow water; lives up to 30 cm deep in sediment; requires little oxygen.	Nutrition: Uses a two-tube retractable siphon to draw in plankton-rich water and expel filtered water.	Traditional food in New England (USA) and intensively fished; populations declining due to climate change and invasive shore crabs. Predators: Juveniles are vulnerable to shore crabs, sea stars, and birds. Ends of the siphons are often bitten by young flatfish (plaice, dab).	Called “Pisser” in Low German because of the water spout when retracting its siphon. Takes 4 years for the siphon to reach 16 cm, protecting it from the Eurasian curlew’s bill. At ~5 years and 5 cm shell length, loses the ability to re-bury itself.



In the famine year 1946, sand gapers were made into “mussel sausage” in Cuxhaven, but it was gritty and not well received.

COMMON WHELK



Common whelk

Buccinum undatum



The common whelk is one of the largest snail species in the Wadden Sea World Heritage Site. It lives as a predator and scavenger.



Konk



Wellhornschnecke



Wulk

Photo: Rainer Borchering

				
Size: up to 12 cm. Lifespan: up to 15 years Appearance: Pointed, spiralled shell with wavy growth rings; washed-up shells vary in colour from grey and brown to blue.	Distribution: North Sea, western Baltic Sea, North Atlantic Ocean, and Mediterranean Sea. Habitat: Lives in the Wadden Sea in areas that are permanently submerged.	Nutrition: Uses a long extendable proboscis to feed on carrion and bivalves; locates prey by smell. Uses the shell opening to block and lever open bivalve shells. Reproduction: Male attracted by female pheromones; female attaches a large egg mass of ~2,000 capsules with 200–300 eggs and nutritive capsules each. Only 1–2 % of the eggs produce baby snails, the rest are food for them.	Popular find on the Wadden Sea coast; holding a shell to the ear allows you to hear “the sea” (or your own heartbeat). Fished in the North Sea using bottom trawls and eaten in England and France. Threats: The toxin TBT (tributyltin) from ship paints caused hormonal disorders and infertility in whelks before its ban (2008), leading to their disappearance from the southern Wadden Sea.	Egg masses consist of parchment-like capsules, each containing ~200 eggs. The first 2–3 juveniles hatch inside and eat the remaining eggs before leaving the capsule. The mouth sits at the tip of a nearly body-length proboscis, which can be inserted deep into crevices to feed. Can crawl fairly quickly, about 14 cm per minute.



Empty whelk shells are sometimes found along the strandline.

COMMON SLIPPER SHELL



Common slipper shell

Crepidula fornicata



In the Wadden Sea World Heritage Site, the aim is to allow natural processes to proceed undisturbed and to preserve native biodiversity. The introduction of invasive species such as the slipper shell opposes this goal.



Tøffelsnegl



Pantoffelschnecke



Muiltje

Photo: Rainer Borchering

				
Size: 2–5 cm. Lifespan: up to 10 years. Appearance: Grey shell, sometimes brown-speckled; has a transverse septum in the shell opening where the soft body attaches; forms curved towers of up to 10 or more stacked individuals.	Distribution: Atlantic Ocean, North Sea, western Baltic Sea. Introduced: Probably brought from the USA with Pacific oysters around 1890; first recorded in the German Bight in 1934. Habitat: Hard substrates, mussel beds, and pilings.	Nutrition: Adults are sessile, filter plankton with their gills. Reproduction: Juveniles are male, searching for a female to settle on; at ~1.5 cm, they transform into females over about 6 weeks. Defence: Retracts into shell and presses body against substrate; cannot move quickly.	Filtration is so efficient that oyster beds heavily colonized by slipper shells can starve. Cold winters reduce populations significantly.	Feared in mussel farming because it consumes plankton needed by cultivated mussels. Stores sperm for months to fertilize eggs; some larvae have two mothers because the sperm donor became female before fertilization.



Called “slipper shell” because the shell resembles a slipper.

GREY CHITON



Grey chiton

Lepidochitona cinerea



The chiton is an inconspicuous but typical inhabitant of hard substrates in the Wadden Sea World Heritage Site, exemplifying the adaptability of small species to constant changes in currents and tides.



Variabel skallus



Rändel-Käferschnecke



Gewone keverslak

Photo: Rainer Borchering

				
Size: up to 2.8 cm, usually smaller. Lifespan: up to 5 years. Species age: estimated 500 million years. Appearance: Dorsal shell consists of 8 rough, movable plates, irregularly coloured yellow, red-dish-brown, or green.	Distribution: Mediterranean Sea, Atlantic Ocean, North Sea, western Baltic Sea. Habitat: Mussel beds and artificial stone structures in shallow water.  Based on appearance, “pill-chiton” would be a more fitting name.	Nutrition: Feeds on plant and animal growth of all kinds; small tentacle-like projections at the anterior mantle edge help locate prey. When prey contacts the tentacles, the chiton covers it with its shell and consumes it. Reproduction: Separate sexes, externally similar; eggs and sperm released into the water for fertilization.	Few predators; can attach tightly to substrate by retracting the “body” > protection from predation.	So primitive that it is barely related to snails and mussels. Has many tiny eyes on its body surface to detect movement and shadows.

MANILA CLAM



Manila clam

Ruditapes philippinarum



 Manila musling
 Manila-Teppichmuschel
 Filipijnse tapijtschelp



In the Wadden Sea World Heritage Site, the main goal is to allow natural processes to occur undisturbed and to preserve native biodiversity. The introduction of invasive species such as the Manila clam opposes this goal.

Photo: Rainer Borchering

				
Size: 5–8 cm. Lifespan: 7–8 years. Appearance: Rounded clam with a latticed shell impression; often brown patterned; variably black-brown marked; very short, wide mantle cavity, extending less than half the shell width.	Distribution: Originally Northwest Pacific Ocean between southern Kuril and Sakhalin Islands (Russia), Sri Lanka, and the Philippines; prefers warmer waters. Cultivated world-wide for consumption. Habitat: Buried in (silty) sand flats in the tidal zone and shallow sublittoral areas.	Reproduction: At salinity 24–35 ‰, up to 2 million eggs per female, several times a year at 12–14 °C. Larvae remain in plankton for up to 4 weeks > wide dispersal. Nutrition: Filter feeder.	Globally used in aquaculture as a high-quality edible clam. Increasing presence in the Wadden Sea; so far, no significant ecological impacts from its introduction have been recorded.	Brought to Europe for aquaculture in the 1970s–1980s. Found in the wild in the UK by 1994; shell found at Hallig Langeneß in 2016, living clams recorded in the northern Sylt Wadden Sea in 2020. In the Venetian lagoon, it was once important for fisheries but was almost eradicated in 2023 by the blue crab introduced from Florida.

Around 4 million tons of Manila clams are produced annually in aquaculture, which amounts to roughly 150 billion clams.

FLOUNDER



Flounder

Platichthys flesus



In the Wadden Sea, young flounder grow up in coastal waters. The mudflats provide abundant food and shelter – ideal conditions for this adaptable flatfish species.



 Skrubbe
 Flunder
 Bot

Photo: Rainer Borchering

				
Size: 25–30 cm, rarely up to 50 cm. Lifespan: up to 15 years. Appearance: Skin teeth along fin bases, lateral line, and gill cover. Similar species: plaice (flounder may have orange spots like plaice; lateral line on plaice feels smooth).	Distribution: North and Baltic Seas, mainly in brackish water; tolerates freshwater, migrates up-river. Habitat: Occasionally as stationary fish on the mudflats, often in estuaries or as juveniles (first year).  95 % of flounder lie on the left side, a few on the right side.	Nutrition: Nocturnal hunters; buried during the day, migrate with the tide to shallow water. Reproduction: Up to 2 million eggs per female. Development: 1 week after spawning, 2–3 mm long symmetrical larvae > grow to ~1 cm, then transform to flatfish via asymmetrical eye migration and shift to bottom life; sexually mature at 3–4 years.	Important food for birds and seals; by-catch in crab fisheries.	“Buttpedden”: historically caught on foot in tidal creeks at low tide. Saying: “flat as a flounder”.

DAB



Dab

Limanda limanda



Dab find a protected habitat in the Wadden Sea with abundant benthic fauna. Shows the importance of shallow coastal areas as nursery grounds for many fish species.



 Ising

 Kliesche

 Schar

Photo: Rainer Borchering

				
Size: Usually 15–20 cm, maximum 40 cm. Lifespan: up to 12 years. Appearance: Similar to plaice (without the curve at the pectoral fin).	Distribution: Northeast Atlantic coasts: France to North Cape, Iceland, Baltic Sea. Habitat: Wadden Sea, preferably deeper than 2 m; replaces plaice under heavy fishing pressure; often juvenile (0-group) and frequent summer visitor, maximum until October.	Behaviour: Bottom-dwelling, often in schools. Nutrition: Eats shrimp, small crustaceans, worms, and carrion in trawl tracks; swallows prey whole. Reproduction: No spawning migration; reproduction occurs locally; large females lay up to 1 million eggs.	Predators: fish and seals Use: usually too small; from 23 cm marketed as “sand-scholle”; historically air-dried for personal use (“Finkenw-order ham”). Research: Used as a monitoring organism → very sensitive to pollutants.	Probably the most common flatfish in the North Sea.



The dab is not in high demand as a food fish; therefore, 90 % of the dabs caught as bycatch are discarded dead.

SOLE



Sole

Solea solea



Sole use the Wadden Sea as valuable growth grounds. Juveniles find optimal conditions here before moving to deeper North Sea areas.



 Tunge
 Seezunge
 Tong

Photo: Rainer Borchering

				
Size: Previously up to 60 cm, now smaller due to overfishing. Lifespan: Up to 25 years. Appearance: Long oval, with sensory barbels for detecting prey; fine scale network; similar species: dwarf sole (some black rays).	Distribution: Eastern Atlantic Ocean, Mediterranean Sea to western Baltic Sea, widespread in the North Sea. Habitat: Sand and silt bottoms at 10–60 m; winter retreat to 100 m.	Nutrition: Worms, crustaceans, small fish; nocturnal hunter. Behaviour: Migrates to spawning areas at night, uses currents; attaches to substrates including aquarium glass. Reproduction: Lays eggs in spring and summer near the coast; larvae planktonic, settle on mudflats at 15 mm; spawn at 3–5 years (25 cm).	Valuable food fish; heavily fished; bottom trawling damages habitat; high bycatch including juveniles in crab fisheries.	Can live long, but usually caught shortly after reaching minimum 24 cm size. Threatened soles raise pectoral fin from the sand, displaying a dark spot resembling the venomous spine of the Greater weever buried nearby.



Sole use barbels to detect prey at night.

LESSER PIPEFISH

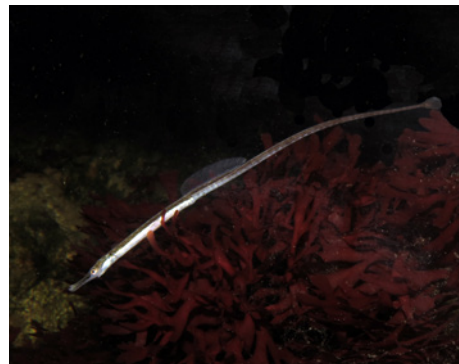


Lesser pipefish

Syngnathus rostellatus



The lesser pipefish is a permanent resident of the Wadden Sea. Its unusual body shape and male brooding exemplify the diversity of specialized lifestyles in this ecosystem.



Lille tangnål



Kleine Seenadel



Kleine Zeenaald

Photo: Rainer Borchering

				
Size: Usually 10 cm, maximum 18 cm. Lifespan: up to 2 years. Appearance: Rod-shaped body with “seahorse” snout, scaleless, covered with bony plates in 13–15 rings (head to dorsal fin); similar species: greater pipefish (18–21 rings).	Distribution: Tolerant of low salinity, often in river estuaries. Habitat: Coastal seagrass and algal zones; May–September in shallow tidal areas; deeper channels year-round.	Nutrition: Uses tubular snout like a pipette to suck in prey. Reproduction: Sexually mature after 1 year; male and female entwine, female deposits eggs in male’s brood pouch; males brood May–August.	Bycatch in crab fisheries.	During food shortages, terns feed pipefish to chicks, which often starve due to low nutritional value.

Pipefish are closely related to seahorses but lack a prehensile tail.

SAND GOBY / COMMON GOBY



Sand goby / Common goby

Pomatoschistus minutus & *P. microps*



Both goby species are frequent and important residents of the Wadden Sea. As a food source for many fish and seabirds, they play a central role in the ecological structure of the Wadden Sea.



Photo: Rainer Borchering



Sandkutling/
Lerkutling



Sand- und
Strandgrundel



Dikkopje/
Brakwatergrondel

Size: 4–10 cm. Lifespan: 2–3 years. Appearance: Difficult to distinguish; mainly by head shape; both species common in mudflats.	Distribution: Eastern Atlantic Ocean, Gibraltar to North Cape, Baltic Sea. Habitat: Sandy coastal substrates; brackish water, not freshwater; present year-round in the mudflats; summer also in shallow pools and flats, winter deeper; most common resident fish.	Nutrition: Eats small crustaceans, mussels, fish eggs; important predators for small animals. Reproduction: Sexually mature at 1 year; spawning March–July; males dig breeding burrows under shells, females attach up to 3,000 eggs to burrow ceiling. Behaviour: Swim actively when hungry and at night.	Predators: Important prey for other fish and seabirds; high reproductive rate, not threatened.	Young seals learn to catch fish using gobies During fish shortages, porpoises hunt gobies, catching ~500 per hour (1 every 7 seconds).

Many birds
skilfully pick gobies
from tidal pools.