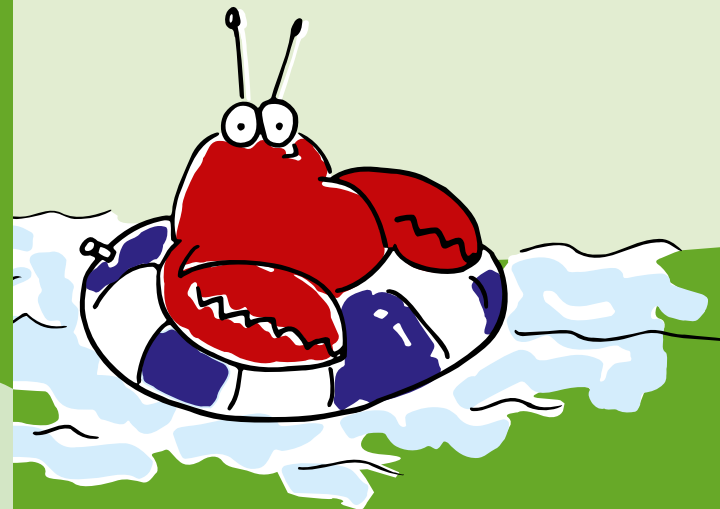




## Sea level rise!

Land is already sinking naturally in the region of the German Wadden Sea coast. This is a delayed consequence of the ice ages. At the water gauge in the Wyk harbour on the island of Föhr an average sea level rise of 5.5 mm per year has been measured which is a result of this natural sinking. On the Hallig islands, which are flooded with saltwater by storm floods in winter, a thin layer of fine sediments is deposited. The geologist Dr. Matthias Deicke from Göttingen has been studying for some years now whether the sediment deposits are enough to counteract the existing natural land sinking and future sea level rise. His first results have shown that the Hallig islands are gaining yearly 3.5 mm in altitude. Therefore they are losing – without considering climate change induced sea level rise – every year 2 mm on altitude in relationship to the normal sea level of the North Sea.

# Spotlight





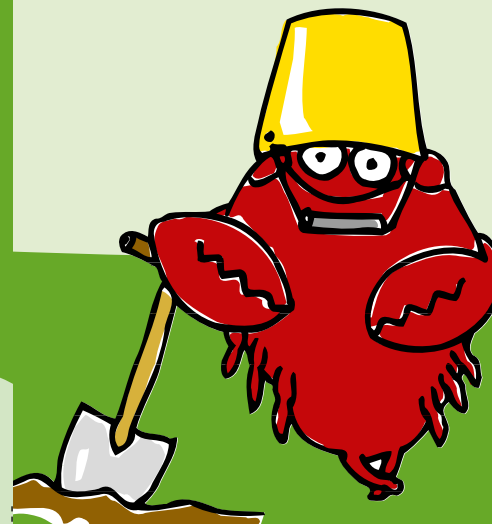
## Coastal protection visions!

The marine scientist Professor Karsten Reise, living on the island of Sylt, already suggested in 1992 that with rising sea levels we should open several dikes and allow once reclaimed land to be reconverted back to tidal flats, in order to sink water levels during storm surges. Furthermore he now proposes that huge amounts of sand from the North Sea should be extracted in order to raise the elevation of the islands. On the mainland his idea is to create lagoons that are regularly flooded by the sea and from which sediment can be taken to elevate the inhabited portions of the coast.

The harbours of Hamburg and Bremen should be transferred to a swimming island off coast. As a result, the Elbe and Weser rivers would not have to be dredged so deeply and storm surges would no longer advance into the cities.

Whether these visions of a marine biologist will be accepted by coastal protectionists, remains to be seen.

# Spotlight



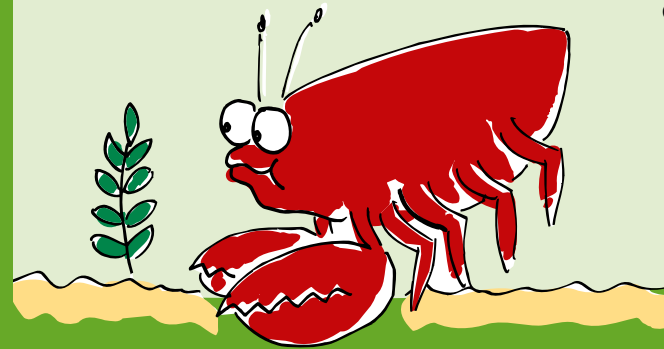


# Spotlight

## Salt marsh protection!

On the flat Wadden Sea coast very fine particles are deposited with every tide which causes the banks to rise in altitude. However, man has for centuries now repeatedly cut off the salt marshes from the sea with dikes and transformed them into farmland. Indeed in front of the dikes eventually with time new salt marshes develop, but altogether the salt marshes today are only a third of the size of what they naturally were.

In Lower Saxony in order to at least return some areas of salt marsh back to their near natural state, drainage channels originally constructed by the coastal protection authorities are being refilled. After this, new natural systems of tidal channels can develop in these salt marshes. They not only look more natural than the previous rectangular constructed patchwork of drainage channels, they can also once again accommodate more types of plants and small animals.



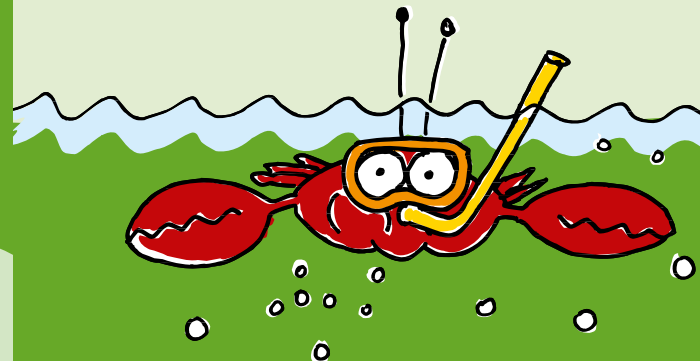


## Sand supplementation!

Sand supplementation has taken place in the Wadden Sea since the early 1970's, especially for the security of islands endangered by erosion. In the process sand from the sea bed of the North Sea is extracted (sucked up) and pumped onto the beaches and then distributed with bulldozers and pay-loaders.

In Germany it is especially the island of Sylt, where, year for year, about 1 million cubic-meters of sand is supplemented on varying portions of its coast. In 2009 sand supplementation on the island of Sylt cost 6.75 million euros. Without sand supplementation, Sylt would become 1 m narrower each year. In the past houses have already been undermined and washed into the sea. The Netherlands supplemented all together 13 million cubic meters of sand to its beaches. The protection of the island of Texel alone costs 8-12 million euros a year.

# Spotlight

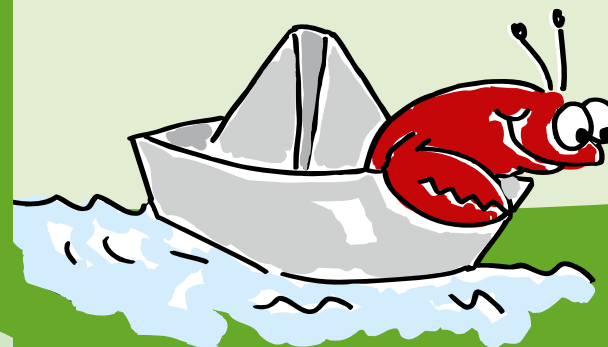




# Spotlight

## Swimming houses - Water world!

Large parts of the Netherlands lie below sea level and only can be inhabited with the help of continuous drainage. Thus, the Netherlands will especially be affected by rising sea levels. Already today specialized architects are building on the banks of several rivers “swimming houses”, which are super equipped for extreme events of high water: if the water level rises, then the houses likewise rise on swimming platforms. In the future whole cities could be developed in this way. The scientist Pavel Kabat, who has been working for years to help develop and establish a new consciousness in the Netherlands, says that “climate change is an opportunity”. He thinks that water no longer should be seen as an enemy. We have to move from this old-fashioned political notion of barricading with dikes, to an expansion of water areas. After centuries of land reclamation, is this extremely difficult for many Dutch people to imagine. Now the government is promoting advertising campaigns, such as “Living with water” and “Back to Nature”, in order to help this change in thinking.







# Spotlight

## Cost of dikes!

Schleswig-Holstein lies between the North and Baltic Seas and has a total coastline 1200 kilometers long. Some 300,000 people live protected by its 530 kilometer long sea dikes. The total value of the houses and streets within the possible flooding area of the North and Baltic seas are estimated at 50 milliard euros. Every year nearly 20 million euros are spent on maintenance and expansion or improvement of dikes. When considering rising sea levels, the North Sea dikes are given a “climate supplement” of 50 cm, which will be implemented and increased step by step during dike expansion measures. A second line of embankments further inland is being maintained in case of emergencies. If a dike breaks, then the water should only be allowed to flood the most outer coastal area, while the second embankment is able to hold

off the invading masses of water. The higher the water rises outside, the higher and wider the dikes have to be and the greater the risk of an inundation of water, when a dike breaks.

