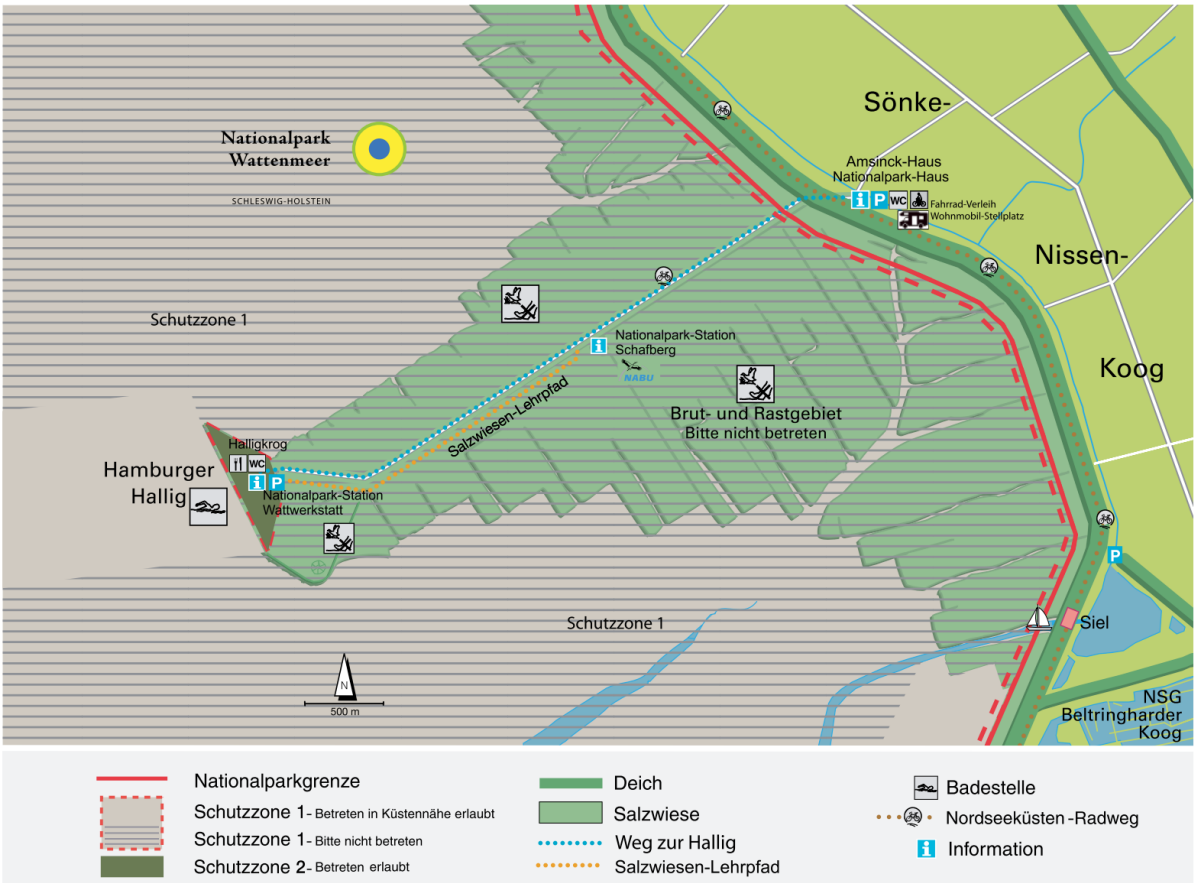
Landward Solutions Hamburger Hallig



Hamburger Hallig is situated in the North Frisian Wadden Sea area in Schleswig-Holstein, Germany. It is not protected by sea dikes. It is therefore counted among the Halligen islands. Its history illustrates the possibilities and restrictions of mud sedimentation.

History

The island was named after two merchants from Hamburg, the brothers Rudolf and Arnold Amsinck. They were granted a privilege to purchase and maintain land NE of Strand island and formed the Amsinck polder by constructing dikes in the period 1624-1628. The Burchardi Flood of 1634 destroyed the dikes, leaving only one artificial dwelling hill with "Hamburger Haus" on it intact. Afterwards the dikes were restored at high financial costs. Dikes were damaged repeatedly and in 1711, the island had again become an undiked Hallig. It remained property of the Amsick family until 1760.The house on the island was destroyed in the February flood of 1825.

In 1859/60 a causeway was built connecting the island with mainland of North Frisia but it broke soon after construction. In 1866/7, a fascine dam was constructed between the Bordelum sluice and Hamburger Hallig. It was paved in 1874. The causeway became traversable in 1901 and was paved in 1970 with concrete slabs, allowing cars to be driven to the island. The road is covered some 60 times per year during extremely high-water level events.

Modern coastal management protects the west coast of Hamburger Hallig from further erosion. Today, there are three artificial hills (German: Warft) on Hamburger Hallig including one hill on the floodplains and one without buildings. These are the main Warft with three houses on it, Main Warft, Kuhberg and Schafsberg. Schafsberg is a hill two kilometres halfway between Hamburger Hallig and the mainland.

Sedimentation

The interruption of tidal current by the causeway led to a considerable increase in mud sedimentation on either side of the dam. Due to sedimentation resulting from building brushwood groins and drainage systems extensive foreland tidal marshes were formed. The experience gained from the construction of the Hamburger Hallig dam considerably influenced development of land reclamation in North Frisia. In 1928 at the mainland side the Sönke-Nissen-Koog was diked and foreland tidal marsh formation was once again stimulated by extensive tidal marsh formation measures. In 1908, the area of Hamburger Hallig measured 96 hectares; by 1930 it amounted to 216 hectares. Today, the Hamburger Hallig, together with the floodplains and 700 ha salt marshes off the Sönke-Nissen-Koog polder, encompasses an area of roughly 1,000 hectares.

Net-sedimentation rates depend mainly on the distance to the tidal flats and on the distance to larger creeks. The results of the grid mapping and of the vegetation mappings in long-term ungrazed salt marshes indicate that *Elymus athericus* spreads in the upper salt marsh mainly on sites with high sedimentation rates. In the central part of the Hamburger Hallig salt marsh where annual net sedimentation rates are below 0.1 cm the relative elevation above mean high water (MHW) has decreased from 1980 to 1995 due to the sea-level rise. In this area the spreading of Elymus seems to be limited by re-wetting. In the low salt marsh, large stands of *Atriplex portulacoides* have spread mainly on areas close to the tidal flats in the intensively grazed and the ungrazed salt marsh of Sänke-Nissen-Koog. The cover of *Aster tripolium* stands which had been dominant all over the ungrazed plot of this salt marsh in 1992 has decreased considerably until 2002. In contrast, *Aster* spread in plots with both moderate and high grazing intensity.

Low sedimentation rates are also problematic on the areas of the Halligen behind dikes. If sedimentation rates are too low, the area will lower with respect to MHW and storm surges will be covering the area much more frequent.

Overview of MHW rise and sedimentation rates at various parts of the Hamburger Hallig and nearby Sönke-Nissen-Koog (after Kiehl et al., 2003)

Parameter	Mean height change mm/yr	Period	Source
MHW rise	8	1975.5-1990.5	Kiel et al, 2003
Foreland Hamburger Hallig, no grazing since 1980, central part of tidal marsh	<1	1995-1999	Schröder & Lünning, 2000
Foreland Hamburger Hallig, NW side near the tidal flats	14-22	1995-1999	Schröder & Lünning, 2001
Foreland Sönke-Nissen-Koog, no grazing, far from tidal creek	3-6	1995-1996	Stelter, 1996
Foreland Sönke-Nissen-Koog, no grazing, near tidal creek	6-19	1995-1996	Stelter, 1996
Foreland Sönke-Nissen-Koog, no grazing, near the dike	1	1991-2000	ALR Husum
Foreland Sönke-Nissen-Koog, no grazing, far from dike near tidal flats	15	1991-2001	ALR Husum

Natural values

On 16 April 1930 the Hamburger Hallig was declared a nature reserve to protect the local populations of pied avocets. It is maintained by Naturschutzbund Deutschland (NABU). The vegetation is mainly characteristic of the lower and middle tidal marsh. The tidal marshes form an important resting area for arctic geese and ducks during their migration with many thousands of birds during much of the year. The tidal marshes of the Hamburger Hallig were grazed relatively intensively by sheep (3.9 sheep units/ha).

Discussion Points

Tidal marshes situated near tidal flats and creeks silt up relatively quickly if enough shelter is present. As a result, the tidal marshes can expand rather quickly. However, as a result the central parts of tidal marshes are positioned at an increasingly larger distance from the tidal flats and sometimes from creeks as well. Due to this sedimentation rates decrease, and succession is slowed down or even reversed. The same result can be reached by decreasing the management of the area so that outer tidal marshes do not silt up as rapidly. The discussion point therefore is: should we expand tidal marshes so that central parts can regress, or should we not strive for expansion of tidal marshes? Would a decrease in tidal marsh area in combination with removing of dikes help the central area of the Halligen to silt up more rapidly?

Literature

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Wikipedia