Excursion 4

Karrendorfer Wiesen - Restoration of a Coastal Flood Peatland near Greifswald

Guides

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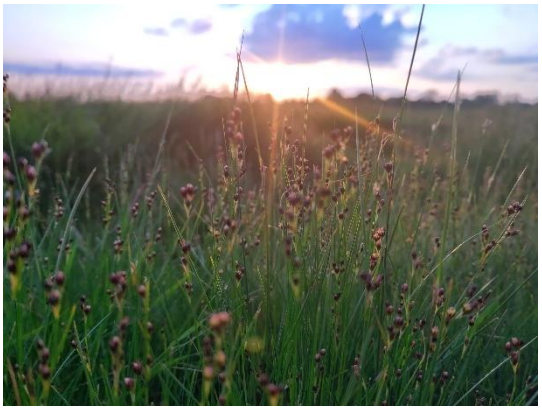
Excursion Programme

Time	Programme
08:00	Depart from Greifswald
08:30	Arrival Karrendorfer Wiesen (no toilets available)
	Excursion into the meadows (ca. 4 km walk)
11:30	Lunch at the bridge to island of Koos. Packed lunches will be provided
12:30	Return to Greifswald



Flowering brown bog-rush

The Island of Koos

Karrendorfer Wiesen

Stop 1: Karrendorfer Wiesen

Site Description

The Karrendorfer Wiesen (Wiesen = meadows) 10 km north of Greifswald, are part of the morainic plain of Vorpommern. The moraine till in the underground slightly undulates and rises from below mean sea level in the north to 2-3 m asl in the southern part of the area. Two thirds of the area are covered by peat, humus-rich sands or alluvial mud. The basis of the peat layer usually consists of *Phragmites australis* (reed) peat that developed during the last stages of the Baltic Sea Littorina transgression after 5500 ca. BP. This reed peat is covered by a radicel peat with abundant diatoms and Juncus gerardii seeds that was formed under influence of trampling by cattle and horses. Reed peat is only deposited at or below the mean water level, its accumulation thus depends on a slowly rising relative water level. Salt meadow peat, however, can grow significantly above the mean sea water level: compaction by cattle results in decreased pore size and therewith increased capillarity. The wetness at the surface thus increases and oxidation of plant material is reduced. Because of this “anthro-zoogenic” peat formation, salt meadows can grow up above the sea level to constitute a significant coastal protection.

Use and exploitation

The late 11th century Swedish fiscal registry map shows that the lowest part of the site was used as pasture, higher areas as hayfields and the highest elevations (> 1 m above mean sea water level) as arable land. The area was already surficially drained by shallow ditches, but no dike existed. From 1820 onwards, intensification of drainage resulted in peat mineralisation, subsidence, and – consequently – more frequent flooding. To prevent flooding at least during the growing season, a summer dike was built in 1850/51. Increased yields allowed higher cattle densities of about one unit per ha in the early 1900s. Although tow wind driven and several electrical (since 1956) pumping stations allowed active drainage of the Wiesen, the brackish Bodden water continued to enter the area during high floods, influencing the vegetation. Around 1930, the area was largely used as grassland and arable land was rare.

After 1936, land use was temporarily suspended. In that year the nearby island of Koos was used as a target for practice bombing. The Karrendorfer Wiesen became a dangerous and forbidden area, grassland use was abandoned, and drainage constructions fell into despair. This situation also prevented the Karrendorfer Wiesen from being redistributed under the 1946 Land Reform in the Soviet Zone, which aimed at providing landless locals and many displaced persons with land. Not until 1953 did a coorperative farm start to use the Wiesen as pasture and grassland again. The so-called complex melioration from 1971 to 1974 permanently cut off the Karerndorfer Wiesen from the Baltic Sea, except from a small fringe. The agricultural use was once more intensified: the main area was used as intensive grassland and temporary arable fields, only one fifth as pasture. To reduce the abundance of less productive grasses, the meadows were regularly ploughed and cultivated with selected grasses. Despite high fertilisation, harvests remained low. As a result of strong peat oxidation, some areas subsided (below the mean sea level) and were difficult to drain. In 1988/89, just before the political “Wende”, the drainage system was fully renewed and the meadows once more ploughed. In 1990/91, however, all land use was abandoned.

Restoration

The restoration of the Karrendorfer Wiesen only came into scope after the political and economic changes in the GDR. The interest in agricultural use rapidly decreased as relatively high costs and small yields no longer brought any profit. The cooperative farm was closed down in 1991 and other farmers were not interested in pursuing use of the Karrendorfer Wiesen. In addition, the state reduced priority of the dike and handed it over into the responsibility of the regional water association that was hardly capable of paying for dike maintenance and pumping costs.

The new state and regional nature conservation administration made good use of the situation and initiated the restoration by allowing a natural flooding regime. Before the old dike was removed, a new dike protecting the village of Groß-Karrendorf was installed and the road dam that crosses the area towards the island of Koos was heightened. In autumn 1993, the old dike was removed over a length of 6,4 km and the former pattern of creeks recognisable on aerial photographs from 1937 reshaped. Never before had a dike had been intentionally opened in Mecklenburg-Vorpommern. An area of 360 ha now again experienced the natural coastal flooding regime of the Baltic Sea.

In 2016, major parts of the Karrendorfer Wiesen were transferred within the programme "National nature heritage (Bundesprogramm Nationales Naturerbe) to the Michael Succow Stiftung. Since then, the foundation is responsible for securing the positive development of the site and its subjects of protection.

In 2018 – 2022 and 2024, about 30 years after the initial project, additional measures were realised within two restoration projects of the Succow Foundation, which aimed at reactivating the partly ill-functioning creek system and improve the infrastructure for cattle grazing as prerequisite for the establishment of typical salt meadow vegetation.

The regeneration process was, and still is, intensively studied by landscapes ecologists from Greifswald University and the Succow Foundation. Until now, a dataset (both biotic and abiotic) for more than 30 years since the beginning of the restoration process is available.

The response of the vegetation to the new water regime differed depending on elevation. Below 30 cm asl vegetation rapidly died off and total biomass was strongly reduced. Only on well drained sites did a rapid succession (3-4 years) to salt meadow vegetation with *Juncus gerardii, Plantago maritima* and *Triglochin maritimum* take place. On less well drained sites pioneer stages with *Spergularia salina, Salicornia europaea* and *Agrostis stolonifera* or open vegetation stages with algae mats persisted. The longer water remained after flooding, the less likely salt meadow species established. Thus, in contrast to the rewetting of inland mires, here the blocking of the ditches hampered the establishment of the target vegetation. The later restoration projects aimed to improve an undisturbed in- and outward flow.

The major vegetation type today is the *Juncetum gerardii* Nordh. Its typical species poor variant with *Juncus gerardii, Triglochin maritimum, T. palustre* and *Plantago maritima* occupies the lower parts. On the higher elevations a richer variant with *Trifolium fragiferum, Lotus tenuis* and *Leontodon autumnalis* is found. At the shore, where grazing is less intense, *Phragmites australis* and *Bolboschoenus maritimus* dominate.

Coastal flood mires and salt marshes

In coastal flood mires, peat accumulation raises the surface above sea level, which results in an effective coastal protection that stabilises the coastline in spite of climate induced sea level rise. Besides this practical value, coastal flood mires are also a haven for a large number of breeding, migratory and wintering bird species.

The total area of coastal flood mires in M-V hast declined dramatically over the years. From about 21.000 ha in the early 20th century, only approx. 10% have survived until today. Already several hundred years ago dikes were built to cut off the mires from flooding. The mires were drained and used as grasslands and arable fields. Years of drainage resulted in oxidation of the peat layers and subsequent lowering of the surface.

Paludiculture

Since restoration, the Karrendorfer Wiesen can only be used for grazing. Today, cattle of one farmer graze on the meadows in low density (0,8 – 1 units per ha). The breed "Uckermärker" can stand the rather poor-quality grasses and can also cope with temporal flooding. The cattle graze from May to approx. November on the site and overwinter close by at the farm site in Groß-Karrendorf. A customised agricultural subsidy was designed especially for this type of grassland to support the extensive grazing regime.

At the boarder of the protected area, reed is harvested during winter time as material for tiling thatched roofs. The so-called "Moorpavillon" at the causeway within the Karrendorfer Wiesen serves both as an example for this regional typical architecture as well as an observatory for wildlife of the meadows.