Salty treasures
Inland salt meadows in Brandenburg
An EU LIFE-Nature Project
The European ecological network of sites, known as the Natura 2000 Network includes the Birds Directive and the Habitats Directive. The inland salt meadows of Brandenburg are a component of this network. In the framework of the LIFE-Nature project, numerous measures are supported by the EU, the State of Brandenburg, the foundation "NaturSchutzFonds Brandenburg", and the Heinz Sielmann Foundation for the conservation or the restoration of the inland salt meadows in Brandenburg.

**Foreword**

Salt meadows and pastures are semi-natural habitats. Often they arose in Brandenburg because of haying and leaf litter removal on moist and wet meadows. Farmers first switched over to this laborious form of cultivation when the easily cultivated land on drier areas had become scarce.

The conditions for saline vegetation in Brandenburg have deteriorated significantly in recent decades. Intensification of land use, melioration, or abandonment have altered and endangered these exceptional habitats. Many of Brandenburg's salt meadows were seriously altered or had disappeared by the end of the 1990s.

From 2005 to 2010 the LIFE-Nature project "Securing and development of the inland salt meadows in Brandenburg" funded by the European Commission worked to restore the salt meadows and pastures and to secure their preservation for years to come. The situation has significantly improved due to the project. In addition, new finds and rediscoveries of plant species have expanded the status of knowledge about the Brandenburg salt meadows.

The successes of the project are above all the result of the cooperation between the State Office for Environment, the foundation "NaturSchutzFonds Brandenburg", the Heinz Sielmann Foundation, and the local land users. It is only through their responsible handling of the sensitive habitats that it is possible to preserve the inland salt meadows. Through the cooperative effort land use suitable to the preservation of the inland salt meadows has been put back on its feet. Here preservation and land use pursue common interests: to maintain land use on sub-optimal areas and thereby to secure income sources for the farms.

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Salt and Man

Salt is of great significance for life on Earth. Animals use it instinctively. Humans have been documented to extract salt from various sources since antiquity; already 6,000 years ago it was used for conservation and as a seasoning in foods.
Inland, however, salt has been a rare commodity for thousands of years. It was a good that had to be transported over long distances, over the so-called salt roads. In some countries the valuable mineral even served as a method of payment. It was also rare and valuable in Brandenburg, which meant that the discovery of "sea weeds" here in earlier times awoke the interest not only of scholars, but also of the land owners who hoped for a lucrative trade through salt extraction.
The healing power of salt has always been known to pharmacists and doctors. In the European Middle Ages it was considered a downright cure-all, even ascribed magical powers. Today we know that table salt plays a central role in the human physiology and is just as vital for the water balance, digestion, and bone development as it is for the nervous system.

Worth its weight in gold: For millennia salt has been on the list of essential foodstuffs for man. Because of its relatively limited natural distribution it has been very valuable into modern times. The wealth of many Central European cities, such as Halle (Saale), Bad Nauheim, Soest, Lüneburg (hist. Stich), Kolberg, or Krakow, was based on salt trade.

A Folk Tale from Brandenburg: Many years ago, in a shallow bog near Pessin, a shepherd came across a salt spring. After he had taken water from the spring for his dinner and boiled it, he discovered on the next morning a quantity of salt in the pot. Dutifully he shared a portion of his discovery with the landlord, who bade him to remain silent. But on the same day the shepherd was found slain. Later a house was supposedly built over the top of the salt spring...
(From: Der listige Schmied und andere Volkssagen . . . aus dem Brandenburgischen)
The Formation

Around 255 million years ago the supercontinent Pangaea still existed. At that time large parts of today’s Europe were covered by the shallow Zechstein Sea. Mighty layers of salty deposits formed on these areas only then to be covered for millions of years by hundreds of meters of sediment.

Normally an impermeable layer of clay separates the saline ground water circulating in the depths from the groundwater stories closer to the surface. In some places the high pressure deforms the horizontal layers of salt to such a degree that it forms a hat-like structure that comes close to the surface of the Earth (salt dome). Holes in the clay formed near the salt domes or in places where Ice Age disturbances left deep troughs. At these rare places saltwater was able to reach the surface. Where these exits are stable, inland salt meadows could develop.
The Discovery

They're like a book. Whoever can read them knows that *sea aster* and *sea arrowgrass* point to salty water. The discovery of a new source of salt was still noteworthy even into the 19th century which is demonstrated by the following report by the Medical Officer Sybel from Brandenburg an der Havel from July of 1811, who:

"... recently discovered a rather significant area in the neighborhood of his place of residence (Brandenburg) that was occasionally covered with salt crystals, and upon it also a number of salt plants... they were found in enormous numbers, pleasantly transporting him in his thoughts back to the salt meadows of Halle. The water hole of this almost mile-long green tasted quite salty, and in the autumn he will use his earliest leisure to investigate everything more precisely, and perhaps publish the results to the public..." for "the special attention seems to him of the highest value."

The earliest documentation of salt meadows in Brandenburg originates from the 16th century. Above all, these documents dealt with salt extraction, that is, with money. Later reports on saline-tolerant plants are primarily found in the writings of teachers and pharmacists with botanical interests. The earliest of these documents date from 1750, while it was first in 1859 that a systematic collection of all known saline-tolerant plants was published by the Berlin professor of botany Ascherson.

*In Bekmann's "Naturgeschichte der Mark Brandenburg" ("The Natural History of the March Brandenburg") from the first half of the 18th century salt meadows are also mentioned.*

The first depiction of the saline moss *Desmatodon heimii* from the plants collected by E.L. Heim in the Havelland Bog (from HEDWIG 1787).
The Distribution

Many plant and animal species from inland salt meadows are not found elsewhere for several hundred kilometers, on the coast of the Baltic Sea. Their inland stocks are severely endangered. While the saline habitats of the seacoasts are very numerous, the natural inland salt meadows belong to the rarest habitats in Europe. Therefore they are a component of the European nature conservation network Natura 2000.

Around 50 current or historical saltwater exit points are known in Brandenburg. They are primarily located in a line that extends from Havelland over the lowlands of Nieplitz, Nuthe, and Notte close to the groundwater all the way to the Dahme lake region. However, there are also some inland salt meadows in the Uckermark and in Luckau-Calau basin. In the Prignitz area there exist only historical statements about saltwater plants.

Scattered documentation from the 16th century testifies to the existence of a salter near Trebben and Saarmund. Karl Friedrich von Klöden (1786-1856), Director of the Berlin Trade School, mentioned three open waterholes east of Tremsdorf, "... known since olden times as salt puts ...". The saltworks were set up at the end of the 15th century by the Brandenburg Elector Albrecht Achilles. Salt was extracted here for more than a century. All that remains today is a saline area on the causeway between Tremsdorf and Gröben.
The Habitat

The Brandenburg salt meadows are located in swampy lowlands. Most of them are silted sections of former watercourses or lake basins where today salt plants grow. Occasionally sediments rich in lime are also located nearby, so that lime-loving and saline plants grow next to each other in perfect harmony.

The salt meadows are normally moist and wet from early autumn until late spring. In spring time the water slowly recedes from the cool meadows and the plants begin to grow later than on a dry slope bathed in warmth. In summer, when the last of the water has evaporated, the surfaces of the salt meadows dry out and salt crystals form.

The saline soil is hostile to most plants, yet it offers ideal conditions for a few specialized species that have adapted in various ways. Sea milkwort excretes the salt through special glands. Salt sandspurry "dilutes" the concentration by storing water in its cells, making its leaves so thick-fleshed.

![Strawberry clover](image1)
![Sea arrowgrass](image2)
![Sea milkwort](image3)

![Sea aster](image4)
![Salt sandspurry](image5)

*Saltwater is the vital elixir of halophytes (from the Ancient Greek "halas" = salt and "phyton" = plants). The salty-tasting sea arrowgrass and sea aster display a relatively high salt content. Other species, such as the red-blooming strawberry clover prefer lower concentrations.*
Extensively used wetland meadows, like salt meadows, are preferred habitats of many breeding birds. Northern lapwing, common snipe, and meadow pipits feel at home here. During the annual migration waders, cranes, and thousands of nordic geese stop here and also ensure the transport of seeds from the coastal salt plants all the way here inland. Some species of beetles, bugs, and other invertebrates have also specially adapted to the saline environment. 27 species of invertebrates have been identified on the Brandenburg salt meadows with a connection or preference for saline biotopes. The *Acupalpus elegans* (Ger. *Salzstellen-Buntschnellläufer*), a ground beetle, and the shorebug *Salda littoralis* carry their connection to the sea and saltwater in their very names.

*From left to right: Salda littoralis (family of shorebugs), 6 mm; Acupalpus elegans, 3,6-4,7 mm and Bembidion tenellum, 2-3 mm (both from the family of ground beetles).*

Inland salt meadows on the monastery peninsula of Lake Oberuckersee
Preservation through Use

Salt meadows in Brandenburg are largely the work of farmers. They use even moist and wet lowlands to get feed (hay) and bedding (straw) for their animals. Indeed, back in the days when artificial fertilizer was not prevalent, they were forced to use barren areas to ensure their survival. This has led to a parceled, diverse cultural landscape with various habitats in close proximity. Mechanized and often industrial agriculture – with irrigation, tilling, sowing, fertilization, and pesticide use – have seriously endangered the salt meadows and wetlands for decades.

But the other extreme, the complete halt to all use, also leads to the disappearance of the rare meadow vegetation. When farmers leave these difficult-to-work areas, reeds and trees quickly invade and displace the less-competitive salt plants.

Today agriculture usually takes place on large areas. Where people think big, there is not always room for small, difficult areas in their concept. Still, some farmers are also seeking their fortune in niches. Salt meadows need to be used and they give their users something back: delicious horse hay, fresh greens even when the summer is dry or the levels of salt and minerals they need after a long, hard winter.

The draining of the Oderbruch (1747-1753) and the Havelland Mire (1718-1724) were the first major draining operations in today’s Brandenburg. Later – well into the 20th century – increases in agricultural production were the goal of intensive melioration measures. Historical drainage facilities were renewed, ditches cut, waterways expanded all to lead the "superfluous" water quickly away. Lowmoors were drained. Today the negative effects on the climate and water balance are well known. The interferences in the water balance are being partially reversed or at least mitigated.
Doing Something Good ...

Improving and sustainably securing the state of the inland salt meadows was the goal of the EU-Life project implemented from 2005 to 2010 by the Brandenburg State Office for Environment together with the foundation “NaturSchutzFonds Brandenburg” and the Heinz Sielmann Foundation. In 19 Natura 2000 areas individualized solutions had to be found to organize the protection and use of the inland salt meadows. This was certainly a cooperative effort with input from farmers and members of the nature watch, water and soil organizations, geologists, and conservation and agricultural agencies.

In those places where salt water could no longer rise to the roots of the plants, the water level had to be increased somewhat in the summer months. That was a sensitive task, as higher water levels make it harder to mow and graze on the salt meadows. It was, however, successful due to the trust and cooperative solution finding accomplished by the farmers and the conservationists.

On many of Brandenburg’s inland salt meadows today fewer reeds are growing than several years ago. On occasion it was enough to use a tractor with wide tires, but often special methods were necessary in order to mow the thick reeds and to improve the habitat for the sensitive salt plants. Now, fresh reeds are on the spring menu for cattle and water buffalo.

The water level has to be just right:

The renovation of the barrage on the northern edge of the Marstall meadows near Storkow was preceded by an intensive planning and trial phase. Thus it was possible to find a responsible compromise for the regulation of the water level on the meadows before the construction started.

The salt concentration is regularly measured. This also serves to monitor the success of the measures.
Since 2008 water buffalos graze on the largest inland salt meadow of Brandenburg in Schenkenberg, which is in the possession of the foundation "NaturSchutzFonds Brandenburg". In future, the foundation will work together with the farms not only to care for the water buffalos, but also for the well-being of the salt plants.

Cutting reeds and removing young trees are both important measures necessary to restore open areas.

On the Luckau salt meadows small ponds were built with shallow shores. They were supposed to offer new habitats for salt-loving pioneer plants. Already in the following summer rare species such as sea milkwort and creeping marshwort established themselves there. A floristic surprise was the immediate appearance of the Charales Chara canescens, a species of brackish water from the Baltic Sea that, to date, had only been identified in Brandenburg a single time in the 19th century.
... and Talk about it

Inland salt meadows are inconspicuous. It's easy to miss them. The project has made Brandenburg's inland salt meadows better known. At selected locations frequented by tourists illustrated charts inform about the creation, vegetation, water balance, and significance of salt meadows. In Storkow, in the Dahme-Heideseen Nature Park, a "Salt Trail" connects the most important inland salt meadows in eastern Brandenburg. In Seehausern, on the northern edge of the Schorfheide-Chorin Biosphere Reserve, a new observation platform offers a view of the monastery peninsula and Lake Oberuckersee. Numerous walks and events have led people to the inland salt meadows. Rangers at the nature watch in Brandenburg's large reserves pass their knowledge about inland salt meadows on. In the Natureum exhibition in Storkow Castle (Burg Storkow) farmers tell about the hard work on the meadows. A mobile exhibition has "wandered" through numerous nature parks and the environment and science magazine OZON has become interested in water buffalos as lawn mowers on salt meadows.

The 8.5-kilometer-long Salt Trail near Storkow allows great insights and views into the fascinating world of salt meadows. From Storkow Castle a circular trail passes the train station through the meadows of the Luchwiesen to Philadelphia and Groß Schauen. It returns to Storkow Castle along the Marstall and Burg meadows. Information boards and an observation tower are parts of the Salt Trail.
Guided tours through the project areas

A mobile exhibition “wanders” through the preservation areas

An observation platform on the monastery peninsula on Lake Oberuckersee (Uckermark)

Information events with landowners and users are elements of the project work.
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