

## Long term monitoring of grazing in salt habitats on the eastern shore of Lake Neusiedl

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### Keywords

Lake Neusiedel, National park, grazing management, long-term monitoring, reed management, halophile vegetation, restoring salty sites, reducing competitive species,

### Abstract

The landscape of the Lake Neusiedel and the Seewinkel was shaped by centuries of grazing. After the virtual collapse of the grazing in the 1960s there was a gradual increase in fallow land in the Seewinkel and on the shores of Lake Neusiedl. As a result of decreased grazing the reed (*Phragmites australis*) spread massively and displaced in vast areas a large number of endangered plant and animal species that have benefited from the earlier grazing-regime.

The resumption of the grazing with cattle and horses is aimed at restoring a preferably shrub- and reed-free landscape. Within the National Park Neusiedler See - Seewinkel the grazing of the lakeshore of Lake Neusiedl in the so called "cultural landscape zone" is mainly carried out by herds of horses and cattle.

The main problem at the beginning of the management, was the then widely held view - even among nature conservationists - that in large protected areas, like National parks, man should protect natural processes, but not help to maintain man-made conditions also. The impetus for a more intense and coordinated management came from ornithologists who noticed a sharp decline in stocks of water birds and meadow breeding birds. It was quickly identified that the lack of grazing of the lake shores was the main cause for it. In 1990 a monitoring program has then been established, which should monitor the effects of grazing and regulate the grazing intensity in different focus areas.

In this presentation the results of long-term monitoring from 1990 to 2011 are presented for one exemplary site at the paddock of Podersdorf. The paddock is situated at the southern edge of Podersdorf and extends over a length of approximately 2.5 kilometers to the lookout tower in the "Illmitzer Hölle". The width of the grazed shoreline of Lake Neusiedl is between 110 and 220m and varies with the water level of the lake by another 20 to 30 meters.

The pastures are dominated by stands of purple moor grass (*Molinia caerulea*) and head rush (*Schoenus nigricans*), which is in phytosociological terms called *Junco obtusiflori-Schoenetum nigricantis*. These stands gradually intersperse with the reeds of the shoreline, integrating a narrow strip of *Cladium mariscus*. Landwards salty meadows (*Scorzonero parviflorae-Juncetum gerardii*, *Atropidetum peisonis*) are following, which had been extended significantly by grazing. Beginning with 1999, a scientific monitoring program has been established there which documents the effects of grazing on vegetation, in other parts of the National Park Neusiedler See – Seewinkel monitoring started in 1990. Trends are detected and interpreted on fixed plots of 2x2 meters.

By grazing, the reed (*Phragmites australis*) was pushed back from the shoreline and the landward salty meadows to the permanently water covered sections of the lake by about 200m in about only 10 years.

Looking at the trends in one individual study area, it is evident that the vegetation cover of highly competitive species such as reed or creeping bentgrass (*Agrostis stolonifera*) declined sharply, while typical salt plants recovered and benefited.

Table 1: trends of the vegetation cover of plants in the permanent plots

	1999	2001	2004	2005	2007	2011
<i>Phragmites australis</i>	62,0	12,0	7,3	8,0	4,5	
<i>Agrostis stolonifera</i>	44,0	30,0	11,3	6,5	2,5	
<i>Cladium mariscus</i>	6,0	4,0	1,3	0,8		
<i>Bolboschoenus maritimus</i>	2,9	1,0	1,0	0,3	0,4	
<i>Tripolium pannonicum</i>	1,5	0,2	23,3	38,0	12,0	0,2
<i>Juncus gerardii</i>			0,9	1,0	0,3	1,5
<i>Carex distans</i>			1,9	1,4	2,2	0,4
<i>Spergularia maritima</i>					4,5	0,9
<i>Crypsis aculeata</i>						0,4
<i>Chenopodium chenopodioides</i>						0,3
<i>Salicornia prostrata</i>						0,2

The reed was above 60% coverage in the first year of observation and declined to 4.5% in 2007. By the rise of water level in 2009 and 2010 the site was completely flooded yearover and the reeds has died out entirely at this site.



Figure 1: open shoreline south of Podersdorf with salt habitats

Considering the occurrence of Pannonian Salt-Aster (*Tripolium pannonicum* = *Aster tripolium*), the species is very rare prior to 2001 and shows only a 0.2 to 1.5 % cover. In the years with intensive grazing the coverage values increased up to 38%. But *Tripolium pannonicum* is not only dependent on the presence of open land induced by grazing, but also on the water level of Lake Neusiedl. Between 2006 and 2009, the riparian zone under monitoring was almost all year round water flooded. So *Tripolium pannonicum* can spread only in periods of low water level, but the rate of increase is clearly accelerated by the reduction of reed.

Remarkably, however, is the re-establishment of strict halophytes in the riparian zone. By grazing, not only open ground was created by physical displacement of the reed, but also the accumulation of soda in the soil is favoured. A study of soil chemistry (KRACHLER et al. 2012, in preparation) shows that there is a negative correlation for an intact salt budget with the density of vegetation cover. Vegetation prevents the capillary rise and crystallization of soda on the soil surface. The increase in soda causes that typical halophytes can establish in locations where they would otherwise not occur for competitive reasons.

Species indicative for high salt concentrations - such as the greater sea spurrey (*Spergularia maritima*) have established themselves after several years beginning in 2007. In subsequent years further pioneer species of habitats with high salt concentrations followed, so that the development of a *Crypsido aculeatae* - *Suaedetum maritimae* could be initiated. Characteristic species of this association such as glasswort (*Salicornia prostrata*), the grass *Crypsis aculeata* and thick leaf goosefoot (*Chenopodium chenopodioides*) have just been recorded in the growing season 2011. Due to the decline of reed and bent grass (*Agrostis stolobifera*), there was a greater extent of open soil, which was enriched in salts in consequence to higher evaporation. The best evidence for the successful restoration of a typical salty site was the occurrence of large-seepweed (*Suaeda pannonica*), which was also first recorded in 2011.



Figure 2: salt habitats with glasswort (*Salicornia prostrata*)

The grazing of the reeded lake shore for about 13 years resulted in the the opening of the vegetation cover. Beside highly endangered salt plants species, numerous bird species that prefer low growing and sparse vegetation also benefited from the grazing. Species such as Kentish Plover, little ringed plover, common redshank, avocet and greylag geese (the latter with large populations) are found again in the restored habitats of the lakeshores.

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