

# Management directed at ruff *Philomachus pugnax* – results from Tipperne and Saltholm, Denmark

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Often the historical knowledge of the management of a site is limited to knowledge of some significant changes. At Tipperne such significant events could be

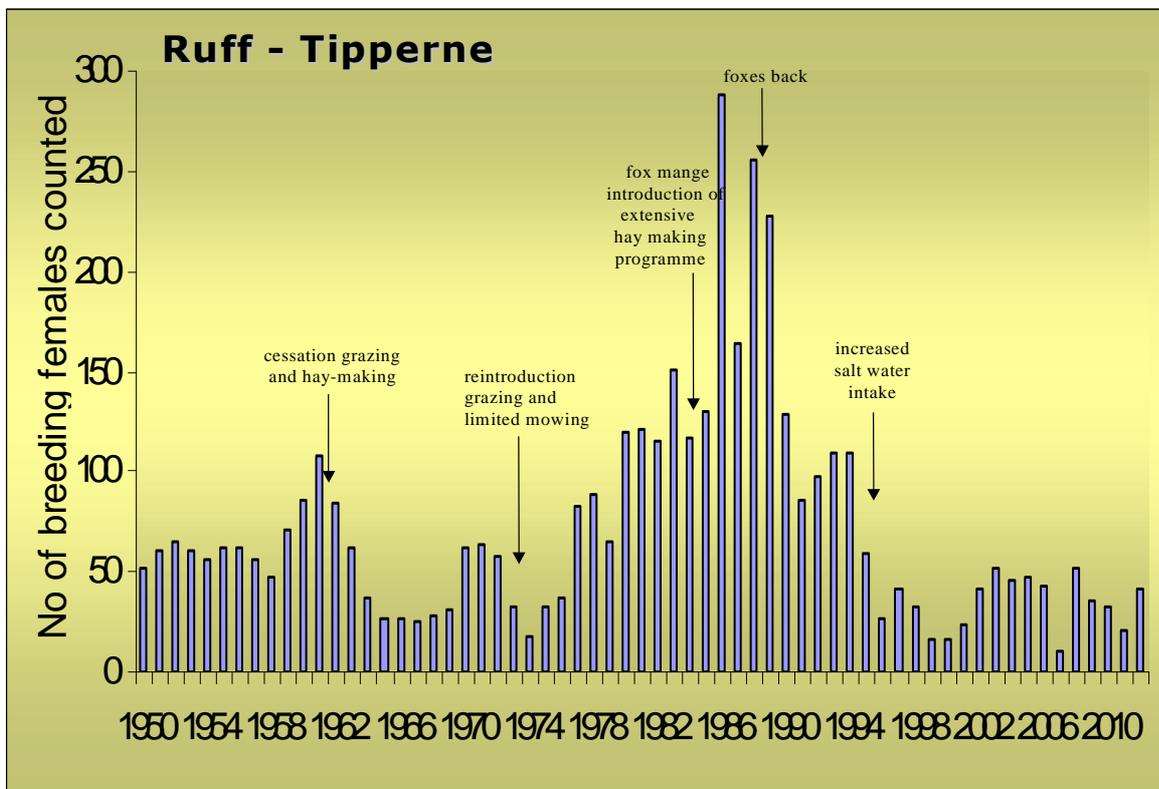


Figure. Ruff population at the nature reserve Tipperne, Denmark 1950-2012, and the most significant changes in management during that period.

Tipperne is a meadow bird reserve with a field station in western Denmark.



At Tipperne we have developed a concept of “experience founded nature management”. In this concept we perform:

- 1) Annual monitoring of target species following standardized protocols: population sizes and distribution, nest survival, chick survival. The distributions are digitalized, the other data are stored in databases
- 2) Annual monitoring of management. Numbers and distribution of cattle and grazing schedules are stored in databases, fences and mowing are mapped and digitalized. In addition water table of the meadows, salinity in temporary wetlands and the surrounding water bodies and precipitation are measured and observations of predators like foxes and birds are registered. All data are stored in databases
- 3) Each year after the breeding season an annual report presents the results and evaluates the reaction by the bird populations on the management of the previous year.
- 4) The management is subsequently adjusted or fine-tuned according to the evaluation

This process enable us to get a very good insight in suitable management for the target species.

## **Proper management for ruff**

Evaluation of ruff population trends and distribution reveals that the key factors are **water table, height and structure of the vegetation, salinity and predation patterns.**

- 1) **Water table:** Ruffs need very wet meadows for breeding, and there is a very strong correlation at Tipperne between a high water table and high numbers of breeders. With hydrology conditions with a water table 15 May of above 30 to 40 cm below the ground surface, population numbers and breeding success are significantly higher, and the same holds true when the meadows only get dry – e.g. the water table drops to more than 65 cm below the ground surface – late, preferably well into June or later.
- 2) **Vegetation height and structure:** In general ruffs are only found in meadows which have rather low and open vegetation at the start of breeding in mid May. At the same time ruffs need a certain vegetation diversity as they need tufts for nests in vegetation clumps with a height of 10-20 cm.

Ruffs are primarily breeding in meadows grazed by cattle (and horses), and moderate grazing during the central and late part of the breeding season creates perfect habitat for chick feeding and nest habitat for replacements. But in the incubation period in May, June and early July nests are on the other hand vulnerable to destruction by cattle, so grazing densities and schedules must be planned very carefully. The table below shows the level of trampling by heifers (young cattle) of nests, which otherwise survived predation and flooding with a timing of breeding as found at Tipperne. Other types of cattle have very similar trampling rates.

<b>Stocking schedule and density</b>	<b>Trampling/day</b>	<b>Trampling in total</b>
<b>1 heifer/ha 15 May-</b>	<b>3.6%</b>	<b>57% of nests</b>
<b>1 heifer/ha 30 May-</b>	<b>3.6%</b>	<b>30% of nests</b>
<b>2 heifers/ha 15 May-</b>	<b>7.2%</b>	<b>78% of nests</b>
<b>2 heifers/ha 30 May-</b>	<b>7.2%</b>	<b>41% of nests</b>
<b>3 heifers/ha 15 May-</b>	<b>10.8%</b>	<b>86% of nests</b>
<b>3 heifers/ha 30 May-</b>	<b>10.8%</b>	<b>45% of nests</b>

A sufficiently careful grazing in the long incubation period often leaves patches or parts of the meadow with a too high grass sward. In this situation additional mowing may be necessary in order to keep a proper vegetation height and structure. Monitoring the vegetation gives an idea of where and how often (annual, biennial, triennial) mowing is needed for performing the ideal breeding habitat. Mowing during the chick rearing period is detrimental as the mowing machine kills most unfledged chicks during the mowing. Excluding the earliest and latest 10% of the broods, the central 80% of the chicks hatch between early June and early July. As they need some three weeks to fledge, mowing in ruff breeding areas has to be late – in normal years mowing before 20 July is hardly advisable, and in very wet years it will be best to avoid mowing until after 1 August.

- 3) **Salinity:** As mentioned above a high water table is crucial for breeding ruff. In many coastal meadows the least complicated way to keep a high water table is by intake of salt water from the adjacent water body. However, ruffs are fresh water birds, and a change in

hydrology in the surrounding brackish water lagoon at Tipperne from 1995-1996, which doubled the concentration of salt (see table) had the effect that ruffs immediately almost completely ceased breeding in the lowest meadows, in which the increased salinity affected temporary wet features the most. 5 per mille of salt seems to be the turning point. Meadows where the salinity in the temporary water bodies regularly exceeded 5 per mille of salt have had no breeding of ruffs since 1996, while these areas in the fresh water period before 1995 had approximately 30-40% of the breeding ruffs at Tipperne.

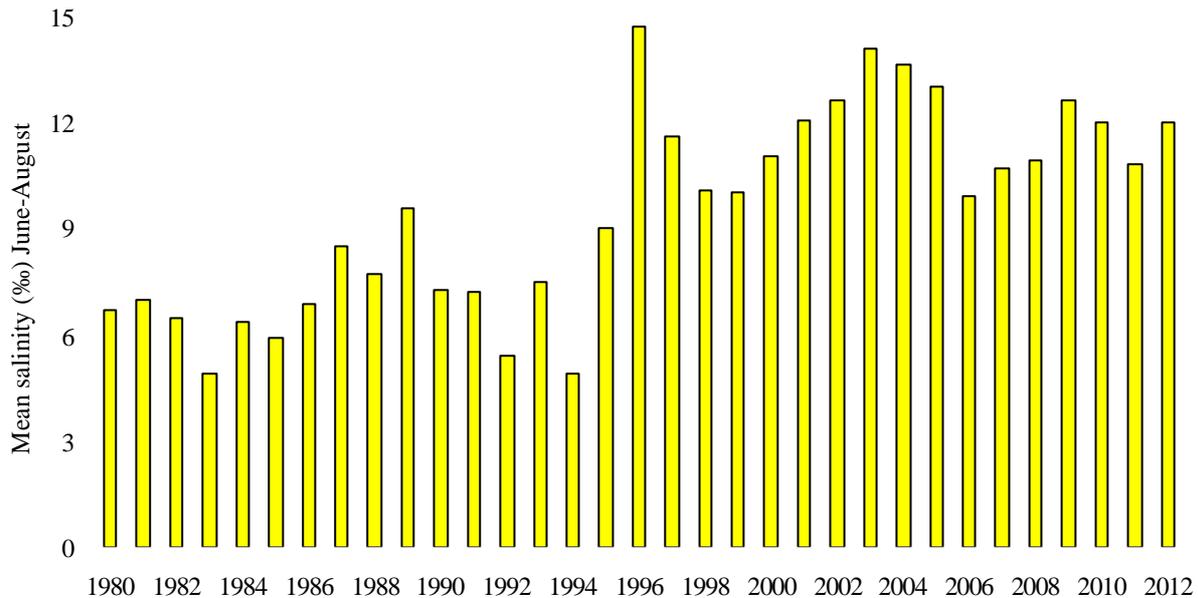


Table: Summer salinity in the brackish lagoon surrounding and regularly flooding Tipperne

- 4) **Predation:** Tipperne has a large suite of predators of adults, nests and chicks of the ground breeding birds including ruffs. Marsh harriers *Circus aeruginosus*, foxes *Vulpes vulpes* and common gulls *Larus canus* have been documented to affect the breeding success significantly in some years, while another 6-8 mammal species and 20-25 bird species are known to have been more or less important predators on the breeding meadowbirds on the site.

The predation rates of the meadowbirds fluctuate a lot, and the last 25 years there have typically been some periods with high predation and others with lower predation. The exact figures are not known, but it is estimated that nest predation rates below 60-70% is allowing the meadowbirds on Tipperne to reproduce themselves, when the other conditions onsite are favourable. In approximately 10 out of the last 25 seasons the nest predation has been above the 70% level, whereas in another 10 the predation was well below 60%. 1996-2003 almost all seasons had high predation, while the predation level has dropped markedly in recent years.

There is a correlation – although not very strong – between the predation rate and the number of successful breeding females in ruff the last years. Obviously, the need for meadows with a high water table is much more important for the ruffs, both for population numbers and for the breeding success.

So in conclusion:

### **High water table is crucial**

**At sites with natural hydrology:**

- keep winter and spring precipitation on the meadows
- block ditches and foot drains

**At sites with controlled/managed hydrology:**

- keep water table above 40 cm below surface till 15 May
- avoid that meadows are drying out in April, May and early June

**Salinity: Ruffs avoid breeding where salinity in wet features is > 0.4-0.5 ‰**

**Vegetation: Ruffs (and dunlins) are breeding late, and it is a delicate balance to keep the vegetation sufficiently short and open without compromising the breeding success by extensive destruction of nests by cattle or killing chicks by mowing operations**

**Preferably do not release (summer grazing) cattle before 25 May (extensive nest destruction) or after 10 June (grazing necessary for chick feeding and nest replacement habitat)**

**In ruff breeding areas do not mow before 20 July (perhaps even later in very wet years)**

**Predation: In some sites (at least on islands and peninsulas) where hydrology and vegetation management is perfect late winter shooting of foxes can improve reproduction**

## ***Ruff management on Saltholm – the BaltCoast Life project***

The island of Saltholm situated in Øresund between Copenhagen and Malmö has a huge coastal meadow of some 1200 ha, and the island has been an important breeding site for ruff for many years. The unique logistics makes it difficult to obtain enough cattle for grazing, and in the early 2000s there had been a shift from a large number of summer grazing cattle into a smaller number of whole year grazers. Large fractions of the central part of the island were overgrowing and so were some gullies inside the west coast – former preferred breeding areas of ruffs (and Baltic dunlins). With the management experience from Tipperne, management activities were planned that would counteract the unfavourable development of the vegetation on the island.

Each year the vegetation in the potential ruff and dunlin breeding areas was monitored, and areas for additional mowing were selected and mapped. With a mixture of whole year grazing and focussed additional mowing the desired vegetation structure and height was achieved between 2007 and 2011 (helped by a harsh winter in 2010-2011), and it was possible to stabilize the number of

breeding ruff here in a period when the species suffered sharp declines at most sites elsewhere in its temperate breeding distribution.

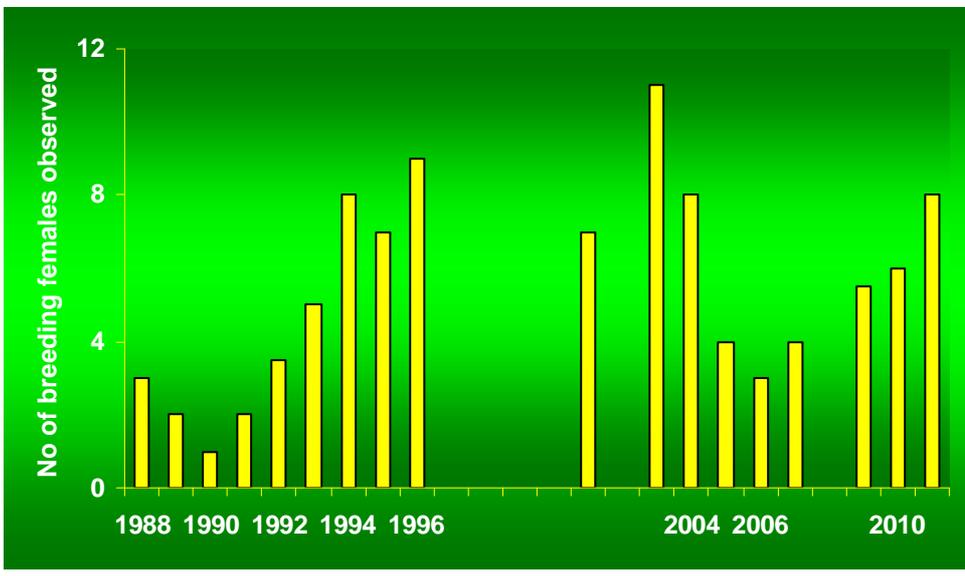


Figure. Ruffs (observed breeding females) at Saltholm. No survey was conducted in 2012, but flooding with salt water and a serious drought meant that only one ruff was present mid June.

Only two sites in Denmark have management specifically directed at ruff: Tipperne and Saltholm. At these two sites, ruffs are doing significantly better than elsewhere in Denmark (see table).

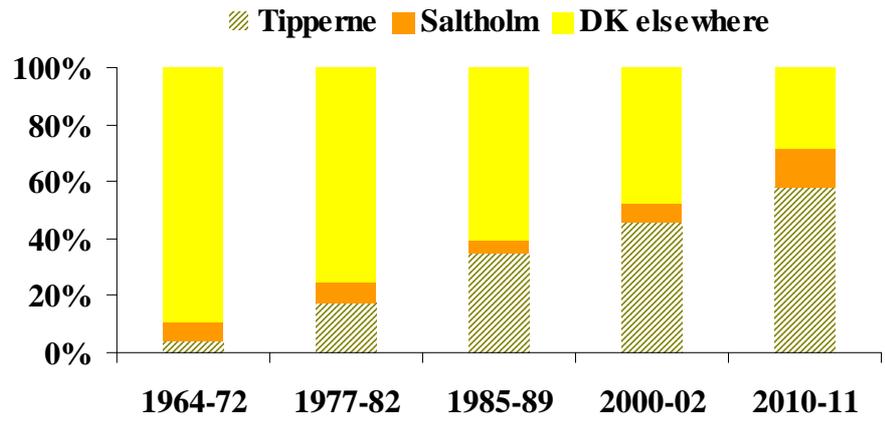


Figure. The proportions of the Danish ruff total found at Tipperne and on Saltholm

## ***Global warming and the future for ruff in the Baltic***

Concern has been raised that a warming climate has had and will increasingly in the future have a negative impact on the conditions for the breeding ruffs in the Baltic. Two reasons make it quite unlikely that ruffs are facing an immediate threat by a too warm climate. First, ruffs bred historically south to SW France and southern Ukraine and were widespread in Britain in climates warmer than the predicted climate in the Baltic the next many years. Secondly, by modelling ruff distribution according to climate, the 'Climatic atlas' (by Huntley et al. 2007) concluded, that the southern part of the distribution of ruff most likely was more dependent on the presence of the right habitat rather than predictable by climate.

There is now a time series of 85 years with ruff numbers at Tipperne. In these 85 years there have been two periods with many more breeders than at present, but the recent level of 30 to 50 breeding females is not lower than the number of breeders in several other time periods in this long time series. So a population decline following the global warming in the last decades is by no mean detectable from these data.

