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Long term-monitoring of birds reveals drastic changes in the bird communities at the national park Neusiedler See – Seewinkel

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Introduction

The area of the Lake Neusiedler See, comprising Lake Neusiedl itself (including one of the largest reedbeds in Europe) and the adjacent Seewinkel with its unique soda lakes is one of the most important sites for the conservation of wetland birds in Central and Eastern Europe. Quantitative bird monitoring in the area started earlier than in most other sites of similar importance and there are comparable data on population sizes for many bird species from the early-1980ies onwards. In 1993 parts of the Lake Neusiedl area, in particular about 10 % of the reedbed of the Lake and parts of the Seewinkel were declared a national park and since then enjoy a certain degree of protection and, more importantly, also some large scale management measures. Regarding the avifauna the recreation of large areas of wet and dry grassland and the re-introduction of a large scale grazing regime with mainly cattle and horses had the most pronounced effect. While bird monitoring started long before the creation of the national park basic research and long term monitoring were important goals of the national park Neusiedler See – Seewinkel right from the beginning. This paper gives a concise summary of the results of the bird monitoring programs running in the area since about 35 years, concentrated on breeding birds. It evaluates the success of past management measures for bird conservation and draws conclusion for the further management regime of the national park. The results also elucidate some general patterns of avifaunal change in Central Europe during the last decade and can serve as a baseline to describe and discuss long term environmental changes and their influence on ecosystems and their animal communities.

Material and methods

The monitoring program covered 39 breeding bird species. These were selected on the basis that i) they are threatened on a national or international basis, ii) the Lake Neusiedl area is of special value for the species or iii) the species is of a high ecological significance for the area (e.g. because of their high numbers and therefore significant impact on the ecosystem). For some species qualitative and semi-quantitative data were available already for the 1950ies. For no less than 25 species quantitative surveys started in the early to mid 1980ies, for the rest in the mid-end 1990ies. Starting in 2001 and continuing until 2016 and in the foreseeable future, the national park started a comprehensive bird monitoring program with counts and surveys on a yearly basis for most species. For most species standard bird survey methodology was adapted to the particularities of the study area and refined over the years, for some species new methods had to be developed. Comparability over the years was of outmost importance, therefore, with one well justified exception counting methods remained the same for all species and in most cases also the personnel involved remained the same over the years. Trends were calculated for three periods of time: long term: ~ 1950 until 2015, medium term: 1981-2015 and short term 2001-2015 (for details see DVORAK et al. 2016).

Results

(see Tab. 1 & 2)

In the long term, only 31 of the 39 species covered by the monitoring program were already present as breeding birds in the early 1950ies. Eight species are new breeding birds not present historically. All of them colonized the area post-1980 and most (six) of them since 1995; three are very recent arrivals with first breeding in 2007, 2009 and 2012. Particularly noteworthy is that all these species are now well established and are today among the most common wetland breeding birds of the Lake Neusiedl area. Of the breeding bird already present 65 years ago, no less than 12 showed a population decline in the long term, nine have stable populations and only six showed an increase. Four were fluctuating or their status in the 1950ies is unknown.

In the medium term (1981-2015) ten species are still on the decline but another ten were increasing. Eight species show no clear trend and were fluctuating, most of them according to fluctuating water levels in the area.

From 2001 until the present only four species show negative population trends, seven are stable and no less than 11 have increasing or recovering populations. However, the majority (16 species) shows fluctuating population sizes in the short term. This partly reflects our better knowledge of exact population sizes (some species that were judged to be stable in the long term may have been fluctuating in reality), but also rapidly changing environmental conditions (for details see DVORAK et al. 2016).

Bird species	short term (2001-2015)	medium term (1981-2015)	long term (1950-2015)
Greylag Goose (Anser anser)	large increase	large increase	large increase
Common Shelduck (Tadorna tadorna)	large increase	new breeder (1995)	absent
Gadwall (Anas strepera)	fluctuating	stable	stable
Pintail (Anas acuta)	fluctuating	small decline	small decline
Garganey (Anas querquedula)	fluctuating	fluctuating	small decline
Northern Shoveler (Anas clypeata)	fluctuating	small decline	small increase
Red-crested Pochard (Netta rufina)	fluctuating	large increase	new breeder (1980)
Common Pochard (Aythya ferina)	fluctuating	fluctuating	stable
Ferruginous Duck (Aythya nyroca)	fluctuating	small increase	large decline
Little Grebe (Tachybaptus ruficollis)	fluctuating	fluctuating	small decline
Black-necked Grebe (Podiceps nigricollis)	fluctuating	small decline	large decline
Great Cormorant (Phalacrocorax carbo)	new breeder 2012	absent	absent
Pygmy Cormorant (Phalacrocorax pygmeus)	new breeder 2007	absent	absent
Bittern (Botaurus stellaris)	fluctuating	fluctuating	fluctuating
Night Heron (Nycticorax nycticorax)	fluctuating	fluctuating	fluctuating
Little Egret (Egretta garzetta)	fluctuating	new breeder (1995)	absent
Great White Egret (Egretta alba)	stable	large increase	large increase
Grey Heron (Ardea cinerea)	stable	large increase	stable
Purple Heron (Ardea purpurea)	stable	stable	stable
White Stork (Ciconia ciconia)	large decline	large decline	stable
Eurasian Spoonbill (Platalea leucorodia)	small increase	fluctuating	large decline
Little Crake (Porzana parva)	large decline	large decline	small decline
Water Rail (Rallus aquaticus)	fluctuating	fluctuating	stable
Black-winged Stilt (Himantopus himantopus)	large increase	new breeder (1981)	absent
Avocet (Recurvirostra avosetta)	large increase	large increase	large increase
Kentish Plover (Charadrius alexandrinus)	stable	small increase	large decline
Northern Lapwing (Vanellus vanellus)	stable	stable	stable
Black-tailed Godwit (Limosa limosa)	large decline	small decline	small decline
Redshank (Tringa totanus)	fluctuating	stable	stable
Common Tern (Sterna hirundo)	large increase	large increase	small decline
Whiskered Tern (Chlidonias hybrida)	new breeder (2009)	absent	absent
Black-headed Gull (Larus ridibundus)	stable	small increase	large increase
Mediterranean Gull (Larus melanocephalus)	large increase	new breeder (1988)	absent
Hoopoe (Upupa epops)	small increase	fluctuating	stable
Bluethroat (Luscinia svecica)	fluctuating	large decline	large decline
Savi's Warbler (Locustella luscinioides)	fluctuating	small increase	small increase
Moustached Warbler (Acrocephalus melanopogon)	small decline	large decline	unknown
Reed Warbler (Acrocephalus scirpaceus)	stable	small decline	unknown
Great Reed Warbler (Acrocephalus arundinaceus)	large increase	small decline	large decline

Table 1: Popuation trends of 39 bird species in three time periods (see text). Large decline/increase (+/- 50 % and more, decline/increase (+/- 20-50 %)

	long term	medium term	short term
large decline	6	4	3
small decline	6	6	1
stable population	9	4	7
small increase	2	4	2
large increase	4	6	9
fluctuating	2	8	16
new breeder	1	4	3
not occuring	7	3	0
trend unknown	2	0	0

Table 2: Summary of trends for 39 bredding species in the three time periods (see text and Tab. 1)

Discussion

The result of the long term bird monitoring in the Lake Neusiedl area clearly shows that in the long term, a large percentage of species (12 out of 39) showed a decline in numbers. These are mostly habitat specialists and species showing large scale declines Europe- or worldwide.

On the other hand short term trends since 2001 are mostly positive, only four species have a continuing decline. A more detailed analysis demonstrates that some of these recovering species have benefitted from management measures of the national park. Among these, the promotion and re-establishment of large scale grazing by far plays the most important role. Without the pastureland recreated by the national park the conservation status of many breeding bird species would be much worse.

However, these successes of the park management are overshadowed by the negative impacts of the deteriorating water regime of the area. Large scale drainage (some of it illegal) continued until recently and still continues. Intensive agriculture outside the national park (in many cases with crops unsuitable for the relatively dry climate of the area) drains heavily on the ground water resources and contributes massively to the ongoing environmental disaster happening in the Seewinkel. The Lacken die-off ('Lackensterben') has led to the disappearance of a large percentage of the soda lakes; what is still there is in most cases in a bad to terrible conservation status. Some bird species (most pronounced Black-tailed Godwit *Limosa limosa*) showed a promising increase during the first years of management but are now again on a (final?) decrease.

The last pattern emerging is the establishment of eight new breeding species within the last 35 years. These newcomers are now (some only when conditions are favorable) common breeding birds and make up a large part of the bird community. A few species (e.g. Black-winged Stilt *Himantopus himantopus*) have without doubt benefitted from national park management. But all are species of a southern or south-eastern origin generally on the increase all over Europe and expanding rapidly their distribution area. These species have changed the wetland bird community in the Lake Neusiedl area completely, they are now dominating while species with a more northerly distribution (e.g. Shoveler *Anas clypeata* or Pintail *Anas acuta*) and habitat specialists (Kentish Plover *Charadrius alexandrinus*) are declining. The waterbird fauna of the Seewinkel today resembles the one of a wetland in Northern Greece or Southern Spain 40 years ago. This faunal changes exactly match the shifts in breeding areas predicted by models as recently as 10 years ago (e.g. HUNTLEY et al. 2008). While from some point of view this can be also seen as a gain let's hope that in 50 years' time the Seewinkel will not resemble an oasis in today's central Sahara.

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