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SUPERABUNDANCE IN BIRDS: TRENDS, WETLANDS AND AVIATION

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ABSTRACT

Birds, like other living beings, survive by adaptation and specialization. Compared to other animals of similar body size, relatively many birds are opportunistically adapted to highly dynamic ecosystems. Consequently they succeed well in finding their way among humans and in habitats strongly modified by man. Birds are particularly noticeable in 'wetlands', such as rivers, marshes and coastal zones. Human influences on bird populations in these 'flatland' habitats are negative for highly specialized species, but may on the other hand be very positive for adaptable types, leading to rapid increase. This may conflict with the safety interest of other 'birds' of flat countryside: aircraft. Because of flatness and relative low ground prices uncultivated wetlands often are selected for airport construction in developing countries. With the reclamation for runways much accompanying developments follow, lying heavy claims on the available surface. Nowadays aviation more or less symbolizes this cultivation process. In the western world poldering and cultivation have already caused the disappearance of an enormous area of natural countryside in the past. Holland as a whole may be seen as the ultimate example of this process. But now, here, we see a new, opposite trend: nature development. Based on broad political support significant numbers of square kilometres polderland are 'given back to nature'. As birds are extremely popular, high bird numbers are considered as signs of success. Therefore, it now becomes imperative to bring together aviation and nature conservancy into spatial planning procedures, for the sake of flight safety.

introduction

Recently a new version of the Red List of threathened and vulnerable bird species of The Netherlands has been published. It gives a balance over the period 1960-1991 and concludes that 57 of the 165 species that breed in the country annually deserve special care. The clear trend is that uncommon species rapidly become scarcer or even disappear, an alarming situation. Simultaneously however, many common species tend to become more numerous. What is found in breeding birds also holds true for wintering and passing species. The paradox is that the Dutch bird population is decreasing in diversity, while expressed in kilo's per km^2, it has grown rapidly over the last 30 years.

This growth was not accompanied by more public complaints. Birds still enjoy a growing popularity. Moreover, they are increasingly considered as indicators of the success of nature promoting policies. To put it differently, the quality of the avifauna became a political factor. This implicates that when birds do turn into a pest very good arguments are needed to solve these problems.

Airports may suffer problems with local superabundancy of birds. The aim of this contribution is to make clear that aviation people do well by getting in touch with bird protectors, and vice versa. An illustration of avian dynamics will be given. It will be argued that especially birdlife in wetlands is very dynamic. This leads to the conclusion that projecting airports in wet low-lands is asking for bird problems. It inevitably forces at least to an early ornithological maintenance planning.

population dynamics in birds

Like all other living beings, birds survive by adaptation and specialization. These qualities seem to contradict to a certain extent. Adaptation is only possible if an organism leaves open different options for habits of which the profit is not sure in advance. As soon as an option is profitable, however, specialization will make the most of it. Competition is usually the driving force. When specialization involves the loss of other options, vulnerability will increase. Therefore, nature also somehow invented the opposite: investment in unforeseen, or: creating generalism. We see specialisation and generalism in all sorts of combinations and at different time scales. It occurs physically and in behaviour and it may or may not have a genetic basis. In birds adaptability seems to have evolved into a specialism. The possession of wings is a crucial prerequisite. In principle it enables the bird to pick food right under man's nose and select the most quiet nature reserve 10 km away for roosting or breeding. In this way one by one, species entered the cultivated area. Some did so long ago when man settled for agriculture, others came with the recent very drastic modification of the landscape, the growth of scale of landscape features and the decrease of hunting pressure.

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wetlands as dynamic ecosystems

The border area of water and land is characterized by high bioproductivity, and therefore by numerousness of birds. Birds are extra numerous here because water causes dynamics. At different spatial and temporal scales the water level drops and rises, streams shift and nutrients are supplied and carried off. Their mobility enables the birds to profit optimally from this fluctuating environment rich in food. The multitude of local feeding flights explains why the RNLAF suffered above Holland, as one big delta area, on average three time more from bird strikes than the average USAF.

The fact that the Dutch controlled the water by dikes did not prevent the birds from further profitting. In stead, an unique and very rich meadow bird population has evolved in the very green polder landscape. Waders like Lapwing and Black tailed godwit in summer and geese and ducks in winter have reached world record densities. The extreme density of bird meat per km^2 could increase so much due to the growing of food rich pioneer plants as crops, the spilling during harvest, and the possibility to catch invertebrates during each tillage of soil. During the last decennia the number of birds in these 'cultural wetlands' has been more than doubled by the enormous imput of fertilizers.

It is only recently that an opposite trend is ending the process decribed above. Refinement of mechanization and scale enlargement of the cultivation process urge to manipulate water levels. The spring underground water dropped considerably. This reduces the opportunitees of mass feeding and the general bird richness. The density of small fragments of nature, ditches and gradual sloping banks has decreased. Specialized birds disappear and even a very successful species like the Lapwing is declining.

Another trend, however, is agricultural overproduction. This forces Holland to stop production at marginal agricultural areas. Here, as well as in other european countries, agricultural land is set aside. The Dutch now try to turn this economical loss into a nature profit by 'giving back to nature' a considerable area of polderland. Forelands along rivers are the first to be transformed in so-called 'new nature'. The wet peatgrasslands in the low parts of the country will be the following category and will increase the total marsh area. Nature developement will be most successful where water can mould the old structures and the opportunistic bird species will profit directly.

airports in wetlands

Traditionally, aviation has an interest in wetlands too. They usually are flat areas of relatively low price. After drainage, they offer the opportunity of integral developement. This is the situation in several countries where large natural wetlands still occur. As most of the fresh water marshes already have been cultivated and build upon, to an increasing extent coastal areas are affected. Enlargement of scale in financing and techniques offers the possibility of

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new nature: a political issue

The Netherlands illustrates what the effect of poldering and cultivation on nature and the appreciation of nature can be. The disappearance of wild nature evoked in the first place, and quite understandably, a conservative reaction: save what can be saved, by establishment of reserves. Subsequently, as it became clear that many species can adapt to the cultivated land, it was recognized that also this type of nature represents values to the urbanized society. Furthermore, it was found that one can maintain and manipulate certain types of nature. And finally, a general feeling arose that besides employment one also needs a livable environment.

This trend has given the nature conservation movement a new elan. A new generation of ambitious 'nature developers' lined up, became an influencial factor, and is now obliged to the society to show practical results. In short term, this is only achievable in the wet and dynamic nature along rivers. Wetlands quickly attract many birds and birds are very visible and beautiful. They are well suited to symbolize succes.

We therefore conclude that in the Dutch society the basis for nature developement is growing. As a contrast, this is not the case for yet more aviation pressure in our overpopulated country. Although it is broadly acknowledged that an airport is a strong driving force for employment, people are not anymore willing to offer living space at any price. Therefore a carefull balancing is needed. In this political process nature developement became a new issue.

flight safety and the planning of airports and wetlands

Flight safety can create a (narrow) bridge between the 'hard sector' of economic interest and the 'no longer soft sector' of a society reorienting upon nature. On the one side, even the most fanatic naturalist will understand that big flocks of birds above airfields are not tollerable. On the other hand, aviation more and more grows familiar with the fact that simple solutions for the bird problem do not exist. Bird knowledge is needed, and as a rule the best ornithologists tend to be bird lovers. This implies that both parties should respect each other. By doing so they could negotiate and even cooperate with respect to the planning of new airports. The Dutch experiences with 'new nature' indicate two supporting points. Firstly, one cannot always say: the birds were first. And secondly, alternative wetlands can be created elsewhere, and even be part of the deal. Anyway, treatment of the bird problem should be part of the regular planning procedures.
With respect to existing airports, it is obvious that the creation of new bird sources by nearby wetland developement should be avoided. Several countries

do have (a beginning of) regulations (see the BSCE Green Booklet), but more guidelines should be developed. Inclusion of the aviation safety aspect into international conventions on bird preservation is urgently needed.

Shooting is often regarded as a simple solution to the bird problem. But mass cullings in relation to flight safety did almost never provide the final success. Sheer reduction of numbers cannot be achieved locally because of the mobility of birds, especially of pest species. RNLAF experiences (fig. 2) show that a sustainable reduction of bird strikes could be achieved while the need to kill birds also decreased! This is not to say that shotguns aren't necessary. In fact they are important to amplify the effect of other scaring devices. But the key is that birds get the chance to learn the safe and unsafe places and to communicate about it. Unpredictable environmental conditions are the real threat for flight safety.

acknowledgement

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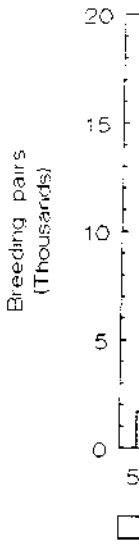

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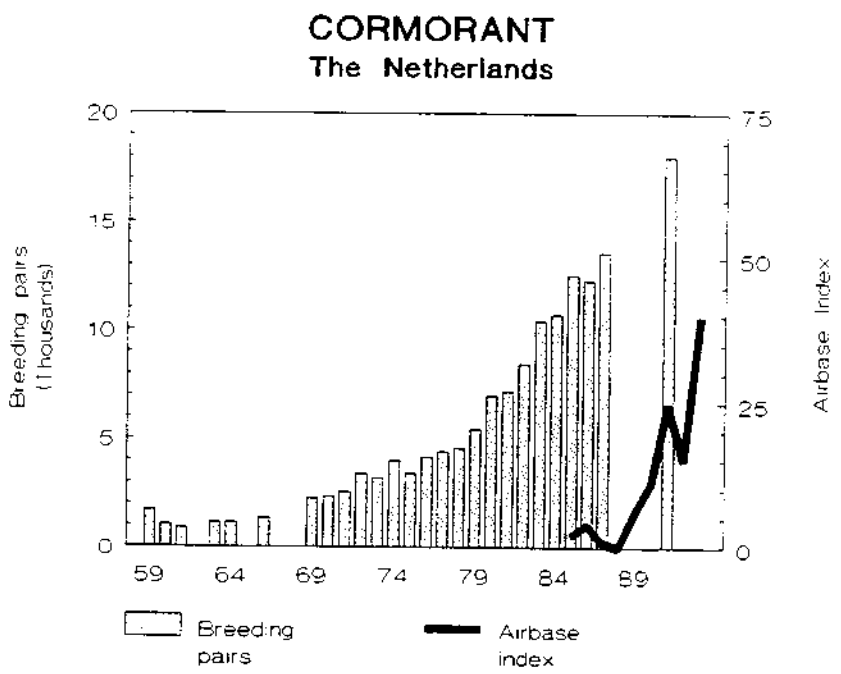

Numbers of breeding pairs of the Cormorant in the Netherlands during the period 1959 - 1987 plus an estimate for 1991.

After: Osieck E.R. & F. Hustings, 1994; Red Data and important birds in the Netherlands; Report Bird Life NL

Airbase Index: Percentage of the number of months x airbases (12 x 7 = 84 = 100%) wherein Cormorants were seen above RNLAF runways

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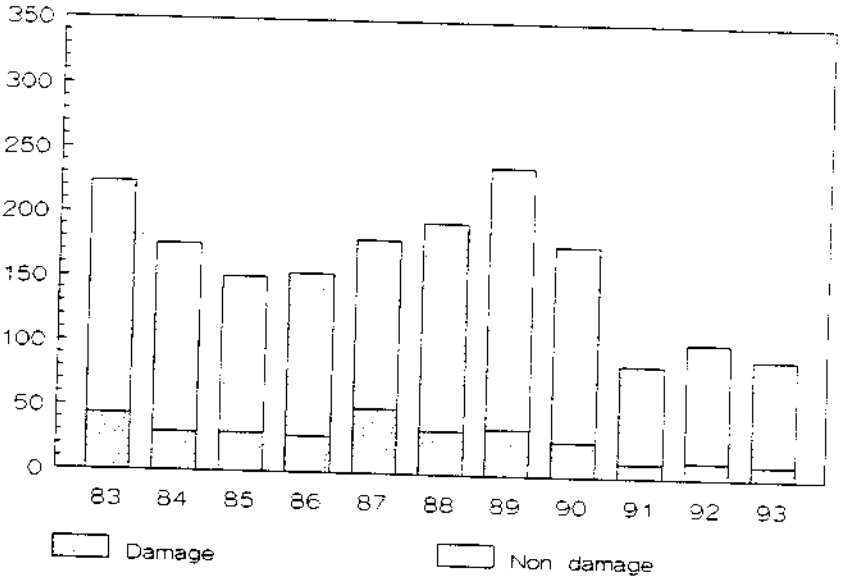
Total number of bird strikes
RNLAF, 1977 - 1993



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Birds shot for flight safety reasons
on 7 RNLAF airbases, 1983 - 1993