

The Influence of Tourism on Marsh Harriers *Circus aeruginosus* in the Neusiedlersee- Seewinkel National Park, Austria

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ABSTRACT

The impact of human disturbance on Marsh Harriers in the Neusiedlersee-Seewinkel National Park was investigated between March and August 1991. Although the harriers breed mainly in the reed zones undisturbed by humans, problems arise because intensively frequented tourist routes (80% cyclists) lead through the feeding grounds.

Cyclists and pedestrians create a negative factor, especially during the time of highest intake of food by the young, when their presence influences the pattern of hunting time and place. An increase in tourist numbers on particular routes means that the harriers cannot use these areas, including a distance along either side ("avoidance belt"). The more such routes are opened up, the less accessible the regular hunting grounds will become.

INTRODUCTION

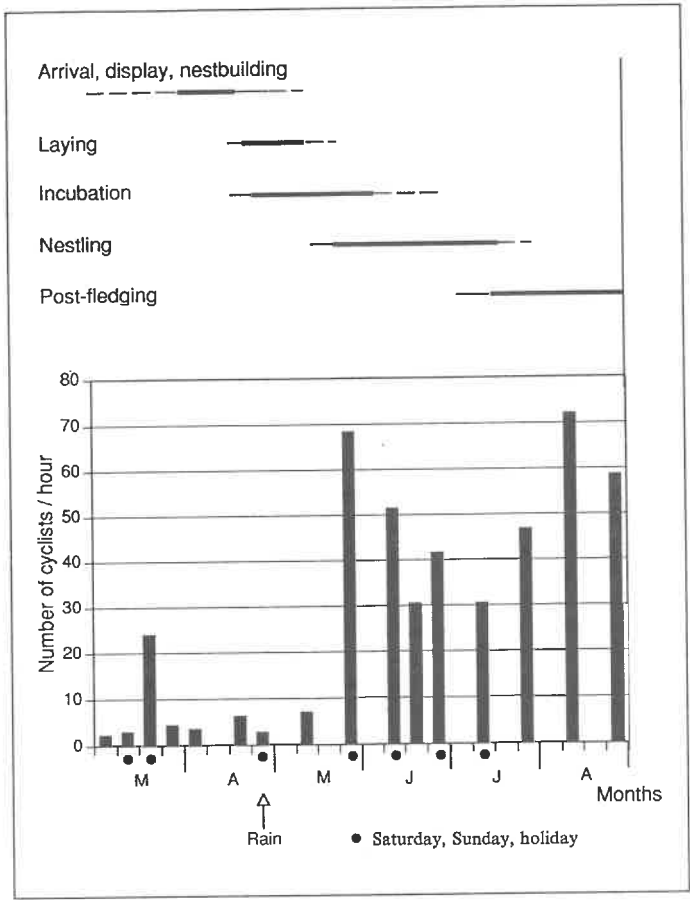
In Austria the Marsh Harrier breeds in only a few places (Gamauf 1991) and therefore is included in the Red List (Bauer 1989) as a "potentially endangered" species. The centre of dissemination is the extended area of the planned Neusiedlersee-Seewinkel National Park, which at the same time accommodates one of the largest concentrations of this species in Central Europe (Sezemsy & Ripfel 1985). Disturbances can therefore have a negative impact on the population, also beyond the borders of Austria.

Disturbances in spatial and temporal use of a bird's habitat can locally be the result of mass tourism. Whilst the large reedbeds used as hunting and breeding habitats are disrupted only peripherally, territories further inland are locally exposed to permanent disturbance by humans. Large areas of the Marsh Harrier's habitat in the national park are subjected to the pressure of a fast-rising stream of visitors. Between March and August the number of overnight stays by tourists in the region increases by thirty times, from 8,000 to 238,000, corresponding to the holiday season, especially during June and July, coincident with the harrier's sensitive reproduction cycle (Fig. 1).

Within the scope of a project commissioned by the Neusiedlersee Working Team (AGN), the possible effects of the leisure industry on Marsh Harriers were investigated (Gamauf, in press), in particular the following questions: -

- How do Marsh Harriers react to the presence of human beings ?
- Does tourism influence the space-time system of the harriers?

Figure 1. Breeding cycle of the Marsh Harrier in relation to tourism frequency in the area of the national park Neusiedlersee Seewinkel (for instance "Zitzmannsdorfer Wiesen").

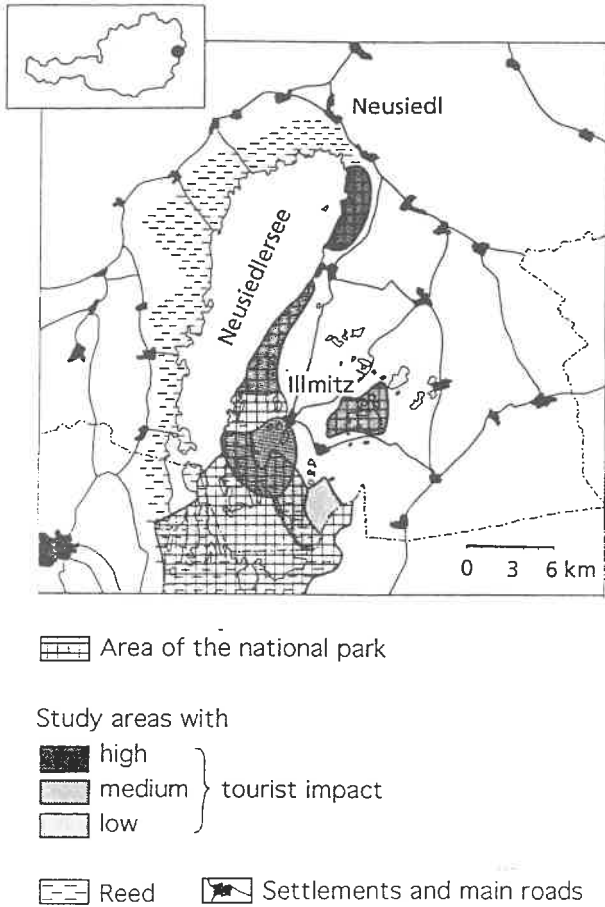


STUDY AREA

The study area, totalling over 70km², lies along the eastern shore of the Neusiedlersee lake and the bordering Seewinkel (Fig. 2). The extended area of the national park is one of the major wetlands of Central Europe. Situated at the western edge of the Little Hungarian Lowland (120m a.s.l.) and at the eastern limit of the Alps, it is notable for its richness of species. It is located only 60km from Vienna with its 1.7 million inhabitants. The resulting stream of visitors creates a series of problems for nature conservation. Swimming and boating activities along the edge of the reedbelt play their part; however, the cyclists (80%) and pedestrians in the reedless areas are the main disturbance factors.

Characteristic for the study areas in the national park are the lake, skirted with its (32%) reed belt of varying width, and the pools. Former pasture land is to-day intensively cultivated as arable land (23%), vineyards (14%) and grassland (31%). Meadows for hay and cattle grazing are predominantly confined to the nature reserve. Conditional on the land use, an extensive network of tracks and paths runs through the research area, and these are widely frequented by tourists. Climatically this region is one of the driest and hottest in Austria, with a rainfall of approximately 600mm per annum and an average annual temperature of 10°C.

Figure 2. Study areas in the national park Neusiedlersee Seewinkel, Austria.



MATERIAL AND METHODS

Investigations were carried out in five sections (See Fig. 2) variously influenced by tourist activities between mid-March and the end of August 1991. At least 61 Marsh Harrier nest sites were known in this area. The non-breeding population was not assessed.

Surveys were conducted in each section regarding the hunting behaviour (e.g. routes taken, habitat use) and the harriers' reaction to humans (e.g. avoidance behaviour, escape distances). The distribution of the birds within the sections, their distances from the paths as well as their habitat use and chosen flying routes were recorded *inter alia*. The number of tourists and the harriers' reaction to them were considered by analogy.

During observation days investigations began before sunrise and ended after sunset. In each section continuous observations for a minimum of six hours were carried out. Particular emphasis was laid on the comparability of data from before the main tourist season (up to mid-May) and from the peak tourist season (mid-May onwards, especially the end of June). Interpreting the results, the behaviour of the Marsh Harriers during the different phases of the breeding cycle was also considered; in all sections, for example, the continually retrograde use of the reed areas during the phases of reproduction (provided they were in the vicinity of roads) was not due to anthropogenic disturbances. For comparison of the results Wilcoxon, Man & Whitney U-test and t-tests were conducted.

RESULTS AND DISCUSSION

Cyclists and pedestrians clearly constitute a disturbance factor as regards escape distances, avoidance behaviour and habitat use by Marsh Harriers. "Disturbance" is defined as an effect factor negatively influencing the birds' behaviour (e.g. escape to other, in part less optimal, habitats, the choice of different hunting routes and the avoidance of certain regions).

1. Avoidance behaviour. (Fig.3)

- Single persons are usually overflowed at low heights (8-10m).
- Larger groups of people at greater heights ($\bar{x}$ = 35m, n = 64) and with an arching line of flight.
- In the absence of humans, on the other hand, or in undisturbed areas, the harriers fly close to the ground when hunting ($\bar{x}$ = 4m, n = 345, $p < 0.0011$).

2. Escape distance.

- The increasing number of visitors results in rising escape distance.
- In areas covered by vegetation and along foot-paths lined with trees and hedges, the escape distances are less ($\bar{x}$ = 50m, n = 61) than in open landscapes (with an average of 90m, n = 178, $p < 0.05$).

3. Distances of harriers from more and less highly frequented tourist routes. (Fig.4)

A. Before main tourist season (up to mid-May):

- On weekdays and during weekends with bad weather (= few visitors), a strip of land 200m wide along the tracks (often more diversified in structure than the surrounding, possibly richer in food) is favoured by the harriers (n = 167). During this period, the paths are used by only 0-5 persons/hour (8 at a maximum).
- During sunny weekends (= many visitors) a corridor of *ca.* 100m width is avoided along the tourist paths (n = 124, $p < 0.05$). Only in early morning, so long as no human disturbances occur, is this area accessible to hunting Marsh Harriers.

B. Main tourist season (mid-May onwards):

Especially from the end of June (start of holiday season), on weekdays as well as at weekends, a corridor approximately 240m wide is avoided (n = 906). During this period some paths are frequented by 50-80 visitors/hour, mostly cyclists. On peak days more than 470 persons/hour may be counted. The network of routes opened up for tourists reduces the habitat available to the harriers; thus 40% of the Zitzmannsdorfer Wiesen are inaccessible to this raptor during the later breeding period, when the young require the maximum amount of food. The birds are accordingly forced to extend and change their feeding range into less optimal habitats.

The results demonstrate the adverse effects of tourism on an endangered species. Only a wider study may confirm whether this causes a genuine loss of fitness, e.g. in the form of reduced breeding success and/or a reduced reproduction rate. For the present study, such data are unfortunately not available because the weather was cold and wet during the breeding period and the cause of many brood failures. Only 27 (44.3%) out of 61 controlled breeding attempts were successful, with only 0.9 fledged young/pair (2.1 young/successful pair). Thus the reproduction rate was lower than that reported from other areas of Europe, where the proportion of successful broods usually ranges between 60% and 80%, whilst the reproduction ranges between 1.6 and 2.8 fledged young/pair (*cf.* Bavoux *et al.* 1989; Bock 1979; Höser *et al.* 1979; Missbach 1972; Schipper 1979; Underhill-Day 1984; Witkowski 1989).

Investigations dealing with other bird and mammal species (e.g. Berger 1992; Cederna & Lovarni 1985; Gosow 1992; Ingold 1992; Jenny 1992; Stock 1991; Zehnter & Abs in press) show that increasing recreational activities can play a negative role for wildlife. In spite of this, it is neither necessary nor realistic to ban visitors from nature reserves, since animals can usually adapt to certain tourist routes without unduly detrimental effects.

A clear concept for the guidance of visitors to the national park is needed in order to reduce the conflict between the aims of nature conservation and tourist trade politics.

Figure 3. Behaviour of Marsh Harriers crossing (a) less and (b) frequented tourist ways.

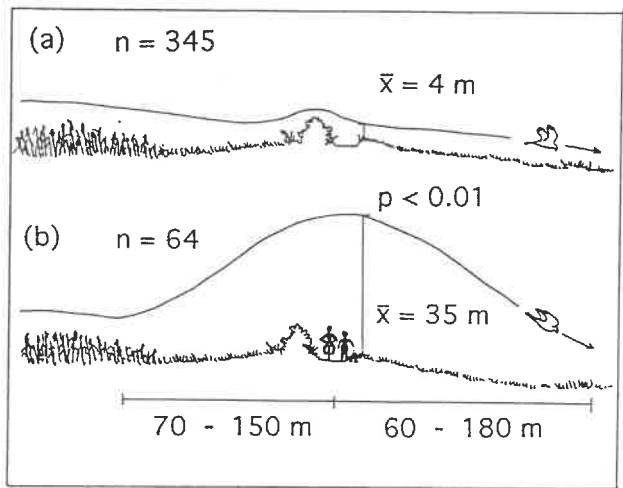
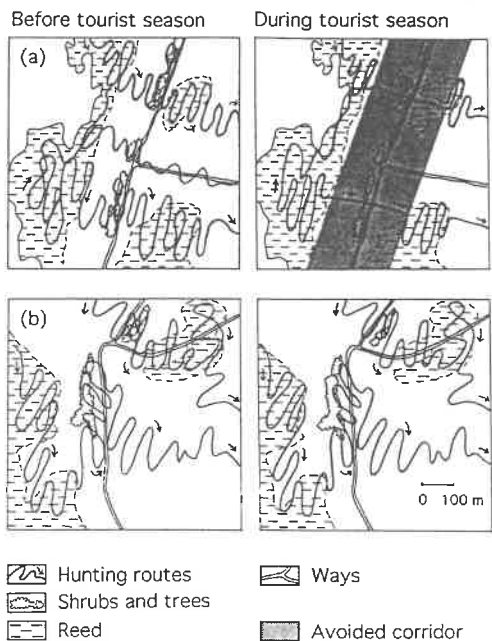


Figure 4. Comparison of Marsh Harrier hunting routes in the vicinity of (a) intense and (b) low frequented ways before and during tourist season.



Recommendations for reducing the impact of tourists in sensitive sections of the Neusiedlersee-Seewinkel National Park:

- Tourist routes should not lead through ecologically important areas.
- The opening up of paths and tracks for mass tourism should not be planned for ecologically sensitive areas.
- If necessary, restrictions should be imposed on heavily frequented routes during the breeding season of rare species (at least from the beginning of April to mid-July).
- Ecologically justifiable tourist routes must be controlled, in order to ensure that visitors stay on the paths.

ACKNOWLEDGEMENTS

For critical examinations I wish to thank R.D. Chancellor, H. Gossow, C. Leditznig, R. Parz-Gollner and M. Preleuthner. This study, as part of an interdisciplinary research project of the Arbeitsgemeinschaft Neusiedlersee (AGN) was supported financially by the Government of Burgenland, the Ministry for Science and Research and the Ministry for Environment, Youth and Family.

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