

Disturbance to estuarine birds: other reports and papers

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In addition to the reports of work on estuarine bird disturbance brought together in this volume, there is a variety of other research that has contributed to our knowledge of how estuarine birds respond to human disturbance. This listing summarises some of these other published papers and unpublished reports, concentrating chiefly on the birds' non-breeding season. Most of the summaries are drawn, with some modifications for consistency of style, from the authors' own summaries.

Burger, J. 1981. The effect of human activity on birds at a coastal bay. *Biological Conservation* 21: 231-241.

The direct and indirect effects of human activity on birds at a coastal bay refuge along the Atlantic Coast (Jamaica Bay, New York) were examined. Over the year human activity varied at different sample sites on the refuge, but people were present on part of the refuge every day, although activity was concentrated on designated paths around a freshwater pond and at a fishing pier.

On the refuge (exclusive of the ponds) people were present at the sample sites 17% of the time. Birds were present 42% of the time when people were present, but birds were present 72% of the time when people were absent. Human activities such as jogging or grass mowing, which involved rapid movement or close proximity to roosting birds, usually caused them to flush. Slow-walking birdwatchers and clammers did not usually cause birds to flush.

Gulls and terns were least affected as they usually re-landed where they had been; ducks usually flushed and flew to the centre of the pond; and herons, egrets and shorebirds were most disturbed and flushed to distant marshes. These results suggest that if management objectives include providing roosting areas for migrating shorebirds then some areas must be protected from close and fast-moving human activities.

Burger, J. & Gochfeld, M. 1991. Human activity influence and diurnal and nocturnal foraging of Sanderlings (*Calidris alba*). *Condor* 93: 259-265.

The foraging behaviour of Sanderlings *Calidris alba* was studied in the winters of 1986, 1988 and 1990 in Florida to determine whether the presence of people influenced foraging behaviour, and whether foraging behaviour varied as a function of time of day. A focal animal sampling approach was used. For all three years, the models explaining the greatest variation in

seconds per minute devoted to feeding included the number of people within 100 m of foraging Sanderlings. Although the number of people within 10 m of foraging Sanderlings during the day did not increase from 1986 to 1990, the number of people within 100 m rose dramatically, and foraging time per minute decreased. Sanderlings continued to feed through dusk into night. The time devoted to foraging and to aggression was greater at night, while the time devoted to avoiding people was less at night than during daylight or dusk.

Meltofte, H. 1989. *Dansk Rastepladser for Vadefugle. Vadefuletaellinger i Danmark 1974-1978. Vadefuglegruppen, Dansk Ornithologisk Forening Miljoministeriet.*

(*This report documents wader counts made by the wader study group of the Danish Ornithological Society on about 300 sites throughout Denmark excluding the Wadden Sea, and gives summaries and overall analyses of wader numbers and distribution. Of particular interest is an analysis of shooting and disturbance to waders. The extract below is modified from parts of text and the English summary of the report.*)

The waterfowl shooting intensity was recorded during each count, in three categories: *intensive shooting* - sportsmen recorded during half or more of the counts during the open season; *moderate shooting* - sportsmen recorded on less than half of the counts; and *no shooting* - area had some form of protection against shooting. Waterfowl shooting is most intensive during the early morning and late evening. As most counts were performed in the middle of the day they can provide only an underestimation of the shooting intensity.

Nineteen per cent of the count areas are protected against shooting to a varying extent (as game reserves, sanctuaries, etc.). In 43% of the classified sites intensive shooting took place in at least part of the area

or during part of the shooting season. Only 4% of the areas were fully protected.

Shooting disturbance was analysed by comparing the distribution of waders outside the shooting season with the distribution of waders in the open season. Comparisons were made between areas with extensive shooting, moderate shooting and no shooting. It appears that the proportion of Golden Plover and Curlew staying in intensively hunted areas is significantly reduced in the shooting season, but no significant changes were found for Lapwing or for waders in general. The effect of shooting disturbance on Curlew is much more extensive than this method suggests since this species is so shy that even moderate shooting drives the birds away from most sites. There are only two sites in Denmark, apart from the Wadden Sea, where Curlews regularly roost in autumn, whereas they are widely distributed during spring migration (in the close season). Furthermore, the shyness induced by hunting makes the birds flee even ordinary human activities, thus compounding the effect of shooting disturbance.

A more direct analysis of disturbance resulting from shooting activities can be obtained by comparing the number of waders recorded at specific localities when sportsmen were present with the number recorded when sportsmen were absent. The numbers of Lapwings and Golden Plovers were reduced by c. 35% and other waders by c. 25% when sportsmen were present. On about one-third of the sites the number of Lapwings and Golden Plovers was reduced by over 90%. These figures may, however, underestimate the effects of disturbance since sportsmen may have only recently left the some of the areas being counted, so that the numbers of waders on apparently undisturbed sites may in fact have been already reduced through disturbance. Many more data are needed for precise analyses of the extent of wader displacement resulting from shooting activities, and the ecological consequences of such displacement.

Belanger, L. & Bedard, J. 1989. Responses of staging Greater Snow Geese to human disturbance. *J. Wild. Management* 53: 713-719.

The effects of human disturbance on staging in Greater Snow Geese *Chen caerulescens atlantica* in spring and in fall were studied in the Montmagny bird sanctuary, Quebec in 1985-1987. 652 disturbances (any event causing all or part of the goose flock to take flight) were recorded in 471 hours of observation. Rates of disturbance were higher in fall (1.46/hr) than in spring (1.02/hr) ($P \leq 0.001$). The entire flock was disturbed in 20% of all cases. Mean time in flight was 56 and 76 seconds in fall and spring respectively ($P = 0.049$).

Transport-related activities, particularly low-flying aircraft, causes $\geq 45\%$ of all disturbances in spring and fall. In 40% of all cases ($P \geq 0.05$) geese stopped their feeding activities following a disturbance. Mean time to resume feeding was then 726 seconds in fall compared with 122 seconds in spring ($P \leq 0.001$). The level of disturbance that prevailed on a given day in fall (mean hourly rate) influenced goose use of the sanctuary on the following day ($P \leq 0.01$). When disturbance exceeded 2.0/hr it produced a drop in the mean number of geese present in the sanctuary the next day. Low-level aircraft flights over goose sanctuaries should be strictly regulated.

Belanger, L. & Bedard, J. 1990. Energetic cost of man-induced disturbance to staging Snow Geese. *J. Wild. Management* 54: 36-41.

The energetic cost of man-induced disturbance to fall-staging Greater Snow Geese *Chen caerulescens atlantica* in Quebec was estimated. Two responses of birds to disturbance were considered:

1. birds fly away but promptly resume feeding following a disturbance (Response A), and
2. birds interrupt feeding altogether (Response B).

Daylight foraging time decreased by 4-51% depending on disturbance levels. The average rate of disturbance (1.46/hr) in Response A resulted in a 5.3% increase in hourly energy expenditure (HEE) combined with a 1.6% reduction of hourly metabolisable energy intake (HMEI). In Response B, HEE increased by 3.4% and HMEI decreased by 2.9-19.4%.

Increases in night-time feeding rate and daily feeding rate were evaluated as compensatory mechanisms. A 4% increase in night feeding could compensate for energy losses caused solely by disturbance flights (Response A) but a 35% increase in night-time feeding was required to restore energy losses incurred in Response B. No increase in daily feeding rate was observed between days with different disturbance levels ($P > 0.05$). The authors conclude that man-induced disturbance can have significant energetic consequences for fall-staging Greater Snow Geese.

Keller, V.E. 1988. Human disturbance of Eider creches on the Ythan estuary. Report to the Nature Conservancy Council. 28pp.

Between June and August 1988 disturbance of Eider *Somateria mollissima* creches by human activities on part of the Ythan estuary in north-east Scotland was studied. Observations concentrated on the period around high tide, when the shores of the estuary are used by fishermen, walkers and dog-walkers, board-sailors and boats. Disturbance of creches roosting on

the shore was frequent (0.69 disturbances/creche-hour), but was rare when creches were on the water (0.11 disturbances/creche-hour). Most disturbances were caused by fishermen, with shoreline walkers causing the next most frequent disturbance. Direct disturbance by board-sailors was infrequent, largely because on the narrow Ythan estuary board-sailing takes place mostly at high tide, a time when most Eider creches were roosting on the shore.

Eider creches disturbed while roosting usually fled to the water, where more direct pressure from board-sailors was possible. After disturbance creches spent a median of 10.5 minutes, and sometimes up to one hour on the water, and repeated disturbance caused creches to remain more frequently on the water, as did disturbance late in the roosting period. In addition the increased time spent on the water as a result of shoreline disturbance could increase energy expenditure as well as predation.

There was also some evidence of indirect effects of disturbance on Eider creches in that part of the estuary subject to heavy disturbance were avoided by creches.

Most observations during this study were on ducklings more than two weeks old. The results suggest, however, that the effects of disturbance on ducklings could be more severe during their first two weeks of life. Further investigations during this early summer period are needed. This, coupled with the lack of information about disturbance during the low-tide period, when the birds are feeding, means that a general conclusion about the importance of disturbance on the survival of Eider ducklings cannot yet be drawn.

Scott, F.E. 1989. *Human disturbance of wading birds on the Ythan estuary*. Unpublished B.Sc. thesis, Department of Zoology, University of Aberdeen. 42 pp.

Disturbance to waders from walkers, bait-diggers and sport fishermen was studied on the Ythan estuary in north-east Scotland from October-December 1988. At this time walkers (including dog-walkers) were the most frequent cause of disturbance. Over half the walkers were accompanied by dogs. Most fishing took place during low tide, as did most bait-digging, but walkers visited at all stages of tide. On this estuary waders took flight from advancing disturbance at short distances: about 10 m in Oystercatchers and Dunlins, 10-15 m in Redshank and 7 m in Turnstones.

Several species kept a considerable distance away from a fisherman: average distances were over 50 m in Oystercatchers, 40 m in Redshank, and 35 m in Curlews. This avoidance distance was significantly greater for fishermen than for bait-diggers – 20-25 m in

these three species. Indeed bait-diggers seemed to cause rather little dispersal of several species such as Dunlin and Turnstone. Of all species, Dunlins approached bait-diggers most closely (c. 8 m), significantly closer than most other species, with Turnstones approaching to 15 m.

Experiments to assess the duration of disturbance from different causes found that numbers of Oystercatchers and Redshanks on the part of the tidal flats subject to disturbance dropped sharply during disturbance from walking or bait-digging, with numbers not returning to previous levels for 20-25 minutes. Firing a single shot from a gun seemed to have little effect on either species, since numbers present five minutes after the shot were similar to those beforehand.

On this estuary it seems that the small numbers of bait-diggers present in early winter had relatively little effect on feeding waders, as did the small numbers of fishermen, but fishermen may have had a greater impact in autumn when more fishing takes place. The apparently greater disturbance from individual fishermen compared with individual bait-diggers may be related to the greater activity of fishermen in casting their lines. By comparison, bait-diggers generally remain in one place for some time.

Disturbance to waterfowl on freshwater bodies

There are also a number of published papers reporting studies of the impact of disturbance to waterbirds and passerines on and around freshwater lakes. These report the effects of many of the same human activities that are the subject of concern in relation to the disturbance of estuarine birds, and so provide useful additional insights into the interactions between various human recreational activity and disturbance to birds.

This research includes:

Batten, L.A. 1977. Sailing on reservoirs and its effects on water birds. *Biological Conservation* 18: 85-88.

Cooke, A.S. 1987. Disturbance by anglers of birds at Grafham Water. In P.S. Maitland & A.K. Turner (eds.), *Angling and wildlife in fresh waters*. ITE Symposium No. 19.

Cryer, M., Linley, M.W., Ward, R.M., Stratford, J.O. & Randerson, P.F. 1987. Disturbance of overwintering wildfowl by anglers at two reservoir sites in South Wales. *Bird Study* 34: 191-199.

Grice, P. 1990. *'The effect of sailing on the Tufted Duck of the Mid-Colne Valley SSSI.'* M.Sc. dissertation, University College, London.

Tuite, C.H., Owen, M. & Paynter, D. 1983. Interaction between wildfowl and recreation at Llangorse Lake and Talybont Reservoir, South Wales. *Wildfowl* 34: 48-63.

Tuite, C.H., Hanson, P.R., & Owen, M. 1984. Some ecological factors affecting winter wildfowl distribution on inland waters in England and Wales, and the influence of water-based recreation. *J. Applied Ecol.* 21: 41-62.

Ward, D. 1990. Recreation on inland lowland waterbodies: does it affect birds? *RSPB Conservation Review* 4: 62-68.

van der Zande, A.N. & Vos, P. 1984. Impact of a semi-experimental increase in recreation intensity on the densities of birds in groves and hedges on a lake shore in the Netherlands. *Biological Conservation* 30: 237-259.



Eider

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