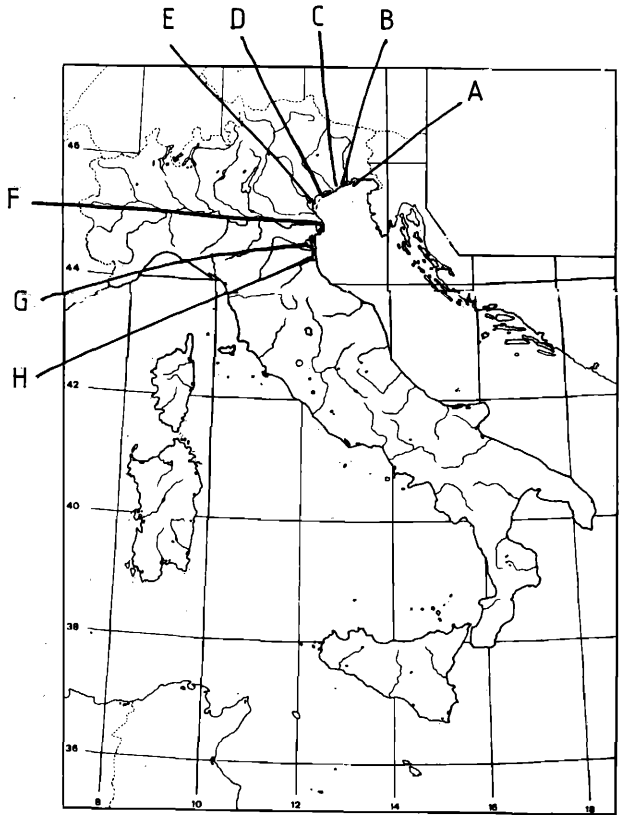

Figure 1. Wetlands in northern Italy for which counts were made between 1979 and 1984.

inflow. Only a few areas are tidal. Vast areas are being used as fish-breeding grounds.

D: Lagoon of Venice (northern part) (25 000 ha). A partly dammed complex of lagoons, with vast areas of tidal flats and open water.

E: Lagoon of Venice (southern part) (35 000 ha). Part of the Venice lagoon complex, more or less similar to the northern part but with larger areas of tidal flats.

F: Po River delta (30 000 ha). River delta with partly degraded lagoons, partly tidal, with vast sand-banks along the coast.

G: Lagoon of Comacchio (*sensu lato*) and the mouth of the River Reno (16 000 ha). A completely degraded lagoon, with salt-pans and sand-banks along the coast.

H: Saline de Cervia (800 ha). Salt-pans.

The following observers provided the information summarised in Table 1:

Areas A & B: Roberto Parodi, Fabio Perco and Paolo Utmar;
Areas C, D & E: Giampaolo Rallo;
Areas F, G & H: Paolo Boldregheni, Federico Montanari and Roberto Tinarelli.

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WSG AUTUMN MEETING 1983 - AN INSIDE VIEW

by Steve Percival and Digger Jackson

In keeping with recent tradition, the Wader Study Group AGM and conference were held in an area famous for its large and threatened communities of waders. Since the catastrophic floods of 1953, the Rhine Delta in the southern Netherlands has undergone extensive habitat manipulation under the auspices of the Dutch Government's Delta Project. On the night of Friday 18 November 1983 WSG members converged on the conference centre at Nieuw Haamstede on the island of Schouwen in the Delta, to savour the delights of Dutch cooking and alcohol. Rumours abounded that these pursuits might be interrupted by talks about waders! Meanwhile, the group's elite, who had driven and flown in from Norway, West Germany, Birmingham and Teesside, were locked away in secret committee meeting.

The conference opened on Saturday morning, with a welcome from Dr. Gerard Boere of the Dutch State Forest Service, who presented a gift of gingerbread men to all present, in celebration of the forthcoming feast of Santa Claus. Soon we were engrossed in the first session of talks, on breeding wader surveys. Here we were treated to a variety of topics from many countries, including Rob Fuller's account of the WSG's own very successful survey in the Outer Hebrides; for which Tim Reed later reassured us that they had "got the timing right".

A Portugese film on the Algarve wetlands brought to our attention the importance of using scientific names for birds. Whilst highlighting the conservation issues of this important area, the film also demonstrated the problems of translating Portugese bird names into English. This had led the commentator to some misunderstandings of the species involved. In particular, the rarity of the Sultana *Porphyrio porphyrio* and the Diving Goose *Tachybaptus ruficollis* gave the meeting some cause for concern! Johan van Rhijn enlightened us about the antics of satellite and independent male Ruffs *Philomachus pugnax* on their leks, in an excellent talk about their reproductive strategies.

Before the evening session, our hosts provided us with one of the local delicacies: raw Herring *Clupea harengus*. Having overcome our prejudices, many of us were amazed at its texture and flavour, and it is believed that some even enjoyed it! The High Arctic was the focus for the next set of talks. Brian Witts spoke on the Joint Services Expeditions to Ellesmere Island, and Ko de Korte spoke on the arrival of breeding waders in Greenland.

After a hard night's drinking, local studies on the Delta dominated Sunday morning's talks, Henk Baptist and Patrick Meire illustrating the research work being carried out in the area.

Peter Meininger gave us a thoroughly entertaining lecture on his expeditions to Egypt to carry out survey work for the Egyptian Atlas project.

The final talk of the conference was given by Guy Morrison of the Canadian Wildlife Service. Following on from Saturday's insight into the reproductive behaviour of Ruffs, Guy's talk might have been entitled "All you ever wanted to know about sex in Arctic waders/shorebirds, but were afraid to ask". Amidst an abundance of perversion, pride of place went to a Pectoral Sandpiper *Calidris melanotos* indulging himself in "interspecific homosexual necrophilia", by copulating with a dead male Red-necked Phalarope *Phalaropus lobatus*!

Sunday afternoon brought the conference to a close, with a field excursion to local sites of interest; an opportunity taken by many to add Avocet *Recurvirostra avosetta* and Barnacle Goose *Branta leucopsis* to their "tick-lists".

The weekend was thoroughly enjoyed by the over 100 people who attended, including members from the Netherlands, Friesland, Britain, Portugal, France, West Germany, Belgium and Poland. We certainly had a good time. Many thanks to our hosts at the Delta Department, especially Henk Baptist and Peter Meininger, and all those who helped the smooth running of the meeting.

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THE EFFECTS OF PREDATORS UPON SHOREBIRD POPULATIONS IN THE NON-BREEDING SEASON

by D.J. Townshend

INTRODUCTION

This paper examines the sparse information available on the effects of predators on shorebirds, and how these might be quantified further. Predation on adult shorebirds is known to occur during both the breeding and non-breeding seasons, but little is known of its magnitude.

Anecdotal records of both avian and mammalian predators killing shorebirds are scattered through the scientific literature. (Many more surfaced at the 6th International Workshop on the Ecology of Shorebirds at Cardiff, September 1983, at which the need for further research on the effects of predators upon shorebirds was stressed.) From such records, lists can be compiled of the taxonomic range of predators on shorebirds, and of the shorebird species taken by each of these predators. These lists vary both seasonally, with different predators on the breeding and wintering grounds, and geographically, e.g. between different breeding areas. However, from these spot observations alone it is not possible to quantify the rates of predation upon shorebird populations. Intensive studies of the prey taken by predators in one site are required. Only one thorough study has been published, by Page and Whitacre (1975). They measured predation on shorebirds by raptors. Studies of predation at the same site in California have continued (J.P. Myers pers. comm.).

RAPTOR PREDATION

Page and Whitacre quantified the daily rates of predation by raptors (Falconiformes and Strigiformes) upon the shorebird populations of a small estuary in California, and extrapolated from these to estimate the number of shorebirds of each species killed by each predator species during a winter. Because of the abundance of raptors hunting over the estuary, and the specialization on shorebirds by a single Merlin *Falco columbarius*, raptor predation was a significant cause of mortality of shorebirds there (Table 1). It is probable that raptors take much smaller proportions of shorebird populations on European than on Californian estuaries because there are fewer raptors wintering on European coasts, at least in recent years (Table 2). However, calculations presented below using the rates of predation measured by other workers show that even single raptors could have a considerable effect upon the shorebird population of an estuary.

At Teesmouth, N.E. England, a single female Merlin is present through each winter, and has been seen capturing Dunlin *Calidris alpina* but no other species of shorebird. Over a winter this predator could kill between 10% and 23% of the Dunlin population (Table 3) if it took only this prey. This value is suspiciously high for a species with an overall annual mortality rate of 25-30%, of which over one quarter is known to occur during the four weeks of incubation in

Table 1. Raptor* predation on wintering shorebirds in California

	% of total wintering populations taken by raptors			
	1 MERLIN *Falco columbarius*	1-4 SHORT-EARED OWLS *Asio flammeus*	1 LONG-EARED OWL *Asio otus*	ALL RAPTORS
DUNLIN (N = 1900) *Calidris alpina*	5.6%	11.7%	3.0%	20.7%
LEAST SANDPIPER (1600) *Calidris minutilla*	7.1%	2.3%	1.5%	11.9%
WESTERN SANDIPER (350) *Calidris mauri*	7.5%			7.5%
SANDERLING (130) *Calidris alba*	13.5%			13.5%
DOWITCHERS (100) *Limnodromus* spp.				15.5%

(Data from Page and Whitacre 1975)
*Falconiformes and Strigiformes