

# INCREASES IN WADER MORTALITY AT TEESMOUTH DETECTED FROM RINGING RECOVERIES

by N. C. Davidson

At Teesmouth in north-east England, neither of the recent spells of severe weather (January/February 1979 and December 1981/January 1982) caused the heavy mortality of waders that occurred on some other estuaries on the east coast of Britain (Clark 1982, *Wader Study Group Bull.* 34: 5-7). Despite this, I found evidence from recoveries of ringed birds that the mortality of most waders was higher in January/February 1979 than during mild weather in recent winters (Davidson 1982, *Wader Study Group Bull.* 34: 8-10). Data on ringed birds found dead at Teesmouth during the 1981/82 winter are now available, so some comparisons between the two spells of severe weather can be made.

## Results and Discussion

Table 1 compares the number of ringed birds found dead during the two severe spells with that during recent mild winter weather. Assuming equal mortality in each month between November and March in each of the five winters between 1977/78 and 1981/82, then approximately 8% of the normal winter mortality would have occurred in each of the two severe spells. In January/February 1979, this figure was exceeded by seven of the ten species for which there are ringing recoveries. Similarly, six of the ten species suffered more than 8% of their winter mortality during December 1981/January 1982. No ringed Bar-tailed Godwits *Limosa lapponica* or Turnstones *Arenaria interpres* were found dead in either cold spell. Combining all species, the number of ringed birds found per month was very similar, and was 7.5 to 8 times the number per month reported during mild winter weather. As found for January/February 1979 (Davidson 1982), when the difference in time periods was taken into account the number found dead during December 1981/January 1982 was significantly higher than during mild periods between 1977/78 and 1981/82 ( $G = 23.21$   $P < 0.001$ ). In total, 54% of the recoveries of ringed birds from five winters occurred during the four months of severe weather.

Table 1. Recoveries of ringed shorebirds found dead at Teesmouth during the five winters (November - March) between 1977/78 and 1981/82.

No. Ringed	No. found dead*				% found dead	
	Jan/Feb 1979	Dec 1981/Jan 1982	1977/78 excl. cold spells	to 1981/82 incl. cold spells	Jan/Feb 1979	Dec 1982/Jan 1982
Ringed Plover	496	1	1	3	33	33
Grey Plover	292	1	0	1	100	0
Knot	2714	2	3	12	17	25
Sanderling	802	2	6	10	20	60
Dunlin	4771	4	1	7	57	14
Bar-tailed Godwit	94	0	0	1	0	0
Curlew	187	0	1	3	0	33
Redshank	544	1	1	4	25	25
Turnstone	188	0	0	5	0	0
Oystercatcher	257	1	0	1	100	0
Total	10345	12	13	47	26	28
Mean No. per month		6.00	6.50	1.05	1.88	

\*Recoveries for which there is evidence of accidental death (e.g. killed by predator, shot, flew into wires) are excluded.

The number of ringed birds dying will depend partly on the number that were alive (and so could have died) in each winter. To correct the numbers found dead for this variation, the size of the ringed population of each species at Teesmouth was estimated from the number ringed in each winter, and the annual survival rates at Teesmouth in mild and severe winters. These survival rates were calculated from individually-marked waders by Evans (1981, pp 275-290 in *Feeding and Survival Strategies of Estuarine Organisms*, Plenum Press) and Townshend (1982, *Wader Study Group Bull.* 34: 11-12). For those species whose survival rates have not been calculated, an average survival rate of 80% in mild winters and 70% in severe winters was used. The estimates of population size do not take any emigration or immigration during winter into account, as insufficient information about the rates of population turnover is available. The numbers of ringed birds dying (expressed as No. found dead per month per 1000 ringed birds available) were 1.00 in January/February 1979, 1.17 in December 1981/January 1982, and 0.04 in mild winter months. Thus the higher mortality during severe weather was not a consequence of larger populations of ringed birds at Teesmouth at those times. Also, the number of ringed birds found dead in December 1981/January 1982 remained very similar to that in January/February 1979.

The results show that in 1981/82, as in 1979, most species of waders at Teesmouth were affected seriously enough by the severe weather for more to die than is usual during mild winters. This emphasises that all sources of information (including systematic tideline searches, ringing recoveries, the body condition of live birds, and population counts) must be integrated before the effects of severe weather on waders can be determined fully. We hope that the new WSG Project on the Effects of Severe Weather on Waders will provide such information on a wide geographical scale.

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