

Disturbance on estuaries: RSPB nature reserve experience

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This paper documents some effects of wildfowling and other disturbance on the conservation value of estuarine reserves managed by the RSPB. The management undertaken to alleviate the effects of wildfowling and other recreational disturbance is described and its effectiveness assessed.

Evidence is presented to show that wildfowling affects the local distribution of wildfowl in winter within estuaries. Unshot areas within reserves are used disproportionately by wildfowl during the shooting season, while the total number of wildfowl using an estuary may increase following the creation of refuges. Similar effects of disturbance from wildfowling on wader distribution at either high or low tide have not been convincingly demonstrated on RSPB reserves.

Anecdotal observations from RSPB estuarine reserves indicate that other types of recreational activity can also cause substantial disturbance to waterfowl. Most reserve management plans contain prescriptions to alleviate their effects. These may include the development of an integrated recreational strategy for the estuary as a whole, with zoning of the major activities causing disturbance. This is illustrated by examples taken from management plans for the Hayle and Langstone Harbour reserves.

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INTRODUCTION

This paper documents some of the recorded effects of wildfowling disturbance on the conservation value of estuarine and other nature reserves managed by the RSPB. Management undertaken to alleviate these effects, and those arising from other types of recreational disturbance on estuaries, is also described and where possible its effectiveness assessed. The paper relies largely on unpublished information contained in reports of research projects commissioned by the RSPB, Reserve Annual Reports and Management Plans.

Estuarine nature reserves managed by the RSPB

Currently the RSPB manages 28 estuarine nature reserves, including 20 on estuaries of international significance. These contain over 9.3 km² of intertidal mud (3.6% of the national resource) and 2.8 km² of saltmarsh (6.4% of the national resource). RSPB manages more than 10% of eight major estuaries and has large (>4%) landholdings on four other estuaries of international or national importance (Table 1).

RSPB policy towards wildfowling on its reserves

The Society's Charter dictates a policy of strict neutrality towards the existence of shooting *per se* but wildfowling is not normally allowed at RSPB reserves because of its potential to cause disturbance (Thomas 1991). However, exceptionally, the Society may license limited shooting rights to responsible wildfowling associations

Table 1. Internationally or nationally important estuaries on which RSPB has significant landholdings, 1991.

>10% of intertidal	Others
Dee	Wash – 1,604 ha (4%)
Findhorn/Culbin	Humber – 1,295 ha (8%)
Inner Clyde	Firth of Forth – 405 ha (8%)
Langstone Harbour	Blackwater 172 ha (6%)
Lough Foyle	
Morecambe Bay	
Stour	
Swale	

to secure a net gain for bird conservation. Examples of such circumstances are where breaking a long-standing custom would, in other respects, be disadvantageous to bird conservation at the site or where a landowner insists on exercising rights over land the Society wishes to hold as a reserve.

THE EFFECTS OF DISTURBANCE BY WILDFOWLING ON RSPB RESERVES

The effectiveness of sanctuary areas within reserves

On the five estuarine reserves where limited shooting occurs, the sanctuary areas represent from 55% to 95% of the reserve (Table 2). Some quantitative information

Table 2. Extent of sanctuary areas on RSPB estuarine reserves where some wildfowling takes place. At Frampton no shooting is allowed above Mean High Water Mark.

Reserve	Sanctuary area (ha)	% Reserve	% Estuary
Morecambe Bay	2,506	>95%	13
Snettisham	1,233	95%	3
Dee (Gayton Sands)	1,740	85%	12
Frampton	282	79%	<1
Langstone	287	54%	14

pertaining to the effectiveness of sanctuary areas is available for three of these sites: Dee Estuary, Snettisham and Morecambe Bay. In addition there is detailed information on the effects of the creation of a sanctuary area on the distribution of wildfowl on the Ouse Washes, a lowland wet grassland reserve adjacent to one of the tidal rivers of the Wash, that supports internationally important numbers of wintering wildfowl.

Dee Estuary

In 1979 the RSPB acquired 2,040 ha, 14% of the Dee estuary at Gayton Sands. This created a sanctuary in the core of Dee Wildfowling Club's shooting grounds. Shooting is allowed on a peripheral 16% of the reserve in return for a management agreement creating a sanctuary area encompassing high-tide wader roosts elsewhere on the estuary.

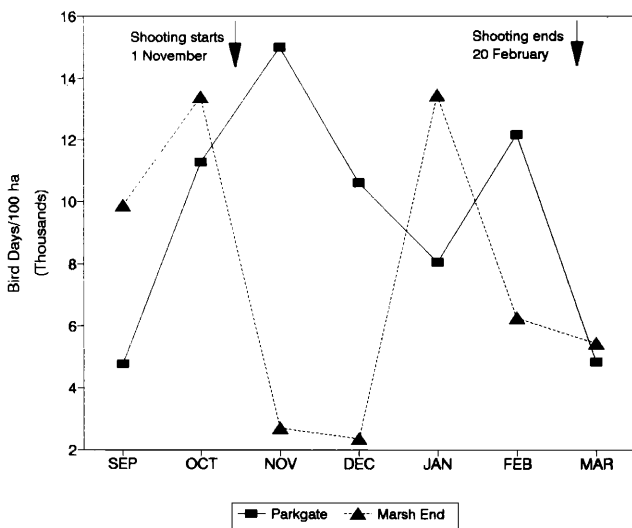
Gomes (1981; 1982) investigated the effects of wildfowling on wildfowl and waders at Gayton Sands over the winters of 1980-81 and 1981-82. He made regular counts of two adjacent and ecologically similar areas of 530 ha: a sanctuary area (Parkgate) and an area in which a core of 150 ha was shot over between 1 November and 20 February (Marsh End). In the first

winter, wildfowl use of the shot area declined sharply with the onset of shooting (Figure 1). The effect was particularly noticeable for Mallard *Anas platyrhynchos* and both this species and Teal *Anas crecca* grouped farther out in the estuary at Marsh End. No such effects were apparent on the distribution of protected species, such as Shelduck *Tadorna tadorna*, waders or gulls.

Wildfowl usage of the shot area was again much lower the following winter but increased markedly during wildfowl bans introduced as a result of hard weather (Figure 2). This latter effect was particularly apparent for Wigeon *Anas penelope* and Pintail *Anas acuta*. Waders were not similarly affected (Figure 3), although Redshank *Tringa totanus* did show significantly less use of the shot area.

Gomes' study demonstrated clearly that wildfowling affected the distribution of wildfowl within the estuary but that there was little or no effect on the distribution of gulls and most wader species. Since the sanctuary was created, average winter peak wildfowl numbers have almost trebled, from 7,000 to over 20,000 (Table 3). It is possible that this increase is due, at least in part, to the establishment of the refuge area.

a) Wildfowl



b) Waders

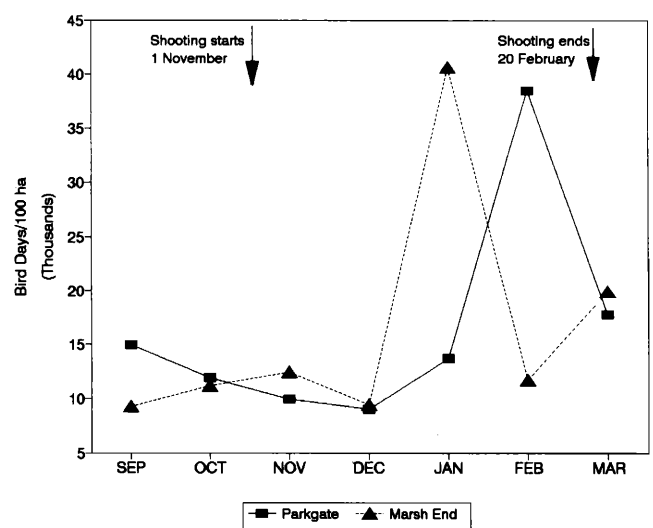


Figure 1. Monthly use by (a) wildfowl and (b) waders (number of bird-days/100 ha each month) of shot (Marsh End) and refuge (Parkgate) areas of the Dee Estuary in 1980/81 (Gomes 1981). Data points are the average of at least three counts at low and high tide in each area in each month.

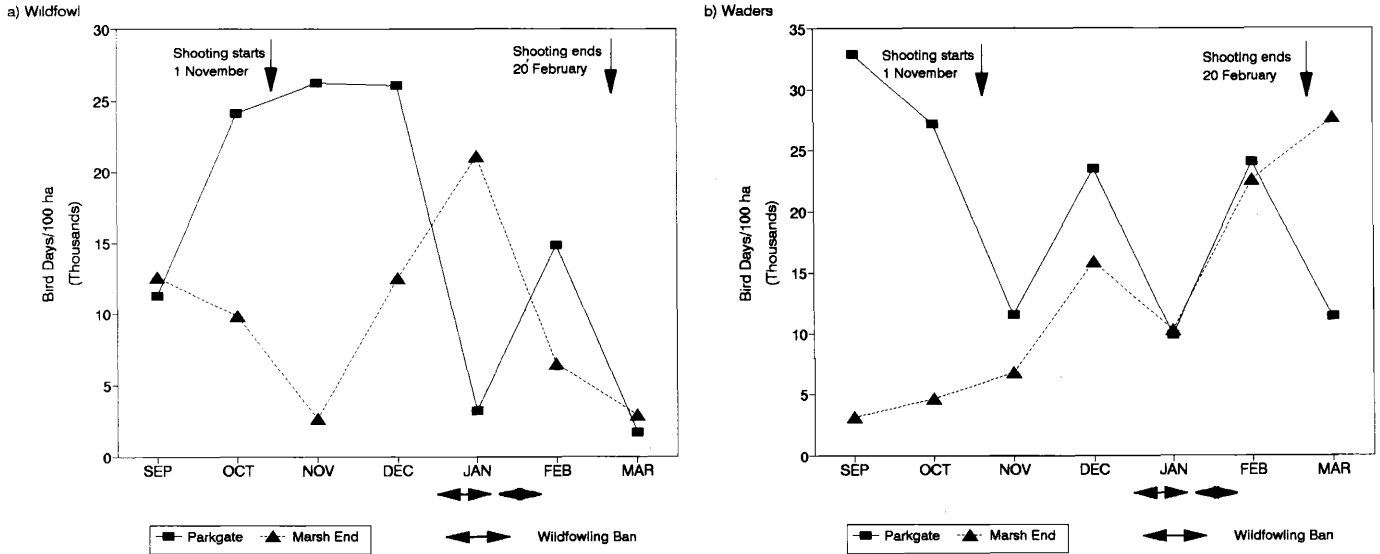


Figure 2. Monthly use by (a) wildfowl and (b) where (number of bird-days/100 ha each month) of shot (Marsh End) and refuge (Parkgate) areas of the Dee Estuary in 1981/82 (Gomes 1982). Arrows indicate hard-weather wildfowling bans (17 Dec-5 Jan. and 10-22 Jan.). Data points are the average of at least three counts at low and high tide in each area in each month.

Snettisham

The size of the unshot area within the reserve has been increased in stages since it was acquired in 1972. The unshot area now extends to almost 95% (1,233 ha) of the reserve. Since 1972 the average winter peak number of wildfowl on the reserve has more than trebled (Table 4). These now represent almost 40% of the total wildfowl using the Wash as a whole as compared with less than 20% when the reserve was first acquired and the whole area shot over.

Morecambe Bay

The main wildfowl refuge (2,506 ha) was established in 1977. Wintering wildfowl increased from a mid-winter average of 1,755 in the period 1974-77 to 4,350 in the period 1983-89. The increase involved both roosting and feeding birds. Post-refuge creation increases were particularly apparent for Greylag Geese *Anser anser* and Wigeon (Table 5).

Ouse Washes

The effects of creating a sanctuary area on the Ouse Washes were investigated by Thomas (1978) over the period 1970-74. During the study period 490 ha (26%) of the Washes were designated as refuges. The creation of the refuges in 1969 and 1970 was followed by an increase in the numbers of ducks using the Washes from an average annual maximum of 21,205 to over 49,000. This included a three-fold increase in peak winter numbers of Wigeon to over 34,000 birds.

The refuges also had a marked effect on the distribution of birds before and after the shooting season (Table 6). The greatest effect was on the distribution of Mallard and Wigeon, the least on diving ducks, Coot *Fulica atra* and Moorhen *Gallinula chloropus*. In addition, there was

a tendency for Teal, Mallard and Wigeon to arrive earlier in the winter once refuges had been established (Figure 4).

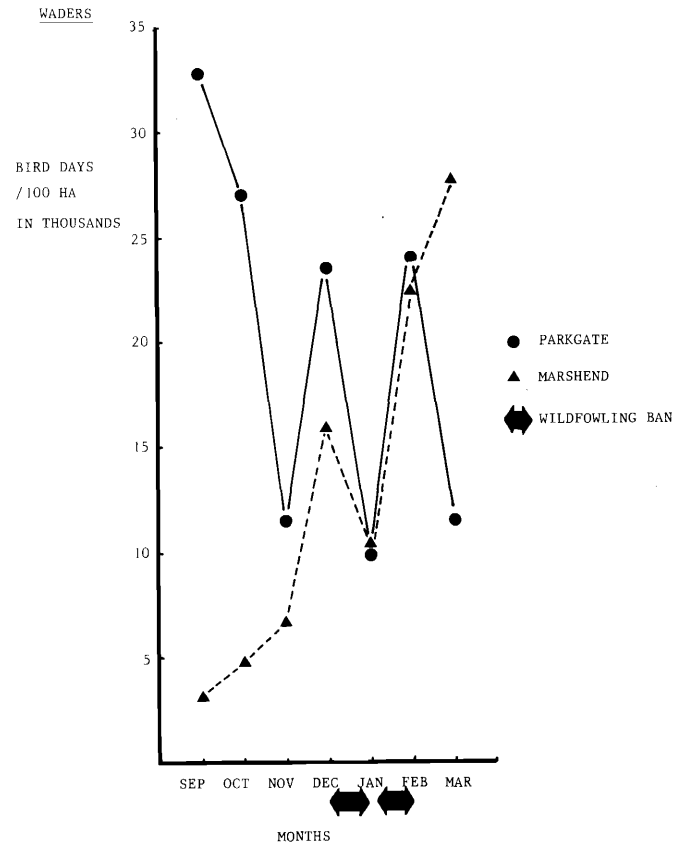


Figure 3. Monthly use by waders (number of bird-days/100 ha each month) of shot (Marsh End) and refuge (Parkgate) areas of the Dee Estuary in 1981/82 (Gomes 1982). Arrows indicate hard-weather shooting bans (17th Dec.-5 Jan. and 10-22 Jan.). Data points are the average of at least three counts at low and high tide in each area in each month.

Table 3. Trends in the average peak winter counts of selected wildfowl species on the Dee Estuary in relation to when the sanctuary area was created.

Species	Before sanctuary (1972-75)	After sanctuary (1983-86)	Per cent change
Mallard	730	3,670	+403%
Teal	381	2,245	+489%
Wigeon	445	700	+57%
Pintail	865	4,830	+458%
Shelduck	2,145	3,310	+54%

Table 4. Trends in wildfowl numbers (average peak winter count) at Snettisham in relation to those on The Wash as a whole and the size of sanctuary area within the RSPB reserve. The reserve (1,300 ha) comprises 80% of the 'Snettisham' recording area.

Period	The Wash	Snettisham (% Wash)	Sanctuary Area (ha)
1972/3-1976/7	36,266	6,747 (18.6)	0
1977/8-1981/2	49,881	14,471 (29.0)	260
1982/3-1986/7	74,444	18,534 (25.0)	830
1989/90	57,352	22,607 (39.4)	1,233

DISTURBANCE FROM OTHER RECREATIONAL ACTIVITIES ON RSPB RESERVES

Other types of recreational activity occurs on parts of many RSPB estuarine reserves. Anecdotal observations by reserve wardens suggest that several types of recreational activity, in addition to wildfowling, may cause substantial disturbance to birds on these reserves (Table 7). There are, however, no data to quantify these effects.

Table 5. Effects of creating refuge areas on numbers of Greylag Geese and Wigeon at Morecambe Bay. The initial wildfowl refuge was established in 1977 and most shooting ceased on Carnforth Marsh in 1979/80.

Wigeon (Ave. mid winter)	
Period	Number
1974-77	415
1977-83	960
1983-89	1,505

Greylag (Peak no. grazing on Carnforth Marsh)	
Period	Number
1977/78	45
1978/79	65
-----shooting ceased	
1980/81	226
1981/82	270

MANAGEMENT TO ALLEVIATE RECREATIONAL DISTURBANCE ON RESERVES

Even though the disturbance effects of recreational activities on reserves can seldom be quantified, most management plans for RSPB estuarine reserves contain prescriptions to alleviate these effects. This is described below for two reserves: Hayle and Langstone Harbour.

The Hayle Estuary

The Hayle is a small estuary in south-west Cornwall. It has recently become an RSPB reserve and a draft management plan has been written.

Recreation

Being in a holiday area, the estuary is subject to a wide range of recreational pressures and the need for an integrated recreational strategy has been recognised. This would bring all estuary users together within an agreed, organised framework whereas, before, each type of user operated independently.

Table 6. The distribution of wintering wildfowl on the Ouse Washes in 1970/71 between refuge (490 ha) and non-refuge (1,395 ha) areas in relation to the shooting season (before 31 January). Bird use is expressed as number of bird-days per ha (Thomas 1978).

Period	Refuges (26% Area)	Non-refuge (74% Area)
Before 31 January	8,520 (86%)	1,410 (14%)
After 31 January	3,493 (46%)	4,183 (54%)

POPULATIONS

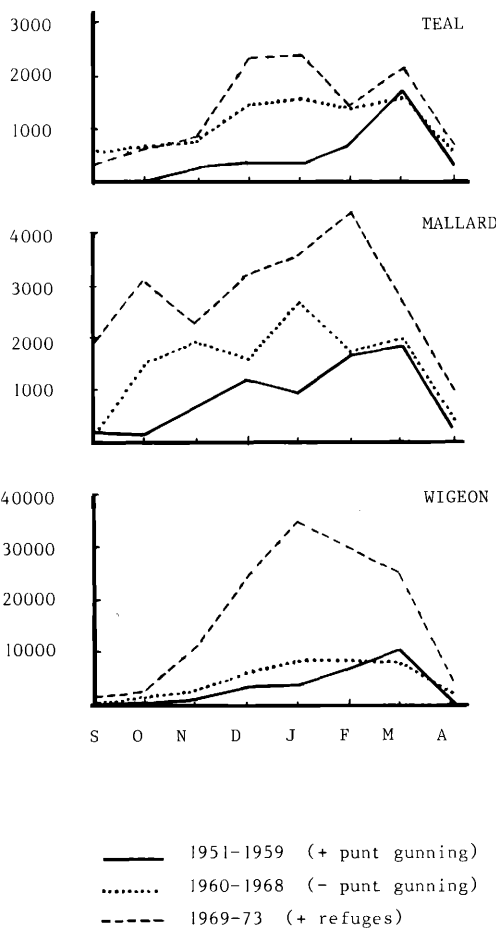


Figure 4. Average monthly populations of three duck species on the Ouse Washes during three periods: with punt gunning (1951-59), with wildfowling but no punt gunning (1960-68) and after the creation of refuge areas (1969-73).

Recreational strategies of the type outlined in Table 8 are difficult to agree and implement. They may also lead to previously unforeseen problems. Limiting water-skiers belonging to the local club to a specified area has reduced disturbance to the main wader roost at the

Table 7. Recreational activities most frequently mentioned as causing disturbance to birds on RSPB estuarine reserves.

Activity	No. of reserves
Boating	8
Angling	6
Water-skiing	6
Wind-surfing	4
Shellfish collecting	4
Bait-digging	4
Dog-walking	4
“Jet-skiing”	3
Microlites	3
Canoeing	3
Birdwatching	3

Hayle, but has displaced other water users to other areas sensitive to disturbance (Table 9).

Langstone Harbour

Langstone Harbour covers 1,932 ha of which the RSPB reserves purchased in 1978 covers c. 29%. Wildfowl and waders overwinter on the estuary in internationally important numbers. Within the reserve there are five saltmarsh and shingle islands extending to about 30 ha. These form the major roosting areas for waterfowl and breeding sites for regionally, and occasionally nationally, important seabird populations.

Recreation

Public rights of navigation, fishing and access mean that recreational disturbance of the reserve is high. Following acquisition, no landings were allowed at any time on any of the reserve islands to prevent disturbance to roosting waders and breeding seabirds. This has been superseded by a policy of restricted landing. This allows landing at all times on part of Long Island, and landing outside the breeding season (April-August) on Round Nap. This restricted landings policy has resulted in many fewer unauthorised landings on reserve islands during the breeding season (Figure 5) with consequently less disturbance to breeding birds.

Wildfowling

There is a long history of wildfowling in the Harbour and since the reserve was acquired the RSPB has let a portion of the reserve (c. 255 ha) for wildfowling on an annual licence to the Langstone and District Wildfowling and Conservation Association (LADWACA). This was seen as the best way of regulating shooting on the reserve. Bag returns and wildfowl numbers are closely monitored. Several advantages stem from the agreement with the wildfowlers (Glover 1987): the stringent RSPB licence conditions have been adopted beyond the reserve boundaries, wildfowlers police the unshot area of the reserve and prevent poaching, and shooting is foregone on other areas of high conservation value.

Table 8. Proposed management of recreational activities on the Hayle estuary.

Forbidden	Zoned	No action
Bait-digging (Bye-law)	Dog-walking (Fence) Canoeists Model Boats Wind-surfers Water-skiers Rowing	Swimming Beach-users Anglers (Monitor)
Plus: Create two new wader roost sites (islands) outside water-ski zone.		

Table 9. The effects of zoning club water-skiing on the Hayle Estuary.

Beneficial

- Reduced disturbance to main spring-tide wader roost (wadgers tolerate wash)
- Club limited operation to 6 boats at any one time 'pirate' users kept away
- Specified area adhered to

Adverse:

- Other water users (canoeists, windsurfers) displaced
- More disturbance to other sensitive areas
- No wildfowl use when vessels present

Since the arrangement was introduced, average annual peak wildfowl numbers in the Harbour have increased by 50% to c. 12,400 birds.

Military activities

Low-flying military helicopters caused much disturbance to waterfowl in the early 1980s. Pressure from the RSPB and the Hampshire and Isle of Wight Naturalist Trust resulted in the declaration of Langstone and Chichester Harbours as a Local Avoid Area in April 1986. This has greatly improved the situation, although over-flying by civilian aircraft, including microlites, continues to cause disturbance.

Management to reduce disturbance

The main management undertaken to alleviate the effects of disturbance on the bird populations at Langstone Harbour reserve and the main perceived conservation benefits are summarised in Table 10.

CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

The disturbance effects of wildfowling on RSPB reserves

The evidence presented above suggests that wildfowling affects the local distribution of wildfowl in winter both within and between estuaries. Unshot areas within sites are used disproportionately by wildfowl during the wildfowling season, while the total number of wildfowl using estuaries may increase following the creation of refuges. However, similar effects of disturbance from wildfowling on wader distribution at either high or low tide have not been convincingly demonstrated on RSPB reserves.

Given that the disturbance caused by wildfowling affects the distribution, and possibly the size (see below) of waterfowl populations, the Society will continue to seek to secure adequate sanctuary areas on coastal and inland wetland complexes with internationally and nationally significant populations of important birds.

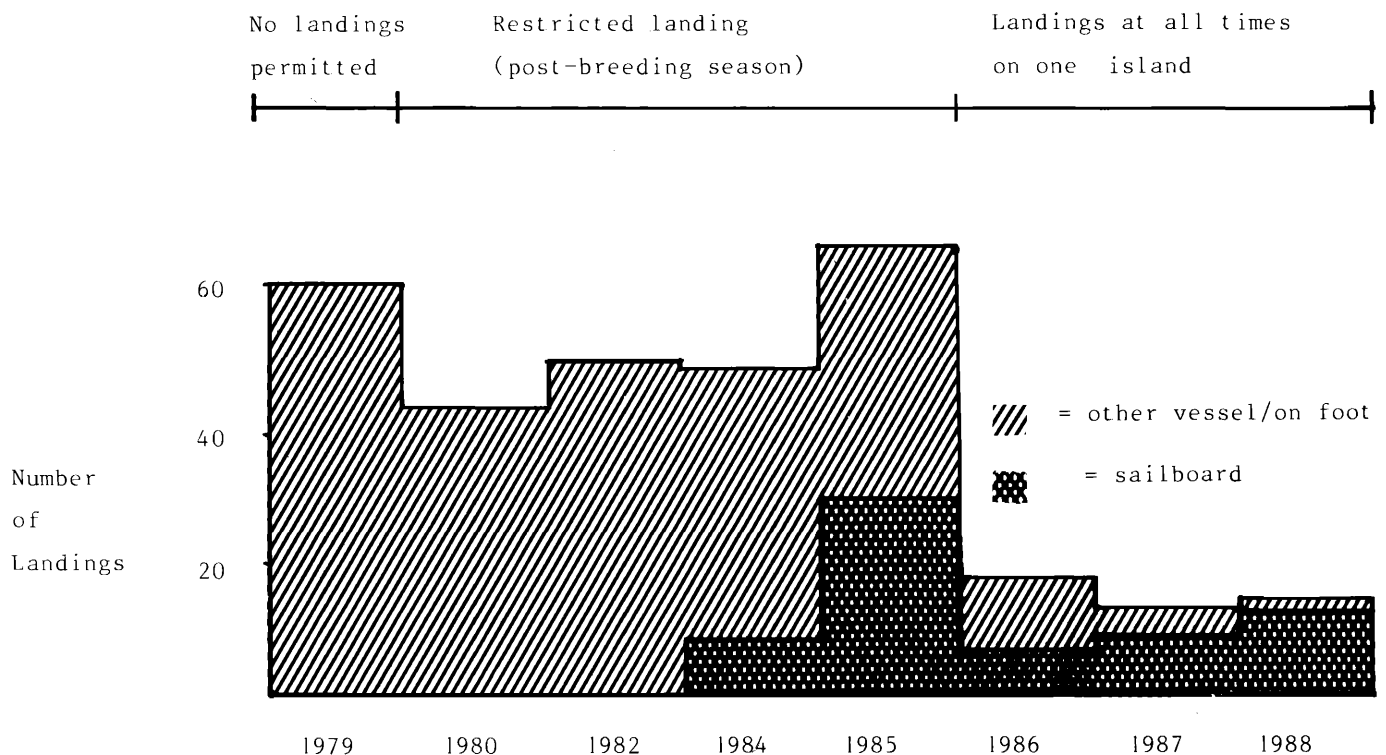


Figure 5. The number of unauthorised landings between April and August on reserve islands in Langstone Harbour during 1979-88 in relation to reserve landing policy.

Table 10. Conservation management at Langstone Harbour RSPB reserve.

Management	Conservation benefit
1. Control of water-borne disturbance	Large increase in breeding birds e.g. Little Tern 0-162 pairs. Reduced disturbance to internationally important numbers of roosting waders.
2. Control of military aircraft by local avoid area (1986)	Reduced disturbance to internationally important numbers of waterfowl.
3. Licensing of wildfowling	Improvement in wildfowling standards. Prevention of 'cowboy' shooting. Demonstrates a positive working relationship with a BASC-affiliated club.

The disturbance effects of other recreational activities on RSPB estuarine reserves

The disturbance effects of other recreational activities on waterfowl distribution and abundance on RSPB estuarine reserves have not been quantified. However, when managing its reserves the Society will continue to adopt the precautionary principle and try to reduce potentially damaging activities wherever possible. On many reserves this may best be achieved by encouraging the development of an integrated recreational strategy for the estuary as a whole, with zoning of the major activities causing disturbance.

Suggestions for further research

There have been surprisingly few studies quantifying the effects of recreational activities, other than wildfowling, on the distribution of waterfowl within estuaries. Research to demonstrate whether disturbance by wildfowling affects the population sizes of wildfowl and wader species is clearly needed but would be difficult to achieve. However, as a first step it should be feasible to determine the effects of controlled disturbance on the feeding rates of individual wildfowl or waders and perhaps even on their survival rates.

Information on the size and configuration of sanctuary areas is needed to provide an adequate safeguard against disturbance to wildfowl and waders on

estuaries. A site inventory of waterfowl numbers with disturbance, habitats and sanctuary areas mapped and quantified would provide a useful starting point for this research. The effects on waterfowl distribution resulting from the creation of existing sanctuary areas should be reviewed in relation to the size, habitat and proportion of the estuary contained within the refuge.

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REFERENCES

- Glover, C.J. 1987. *Langstone Harbour reserve: a brief review of its ecology and management*. Saltmarshes and intertidal areas symposium. RSPB, Sandy.
- Gomes, R. 1981. *The effect of wildfowling on the waterfowl at Gayton Sands, 1980-81*. Unpubl. rept. RSPB, Sandy.
- Gomes, R. 1982. *The effect of wildfowling on the waterfowl at Gayton Sands, 1981-82*. Unpubl. report. RSPB, Sandy.
- Thomas G.J. 1978. *Breeding and feeding ecology of waterfowl at the Ouse Washes, England*. Unpubl. PhD. Thesis, CNA.
- Thomas, G.J. 1991. *Wildfowling on Reserves*. Position statement. RSPB, Sandy.