

# Changes in bird use following the managed realignment at Freiston Shore RSPB Reserve, Lincolnshire, England

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## SUMMARY

The sea wall at Freiston Shore, eastern England, was breached in three places in 2002 to create 66 ha of intertidal habitat. By September 2005, 70% of the site was covered by salt marsh plants. The area now supports large numbers of wintering geese, duck and waders, as well as smaller numbers of species of passerine of conservation concern. The site has proved popular with people with over 57,000 visitors in 2005.

## BACKGROUND

Every year 100 hectares of salt marsh and mudflats are lost in the UK as a result of sea level rise and erosion. These are key habitats for biodiversity, supporting a range of specialised plants, hosting a range of waders and wildfowl throughout the year, as well being important nursery areas for fish and shellfish. With global warming and the imminent risk of rising sea levels, hard defences such as sea walls become both more impractical and more expensive. Coastal realignment (or managed retreat) is a soft engineering option that aims at re-creating salt marshes and intertidal mudflats by breaching hard coastal defences such as sea walls and embankments, and allowing the sea to flood the low-lying areas behind. The land behind, now subject to regular tidal inundation, is re-colonized by salt marsh vegetation. From a non-ecological perspective, coastal realignment has a number of advantages. The inter-tidal region is able to dissipate wave energy and protect property and land, managed realignment schemes have reduced capital and maintenance costs compared to fixed defence schemes (approximately £3000/km less than hard defences) and some inter-tidal habitats created by realignment schemes produce areas which are suitable for recreation.

The Wash (a large estuary off the east coast of England) is the most important area in the UK for wintering and migrating waterbirds, holding in excess of 300,000 birds in peak periods, and has multiple nature conservation

designations (SSSI, SPA, SAC, Ramsar). Whilst the Wash Shoreline Management Plan recommended holding the current line for the entire Wash, it was identified that some areas of defence would benefit from a managed retreat. Freiston Shore was identified as one such potential realignment site, creating 66 ha of salt marsh in front of the secondary line of defence. Freiston Shore was the last area of the Wash to be claimed from the sea, as recently as 1983, and had been used for arable since until the realignment.

This project was undertaken in partnership with the Environment Agency (lead partner), English Nature and Her Majesty's Prison Service.

## ACTION

**Site:** As part of the Gibraltar Point to Hobhole Strategy within the Wash Shoreline Management Plan, the need to realign 66 ha of arable at Freiston Shore (Lincolnshire) was identified. The site was suitable because:

- i) The existing primary defence (sea wall) was too exposed to wave action and thus expensive to maintain.
- ii) Secondary sea defences were already in place although work was needed to reinforce, and in places, repair this.

- iii) The narrow band of salt marsh in front of the sea wall meant that wave attack was relatively unhindered and severe erosion took place in 1996. These factors combined to suggest that this would be a suitable place for a realignment scheme.

**Preparations:** Following community and statutory consultations and a survey of the site, preparations were begun to re-inundate the area:

- i) Computer models were used to determine the optimal location, size and number of breaches to minimize erosion and accretion on either side of the old sea wall.

**Table 1.** RSPB Freiston Shore managed realignment area peak winter waterbird counts.

	2002/03	2003/04	2004/05	2005/06
Little egret <i>Egretta garzetta</i>	1	7	11	14
Grey heron <i>Ardea cinerea</i>	3	3	2	1
Dark-bellied brent goose <i>Branta bernicula</i>	250	<b>1005</b>	660	1,727
Shelduck <i>Tadorna tadorna</i>	125	300	109	167
Wigeon <i>Anas penelope</i>	40	500	200	485
Teal <i>Anas crecca</i>	0	218	31	242
Mallard <i>Anas platyrhynchos</i>	11	89	8	38
Oystercatcher <i>Himantopus ostralegus</i>	14	5	20	15
Ringed plover <i>Charadrius hiaticula</i>	67	18	0	4
Golden plover <i>Pluvialis apricaria</i>	<b>5,780</b>	<b>6,000</b>	<b>6,000</b>	<b>5,000</b>
Grey plover <i>Pluvialis suatarola</i>	31	52	<b>1,000</b>	<b>263</b>
Lapwing <i>Vanellus vanellus</i>	3,423	1,502	2,000	2,000
Knot <i>Calidris canutus</i>	40	65	300	112
Dunlin <i>Calidris alpina</i>	1,503	833	170	250
Black-tailed godwit <i>Limosa limosa</i>	0	1	1	25
Bar-tailed godwit <i>Limosa lapponica</i>	5	2	0	1
Curlew <i>Numenius arquata</i>	41	31	30	22
Redshank <i>Tringa totanus</i>	106	80	70	81
Turnstone <i>Arenaria interpres</i>	2	47	16	26
Total wildfowl	426	2,112	1,008	2,659
Total waders	11,012	8,636	9,607	7,799_

**Notes:**

Figures in **bold** are nationally important

The recognised winter period is Sept-March for wildfowl, Nov-March for waders

The managed realignment (66 ha) became intertidal in August 2002

- iv) The land contained behind the primary defence was of a similar height as the adjoining saltmarsh and mudflats indicating that the area would be subjected to suitable regular tidal inundation.
- v) As the land had been under an arable rotation since being claimed from the sea in 1983, the land was topographically relatively flat. This reduced the amount of pre-inundation preparation that would be required.
- ii) Approximately 500 m of new cross wall were built using material won from the landward side of the realignment.
- iii) The borrow pit for seawall construction was landscaped to produce a 15 ha saline lagoon, incorporating a series of islands for breeding and roosting waders and breeding terns (Badley & Allcorn 2006).

- iv) More than 1,000 m of the secondary wall were reinforced to 1 in 200 year standard.
- v) The vegetation in the realignment area was cut, baled and removed to avoid the likelihood of an anaerobic mat of decaying vegetation forming after flooding.
- vi) Soke drains were retained but all but 800 m of other field drains were infilled.
- ix) Three 50 m breaches in the outer sea wall were created in August 2002.
- Monitoring:** Counts are made of the birds using the realigned area throughout the year. Two neap high tide, spring high tide and low tide counts are made each month from points along the sea banks. All species on the realignment are recorded. In winter transects are walked once a month to determine the realignment area's use by passerines. There is also a significant monitoring programme undertaken by contractors on behalf of the Environment Agency/DEFRA. This

**Table 2.** RSPB Freiston Shore managed realignment area passerine counts along transects.

Species	Peak	Average	Peak	Average	Peak	Average	Peak	Average
	count	count	count	count	count	count	count	count
	2002/03	2002/03	2003/04	2003/04	2004/05	2004/05	2005/06	2005/06
Skylark <i>Alauda arvensis</i>	35	15.6	197	76.5	151	88.2	255	121
Meadow pipit <i>Anthus pratensis</i>	3	1	36	10.2	10	3.8	1	0.3
Rock pipit <i>Anthus petrosus</i>	1	0.2	1	0.3	2	0.4	4	2
Wren <i>Troglodytes troglodytes</i>	0	0	0	0	0	0	1	0.3
Starling <i>Sturna vulgaris</i>	0	0	0	0	0	0	18	6
Twite <i>Carduelis flavirostris</i>	0	0	105	21.8	40	9.2	0	0
Lapland bunting <i>Calcarius lapponicus</i>	0	0	0	0	0	0	1	0.3
Snow bunting <i>Plectrophenax nivalis</i>	0	0	13	2.2	0	0	0	0
Reed bunting <i>Emberiza schoeniclus</i>	0	0	1	0.2	0	0	0	0

**Notes:**

The managed realignment area became intertidal in late August 2002.

The realignment area is divided into three reserve recording compartments. There is one transect in each.

The transects are a total length of 1,484 m.

The transect counts do not necessarily reflect the peak number of birds recorded from the realignment area.

The realignment area winter 2003/04 peak count was 730 for skylarks and 170 for twite .

- vii) Approximately 1,200m of primary channels were created feeding off the breaches. By using historical photographs it was possible to establish these in the same locations as the previous natural channels.
- viii) The external primary creek network was deepened.

programme covers wave and tide, sedimentation, vegetation, invertebrates and fish.

**CONSEQUENCES**

**Habitat:** A total of 66 ha of new intertidal habitat have been created on former farmland following breaching in August 2002. This was at the time the largest realignment project

undertaken the UK. This new salt marsh is making a significant contribution towards Britain's Biodiversity Action Plans (BAP) targets. The 66 ha of salt marsh created represents 56% of the UK's national yearly target for salt marsh creation.

**Vegetation:** Colonisation by vegetation has been rapid. By September 2005, 70% of the realignment area was covered by salt marsh plants, initially with species such as glasswort *Salicornia* sp. and annual sea-blite *Suaeda maritima* dominating. Perennial species such as sea purslane *Halimone portulacoides* and sea aster *Aster tripolium* became more prevalent after 2-3 years. After three years the realignment saltmarsh has reached the same species diversity as the saltmarsh outside the realignment area.

**Birds:** Peak numbers of wintering waterbirds and peak and mean numbers of passerines recorded along the transects in the re-alignment area are shown in Tables 1 and 2. The re-alignment area now supports large numbers of wintering waterbirds, several species in nationally important (i.e. > 1% of the UK population) numbers. Currently the re-alignment is too low to support breeding waders, as the whole of the realignment area is completely flooded on spring tides.

**Human visitation:** The site has also proved popular with visitors, in an area of the Wash with little other easily accessible wildlife habitat. Over 57,000 people visited the site in 2005, three years following the habitat management works, compared to an estimated 11,000 per year in the year prior to the breach.

**Flood defences:** The improvement of the flood defences to Boston has resulted in better protection of 80,000 hectares of low lying Grade 1 agricultural land and numerous isolated rural communities. Prior to the construction of the new defences, the existing bank provided them with a standard of protection of 1 in 20 years (5% risk of breaching). The scheme that the Agency has implemented provides them with a standard of protection of 1 in 200 years (0.5% risk of breaching). This is a significant increase in standard of protection for the area.

## REFERENCES

Badley J. & Allcorn R.I. (2006) The creation of a new saline lagoon as part of a flood defence scheme at RSPB Freiston Shore nature Reserve, Lincolnshire, England. *Conservation Evidence*, 3, 99-101.

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