Terns of Rye Bay

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Introduction

Rye Bay provides several safe nesting sites for large numbers of terns to breed and usually has the good supply of small fish required for successful breeding. Six species of tern have been recorded nesting along the coast of Rye Bay and this paper describes the changes in fortunes of the populations and several factors that influence their numbers and distribution.

These noisy terneries provide an attraction for passing rarer species and a further eight species of tern have been recorded in Rye Bay making it one of the top tern sites in the UK.

Location

Rye Bay is a large area, about 57 km^2, of shallow sea with a sandy and muddy bed between the headlands of Fairlight and Dungeness, 22 km apart. The bay straddles the Kent/East Sussex border and along its coast there are many discrete sites that offer nesting opportunities for terns (Figure 1). All of the current nesting sites are contained within the 9137-ha Dungeness, Romney Marsh and Rye Bay SSSI and include Dungeness RSPB, Rye Harbour Nature Reserve and Pett Level. Rye Bay has a long history as an inshore fishery and a small fishing fleet still survives. There is a large tidal range and a falling tide often strands fish in shallow waters that lead to a feeding frenzy of seabirds. During the winter when the terns are in Africa the fish resource is exploited by large numbers of Great Crested Grebes and Red-throated Divers.

Breeding Terns

The breeding tern data was extracted from several sources: annual county bird reports and avifaunas, annual reports of the Hastings and East Sussex Naturalists (HESN), annual reports of Rye Harbour Nature Reserve, several site managers, the notebooks of John Ashbee and two books by Axell (1992) and Alexander (1974). Reading both of these latter two books to give a good background into the status of many other breeding birds in the early twentieth century is highly recommended.

Little Tern

At Dungeness (Kent) nesting has been reported at several sites: along the west beach, the east beach, Greatstone, Holmstone, Brooks, Galloways and Denge Marsh, and in Sussex at The Midrips, Wicks, Northpoint Beach, Camber Beach Bank, Nook Beach, Rye Harbour and Pett Level (Figure 2). However, since 1978 nesting has occurred almost entirely at Rye Harbour with the exceptions of 2000 when the colony moved to The Midrips, and 2008 and 2009 when none nested. This current very limited choice of suitable nesting sites makes the Rye Bay population of Little Terns vulnerable to long-lived predators who can learn how to prey on them, especially Kestrels. At Rye Harbour the success of the Little Tern colony has varied greatly (Figure 3). It is in only 16 out of 38 years that the colony has produced the 0.65 fledged chicks per pair that is considered the level of productivity necessary to maintain the population (Ratcliffe 2000). Much of the loss during the last 25 years has been due to Kestrels preying on chicks.

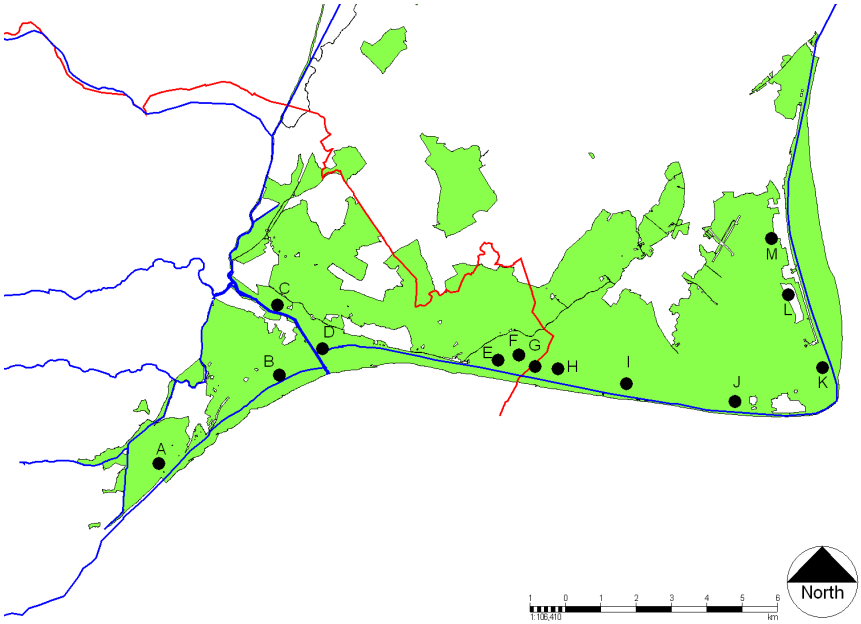

Figure 1. *Map of tern breeding sites in Rye Bay. Red line, Kent/Sussex border; green shaded area, SSSI; A, Pett Level; B, Rye Harbour; C, Northpoint Pit; D, Camber shingle bank; E, The Midrips; F, Wicks; G, Holmstone; H, Brooks; I, Denge Marsh; J, West Beach; K, East Beach; L, Water Tower; M, Greatstone.*

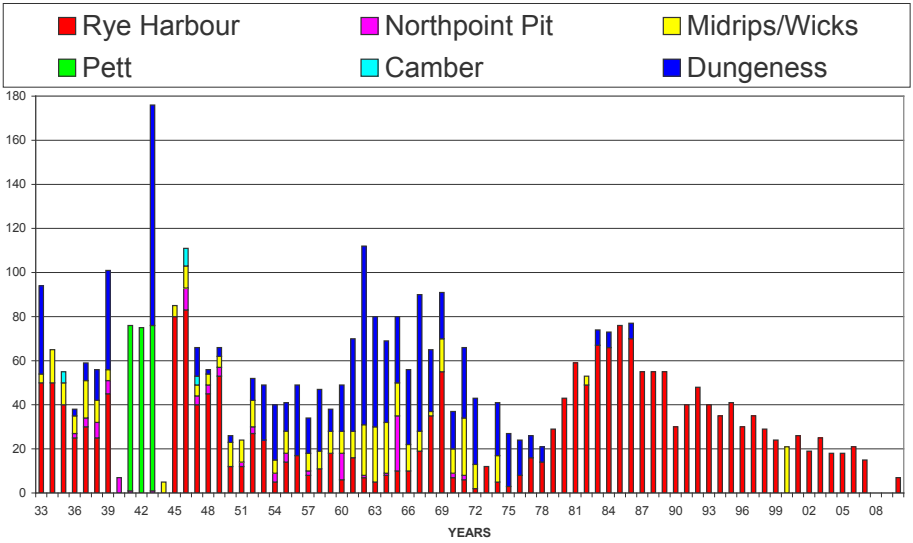

Figure 2. *Little Tern breeding numbers (pairs) in Rye Bay.*

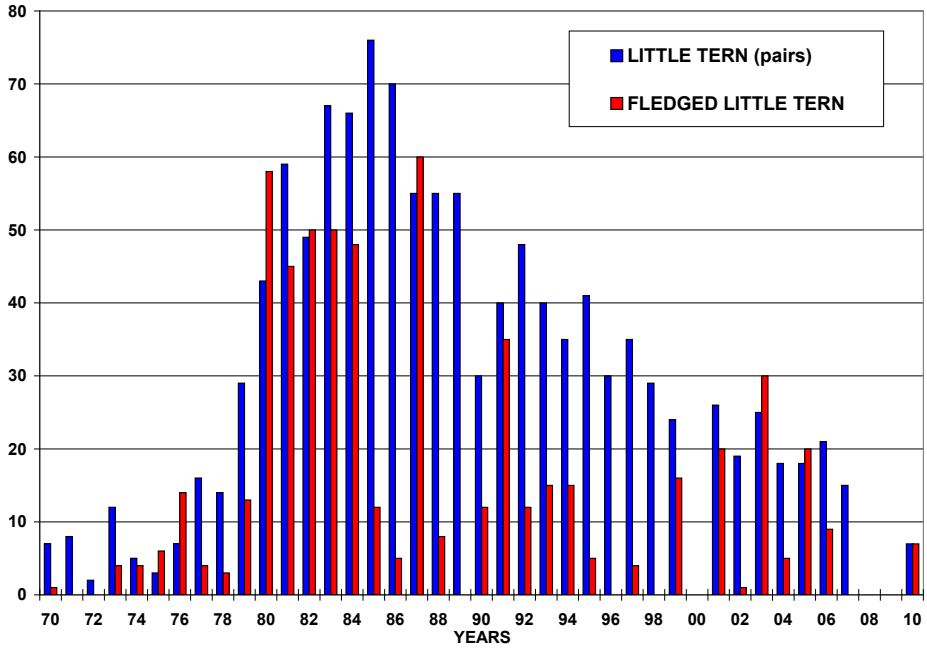

Figure 3. *Little Tern population and productivity at Rye Harbour.*

The persistence of this vulnerable beach-nesting bird at a site that has in excess of 150,000 visitors a year and many foxes and badgers is mainly down to the development of electric fencing since 1978 (see Appendix 1).

The re-colonisation of Rye Bay in 2010, after two blank years, was encouraged by the use of decoys and a sound recording at Rye Harbour Nature Reserve which were positioned at an historic nesting site within the protection of electric fencing.

Common Tern

In 1915 and 1933 there were 1000 pairs reported as nesting on the west beach at Dungeness (and probably did so in the intervening years) (HESN). During the 1940s and 1950s there were repeated reports (HESN) of the declining colony being persecuted by the collection of eggs and an increase in predation. Nesting has been widespread (Figure 4), including at sites up to 2 km inland, and individuals feed at least 8 km inland along the river Rother.

Sandwich Tern

It is thought that Sandwich Terns nested regularly at Dungeness until 1847, but then only single pairs nested in 1896, 1935 and 1939 (Taylor *et al.* 1981). In 1978 seven pairs settled at Dungeness and the colony reached a maximum of 350 by 1985. In 1984 the first two pairs nested at Rye Harbour, but none nested the following year. During the next decade the Rye Bay population moved between the two sites. In 1987 none nested at Dungeness, but 125 did so at Rye Harbour raising at least 50 young, and in the following year the pattern was reversed.

These birds last nested at Dungeness in 1997 and since 2001 there has been a steady increase in the population at Rye Harbour reaching an all-time peak of 750 pairs in 2010 (Figure 5). This represents about 7% of the UK population (Mitchell 2004). During the period 1996-2001 the Rye Bay population was very small and many pairs may have relocated to the adjacent French coast at La Reserve Naturelle du Platier d'Oye (established in 1987), just east of Calais about 80 km east of Dungeness. Since 1996 more than 200 pairs have nested at this French site.

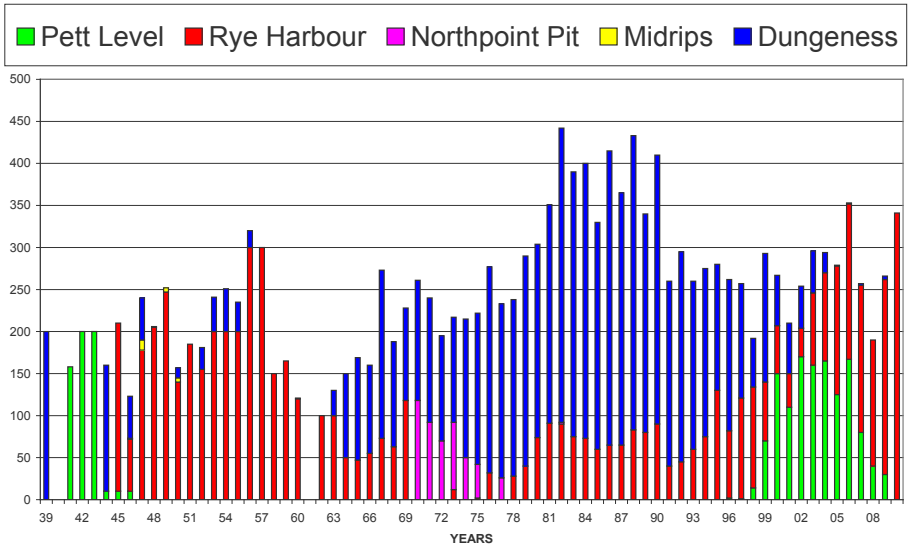

Figure 4. *Common Tern breeding numbers (pairs) in Rye Bay.*

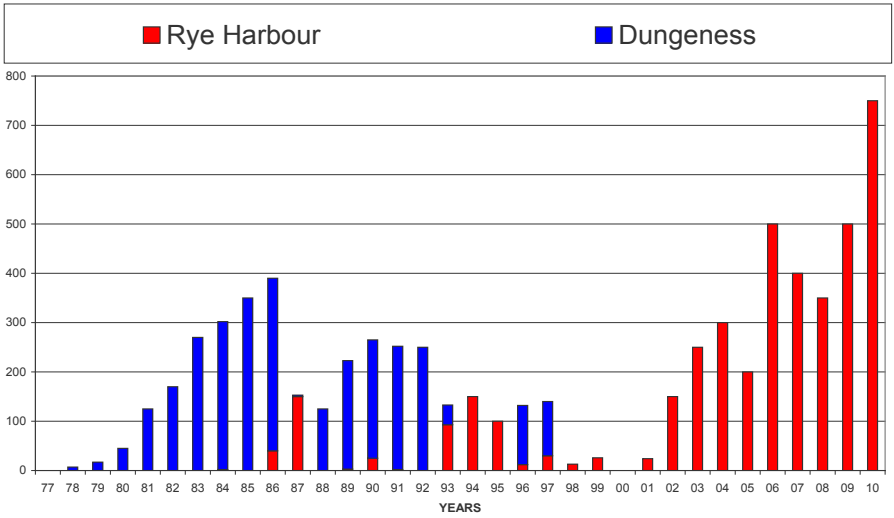

Figure 5. *Sandwich Tern breeding numbers (pairs) in Rye Bay.*

The decline of the Dungeness population may be related to increasing populations of fox, badger and Herring Gull. The rise of the Rye Harbour colony is related to electric fencing controlling foxes and badgers and the control of breeding Herring Gulls by oiling their eggs (under licence).

Sandwich Terns have a large feeding range when breeding and can bring back a single large food item. In 2009 adults were seen fishing east of Dungeness point and heading back with food to the Rye Harbour colony 15 km away.

Arctic Tern

Ticehurst was unable to accept any breeding records of Arctic Tern in Rye Bay, while Harrison (1953) refers to nesting in 1923-28 and again in 1937, but all with some element of doubt (Taylor *et al.* 1981). However, Alexander (1974) also reported and believed these observations of Jack Tart, the RSPB "looker" at Dungeness.

Roseate Tern

Alexander (1974) reported and believed the observations of Jack Tart of Roseate Tern possibly nesting at Dungeness in 1931, 1934, 1935 and 1937. Harrison (1953) reports summering pairs at Dungeness in 1935-37, but with no proof of breeding. Then a pair bred among the Common Terns there in 1976 (Taylor *et al.* 1981). At Rye Harbour there are regular summering birds and occasionally apparent pairs prospecting within the Common Tern colony, so this is a candidate for a new Sussex breeding species!

Black Tern

This tern is not a marine fish feeder, but requires marshy areas with high invertebrate productivity. Ticehurst makes reference to breeding on Romney Marsh until around 1840, with five or six pairs at the Woolpack Fleet in 1883 (Taylor *et al*. 1981).

Des Forges and Harber (1963) stated: "There is no evidence that Black Terns bred in the county [Sussex], though they may well have done so. Nor is there satisfactory evidence that they have done so more recently, though they are said to have bred at Pett Level in 1941 and 1942." From 1941 to 1943 Pett Level was flooded to hamper the threat of military invasion and this created nesting opportunities for Little, Common and Black Terns.

In the 1946 HESN Ticehurst reported: "Mr R. Cooke traced the birds late in May 1941 to a small island in the flood formed by pieces of wood, dead grass and other debris, drifted by the wind and stranded in shallow water. On this the nests were built, eight of them, each containing three eggs. In early June the young were out and later on were seen on the wing until mid-August… In 1942 five pairs returned and nested at the same place... In 1943 seven birds returned again in May but did not stay, probably owing to the great increase in numbers of Black-headed Gulls, which occupied every square foot of the available nesting place. By the spring of 1944 the floods had gone and so any chance of the Black Tern's return had vanished". This was oiginally reported in *British Birds* by Cooke (1946) following a BBC broadcast in January 1945. In the two latest Sussex avifaunas, Shrubb (1979) and James (1996), there is no mention of these possible breeding records.

Non-breeding Terns

The various terneries in Rye Bay provide an attraction for passing rarer terns and a further eight species have been recorded. Many of these records have been at dusk when all terns come ashore to seek a safe roost.

- Bridled Tern: one found dead at Dungeness on 19 Nov 1931, one at Rye Harbour 16-17 May 1993.
- Caspian Tern: very rare vagrant.
- Gull-billed Tern: scarce passage migrant.
- Least Tern: one recorded at Rye Harbour every summer from 1983 to 1992 (Yates 2010).
- Lesser Crested Tern: one at Rye Harbour on 13 May 1986 and 4 May 1998.
- Sooty Tern: one at Rye Harbour and Dungeness on 9 Jul 1984.
- Whiskered Tern: very rare vagrant.
- White-winged Black Tern: scarce passage migrant May-October.

Factors that influence the breeding terns

Food Availability There is no direct measure of the availability of suitable fish (sandeels and other small fish) for the breeding terns, despite this being a major factor in their success. In some years Common and Little Terns have difficulty in finding enough "good" fish and resort to feeding shrimps, prawns and flat fish to their young. Small chicks of Common Terns are often unable to eat the small flat fish that are offered to them by their parents and Little Tern chicks have even been seen begging to a hovering Kestrel at times when food was considered to be scarce (*pers. obs*.). Hungry chicks grow slower and are not so good at hiding, so their chances of fledging are reduced.

Flooding of Pett Level Figures 2 and 4 show significant numbers of Little and Common Terns nesting at Pett Level in 1941-43 and this was enabled by the intentional flooding of the area to deter military invasion, so that the whole area had restricted access. It was at this time that Black Terns were reported nesting there.

Predators In the early 20th century there were fewer tern predators in the Rye Bay area. Ticehurst reported finding a Carrion Crow nest on 3 May 1919, "built near the top of a tall willow by a ditch side in Romney Marsh, a good view being obtained of the bird. This is quite a rare breeding species everywhere in our district…". A second pair on Romney Marsh was noted in 1928! In 1951 Ticehurst summarised the increase of Carrion Crows: "Prior to 1919 it had always been a scarce breeding bird… their numbers were kept under control by keepers and game preservers" (HESN).

Ticehurst also reported that badger records "from Pett, Guestling and Westfield came to our knowledge during 1933" (no mention of any in Rye Bay) (HESN). In 1992 stronger legislation protecting badgers came into force and the number of setts in the Rye Harbour area increased from two to more than 20 by 2010. In the 1990s badgers were known to swim out to islands with nesting terns at Dungeness and Rye Harbour and cause total failure.

Ticehurst reported a fox footprint in snow in Hastings in February 1947! In 1955 "seabird eggs and nestlings have been taken from the shingle along the SE coast" (HESN). In the 1960s organised fox shoots across Dungeness must have contributed to the success of the terneries there. Since the value of a fox pelt declined due to the collapse of the fur industry in the late 1980s, fox populations have increased (*pers. obs*.). In the 1990s at Dungeness, Pett Level and Rye Harbour foxes regularly swam/walked out to islands with nesting terns and caused total failure. Local sheep farmers shoot foxes during the winter and early spring as does the management of Rye Harbour Nature Reserve.

Little Terns are particularly susceptible to Kestrels and it seems that these long-lived predators are able to specialise in catching Little Tern chicks in June and July. This factor is made worse

because there now appear to be very few nesting sites suitable for this tern, not only in Rye Bay, but along the whole of the Kent and Sussex coast. Another raptor that has occasionally taken breeding adults at Rye Harbour is the Hobby, but this has not been annual. In addition, the non-native Little Owl has in some years killed incubating adult and juvenile Little Terns and it is important not to provide nesting sites for owls close to terneries.

Gull Colonies Some birdwatchers consider the very large number of nesting Black-headed Gulls at Rye Harbour (2,600 pairs in 2010) to be a negative factor for the terns, but this is not the case. At Rye Harbour there is a strong correlation between the annual numbers of nesting Sandwich Terns and Black-headed Gulls (coefficient of determination $R^2 = 0.85$, see Figure 6). The corresponding value of R^2 for Common Terns and Black-headed Gulls is 0.81.

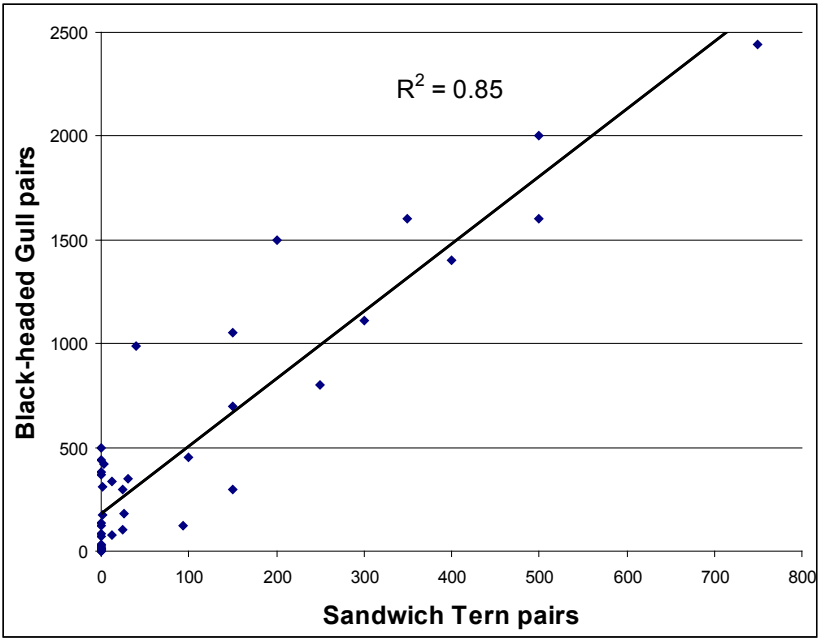

Figure 6. *Correlation between Sandwich Tern and Black-headed Gull populations at Rye Harbour.*

From many years of observing these colonies it is clear that both Common and Sandwich Terns benefit from the protection afforded by Black-headed Gull colonies. When a land or aerial predator approaches there is mass mobbing by the small gulls, which distracts and/or deters the predator. There is some predation of tern eggs or small chicks by the Black-headed Gulls, but this seems to be more than offset by the benefit.

In contrast to this the breeding Herring and Lesser Black-backed Gulls are a real threat to the productivity and survival of the terneries. For example, a Herring Gull nesting close to, or on a Common Tern nesting island will repeatedly remove tern eggs and young, causing total failure of an island after several days (*pers. obs.*). It is worth noting here that at Rye Harbour and Dungeness, the years in which there were large numbers of nesting Herring Gulls were also the years when no or few Common Terns nested. At Rye Harbour the population of these large gulls is controlled under licence from Natural England.

During the last ten years the population of Mediterranean Gulls has increased at Rye Harbour (185 pairs in 2010) and it is becoming clear that these birds do eat eggs and small chicks of both Common and Sandwich Terns (*pers. obs*.). This is more significant than the predation by Black-headed Gulls and it remains to be seen if this becomes a large factor for the tern populations.

When the Sandwich Terns have just fledged, they form groups close to their colony waiting for their parents to bring fish to them. Among these groups there are often adult Black-headed and especially Mediterranean Gulls that wait to ambush the terns and steal the fish (*pers. obs*.).

Establishment of Nature Reserves Nature reserves were established at Dungeness in 1930, Rye Harbour in 1970 and Pett Level in 1986. At these sites the impact of public disturbance and ground predators was reduced by creating islands and/or building fences, controlling some predators and establishing a team of paid and volunteer wardens. Without these efforts it is unlikely that there would have been many breeding terns in Rye Bay during the last forty years.

The Future

With limited tern nesting locations in Kent and Sussex, the Rye Bay area remains nationally important and the tern populations feature in the SSSI and Special Protection Area citations. Assuming that the two main sites remain as nature reserves with undisturbed islands with sparse vegetation, then the future of the Sandwich and Common Tern populations will also depend on:

- The ability to limit the impact of foxes and badgers with islands, fencing and fox shooting.
- There being continued suitable fish stocks in the adjacent sea.
- The formal licensing to limit the numbers of Herring and Great and Lesser Black-backed Gulls nesting successfully in the immediate vicinity of the terneries.

The future of Little Terns does not look so promising. The impact of Kestrels on the very small and localised population has resulted in few years when enough chicks are produced to maintain the population. It would not be surprising if Little Terns no longer nest regularly in Rye Bay by 2020.

However, in the much longer term the coastline of Rye Bay will be changing as the sea level rises. This will threaten the current tern nesting sites at Rye Harbour, but there may also be considerable opportunity for large-scale habitat creation that will benefit the breeding populations of the three main breeding tern species in Rye Bay. The latest Shoreline Management Plan for this coast (Halcrow 2006) makes interesting reading and one only has to consider the great changes that took place at Pett Level during the intentional flooding of the 1940s to see what might happen.

Scientific names of avian species quoted in this paper can be sourced in the Systematic List.

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Appendix 1: Electric Fencing at Rye Harbour

Starting in 1977, the electric fencing on the Beach Reserve was designed to exclude foxes from areas used by ground-nesting birds, especially Little Terns. The original fencing was low budget and consisted of up to 13 horizontal wires powered by battery units, whereas the new fencing includes wire mesh and is powered by a more powerful mains powered unit. This fencing now effectively protects against disturbance and predation from foxes, badgers, people and dogs. Although no fence can be 100% effective against these threats the early fences reduced the pressure and the latest design is more effective. In 2003 and 2004 all of the electric fencing was replaced through the Aggregates Levy Sustainability Fund (Project IW-2002-09) with 7 km of new fence protecting 65 ha of vegetated shingle habitat.

The new fence specification is as follows: Tornado Horse Fencing (HT 13/122/8 = 13 horizontal wires, 122 cm high, 8 cm vertical spacing). Two live wires at the top of the fence bring the height of the fence to 150 cm, and an offset live wire 20 cm out and 10 cm off the ground deters digging. This is supported by posts at 3-m spacings (c.2,300 posts) and each post provides an ideal perch for predatory birds, so each has a 15-cm spike to deter these. The cost was about £7 per metre in 2004.

With this new fencing all ground nesting birds have had greater success and the nesting of Herring and Lesser Black-backed Gulls started away from the islands. There is also permanent electric fencing at Castle Water and Rye Harbour Farm. The electric fencing also encourages high-tide, daytime and nocturnal roosts of several species, including Golden Plover, Curlew, Whimbrel, Oystercatcher, gulls and terns.