



BTO Research Report No. 302

**Assessing The Effects Of
Scaring Starlings Roosting On
Blackpool Piers**

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Report of work carried out by
The British Trust for Ornithology
under contract to
The Environment Agency

October 2002

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1. INTRODUCTION

Beaches at Blackpool are designated as Bathing Waters under European Community directive 76/160/EEC (The 'Bathing Waters Directive'). The Bathing Waters Directive aims to reduce the pollution of bathing water and to protect such water against further deterioration. These waters have failed to comply with the imperative microbiological standards set out in the directive.

Evidence has shown that birds may be a possible source for contaminants found off the Blackpool coastline as they are known to act as carriers of *Salmonella* and *Streptococci*. Research work was carried out in 2001 (Holloway *et al.* 2002) to investigate the possible origin of such contaminants and has been continued in 2002. It was suspected that Starling (*Sturnus vulgaris*) might be a possible source of the contamination.

Anecdotal information suggested that "tens of thousands" of Starlings roosted on the piers at Blackpool in the late summer and early autumn, thereby generating considerable amounts of faecal material. Observations and data collected in 2001 confirmed that large numbers of Starlings roosted on the piers. Large, regular Starling roosts are known to damage plantation trees by either breaking small branches by the sheer weight of the roosting birds and/or smothering all the surfaces with a thick coating of uric acid, which can also kill the tree (Feare 1984). Large roosts on buildings can cause pitting of lime containing stonework, as the calcium carbonate content is dissolved by the acidic nature of the faeces.

In order to assess the significance of the roosting Starlings as a potential source of contaminants, a scaring procedure was instigated by Environment Agency to shift the Starlings from the piers. Data were collected on numbers of birds and the water quality before, during and after the scaring in order to assess the success of the operation.

The objectives of the project were:

- To identify the origins of the roosting Starlings on a broad spatial scale.
- To monitor the number of Starlings at the Blackpool seafront and piers before scaring.
- To observe the behavioural impact of the scaring on the Starlings post scaring and to identify the formation of new roosts.

2. METHODS

2.1 Study Area

Figure 1 shows the survey area comprising a 5 km stretch of the Blackpool seafront incorporating all three piers from the South Pier (Fig. 1(1)), Central Pier (Fig. 1(2)) to the North Pier (Fig. 1(3)) and an area up to 10 km inland from the South-east near Wrea Green (Fig. 1(4)) to the North-east near Whin Lane End (Fig. 1(5)).

2.2 Bird Observations

Prior to the scaring evening observations were made during three days in July and one in August between 1700hrs and dusk (around 2100hrs). During these observations the number of Starlings coming to roost on the piers was recorded. Similarly, morning counts made between dawn (around 0545hrs) and 0830hrs recorded the numbers of Starlings leaving the piers.

The observations on the first evening were made from the top of Blackpool tower (Fig. 1(6)) with the aim of ascertaining the direction of origin and distance the Starlings were travelling before arriving at North Pier. Further counts were made directly at or near the North Pier and the other two piers. Additional information was collected on their timing of arrival and directional movements to the roosts by moving to different locations up to 10 km to the East of Blackpool. Contact was maintained with the use of mobile phones so that all fieldworkers were aware of birds starting to move or sudden influxes. Data collected was plotted on a 1:50,000 OS map (Fig. 1) to give a general impression of the direction in which the birds were travelling.

2.3 Bird scaring

On the advice of Dr Chris Feare scaring was recommended for a period of at least five consecutive evenings with the possibility of an extension for another three evenings. The scaring took place from 20 August through to 24 August inclusive, commencing when the first birds arrived until dusk (approximately 18-2100 hrs). Several teams of four people were deployed to each pier with horns, sirens and playback of Starling alarm calls. Horns were pointed directly at the birds trying to enter the roosts as soon as they were seen by the scarer. This was carried out during low tide periods so that the scarers could be on and under the piers. These methods had been tried and tested on previous scaring operations and Chris Feare was involved to provide advice.

Scaring was not carried out at South Pier during the first night (20 August) due to lack of personnel. The number of birds entering the roosts and their behaviour was recorded during the evenings. Additional counts were made in the morning (0545-0830 hrs) as birds left the roost. These were considered to be more accurate than the evening counts as the birds were not disrupted by the scaring and there was therefore less likelihood of double counting individuals flying to and from the pier in response to the broadcast alarm call.

3. RESULTS

3.1 Bird Observations Before Scaring

Figures 1 and 2 give the general movements and direction of birds to the roosts at the three piers on Blackpool seafront. Table 1 summarises the approximate number of birds recorded at each pier before and after scaring. And includes the data collected before and after scaring on Starling numbers for another BTO project related to monitoring water quality being undertaken on behalf of the Environment Agency.

3.1.1 Movements and directions

The majority of Starlings arrived from a north-east direction, with birds heading in a south-westerly/westerly direction towards the North and Central Piers. Birds were seen to be on a flight path at least 10km inland of the coast and piers. Figure 1 shows the general direction and main area of movement to the North and Central Piers. The southern part of this flight path was east to west from an area north of Weeton camp (Fig. 1(9)), near Staining (Fig. 1(8)), near Stanley Park (Fig. 1(7)), to Central Pier (Fig. 1(2)). The northern part of this flight path was north-east to south-west at Whin Lane End (Fig. 1(12)), north area of Poulton (Fig. 1(11)), Water Tower (Fig. 1(10)), to North Pier (Fig. 1(3)). In this flight path most birds appeared to be moving in the northern part along the Rail line (Fig. 1(13)) and A585 area (Fig. 1(14)) – although this may be slightly biased due to accessibility problems.

The flight path to South Pier could not be as well defined due to fewer birds moving to the pier and hence only an approximate directional movement could be estimated from sightings taken at locations (Fig. 1(17) and (18)) in the adjacent housing estate.

3.1.2 Pre-roosts

No pre-roosts were found and a visit to potential pre-roosting areas such as Stanley Park (Fig. 1(7)) and the zoo (Fig. 1(15)) showed that no birds were present. However several hundred birds were reported to be roosting in the Reed bed and Poplar trees at Marton Mere (Fig. 1(16)).

Birds were also seen sitting on the buildings/roof tops near to North Pier in August. Figure 2 shows these were concentrated inland and north-east of North Pier on the housing estates (Fig. 2(4) and (13)) and on the aerial mast of the Regent court building (Fig. 2(1)).

3.1.3 Pier roosts

The first evening attempted to monitor Starling movements from Blackpool Tower, but it was soon evident that this was too far away from the roosts on the piers, and that only local movements directly onto North Pier could be seen. Birds were difficult to see due to their movements between the buildings and their dark plumage that made them hard to see on the slate grey roof tops. Recording the numbers of birds from this position was not possible. The remainder of the preliminary fieldwork was therefore done from the ground.

Table 1 shows that before the scaring commenced, the majority of the birds were roosting on North Pier (seaward end – Fig. 2(8)) and smaller numbers on Central Pier (Fig. 1(2)) and South Pier (Fig. 1(1)). Fieldwork showed that the first significant flocks of birds (50+) started to arrive at North Pier (Fig. 1(3)) shortly after 1800hrs in July and 1830hrs in August with similar arrival times at Central and South Pier. The weather was however considerably better in the latter month which may account for the later start of the arrivals. Most birds were into the roost at North Pier by 2100hrs in July and 2030hrs in August.

3.2 Bird Observations During Scaring

Figure 3 gives the monthly maximum number of Starling observed at all three piers between May and September 2002 where data was available. Figure 4 includes roost data immediately prior to scaring, during the actual scaring and immediately after the scaring.

3.2.1 Evening 1 – 20.8.2002

3.2.1.1 North Pier

The horns were sounded when the first birds arrived at 1830hrs. This method had an immediate impact on the birds, which were seen to turn away from the North Pier and to head back to the Regent Court building (Fig. 2(1)) and the housing estate immediately behind, sitting on roof tops and aerial masts. By 1900hrs several thousand birds had attempted to roost but had not successfully landed either on or under North Pier. Constant movement back and forth from North Pier to Regent court building occurred between 1900 and 2000hrs. With the incoming tide, scaring was no longer possible from beneath the pier and birds started dropping and gathering on the seaward end. However these birds were not settled in a roost area and continually lifted and swirled around the pier or flew back inland to buildings, after being disturbed by the scarers on the top of the pier. No birds were seen to leave the area completely, but a few moved towards Central Pier. By sunset (2030hrs) 10,000+ were in the general area of North Pier, with birds trying to roost at the inner end where there were no scarers. Starlings were continually going under the pier and being disturbed, but some birds were now entering the pier at their preferred location (seaward end) as in the previous nights, which was made easier with an incoming tide that prevented scaring in this area. By 2050hrs all birds had left the buildings and were settled in the roost.

3.2.1.2 Central Pier

Starlings attempting to roost on Central Pier showed similar behaviour to that outlined above on North Pier. Birds entered all sections of the pier (with concentrations at the Central and seaward sections), and continually moved around to areas under the pier where scaring was not being undertaken. By 2050hrs all birds had left the buildings and were settled in the roost.

3.2.1.3 South Pier

No observations or scaring were carried out at South Pier.

3.2.2 Evening 2 – 21.8.2002

3.2.2.1 North Pier

North Pier again had most birds with a large proportion trying to roost at the inner end due to scaring at the seaward end. Birds were again flocking on buildings around the Regent Court building. Birds were also seen to be moving up from Central Pier (Fig. 2(2)). Counts of evening arrivals at North Pier were now difficult due to scaring procedures, and therefore counts on the following mornings as the birds were leaving the roost gave more accurate figures.

3.2.2.2 Central Pier

Central Pier showed a small decline in numbers and similar behaviour to the previous night.

3.2.2.3 South Pier

Birds began to arrive at South Pier at 1820hrs. Their arrival behaviour was different to that at North and Central Piers, with a steady flow of birds flying in low from between the housing estates

inland. Few birds were seen to arrive in large flocks and at a great height, as occurred at North Pier. These birds were all seen to arrive from an east/south-east direction. Birds were recorded by the minute giving 2,124 birds in 75 minutes (an average of 28 birds/minute). Scaring started at 1935 hrs (due to lack of personnel) so accurate counts after this were not possible but it would be estimated that with a final arrival time of 2030hrs, around 3,000-4,000 birds would have roosted. With the scaring in action, birds from the South Pier settled on buildings inland around the Church (Fig. 2(3)). Scaring stopped at South Pier by 2020hrs and birds immediately roosted beneath the pier.

3.2.3 Evening 3 – 22.8.2002

3.2.3.1 North Pier

The first birds arrived 1842hrs on North Pier - later than normal. Fewer birds were gathering on the Regent Court aerial mast but many more birds were between this building and the Imperial Hotel (Fig. 2(14)) – i.e. area (Fig. 2(4)).

The morning counts of 23 August at North Pier gave a slightly increased figure of 14,500 birds over the previous day, which supported observations that more birds were roosting there than the night of 21 August. This maybe explained by birds arriving from Central Pier, having been moved on by the scaring.

3.2.3.2 Central Pier

Many Starlings were seen gathering on the Police Station aerials (Fig. 2(5)) behind the Central Pier. Between 2010hrs and 2020hrs observations between Central and South Pier (Fig. 2(6)) recorded 1,500-2,000 birds moving between the two piers in either direction (Fig. 2(9)). These could have been birds originating from Central and South Piers and/or birds that may have been returning to both.

Counts at Central Pier on the next morning (23 August) gave a figure of 1,000-1,500 birds, which suggested that birds have gone to either North or South Pier (supported by sightings of interchange between piers).

3.2.3.3 South Pier

South Pier arrivals started at 1915hrs and scaring started immediately. Scarers left the site at 2035hrs at which point many birds flew into the roost. A final effort of using Environment Agency staff on quad bikes (who had just finished collecting water samples) only succeeded in moving birds from one section of the pier to another. An increase in numbers from the previous night could be explained by the interchange between South Pier and Central Pier.

3.2.3.4 Marton Mere

A brief visit to Marton Mere (Fig. 1(16)) (2035hrs) saw no influx of birds from the coastal area and several hundred birds roosting in the reed bed. Birds were heard roosting in the poplar trees scattered across the Marton Mere campsite complex. Accurate numbers were not possible to assess this late in the evening.

3.2.4 Evening 4 – 23.8.2002

No birds arrived at any of the three piers before 1900hrs. Additionally no birds were seen on surrounding buildings or aerial masts before 1900hrs.

3.2.4.1 North Pier

First birds arrived at North Pier at 1920hrs. By 1930hrs c.200 birds were seen flocking above North Pier and some birds seen to fly towards Central Pier. By 1945hrs c.500 birds were circling around North Pier and 1000+ birds were gathering on the Regent Court mast (Fig. 2(1)) and surrounding buildings (Fig. 2(4)). By 2000hrs 5000+ Starlings were gathering in the general area and surrounding buildings. Lots of birds were seen trying to roost at the inner end of North Pier (Fig. 2(7)) while scaring was going ahead at the seaward end (Fig. 2(8)). By 2030hrs 10,000+ birds were trying to roost but an accurate count was difficult. By 2100hrs it was dark but some birds were still seen coming to roost at the seaward of North Pier.

The following morning (24 August) Starlings were observed leaving North Pier roost between 0610hrs-0740hrs, with a count of 11,000-12,000 birds. Of these 1,200+ (10%) left the inner end of the pier (Fig. 2(7)). Eighty birds had roosted on the Obelisque and Metropole Building (Fig. 2(10)) near to North Pier.

3.2.4.2 Central Pier

At 2040hrs between 500-1,000 birds were seen at Central Pier but poor light made viewing difficult. Birds were seen perching on the Police Station aerial behind Central Pier. The morning count (24 August) observed a similar number of birds (1,500) leaving the Central Pier as the previous morning.

3.2.4.3 South Pier

Most birds roosted in the central section of South Pier. The first large flocks arrived at 1900hrs. The scaring stopped at 2050hrs. Several hundred Starlings were seen flying inland after 2000hrs in the direction of Marton Mere and also towards Central Pier (Fig. 2(9)).

3.2.5 Evening 5 – 24.8.2002

3.2.5.1 North Pier

No birds at North Pier at 1830hrs. Quite a large number of birds were seen on the housing estates much further inland and further north than during the previous nights. These were first seen on Warley Road/Devonshire Road junction (Fig. 2(11)) at 1840hrs. These birds gradually moved towards North Pier (Fig. 2(12)) and had reached the housing estate (Fig. 2(13)) by 1920hrs. They moved across the roof tops and occasionally took off in large flocks of up to 5,000 individuals. At 1930hrs the birds flew over Imperial Hotel (Fig. 2(14)) and the estates where they had previously rested (Fig. 2(4)), but on this occasion they proceeded to the Regent Court aerial mast (Fig. 2(1)). By this time scaring had just started on North Pier. By 2000hrs 3,000+ birds were attempting to enter North Pier again, with many at the inner end where there was no scaring.

3.2.5.2 Central Pier

A visit to Central Pier (2020hrs) revealed fewer birds than the previous night. By 2045hrs up to 1000 birds were now at Central Pier and several hundred were sat on the Police Station aerial mast (Fig. 2(5)). These birds remained there for the night and some were seen again in the morning.

3.2.5.3 South Pier

A brief visit to South Pier (2010hrs) revealed c. 500 Starlings, fewer birds than the previous night.

3.2.5.4 Marton Mere

More than 10,000 Starlings were recorded roosting in the Reed bed and Poplar trees at Marton Mere (Fig. 1(16)). Counts of birds leaving North Pier in the morning (25 August 0600hrs – 0745hrs) confirmed that approximately 8,000 were roosting, which supported the increase in numbers at Marton Mere.

After the evening scaring event Blackpool Council made the decision that there was to be no more scaring. Various factors including Health and Safety issues and the cost of staff time to continue the scaring over the bank holiday weekend could not be justified. The numbers of birds at each pier had decreased and Chris Feare suggested that another three evenings of scaring would have continued to see a decline in Starling numbers.

3.2.6 Evening 6 – 25.8.2002

Scaring had now finished but it was considered useful to observe the behaviour of the birds at the piers and Marton Mere. Counts at South Pier in the evening were followed up by counts at North and Central Pier in the morning (26 August) to give an accurate number of birds on all piers.

3.2.6.1 North Pier

No birds were seen to be entering the roost at North Pier before 1900hrs. At 1905hrs no birds were seen at the Warley Road/Devonshire Road junction (Fig. 2(11)) but birds were seen flying over the usual housing estate behind Imperial Hotel (Fig. 2(13)). Shortly afterwards between 500-1,000 birds were feeding on grass around St. Pauls Medical Centre and behind the Hilton Hotel (Fig. 2(15)). All these birds were juveniles. At 1920hrs between 3,000 and 5,000 birds moved out in one flock towards the Imperial Hotel (Fig. 2(14)) and Regent Court (Fig. 2(1)) in the direction of North Pier. By 1925hrs small flocks (40-60 individuals) were trying to enter North Pier at the seaward end (Fig. 2(8)).

Birds appeared agitated and returned to the Regent Court aerial (Fig. 2(1)). Their behaviour was clearly different to that in the pre-scaring period. At 1935hrs 300+ birds were sat on and around the theatre building at the end of the pier. Birds were then seen to start entering the roost in the usual area. Between 1945 and 2000hrs 6,000+ Starlings went into roost in the normal manner. It was noticeable that 1,000+ birds came to the roost from a south-east direction rather than north-east. These could be birds that had originally roosted on Central Pier or South Pier. No birds were seen entering the roost after 2030hrs.

3.2.6.2 Central Pier

At Central Pier several hundred birds were sitting on the Coral Island building along the Promenade and on the aerial behind the police station (Fig. 2(5)).

3.2.6.3 South Pier

At South Pier the first birds (<6) arrived at 1835hrs with the majority of birds in the roost by 2015hrs. As before, most birds entered the central section of the pier.

4. DISCUSSION

The principal aim of this research was to investigate the impact of scaring Starlings from the piers.

North Pier always had the majority of the birds and the removal of the Starlings proved difficult there. It was observed that after several days of scaring there was a clear interchange of birds between North and Central Piers.

4.1 Future Monitoring

Ideally all three roosts should be monitored using simultaneous counts. These counts could be taken either in the evening or in the morning when birds are leaving the roost. It would be advisable to use morning counts as a more reliable figure during the scaring operations due to the potential of duplicate counts of birds that are continually entering and leaving a roost during the evening disturbance.

Observations from the Tower were useful for the first day of the project to ascertain direction of movement. However due to the difficulty in observing birds from a distance, only a short period of time was required at this location during peak movements, and data collected on movements from the ground were just as reliable.

Any future scaring operations need to be sustained until all the birds have been moved away from the piers and carried out during a period that is least disruptive to holiday makers. After five evenings of intensive scaring activity the numbers of Starlings at each pier had reduced significantly. We suggest that at least a further three days would be required to make the Starlings roost elsewhere.

The first evening after scaring had stopped, the numbers of Starlings at North Pier had increased by over 30% from the previous evening. This suggests that the birds may return quickly unless the scaring continues for a period after the birds have gone.

4.2 Conclusions

Scaring had a significant effect on the numbers of Starlings roosting on the piers. Numbers dropped by 50%, 94% and 82% for North, Central and South Pier respectively (Figs. 3 & 4). This drop in numbers was supported by a twentyfold increase in the numbers of Starlings roosting at Marton Mere from approx 500 to 10,000.

Scaring clearly had the desired effect and birds appear to relocate to a natural site. However the long-term success of the operation is as yet unknown. By leaving part of the roost intact birds may be encouraged to return rather than to stay on at another roost. This is supported by the data collected in September, several weeks after the scaring had stopped, that showed the Starlings roosting on North Pier had increased to approximately 16,000, similar to pre-scaring observations.

The roost at the reed bed at Marton Mere would start to disperse as soon as the reeds start to die back with the Starlings either returning to the piers or another location. It is therefore suggested that even if the birds were moved to this area early in the autumn, alternative areas for Starlings to roost may need to be created for the winter. This could be the planting of Leylandii trees (*Cypessus leylandii*) or modifying old buildings and erecting covered aeries for the Starlings to perch on, similar to areas where they already favour roosting or pre-roosting.

Acknowledgements

Thanks are due to the Environment Agency for funding this project, to Blackpool Borough Council for supplying staff to assist with bird scaring and to Blackpool Leisure Parks for allowing us the use of Blackpool Tower for Starling observations.

We would also like to thank Chris Feare for his advice and assistance, Chris Batty for his assistance during the overnight stay in Blackpool Tower and Pete Marsh and Jean Roberts for their observations of Starlings at and around the piers and locating movements further inland.

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	May		June		July			Scaring started	August			Scaring finished	September			
	21/05	22/05	18/06	09/06	22/07	23/07	24/07		19/08	20/08	21/08		22/08	23/08	24/08	25/08
North Pier		6,357		11,168	14,000	12,000	10,500	16-18,000	c. 16,000	12,000	14,500	12,000	8,000	12,000	19,000	
Central Pier	1,714		2,172			6,450		7-9,000	c. 7,000	5,000	4,000	1,200	c. 500	c. 700		550
South Pier						c. 4,000		3-4,000		c. 3,500	c. 2000	1,200	1,500	c. 700		

Table 1. Number of Starlings observed at the Blackpool Piers. During the scaring period the Starlings were counted under difficult conditions.

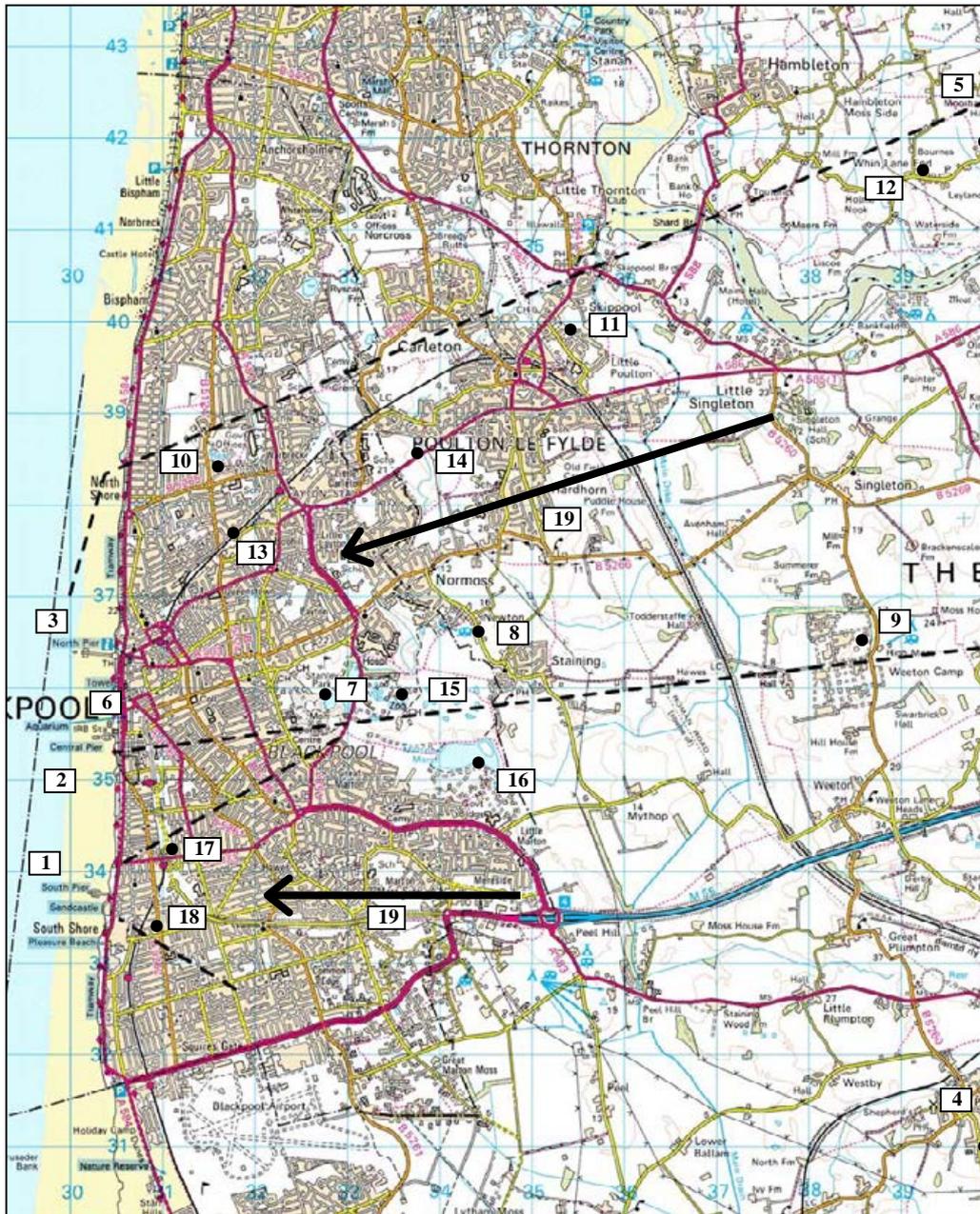


Figure 1. OS 1:50,000 map to show movements and directions of Starlings towards the piers and in the Blackpool area. Numbers referred to in text. 1 = South Pier SD303337; 2 = Central Pier SD303355; 3 = North Pier SD302364; 4 = SE Limit SD4031; 5 = NE Limit SD4042; 6 = Blackpool Tower SD304360; 7 = Stanley Park SD325360; 8 = near Staining SD345365; 9 = Near Weeton Camp SD385365; 10 = Water Tower SD318384; 11 = North of Poulton SD355400; 12 = Whin Lane End area SD393417; 13 = Rail Line SD318377; 14 = A585 area SD337386; 15 = Zoo SD335360; 16 = Marton Mere SD345353; 17 = near rail station South Pier SD309342; 18 = near Church South Pier SD310333; 19 = movement of birds towards piers. Dotted lines and arrows indicate direction of arrival of Starlings to their pier roosts.

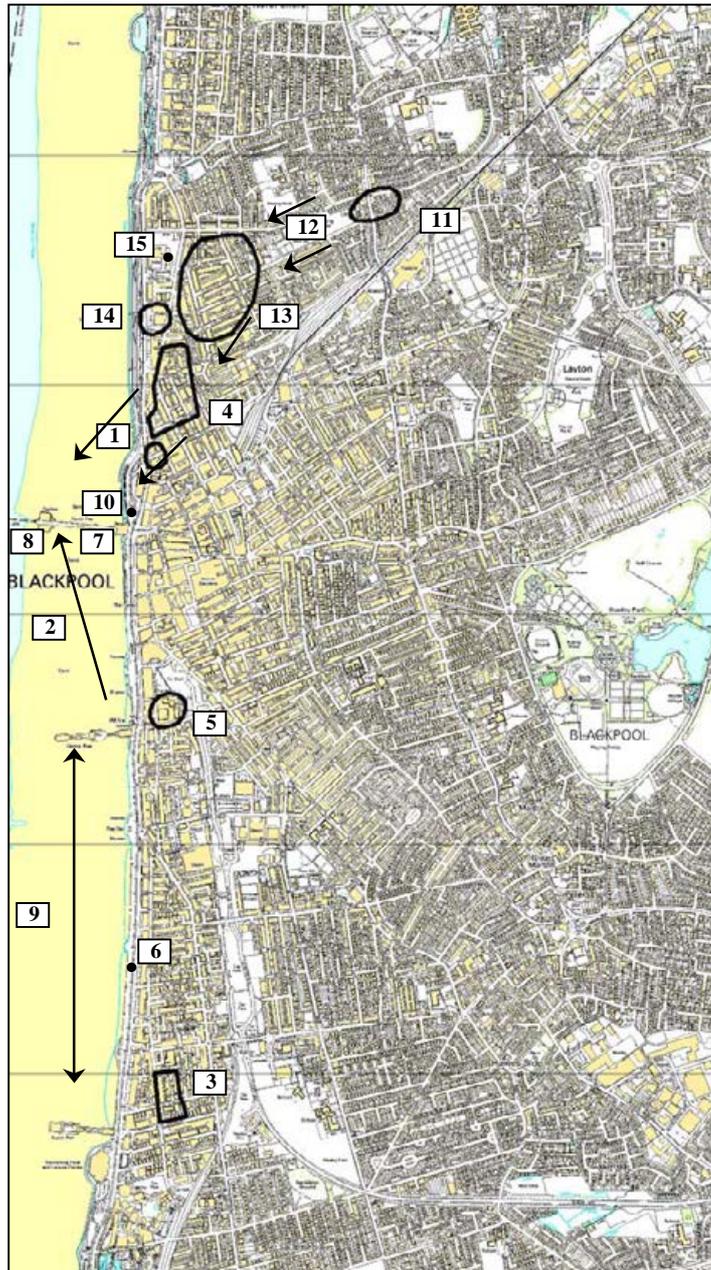


Figure 2. Map to show movements of Starlings at and around the three Blackpool piers. Numbers referred to in text. 1 = Regent Court building; 2 = Direction of movement from Central to North Pier; 3 = Housing estate at South Pier; 4 = Housing estate between Regent Court and Imperial Hotel; 5 = Aerial/Police Station; 6 = Observation point between South and North Pier; 7 = Inner end of North Pier; 8 = Seaward end of North Pier; 9 = Interchange/ movement between South and Central Pier; 10 = Metropole building; 11 = Warley Road/Devonshire Road junction; 12 = Movement towards North Pier; 13 = Housing estate behind Hilton Hotel; 14 = Imperial Hotel; 15 = Hilton Hotel.

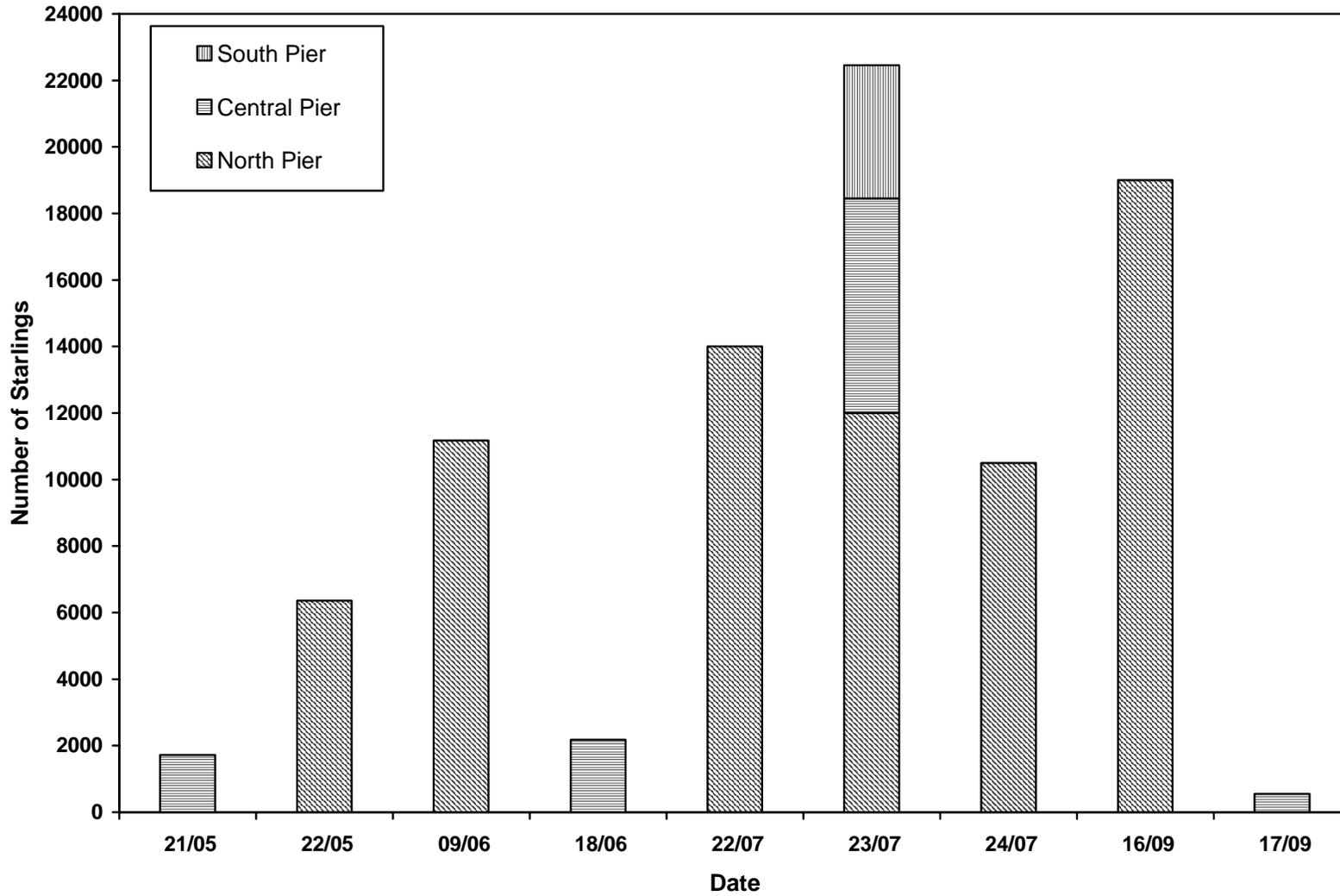


Figure 3. Chart to show the monthly maximum number of Starlings observed at the Blackpool piers between May and September 2002. The Environment Agency undertook Starling roost counts on South Pier between May and September but these were not included.

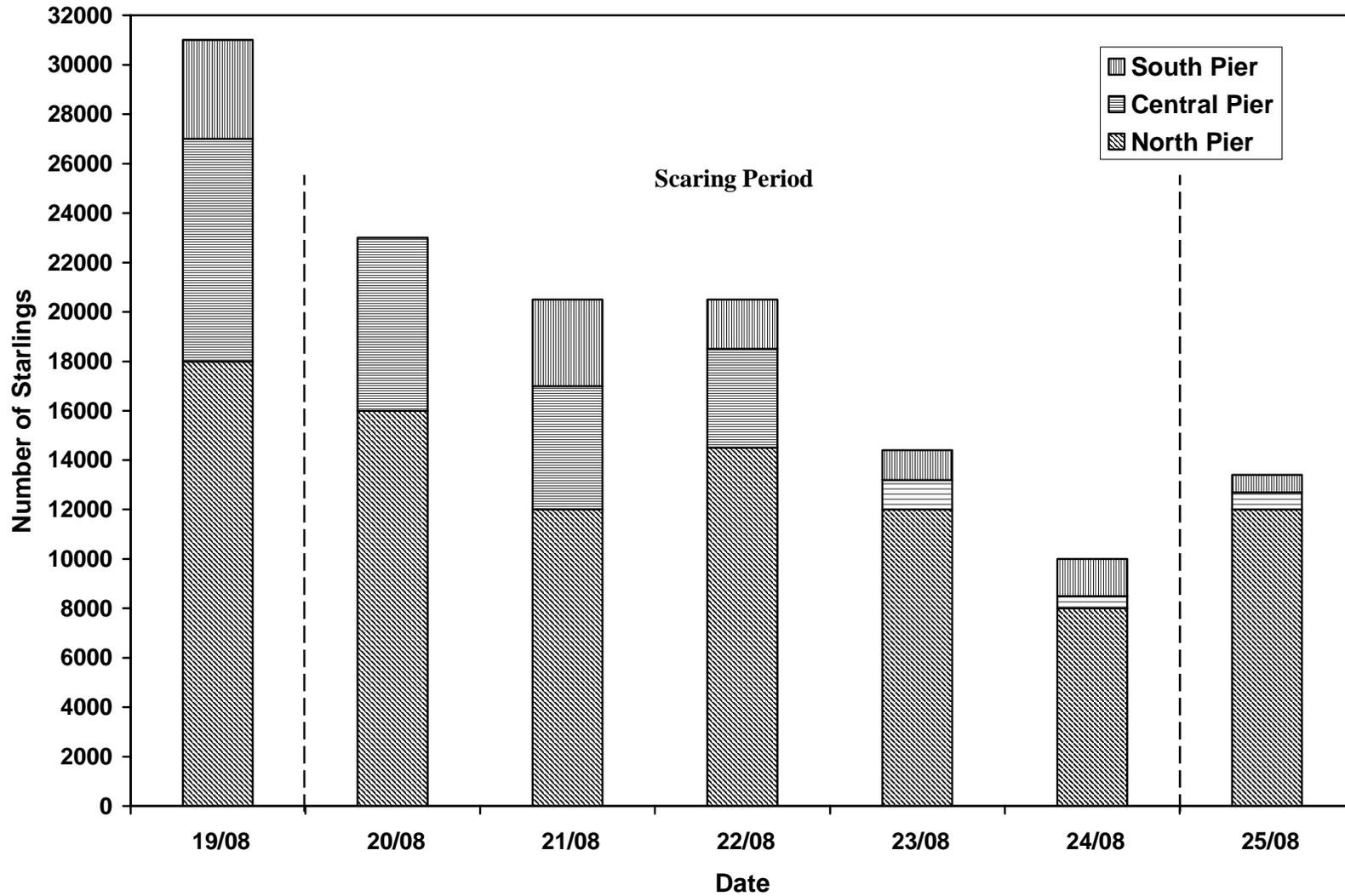


Figure 4. Chart to show the maximum number of Starlings observed at the Blackpool Piers before, during and after the Starling Scaring period.