The Ciconiiformes of Poole Harbour

herons and their allies

Eurasian Spoonbill (*Platalea leucorodia)*

Grey Heron (*Ardea cinerea)*

Little Egret (*Egretta garzetta)*

Eurasian Bittern (*Botaurus stellaris)*

Great White Egret (*Ardea alba)*

Cattle Egret (*Bubulcus ibis)*

November 2016 - April 2018

Nick Hopper

This project was kindly sponsored by Mark Constantine and Birds of Poole Harbour

Contents

Introduction

The Ciconiiformes are an ancient family that first appeared around 130 million years ago, with the first known specimen found in Auxerre, only a few hundred miles south of here. The first Ciconiiformes that we would perhaps recognise today as herons, evolving some 60-38 million years ago.

Although walking through a heronry today you would be forgiven for thinking that you had travelled back to that period. Particularly at a conifer plantation such as Arne. Inside is dark and dank, you are surrounded by a dense undergrowth of tall ferns, pungent from droppings. Sound however most dominates your senses, as a cacophony of loud raucous calling and squawking reverberates around the tops of the trees. You look up to see something truly primitive staring back at you with bare faces, bulging eyes, dagger like bills and wispy half-grown feathers sprouting from the tops of their heads.

The Ciconiiformes regular to Europe are the herons, egrets, bitterns, storks, Glossy Ibis, Eurasian Spoonbill, and Greater flamingo.

Of these species, Poole Harbour now regularly attracts six. Had this survey been conducted 30 years ago, a blink of an eye in historical terms, the species list would have been just one. How things have changed.

Species accounts

Eurasian Spoonbill

Introduction

The Eurasian Spoonbill *Platalea leucorodia* has a wide but fragmented Palearctic distribution, with a breeding range that extends from Europe to China, India and Sri Lanka. The species is migratory throughout its range, except for the populations of Northwest Africa (*P.l.balsaci*) and the Red Sea (*P.l archeri*).

The westernmost 'Atlantic' population *P.l.leucorodia* breeds in Western Europe and migrates along the East Atlantic coast to mainly winter in coastal West Africa. Its current breeding distribution is a relic of a formerly much wider breeding area, the decrease a result of persecution and wetland loss. Recent efforts to reverse this process has been successful, resulting in a significant increase in breeding numbers in the Netherlands and subsequent expansion into Belgium, Germany and Denmark. It has also colonised former breeding areas in France.

Migration routes have also changed. Originally all birds migrated to the Atlantic coast of Mauritania and Senegal, mostly crossing central Spain. Some then began to use a more westerly route to follow the north coast of the Iberian Peninsula to overwinter in the estuaries of NW Spain and Portugal. Presumably, as a consequence of milder winters, some birds are now taking an even more westerly route along the northern coastline of France, with some now stopping off along the way to winter. The last few years have seen a number of pioneering birds now heading straight west, to spend the winter in southern Britain including here in Poole Harbour.

History of Eurasian Spoonbill in Poole Harbour

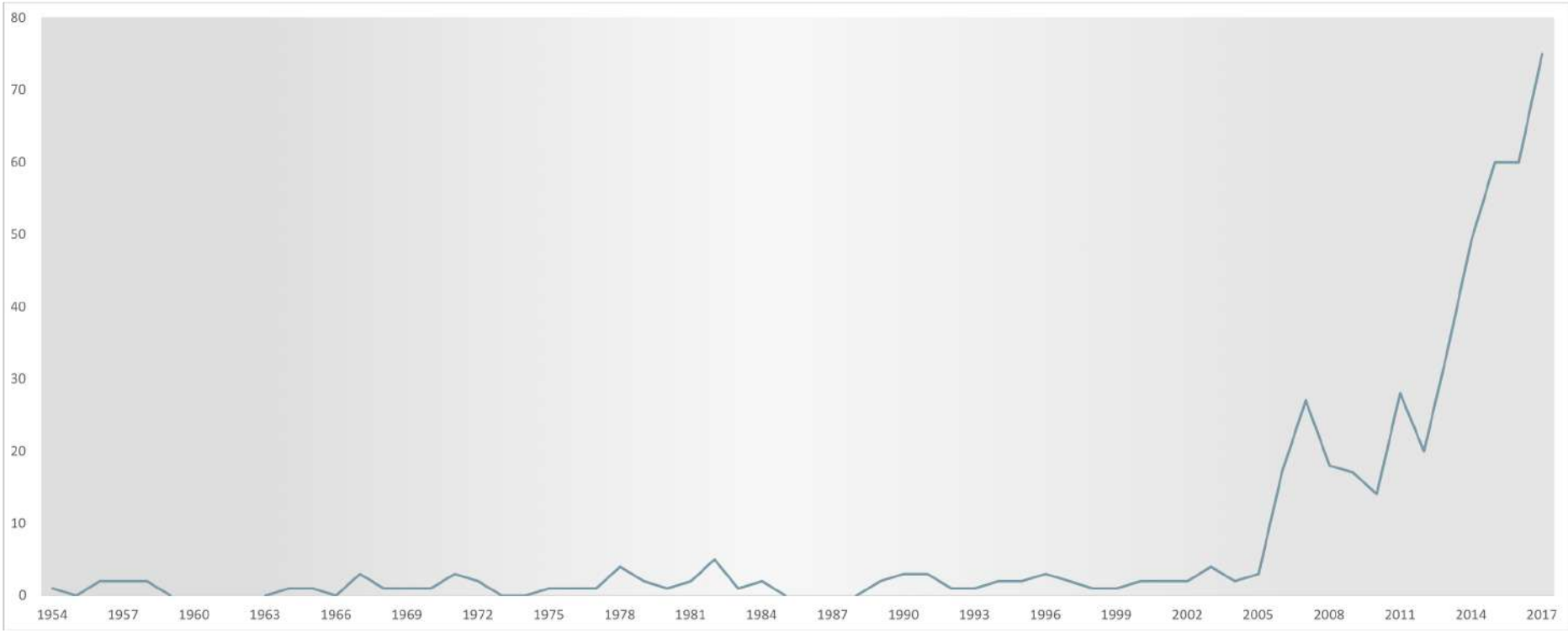
Formerly bred in Southern Britain in the 16th Century, known then as the shovelard. It is assumed that at this time all brackish estuaries were occupied by breeding Spoonbills. Quite possibly including Poole Harbour.

Writing in 1799, Richard Pulteney described Spoonbill as an accidental visitor, being seen 'a few years ago near Poole'. Although in his 1888 work Mansel-Pleydell quotes Pulteney as saying that in his day, 'it was not infrequently to be seen in the neighbourhood of Poole'.
Whatever the situation, there were only three documented records during the 1800's. One was shot in Lytchett Bay in June 1841, one in Poole Harbour in November 1848 and an immature bird shot at Poole in October 1881. Perhaps in reality there were more occurrences; Mr Pike for example mentioned he had seen Spoonbills 'several times in autumn about Poole Harbour and the Corfe division of the estuary and were also occasionally observed in spring'.

Three more birds in 1906, four in 1917 and apparently five birds on December 25th 1938, followed by a few more records in the 50's and 60's. An increase in records in the late 70's and early 80's, followed by four blank years at the end of the 80's until two birds wintered in 1989, since when records have been annual.

The same bird is thought to have been responsible for a series of winter records through the early 90's, until two birds wintered in 1995. Numbers then pottered along with one to three birds being seen each year, until a remarkable count of 17 birds at Bestwall on 9th October 2006 heralded the start of something big!
The following year saw 27 birds, then a bit of a retracement with numbers dropping to 14 in 2010 but rising back to 28 birds in 2011. Thirty-four birds in 2013 were then followed by an even more remarkable run of recorded breaking counts year on year, peaking at 75 in October 2017.

Fig 1. The rise of the Spoonbill in Poole Harbour



Poole Harbour's Population

Today the Spoonbill is a regular passage migrant, winter visitor and occasional summerer, with peak numbers typically occurring in early October.
The lowest numbers are in April and May when the population can sometimes reduce to zero.

This survey was no exception, with the total population peaking on 9th October at 75 birds, (40 at Arne Bay and 35 at Brownsea Lagoon) another UK record following a recent run of record-breaking years. The population also reduced to zero at the beginning of April 2017.

The population size was determined every 10 days by coordinated high tide roost counts. Throughout the survey period there always seemed to be a reason for birds to be on the move, be it migration, the weather or just wanderings, resulting in a regular tweaking of the population. In fact, the the longest period without a change in the size of the population was only five weeks, from early January until early February 2018.

Fig.2. Poole Harbour Spoonbill 10-day period maxima. November 2016 - May 2018.

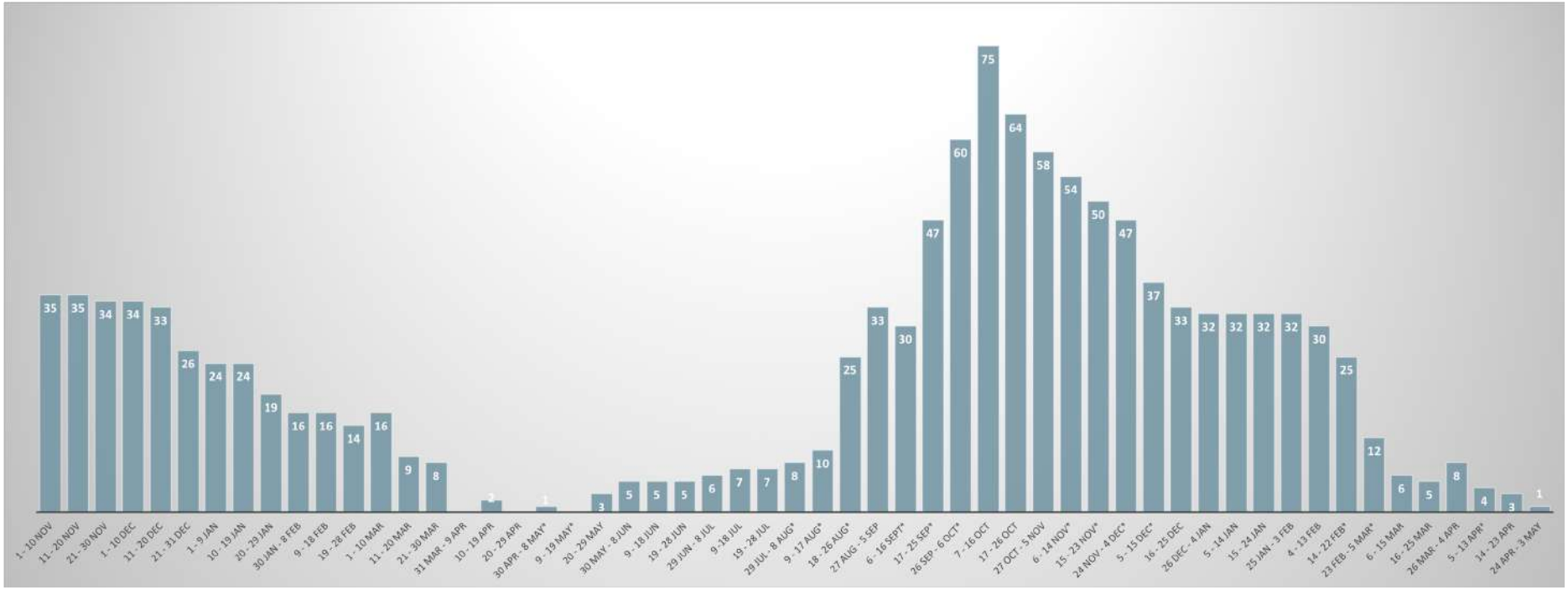


Table 1. Poole Harbour Spoonbill population November 2016 - May 2018.

2016						2017											
1 - 10 Nov	11 - 20 Nov	21 - 30 Nov	1 - 10 Dec	11 - 20 Dec	21 - 31 Dec	1 - 9 Jan	10 - 19 Jan	20 - 29 Jan	30 Jan - 8 Feb	9 - 18 Feb	19 - 28 Feb	1 - 10 Mar	11 - 20 Mar	21 - 30 Mar	31 Mar - 9 Apr	10 - 19 Apr	20 - 29 Apr
35	35	34	34	33	26	24	24	19	16	16	14	16	9	8	0	2	0

2017																	
30 Apr 8 May*	9 - 19 May*	20 - 29 May	30 May - 8 Jun	9 - 18 Jun	19 - 28 Jun	29 Jun - 8 Jul	9 -18 Jul	19 - 28 Jul	29 Jul - 8 Aug*	9 - 17 Aug*	18 - 26 Aug*	27 Aug - 5 Sep	6 - 16 Sept*	17 - 25 Sep*	26 Sep 6 Oct*	7 - 16 Oct	17 - 26 Oct
1	0	3	5	5	5	6	7	7	8	10	25	33	30	47	60	75	64

2017							2018										
27 Oct - 5 Nov	6 - 14 Nov*	15 - 23 Nov*	24 Nov 4 Dec*	5 - 15 Dec*	16 - 25 Dec	26 Dec - 4 Jan	5 - 14 Jan	15 - 24 Jan	25 Jan - 3 Feb	4 - 13 Feb	14 - 22 Feb*	23 Feb 5 Mar*	6 - 15 Mar	16 - 25 Mar	26 Mar - 4 Apr	5 - 13 Apr*	14 - 23 Apr
58	54	50	47	37	33	32	32	32	32	30	25	12	6	5	8	4	3

Thirty-five birds were present from the start of the survey in November. One wandered off toward the end of the month followed by another in early December. A few more departures in December and into January saw the population drop to 19 birds by the end of the month. No sooner had birds finished moving west, five birds leaving in February were presumably heading back east. The 14 remaining birds were then joined by two presumed migrants in March for a short while before they and a few others departed. Still eight birds at the end of March, all leaving together not long after.
A couple of later migrants passed through in mid-April, after which the harbour was Spoonbill-less again. A single bird showed up on 6th May and just as quickly disappeared.

Three immature birds arriving in late May were the first of the 'returners'. These were joined by two more birds in early June until the next arrival, a single bird in mid-July. A trickle of new birds through August until the third week when things got a whole lot busier, with wave after wave of arrivals until a peak count of 75 birds in the second week of October. A week later and the egression had already begun. From then a rather steady departure of birds through November and December, until numbers finally stabilised at 32 birds from early January.

A couple of early leavers in early February followed by five more in the middle of the month. Things are progressing normally until the onset of some very cold weather at the end of the month prompts an exodus of birds. Only five birds saw out the worst of the weather in Poole, staying until late March, with one bird leaving at the end of the month.
In early April, two parties of two birds arrived, temporarily increasing birds present to eight before they moved on. Of the remaining four, two stayed until at least 22nd April with subsequent sightings after this date all involving single birds.

Roosting

Spoonbill will roost by day and by night. This is because of the fundamentally different way they feed, being the only birds in their order that don't primarily locate their prey by sight. Their only consideration is the height of the tide. If it is low tide is during the day they feed in the day, if it is during the night they feed at night. Some literature suggests Spoonbill actually prefer to feed at night, something that was not difficult to believe, given the number of occasions birds were encountered sleeping by day.

All roost data presented refers to daytime observations.

Three main roost sites were identified: Arne Bay, Brownsea Lagoon and Middlebere. Away from these sites, the only other used for roosting with any regularity was Lytchett Fields, although this was probably a consequence of them having been feeding there earlier. In fact, birds could often be found sleeping almost anywhere for short periods of time, nearby to where they had been last feeding, although these were technically naps!

Numbers and importance of the roost site varied throughout the year, although high counts at one site (in any given 10-day period) didn't necessarily correspond to a lower count at another site, with birds often switching roosts within the counting period.

Each site did have independently identifiable trends however, going through periods of high usage and low usage.
Brownsea Lagoon registered the highest count with 64 birds on 17th and 19th October 2017, although both Arne Bay and Middlebere also registered an impressive 56 birds. Arne's count was on 25th October but interestingly Middlebere's high count was a full month earlier on 26th September, which at the time represented the entire harbour population.
From the perspective of an average monthly maximum count, Arne roost came out on top with just under 16 birds, Brownsea second with just under 13 birds and Middlebere third with just under six birds.

Unlike Little Egrets where each roost has a specific (if somewhat slightly overlapping) catchment area, the Spoonbill roost sites had no such areas, with birds flying from anywhere to anywhere. At Wych Channel, for example, birds were regularly seen to fly from here to any of the three high tide roost sites.

Arne Bay

Probably the most famous Spoonbill roost in the country, being on more wildlife programmes than you can shake a stick at. Since Spoonbill records began there have always been birds roosting at Arne Bay spit.

Quite a striking looking bar chart below, with distinct periods of occupation and non-occupation. Apart from a bird spending two days here in early September, no birds were recorded here from late March through until early October when 49 birds then descended on the site.

Fig 3. Arne Bay roost 10-day period maxima

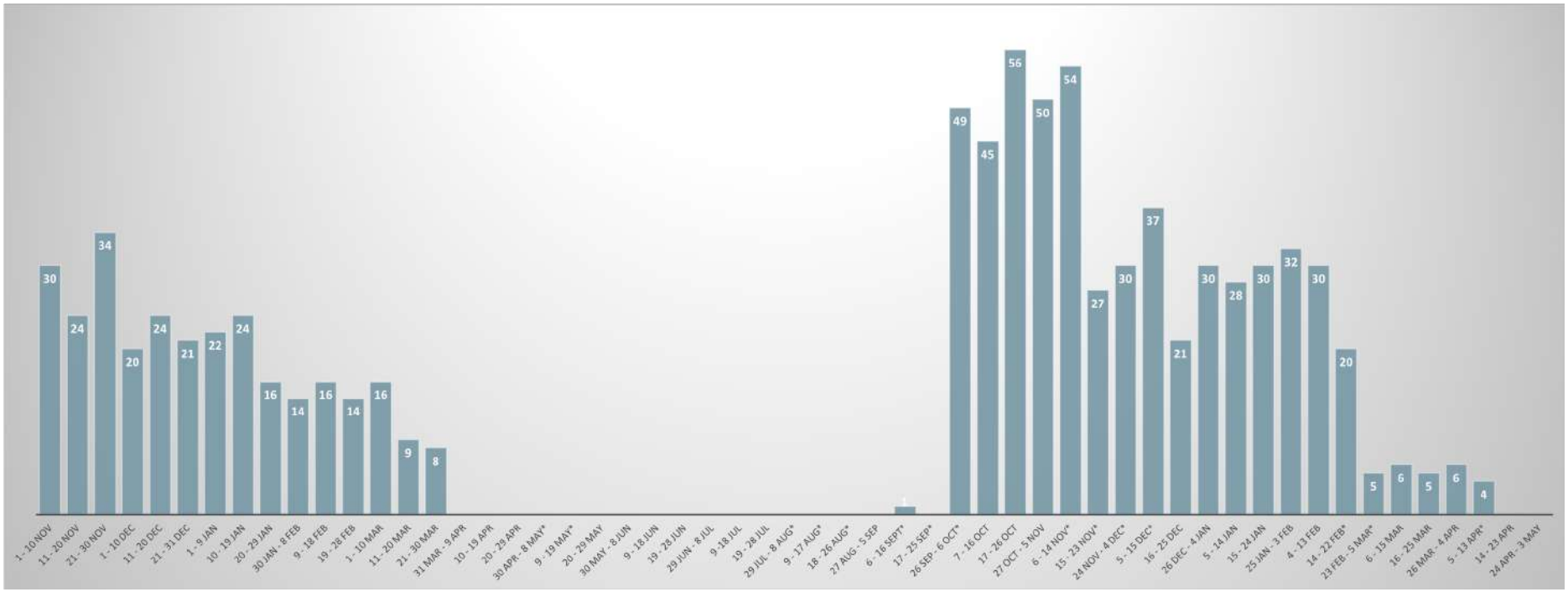


Table 2. Arne Bay roost 10-day period maxima

2016						2017											
1 - 10 Nov	11 - 20 Nov	21 - 30 Nov	1 - 10 Dec	11 - 20 Dec	21 - 31 Dec	1 - 9 Jan	10 - 19 Jan	20 - 29 Jan	30 Jan - 8 Feb	9 - 18 Feb	19 - 28 Feb	1 - 10 Mar	11 - 20 Mar	21 - 30 Mar	31 Mar - 9 Apr	10 - 19 Apr	20 - 29 Apr
30	24	34	20	24	21	22	24	16	14	16	14	16	9	8	0	0	0

2017																	
30 Apr 8 May*	9 - 19 May*	20 - 29 May	30 May - 8 Jun	9 - 18 Jun	19 - 28 Jun	29 Jun - 8 Jul	9 -18 Jul	19 - 28 Jul	29 Jul - 8 Aug*	9 - 17 Aug*	18 - 26 Aug*	27 Aug - 5 Sep	6 - 16 Sept*	17 - 25 Sep*	26 Sep 6 Oct*	7 - 16 Oct	17 - 26 Oct
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	49	45	56

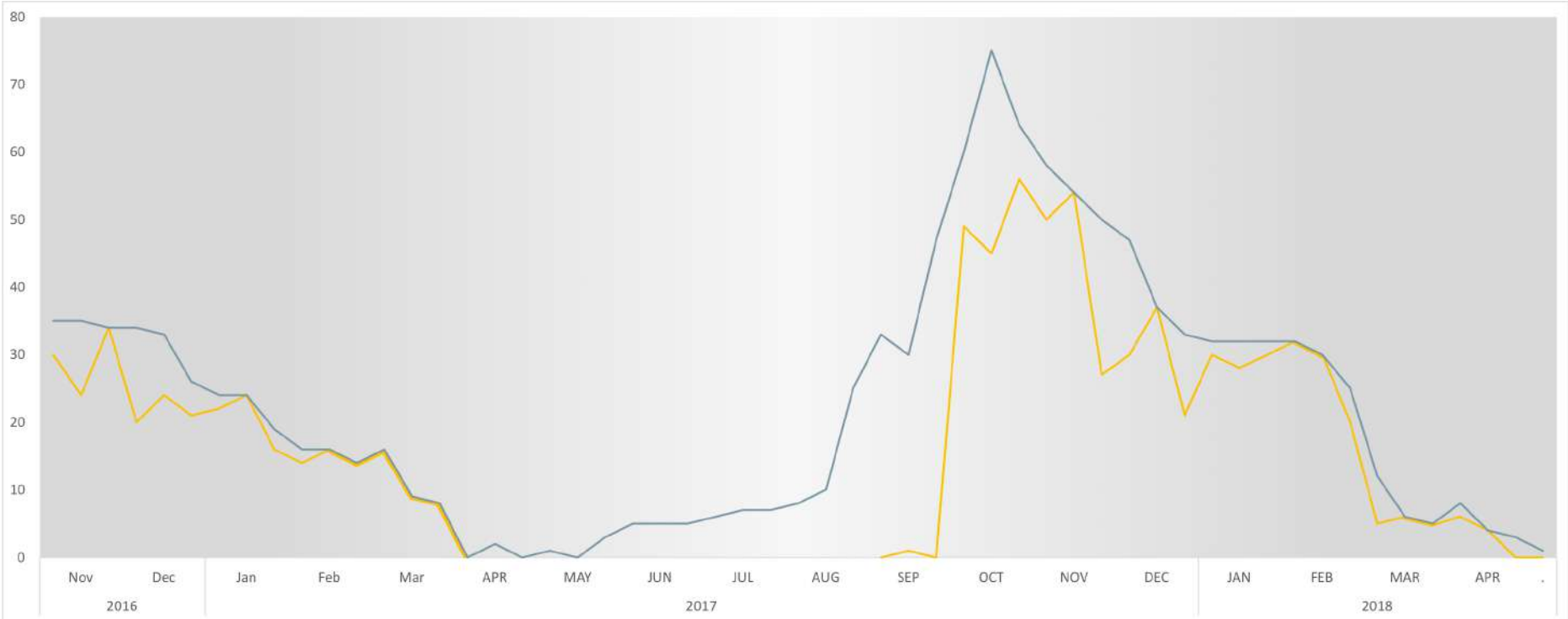
2017							2018										
27 Oct - 5 Nov	6 - 14 Nov*	15 - 23 Nov*	24 Nov 4 Dec*	5 - 15 Dec*	16 - 25 Dec	26 Dec - 4 Jan	5 - 14 Jan	15 - 24 Jan	25 Jan - 3 Feb	4 - 13 Feb	14 - 22 Feb*	23 Feb 5 Mar*	6 - 15 Mar	16 - 25 Mar	26 Mar - 4 Apr	5 - 13 Apr*	14 - 23 Apr
50	54	27	30	37	21	30	28	30	32	30	20	5	6	5	6	4	0

Around 30 birds were using the roost at the start of the survey in November. Numbers drop in December to fluctuate between 20-25 until mid-January. A few birds began to drift away toward the end of the month leaving 14-16 birds February into early March. Just eight to nine birds for the rest of March with the last eight leaving together at the end of the month.

Despite the presence of a significant number of birds in other parts the harbour throughout September, none, apart from one independently minded bird, ventures to Arne until early October, when the whole population suddenly appears. A few more arrivals in October culminating in a high count of 56 birds on the 25th. During November over half of these birds switched roost allegiance again, leaving a regular 20-30 birds to use the site through the winter. That was until the very cold spell at the end of the month which triggered a departure, leaving just five to six birds here from early March. Still four birds present into April before they finally moved on in the middle of the month.

The chart below shows the numbers of birds using Arne Bay roost in relation to the total harbour population at the time.

Fig 4. Arne Bay roost numbers compared to total harbour population



Brownsea Lagoon

Probably the second most famous Spoonbill roost in the country, being on slightly fewer wildlife programmes than you can shake a stick at. Since Spoonbill records began there have always been birds roosting at Brownsea Lagoon.
The highest count of the survey was recorded here, with 64 birds on 17th October.

Fig 5. Brownsea Lagoon roost 10-day period maxima

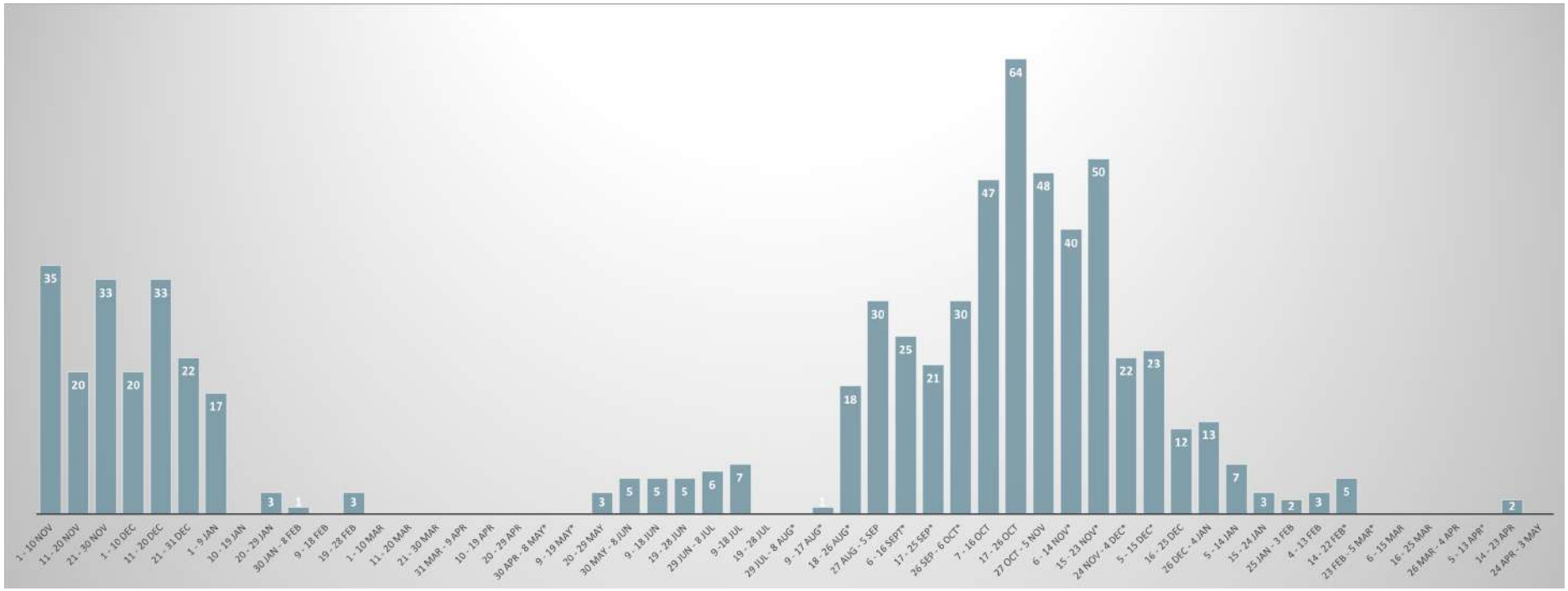


Table 3. Brownsea Lagoon roost 10-day period maxima

2016						2017											
1 - 10 Nov	11 - 20 Nov	21 - 30 Nov	1 - 10 Dec	11 - 20 Dec	21 - 31 Dec	1 - 9 Jan	10 - 19 Jan	20 - 29 Jan	30 Jan - 8 Feb	9 - 18 Feb	19 - 28 Feb	1 - 10 Mar	11 - 20 Mar	21 - 30 Mar	31 Mar - 9 Apr	10 - 19 Apr	20 - 29 Apr
35	20	33	20	33	22	17	0	3	1	0	3	0	0	0	0	0	0

2017																	
30 Apr 8 May*	9 - 19 May*	20 - 29 May	30 May - 8 Jun	9 - 18 Jun	19 - 28 Jun	29 Jun - 8 Jul	9 -18 Jul	19 - 28 Jul	29 Jul - 8 Aug*	9 - 17 Aug*	18 - 26 Aug*	27 Aug - 5 Sep	6 - 16 Sept*	17 - 25 Sep*	26 Sep 6 Oct*	7 - 16 Oct	17 - 26 Oct
0	0	3	5	5	5	6	7	0	0	1	18	30	25	21	30	47	64

2017							2018										
27 Oct - 5 Nov	6 - 14 Nov*	15 - 23 Nov*	24 Nov 4 Dec*	5 - 15 Dec*	16 - 25 Dec	26 Dec - 4 Jan	5 - 14 Jan	15 - 24 Jan	25 Jan - 3 Feb	4 - 13 Feb	14 - 22 Feb*	23 Feb 5 Mar*	6 - 15 Mar	16 - 25 Mar	26 Mar - 4 Apr	5 - 13 Apr*	14 - 23 Apr
48	40	50	22	23	12	13	7	3	2	3	5	0	0	0	0	0	2

Fluctuating counts of between 20 and 35 birds for the first period of the survey until the middle of December. Numbers then begin to decline with successively lower counts until the second week of January when they reach zero. After that, just the odd visitor in the second half of January and February, then nothing for nearly three months.

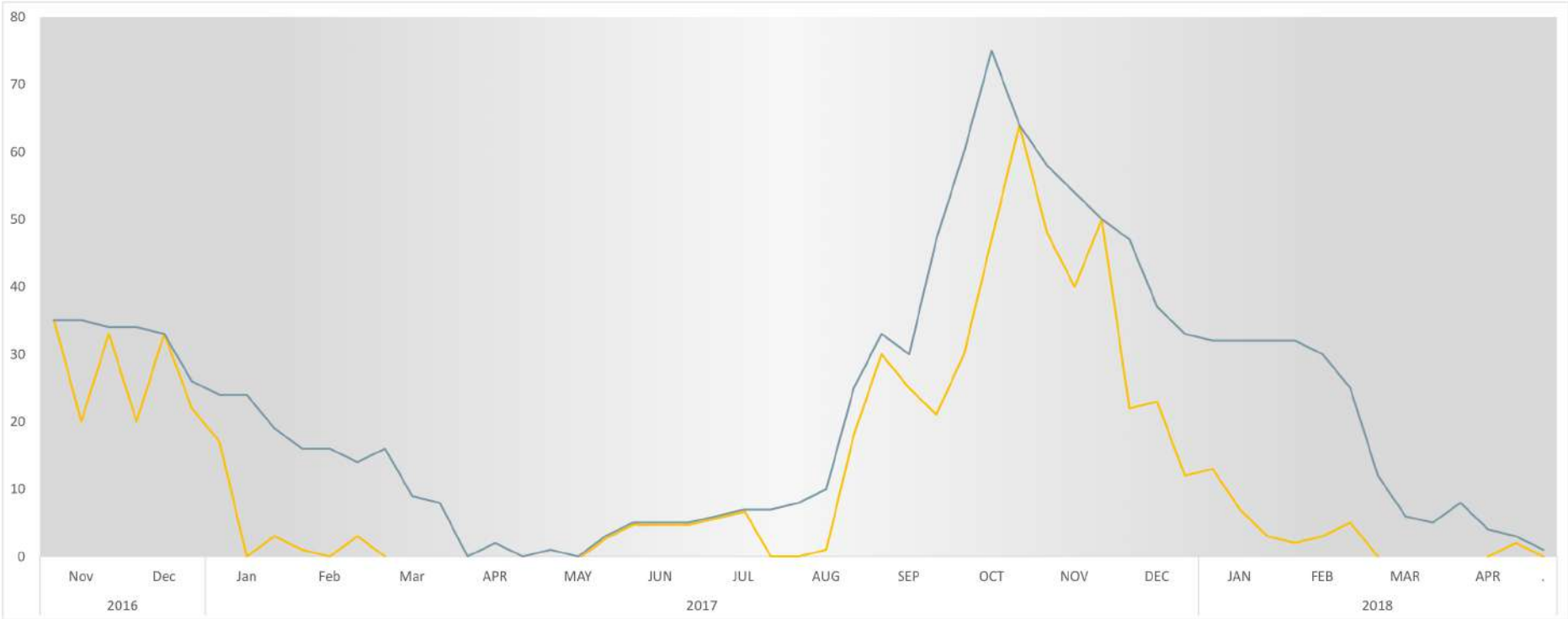
Due to its location on the far eastern side of the harbour, Brownsea typically receives the first incoming Spoonbills. This was the case during this survey when three immature birds turned up on 25th May. They were joined by two more immature birds on 3rd June and from then until early July the 'famous five' had the harbour to themselves. Not that they went on many adventures however, remaining on Brownsea Island for much of their stay apart from when they visited Lytchett Fields pools.

On 26th June a note in the Brownsea log: 'Five Spoonbill...spending most of the day asleep as usual'. In fairness, this was during a period of daytime spring high tides when water levels were high for most of the day. By night they would have been out feeding.

A sixth bird arrived on 3rd July and joined up with the group. By mid-July however, Brownsea Lagoon had lost its lustre and all had moved on.
On 23rd August, the first two arrivals of the next wave of birds turned up. Followed by plenty more. A slight retracement of numbers in the middle of September, as some of the birds moved straight through, but numbers soon rising again as more and more birds turned up. The highest count eventually reaching 64 on 17th October, a UK single group record. Some impressive numbers continue until mid-November, but from then the trend was downward all the way, reaching zero in mid-February. The only other records after that being two passage birds in mid-April.

The chart below shows the numbers of birds using Brownsea Lagoon in relation to the total harbour population at the time.

Fig 6. Brownsea Lagoon roost numbers compared to total harbour population



As can be seen from the chart, Brownsea could quite regularly host a significant proportion of, if not all of the harbour population at the time.
There were also periods when the site was quite out of favour, most particularly the winter months, from mid-December in the first winter and from mid-November in the second winter period through until April.

Middlebere

Fig 7. Middlebere roost 10-day period maxima

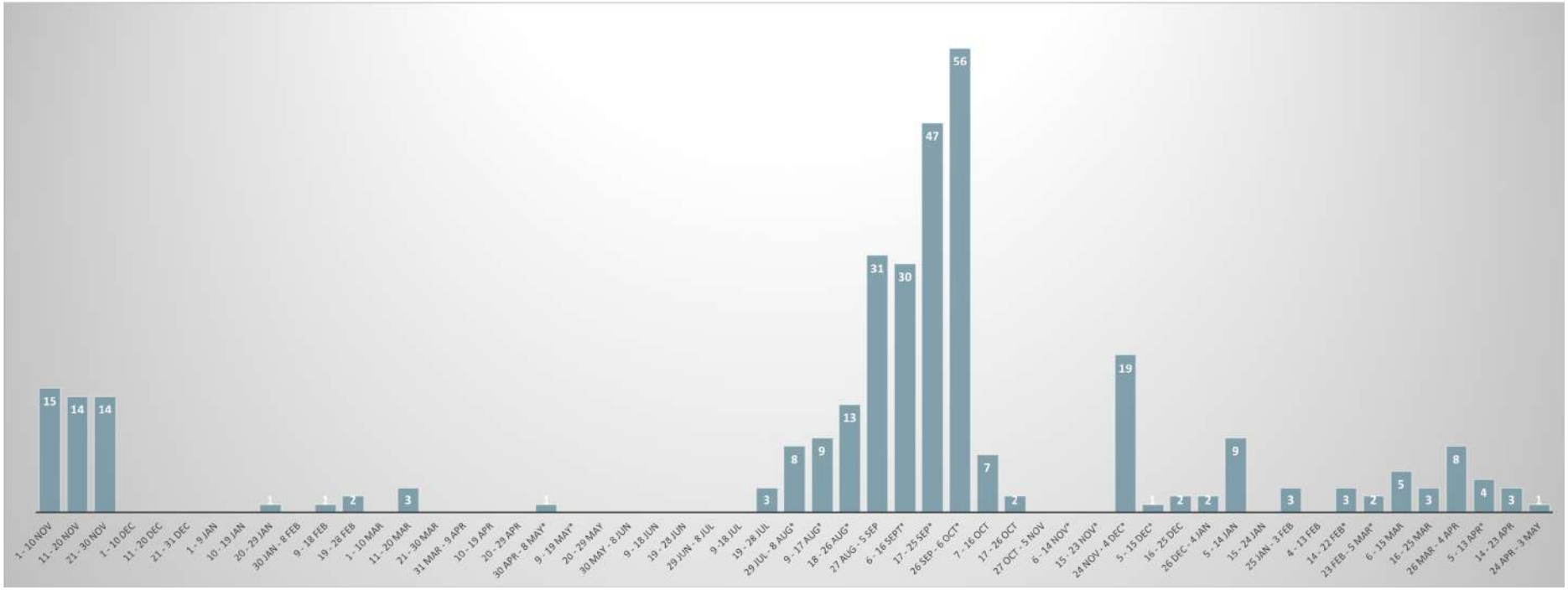


Table 4. Middlebere roost 10-day period maxima

2016						2017											
1 - 10 Nov	11 - 20 Nov	21 - 30 Nov	1 - 10 Dec	11 - 20 Dec	21 - 31 Dec	1 - 9 Jan	10 - 19 Jan	20 - 29 Jan	30 Jan - 8 Feb	9 - 18 Feb	19 - 28 Feb	1 - 10 Mar	11 - 20 Mar	21 - 30 Mar	31 Mar - 9 Apr	10 - 19 Apr	20 - 29 Apr
15	14	14	0	0	0	0	0	1	0	1	2	0	3	0	0	0	0

2017																	
30 Apr 8 May*	9 - 19 May*	20 - 29 May	30 May - 8 Jun	9 - 18 Jun	19 - 28 Jun	29 Jun - 8 Jul	9 -18 Jul	19 - 28 Jul	29 Jul - 8 Aug*	9 - 17 Aug*	18 - 26 Aug*	27 Aug - 5 Sep	6 - 16 Sept*	17 - 25 Sep*	26 Sep 6 Oct*	7 - 16 Oct	17 - 26 Oct
1	0	0	0	0	0	0	0	3	8	9	13	31	30	46	56	7	2

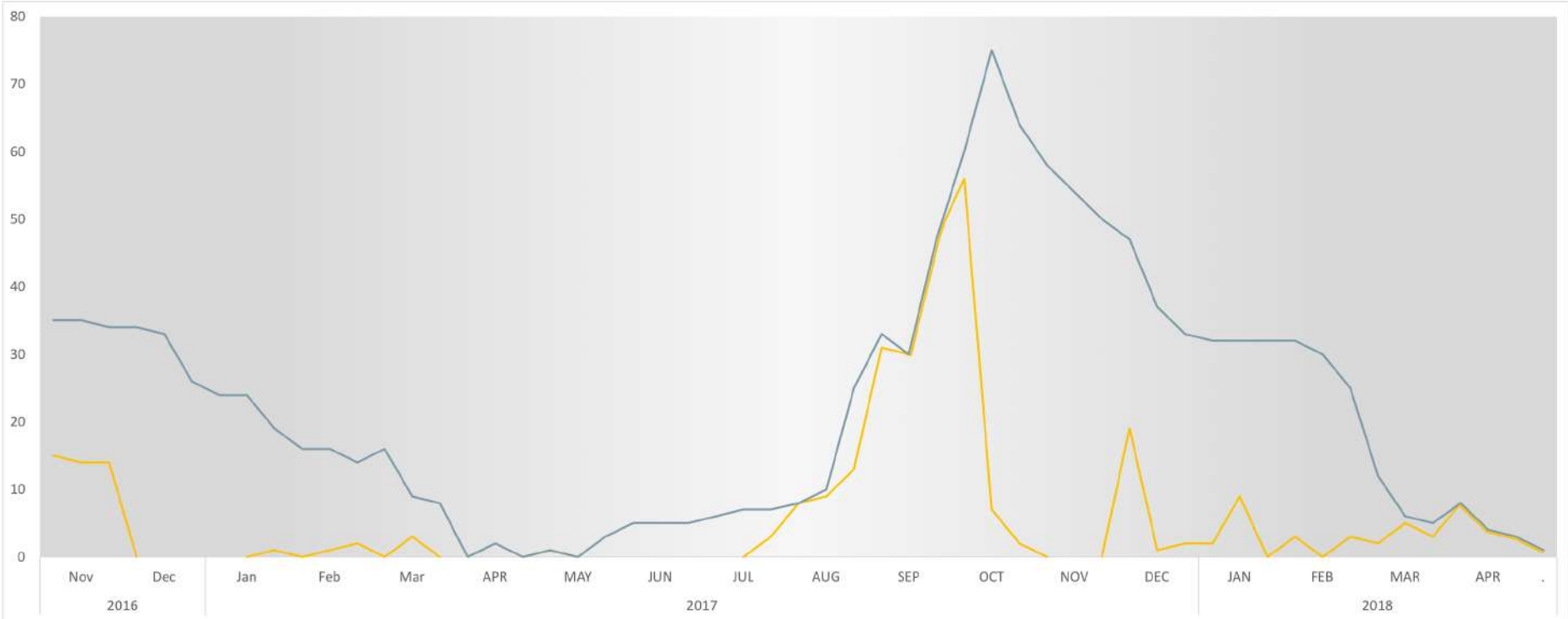
2017							2018										
27 Oct - 5 Nov	6 - 14 Nov*	15 - 23 Nov*	24 Nov 4 Dec*	5 - 15 Dec*	16 - 25 Dec	26 Dec - 4 Jan	5 - 14 Jan	15 - 24 Jan	25 Jan - 3 Feb	4 - 13 Feb	14 - 22 Feb*	23 Feb 5 Mar*	6 - 15 Mar	16 - 25 Mar	26 Mar - 4 Apr	5 - 13 Apr*	14 - 23 Apr
0	0	0	19	1	2	2	9	0	3	0	3	2	5	3	8	4	3

Fifteen birds were using the roost at the start of the survey in November. These moved to another roost site in December and from then through until mid-July the site was hardly used. A few birds in February and March, presumably related to passage birds. Two arrivals on 19th July proved to be the vanguard of the autumn influx, with numbers then rising steadily through August before a couple of large arrivals in September took the number of birds to 56 on 26th September. They were short stayers, however, and in the next few days the numbers dropped considerably. Just 38 birds the following day, 20 the day after and 11 birds two days after that. Still seven birds until mid-October, with these moving on toward the end of the month.
A group of 19 birds appeared in early December but just as quickly disappeared again, after which very small numbers on and off until the end of April.

It is clear why Brownsea Lagoon and the spit at Arne are attractive places to roost. It is not so clear as to the advantage of the west end of the Middlebere Channel, with seemingly plenty of other such places of a similar nature in the harbour.

Middlebere is one of the last sites to be inundated by the rising tide. Consequently, it is also one of the first places to have shallow water again, which is a possible advantage, although by the time the birds arrive here to roost they have already done plenty of feeding. Salterns and Slepe Moor is a popular high tide feeding area, which could be a factor, but as we have seen, distance to sites doesn't seem to be a consideration.

Fig 8. Middlebere roost numbers compared to total harbour population



Middlebere, on average, is some way behind Arne and Brownsea in terms of proportions of the harbour population using the site. It is however, the most important site between the end of July and late September, with all of the harbour birds choosing to roost here during this period. As we have seen earlier, this was largely at the expense of Arne which had no birds at this time. Arne, however, had the last laugh in mid-October when all of these birds rather abruptly deserted the site in favour of Arne.
The only other time a significant proportion of the population uses Middlebere is during March and April 2018, although actual numbers are very small.

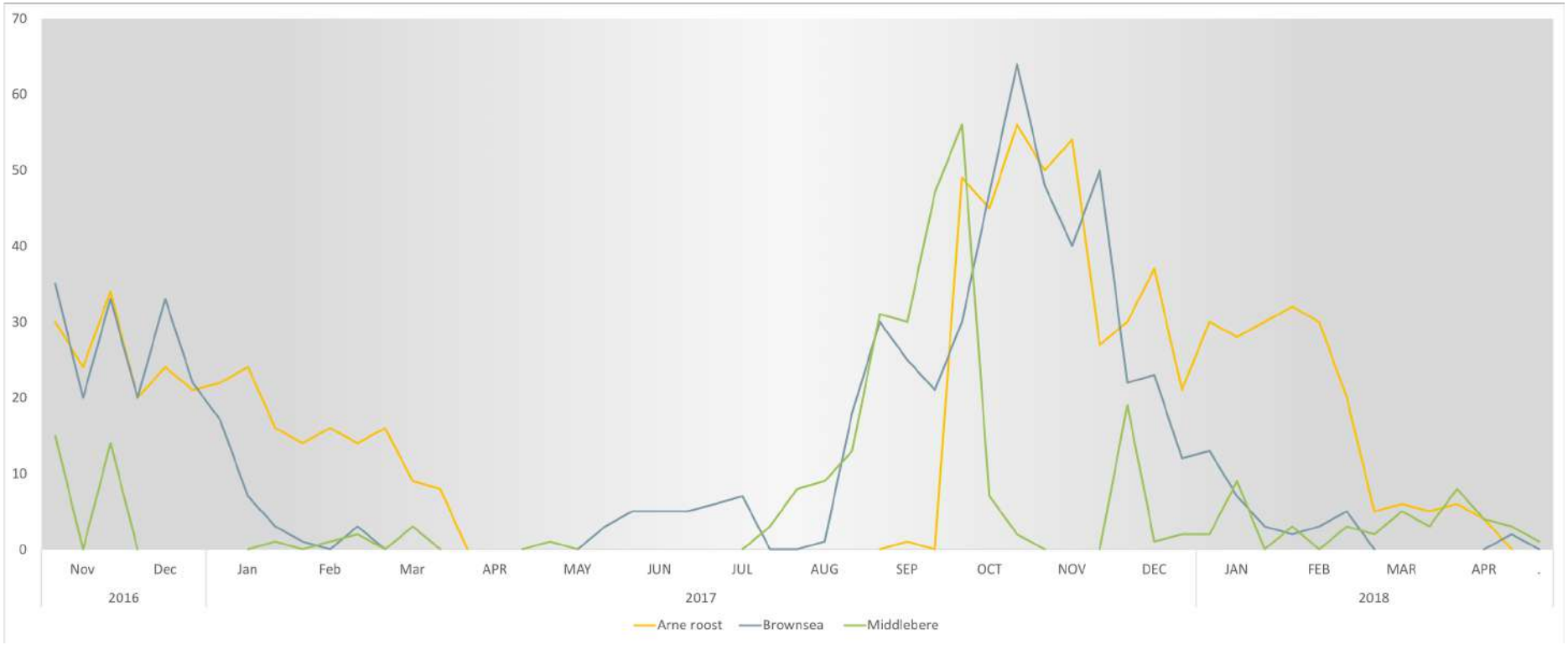
On arrival, all birds initially landed on a chosen area of exposed intertidal mud. From then, some settled down to preen while others wandered off to the channels to feed. Some 'preeners' could then later decide to feed and some feeding birds could take breaks to preen. Some birds preened each other. Some went straight to sleep.
As the channel filled up with water, a few could wander up the creeks, but most would now be standing together on the last vestiges of mud, watching the tide start to flow around their ankles. Fast forward and the same birds are still there with the water now lapping at their bellies and tails dipping in the water, until one bird finally cracks and takes off for the *Spartina* bank. The distance is often very short, but in order for the bird to effect a safe landing it is compelled to gain height, circle and then come back around to land in the usual fashion by dropping in at a height. Here the high tide is then seen out.

Correspondingly, some feeding could also occur at the other side of high tide, as it dropped to levels low enough for their liking. Rather than flying, they now only had to step off the *Spartina* bank and walk. Typically however, these feeding times were relatively short, before birds departed for their primary feeding areas.

For a time, a particular bird regularly fed at the little pond directly outside the hide, affording great photographic opportunities (next to the Kingfisher on a strategically placed stick) for the many people happy to sit there all day taking up the seating.

Roost site usage compared

Fig 9. Arne, Brownsea and Middlebere roost sites compared



Low tide feeding

Watching a flock of Spoonbill feeding in unison is one of the delights of Poole Harbour.
Having said that, most visitors have to be content with a group of tightly bunched birds, all hunched up together asleep, the main feeding areas often being at some distance or having restricted access.

The Wareham Channel was the most important of these, consistently hosting the largest feeding flocks. It attracted birds in every calendar month during the survey, even when the population was just one. The highest count reached was 44 birds.
The next most regularly visited site was the Wych Channel area to also include just north of Fitzworth point. The highest count recorded here was 38 birds.

In fact, all the important feeding sites were in the western half of the Poole Harbour.

Fig 10. Spoonbill feeding areas by relative use (darkest areas most used)

One can say from the map that, in the absolute strictest sense, the western half of the harbour was the most important, with all of the most regularly used sites extending no further east than a line through the centre point of the harbour. An arbitrary line in reality and just a quirk of coincidence in its exactness, but the overall picture of the dominance of the western half is clear.

Wareham Channel

As mentioned, the Wareham Channel was by far the most important feeding site in the harbour, consistently hosting the largest feeding flocks; of which the largest of those was 44 on 10th November 2017. The second largest gathering was 43 birds on 4th November 2017.

Fig 11. Wareham Channel monthly feeding maxima

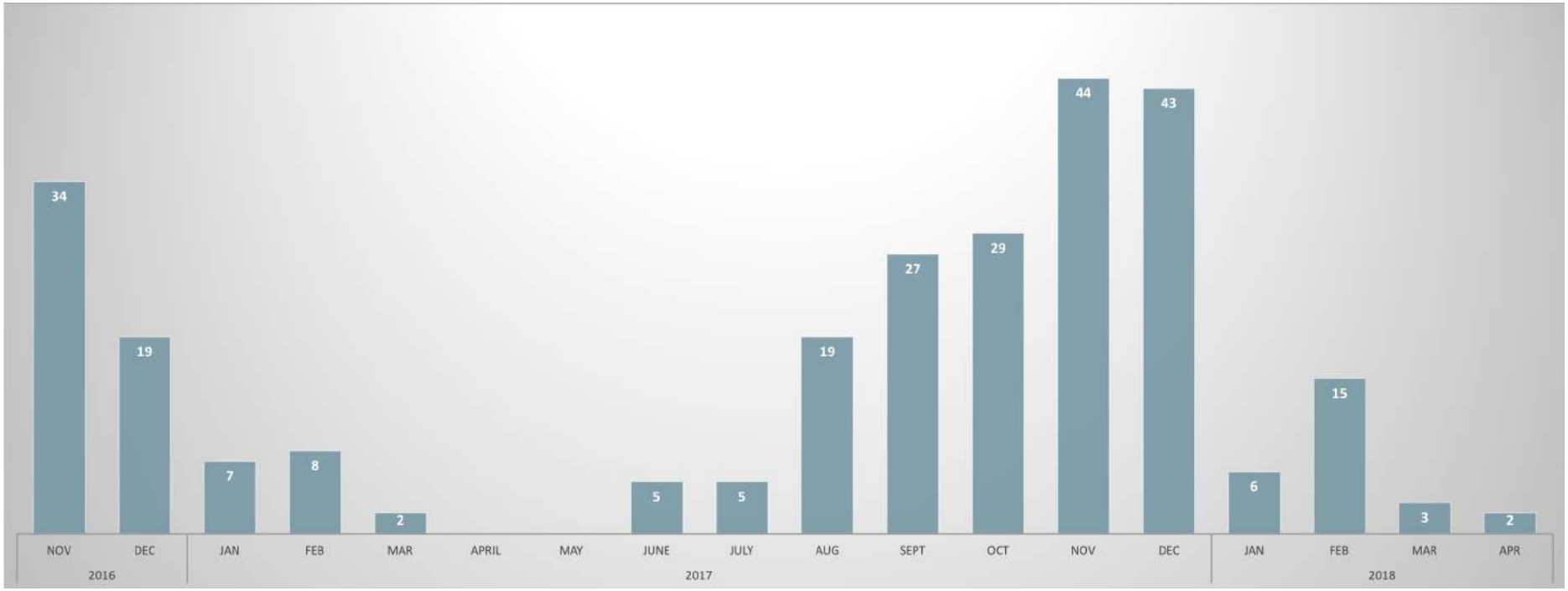


Table 5. Wareham Channel monthly feeding maxima

2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
34	19	7	8	2	0	0	5	5	19	27	29	44	43	6	15	3	2

At low tides Spoonbill love to work channels, and the Wareham Channel area certainly provides channels. As well as the main channel there are also a number of tributary channels, particularly in the central part of the area on the eastern side, offering a whole range of water depths. This area became one of the most regularly frequented.

Feeding was by no means limited to the channel however. Before the tides were low enough for these to form, any area of suitable water depth would be used, with birds tending to follow these ever-shifting shallow areas with the tides.

At the start of the survey in November, the high count of 34 birds represented all bar one of the total population of the harbour.
As the population decreased the proportion of that population using the Wareham Channel also decreased and by January only seven birds (some 37% of the population) were feeding here. A similar number of birds were present in February, dropping to just two in March.

The ‘famous five’ ventured here on occasion in June and July but from August numbers steadily increased as the total population increased, culminating in the peak count in the second week of November. Still high counts in December but January saw a marked drop in birds using the area with only 10 birds, rising to 15 again in February until most birds left in March.

The chart below shows the relationship between the monthly maximum counts and the total harbour population at the time. One of the interesting relationships occurs in the two January periods, particularly in the second winter period where the proportion of birds using the Wareham Channel drops quite significantly but then recovers in February. January is statistically the coldest month of the year, a time when prey items are less active. Perhaps this is more of an issue at this site.

Fig 12. Birds feeding in the Wareham Channel compared to the total harbour population

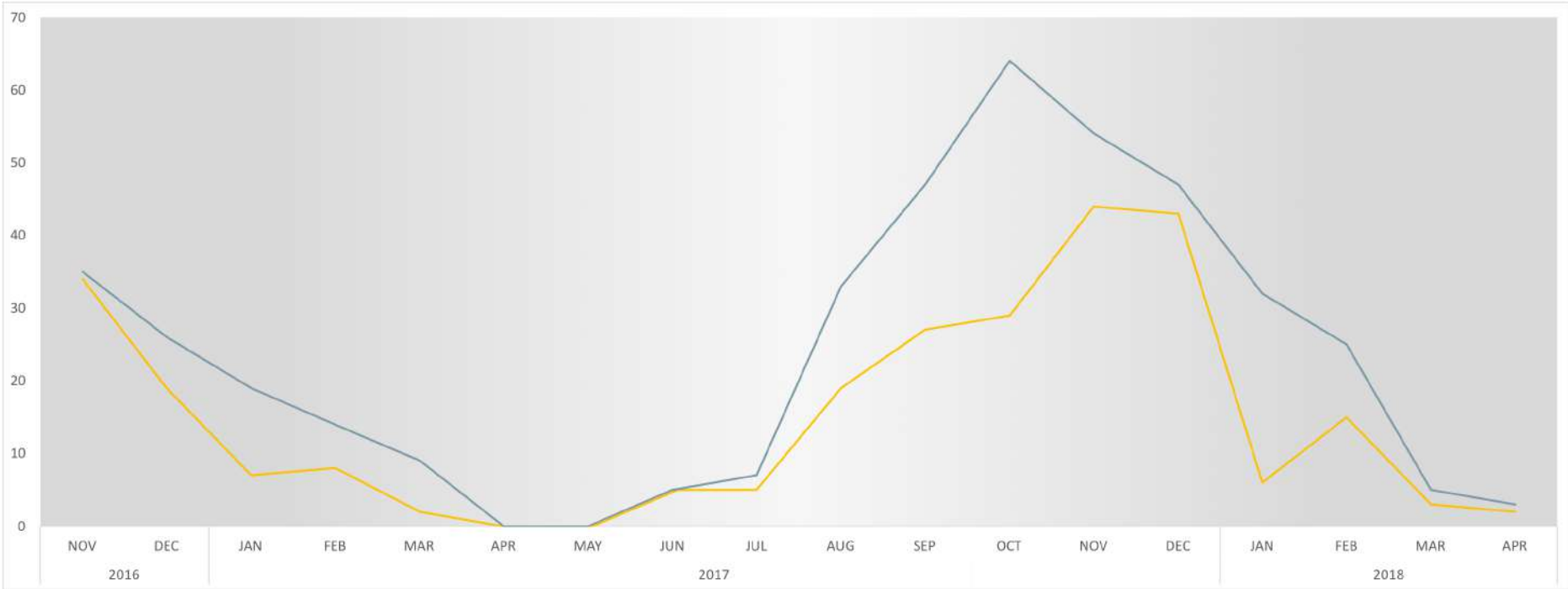


Table 6. Numbers of Wareham Channel feeding birds as a percentage of the population

Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
97%	73%	37%	57%	22%	-	-	100%	71%	58%	57%	45%	81%	91%	20%	60%	60%	67%

Over the period of the survey, the average percentage of the population using the Wareham Channel was 63%

One of the features of their feeding here was a constant movement and shifting within and between feeding places.
Although this occurred at all intertidal areas it was more readily observable here, having a larger area to move around in.

Such a feeding strategy is understandable when one considers the constantly shifting positions of favoured feeding water depths. It was the nature however that was most fascinating. The style depended on the speed of the tide; if it were on the turn for instance, feeding could be very relaxed with flocks casually ambling along. A moving tide required a slightly faster walk and a fast moving spring tide a veritable spurt on was needed. Here the pace could be so rapid that birds at the back would think nothing of taking a short leapfrog flight to the front, seamlessly resuming feeding immediately on landing.

They could also be very restless between areas, often only feeding for short periods before making a flight, usually quite short to try somewhere else. And they didn't necessarily keep in the same groups, with one or two perhaps flying off to join a neighbouring feeding group. Perhaps then these birds splitting and later reforming. It was all rather fluid. They certainly appeared to be independent minded, as well as being highly social birds.

A typical example from 8/12/17: a group of 30 birds and a group of five birds were feeding separately, they then joined and fed together for a while before splitting into groups of two, 16 and 17. The 17 then fed in a tight pack as they followed the channel, the other group fed as a looser group. Later, the 16 birds flew back to the 17 and they all fed together. The 35 were later joined by another bird who had been feeding completely on its own. The 36 then stood and preened together. Twenty minutes later they all flew up the channel, coming down somewhere off of Turford Point where they resumed feeding again.

Very occasionally the odd bird could be seen feeding at high water, at shoreline areas where the water was still just shallow enough to feed, typically in the Turford Point area.

Some birds were also occasionally seen to poke about on the mud. Never really too much of a concerted effort however, and seemingly more a token gesture. Occasionally, temporary trapped pools of water could form in basins within the intertidal areas which could also be investigated.

During cold weather, feeding in the intertidal areas didn't always provide enough food, most particularly during the cold snap at the end of February 2018, when birds were seen to frequently make trips to nearby saltmarsh areas at Keysworth, Piddle Valley and the north end of Arne Moors. Even flying up the Frome Valley.

Wych Channel and Fitzworth

These normally separately treated areas were part combined in this survey due to the Spoonbill's complete disregard for carefully worked out recording areas, with birds brazenly wandering between the two. This was particularly prevalent at the northern end, where birds worked the area from the west side of Long island around to the east side. Similarly, around the south of Round Island.

The map below shows the extent east of the feeding area, with birds never seen to stray any further east than here.

Fig 13. Wych Channel and Fitzworth

Some impressive counts were had here, at times comparable to the Wareham Channel. Using monthly maximum counts however, although a very useful tool, can sometimes be a bit misleading. Such was the case here with each high count for the month tending to be only occasionally reached with other occasions recording perhaps much lower numbers. Whereas for the Wareham Channel for example, such high counts were often regularly repeated.

Fig 14. Wych Channel and Fitzworth monthly feeding maxima

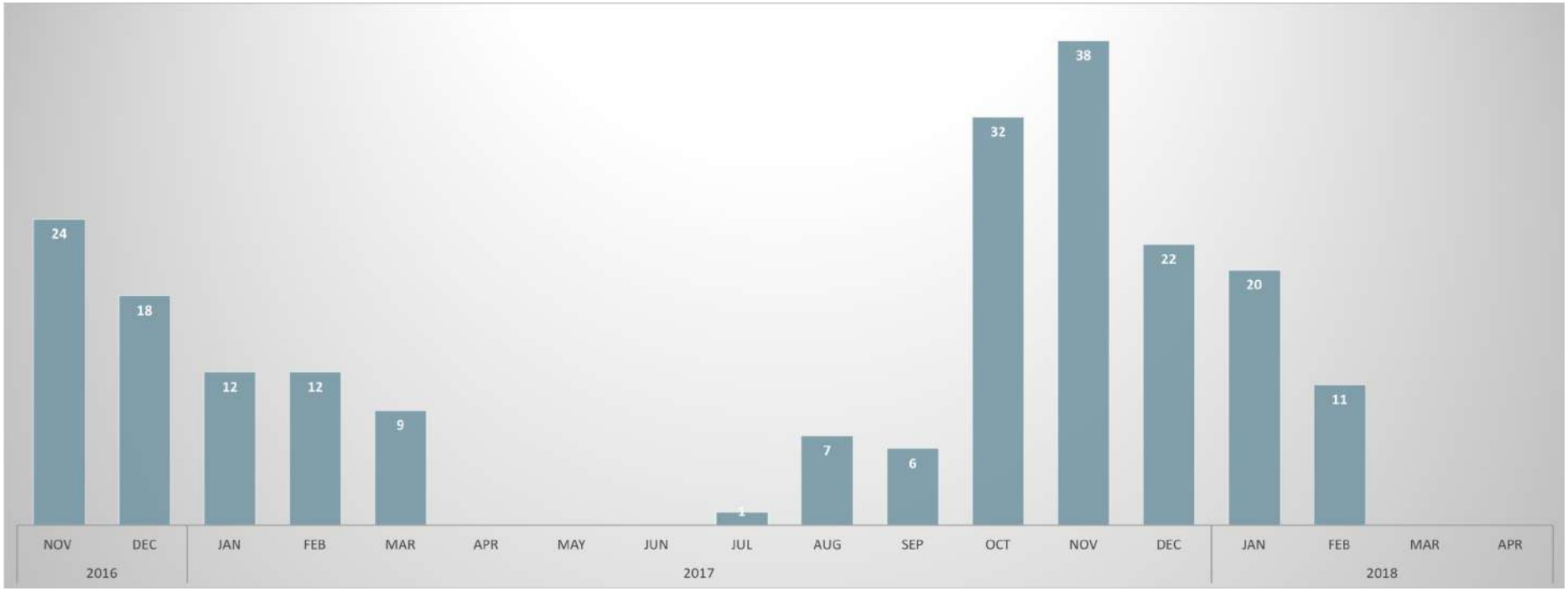


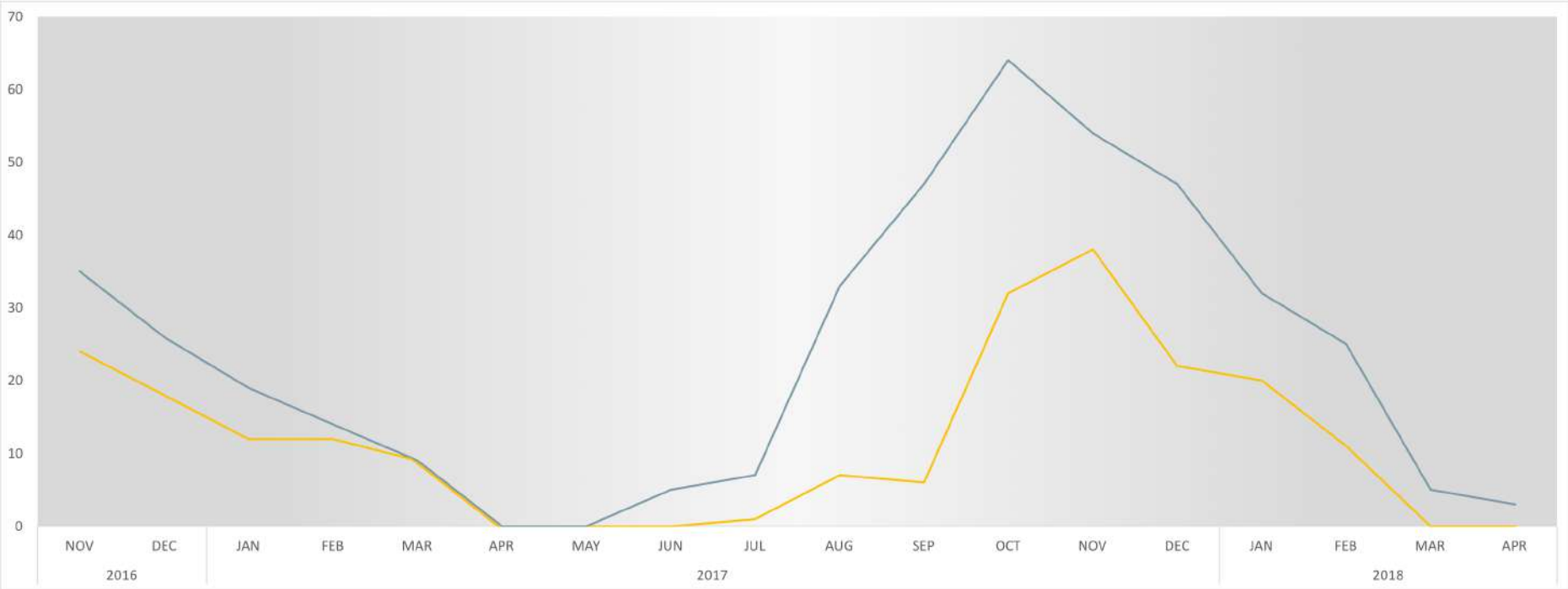
Table 7. Wych Channel and Fitzworth monthly feeding maxima

2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
24	18	12	12	9	0	0	0	1	7	6	32	38	22	20	11	0	0

During the first winter period, monthly maximum counts in January February and March were higher than the Wareham Channel. No birds for either site in April and May. June also draws a blank and just one bird was seen here in July. August and September only record high counts of six to seven birds which was very surprising given the numbers that were roosting just to the west at Middlebere at the time.

Conversely, October sees a big jump in numbers feeding here with to up to 32 birds, this at a time when the Middlebere roost numbers had dropped to single figures. The highest flock count achieved during the survey was 38 on 19th November during a very low tide.
December and January in the second winter period attracted 20-22 birds, dropping to 11 in February, with no more birds recorded here following the cold period at the end of February.

Fig 15. Wych Channel and Fitzworth feeding birds compared to harbour population



Lytchett Bay

The intertidal area of Lytchett Bay perhaps benefiting from its location just north of the Wareham Channel, could occasionally receive visits from some of its birds.

Fig 16. Lytchett Bay monthly feeding maxima

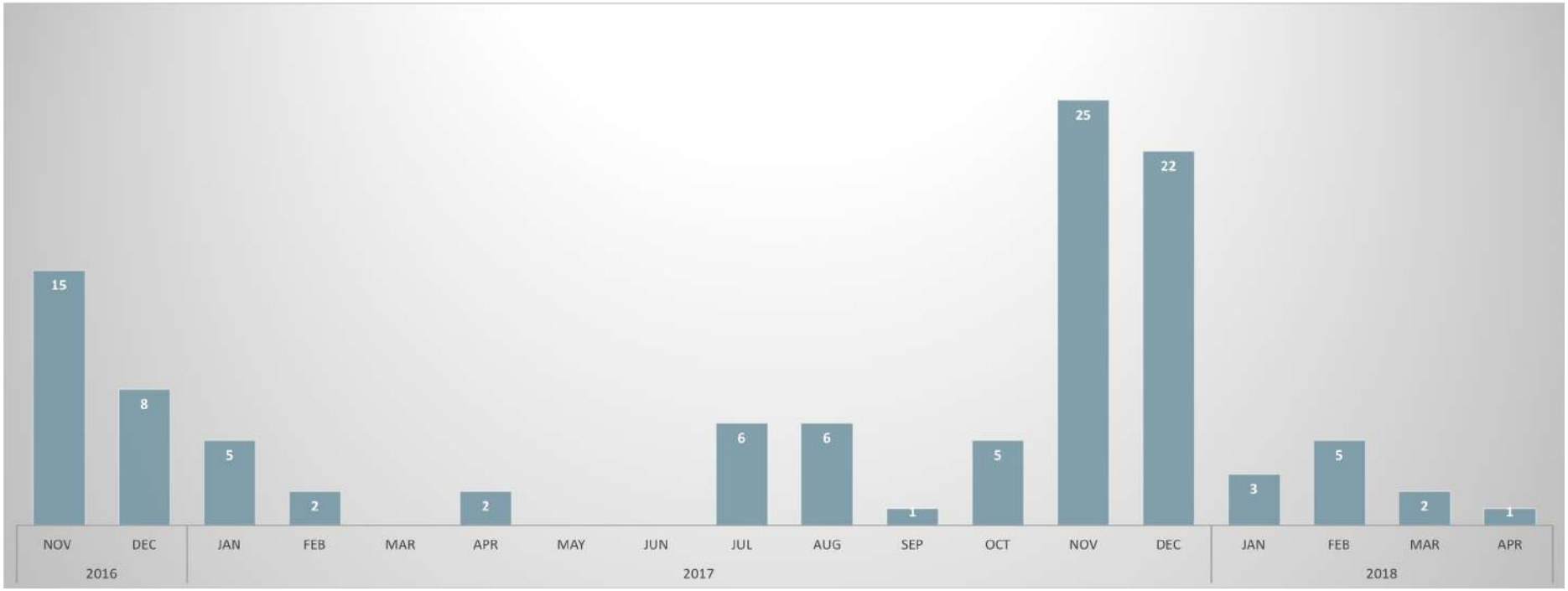


Table 8. Lytchett Bay monthly feeding maxima

2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
15	8	5	2	0	2	0	0	6	6	1	5	25	22	3	5	2	1

Interestingly, the highest 10 counts all came between the dates of 12th November and 7th December. And these were not a product of an increase in overall population, in fact the population was decreasing at this point. It was a genuine change of feeding strategy, with Lytchett Bay seemingly providing something that perhaps other sites could not.
The highest of these counts was a flock of 25 birds on 12th November 2017, a Lytchett record.
Away from this rather short period, all numbers were single figures, the highest being six in July and August.

Holes Bay

Twelve of the 15 records occurred in November and December. A pattern correlating strongly with what we have just seen at Lytchett Bay. There does appear to be a genuine increase in feeding activity at these two sites at this time of the year.

Up to seven birds visited the north east sector of Holes Bay in early November 2016 but were not seen subsequently. One to four birds irregularly seen in early December were the only records for the winter period, apart from a very unusual record of 12 birds roosting at the south end of Holes Bay on 29th November.
No more records until 28th September the following year, when a single bird was found feeding in the north west sector, staying three days.
Three to six birds irregularly seen feeding from 13th November to 9th December 2017 with a group of seven on 10th December, the last record for the winter.
Only one further record of a bird on 2nd March 2018.

Arne north shore and Gold Point

The intertidal area that followed the north shoreline of the Arne Peninsula and Gold Point was fairly regularly frequented by birds that were using the Wareham Channel.
Although not amongst the first choice of feeding areas, some reasonably sized flocks could be encountered here. It seemed to be mainly used by birds that were gravitating nearer toward the Arne roost as the tide rose, but could be used at other times.
A flock of 17 were feeding here on 9th December 2017 and a flock of 28 on 4th January 2018.

Other feeding areas

During very low spring tides, birds could also be encountered at areas not otherwise shallow enough. Most were extensions of the feeding areas we have already met, but could also include different areas such as the north shore of Brownsea Island.

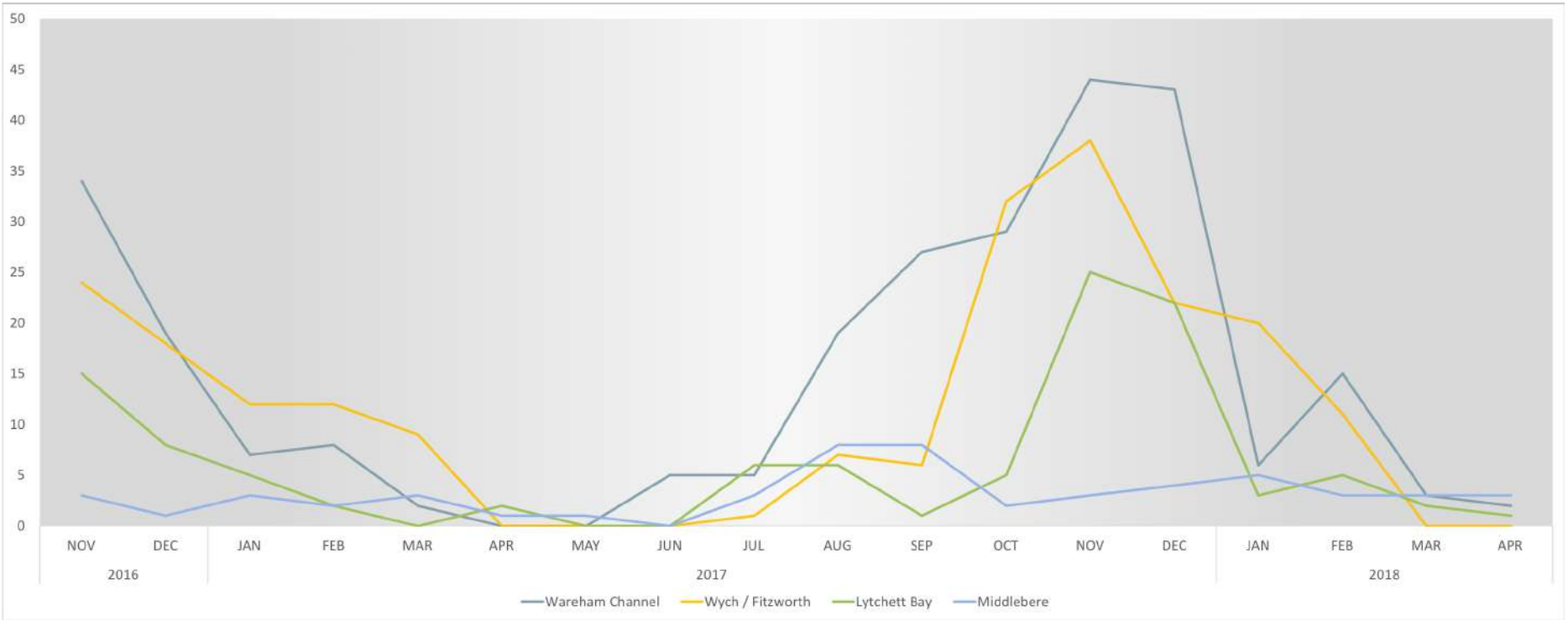
Beast from the east

The cold snap in late February 2018 resulted in Spoonbill encounters at places where they would not ordinarily have been found. It was clear that although obviously not frozen, the intertidal areas were not providing sufficient food. As we have already touched upon, during the colder periods prey items that inhabit the estuarine areas tend to be a lot less active or retreat to deeper water, and this was presumably the situation.

As well as areas of Keysworth and the Arne Moors that have been mentioned, birds were also encountered quite some distance up the Frome Valley. Nearly all encounters, however, invariably involved birds roosting for some reason, with only one bird seen actively trying to feed at the shore of the river bank, along with some Little Egrets. Birds were also seen to fly a little way up the Piddle Valley.
A few birds were also located frequenting various other water courses and ditches that still had running water.

Feeding sites compared

Fig 17. Wareham Channel, Wych Channel and Fitzworth, Lytchett Bay and Middlebere compared



High tide feeding

Lytchett Fields

Formerly some tired looking fields until a fortuitous breach in the sea defences produced a series of pools that are now a valuable high tide feeding area for many birds.

Single figure counts here apart from a high count of 12 feeding on 12th February 2017. A particularly good count given there were only 16 birds in the Harbour at the time.
Nine of these visited again on 4th March, coming in over 30 mins after sunset in virtual darkness, to feed at the pools.

Table 9. Lytchett Fields monthly feeding maxima

2016	2017												2018			
Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
0	4	12	9	0	3	5	7	6	1	2	1	4	2	5	1	1

Three immature birds arrived on 26th May, but were not seen again until 3rd June when they had been joined by a further two immature birds. The 'famous five' then became regular visitors to the pools throughout June and into July, being joined by a sixth bird on 3rd July. A few more visits by the six in July until last being seen here on 9th August. A couple of single records for the rest of August.

From 14th September to 8th October regular single bird sightings, suggested perhaps the same individual. During this period of visits, at one time on 28th September it was seen flying from the south end of the Wareham Channel, straight over 29 of its friends feeding below, completely ignoring them and flying directly to Lytchett.

No more records until 21st October, then one to two birds until the end of the year with four on 27th December. Back to ones and twos again at the start of the year to the end of the survey, the sequence only being broken a couple of times in early February and at the end of the month during the very cold spell when up to five birds appeared, searching for some alternative feeding.
Rather than feeding however they were often found hunched up together in one of the ditches that still had running water.
Sadly, one of the birds did succumb to the weather here.

Interestingly, on at least two occasions, a bird was found stood in the large dry pasture field: on 31st January and again on 3rd March 2018. There were Grey Herons regularly feeding here and perhaps, given the lack of any conspecific friends, it was their presence that encouraged the bird to roost here.
Although the bird wasn't seen feeding, reference to BWP suggests that worms, reptiles, frogs and some plant material can be eaten.
Occasionally, one or two birds were encountered feeding across the border at Holton Pools. Occasionally the famous five were seen here also.

Slepe Moor and Salterns

An area with saltmarsh pools, fresh water pools, creeks ditches and *Phragmites*, regularly attracting feeding Spoonbill over high tide during the winter months. Typically, two or three birds, but on more than one occasion up to eight were present.
Visits here could involve the flushing of feeding birds and so were kept to a minimum. Observations were therefore considered an underestimate, being limited to views of birds in flight.
All sightings here were in the winter months apart from a single bird in September.

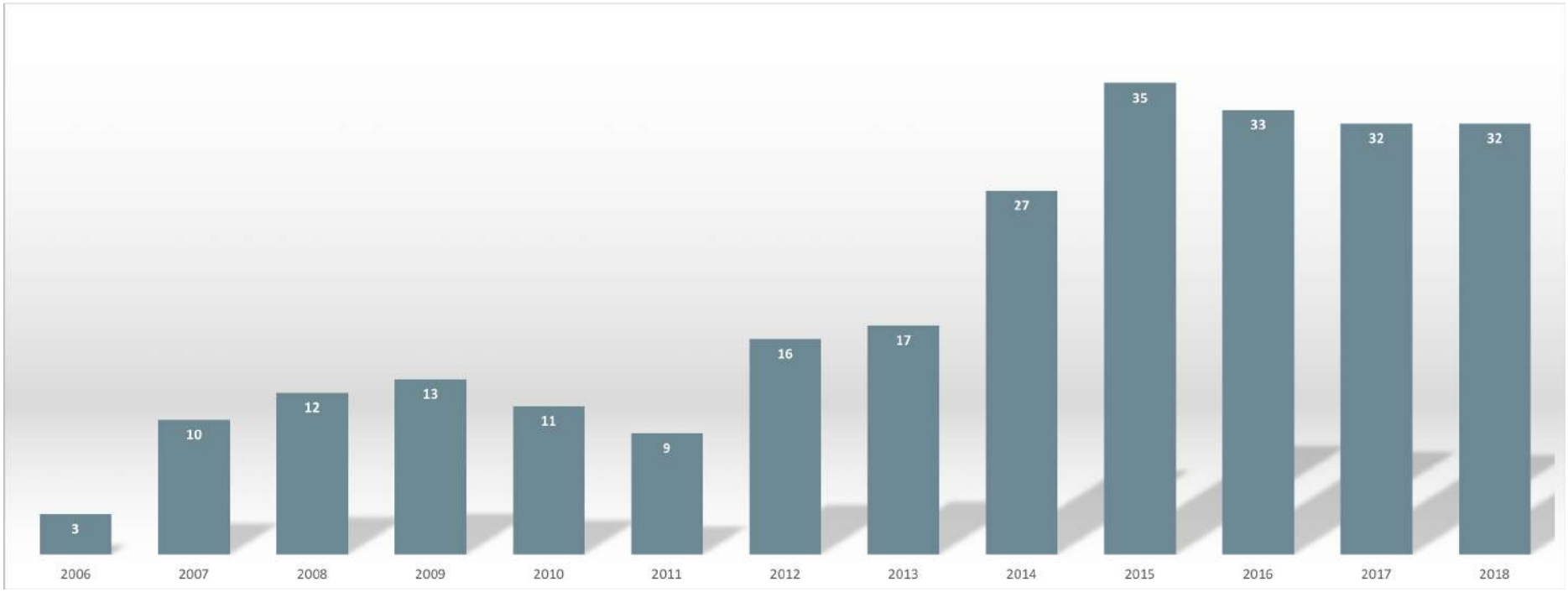
Other high tide feeding sites

The only other places that Spoonbills were regularly encountered feeding at high tide were Brownsea Lagoon and the pools of the upper saltmarsh areas at the back of Arne Bay and occasionally off of Grip Heath.

Wintering birds in relation to peak 'autumn' counts

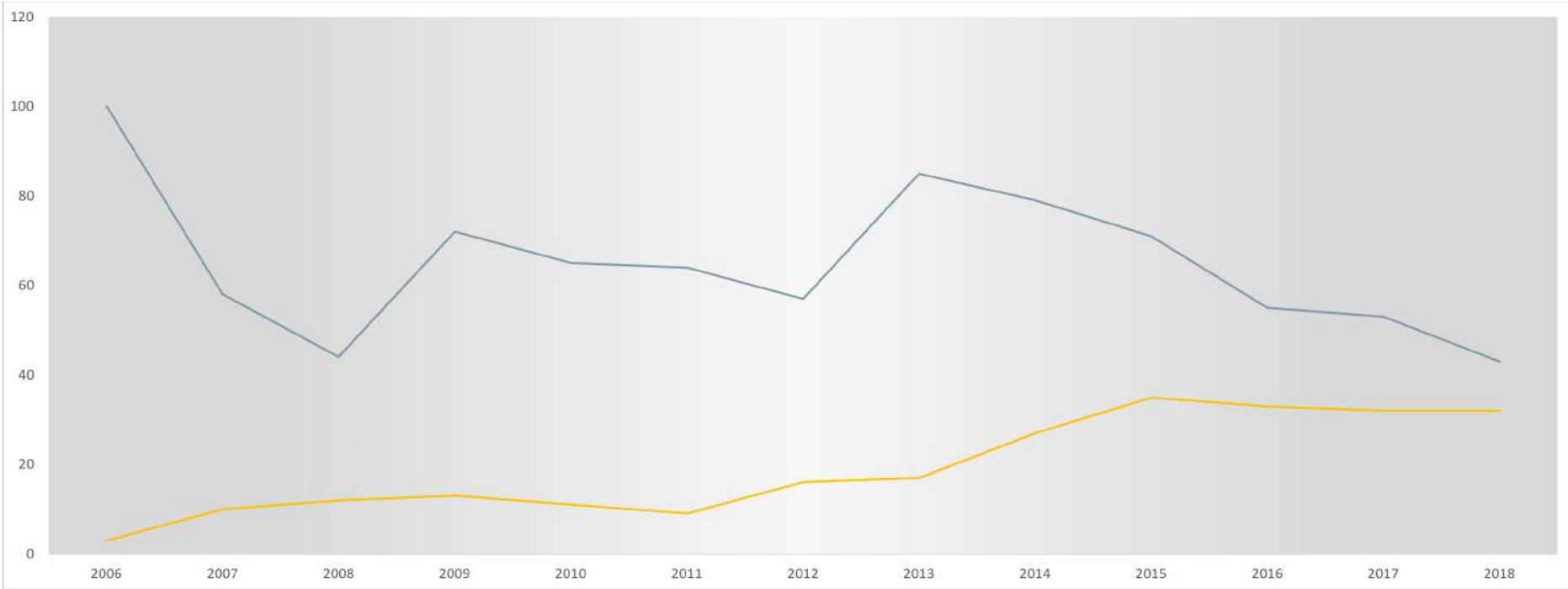
As we have already seen, numbers of birds moving through the area has been rising year-on-year. Numbers of wintering birds have also been rising but nowhere near as fast.

Fig 18. Wintering numbers of Spoonbill since 2006



In fact, in terms of percentages of the peak autumn counts, the relative numbers have been falling.

Fig 19. Numbers wintering and as a percentage of peak autumn counts. (Wintering numbers Yellow, as a percentage of peak autumn counts Blue/Grey)



Ringed birds

Ringed bird sightings have shown us that many of Poole Harbour's birds are of Dutch origin. We have also had ringed birds from Denmark.
There are now breeding birds in Germany and Belgium, as a result of the expansion from the core Dutch population, and no doubt a few of these have also visited. There also exists a population in northern France, however given that Spoonbill generally move south west or at most west, from their natal area it would seem that visiting French birds were probably unlikely, but not out of the question.

Conclusively identifying a Spoonbill's ring combination in Poole Harbour however, is more difficult than one might perhaps imagine. Roosting birds (which most of them spend a lot of time doing) are often bunched up and invariably standing on one leg!
Intertidal feeding birds are often at quite some distance from the observation points and, when nearer, one has to hope that the water is not obscuring any lower colours.
The best opportunities for reading rings were at high tide feeding areas such as Lytchett Fields or closer sites such as Middlebere or Brownsea Lagoon.

As well as providing information on a bird's origin and history, a ringed bird can also help us to gather information on feeding habits within a large area such as Poole Harbour. Also, once a bird has been conclusively identified, not all of the rings will then necessarily have to be seen properly on subsequent sightings, allowing more records.
Observations of ringed birds during the survey were enough to suggest that Spoonbills do not restrict themselves to any particular feeding area or roosting site. That may have already been obvious but it is now confirmed!

During the survey, six ringed birds out of seven birds seen could be conclusively identified: five of them hailed from The Netherlands, the other from Denmark.

YfGa/GYL
Ringed in The Netherlands in 2014, first seen in Poole Harbour at Brownsea Lagoon October 2014.

Survey sightings:
4th Mar 2017 Arne Bay
21st Sep Middlebere
26th Sep Middlebere
5th Oct Arne Bay
23rd Oct Wareham Channel
25th Oct Arne Bay
7th Dec Lytchett Bay
8th Dec Wareham Channel
9th Dec Gold Point, Arne
20th Feb 2018 Arne Bay

B(AE)/W(AE)
Ringed in The Netherlands in 2006, first seen in Poole Harbour at Brownsea Lagoon November 2007.
In 2008 it was seen at Arne on 23rd October, subsequently wintering on the Tamar, Cornwall.
In 2010 it passed through Poole Harbour again before wintering on the Tamar for a couple of months to then return to Brownsea on 11th January 2011.
In the winter of 2011/12, it decided that Poole Harbour was far enough west and spent the entire winter here. Subsequently spending each successive winter here since.

Survey sightings:
16th Oct 2016 Fitzworth
8th Nov Lytchett Fields
26th Jan 2017 Lytchett Fields
12th Feb Lytchett Fields
4th Mar Arne Bay
9th Oct Arne Bay
25th Oct Arne Bay
9th Nov Arne Bay

27th Nov Lytchett Fields
8th Dec Wareham Channel then Arne Bay later in morning
17th Dec Wareham Channel
16th Feb 2018 Arne Bay
20th Feb Arne Bay
23rd Feb Swineham Point, Wareham Channel
5th Mar Frome Valley

YaB/YGYf (where 'a' is aluminium and 'f' is flag)
Ringed in The Netherlands in 2014. Spent its first winter in Suffolk, went back to The Netherlands for just three weeks in May before heading back to Suffolk, where it then remained until March 2017, moving up to Norfolk in the spring until at least June.

Survey sightings:
8th Oct 2017 Brownsea Lagoon
23rd Oct Wareham Channel
25th Oct Arne Bay
20th Nov Lytchett
23rd Nov Lytchett fields
7th Dec Lytchett fields
8th Dec Wareham Channel then Arne Bay later in morning
13th Jan 2018 Arrived at Lodmoor staying until 3rd March

Interestingly, it was then seen back in Suffolk 10 days later before moving on again to Norfolk where it was seen nest building in June.
Postscript: Poole Harbour again 21st October 2018.

YfGa/GYL
Ringed in The Netherlands in 2014. First seen on Brownsea Lagoon October 2014. Wintered 2015/16 Poole Harbour.
Wintered northern France in 2016/2017 but then seen as a migrant at Arne 19th March 2017, before heading back to The Netherlands for the summer.
Back in Poole Harbour September 2017 staying the winter.

Survey sightings:
9th Dec 2017 Gold Point, Arne.

GYfG/Ba
Ringed in The Netherlands in 2007, has spent most winters in Devon. Seen passing through Poole Harbour on 27th August 2011.

Survey sightings:
12th Sep 2017 Middlebere (M.Wright)
9th Oct 2017 Arne Bay

Wintered in Devon again 2017/18.

V027

Ringed in Denmark in 2013. First seen in Poole Harbour at Brownsea Lagoon October 2014. Seen again Brownsea Lagoon October 2015.

Survey sightings:

12th Feb 2017 Lytchett Fields (S.Robson)
4th Mar Arne Bay
25th Oct Arne Bay
8th Dec Wareham Channel and Arne Bay
9th Dec Arne north shore
7th Feb 2018 Middlebere
23rd Feb off Swineham, Lower Wareham Channel

Grey Heron

Introduction

The original British Heron. A very wary bird, often fleeing at the first sign of disturbance thanks to a very long history of persecution and hunting.
Despite this, it has still become the most successful and abundant heron over its range.
The reason, its flexibility and adaptability, being able to make use of a wide variety of habitats and take a wide variety of prey types, by day and by night.

History of Grey Heron in Poole harbour

The Grey Heron goes back further than Poole Harbour itself. Presumably one time feeding along the river valley that once meandered through the area before sea levels rose to flood the entire area and form the Harbour.

The local Anglo-Saxon villagers called them the hragra and very tasty they were too. Later, the Normans found them even more to their taste, they called it the héron, and by the late Middle Ages they were a high-status bird on the menu.
By the 1600's numbers would have already been facing the pressures of an increasing human population. Pulteney, in 1799, writes 'I am informed that Herons are not so frequent in this part of the country as they were formerly'. Although, writing in 1888 Mansel-Pleydell mentions 'they are exceedingly numerous in Poole Harbour, where as many as a hundred may sometimes be seen fishing'.

The Heronry at Brownsea was thought to have been established in the early 1800's, but was deserted in the middle of the century when all the trees were felled at the height of Brownsea's habitation. The birds then moved to a site 'on the Arne estate overlooking Wareham Bay'. A Breeding census of 1928 estimated the colony at Arne Heath to be c70 pairs.
During this time it seems likely that some birds also began nesting on Brownsea again. The 1928 census does not mention Brownsea but the island had recently been purchased by Mrs Bonham-Christie who allowed absolutely nobody on to the island. It is written though that there were 50 or so nests in the late 30's and early 40's.

The Arne Heath colony was abandoned in the 1940's after war training started there, with the remaining birds joining the colony at Brownsea.
In 1957 the Brownsea colony was estimated at 48 nests. By 1967 this had risen to 90 pairs and by 1971 stood at 131 pairs. Sadly, it was all downhill after that, with the colony then steadily shrinking year on year. In 2010 only seven pairs were left. The following year none.

The remaining birds once more returned to Arne Heath in 2011, where nine nests were estimated by the RSPB. And that estimate has proved to be the most accurate count they have done to date, sadly.

Feeding

The only true heron generalist – marine, fresh water, terrestrial, by day and by night. In Britain, Grey Herons use a variety of wetlands, estuaries, lakes, brackish pools, rocky shores, dry fields and more besides. All of these can be found in Poole Harbour.

The Grey Heron's diet is also remarkably versatile, eating almost anything it can find. Depending on location, fish tend to dominate, with crustaceans, amphibians and their spawn, reptiles, worms, insects, small birds, rodents and small mammals such as Voles.
Things don't have to be small however, anything from a large Rat to a Water Rail can be successfully tackled. If none of these can be found they can also resort to scavenging.

As a rule, Grey Herons rely on stealth and therefore must forage alone. The most popular strategy is standing still, either in the water or at its edge, waiting patiently for a fish to swim by, but will have no qualms about snatching an unsuspecting duckling or Little Grebe swimming past a motionless and seemingly inattentive bird.
They can also stand in elevated positions, on banks for example and use the 'peering over' technique. Walking at a very slow pace being the other main strategy.

To maximise their solitary hunting technique in terms of efficiency, Grey Herons will defend a feeding territory. Recent studies have shown that feeding territories can be held both during the breeding and non-breeding seasons. Not all birds will have territories however, and will have to make use of unappropriated areas wherever and whenever they can.

Feeding times are typically concentrated around dawn and dusk, with many birds being able to sustain themselves adequately by just feeding within these rather narrow time frames. This is in part due to the size of the prey they prefer to hunt. Most of us at one time or another has seen a Grey Heron trying to swallow something inconceivably large, in the end usually successfully. This strategy allows many birds to spend the rest of the day communally loafing somewhere.
For birds using the extensive tidal areas of Poole Harbour, this routine has to be modified to accommodate the tidal regime.

Feeding areas

To help assess distribution, twenty main feeding areas were identified, where possible using traditional recording areas.

Fig 20. Grey Heron recording areas

Survey counts were supplemented by WeBS data where possible and on occasion counts from other reliable sources were also used.

Results

Grey Herons were found to be widely and rather sparsely distributed throughout the harbour.
The most important feeding habitats were the intertidal margins and upper saltmarsh areas. The intertidal flats and channels were used, but to a much lesser extent.
Coastal grazing and floodplain meadows, drainage ditches, river banks, various lakes and rocky shorelines, urban shoreline areas and breakwaters were all regularly used. The fringes of Little Sea were also a regular haunt. The man-made ditches of the coastal grazing and floodplains were a particular favourite.
Some dry field feeding was also encountered.

The intertidal margins were used particularly at an ebb or flow tide, when the margins held shallow water. As the tide rose, this pushed feeding birds into the S*partina* or reed edged margins where they could stand for some time until it was too deep to fish, or where available, follow the tide into the creeks.
High tide in the upper saltmarsh areas for many birds was 'the' time to be fishing. The subsequent retreating tide was also productive, leaving stranded pools with stranded prey. Many remained here to forage even during low tide, particularly those areas that were receiving fresh water seepage, if backing onto wet heath for example, an area itself which could also be explored.

By site

The highest concentrations of birds were found in the upper saltmarsh areas of Arne Bay, the S*partina* bank and reedbed margins of the southern half of the Wareham Channel and particular parts of Holes Bay.
The saltmarsh and brackish pools at Slepe Moor and Salterns at the western end of Middlebere Channel were also popular.
Lytchett and Wareham Channel north, were the next most used areas.

Brownsea Lagoon's main attraction was primarily as a communal day roost site, but occasionally reasonable numbers of feeding birds could be encountered here that rivalled the top sites.
These however were considered to be opportunistic feeders taking time out from roosting, rather than being birds primarily attracted here because of its value as a feeding site.

The highest feeding count was 12 at Wareham Channel south on 13th November 2016, with 11 there on 15th October 2017. Next highest count was 10 birds at Holes Bay on 10th August 2017.

Wareham Channel south attracted the highest numbers overall, with an average monthly count of just under six birds. The second highest was Holes Bay with an average of 4.5 birds per month. Third was Arne Bay averaging just under three.

The highest numbers for all sites occurred in the autumn, the increase starting from June onwards when the first fledged birds appeared.

Away from this period, numbers in specific areas were determined primarily by the numbers of regular site faithful birds.

Wareham Channel south

Fig 21. Wareham Channel south monthly feeding maxima

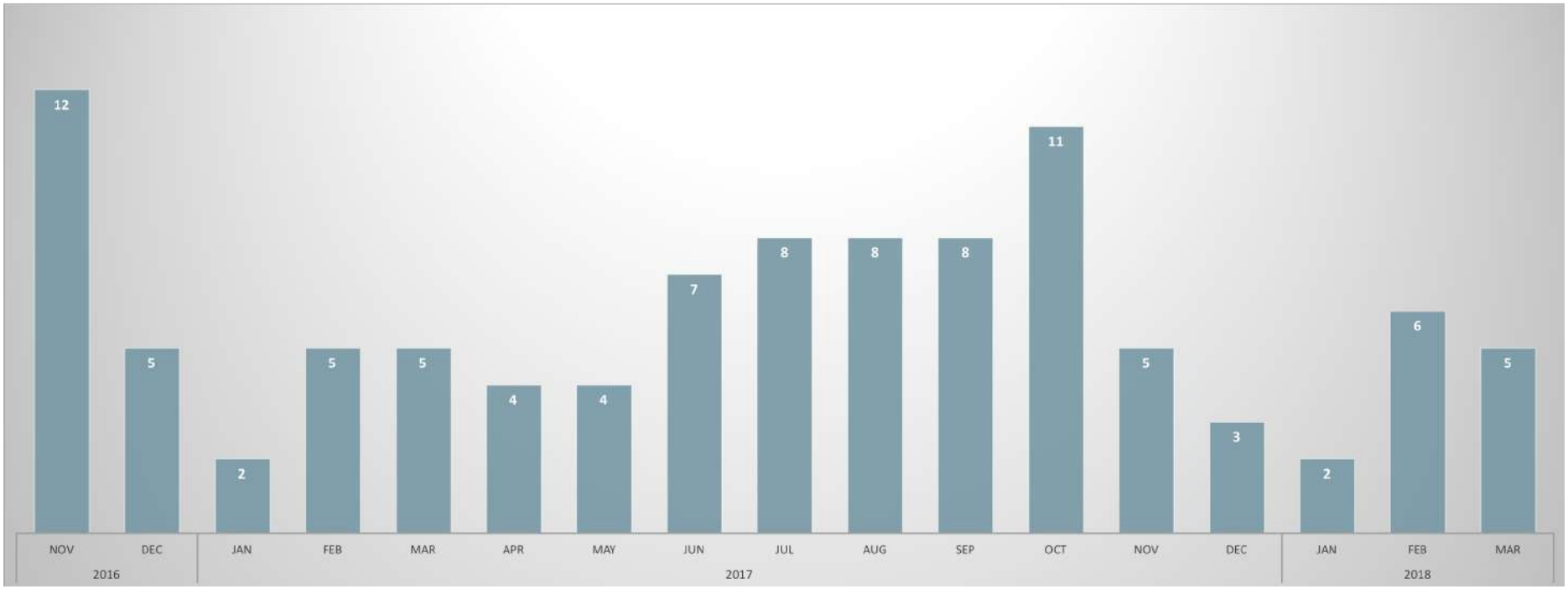


Table 10. Wareham Channel south monthly feeding maxima

2016		2017												2018		
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
10	5	2	5	5	4	4	7	8	8	8	11	5	3	2	6	5

Wareham Channel south attracted the highest numbers of birds on average, no doubt due in part to its proximity to the breeding colony. Although one might equally say that the colony was attracted to this location because of the immediacy of a very attractive feeding area.

The preferred feeding areas were the intertidal margins fringed by S*partina* and reed. Anywhere from Shag Looe head all the way around to the far southern shoreline could be used. The river mouths were particularly favoured. There were also preferred specific 'watching posts' within these areas that were regularly used, most likely by the same individuals. (the term 'watching post' is a buzzword, although actual posts could sometimes be used!)

At high tides, birds hunted in the upper saltmarsh areas, either in the upper creeks or, when these had filled with water, on the marshy areas and isolated pools towards the back. Beach areas were also regularly used.
At low tide, the formed channels in the intertidal areas were also used but not nearly to the same extent. The mudflats themselves when exposed were just places to loaf.

The presence of the breeding colony in the Arne Heath Plantation near the south west shore certainly influenced numbers of feeding birds encountered. The effect however was not as one might expect. During the breeding season most adult birds had feeding territories away from the colony, resulting in rather modest local feeding numbers, with a maximum of four in April and May.
It was only in June that the influence of the colony took effect when first fledged birds started to arrive on the scene. Up to seven birds were seen in June, rising only a little to 8 in August and September, presumably a result of some of the earlier birds already moving beyond this area. The highest count reached was 11 in October.

In November 2016 at the start of the survey, numbers of Grey Heron were still at 10 birds. However, in November 2017 many of October's birds had already moved on. The area was least used in January with a maximum count of just two birds for both years. Estuarine prey are known to be least active at this time of year and many of the fish are thought to head to deeper waters. This would certainly appear to be the case here with most birds using alternative sites at this time.

Wareham Channel north

The north, as can often be the case is the poor relation here. Although on the face of it, a very similar habitat to Wareham Channel south, the subtle physiological differences were such that feeding numbers of birds were unquestionably lower.

Only one to three birds were recorded from October to June, with a maximum of four in July and August, rising to a peak of six in September.

Table 11. Wareham Channel north monthly feeding maxima

2016		2017												2018		
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
3	1	1	1	2	1	1	3	4	4	6	2	2	1	0	1	2

Fig 22. Monthly maximum counts compared for Wareham Channel south and Wareham Channel north.

In the northern half, the preferred habitat of tidal margins fringed by S*partina* or reed edge are restricted to the far western shore and the northern shore of Shag Looe head. There are also no river mouths and the hinterland is a lot less attractive, being surrounded by dry fields to the north, an industrial estate to the west and a dry heath on the eastern side.
The favoured feeding area was the S*partina* and reed fringed western shore, the S*partina* gull islands were also popular, particularly when surrounded by shallow water.

Holes Bay

Holes Bay was second only to Wareham Channel south in terms of the highest single count achieved (10 birds), and the average monthly maximum feeding count (4.7 birds). Surprising perhaps, given its urban location and the Grey Heron's known sensitivities to disturbance.

The cycle path that follows the eastern shoreline north to Upton Country Park holds the most potential for disturbance and it followed that the shorelines here were hardly used, at least during the day.
Two of the three outflows here were the only exceptions probably because of their position slightly away from the cycle path, particularly the outflow that emptied just south of the railway line which was some distance from the cycle path.

The outflows, however, were still most regularly used at and beyond dusk when disturbance was much reduced, with birds also encountered feeding here in the hours of darkness. Grey Herons are probably only second to Night Herons when it comes to night fishing skills, with birds regularly including it as part of their feeding routine. Especially here (amongst other sites as we shall see later) which has the benefit of artificial lighting.
The longer days of summer did allow some daytime feeding, with the highest disturbance of the rush hour occurring long before dusk.

Moving further away from the eastern shoreline, the immediate intertidal areas were also hardly used, still being too close to the cycle path, however beyond that, the large area of S*partina* in the centre of the area was regularly used.

The western side of Holes Bay is not nearly as disturbed as one might suppose. The cycle path along the eastern boundary does continue along the northern shoreline westward but is largely obscured by trees. It then carries on as a footpath which is more sympathetically placed, particularly along the western side, being now some way from the shore, allowing birds to use the saltmarsh areas right up to the shoreline without disturbance.
The overall effect is a largely undisturbed natural area and consequently one of the most regularly used parts of Holes Bay

South of the railway line on the western side, although bounded by settlement it was also relatively undisturbed, being perhaps a rather unattractive site to anybody other than those living on its doorstep and owning a dog.

Fig 23. Holes Bay monthly feeding maxima

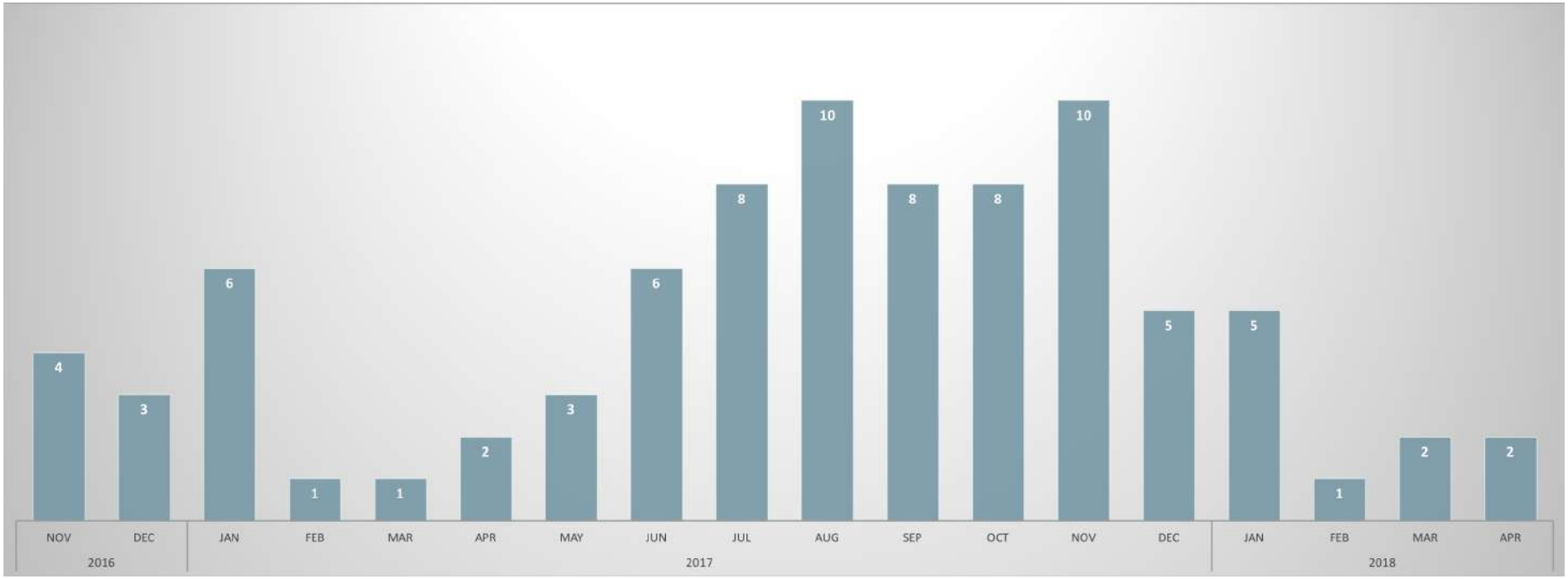


Table 12. Holes Bay monthly feeding maxima

2016		2017												2018		
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
4	3	6	1	1	2	3	6	8	10	8	8	10	5	5	1	2

As with other parts of the harbour, the highest numbers of birds were recorded in the autumn months. The highest count achieved here being 10 birds in August and November.

From November 2016, at the start of the survey, three to four birds regularly used the area. In January, whilst other intertidal areas were becoming less frequented in response to reduced prey availability in the colder temperatures, there was an increase in birds from December into January here for the first winter period and a similar number of birds between December and January in the following winter period.
Presumably there must be something specific to this area that other intertidal areas cannot provide. The outflow at the north eastern sector often runs with warm water, and perhaps the others can also. Could this be a factor?

By late January all birds bar one had moved on, almost certainly to the breeding colony at Arne Heath where numbers were fast increasing. A couple of birds in April and three in May were all immatures. The first post-breeding adults and juveniles arrived in June, followed by a few more in July and August, bringing the peak count of the year to 10 on 10th August. Still up to eight birds around in September and October with 10 again seen in November. It was likely that all 10 birds were probably around for the intervening period but they could easily go missing; wandering up the outflow channels or visiting the nearby ponds around Upton Country Park.
Half of these birds had moved on by December, the remaining five staying into January before leaving for the breeding colony. Just a single bird seen in February as with the previous year.

All observations were also assigned to sectors, allowing monthly maximum counts for each. As can be seen from the chart below the north west sector attracted the highest numbers of birds during the June, July and August influx.

Fig 24. Monthly maximum counts for each sector, Holes Bay

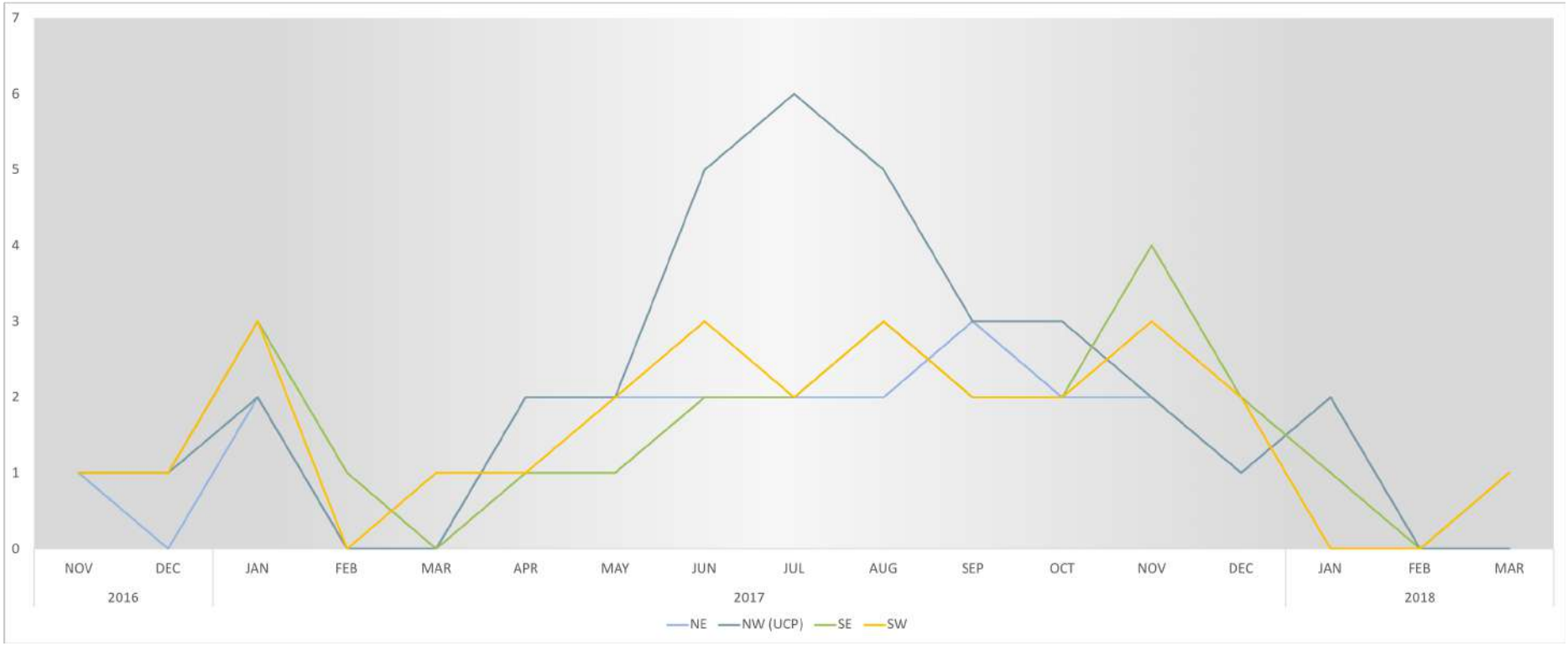


Table 13. Monthly maximum counts for each sector, Holes Bay

	2016		2017											2018				
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Ave.
NE	1	0	2	0	0	2	2	2	2	2	3	2	2	1	2	0	0	1.4
NW	1	1	2	0	0	2	2	5	6	5	3	3	2	1	2	0	0	1.9
SE	1	1	3	1	0	1	1	2	2	3	2	2	4	2	0	0	1	1.5
SW	1	1	3	0	1	1	2	3	2	3	2	2	3	2	0	0	1	1.6

The north west sector also had the highest average monthly maximum count for the survey.

Given its higher disturbance levels, the south east sector probably returned more birds than might be expected. The eastern shore of the popular S*partina* island that ran through the middle of the Holes Bay area providing the numbers. Away from, here birds were few and far between.

In terms of east and west, the west side recorded 23% higher numbers.

As well as the central S*partina* island, any of the S*partina* areas bordering the intertidal flats could be used for feeding, either at their edges when there were favourable water levels or in the middle when partly or wholly inundated.
Other favourite areas along with the various outflows were under the railway bridges, both areas concentrating a flow of water.
The rocky shore at the far south west of Holes Bay was also a favourite site for at least one bird. Being seen feeding somewhere along this shoreline on virtually every visit.

The benefits of this site clearly outweigh the negatives, with birds adapting to cope with the urban environment. In the day keeping to the middle of the area or the more hidden and quieter areas of the margins and by night using their seemingly well-developed night vision as well as the artificial lighting to work the areas that were disturbed by day.

Arne Bay

Most birds here tended to feed during the higher tide phase. Nearly always in the upper S*partina* areas at the back of the bay.
Some high concentrations of feeding birds could be encountered here, in fact probably the highest concentrations of the survey.

Fig 25. Arne Bay monthly feeding maxima

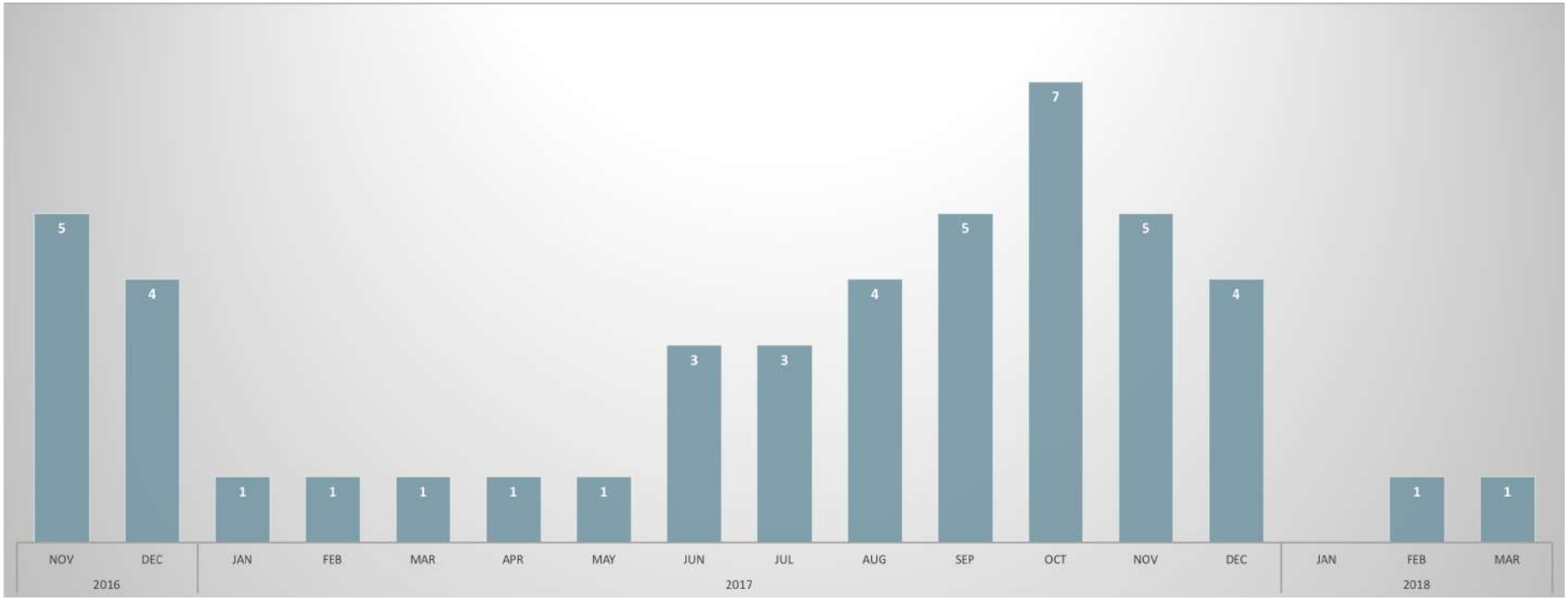


Table 14. Arne Bay monthly feeding maxima

2016		2017												2018		
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
5	4	1	1	1	1	1	3	3	4	5	7	5	4	0	1	1

A similar trend in numbers to the Wareham Channel with the lowest numbers present from January until May, rising in June as a few local juvenile birds begin to explore the local area. A further trickle of birds through August and September, before peaking in October with up to seven birds present. November sees a slight drop in numbers to five, reducing again to four in December (for both years) with a more significant drop in January when nearly all birds are now using alternative feeding areas. Just the one bird seen in February and March of 2018.

Although numbers do not compare to the Wareham Channel, in terms of density however Arne Bay is much higher. One only has to glance at the map to see how small Arne Bay is in comparison. Not only that but it was really only the north west part of the bay that was regularly frequented.
The reason for its specific popularity was not entirely clear, although obviously food supply was no doubt at its heart. The rest of the saltmarsh areas bordering the intertidal superficially look very similar but were hardly used, although the presence of the viewing hide to the south was no doubt a factor.

The highest feeding numbers occurred when the tides were particularly high, when more of the upper saltmarsh areas were inundated. The theory is that prey become stranded here, particularly when the tide begins to recede, isolating them in the various pools.

All of the lower saltmarsh and intertidal areas were much less utilised. As was the area of Gold Point which includes some reasonable looking Heron habitat, with marshy areas and a pool, but for some reason it didn't attract the birds. The area is also undisturbed. It seems to only get inundated on the very highest tides, which could account for a potential lack of prey in so far as the area doesn't receive the 'turnover' of prey items that a regularly inundated area might get.

At low tide most birds vacated the area, many moving to the Gold Point clay pit communal day roost.

Lytchett Bay area

The Lytchett Bay area, unlike many of the other areas, had rather consistent numbers of birds throughout the survey period. Most regularly three birds sometimes four. This was presumably a result of getting out competed by the very popular and closer to the colony areas of the Wareham Channel and Arne Bay, but holding on to these birds throughout the winter period, after all the boys of summer have gone.
That is not to say that it didn't occasionally receive visits from some of these birds. Near blanket coverage by two local stalwarts often resulted in a count of five birds during the busier months, with a very impressive 10 birds on 23rd September.

From November at the beginning of the survey up to three birds were regularly recorded, then just the two in February and one in March.
Numbers were back up to three toward the end of the breeding season in June, rising to four in September and October and with three again from November. From December and through January these could regularly be encountered feeding in a large dry pasture field. Literature suggests that they were most likely feeding on rodents.

Middlebere area

Fig 26. Middlebere area feeding monthly maxima

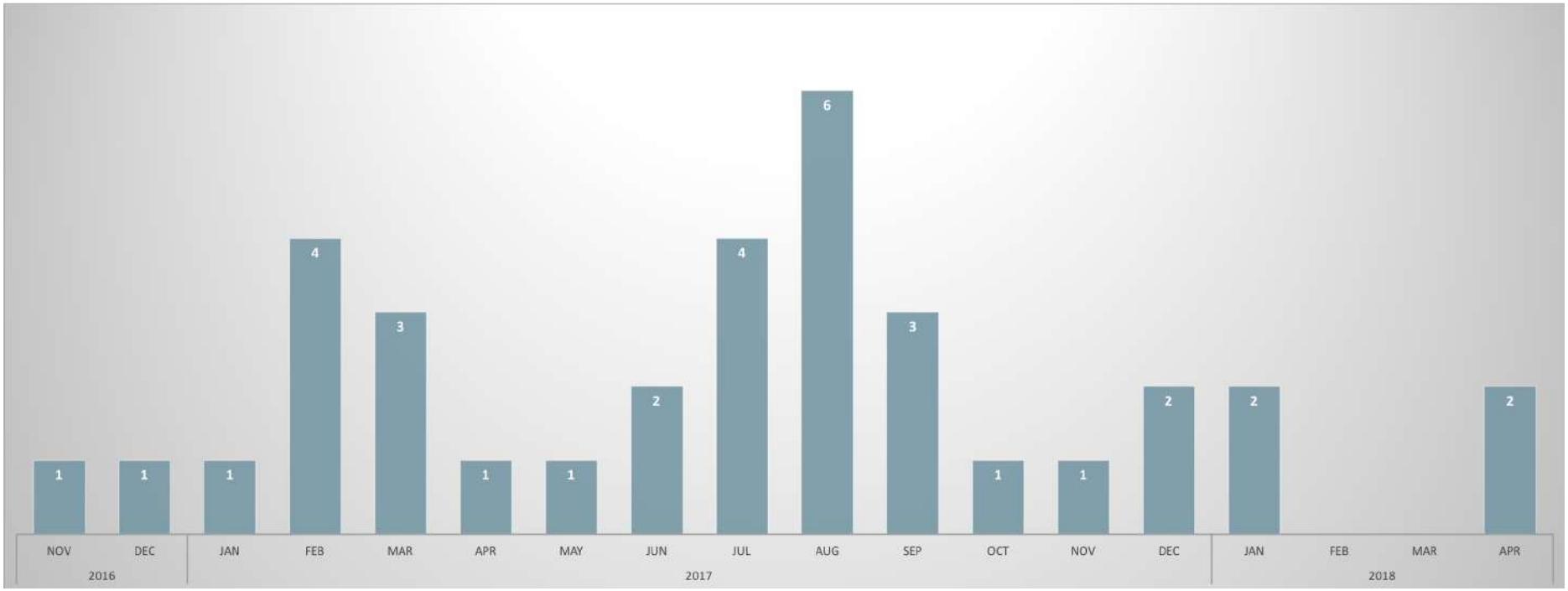


Table 15. Middlebere area feeding monthly maxima

2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
1	1	1	4	3	1	1	2	4	6	3	1	1	2	2	0	0	2

Only the one bird present at the beginning of the survey through until January. Up to four birds seen in February were very likely to have been birds visiting from the breeding colony at Arne Heath. Still three birds visiting March but then only one again in April and May, perhaps a territory holding bird that was excluding others.
A juvenile bird joined the adult in June and a couple more in July. In August, what I like to think of as the rest of the family arrived. The two adults and four juvenile birds and spent the month here. Three birds still present in September, reducing to one to two from October onwards until January. February and March 2018 in contrast to the previous year only recorded just the one bird.

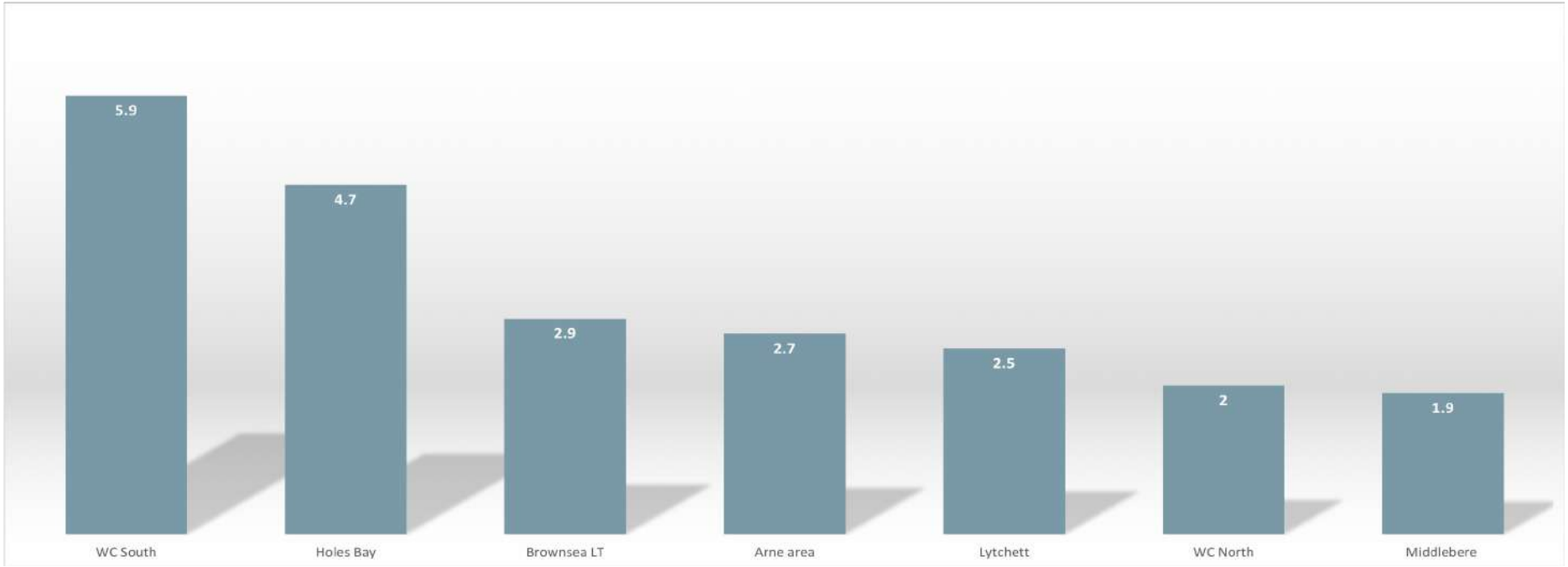
A favourite of the Grey Heron, shallow water, doesn't last very long in the Middlebere channel due to the topography of the land and so this type of feeding was rather limited. The channel when formed was also hardly used either, although it is so deep at low tide that you can lose a Heron in there.
Most birds here used tidal S*partina* margins and the upper saltmarsh areas and creeks that bordered the western end of the channel to the north and to the west. Here the myriad of pools and waterlogged areas provided regular feeding. Birds using Salterns were also able to utilise a large ditch and further scattered pools.
Intertidal areas were generally only used for loafing. At the far western end, the main channel comes to an abrupt end meeting with a S*partina* bank which splits the channel into two much smaller ones. For some of the gathered birds this could provide some alternative feeding.
Viewing Slepe Moors and in particular the Salterns area was restricted, with any sort of approach invariably causing the birds to flush. Observations had to therefore be limited to chance viewings of birds in flight and as a result some underestimations must have occurred.

Wych area

One to two birds usually encountered here. As with Middlebere, the preferred areas were the tidal margins and the S*partina* areas. The intertidal areas not as regularly used.
At higher tides, creeks within the saltmarsh areas off of Grip Heath were a favourite haunt, but any of the S*partina* creeks could be investigated.
Visits were also made to the beach areas off of Shipstal in the early mornings before the visitors arrived.

Sites compared

Fig 27. *Average monthly maximum feeding counts*



South Deep

One to two birds seen from November at the start of the survey through until June. Two juveniles arrived in July, staying around the area until late September at least. From October 2017 through to the end of the survey in April only one bird seen at any one time.
At higher tides, birds regularly worked the shorelines and beach areas. This was seemingly in preference to the saltmarsh areas, although here they are not particularly extensive here.
The tip of Goathorn was a particularly favourite spot, either under the jetty or on the rocky beach. Further along the shore, birds could sometimes be seen concentrating with a fixed stare into the water from the top of a fence post, although given the height, it would have been interesting to see what technique the bird would have used if it had spotted a fish.
At lower tides birds also visited the intertidal channels, perhaps more so here than many other sites around the harbour. Again, perhaps in part due to the limited extent of the saltmarsh. During extensive periods of low tide one or two birds could be seen loafing on the mud.

The visiting juvenile birds fed separately from each other, but kept in touch, often meeting up to loaf on one of the beaches, post-feeding.
Not being used to intruders, the local adult bird would sometimes take exception to their presence and come in to see them off. On the occasions observed, the intent of the adult bird always seemed a bit half-hearted with the two juvenile birds often just moving off a few metres to re-settle nearby, after which they were tolerated. Probably just a case of reminding them who was boss.

Newton Bay was also visited on the odd occasion, as was neighbouring Fitzworth.

Brands Bay

Only one or two birds mustered here, which does seem a rather low number given the similarity of the habitat to other more popular areas.
July to September saw an additional one or two birds visit the area but with no more than three seen at any one time. Still two birds into December reducing to just the one bird from January.
The Goathorn shoreline was regularly frequented, with birds also venturing into the S*partina* areas at the back of the bay.

Bramble Bush Bay was also regularly visited by at least one bird, particularly toward the end of the day or at a lower tide when rocky areas were exposed. A small pond behind the beach on the southern side of the bay was also a visited.

South Beach to Old Harry

The rocky shoreline from South Beach to Old Harry was a favourite haunt for at least two individuals, possibly more, throughout most of the survey period except from April until June when only the one bird was regularly seen. Birds always fed some distance apart.

It was also a favourite dusk and night time fishing location, with observations of regular flights there at dusk suggesting that it was perhaps even more regularly used at night than by day. Birds crossing Studland Bay during the early evenings from the direction of the harbour mouth could be flying some distance out from the shore, often prompting claims of migrating birds.
Birds were seen here using the standing still technique but also walked about the extensive seaweed covered areas.
When the tide receded, occasionally birds followed it out across the beach.
These or perhaps other individuals could also be encountered beyond Old Harry along the base of the cliffs that headed south.

Birds may well have visited inlets etc all the way around to Swanage Bay, as early morning visits to Ballard Down could often include encounters of birds heading from these areas up and over the down toward Little Sea.

Brownsea Lagoon

Brownsea's main attraction was a safe and undisturbed day roost site, but it also had its local regular feeding birds. Often it was difficult to determine how many were the regulars and how many were opportunistic birds breaking up the monotony of loafing.

Fig 28. Brownsea Lagoon monthly feeding maxima

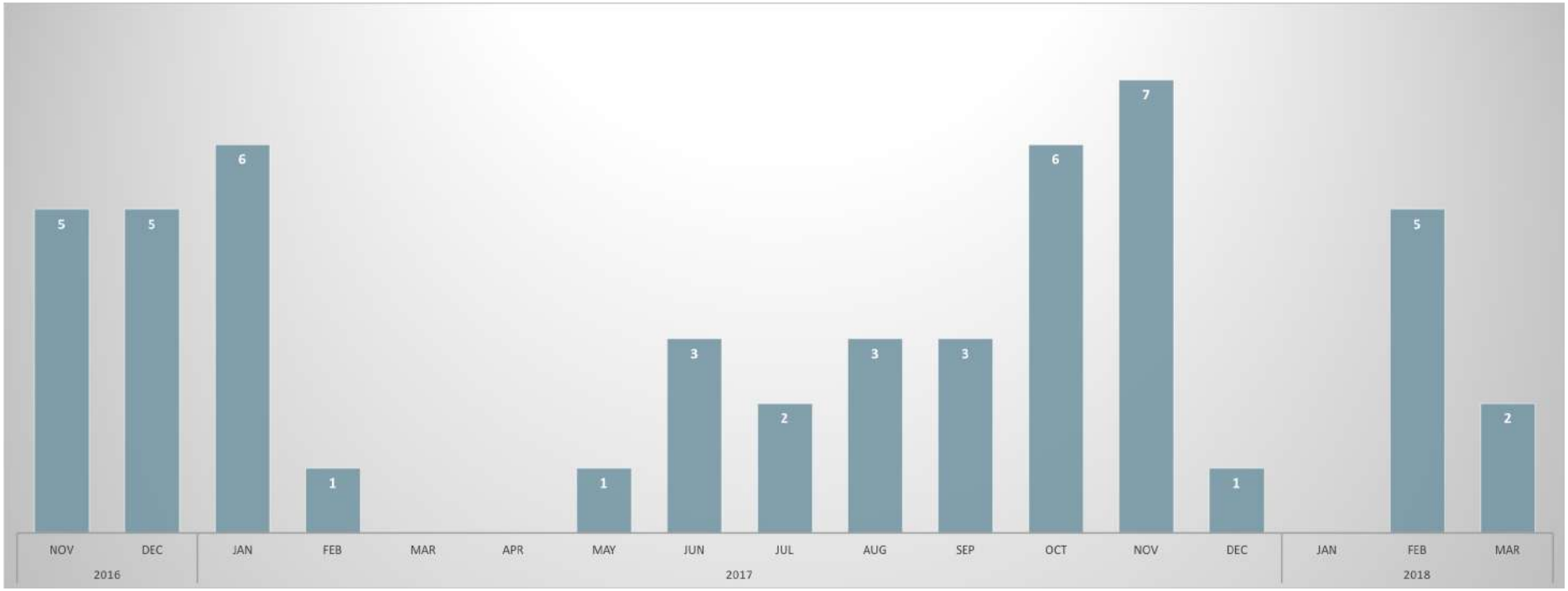


Table 16. Brownsea Lagoon monthly feeding maxima

2016		2017												2018		
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
5	5	6	1	0	0	1	3	2	3	3	6	7	1	0	5	2

Little Sea

Regularly visited throughout the survey by at least two or three birds. Most regularly frequented areas were the lake's margins. A variety of surrounding waterlogged or inundated areas were also made use of.
One or two birds also visited East Lake. Very regular utterances early morning from this direction suggested, perhaps, also a night roost there.

Frome Valley (west of South Causeway)

Used all year round. Usually only one to two birds seen, occasionally three. No discernible patterns of numbers.
Favoured areas were the drainage ditches and the river banks. Birds could also be seen wandering around the *Juncus* at times.

All birds fed solitarily. There was an exception noticed however, from late January into mid-February, when one adult bird was apparently keeping its eye on another adult bird. Always feeding in the same relative proximity but, as etiquette dictated, always at a discrete distance. This was assumed to be a male interested in, or perhaps already paired with, a female.

Bestwall and Wareham Water Meadows

Usually at least a couple of regular birds using this area. Most popular feeding sites were the drainage ditches and the riverside areas.

One of the resident birds from February and March at least, consistently frequented one particular part of the meadow. Whether it was targeting mammals and rodents was difficult to say but on one occasion it downed a very large rat, which in truth looked way too big to swallow. But down it went.

Feeding birds could often be accidentally flushed from ditches after dusk and during the first hours of darkness, revealing the regularity of this feeding strategy. No doubt this occurred at many sites, the regularity of encounters here merely a product of the increased number of visits (to survey additional species). Birds were also regularly heard moving up and down the valley during the hours of darkness.

During the breeding season different individuals could drop in for a short while to poke about, largely involving birds moving between their usual feeding areas and the colony.

Arne Moors

Only one or two regular birds used this area from November at the start of the survey until March. Both birds invariably frequenting the western side which retained water longer, particularly the north western corner where a semi-permanent pond has now formed. One bird distinctly favouring the drainage ditches here.
A few more visiting birds dropped in once the breeding season was underway, with two or three seen at any one time. Again, the north western part being the most regularly visited.
Still up to three birds using the area into October, reducing to two in November. December saw the start of the annual pre-breeding influx of birds into the general area at this time of year but unlike the first winter period when Arne Moors was largely ignored, a few more birds this time were tempted in to feed.
Up to four birds in December rising to five in January of the second winter period.
Still at least two birds regularly using the area in March after the very cold spell in February. Both adults, quite likely the same individuals as the first winter period.

Swineham Gravel Pits

A regular haunt for at least two birds through much of the year, occasionally three. Any vegetated margin could be used as a stake out, but most regularly the reed fringed areas, where they could either wait patiently at the edge or wander around inside.
One bird in particular could always be found in the rather narrow strip of reeds at the far eastern end of the gravel pits, particularly favouring the corner areas. And particularly towards the end of the day where it could stay feeding until well after dark.
During the autumn up to four and occasionally five birds could be seen patrolling the waters edges.

Northern shoreline from Rockley to Sandbanks

A mixture of sandy shore, marinas, wharfs, walls and breakwaters. Being prone to regular human disturbance it was little used by day. The main exception were the breakwaters, particularly the least disturbed south (outward) facing sides at Poole Quay. Parkstone Bay yacht club and Poole yacht club breakwaters were also regularly visited. Assessing the numbers of individual birds was difficult however, with no more than one bird seen at any one time for the combined sites, but more than one bird was suspected.
Dusk saw an increase in activity with birds often encountered moving about these areas searching for an undisturbed, hopefully artificially lit area to do a spot of night fishing. Anywhere from Hamworthy to Sandbanks could be used, although the area around Poole Quay and the entrance to Holes Bay produced the most regular encounters.

Lakes and Ponds

Without even going into the field, one could confidently say that every lake and pond within the recording area has probably been visited by a Grey Heron at some point or another. From the very large to the smallest of garden ponds. The regularity of the visits dependent mostly on the levels of disturbance.

Most observations were achieved through a series of strategically placed vantage point watches. From these it was clear that both the fishing lakes at the north end of the Corfe Valley and the lakes which are now a waterpark were regularly used. Most sightings involving birds visiting toward dusk, although the lakes were also used during the day in the winter.
The odd bird could also be encountered at Poole Park, usually hanging around the newly planted reed fringed areas.

Vantage point watches from various urban locations also revealed quite a lot of movement. Certainly to and from Holes Bay to Hatch pond, from Hatch Pond to Creekmoor pond and Creekmoor back to Holes Bay were regular flight lines, with birds also occasionally encountered at these sites.
Many of the other sightings suggested birds checking out various garden ponds. Conversations with local people and the authors own personal observations confirming what we really already know, that pond visiting is indeed a regular activity in the urban areas of Poole.

Feeding discussion

Studies on individually marked or radio tagged birds have shown that Grey Herons will hold both summer and winter territories. Less dominant adults and immature birds working with what is left, perhaps moving from site to site throughout the course of a day.
An adult bird however will only hold a territory if there is a reliable source of food. Areas that may well provide rich feeding sometimes but poor feeding at other times are not worth defending, so will be used by the non-territory holding birds.

It seems very likely that many of the adult birds regularly encountered at specific sites around the harbour during this survey were likely to have been the same individuals each time.
Some of the non-breeding territories can apparently be fairly small, particularly intertidal ones, giving rise to somewhat regularly spaced single feeding birds throughout a larger area, which in the main did appear to be the case during this survey.

Areas where aggregations of birds were encountered such as Arne Bay and Holes Bay for example regularly involved immature birds.

Communal day roosts

Grey Herons, perhaps uniquely, are known both as loners and social birds. When feeding they like to be alone, when day roosting or breeding they prefer company. Although they can be found roosting on their own anywhere, usually in their own feeding territory, many birds take the time to fly to a specific communal daytime roost.

Grey Herons, when given the choice, prefer to feed in the first couple of hours before dawn, communally roost throughout the day at a 'standing ground' in a large open field, then leave toward the end of the day to feed in the last few hours at dusk.
No Grey Herons during this survey however, were able or willing to do exactly this. Some did come close however and day roosts were found but no 'standing grounds in an open field' were found, and because of the tidal nature of much of the area, many birds were obliged to feed during the middle of the day.

Writing in 1888, Mansel-Pleydell mentions "On the Arne Heath, on a secluded spot they often collect in great numbers and remain motionless for hours together on the lee side of some hill"
Perhaps there are just not the numbers of birds to safely stand around in the middle of an open area loafing anymore. Perhaps there are no longer any suitably sized undisturbed fields. Whatever the reason, security of site seemed to be the common link for the four sites identified during this survey. All being quite inaccessible.

The sites were; Brownsea Lagoon, Gold Point clay pit, Little Sea and Holes Bay railway embankment.

Although not 'standing ground field sites', they did all involve birds standing on the ground. Something that they seem compelled to do during the day, despite the many tall trees available to them which they readily used at night.
The reasons for preferring to stand on the ground are still not entirely clear, but it does seem that for most of the time they are in fact not asleep and when not preening they are literally just doing nothing.

The birds that came closest to the stereotypical routine were around 10 or so birds at Brownsea Lagoon which "spent the whole day loafing' at least throughout the winter months. With logic suggesting that they must have been feeding at some point, investigations revealed that indeed they were off feeding during the night. The destinations being sites already mentioned, such as the urban northern shoreline and the south end of Studland. Sites that Brownsea Lagoon is conveniently placed for.
And if there happened to be no low tide available, higher tides were not a problem, with many areas of the urban shore still being workable, along with the shorelines at Studland. No doubt non-tidal sites also, such as Poole Park and Little Sea were also visited.

Brownsea Lagoon.

The most regularly used day roost site, attracting the highest numbers of birds. The highest being 19 on 8th November 2017.

Fig 29. Brownsea Lagoon monthly high tide maxima

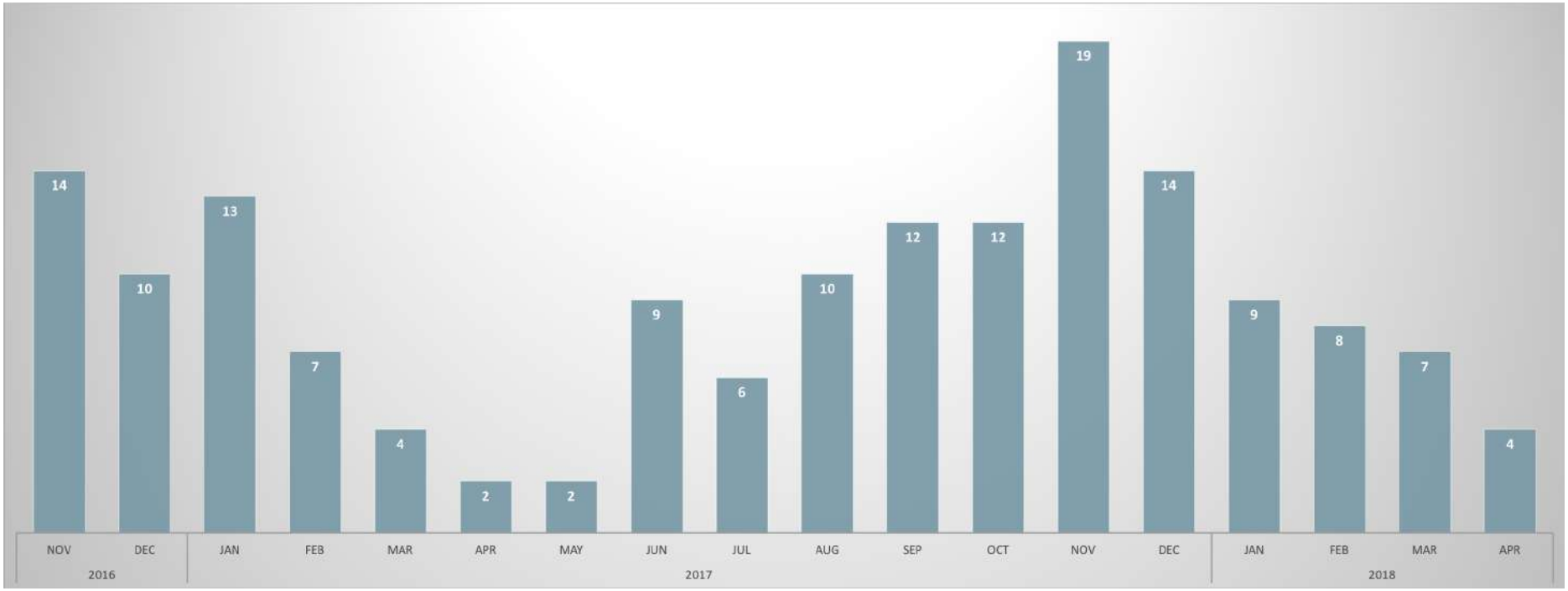


Table 17. Brownsea Lagoon monthly high tide maxima

2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
14	10	13	7	4	2	2	9	6	10	12	12	19	14	10	8	7	4

A rather familiar pattern of numbers, broadly in line with what we have seen so far at feeding areas, with numbers low in the breeding season, rising in June and peaking in November. The notable departure however is seen in December and January which maintain numbers from 10-14, birds. The birds we have just been discussing.

Gold Point clay pit

A small island in the middle of a deep-water ex clay excavation pit provided a safe and largely undisturbed location. Birds could be found here at all tidal states which certainly included low tide.
The assessment of the site would have benefited from more observations, but visits could very easily result in a disturbance, so were kept to a minimum. Rather fortuitously the site formed part of a WeBS count area, results of which were kindly supplied.
The highest numbers were recorded from September until November, when eight to 12 could be found. From December to February two to five birds with only the odd bird seen from March until July.

Little Sea

An area of dead, or at least dead looking, trees along the shoreline in the north east corner of the main lake. This has been a traditional Grey Heron day roost site for some time. Even here, birds still avoided the trees, even though technically there wasn't any ground! The 'ground' in this instance being a complex system of intertwining roots that stood proud of the water level. A few however did venture one or two feet up in the air but had to watch out for nose bleeds.
From February to July, no more than a couple of birds were encountered here, but from August onwards a few more were seen, the highest numbers being in November and December for both years. Highest count seven birds, a far cry from counts of the past. Afternoons generally held the highest numbers until the late afternoon and early evening when they would begin to leave for the feeding sites, all leaving before dark. The most regular route out was south east toward the Studland area but birds could also leave to the north, presumably toward the urban north shores.

Holes Bay railway embankment

Situated on the western side of Holes Bay. Only the much less vegetated southern facing side was used.
In the past a traditional regularly used site, but during this survey it was found to be very irregularly used by just two or three birds. The highest count however was eight on 19th July 2017.

For a period of time, up to five birds could gather at the S*partina* and embankment area at the far southern end of Pergin's Island although this was only observed toward the end of the day and was presumably night roost related.

Night roosting

Apart from the breeding season when birds roosted at the colony, finding night roosting birds proved extremely difficult. The usual method of following regular flight lines at the end of the day doesn't work with Herons as they may just as easily be flying to a feeding site.
Encounters at the regularly monitored Little Egrets roosts were the only source of records.

The Little Sea Little Egret roost hosted a Grey Heron on four dates during the survey. Two birds together in January and singletons in February, March and July.

The only other night roosting birds were found at Pergin's Island, with up to three or four birds that were presumed to be roosting there on at least a couple of occasions in mid-winter, with suspected roosting also in late autumn.

Breeding

For most birds, two major strategies of reproduction and spatial occupation are recognised: Territorial and colonial.
Generally, if food resources are evenly distributed over space and time, pairs will hold territories to the exclusion of others, these form a patchwork over the area. Birds such as Carrion Crows.
If food on the other hand is rather more unpredictable in space and time, colonial nesting that allows information transfer will allow successful foragers to be followed, negating wasted journeys to unproductive areas.

These two strategies were thought to be mutually exclusive, having evolved in response to these opposing situations. However, a study by (L. Marion 1989) revealed that Grey Herons although nesting colonially, also maintained strict feeding territories. So where did that put the theory of colonial nesting having evolved as an information centre? What would be the point of having information on a feeding area that was defended?

More research has shown that although the feeding areas are defended, first time nesting or non-territory holding birds can still learn a great deal about the productivity of feeding areas from others in their colony by following them. They may for example be able to find an adjacent area just beyond the defended boundary.
The most dominant have been shown to hold the nearest territories with the least dominant travelling the furthest, often having to visit perhaps a number of less productive sites. Some at not inconsiderable distances.
The immediate area around the colony however is a neutral area, being far too difficult for any one individual to defend and so will not be appropriated by a territory holding bird.

Grey Herons like nesting in quiet commanding places, although good foraging areas are the most important factor, with the size of the colony often proportionate to the richness of the local foraging areas.

Poole Harbour's breeding birds

Poole Harbour's breeding population currently consists of a heronry at Arne Heath plantation. A quiet (at the moment anyway) commanding place.

Occasionally, Grey Herons will nest solitarily. Two adults appeared to spend both breeding seasons on Brownsea Island and single pairs have nested here recently but no evidence of breeding was found.

Grey Herons are one of the earliest nesting birds and it is not unusual for them to lay their eggs in February. Once the young have fledged, usually by early July, the site is no longer used as a roost site.

The survey from November 2016 until the end of April 2018 allowed a full breeding season to be monitored and breeding numbers to be determined for the following season.

For the first 'season' Grey Herons were already seen taking an interest in the site on 7th November, when two rather vocal birds circled the plantation a few times at dusk. It was not clear whether they roosted there. The first birds seen to enter the plantation to roost was on 11th November.
Over the next month, a trickle of arrivals pushed the number up to 9 birds. Habits now started to change with birds regularly loafing nearby in the day, often in pairs, particularly in and around the mouth of the Frome river at low tides.
Toward the end of the day a regular pre-roost gathering also formed, usually somewhere in the middle of the intertidal mud at the far southern end if the tide was low, or on the beach some 100m north of the colony if the tide was up.

More arrivals in December and into January. By the third week of January, up to 16 could be seen pre-roosting together on the intertidal mud or stood about in pairs alongside the riverside margins anywhere from the mouth of the Frome. Around the same time at least 20 birds were now regularly entering the colony to roost. For the 2017 season, this was the highest number achieved, suggesting that all birds that were intending to nest were already on site.

February involved a lot of interaction, vocalisation and nest sprucing. Toward the end of the month birds were seen sporting reddish legs and bills.

Mid-April saw plenty of to-ing and fro-ing from the colony until the first fledged bird was seen on 20th May. Incubation and fledging generally takes about 80 days, putting first the egg laying in the last week of February.

Some unfledged juveniles were still at the nest on 12th July at least, nearly two months after the first fledged birds, suggesting perhaps a failed first brood.

At the end of July the colony was deserted.

The routine was very similar for the 2018 breeding season. The first bird to start using the colony site to roost was on the very early date of 3rd November. It was a lonely month however for that bird, with the next birds not turning up until 25th November. Perhaps it was just coincidentally using the plantation to roost rather than to claim the best spot.
Up to five gathered birds loafing on the mudflats in early December, rising to 10 by early January.
Late January and up to 20 were communally pre-roosting on the mud at the far southern end of the Wareham Channel.
All potentially breeding birds had again arrived by late January when a more or less regular 25 were now using the roost.
During and after the very cold period at the end of February, disturbance was kept to a minimum. A visit on 12th April was greeted by some rather loud chattering nestlings, presumably reasonably sized fit and healthy birds suggesting that the breeding program had hardly been compromised.

The number of breeding pairs for the 2017 season was nine. In 2018 the number of breeding pairs was 11.

Observations at and beyond the colony were in the main, not inconsistent with feeding territory holding birds. Flights out of the colony occurred in all directions, many involving singles with the majority flying further than they could be followed with optics. Of those later found feeding, all were on their own. Two leaving together also occurred quite frequently.

The most popular flight direction was west, more precisely a west south west, taking birds along the Frome Valley, and a west north west taking birds toward, and also seemingly beyond, the Piddle Valley. The next most popular direction was south west and south south west to a range of possible wet heaths, ponds lakes, and Sunnyside farm. All these directions had one thing in common, their destinations did not involve tidal areas.

The remaining birds were observed flying either north west toward Keysworth, Holton Bay and further inland. Directly north along the shoreline suggesting the Lytchett area, or east south east toward Middlebere and Wych, the fishing lakes in the Corfe Valley also one of the known destinations.

Observations also agreed with the idea of a neutral area, with often two or three seen feeding in somewhat close proximity at times in the far southern end of the Wareham Channel and the saltmarsh pools bordering the sea wall there.

It was estimated that around 60% of all birds headed off in a westerly direction to specifically non-tidal areas, with an additional c10% heading south west and south, again toward non-tidal areas.
Apart from the neutral area, only birds that headed east south east and north would have had the option to use intertidal areas. No adults during the breeding season were seen feeding at Arne Bay, Holes Bay or Brands Bay.

It does seem that tidal areas are not nearly as important a habitat during the breeding season. Presumably a result of the increase in abundance of prey at fresh water sites and perhaps a more suitable type of prey to feed the young.

Fairly regularly a party of two and sometimes three birds were seen to leave the colony together. Before the chicks are of a reasonable size, there will always be an adult on guard, negating the possibility of these leaving being genuine pairs.
One could therefore postulate that perhaps a non-territory holding bird was following a more dominant territory holding bird, hopeful for some insights.
The groups may also not have involved genuine pair birds even after the guarding period, with both adults known to have independent feeding territories, unless of course they were just sharing some of their journey.

It was no surprise that some of these groups involved sub-adults but what was a surprise was the presence of first-year birds. Grey Herons do not attempt to breed until at least two years old so what were these up to? Were they just getting caught up in all the excitement or was there a specific reason for their presence?
It may well be that they too were just after information about feeding areas. Birds of this age may not have travelled any further than the intertidal areas of the harbour so the only way to find out where the best feeding is in the breeding season is to follow an adult bird. All first-year birds seen leaving the colony, did so closely behind an adult. Interestingly, they were also seen to closely follow the adults back to the colony.

Observations that didn't seem to fit so neatly with theory was a group of four (occasionally five) birds that were regularly seen arriving at the roost together, just before dawn, from January through until May. Always from the same direction, the Frome Valley.
The regular four seemed to be three adults and an immature.
A likely scenario could have been that all the birds did indeed feed on their own, either during the night or certainly at pre-dawn, before then forming some sort of post-feeding gathering to loaf and preen awhile before then setting off together back to the colony.

Poole Harbour's population

Method

Spoonbill populations were determined from day roosting birds. Little Egret populations were determined from night roosting birds.
Grey Herons night roost, day roost, feed by day and feed by night. Each seemingly having its own agenda. For example, at the Arne roost some could be leaving at dawn to go and forage and meet birds coming the other way who had been out all night.

Counting day feeding and day roosting birds simultaneously was the only viable option, and this was only really made possible by enlisting the help of WeBS counters or more precisely their data. The WeBS counts proving particularly serendipitous as some of their recording areas also covered non-tidal areas such as Brownsea Lagoon, Little Sea and the Gold Point clay pit, which are important Grey Heron day roosts.

The not inconsiderable number of remaining areas were, where possible, also simultaneously covered by the survey. When all remaining areas could not be covered in the time available use was then made of previously collected data to estimate a likely figure.
This method could only be used from September until March, but by March the majority of the population were roosting at the Arne colony and so easy to count. Away from this site numbers were low and also readily monitored. During July and August however, extra observers were enlisted for coordinated counts.

Results

The highest number of birds reached during the survey was 62 in September 2017.

Fig 30. Monthly Poole Harbour population of Grey Heron

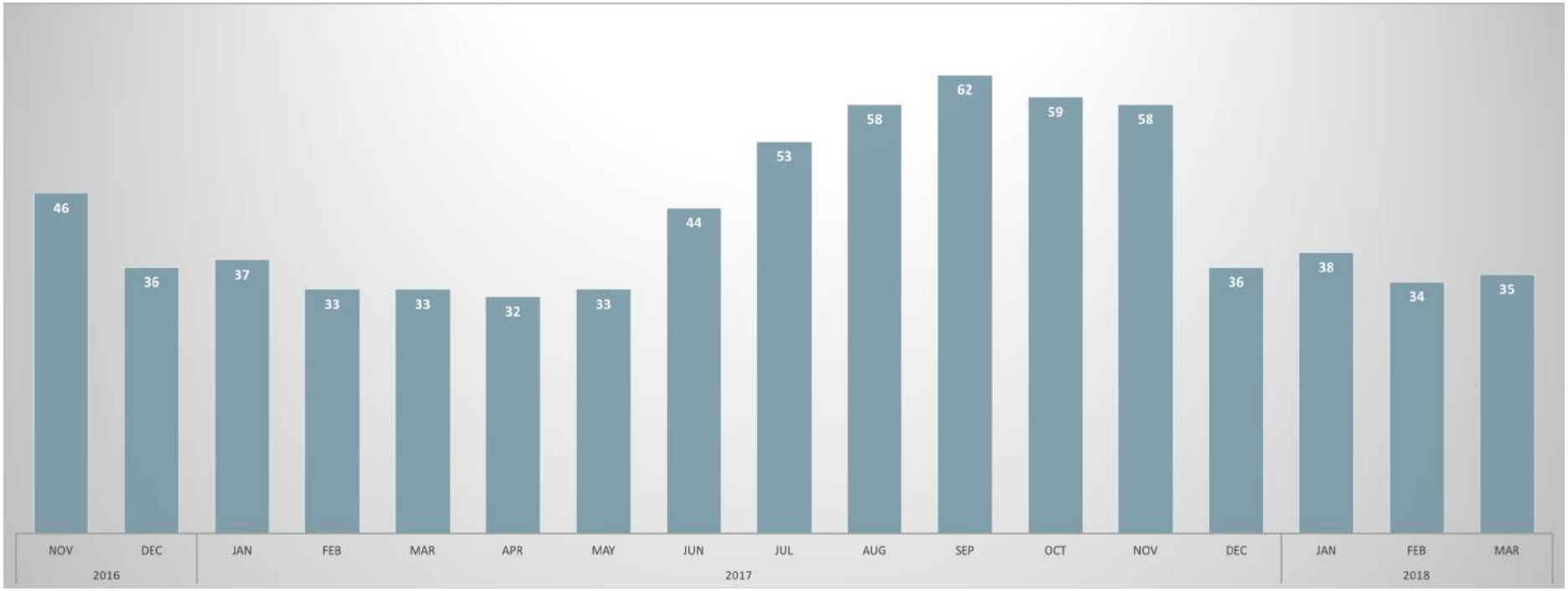


Table 18. Monthly Poole Harbour population of Grey Heron

2016		2017												2018		
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
46	36	37	33	33	32	33	44	53	58	62	59	59	36	38	34	35

Forty-six birds present in November at the start of the survey still included some lingering birds from the previous autumn's highs. A few departures at the end of the month saw the population drop to 36-37 for December and January. A few more departures before the population then settled to its breeding season numbers of 33 from February until May.

June saw the first increase in numbers of the year, as the first fledged birds arrived on the scene. The increase in numbers carried on through July August and into September in gradually decreasing increments, culminating in a high count of 62 in September.

Rather intriguingly, the population then remained stable well into November, until finally dropping in December. A rather significant drop, falling just under 40% to 36 birds. January's numbers were slightly higher, with perhaps the occurrence of some new arrivals. As with the previous season there were a few departures in February with the population again stabilising to what was going to be the breeding season population.

Despite the very cold period at the end of February 2018, which sadly saw some Spoonbill succumb and many Little Egret disperse, many not to return, the Grey Heron population was actually higher than the previous year.
They are, after all, naturally the most northerly of the herons, with adults in particular being able to cope well with most British winters.

Discussion

As we have seen with other aspects of the survey, not all findings fitted neatly into regular theory. A read through mainstream literature which is based on findings, mentions that juvenile Grey Herons can start to disperse as early as late June, with birds continuing to do so through the coming months, the last ones dispersing in November. Then during the winter birds from inland areas move to the south coast for the winter.
Not what happens in Poole Harbour.
As we have just alluded to, the population from June to November was stubbornly stable. It then dropped in December rather than rose. Numbers up by one or two birds for both Januarys could conceivably have involved one or two immigrants, but could have also just as easily been a consequence of the vagaries of counting. There was certainly no influx.

Tackling the winter influx issue first, it seems likely that because of the presence of a well-established breeding colony and year-round territory holding birds, any arrivals may find it tough to find a decent unappropriated feeding area. This not being an issue at other sites along the south coast where there are no colonies and presumably fewer birds to compete with.

As to why juvenile birds from the harbour are seemingly not dispersing from the area until late November, I know not.
Unless we have another Blackcap situation, where we think we are seeing the same individuals but, in reality, the locals are leaving and being replaced by immigrants. For this to be the case however, the numbers of juvenile birds dispersing would have to have matched the numbers arriving each and every month in succession. I suppose stranger things have happened.

Looking at the situation from the standpoint of the local breeding birds, unless they are particularly successful breeders, it must have been that at least a few did indeed arrive into the area from other places during this time. Current understanding estimates average Grey Heron productivity at around 2.1 successfully fledged young per pair.
During the 2017 breeding season, the harbour population was at 32-33 birds of which 18 were breeding. At its height, the population was 62 birds which is a net gain of at least 29. For them all to have hailed from Poole Harbour, each pair would have had to successfully fledge 3.2 birds.
If they were averagely successful, they would have raised 19 birds to fledging stage, meaning at least 10 were immigrants. Perhaps a similar number therefore did disperse.

Literature also tells us that many birds return to their breeding grounds at the end of February. By this time some of Poole Harbour's birds are on eggs. The first arriving here as we have seen, is as early as November and all birds are on site by mid-January.

I think what we can probably agree on however, is that unless they like short winter breaks, none of our core breeding birds depart across the channel for the winter, turning up here as they do in December and early January.

Breeding population discussion

Lastly, and most significantly, Poole Harbour's most worrying departure from current literature is the fact that the Grey Heron population has been steadily increasing since the 1960's, whereas the population of Poole Harbour during this time has been significantly decreasing.

The below charts show yearly breeding pairs for Poole Harbour and the UK, along with computer generated trend lines.

Fig 31. Poole Harbour Grey Heron breeding pairs since 1963

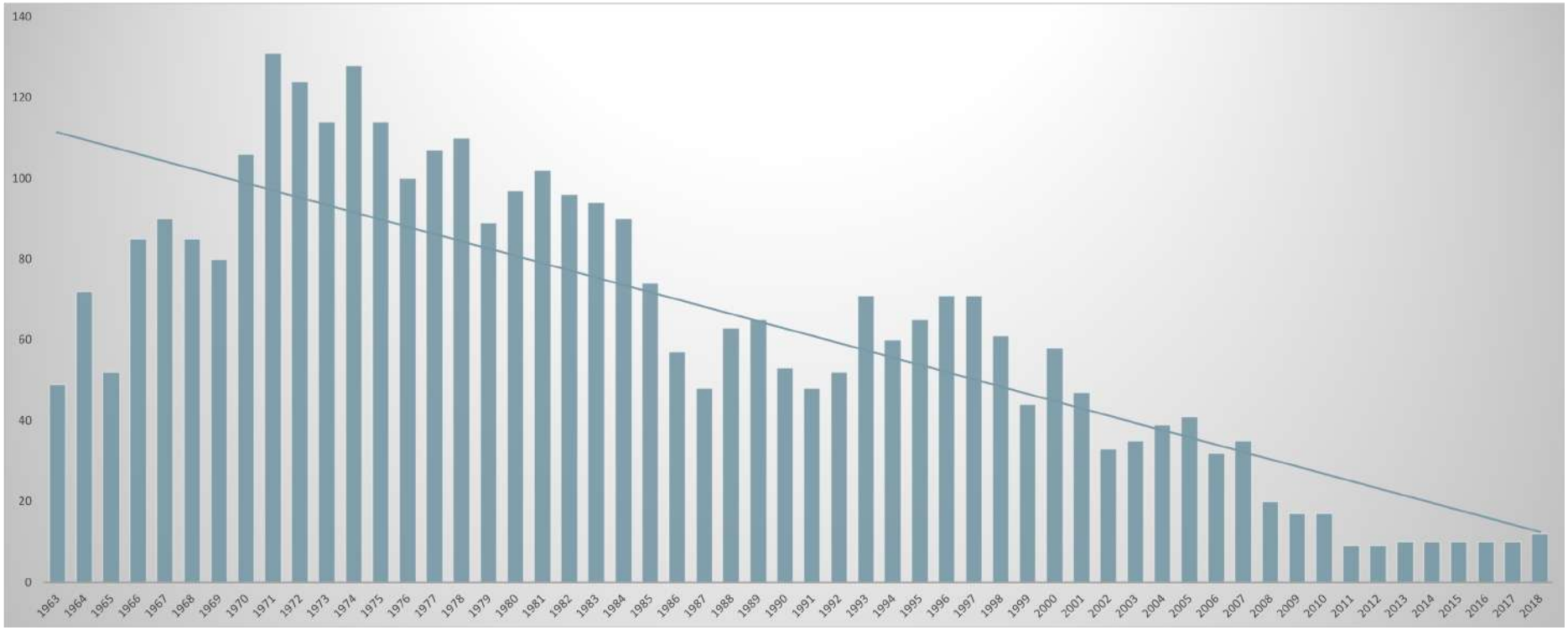
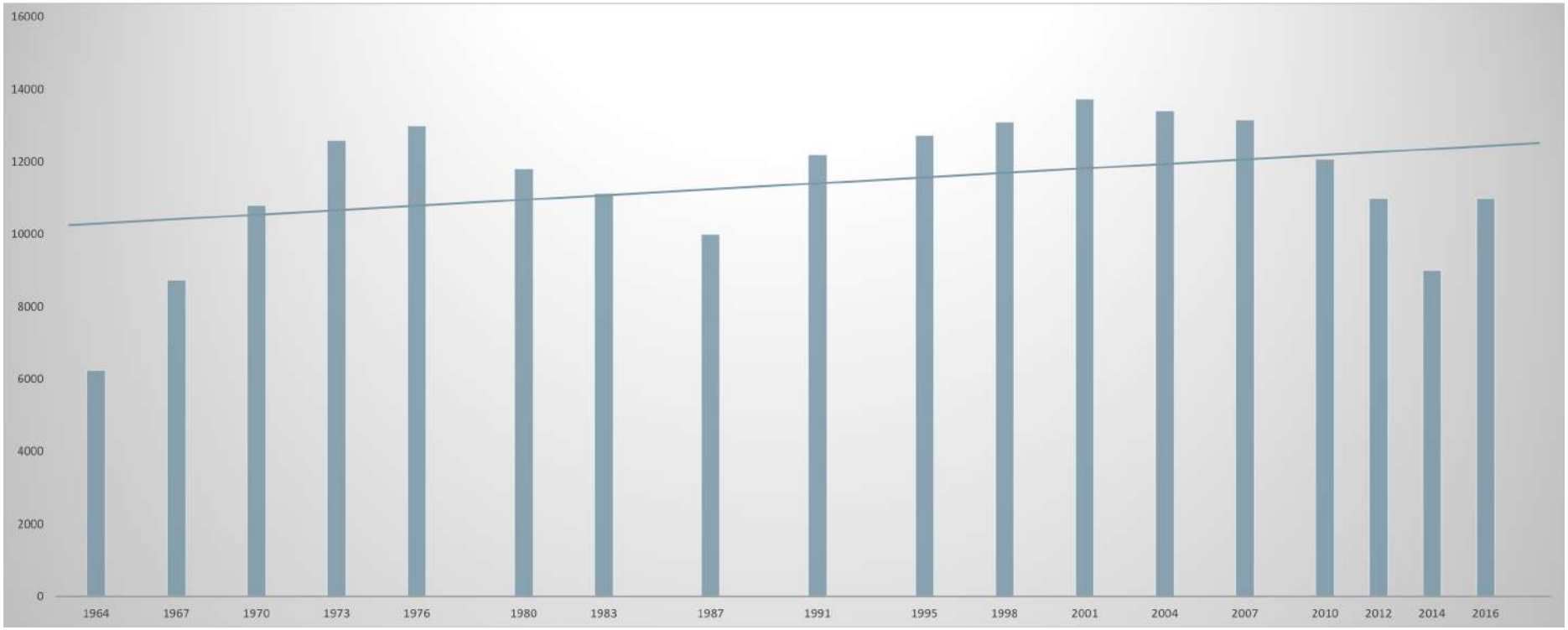


Fig 32. UK Grey Heron breeding pairs since 1963



It certainly doesn't look great. Reference to other colonies in Dorset reveals that it is not just a Poole Harbour issue, with most other colonies in Dorset also declining.

Could our issue be related to human pressures, with birds being gradually squeezed year on year? We do know that they are very sensitive to disturbance. The overall health of the harbour has vastly improved since the early 70's, but as we have seen, many of the feeding areas in the breeding season are beyond the recording area. Have these areas reduced in suitability?

Is the plantation failing them in some way? If it were the plantation then one would expect to see another colony formed elsewhere nearby, enabling the birds to continue using the same feeding areas.

For some time now in the UK, there has been a concerted effort to regenerate wetland areas, mainly to help the Bittern. However, the success of places such as the Somerset Levels and the Fens of East Anglia have also benefited other species including the Grey Heron, whose breeding numbers have increased in these areas.

Could it be that these places are generating an overall increase in UK numbers to such an extent that they are masking the downward trends being seen in other areas that are not quite so spacious?

Regarding the UK population chart, the dip that can be seen for the last few years has been attributed by the BTO to extreme weather including wind and rain and it is expected that the population is back on track toward the trend line.
Can we hope that this is also true for Poole Harbour, for which it could be argued has already reached rock bottom and is also on the way back up, let's hope so.

Given its importance also as the biggest Little Egret colony in Dorset, the last thing the Arne Plantation colony needs right now would be something like the whole area opened up to the public. Wait a minute, that is what is happening.

Little Egret

Introduction

The Little Egret, once an exotic rarity all the way from the Mediterranean, now a firmly established resident breeder in Poole Harbour.

Its expansion has been well documented. Initially stemming from a cessation of persecution at the breeding colonies in Mediterranean countries, the population saturated and expanded further north. Historically, the Little Egret moved south for the winter but juveniles could disperse in any direction. With an ameliorating climate, the birds dispersing north were able to spend the winter where they had ended up, eventually staying to breed. By this method their range gradually expanded north until they reached Britain. But they had been here before.

History of Little Egret in Poole Harbour

The first occurrence of Little Egret in Poole Harbour was probably around 7,000 years ago when the climate was distinctly Mediterranean.
The first bird officially recorded in Poole Harbour was on 23rd February 1946. Then a 21-year gap to the next record, a bird on Brownsea Lagoon from 25th May – 1st June 1967.
The first multiple record was in 1970, followed by 'three or more birds' in 1972.
The status of this species then changed dramatically in the late 1980's, with the start of an annual influx of birds into the area during late summer and early autumn. In 1987 the first bird overwintered and in 1996 the first UK record of breeding birds occurred on Brownsea Island.

Population

Method

To determine population totals, three methods were initially considered: low water counts, high water counts and night roost counts. It soon became apparent that by far the most accurate and indeed easiest way was to count night roosting birds leaving or arriving.
During low tide, not all used the intertidal areas, some staying hidden in the upper creeks and saltmarsh areas or using other habitats altogether. This problem was only exacerbated at high tide.

All night roosts within the recording area, and one roost outside of the recording area, that was being used by birds feeding within the recording area by day, were monitored. Roost population counts were undertaken fortnightly where possible, but at least monthly.

Observations at the roosts were split approximately 50/50 between early morning and late evening watches. On each visit, total numbers of birds entering or leaving the roost, group sizes, flight directions and timings were all recorded.

Results

Although there are resident birds, the population of the harbour was rarely static. Nearly every month containing a reason to leave or arrive.
The survey started in November but not all Little Egret roosts were located before December. The population totals therefore start from then.

Fig 33. Fortnightly population totals (two bars for each month, the first for the first half of month, the second for the second)

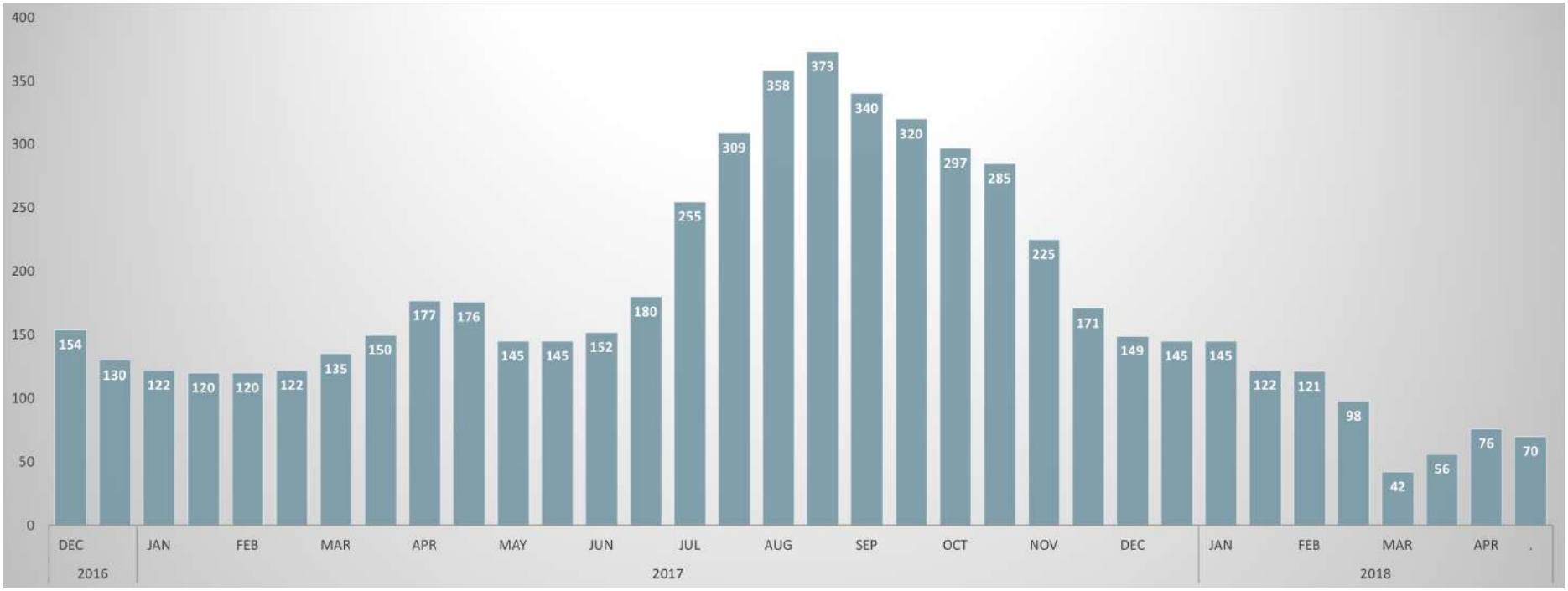


Table 19. Fortnightly population totals (two bars for each month, the first for the first half of month, the second for the second)

2016		2017															
Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug	
154	130	122	120	120	122	135	150	177	176	145	145	152	180	255	309	358	

2017									2018							
Aug	Sep		Oct		Nov		Dec		Jan		Feb		Mar		Apr	
373	340	320	297	285	225	171	149	145	145	122	121	98	42	56	76	70

During the first half of December the population was 154. A few departures in the middle of the month saw it drop to 130. A few more departures in late December into early January before the population stabilised at 120-122.
March saw the beginning of a steady arrival of birds with breeding on their minds. By mid-month the population had risen to 135 and by the end of the month 150. More potential breeding birds arriving and a number of migrants passing through swelled the numbers to 177 in early April. After the migrants had moved through, the breeding season population settled to 145.

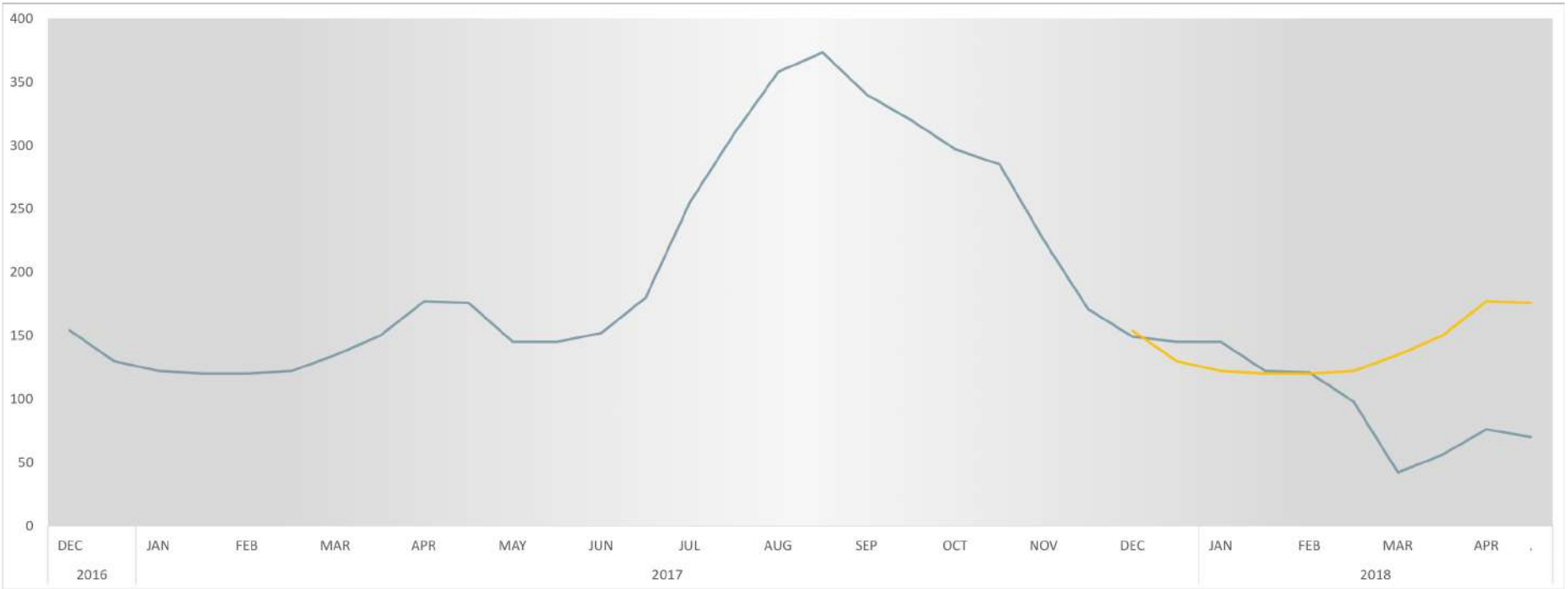
Late June saw the first fledged birds on the scene and the first wave of immigrants, pushing the population up to 180.
The influx picked up pace in July, taking the harbour population to 273 birds by the middle of the month. The momentum continued into August with a further 100 arrivals, the peak count of 373 being reached at the end of the month.

September saw two of the three main roosts continue to increase in size, both peaking in the second week of September. However, during this time the Arne Plantation roost was abandoned (more later) scattering roosting birds, not all of which were initially accounted for elsewhere. Overall numbers therefore instead of rising further, as would have perhaps been expected, declined to 320. October saw a natural decrease in numbers with a steady egress of birds throughout the month.
Departures quickened in November, with around 100 birds leaving the area. A further 50 left in the first part of December leaving the population into the second week at 123 birds. The population then remained unchanged until late February when temperatures dropped considerably.
Although some night temperatures prior to this had been below freezing on a number of nights throughout February, daytime temperatures were between 5 and 10 degrees, allowing thawing. The end of February, however, was a genuine cold spell, with night temperatures dropping to -7 degrees and critically day temperatures that included four straight days below freezing. Just 37 Poole Harbour Little Egrets saw out the cold spell.

From the middle of March, numbers recovered slowly to reach 76 birds in April. A few of these were spring migrants passing through, the population eventually settling down to 68 in May.

The chart below shows the same data as Fig 33, but with the first ‘winter into spring’ period repeated alongside the second, to illustrate the dramatic difference in numbers for the two periods.

Fig 34. Fortnightly population totals with first 'winter into spring' period repeated



Night roosts

Night roosts were located at Little Sea, Arne Heath and Pergin's Island in Holes Bay, with exclusively winter sites at Holme Heath and Holton Heath.

Little Sea was the only site to be occupied in all months of the year. The roost at Arne Heath plantation was also a breeding colony. It was expected to be occupied in all months but was deserted on 1st September, remaining empty until mid-December (more later). During this time some of the birds used a temporary alternative site some 500 metres to the north east, in a clump of willows on an island in the middle of a small pond.
Pergin's Island roost was occupied in all months except May, Holme Heath Plantation from October to April and the Holton Heath pine tree roost was only occupied from January to March in the second winter period.

Assessing the roost sites in terms of importance is rather moot, with not all roosts serving exactly the same purposes, apart from perhaps Little Sea and Pergin's Island. Of these two, Little Sea just comes out on top, with a maximum count of 150 birds to Pergin's Island 140, and an average of 45 birds per month compared to 40 for Pergin's Island.

Arne Heath roost reached a maximum of 137 birds on 6th April. The temporary roost at Holton Heath held a maximum of 48 on 18th January 2018 and

Holme Heath Plantation reached a maximum of 24 on 19th January 2018.

Fig 35. Poole Harbour roost site locations

As can be seen from the above map, the roost sites are pretty much equidistant. Only Holton Heath doesn't conform, being only a short-term arrangement to service a temporary feeding site.

Little Sea, Studland

A Little Egret roost has been present at Little Sea since the first multiple numbers of Little Egrets began to appear in the harbour.
The site is a typical Little Egret roost site, being above water with both low and higher vegetation to roost in and sheltered from the prevailing winds.

Fig 36. Little Sea roost fortnightly maximum counts

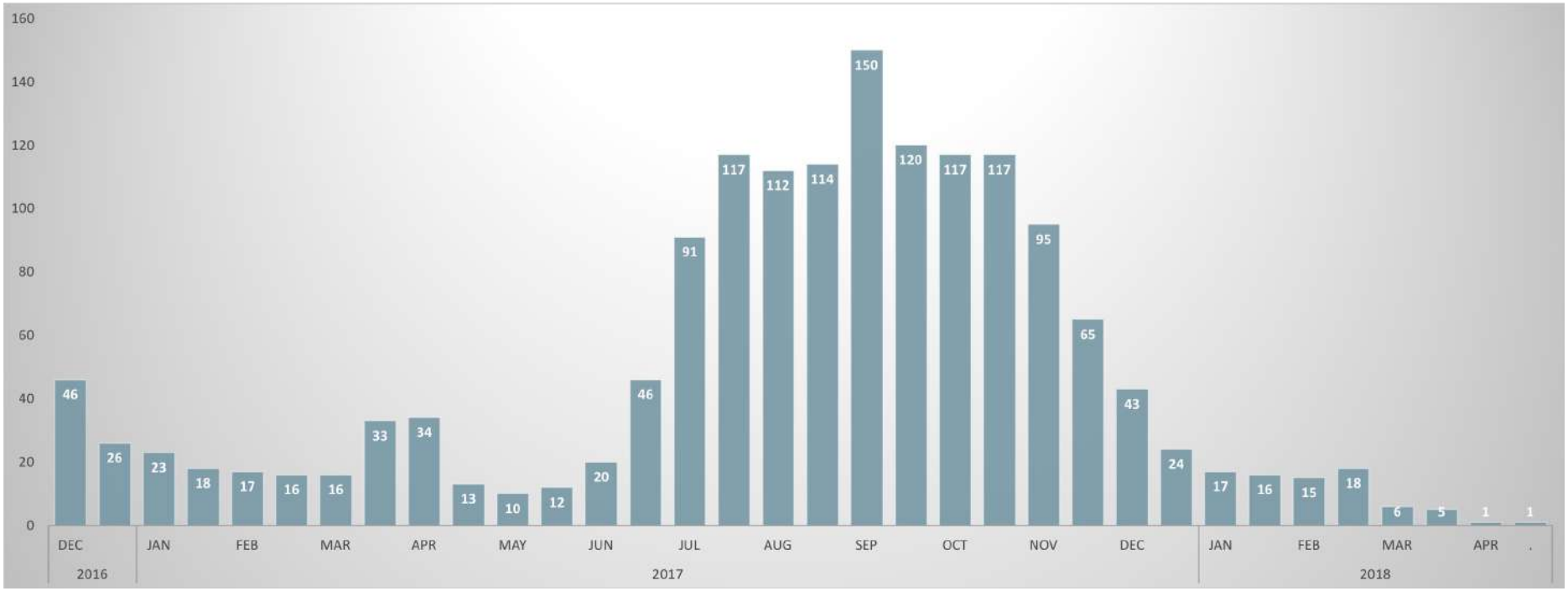


Table 20. Little Sea roost fortnightly maximum counts

2016		2017														
Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug
46	26	23	18	17	16	16	33	34	13	10	12	20	46	91	117	112

2017									2018							
Aug	Sep		Oct		Nov		Dec		Jan		Feb		Mar		Apr	
114	150	120	117	117	95	65	43	24	17	16	15	18	6	5	1	1

During the first half of December 46 were present, but numbers soon declined to the mid-twenties by the middle of the month. January saw one or two more birds leave until numbers stabilised at 16-18 through until early March. The second half of March saw an increase to 34 birds into April, after which numbers declined again to just 10-13 to late May.
Early June saw the start of the post-breeding influx, with numbers steadily rising through July and quickly reaching 117 birds. A consolidation of numbers in August before another small influx in September pushed the numbers to a peak of 150. Almost as quickly however, numbers were back again to where they were pre second influx, suggesting that these arrivals had already moved through. October numbers remained stable until the first few birds began to move on toward the end of the month. From then, a steady exodus right through until January, leaving around 15-17 birds to spend the winter.
The status quo however was interrupted in late February by the period of very low temperatures, seeing off all but six of the hardiest birds. These volitionally moved on towards the end of March leaving just one in April, compared to 34 that were still present the previous April.

Flight lines, destinations and catchment area

Wherever the intended destination, with only the occasional exception, only two specific flight lines were taken out of the roost. Both allowing initial flights to be over water.
One was out to the north east, which then rounded the promontory to continue north. Only from here would birds intending to head west, actually veer west. For those intending to go northward, the route over water could be maintained for a while longer.

For birds wishing to head south, the initial route out was directly east, then around the corner to continue over water southward. On reaching the southern end of the lake, birds would then take their particular route, depending on destination. This was either to the southern end of Studland Bay or, in the winter months, the cattle fields around Manor Farm.

In practice, most used the northerly route out as nearly all the feeding areas were to the west or north of the roost. The balance of power however did shift during the winter months, when a larger proportion of the now much smaller population were using the cattle pasture at Manor Farm fields.
Flight lines back to the roost followed the same routes with, for example, all birds coming in from the west or north appearing low over the water from around the promontory.

Fig 37. Flight lines out of Little Sea roost. (hatched areas represent the range of directions that could occasionally be taken after a certain point).

On a small number of occasions, the odd bird was also seen to take off directly north west (dotted line) on a more direct route to Brands Bay. On an even smaller number of occasions, a few headed back in this way; these invariably involved birds returning very late in the day.

For birds heading out north, depending on the time of year, Bramble Bush Bay, the southern shores of Brownsea Island and Brownsea Lagoon were the main destinations. A few were also seen to carry on further northward to reach at least as far as the shoreline below Evening Hill. Beyond here no direct observations were made, but no doubt sightings from Blue Lagoon, and probably Parkstone Bay, involved some of these individuals.

Fig 38. Little Sea roost catchment area

To the west, direct observations revealed flights as far as the southern end of Round Island, with some perhaps later drifting even further to the west.
To the south, birds were seen to reach fields just south of Ulwell.

During the autumn period, destinations were more obviously governed by the tidal regime. If dawn coincided with a high tide, many birds could be watched tracking their way straight to Brownsea Lagoon. A low tide, and the majority would take the west north west route out toward the intertidal areas, with only the odd one or two taking the northerly heading.
On 12th August, 112 birds were counted roosting at Little Sea. On 16th August, the high tide count at Brownsea produced 112.

At all other times, the majority of birds headed out on their usual route regardless of the state of the tide as the destinations would invariably be close together, either the intertidal areas if low tide or neighbouring upper saltmarsh areas if high tide.
None flew directly to Brownsea.

During the core winter months, a much larger percentage of the now much reduced numbers headed out south to Manor Farm fields and Studland Bay.
On more than one occasion in mid and late January, all roosting birds were seen to leave to the south to use the cattle fields.

Leaving and arriving

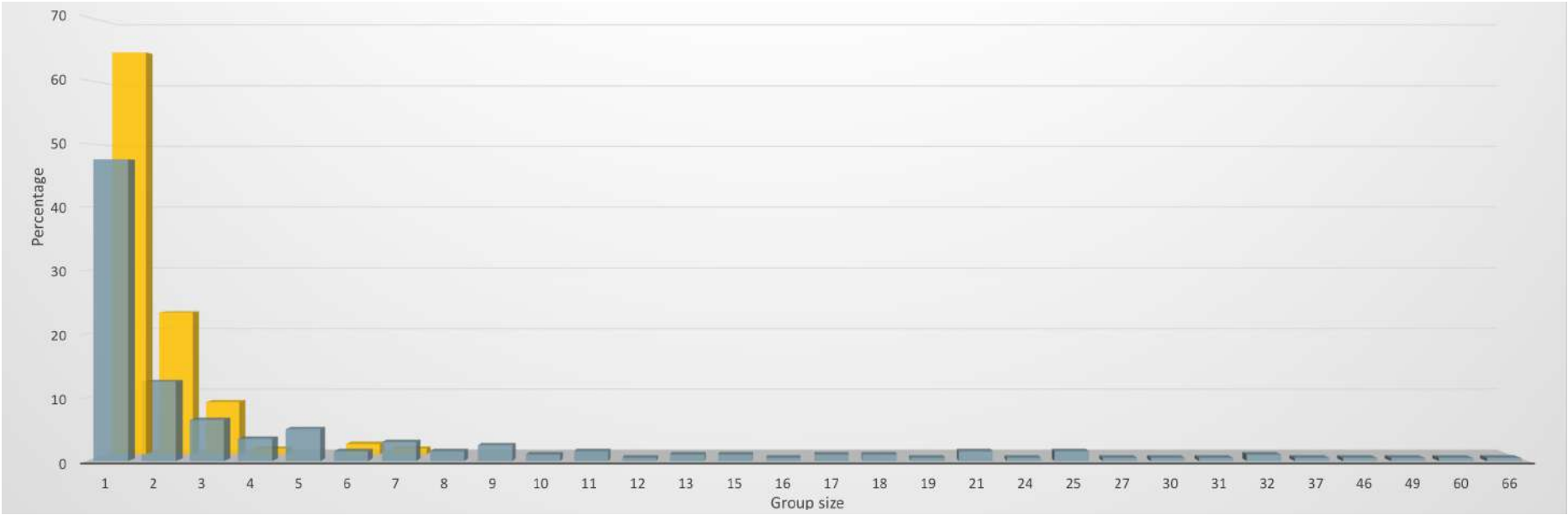
Leaving and arrival times and extents of these periods varied with the time of year and state of the tide, with birds tending to leave on average later during a morning high tide than a low one. Time of year didn't seem to particularly affect leaving times, with all keen to get out early and feed, but it did affect return times with many birds arriving back a lot earlier in the summer and early autumn months having adequately fed.

In winter, all daylight hours possible were used. If there was an early morning high tide then some alternative high tide feeding would be found.
Away from the core winter months, not all birds conformed to the general patterns and there could be some quite large discrepancies in leaving and arriving times between birds.
In general however, the first out would leave in very low light levels, anywhere between 55 and 25 minutes before sunrise, often before the Tawny Owls had finished hooting. This didn't always prompt a response from the other birds, who were happy to continue preening for a while, although most left not too long afterwards. As is the way however, there were always birds that struggled to get up in the morning.
Away from the colder months, the last birds could leave the roost as long as an hour and twenty minutes after the first birds out.

Birds generally arrived back at the roost around 10-30 minutes after sunset. In mid-summer, some could arrive back at the roost up to 45 minutes before sunset, however there were always late arriving birds even then. Perhaps less successful foragers.
In mid-winter most used all the light available with many often arriving back at the roost in the dark. During bad weather however, the even the most determined were forced back to the roost before dark.

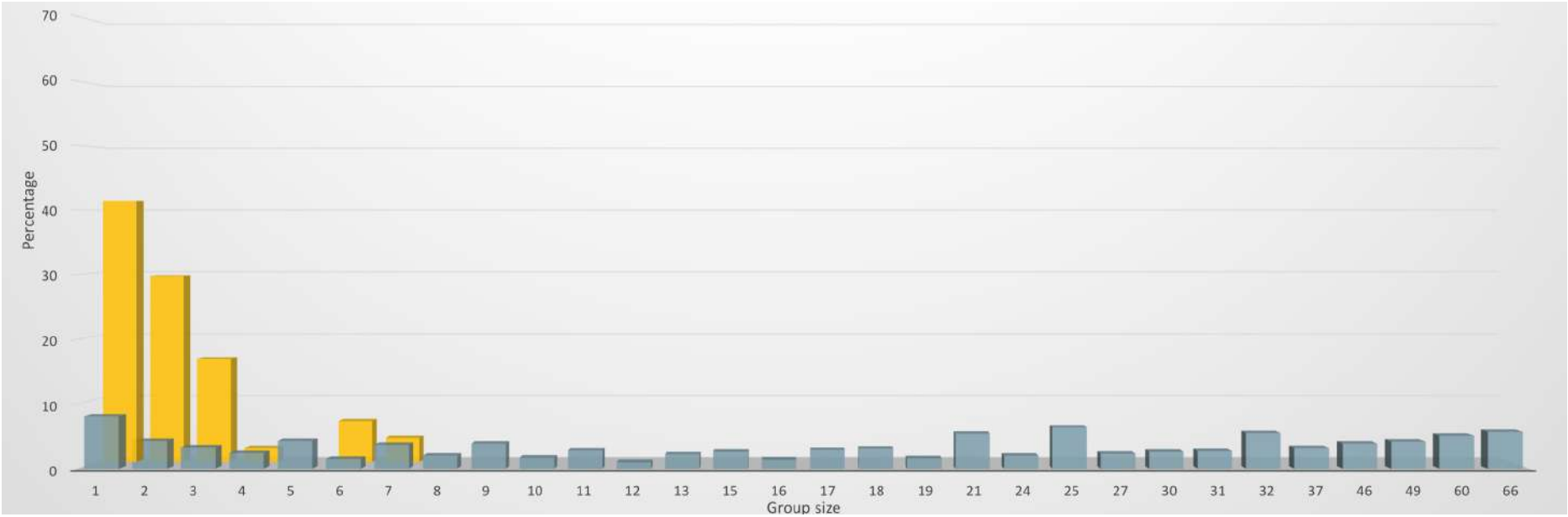
Leaving and arriving group sizes were also recorded. No one morning or evening produced the same pattern of group sizes, although there were some general patterns. The most significant being the majority of birds left the roost as a part of a flock, anywhere from two to 66 birds were recorded, but nearly all returned in ones and twos and never in a flock size greater than seven.
The relationship between the percentages of the sizes of leaving and arriving groups is shown below. From the chart one can see the countless number of large leaving groups, but the highest percentage by far was a 'group' size of one. For the birds arriving back, all the large groups have now disappeared and been replaced by an even higher percentage of groups of one and two birds.

Fig 39. Little Sea leaving and arriving groups (Grey leaving, Yellow arriving)



The differences are even more stark when one considers the data represented in terms of percentages of individual birds involved in the groups.

Fig 40. Little Sea leaving and arriving individuals in the groups (Grey leaving, Yellow arriving)



As to which chart best represents the situation is perhaps a matter of opinion. However, the lower chart is probably more representative as it better demonstrates the numbers of choosing to leave in a large group as opposed to leaving on their own.

As alluded to earlier, July and August saw rather extended pre-leaving loafing and preening periods. For the locals however it wasn't always relaxing. With the addition of lots of fresh arrivals including many new to the area, there was quite a bit of confusion. There were birds flying out of the roost, only to fly back in, others following small groups, only to change their mind and fly back in. There were birds changing positions in the roost and a lot vocalisation.
The classic communal roost scenario presumably, with nobody knowing where they were going and trying to follow out the most likely looking birds that would take them to a good feeding area.
At times the behaviour bordered on the bizarre, with some birds pulling and pecking at twigs, snapping off branches and playing with them. More than one was seen to fly out of the roost carrying a branch. By mid-August things had settled down to a more orderly leaving procedure.

Arne Heath plantation

Located in a stand of tall conifers, adjacent to the shoreline in the south east corner of the Wareham Channel. Roost site and breeding colony.

Fig 41. Arne Heath Plantation roost fortnightly maximum counts

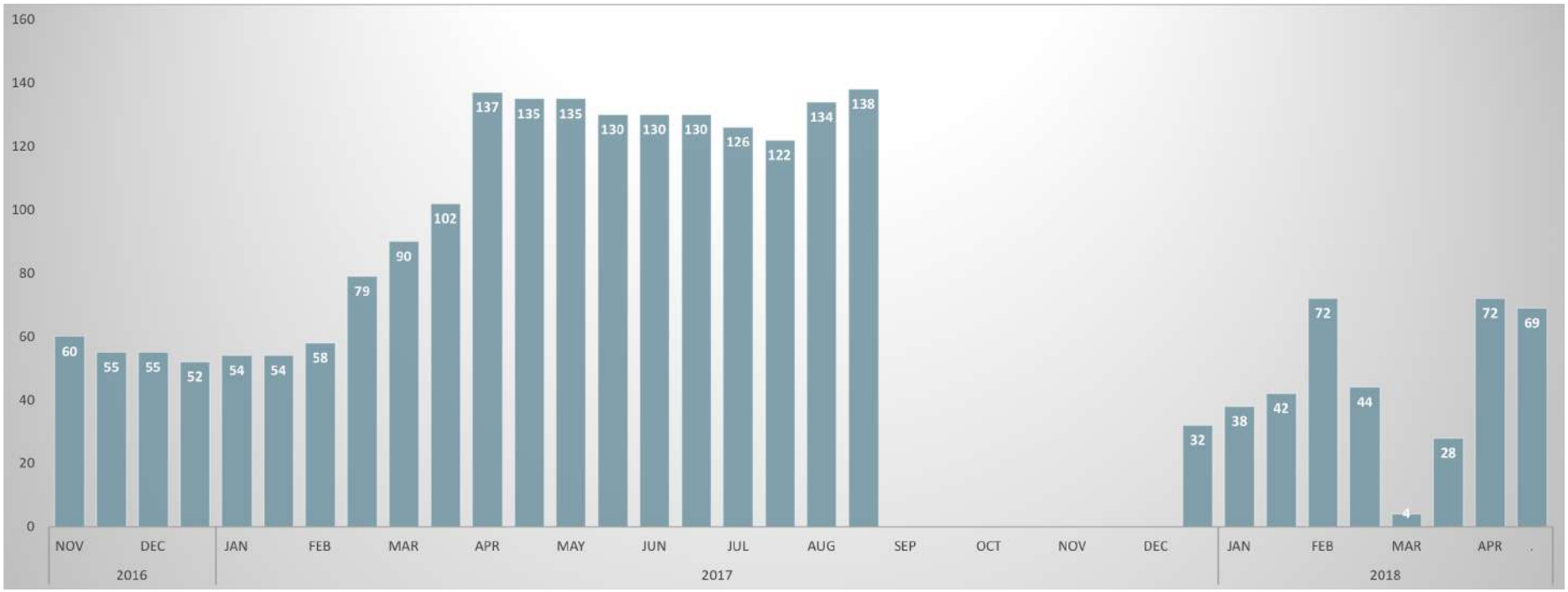


Table 21. Arne Heath plantation roost fortnightly maximum counts

2016				2017													
Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul	
52	55	55	52	54	54	58	79	90	102	137	135	135	130	130	130	126	122

2017										2018							
Aug		Sep		Oct		Nov		Dec		Jan		Feb		Mar		Apr	
134	138	0	0	0	0	0	0	0	32	38	42	72	44	4	28	72	69

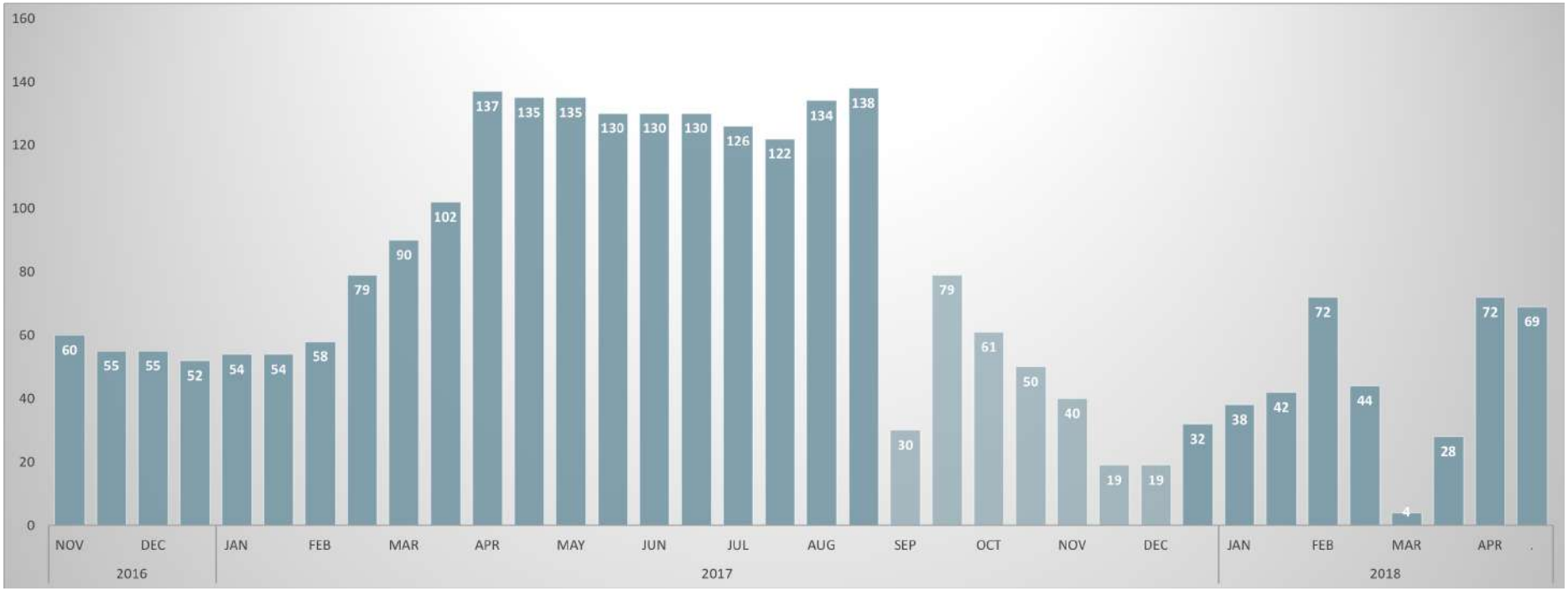
During the first winter period, 52-55 birds attended the roost. The increase in numbers began as early as February with birds already starting to look forward toward the breeding season. By the end of the month, the total had grown to 79. The steady inflow continued through March, culminating in a flurry of arrivals in the first half of April that took the population to 137. This number reduced slightly in May as a few of the migrants moved on. Disturbance was kept to a minimum during the breeding season but a dedicated count in May revealed 130 birds.
A July count revealed a slight decline in numbers from May, but by August any evidence of departing birds was masked by a higher number of arriving birds, the numbers rising to 138 by the end of the month.
An early morning visit on 31st August, however, was met with some very close gunshots. Observations revealed a wildfowler who was not only shooting out of season but had decided to do it within the RSPB reserve, right next to the roosting Little Egrets. The roost was subsequently abandoned. The matter was reported and no repeat occurrences were encountered.

The roost remained empty until the middle of December, when a handful of birds returned. By the end of December there were 32, with numbers steadily rising through the winter to reach 72 by the third week of February. There was yet another twist however, but this time it was mother nature who was the villain. With night temperatures dropping to -7 and day temperatures not rising above zero, there was another large exodus. By early March the roost had reduced to just four hardy souls. When temperatures improved, birds began to return again, with 28 back by the end of March. April saw more new arrivals and by mid-month the population was back up to 72, dropping off slightly again into May as a few of these birds moved on.

After the abandonment of the roost in September, some 30 birds returned a few days later and formed an alternative roost some 500 metres to the north east of the plantation, in a clump of willows on an island in the middle of a small pond. The small bush-like trees were not at all substantial and far from ideal, but more gradually turned up and by the end of the month 79 had managed to squeeze in. The capacity of the roost was tested no further however as birds began to naturally leave the area in October and by the end November the roost held just 19.

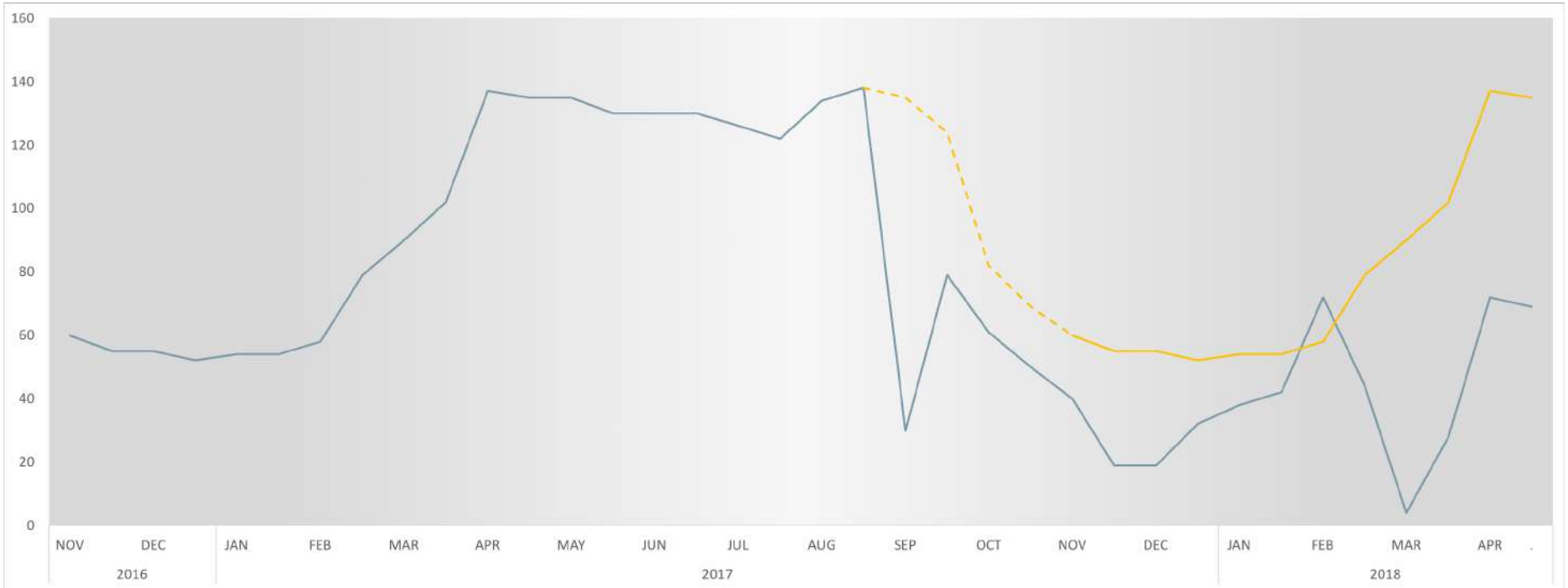
Early December saw some strong winds with birds visibly struggling to maintain a position in the roost. They were clearly having issues and by mid-December patience ran out and this site was abandoned. The 19 birds all returned to the original plantation roost.

Fig 42. Arne Heath plantation and pond roost fortnightly maximum counts. (Dark bars plantation roost and paler bars pond roost)



The chart below shows the same data as above, with an additional line corresponding to the previous November to May to demonstrate just how disruptive the shooting and the cold period was on numbers. (The dotted line is an estimation of likely numbers in the months preceding the start of the survey to aid interpretation)

Fig 43. Arne Heath roost fortnightly maximum counts (dark line) with previous year's numbers repeated (Yellow)



Despite the disturbance setback, numbers by early February 2018 (as can be seen on the chart) had actually recovered to slightly higher than the previous February for a short while, until the cold weather arrived. Numbers after this setback however did not recover to anywhere near the previous year, with the population in May 2018 just under 39% of May 2017.

Flight lines and destinations

As with Little Sea, specific flight lines in and out of the roost were observed by the birds, allowing them to initially travel over water. As can be seen on the map below, this led to some rather circuitous routes.

Fig 44. Arne plantation flight lines

For birds heading out west, the most direct route was hardly compromised by following the shoreline. On approaching the Frome river mouth, birds then took their separate routes. Destinations included the north west part of Arne Moors, Bestwall, Wareham Water Meadows, Frome Valley, Swineham gravel pits and the Piddle Valley.

For birds leaving to the north, the western shoreline of the Arne peninsula was followed. Birds heading for Holton Bay split off first, preferring to round Shag Looe head rather than fly over it. The rest continuing northward, with these taking a variety of headings, the main two were north toward Rockley Bay and Lytchett or north east to follow the entire peninsula right around to Gold Point and beyond.
For birds travelling to Middlebere and Wych, following the northern shoreline around Arne and then back south was a step too far, so an overland route was necessary. But even here birds kept to a defined flight line, following the tree line along the western edge of the heath instead of a more direct route across the it.
No birds left to or arrived from the East, North East or South East.
Return flights followed the same flight lines.

Numbers heading out and arriving back from the south showed similar numbers and a consistent pattern between the two winter periods, suggesting perhaps the same individuals involved.
For both winter periods, November and December saw 23-25 birds regularly leaving this way and 13-14 in January and February.
The consistency in numbers for the two winter periods was interesting, given that very different numbers were using the roost during those periods. In the first winter period for example, the numbers of birds heading this way represented between 20-40% of the total roost numbers whereas, at times during the second winter period, with much reduced numbers they represented 100% of the roost numbers.
Away from these months, the percentage heading this way was around 15%.

Commonly around 45% of the birds left directly north, but at times dropping to as low as 20% or rising as high as 70% during a low tide in August or September for example, when a larger proportion of the roosting birds were using the Wareham Channel to feed.

Only a small percentage tended to head out west, rising in numbers slightly during early morning high tides as birds headed for favourite loafing areas.
The number leaving to the west was highest in late November into early December, when birds began to use the winter cattle fields to feed. The number then dropped off significantly when these birds switched roost to Holme Heath Plantation.
An increase in birds heading out west occurred in March when a significant increase in rainfall flooded large parts of the floodplain.

Catchment area

To the west, a few individuals were seen to fly beyond Holme Bridge, but usually not too far. During the breeding season however, some could continue until out of sight.

Fig 45. Arne Heath Plantation roost catchment area

To the south, the furthest point any birds were seen to go were Norden cattle fields. For those heading south east toward Middlebere and Wych, things are a bit fuzzier. Certainly, birds were seen heading over to the western arm of Wych Channel and Wytch Causeway. Observations at other periods also saw birds heading from here over to Fitzworth and beyond, that no doubt involved some from the Arne roost.

Birds heading out north toward Lytchett regularly carried on to Lytchett Fields and during the winter, further west to fields west of Lytchett Minster. None were seen to go further west than Organford.
For birds then veering more north east, most seem to be heading for the eastern arm of Lytchett Bay but a few could venture over Hamworthy, presumably to Holes Bay.

A small number frequented parts of the Piddle Valley, regularly as far as the Wareham by-pass and irregularly further up the valley. On a couple of occasions, single birds were seen heading further west up the valley at some height, to destinations unknown.

Leaving and arriving

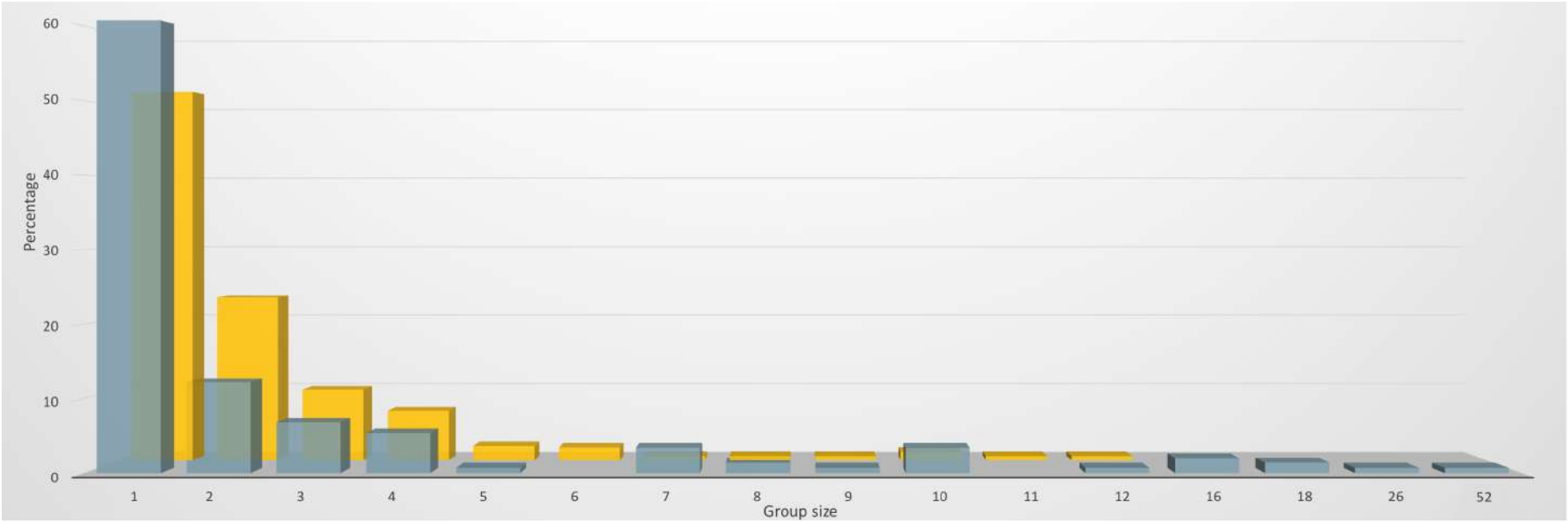
As with Little Sea, leaving and arriving times and extents of these periods varied with the time of year and state of the tide. There were local nuances however, with some arriving from the south in winter consistently later than birds from other areas, often in virtual darkness having been pre-roosting at Middlebere.
Leaving times here did seem more strongly linked to the tidal state than at other roosts, perhaps due to a greater proportion of birds using the intertidal areas, with the Wareham Channel being on the doorstep.
The first birds out were up to 55 minutes before sunrise and on average around 25 minutes before. At the end of March however this all changed with many remaining within the roost trees early morning, spending the time renewing old acquaintances, or making new ones. Return times to the roost were also earlier for the same reasons.

Whilst the temporary pond roost was in use, at dawn on a high tide many birds would leave the roost willows and go no further than a few feet to the stand of tall trees near the shoreline, to preen whilst waiting for the tide to drop.
Similarly, during an evening high tide they would often pre-roost in these trees before moving to the roost as it got dark. Interestingly no birds were observed using these trees for such activities when they were using the plantation roost.

Any single birds arriving to the pond roost first in the evening were always nervous about alighting, not wanting to be the only ones in the roost. This resulted in some very hesitant flying around on arrival with birds then invariably flying off again. Some slightly bolder birds would land, but it wouldn't be long before they too lost their nerve and flew back out. Eventually, a group of three or four would arrive and settle. Even then quite a bit of shuffling and calling and short hops and flights to various points would occur before it all settled down.

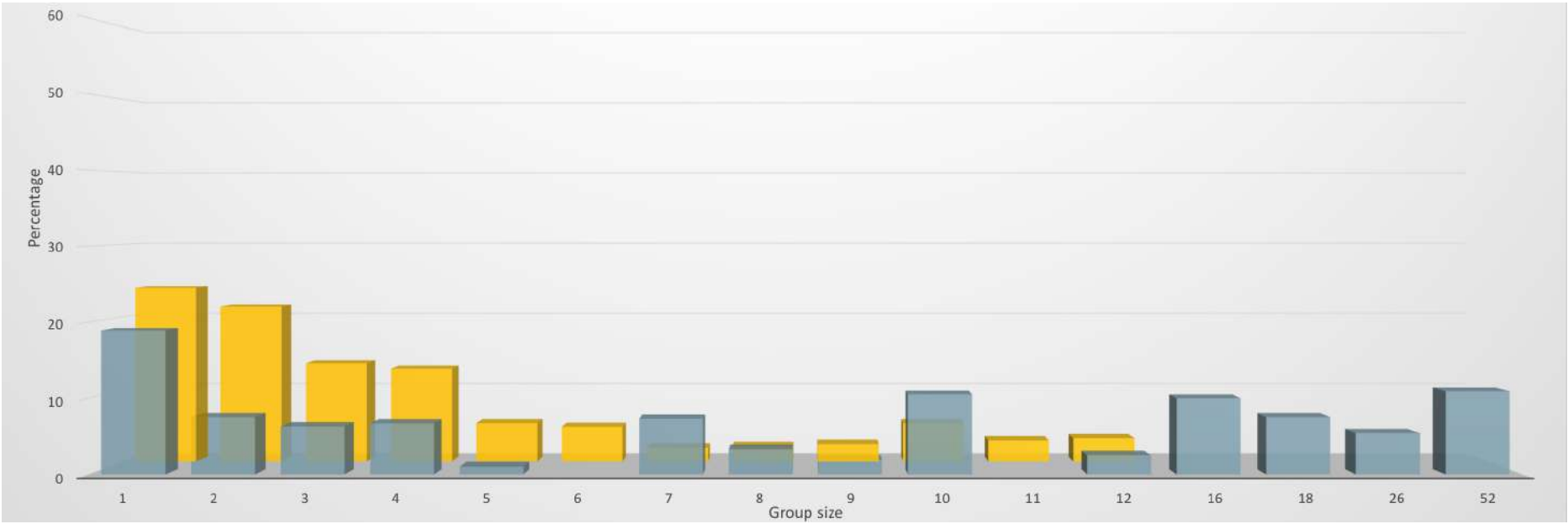
Leaving and arriving group sizes for the plantation roost were also analysed. As with Little Sea, leaving groups tended to be larger than returning groups, but not nearly so stark a difference. Also, the 'large' groups here were not as large. (A flock of 52 leaving together in April was thought to have been disturbance related).
The 'group' size of one dominated however, accounting for 61% of all leaving groups and 52% of all arriving groups. As can also be seen a few larger groups could also arrive back together.

Fig 46. Arne Heath plantation leaving and arriving groups (Grey leaving, Yellow arriving



As with Little Sea, the charts look slightly different when the same data is used to represent the percentage of individual birds involved in each group size.

Fig 47. Arne Heath plantation leaving and arriving individuals in the groups (Grey leaving, Yellow arriving



Pergin's Island, Holes Bay

Located in conifers toward the southern end of Pergin's Island.
Occupied 10 months of the year, with birds absent from the middle of April until the middle of June.

Fig 48. Pergin's Island roost fortnightly maximum counts

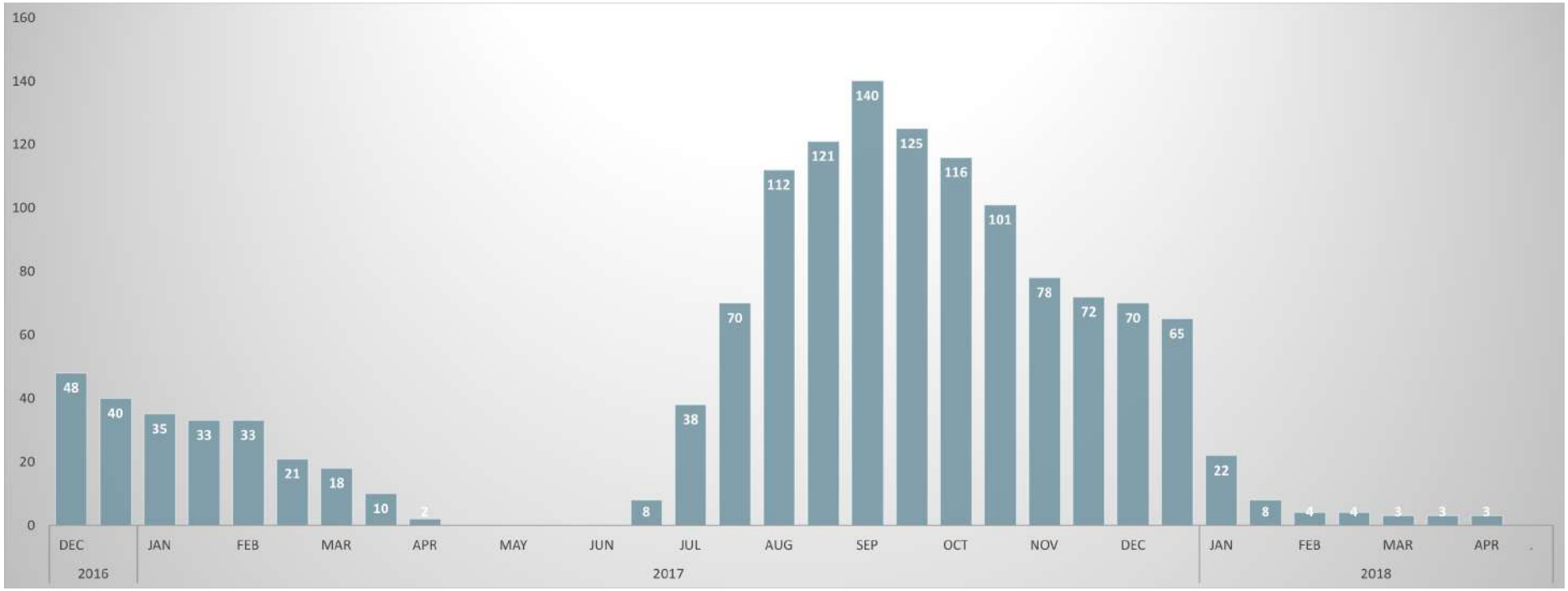


Table 22. Pergin's Island roost fortnightly maximum counts

2016		2017														
Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug
48	40	35	33	33	21	18	10	2	0	0	0	0	8	38	70	112

2017									2018							
Aug	Sep		Oct		Nov		Dec		Jan		Feb		Mar		Apr	
121	140	125	116	101	78	72	70	65	22	8	4	4	3	3	3	0

Highest numbers of the first winter period were in the first half of December with 48 birds. A few moved on in December until the population settled down in January to 33-35. Mid-February saw the start of the first spring departures, reducing the population to 21 by the end of the month. The steady exodus continued through March and into the first week of April leaving just two here. These were gone by mid-April.
The first returning birds were seen in the third week of June, with four arriving. By the end of July numbers had reached 70 and by the end of August 121. Numbers peaked on 4th September at 140, after which departing birds outnumbered arriving birds, reversing the trend.

During the second winter period, 70 birds were still present in the first half of December only declining to 65 by the second half of the month (60% higher than the previous winter period). Late December and into January however saw numbers drop off considerably, leaving only 22 birds. More departures later in January left just eight. Four birds during most of February reducing to three during the particularly cold spell at the end of the month. All of these seeing their way into April before finally moving on.

Flight lines and destinations

Unlike Little Sea and Arne Heath, flight directions out of the roost were determined only by destination, with all heading out to their chosen feeding sites pretty much directly. This was due to local feeding areas being accessible directly over water and other destinations having no viable shoreline route to follow. The only exception were birds heading for the south east of Holes Bay who preferred to give the moored Yachts a wide berth to reach the area south of the marina.

The map below shows just some of the typical flight lines used. A couple of the more regularly used being straight west, taking birds to Lytchett and beyond and south south east to the urban shorelines of the harbour, although this route was only used by a handful of birds.
The majority left the roost on a heading with a westerly bias, the large proportion of feeding destinations being to the west of the roost.

Fig 49. Some of the more popular routes out of Pergin's Island roost.

During the autumn months when numbers were highest, the most common leaving direction was to the south west. During this period, 40-60% of birds headed this way. In August, around a half and in September and October two thirds to three quarters of these birds flew beyond Holes Bay. The destinations being the northern part of the Wareham Channel, southern parts of Lytchett Bay and the north Arne area.
As autumn became winter, more and more (in percentage terms) began to leave directly to the west. More than 50% of birds heading this way from December onwards, until most of these relocated to the more conveniently placed Holton Heath roost.

On a number of occasions in mid-winter, in both winter periods, a small group of birds (typically four) were seen to leave to the north west. The destination of these birds was never determined, but extrapolation of the flight line suggested fields to the west and northwest of Upton Heath.

Catchment area

During the winter, some of the birds heading out west toward Lytchett carried on west and north west to fields at Organford and Hill Farm. None were seen to go further west than Organford.
Others, on reaching the east arm of Lytchett, could then veer south west to Rockley. Observations revealed these birds going at least as far as Holton Bay. It doesn't seem unreasonable to assume that later in the day they could have ventured further south.

Routes out to the south west provided a more direct route to the northern half of the Wareham Channel, whilst birds on a more south south west direction could end up in the Arne area and no doubt beyond.

For the handful taking the south south easterly route out of Holes Bay, Baiter, Poole Park and Parkstone were the main destinations but no doubt on occasion a few sites further east. With birds here also being able to make use of the shoreline areas at higher tides, it seems doubtful that any flew to Brownsea Lagoon.

Fig 50. Pergin's Island catchment area

No birds were ever seen to head out north, north east, east or south east. Given what lies beyond this is not surprising, however during the winter Little Egrets often appeared at Hatch Pond having no doubt flown from Holes Bay. In previous years, flights have also been observed that strongly suggested birds also visited Creekmoor Ponds, both arriving from Hatch Pond and from Holes Bay (pers obs). Presumably part of their feeding routine but not perhaps first choice sites straight from the roost.
To the east, the odd bird was sometimes seen along the small river that runs alongside Kerry Foods.

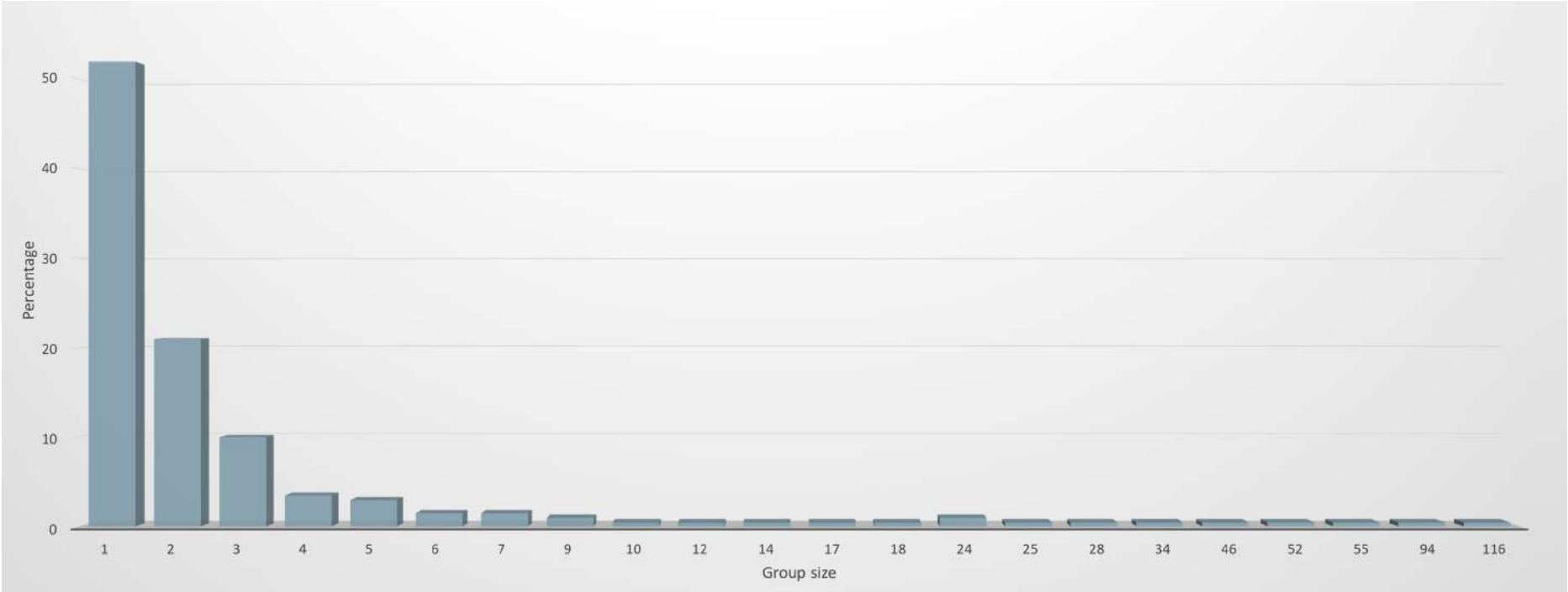
Leaving

The first out were very often single birds heading directly south along the eastern shore of Holes Bay. At times leaving pretty much in the dark, only viewable silhouetted against the backdrop of the street lighting behind. It was probably due to the artificial lighting that these birds were able to leave so early. The regularity of the event suggesting the same individuals involved.
The next birds out were not long afterwards. In fact, the average leaving time was the earliest of all the roost sites at 30 mins before sunrise, with the first out 45-50 minutes before sunrise. No slugabeds here with even the last birds out very rarely leaving after sunrise.

The promptness of leaving times was mostly a result of the tendency of birds roosting here to leave in significantly large sized flocks, or indeed one major sized flock. The flocks however never involved all of the roosting birds with still many leaving singly, usually before but also after the main flocks.

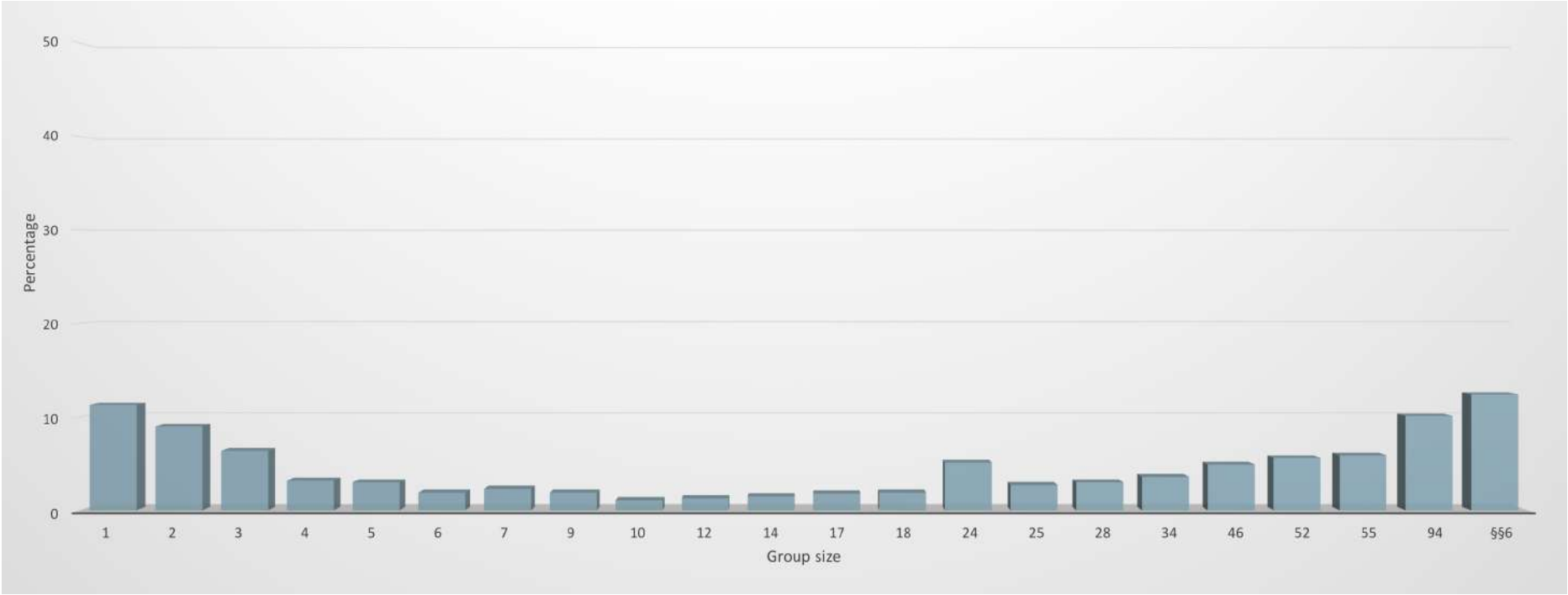
The chart below shows the frequency of leaving group sizes recorded in percentage terms. Despite the regularity of large flock sizes, single birds accounted for more than half of the leaving group sizes here also.

Fig 51. Pergin's Island leaving groups



Below, the same data representing individuals involved in those leaving groups shows that just 11% of birds chose to leave on their own. Calculations from the charts revealed that 61% left in a group size greater than nine.

Fig 52. Pergin's Island leaving individuals in the groups



Over the course of the year leaving group sizes changed, with the change conforming to a discernable pattern.
When overall numbers picked up in July, the pattern was toward a steady departure of small groups, interrupted by a single significantly large group.
A date in August for example saw the following groups leave the roost: 2, 1, 1, 1, 1, 2, 3, 3, 1, 1, 1, 4, 2, 68, 2, 5, 1, 3, 1, 5, 1.
Into September and October the pattern was more extreme. A date in September for example saw groups of 2, 1, 2, 116 and 3 leave, and a date in October was 1, 1, 1, 1, 1, 1, 1, 94.
This pattern continued into November, but towards the end of the month the single large flock departures ceased, being typically replaced by two or three largish flocks. A date in November for example: 1, 28, 2, 24, 2, 1, 1, 34, 4, 2, 2, 2, with December showing a similar pattern.

By January the roost size was smaller, so large numbers of birds leaving together was obviously not going to happen. However, in relative terms, there was a genuine change in the pattern with all now tending to leave in a series of very small groups (on to three birds) with no significantly large group sizes relative to the number of roosting birds. This pattern continued through the winter apart from the odd larger group size of seven that left together to the west to Lytchett.

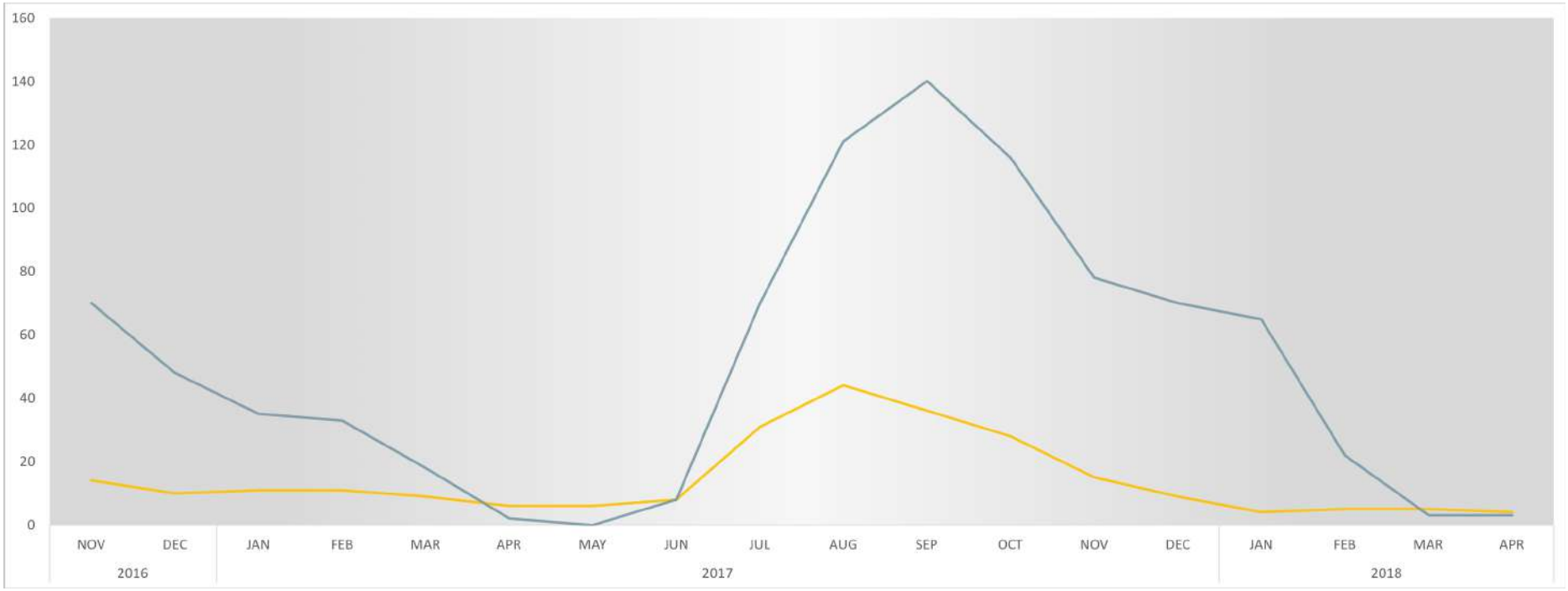
When the large leaving flocks were first observed, they were initially recorded as a disturbance flush, such was the dramatic nature of the event, with birds cascading out and scattering in all directions.

Return procedures were also different here, with many not choosing to fly straight into the roost on arrival, as would normally be the case. Here, although there were always birds that would arrive later and fly straight in, many arrived slightly early to either feed or pre-roost on the *Spartina*, depending on the tidal state. During winter, the cow fields were a popular pre-roost feeding site for birds that had fed elsewhere during the day.

Also, in contrast to other roosts, leaving times in the morning did not appear to be affected by tidal state at all. If the tide was high, birds were happy to come out of the roost at the usual time and fly straight to a high tide loafing area.
At low tides during the autumn, it was common for birds heading out west to pitch down on the intertidal mud for a while first, to preen and loaf before moving off west for the day. This post-roost loafing didn't occur at other times of the year.

Feeding numbers are covered later, however it was interesting to compare the numbers of birds feeding in Holes Bay to the numbers that roosted here.

Fig 53. Pergin's Island roosting numbers (grey) and Holes Bay feeding numbers (yellow)



The first point of interest occurs in the first winter period. Despite a significant decline in roosting numbers from November through until April, the numbers of locally feeding birds remain stable. This strongly suggests that all birds departing in this period had been feeding further afield.

From the chart it would also seem that the feeding birds were more loyal to the feeding area than to the roost site, with birds continuing to feed here in April and May despite not using the Pergin's roost. One can only assume that the reason for leaving the roost is the same one that drives birds to communally

roost in the first place. They like being surrounded by lots of their conspecifics. It would seem that they were probably roosting at Arne, as here, as we shall see later, more roosted at Arne Heath plantation than were breeding.

Moving on to June, the arrival of birds at the roost corresponds with an increase in locally feeding birds, and from there onwards the relationship is quite straightforward with more roosting and more feeding. A slight difference toward the end of August when roosting numbers continue to rise but feeding numbers start to drop. Both are again positively correlated from September through until January until, as with the previous period, feeding numbers stabilise whilst roosting numbers drop.

Holme Heath Plantation roost

Located within a large stand of conifers just to the south of East Holme. A winter roost occupied from October until late March / early April, for birds using the Holme Lane cattle fields and the Frome Valley.
A small roost in comparison to the regular roosting sites. During the first winter period up to 12 birds were present in December, oddly decreasing slightly in numbers in January.
The following winter, 17 in early December increased to a maximum of 24 in January. Still 21 until the end of February but dropping sharply to just four in early March.

Fig 54. Holme Heath plantation roost fortnightly maximum counts

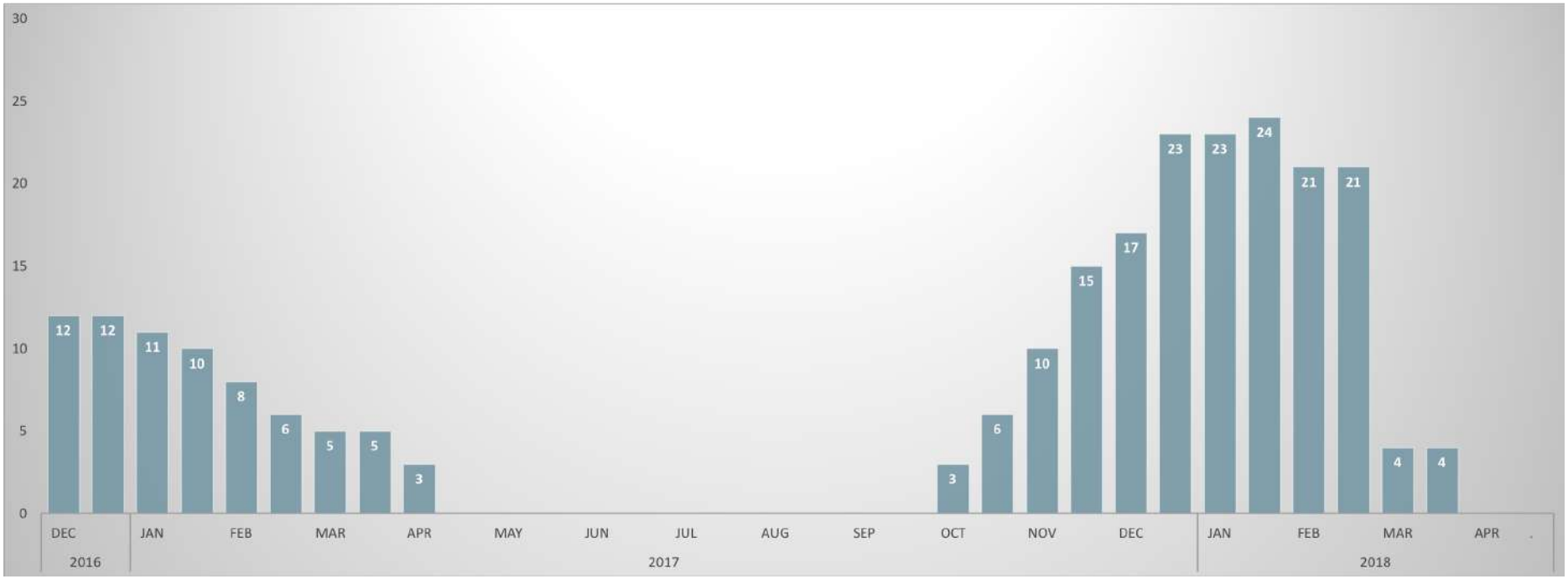


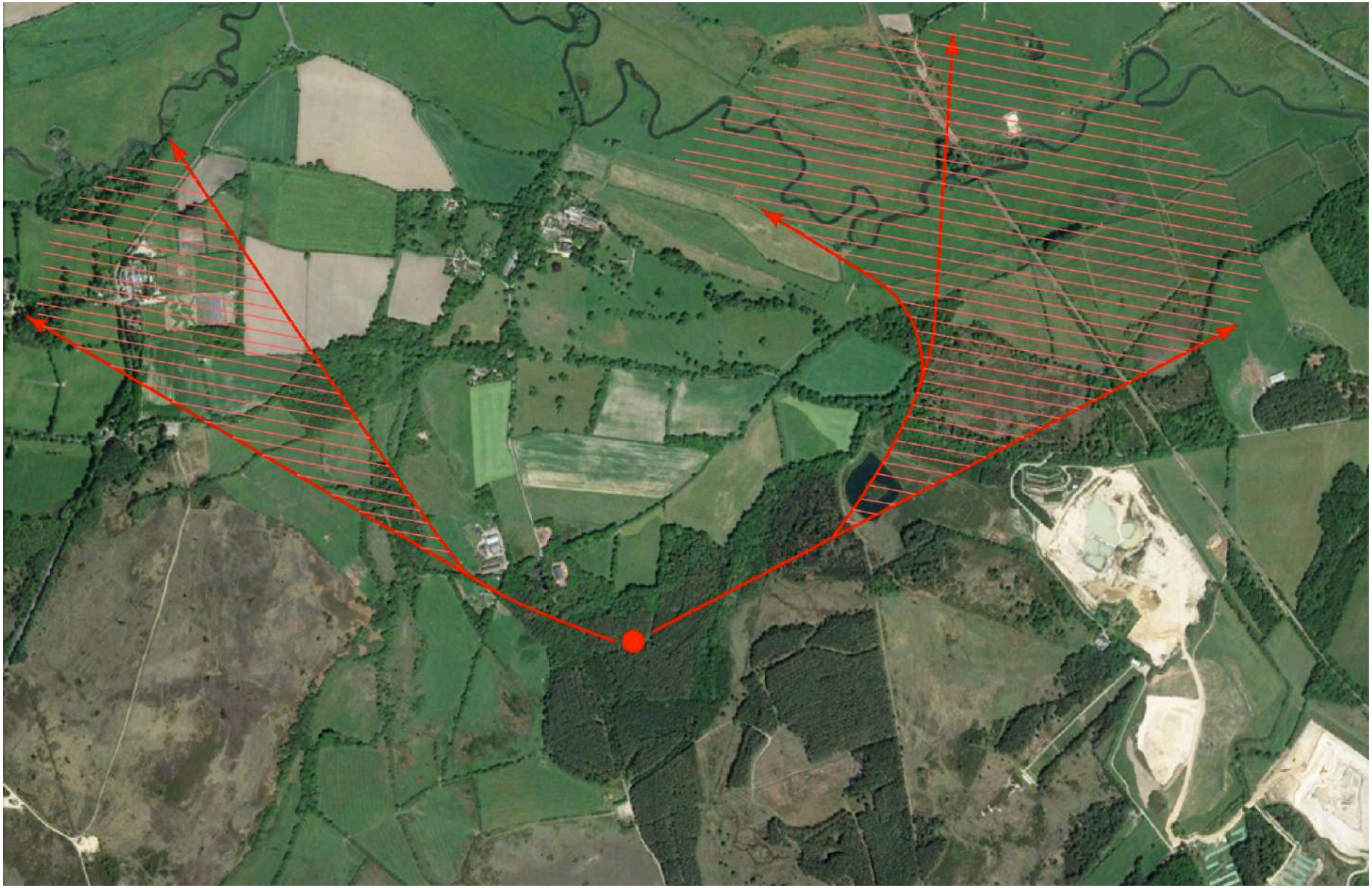
Table 23. Holme Heath plantation roost fortnightly maximum counts

2016		2017																2018							
Dec		Jan		Feb		Mar		Apr		May-Sep	Oct		Nov		Dec			Jan		Feb		Mar		Apr	
12	12	11	10	8	6	5	5	3	0	0	3	6	10	15	17	23		23	24	21	21	4	4	0	0

Flight lines and destinations

As we have seen at other roost sites, flights out in many instances were quite specific, with birds preferring to follow shorelines rather than more direct routes across other terrain.
At this site, despite the plantation being surrounded by low lying fields and scattered trees, with not a shoreline in sight, the flight lines in and out of Holme Heath plantation roost were still rather specific.

Fig 55. Holme Heath plantation flight lines



Regardless of the destination, all initially left either to the north east or to the north west. Upon reaching certain points their routes would then diverge. The route out to the north east was used by the majority of the birds. It was a direct route to the Holme Lane cattle fields, but was also followed by birds wishing

to use the Frome Valley, who somewhere near the small pond area veered off southward, resulting in a somewhat curved flight line. The route seemingly corresponding to the edges of the woods. This phenomenon was also noted at Arne Heath, where birds heading to Middlebere preferred to follow the edge of the wood rather than a more direct route across the heath.

The route out to the north west was more direct, but even here birds seemed to avoid the farm buildings, preferring to swing around behind them before carrying on their chosen route. Destinations presumably other parts of the Frome Valley.

The same phenomenon was repeated on the return flight, with for example birds coming from Worgret Manor Farm field flying south, then swinging west upon reaching the wooded area to allow an approach directly from the east.

Catchment

The roost was primarily used as a convenient location near to the winter cattle pasture, so most didn't stray too far from the local area.
For birds heading out eastwards, none were seen to fly any further east than the Wareham by-pass, although perhaps one or two ventured a bit further east during the day.
To the north, the odd one or two certainly visited parts of the Piddle Valley, venturing further west than east it would seem, with birds feeding just east of the Wareham by-pass invariably leaving westward toward the Arne roost.
For birds heading out north westward most were watched until out of sight. Similarly, they often arrived back at some height suggesting more distant feeding areas.
None left the roost on any southerly headings.

Roosting and feeding comparisons

Not all that used the Holme Lane pasture roosted at Holme Plantation roost, happy to continue the commute from the Arne roost. Birds of different roosts could even be seen feeding together for long periods as though some sort of bond had formed, to then go their separate ways at dusk.

Fig 56. Monthly maxima of feeding birds in the Frome Valley and cattle fields compared to birds roosting at Holme Heath Plantation

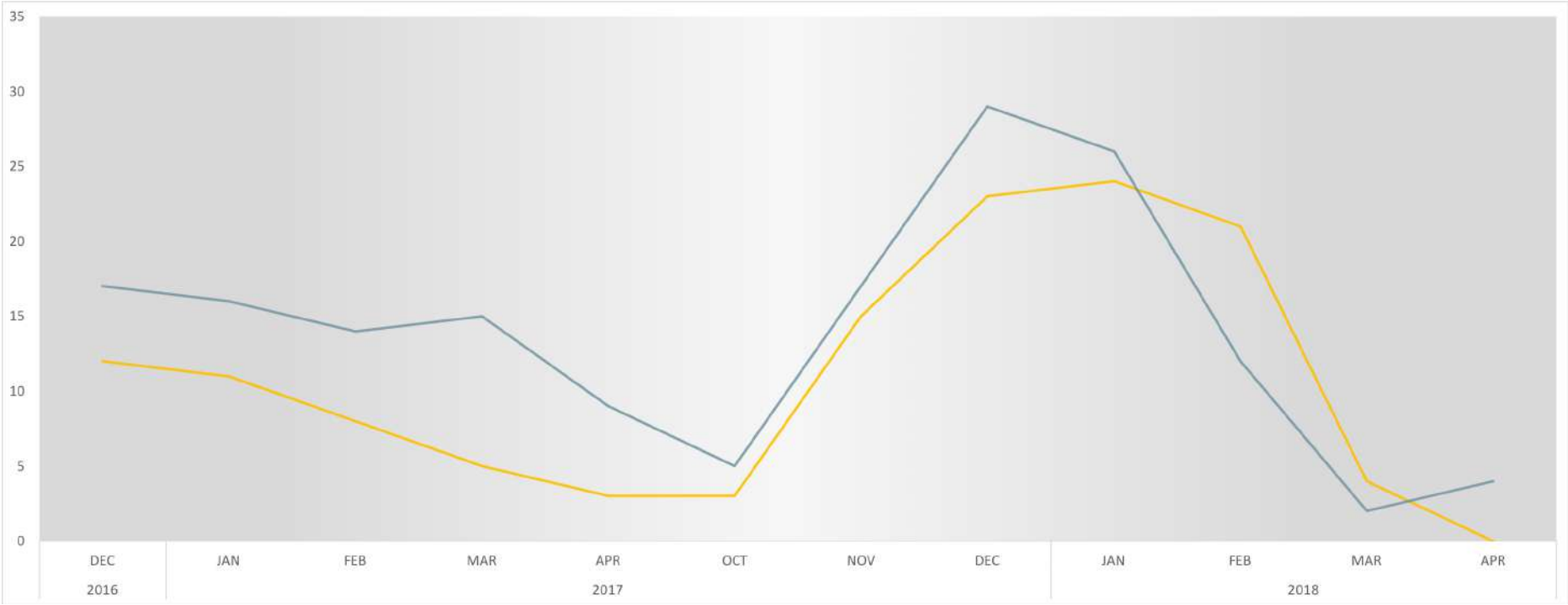


Table 24. Monthly maxima of feeding birds in the Frome Valley and cattle fields compared to birds roosting at Holme Heath Plantation

	2016	2017							2018			
	Dec	Jan	Feb	Mar	Apr	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Roosting Holme	12	11	8	5	3	3	15	23	24	21	4	0
Frome Valley and fields	17	16	14	15	9	5	17	29	26	12	2	4

As would be expected, there was a clear correlation between feeding and roosting numbers, with for the most part more birds using the Frome Valley and surrounding fields than were roosting at Holme Heath Plantation. This remained the case until early February 2018 when a period of freezing temperatures early in the month rendered the cattle fields much less productive. Despite many now foraging elsewhere, they remained faithful to the Holme Heath plantation with still 21 roosting here on 24th February and only six of them feeding in the surrounding area. (11 birds are indicated on the chart due to it being a maximum count from earlier in the month)

This loyalty was severely tested in the very cold period at the end of February and into March. Birds were then seen huddling together in the Frome Valley for the first couple of days and still using the Holme Heath roost. Not too long after however, most did depart, leaving just the four still using the roost with two of these still resolutely using the Frome Valley.

Holton Heath roost

Located in pines at the north end of Holton Heath, just south of the Sherford River. A very recent roost site, first discovered in 2015. Occupation since then has been irregular.
Not occupied during the first winter period. Interestingly two birds used the site for a few weeks from the end of May to June but no breeding attempts were made. Occupied during the second winter period from January until March 2018.
Maximum count of 40 on 18th January 2018.

Fig 57. Holton Heath roost fortnightly maximum counts

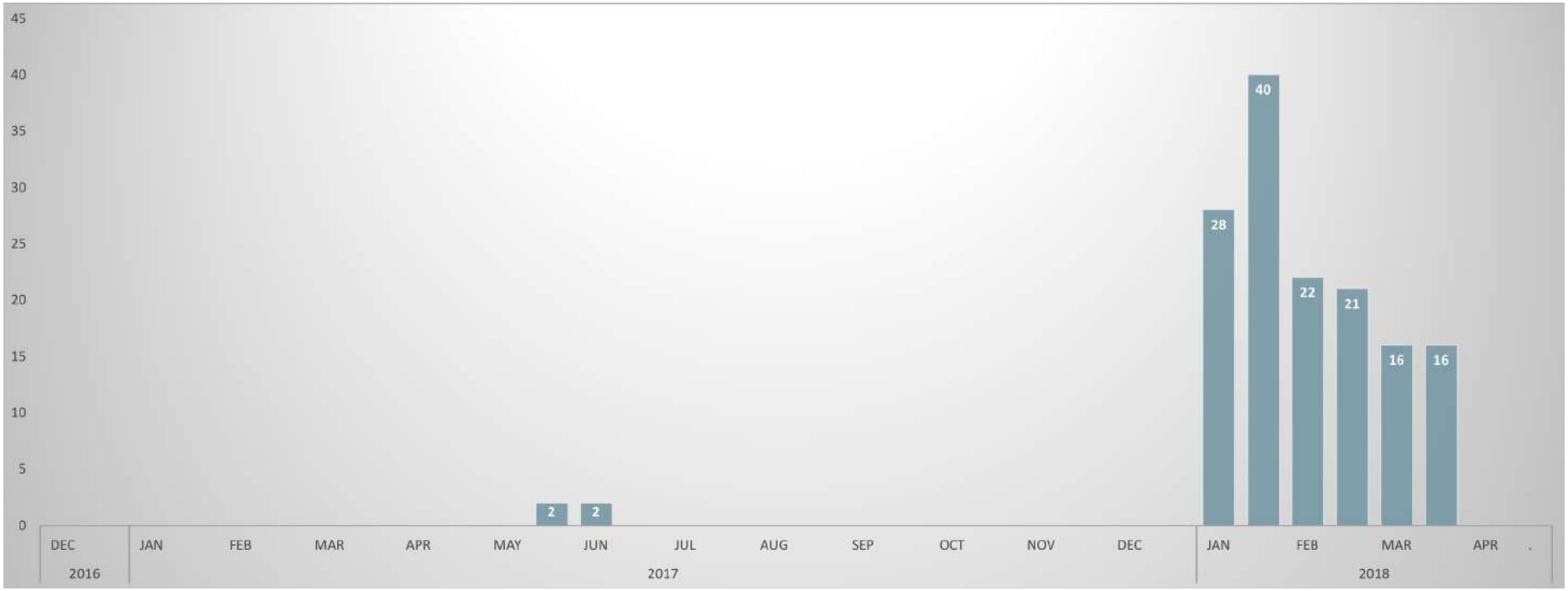


Table 25. Holton Heath roost fortnightly maximum counts

2016	2017						2018							
Nov/Dec	Jan/Apr	May	May	Jun	Jun	Jul/Dec	Jan	Jan	Feb	Feb	Mar	Mar	Apr	Apr
0	0	0	2	2	0	0	28	40	22	21	16	16	0	0

Conveniently located next to Lytchett Fields and more importantly a short distance to the cattle fields to the west, the roost became occupied in January 2018 by birds that had in December had been using the Pergin's Island roost and commuting.

Initially 25 made the move in the first half of January, being joined by 15 more by the 18th. Numbers dropped to 21 into mid-February, corresponding with fewer birds using the cattle fields west of Lytchett Minster. There were still 16 present by mid-March but all had moved out by April.

It was concluded that all of the Holton Heath birds had come from the Pergin's Island roost. The relationship between the two roost sites is elucidated rather well by the charts below

Fig 58. Holton Heath and Pergin's Island roost fortnightly maximum counts compared

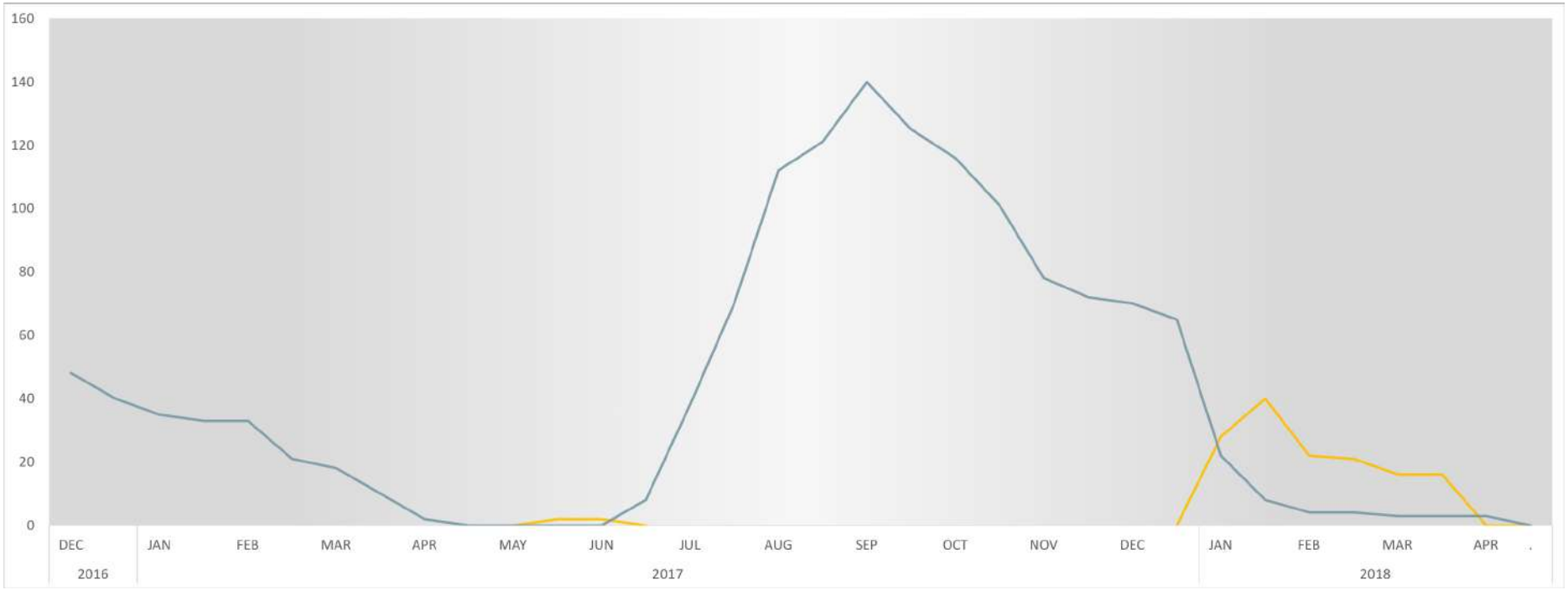
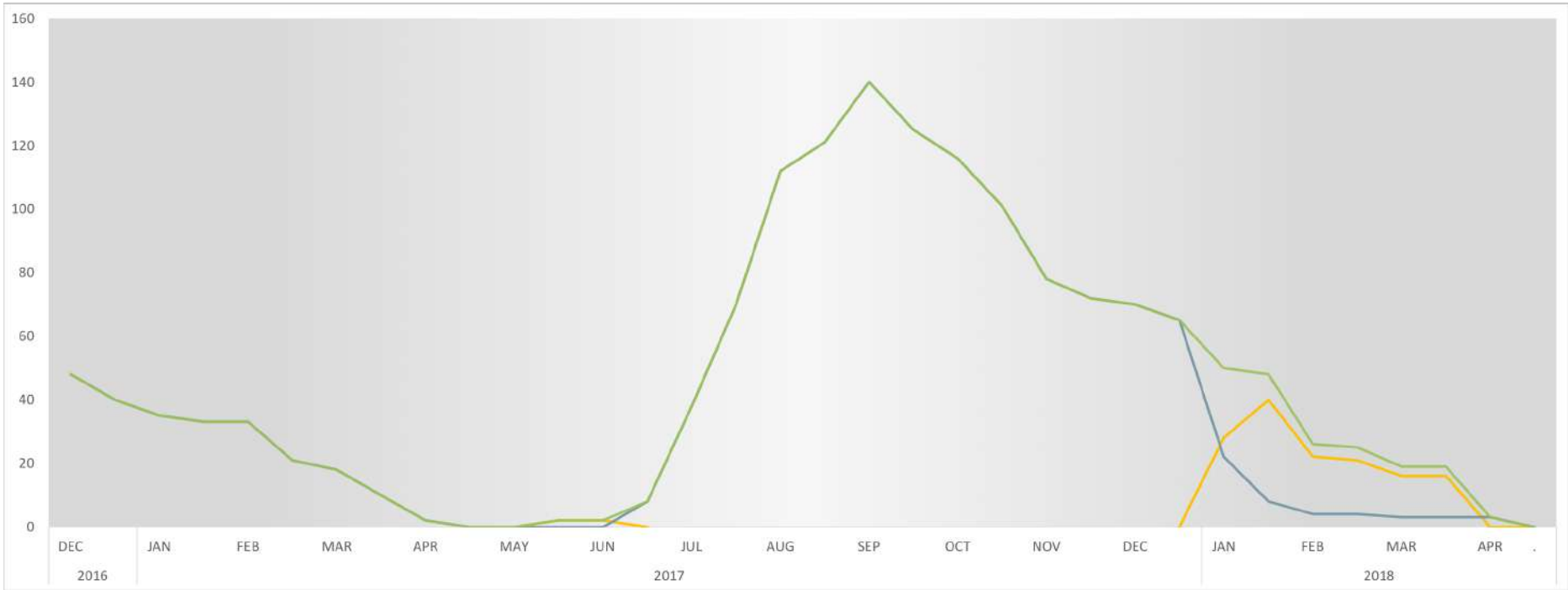


Fig 59. Holton Heath and Pergin's Island roost fortnightly maximum counts and combined totals



The green line representing the combined totals produces a seamless line.

Roost sites compared

The charts below have been formulated to give some perspective to the relative sizes and population patterns of the main roost sites. Two charts were used as one would have been far too busy (as opposed to just too busy)

Fig 60. Comparing Pergin's Island (Yellow), Little Sea (Blue/Grey), Holme Heath Plantation (Light Blue) and Holton Heath roost (Green)

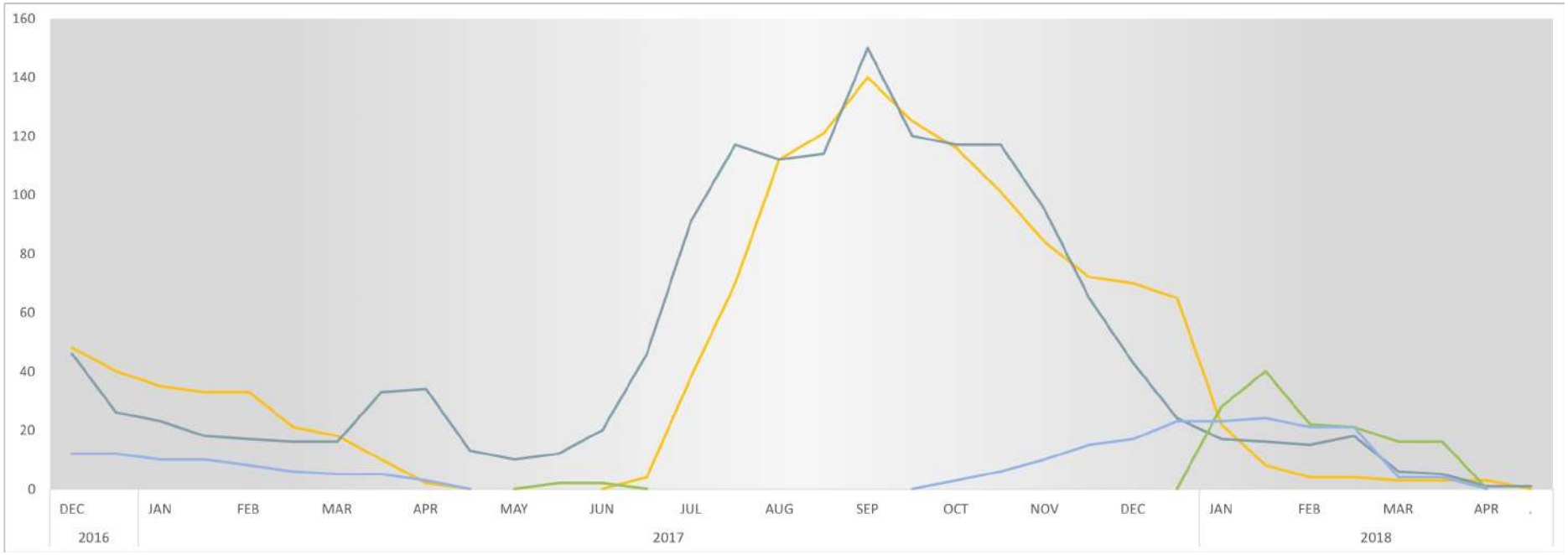
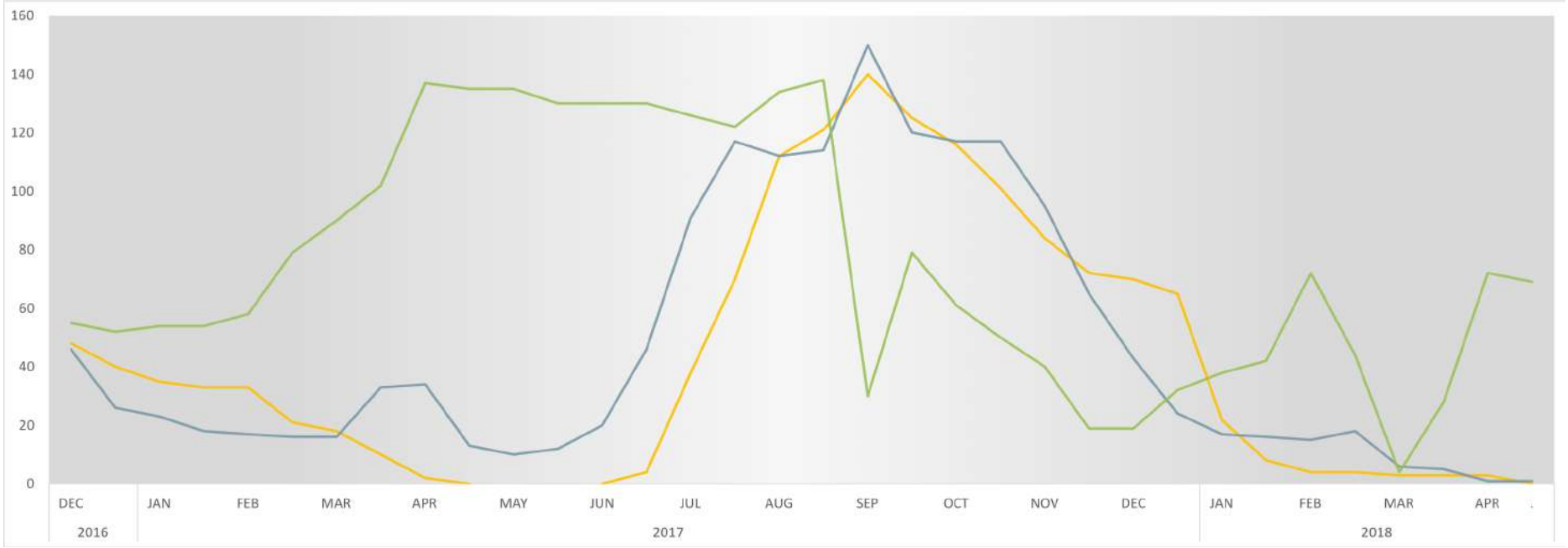
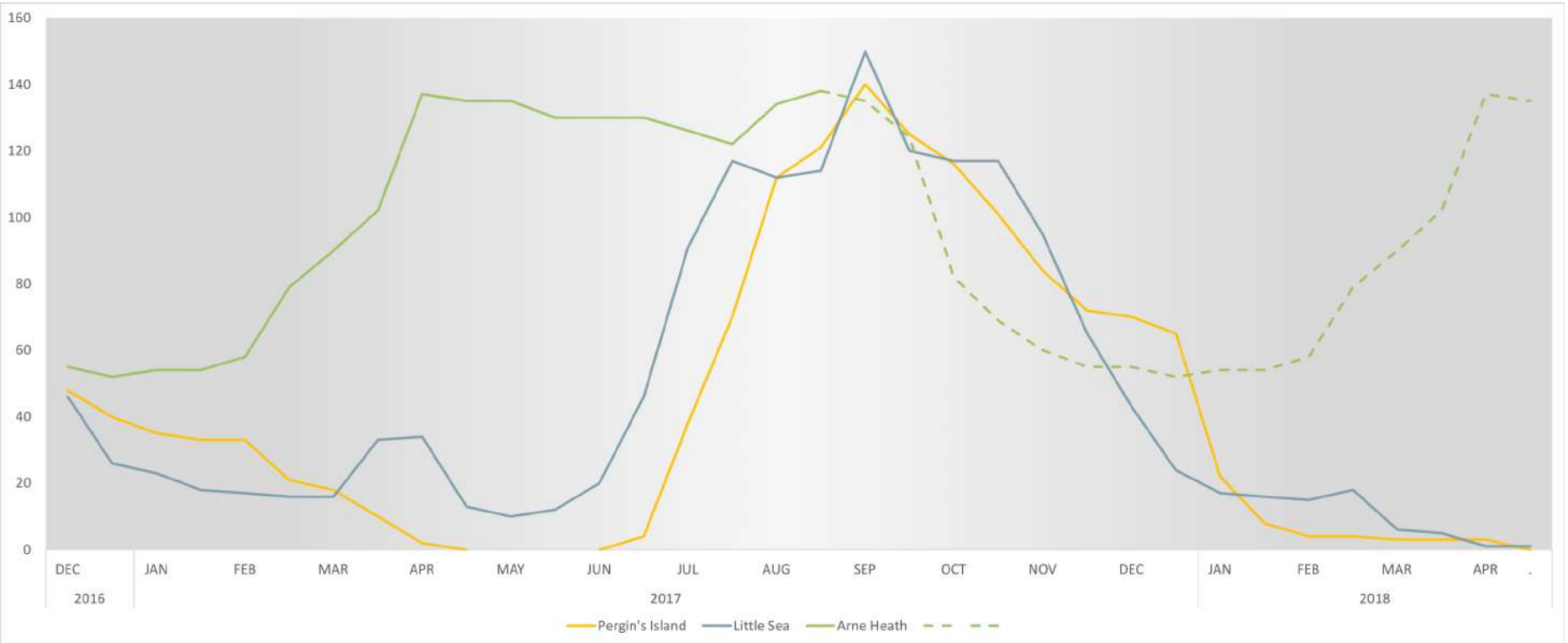


Fig 61. Comparing Arne Heath (Green), Little Sea (Blue/Grey) and Pergin's Island (Yellow)



Just one more chart! This one below shows how the comparisons may have looked if there had been no shooting disturbance and a regular winter.

Fig 62. Arne Heath, Pergin's Island and Little Sea roosts compared, with Arne Heath figures from September that would have been likely in a usual year.



The comparisons, although only valid until the end of August still provide a point of interest; the closeness of the peak numbers during that period, with each site pretty much having an equal third share of the total population.
Is this a coincidence or did it arise through an efficient ecological system at work?

Pre-roosting

The dead trees at the western end of Middlebere was the only routinely used pre-roost gathering site, and only formed during the winter months. The term pre-roost gathering is probably a bit misleading. Although up to 25 birds regularly stopped in the trees at the end of the day to preen and loaf, not all visits overlapped in time, with some birds moving on before others had yet to arrive. Typically, toward the end of dusk, the remaining birds, usually a party of 10 or so all left together for the roost at Arne Heath. Sometimes this could be in the dark. (At least to human eyes)

No other birds using the Arne Heath Plantation regularly gathered in pre-roosting groups. The closest they came was during an evening low tide, when feeding had been good, for example in the late summer and early autumn. Birds would then readily loaf on the mud near to the roost site in loose aggregations, before later flying to the roost.

Birds using Pergin's roost gathered rather sporadically at seemingly random parts of the saltmarsh areas in the north west sector, fairly near to the roost site. Birds could here often loaf until it was virtually dark before making the short trip to the roost trees.
As with the birds at Middlebere, this habit seemed to predominate in the winter months. During this time feeding gatherings could also occur with birds often visiting the cattle fields just to the west of the shoreline. From here they could then later join some of the pre-roost gatherings on the *Spartina* or fly directly into the roost.

Pre-roost feeding gatherings also occurred at Lytchett Fields. Particularly when the Holton Heath roost was in use. Toward the end of the day birds would arrive in from the cattle fields to the west, with up to 19 recorded. When the time was right, they all left together for the roost.
Pre-roost gatherings here were also noted whilst the birds were using the Pergin's and the Arne Plantation roosts.

No local pre-roost gatherings were noted for Little Sea or for Holme Heath Plantation roost. On the odd occasion, small flocks would arrive from distance to Little Sea suggesting some sort of gathering, but not regularly. For Holme Heath Plantation, although birds would often arrive in decent sized flocks, this was a consequence of them having been feeding together earlier at one of the Holme Lane cattle fields.
Having said that, it was noticed in both winter periods that toward the end of the day, birds that had been feeding in other places regularly made their way to the particular cattle field where most of the birds were feeding.

Feeding

Little Egrets are known for their catholic diet. No doubt a significant factor in their successful recolonisation of Britain in recent decades.
Poole Harbour with its wide variety of habitats suits Little Egrets well.

The main source of food for Poole Harbour's Little Egrets is provided by the intertidal areas. When the tide is very low, they can still use the deep channels and when the tide rises, beach and other areas beyond the high-water mark can be worked. At high tide, upper saltmarsh areas containing isolated pools are made use of. Further beyond the high-water mark, occasionally inundated, flooded or waterlogged areas could also be used. During the winter, cattle fields become an important feeding habitat and the main source of food for a proportion of the birds.

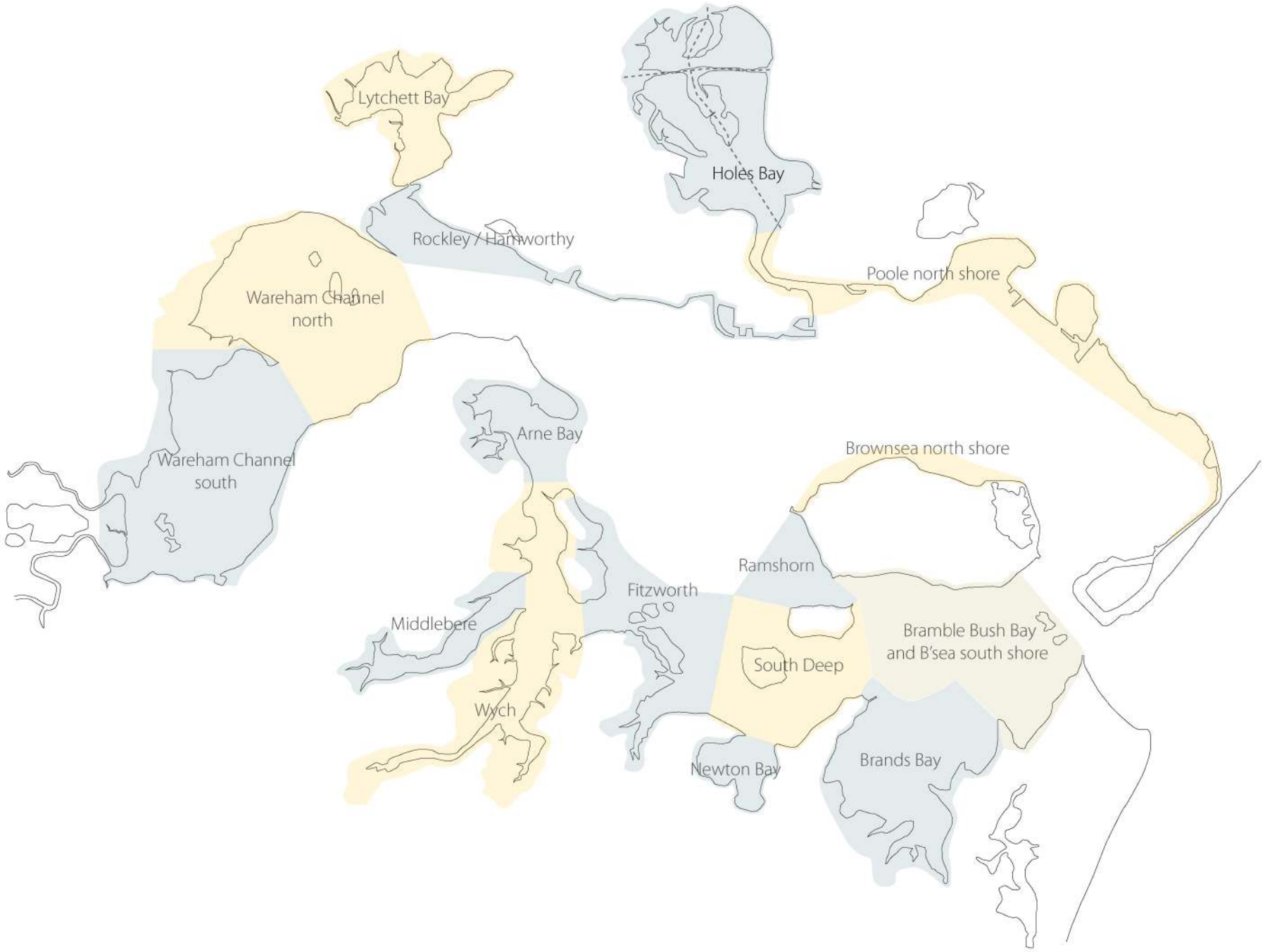
Intertidal feeding areas

To help determine feeding distribution, 16 intertidal areas were identified, where possible using traditional recording areas.

Survey counts were supplemented by WeBS data where possible and on occasion counts from other reliable sources were also used.

The highest counts were achieved in the Wareham Channel. The highest of these being 102 birds on 25th July and 97 on 8th September. Away from the Wareham Channel the highest single count was 40 at Arne Bay on 18th July, with 35 also counted at Fitzworth and Lytchett Bay.

Fig 63. Little Egret intertidal feeding areas



Wareham Channel

Initially the Wareham Channel was divided into two recording areas, north and south. At the start of the survey however, it became clear that during the course of a full tidal cycle, areas in the northern half and southern half were often visited by the same birds moving about the area to take advantage of a particular tidal state. Furthermore, the most popular part of the Wareham Channel was regularly the central area near Turford Point. (map below)
There were however, also birds with a genuine preference for certain parts of the Wareham Channel, so it was decided to also treat the area as a whole as well as two distinct areas.

Fig 64. Wareham Channel recording area

The Wareham Channel consistently delivered the highest counts. The only months when higher maxima were recorded at other sites were January and February of both winter periods and March 2018.

Fig 65. Wareham Channel monthly feeding maxima

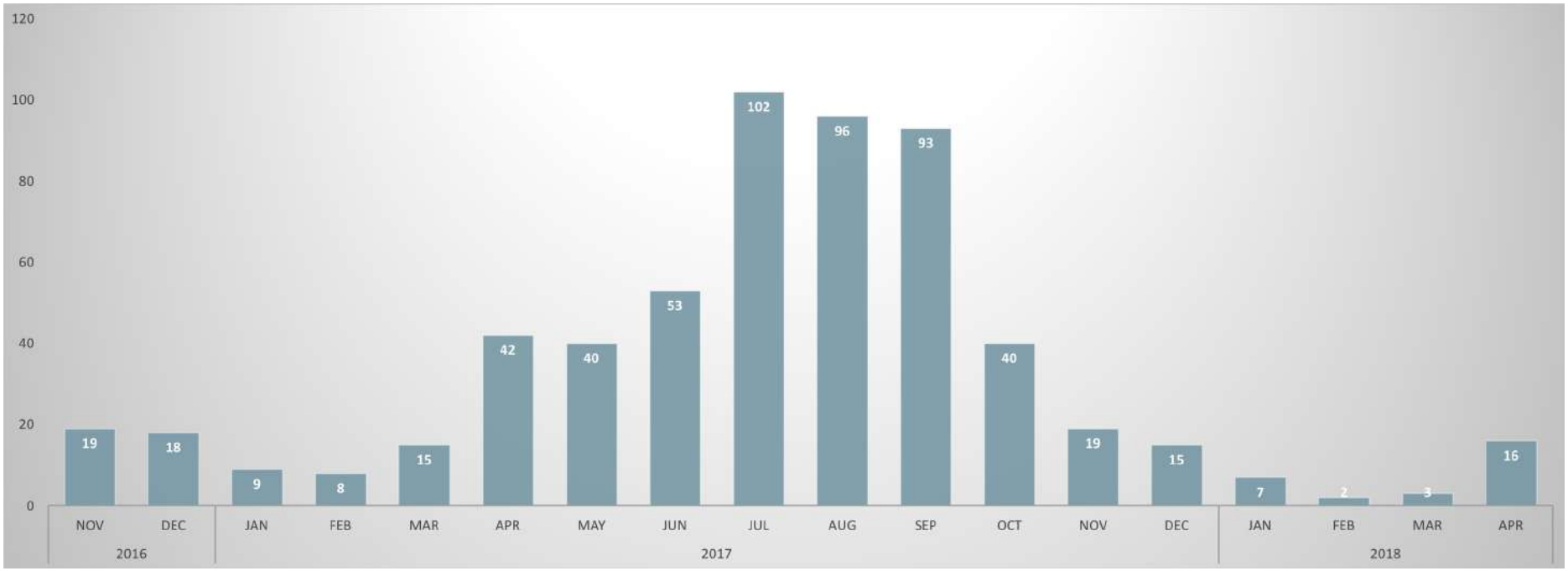


Table 26. Wareham Channel monthly feeding maxima

2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
19	18	5	4	15	42	40	53	102	96	93	40	19	15	7	2	3	16

The area was by far the busiest in July August and September, the months that are busiest for the harbour as a whole.
From the stable breeding population, the first increase in numbers began in June, escalating in July to reach a peak count of 102 feeding birds by the end of the month. Numbers remained high through August and September at the height of the migration period. Given that juveniles are expected to disperse during these months, one may have expected a slight dropping off of numbers. Perhaps they were dispersing but being replaced by an even greater number from elsewhere?

The eventual drop off in numbers came about in early October and was rather abrupt, reducing numbers to just 43% of the September total. Numbers halved again into November to around 19 birds.
Another slight drop in numbers into December to 14-15 but by January only seven were still using the intertidal areas. This reduced to just two in February and then three in March before the arrival of some of the returning breeding birds again in April.

North and South Wareham Channel

Although commonly involving many of the same birds as mentioned, specific analysis of the two halves of the channel did reveal some differences in usage.

As can be seen from the chart below, the southern half has a more consistent population than the more volatile north. It is more popular from November at the start of the survey, through until June when the balance of power then shifts to the north during the peak months of July, August and September. As overall numbers decline the two areas are more in balance, until January 2018 when no birds are recorded in the northern half.

The overall balance lies with the southern half which returned an average monthly maximum count of 18 compared to 15.5 for the northern half.

Fig 66. Monthly maxima for north and south areas of the Wareham Channel

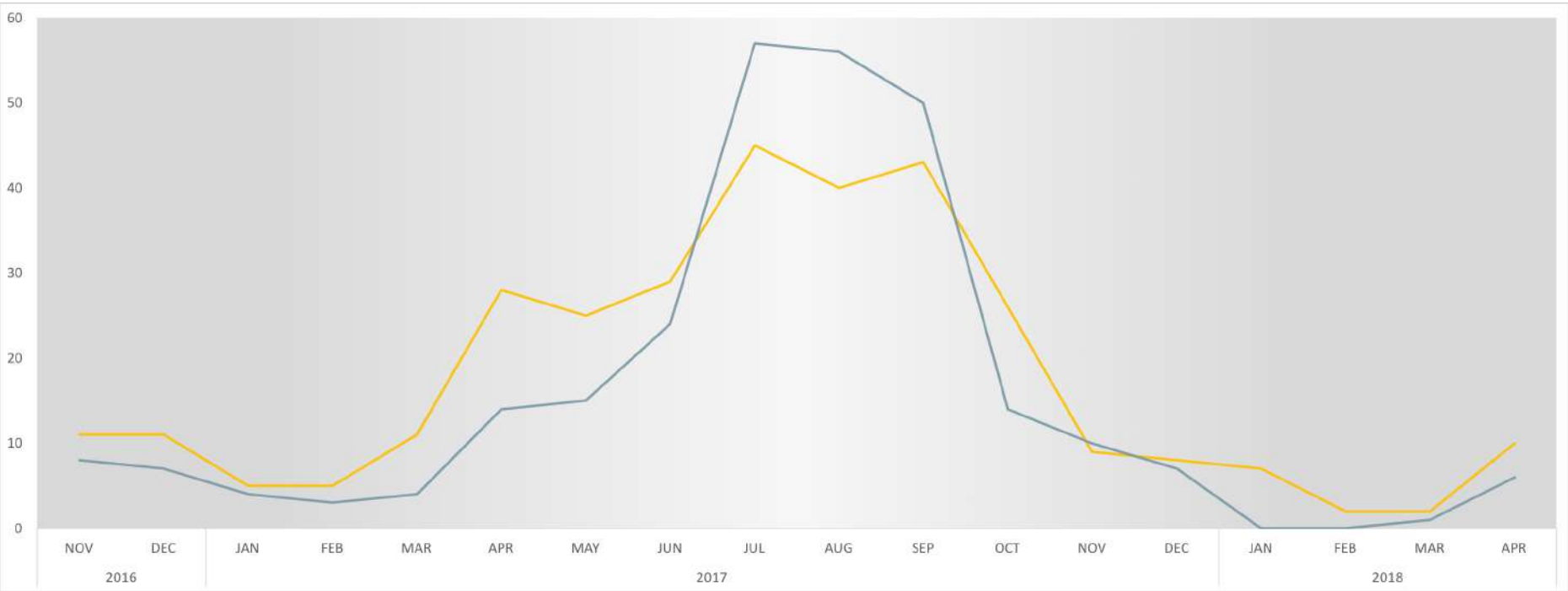


Table 27. Monthly maxima for north and south areas of the Wareham Channel

	2016		2017												2018			
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
North	8	7	4	3	4	14	15	24	57	56	50	14	10	7	0	0	1	6
South	11	11	5	5	11	28	25	29	45	40	43	26	9	8	7	2	2	10

The most popular feeding places were at the water's edge or in the shallowest parts near to the edge. During the lower part of the tides, the channels that formed were used.
A typical example of a routine straight from the roost during the peak months: If the tide was dropping but not yet low enough for feeding, birds would fly to specific areas of *Spartina* to wait. When the tide had dropped enough, some would enter the water and feed in the shallow areas. In the south, some of the first shallow areas were at the reedbed margins, where birds could often be encountered wandering in and out of the reeds.
Further north, the areas off of Keysworth and the inlet bay on the northern side of Shag Looe Head were the first areas to provide shallow water. After that it was then just a case of following the tide out until just the channels remained. The main channel running through the whole area became important during the lowest tides.
There were favourite areas, for example off of Turford Point where two channels converged with seemingly a third channel also, providing all sorts of various water levels to choose from.

Depending on the time of year, birds could continue feeding even after the tide had pushed them onto the shorelines. Then they could work the beach areas at the tide line or poke about at the back of the beach amongst the detritus.

Holes Bay

Located north of Poole town and surrounded by urban areas, Holes Bay recorded the third highest monthly maximum average count after Wareham Channel south and Wareham channel north.
The highest feeding count was 44 on 10th August.
The average maximum monthly count was just over 14 birds.

The following charts are scaled to 50

Fig 67. Holes Bay monthly feeding maxima

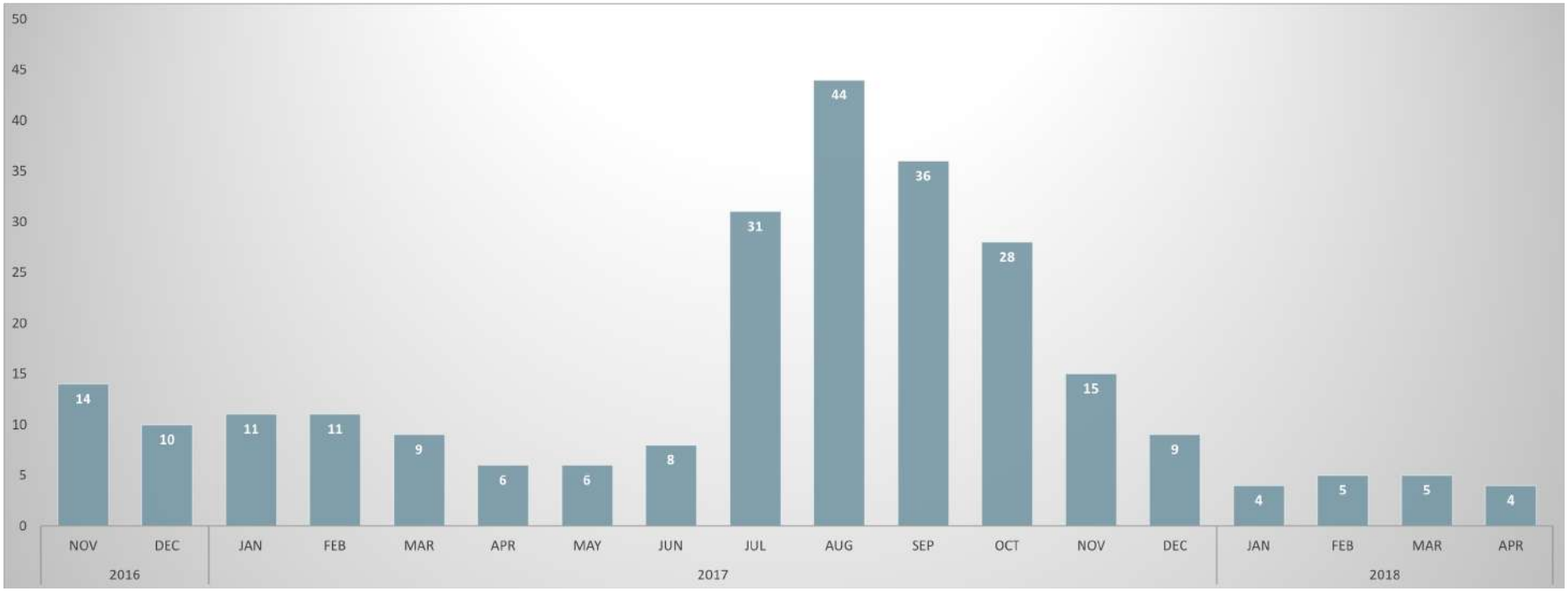


Table 28. Holes Bay monthly feeding maxima

2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
14	10	11	11	9	6	6	8	31	44	36	28	15	9	4	5	5	4

Fairly stable numbers in the first winter period, reducing slightly in the breeding season but then a dramatic increase in numbers from July and into August, increasing the population more than four-fold. Numbers begin to decline in September and continue to do so through October, November and December, reducing down to just four to five birds from January onwards.

As with the Wareham Channel, the area was also subdivided into smaller areas for further analysis. The geography of Holes Bay lending itself very well to a four-way division. North east, south east, south west and north west.

The most popular sector was the south east. It had the highest count of 15 in August and the highest average monthly maximum count of 5.2 birds.
The south west sector had a high count of 14 and an average of 3.8 birds. North west averaged three birds and the north east 2.6.

Although the area rather nicely divides into four areas, it doesn't make for such a nice chart. One can however just about decipher the sectors relationships.

Fig 68. Monthly distribution of Little Egrets Holes Bay based on monthly maxima

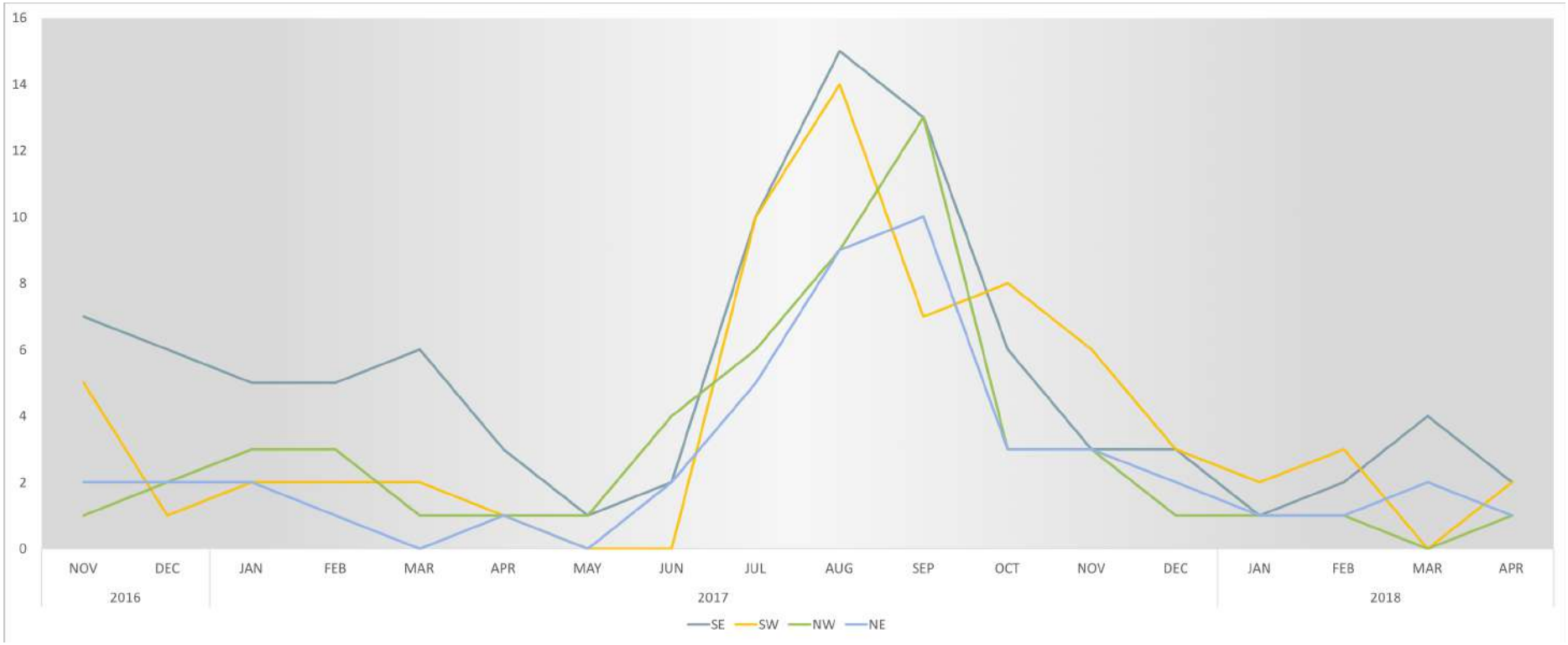


Table 29. Monthly maxima by sector

	2016		2017												2018			
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
SE	7	6	5	5	6	3	1	2	10	15	13	6	3	3	1	2	4	2
SW	5	1	2	2	2	1	0	0	10	14	7	8	6	3	2	3	0	2
NW	1	2	3	3	1	1	1	4	6	9	13	3	3	1	1	1	0	1
NE	2	2	2	1	0	1	0	2	5	9	10	3	3	2	1	1	2	1

Overall, as would be expected, the sectors do follow similar patterns. Closer scrutiny revealing slightly different timings for peak counts. The south east sector consistently held more birds from November at the start of the survey until April, although this was not repeated in the subsequent November to April period.

Wych Channel

Formed from two stream sources to the south and scouring its way to Shipstal to the north before entering the main harbour, the Wych Channel was the fourth most heavily used area.

Fig 69. Wych Channel recording area

Fig 70. Wych Channel monthly feeding maxima

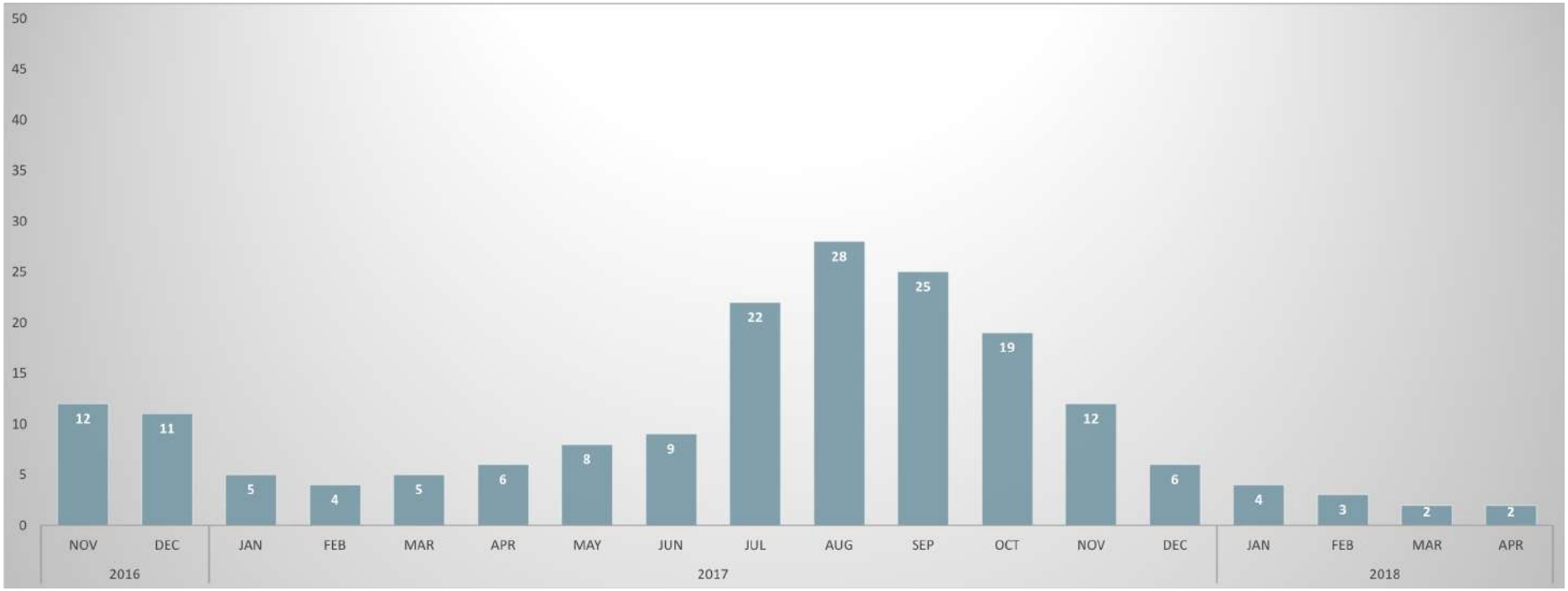


Table 30. Wych Channel monthly feeding maxima

2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
12	11	5	4	5	6	8	9	22	28	25	19	12	6	4	3	2	2

As at other sites, all intertidal areas were utilised according to the state of the tide.
The highest count was 28 birds on 11th August.
The average monthly maximum count was just over 10 birds.

Arne Bay

Some impressive counts here, given the small size of the area relative to some other sites. Although the intertidal areas were used, the extensive saltmarsh areas bordering the whole area with its scattered pools, certainly influenced the numbers being counted, with birds often in these areas in preference to the tidal flats.

The maximum count was 46 on 18th July.
Average maximum count 10 birds.

Fig 71. Arne Bay monthly feeding maxima

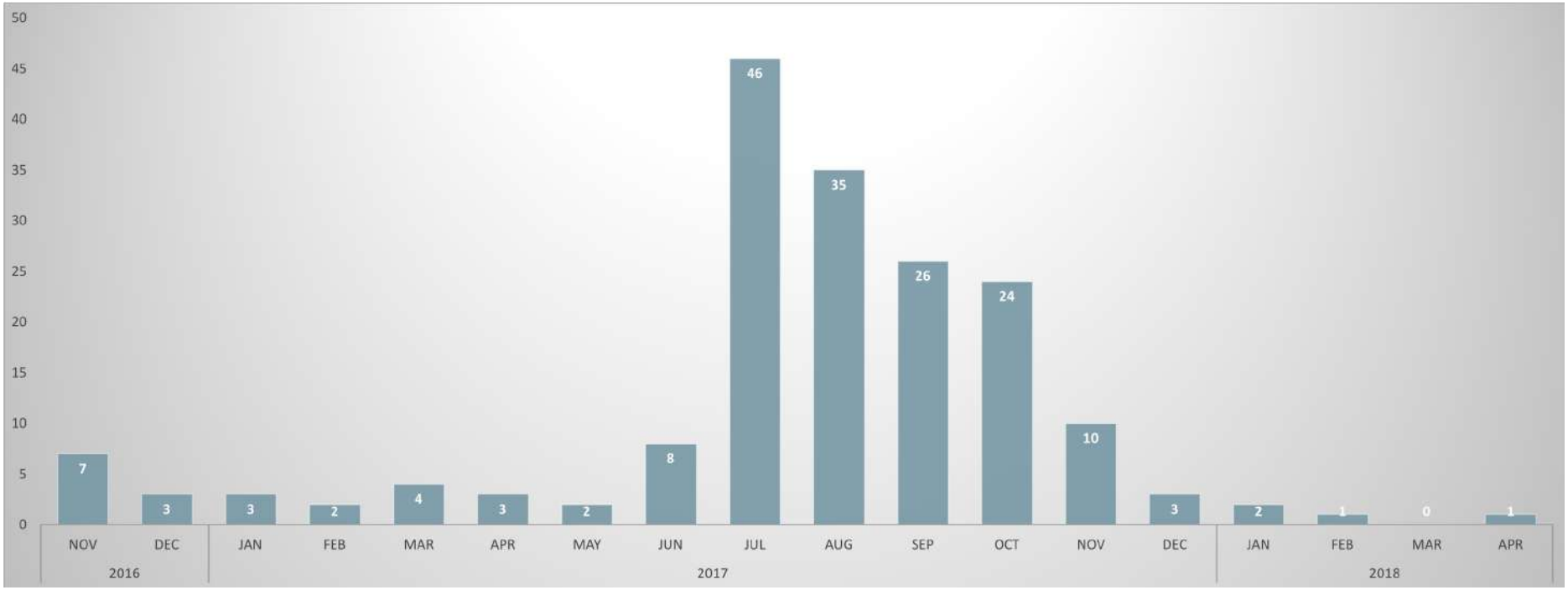


Table 31. Arne Bay monthly feeding maxima

2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
7	3	3	2	4	3	2	8	46	35	26	24	10	3	2	1	0	1

As can be seen from the above chart, the high numbers were very much restricted to the period July to October. Away from these months, counts were disappointing being all single figures apart from 10 birds in November 2017.

Lytchett Bay

Coming in at number six with an average monthly maximum count of just over nine birds.
The highest single count was a very creditable 35 on 15th October 2017.

Fig 72. Lytchett Bay monthly feeding maxima

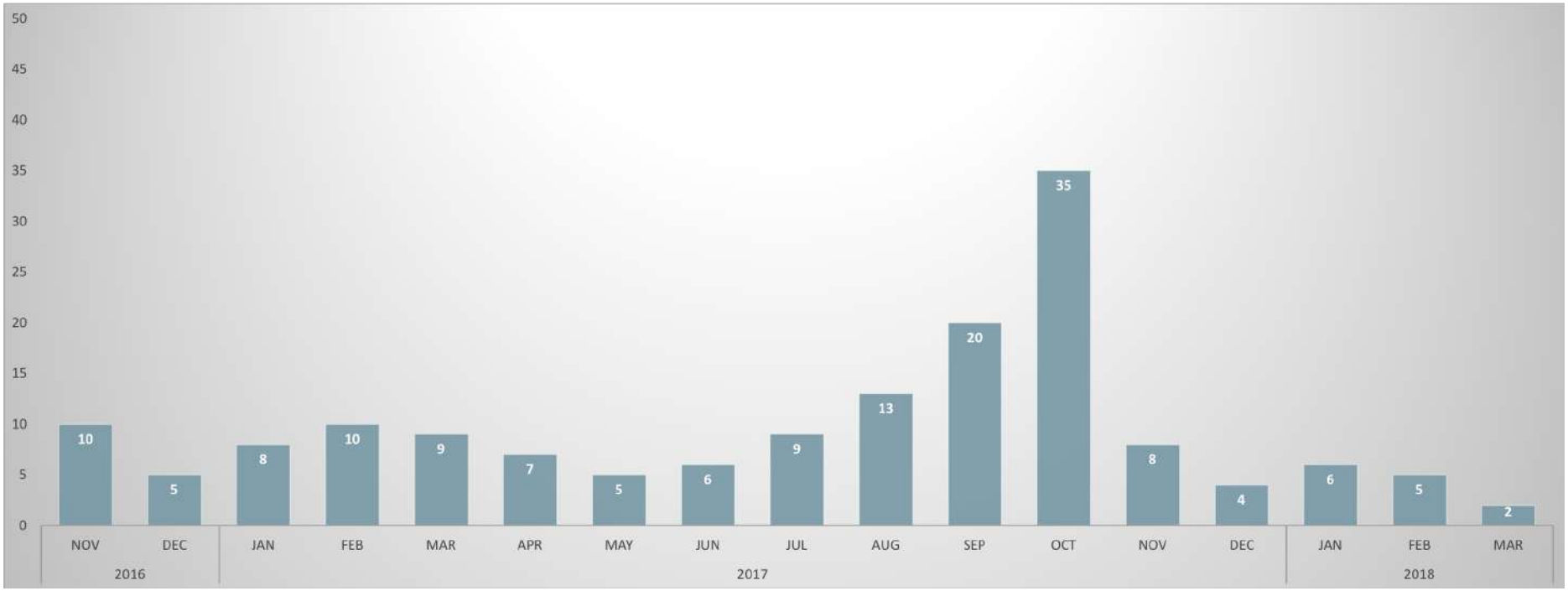


Table 32. Lytchett Bay monthly feeding maxima

2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
10	5	8	10	9	7	5	6	9	13	20	35	8	4	6	5	2	3

The first rather non-conforming monthly maxima chart. The culprit, a run of relatively high counts in January, February and March 2017 when many other sites were experiencing a decline in numbers.
A slight drop in numbers through the breeding season until the first dispersing birds arrive in June and into July. Numbers continue to rise through August and September. By October most other intertidal sites have already begun to lose numbers but Lytchett numbers rise to a significant peak in this month. The drop off to November being correspondingly sharp.

In January and February 2018 Lytchett Bay once more provides unusually high counts of feeding birds in relative terms, with the January count being the second highest monthly site count of the survey and February the equal highest.

Clearly there is something attractive at Lytchett Bay during the colder months of the year. At other times of the year numbers are unremarkable. Perhaps the sewage outflow is a factor?

Fitzworth

Having just mentioned how unusual Lytchett Bay's monthly maximum patterns were, Fitzworth was also very interesting, having many comparisons to Lytchett. During the winter months, Fitzworth counts were second only to Lytchett Bay, with counts at other times of the year distinctly mediocre. It was also the only other site where numbers peaked in October. Again, as Lytchett, suffering a rather sharp drop off in November but retaining birds into January.

Fig 73. Fitzworth monthly feeding maxima

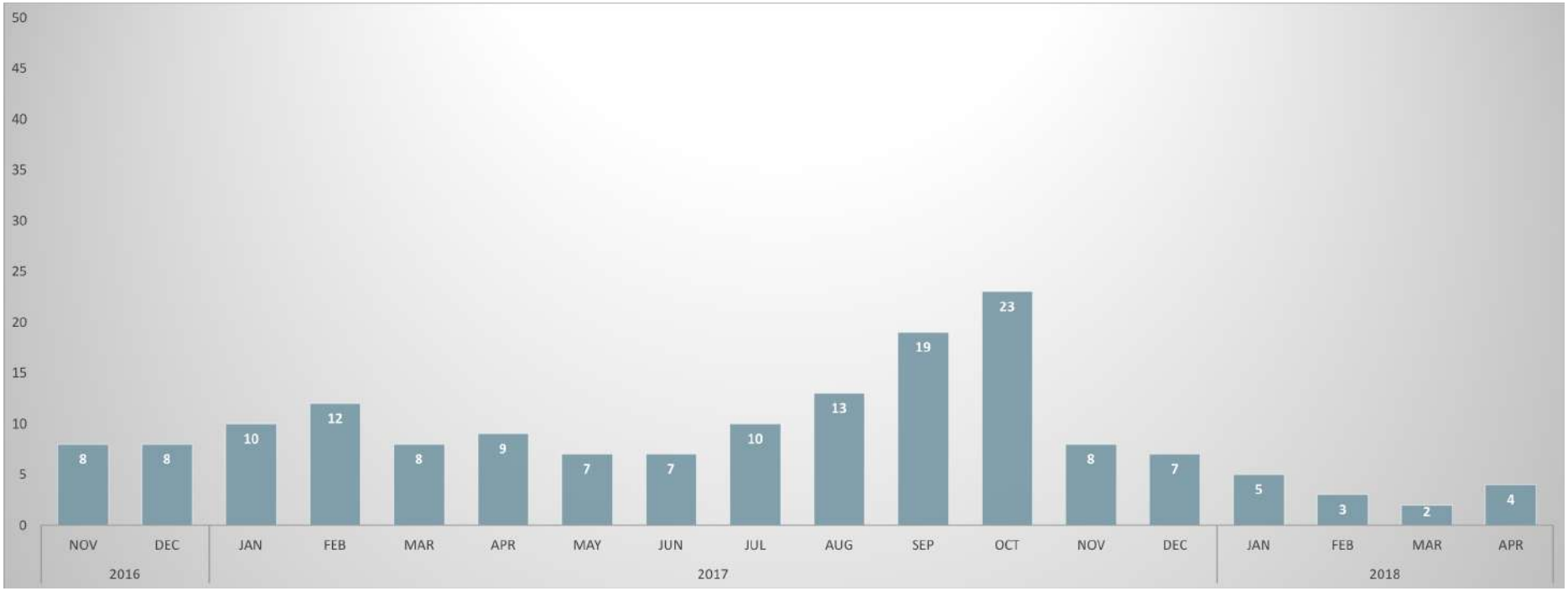


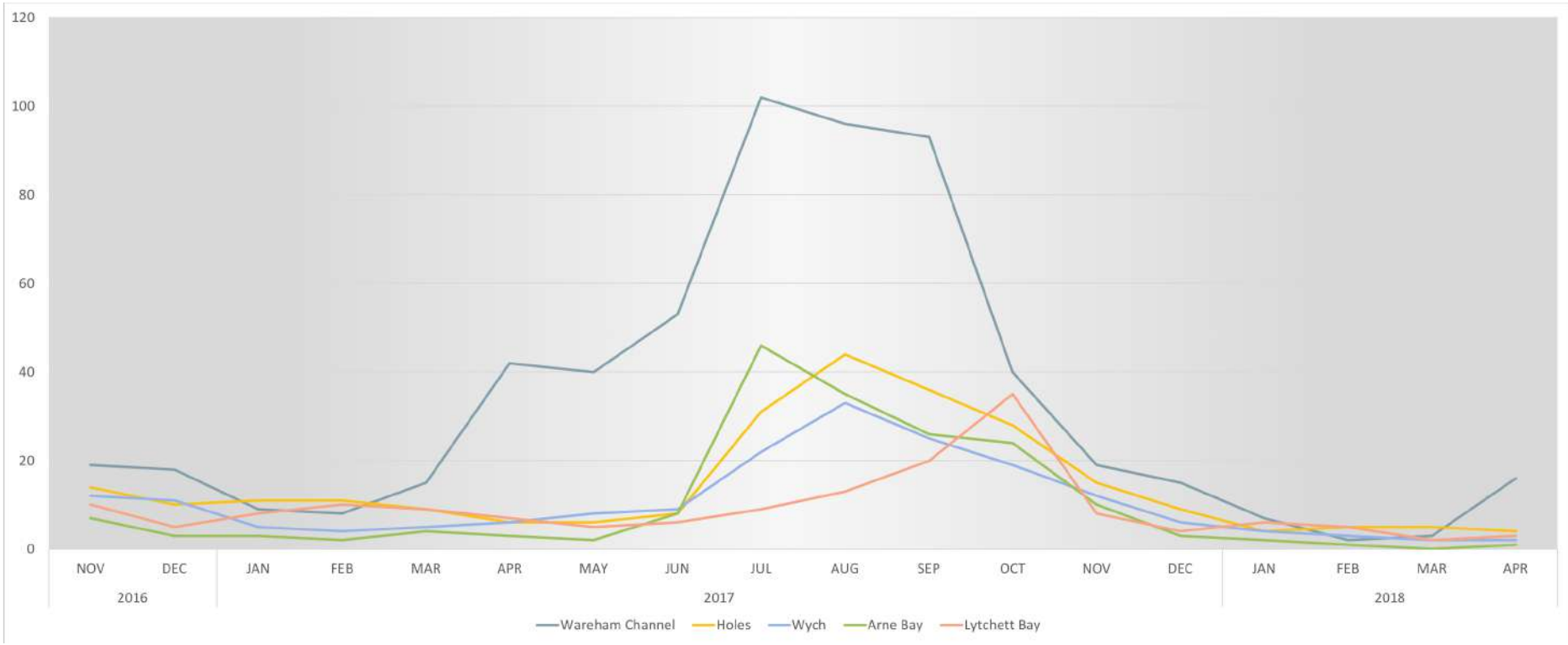
Table 33. Fitzworth monthly feeding maxima

2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
8	8	10	12	8	9	7	7	10	13	19	23	8	7	5	3	2	4

Top intertidal feeding sites compared

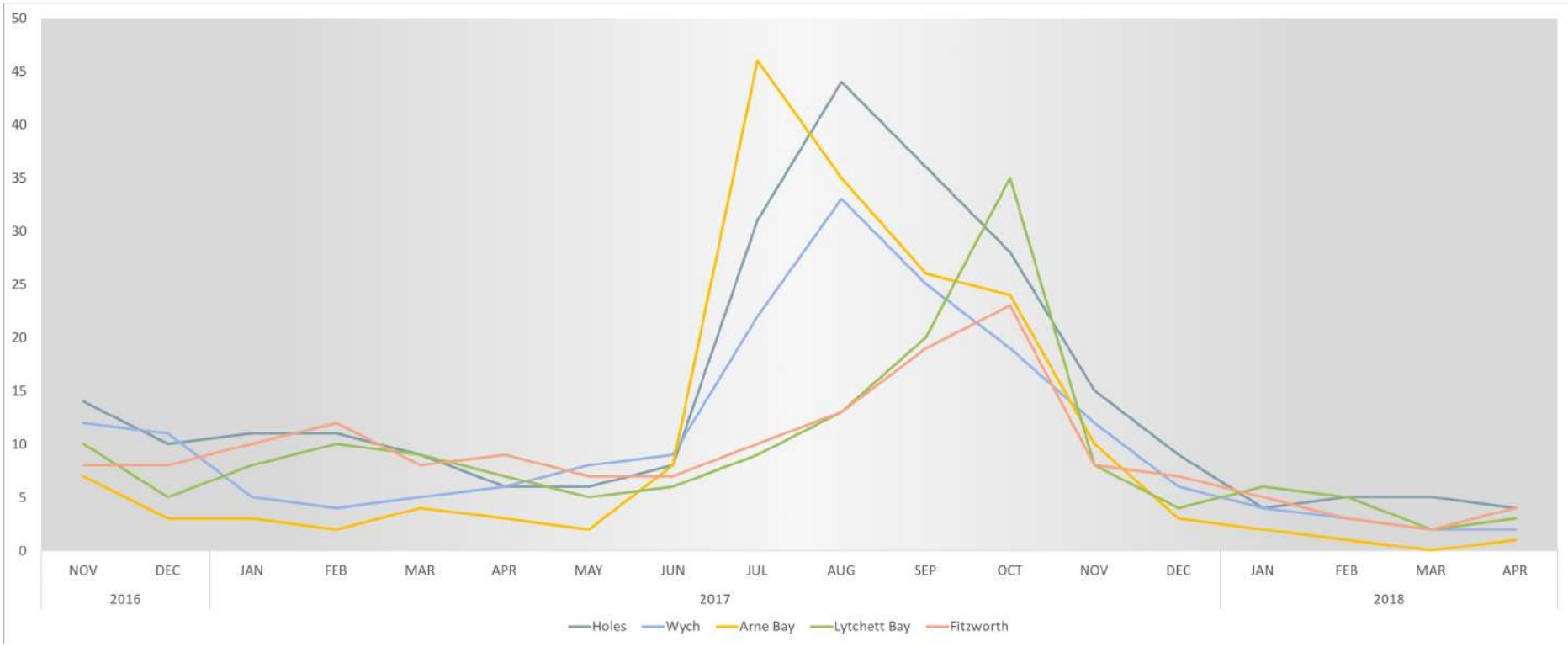
The chart below comparing the sites just discussed shows how dominant the Wareham Channel is. The rest of the sites being fairly equally matched.

Fig 74. Top intertidal feeding sites compared



The chart below has the Wareham Channel removed to more closely focus on the relationships between the other sites, particularly just how out of sync the peak counts of Lytchett Bay and Fitzworth were.
All sites begin to see an increase in numbers in June, but where Arne, Wych and Holes Bay (and the Wareham Channel) all rise steeply to a July or August peak, Lytchett and Fitzworth's rise is much steadier to peak in October. It is interesting that their decline is then correspondingly sharp, to fall back in line with the rest of the sites.

Fig 75. Top sites compared (not including Wareham Channel)



The following charts are scaled to 25

South Deep

Some of the intertidal areas here only have shallow water at the lowest tides, but still some reasonable numbers were recorded.

Fig 76. South Deep monthly feeding maxima

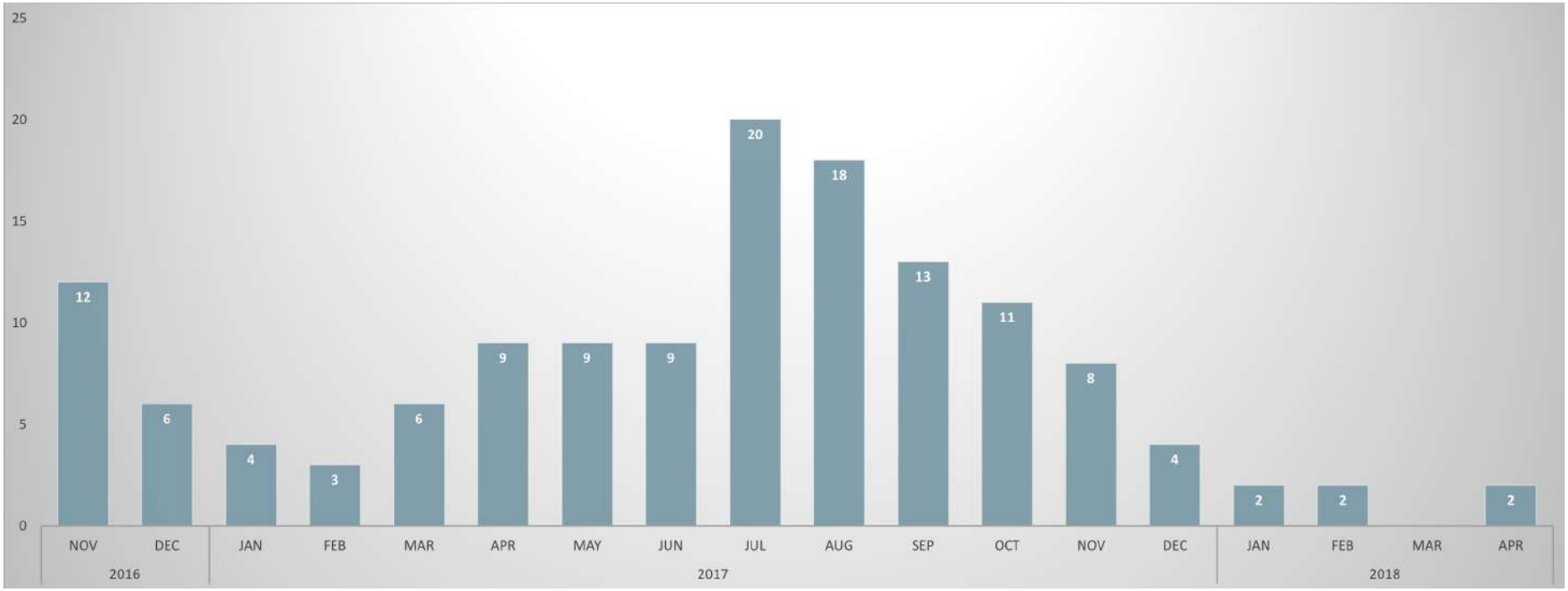


Table 34. South Deep monthly feeding maxima

2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
12	6	4	3	6	9	9	9	20	18	13	11	8	4	2	2	0	2

Along with Wareham Channel, this area has a rather early peak count in July.

Brands Bay

As mentioned earlier, for its size and location next to the Little Sea roost, this area underperforms.

Fig 77. Brands Bay monthly feeding maxima

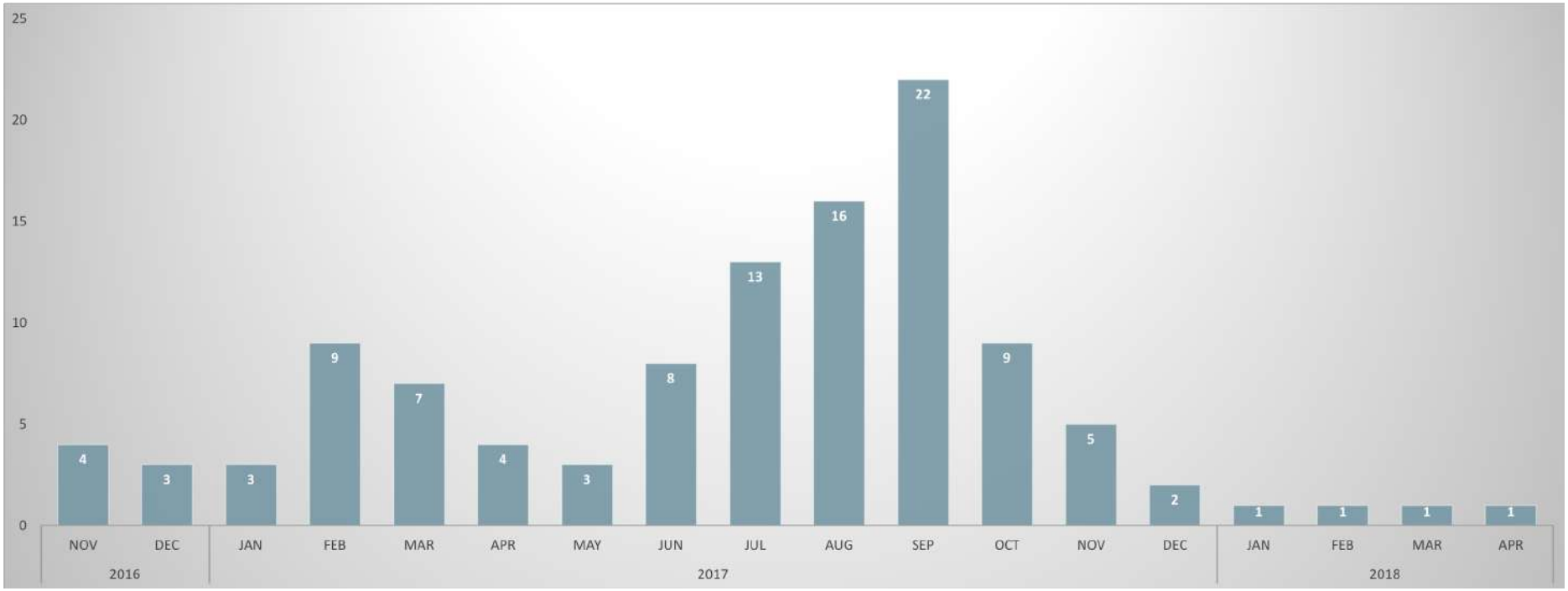


Table 35. Brands Bay monthly feeding maxima

2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
4	3	3	9	7	4	3	8	13	16	22	9	5	2	1	1	1	1

Middlebere Channel

Fig 78. Middlebere Channel monthly feeding maxima

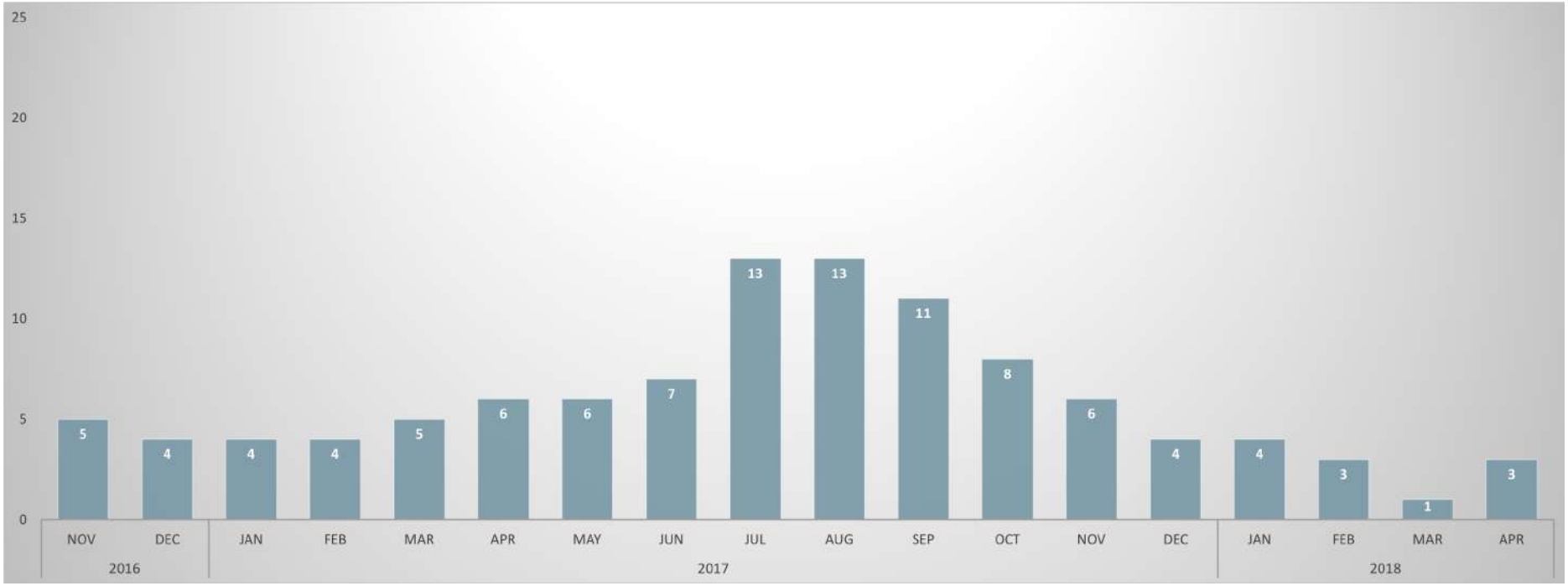


Table 36. Middlebere Channel monthly feeding maxima

2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
5	4	4	4	5	6	6	7	13	13	11	8	6	4	4	3	1	3

Newton Bay

Fig 79. Newton Bay Channel monthly feeding maxima

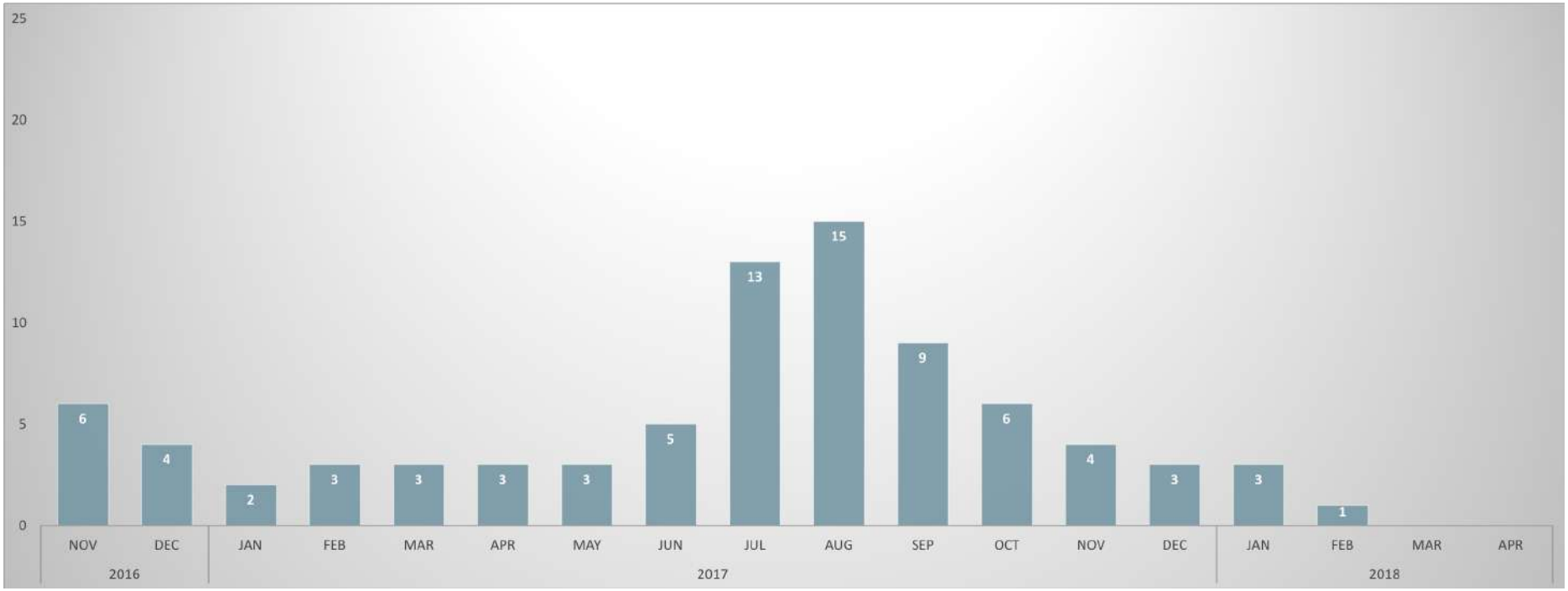


Table 37. Newton Bay Channel monthly feeding maxima

2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
6	4	2	3	3	3	3	5	13	15	9	6	4	3	3	1	0	0

Bramble Bush Bay and Brownsea south shore

Fig 80. Bramble Bush Bay and Brownsea south shore monthly feeding maxima

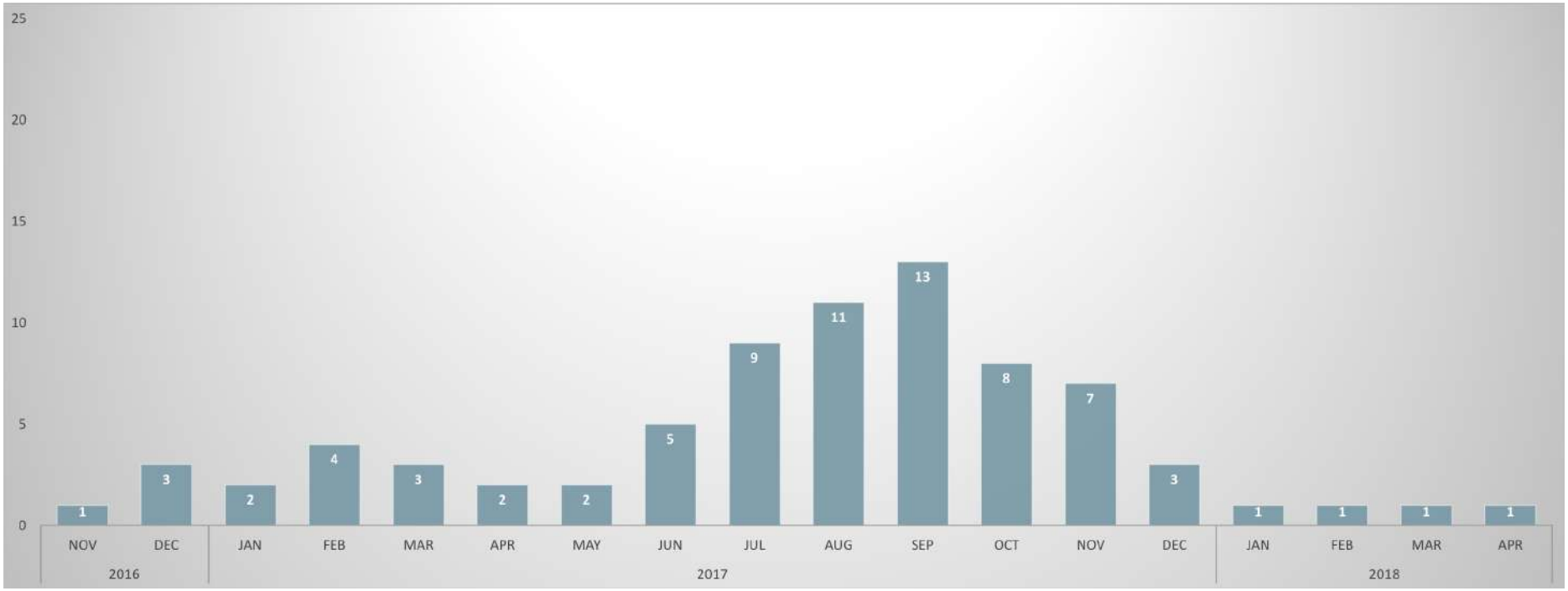


Table 38. Bramble Bush Bay and Brownsea south shore monthly feeding maxima

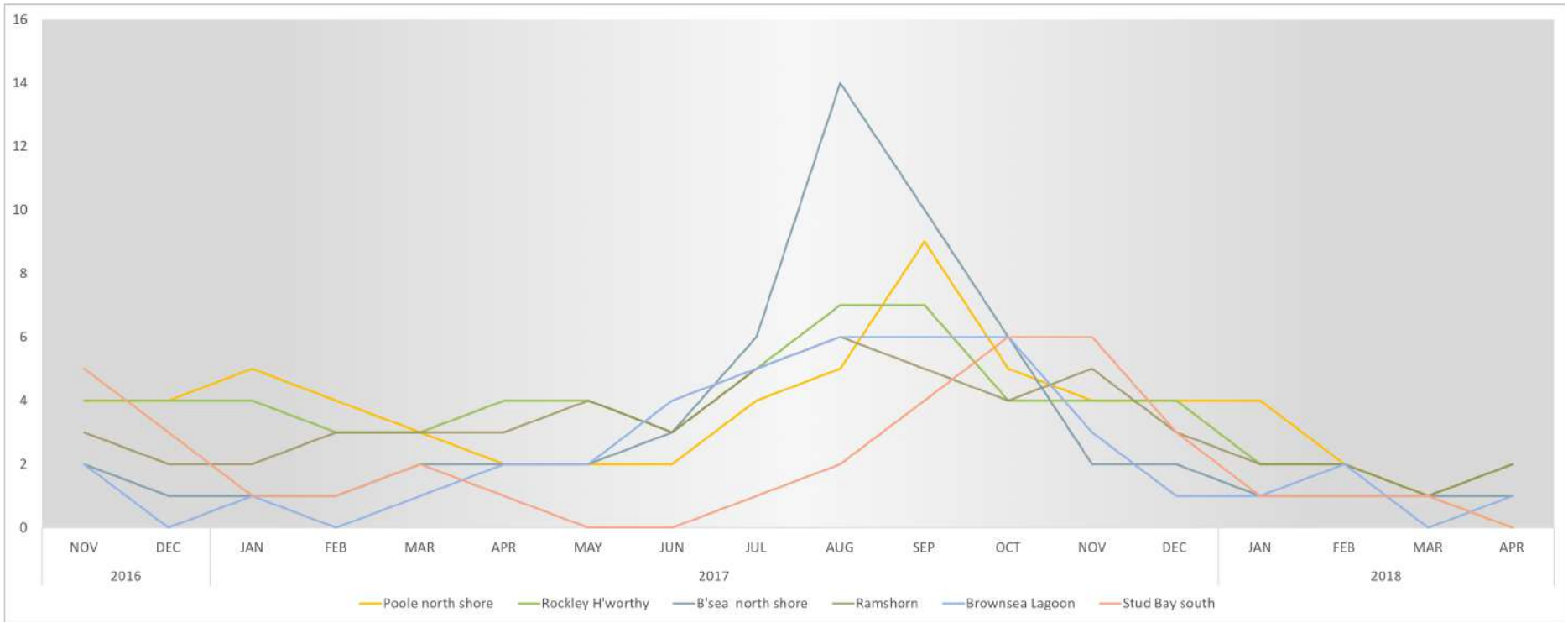
2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
1	3	2	4	3	2	2	5	9	11	13	8	7	3	1	1	1	1

Remaining 6 intertidal feeding areas

Table 39. Monthly maximum counts for remaining six intertidal feeding areas

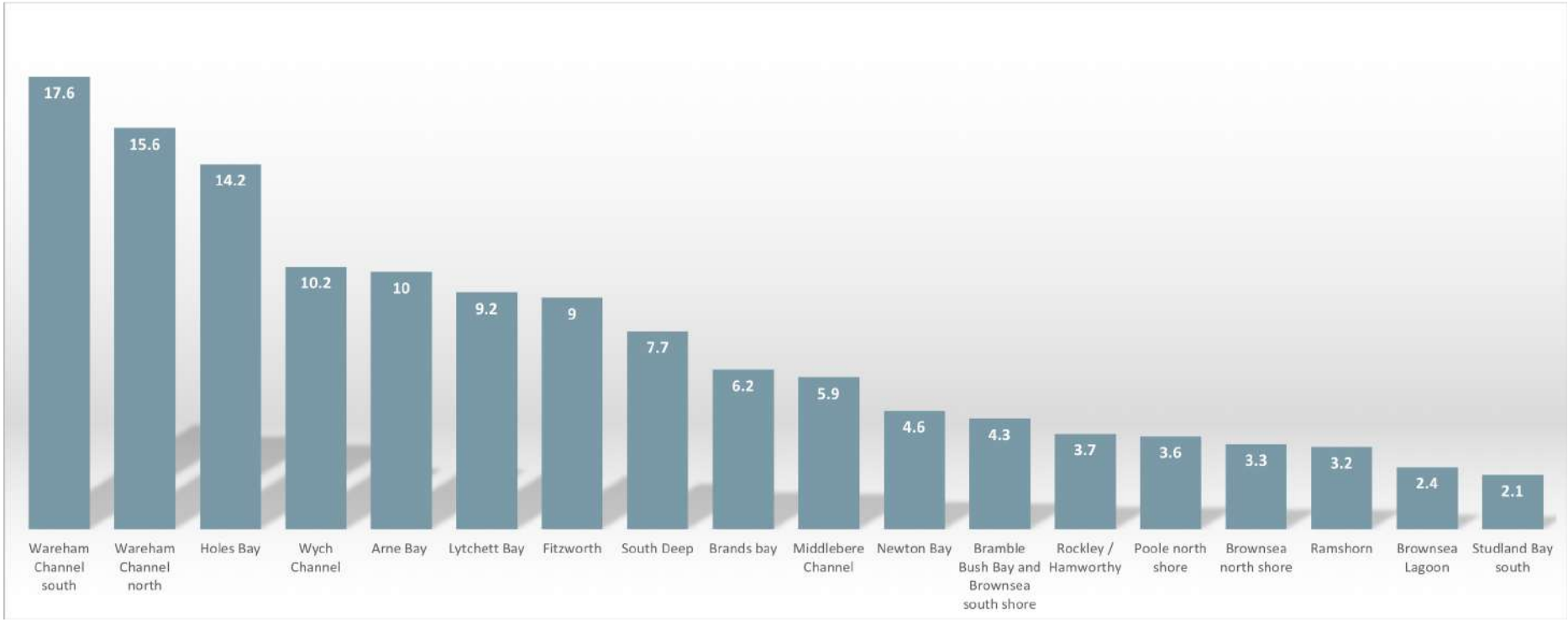
	2016		2017												2018			
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Poole north shore	4	4	5	4	3	2	2	2	4	5	9	5	4	4	4	2	1	0
Rockley / Hamworthy	4	4	4	3	3	4	4	3	5	7	7	4	4	4	2	2	1	2
Brownsea north shore	2	1	1	2	2	2	2	3	6	14	10	6	2	2	1	1	1	1
Ramshorn	3	2	2	3	3	3	4	3	5	6	5	4	5	3	2	2	1	2
Brownsea Lagoon	2	0	1	0	1	2	2	4	5	6	6	6	3	1	1	2	0	1
Studland Bay south	5	3	1	1	2	1	0	0	1	2	4	6	6	3	1	1	1	0

Fig 81. Monthly maximum counts for remaining six intertidal feeding areas. (Scaled to 16)



The above chart comparing the remaining six sites is a bit busy but does at least give an idea of comparison. Brownsea north shore is probably the most interesting here with below average counts in many of the months but a big surge in numbers around August, no doubt a result of its immediacy to Brownsea Lagoon.
Brownsea Lagoon, one of the top high tide sites, is not at all attractive at low tide during the winter months and doesn't fair too much better in the peak months either.

Fig 82. Average monthly maximum feeding counts for all sites



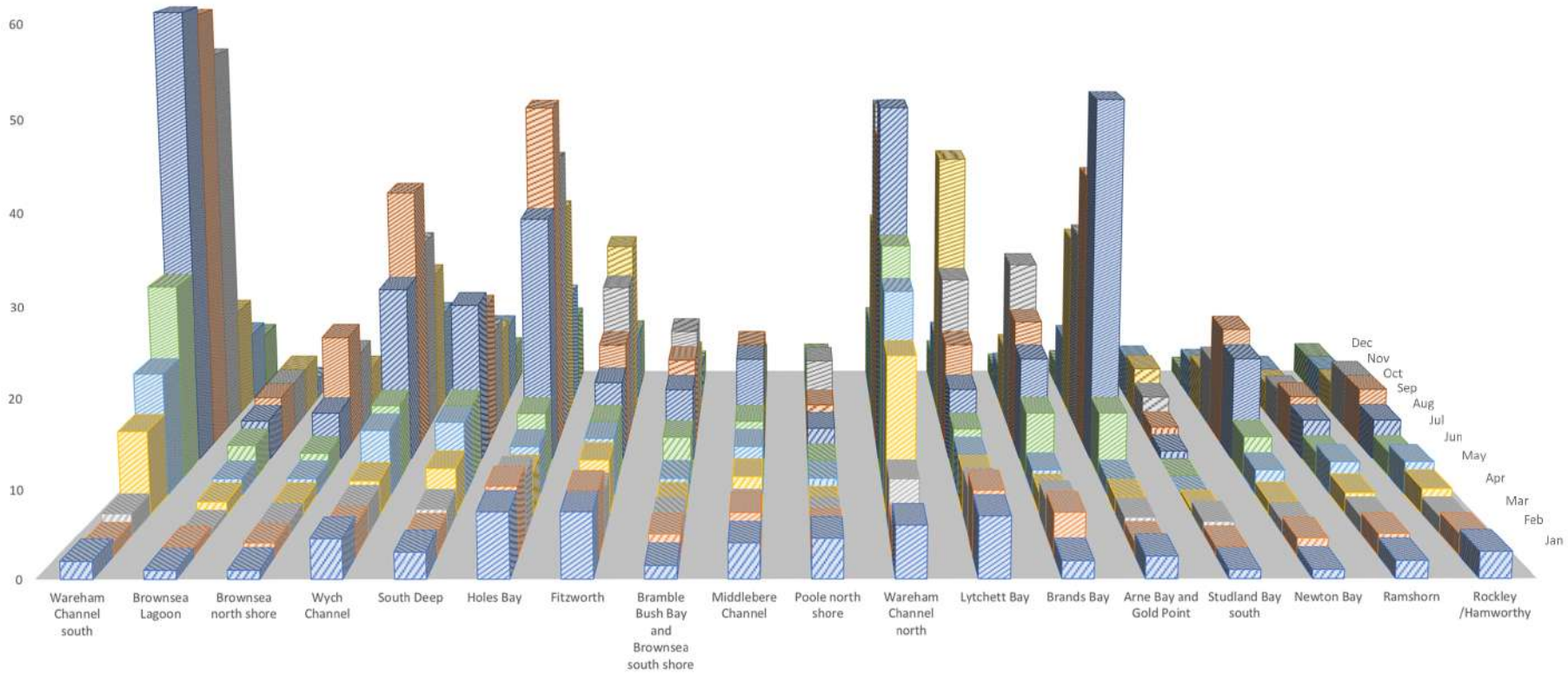
The above chart shows the average monthly maximum feeding counts for each site, ranked from highest to lowest.

Ranking the sites in order of area would also place sites up to the Wych Channel in the same order.

After Wych Channel, Brands Bay would be next in order of area but the rather disappointing numbers appear in 9th position in the chart, whereas the much more modestly sized Arne Bay punches well above its weight, registering the 5th highest average count.

Here's fun. All the sites in all the calendar months in one chart. Where the same months occur twice during the survey, ie November to April, averages of the two are used.

Fig 83. Monthly maximum counts by site and month



High tide feeding areas

Upper saltmarsh areas provided the most important high tide feeding areas in all but the highest tides, being particularly important in the winter months when daylight hours were reduced.
Here semi-permanent stranded pools could form or even be supplied by freshwater seepage from the rear of the areas.
Many areas throughout the harbour were used, the numbers being typically related to the numbers of birds that were present during low tide.
Some areas did however attract in birds from beyond the local intertidal areas, such as Salterns and the saltmarsh areas west of Middlebere.

Away from the upper saltmarsh areas, a range of habitats could be utilised at high tide, the most important probably being the recently formed pools at Lytchett Fields.

Beyond the influence of the tide, floodplain meadows, rush pasture, lake and gravel pit shores, the margins at Little Sea and Poole Park, Brownsea Lagoon and the rocky shoreline beyond the high tide at Ballard undercliff could all be used.

Lytchett Fields

Fig 84. Lytchett Fields high tide feeding monthly maxima

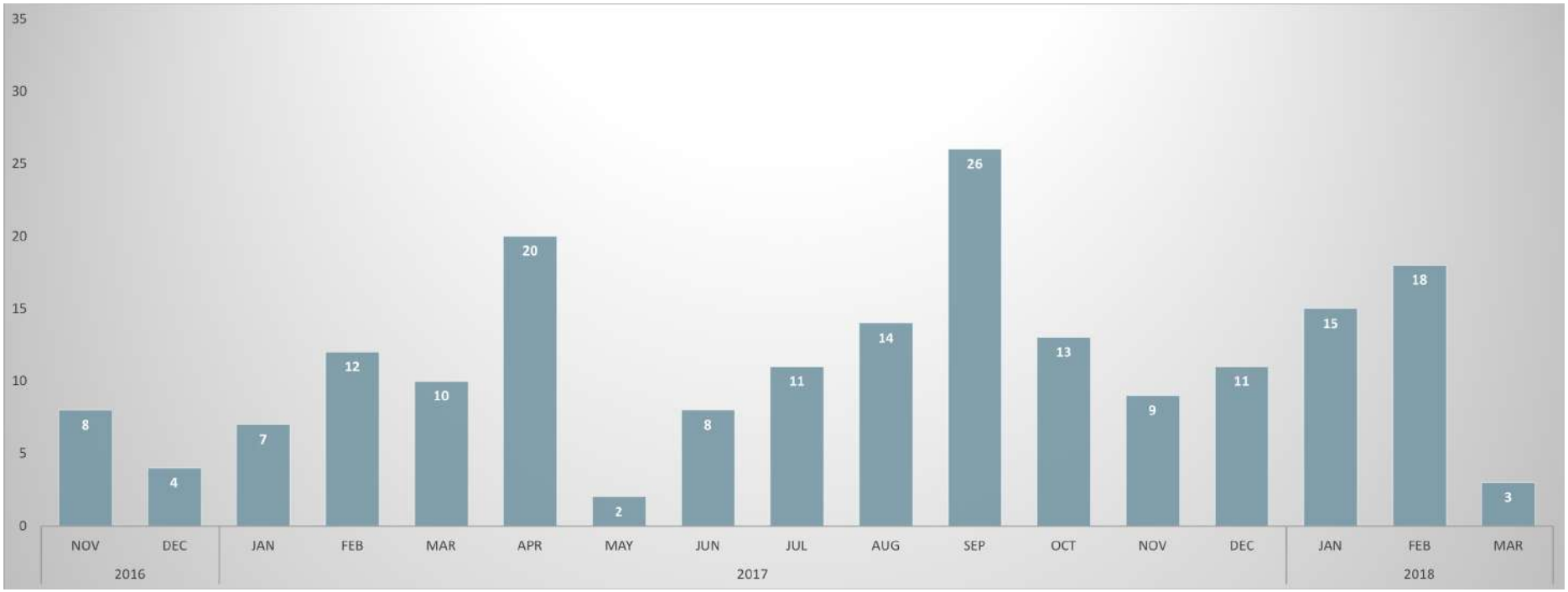


Table 40. Lytchett Fields high tide feeding monthly maxima

2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
8	4	7	12	10	20	2	8	11	14	26	13	9	11	15	18	3	10

Some impressive numbers here, the highest 26 on 4th September. Although certainly attracting good numbers of feeding birds, Lytchett Fields at certain times of the year also doubled up as a pre-roost gathering area; counts of which were sometimes difficult to separate from birds attracted there primarily to feed. This may be part of the reason why the monthly maximum counts appear somewhat disorderly, although obvious pre-roost gathering counts have not been included in the numbers above. At times these numbers surpassed the maximum count of day feeding birds.
A small number also regularly visited the neighbouring and even more recently formed Holton Pools.

Arne Bay

The extensive area of saltmarsh bordering the western half of the bay attracted the most feeding birds during the high-water period. Particularly the permanent pools in the upper saltmarsh areas. The saltmarsh areas further south were underused in comparison, very likely due to the presence of the hide. A few also worked the beach at Gold Point and the flooded pools at Patchin's Point.

Fig 85. Arne Bay high tide feeding monthly maxima

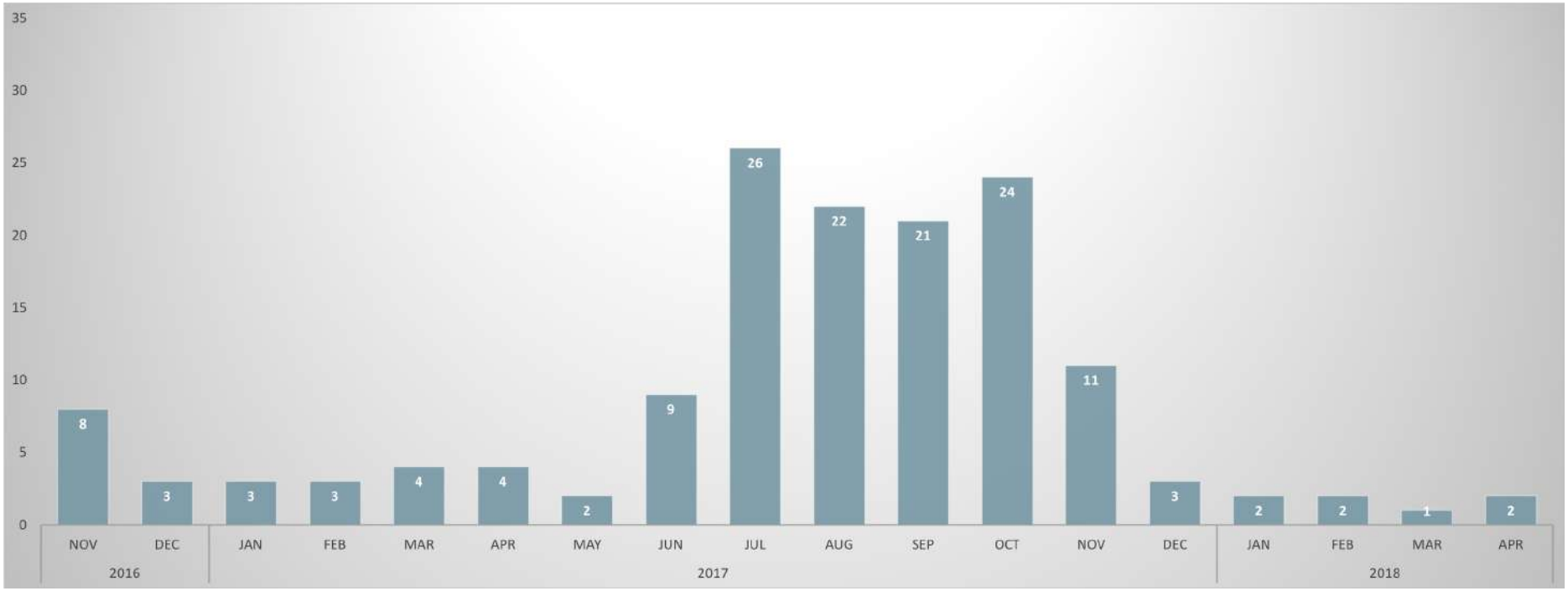


Table 41. Arne Bay high feeding monthly maxima

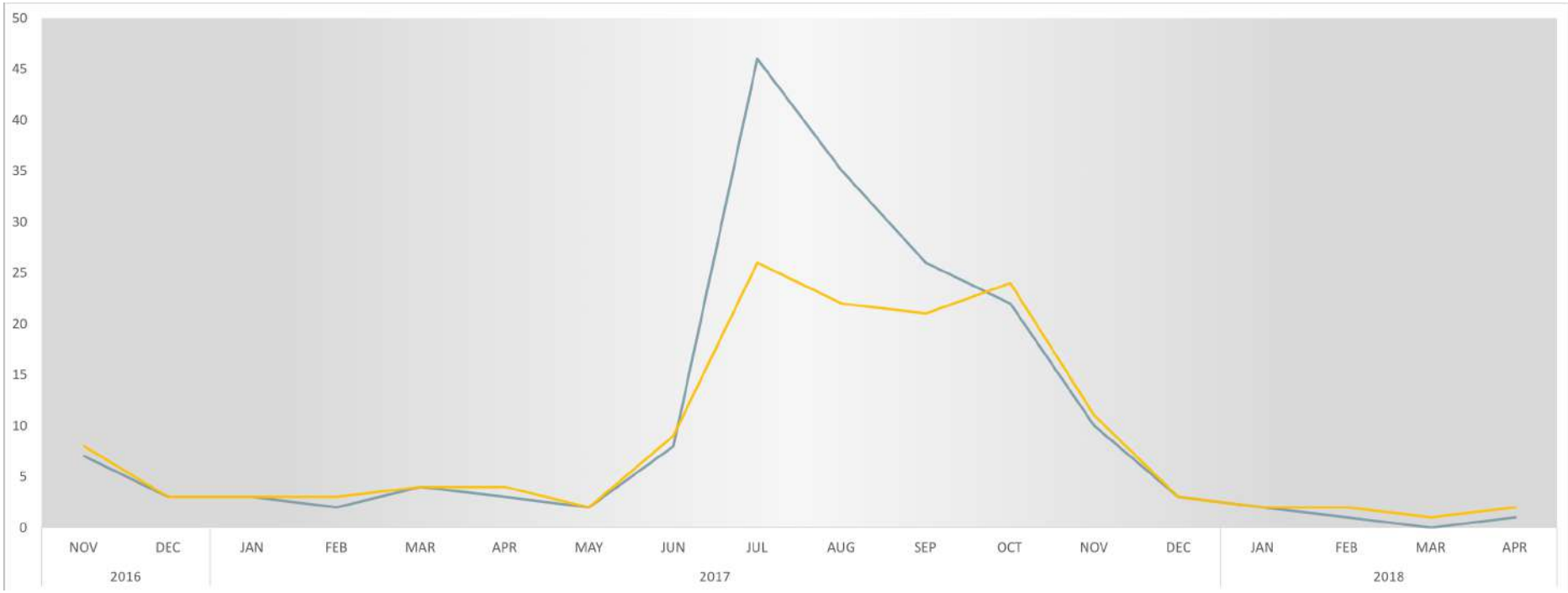
2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
8	3	3	3	4	4	2	9	26	22	21	24	11	3	2	2	1	2

A much easier chart to interpret here, partly due to the direct link to the intertidal area counts. From November at the start of the survey all counts were single figures through until May. An increase to nine birds in June hailed the start of the 'autumn' influx which rapidly gained pace into July, taking the count to 26 towards the end of the month. An early date compared to most other sites. August, September and October counts were similarly high however, until a rather sharp drop off in numbers in November, further reducing in December to two to three.

Various other sites in the area were utilised by small numbers. The beach along the north shoreline of the peninsula was used regularly by one to four birds, with a maximum here of 11 on 18th September 2017.
The Gold Point clay pit shores were a regular haunt of two or three in the non-breeding season, with a high count of five at the end of October.

High tide counts were very similar to low tide feeding counts from November at the start of the survey period until June, with birds happy to stay local. As the autumn influx picked up pace in July however, as can be seen from the graph below, many of the birds feeding in the bay were not to be found in the area at high tide. From October onwards, after the transients had moved through, the status quo was restored.

Fig 86. Arne Bay high and low tide counts



Wych Channel area

Numbers of birds found feeding around high tide in the Wych Channel were similar to the Arne Bay area

Fig 87. Wych Channel area high tide feeding monthly maxima

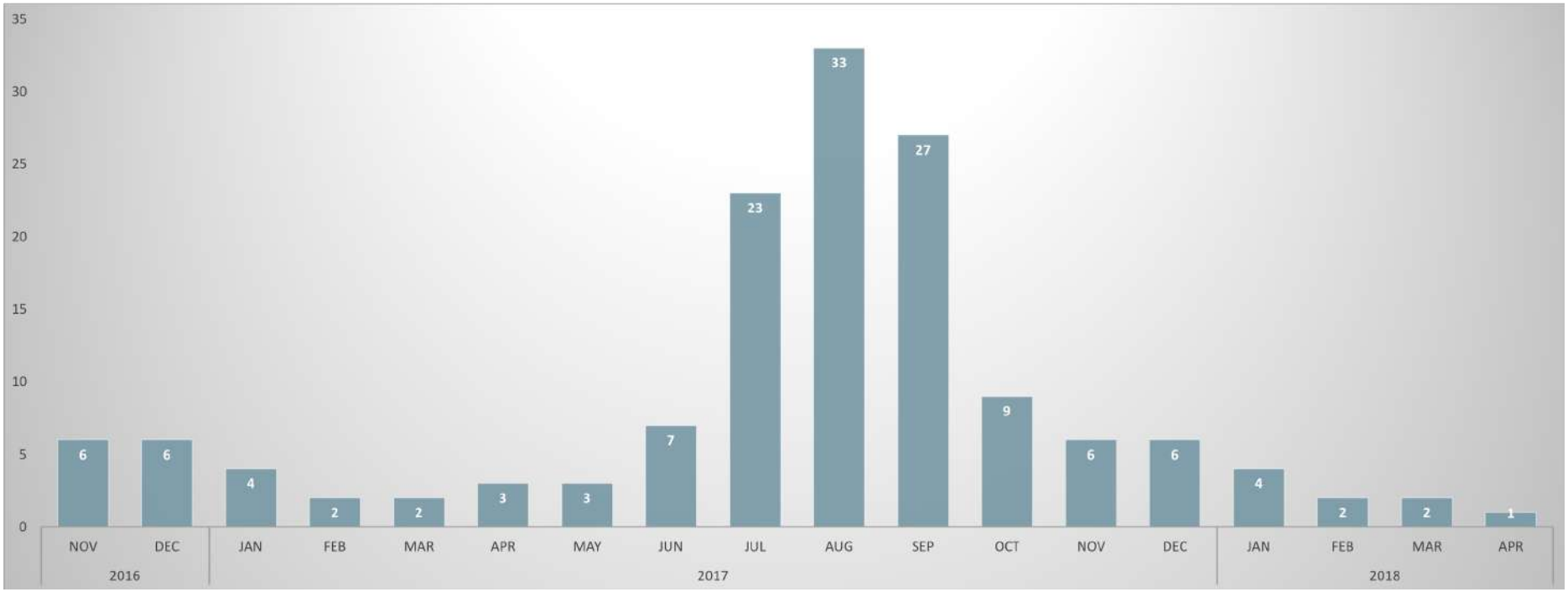
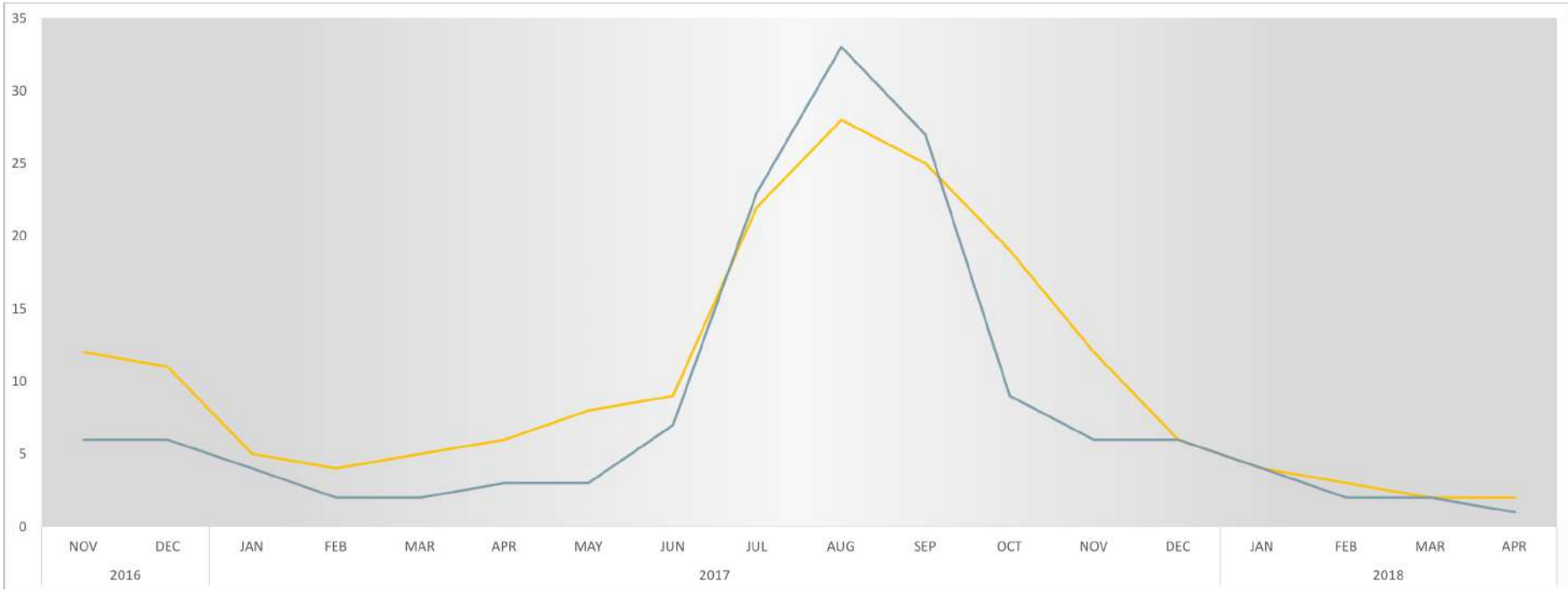


Table 42. Wych Channel area high tide feeding monthly maxima

2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
6	6	4	2	2	3	3	7	23	33	29	9	6	6	4	2	2	1

The graph below compares the high and low water counts. Again, as would be expected, there is a strong correlation between the two.
From July to September more birds are spending high tide here than feeding, which is the opposite to Arne Bay who are losing birds at high tide, suggesting perhaps the same birds involved.
From October there is a sharp drop off using the area at high water, falling well below the numbers feeding at low tide until there is a balance in numbers from December onwards, suggesting the same individuals throughout the day.

Fig 88. Wych channel area high and low tide feeding monthly maxima



West Middlebere and Salterns

Quite an extensive area of Upper saltmarsh, brackish swamp and reed fringed pools to the west of the Middlebere Channel.

Table 43. Middlebere and Salterns high tide feeding monthly maxima

2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
5	5	6	6	5	4	3	3	4	6	7	5	6	5	5	5	2	3

Around 5 to 6 birds used this area in the first winter period from November to March, more than were using the Middlebere channel at low tide.
The number dropped slightly to three to four birds from April until July, rising again to six to seven birds during the migration period before reverting back to around five birds in the second winter period. Still two regular birds in March after the very cold spell.

Viewing in the western *Spartina* and in particular Salterns area was awkward, with any sort of approach invariably causing the birds to flush, so visits were kept to a minimum. Data here regularly relied on views of birds in flight and so may well have been undercounts.

Holes Bay

High tide counts at Holes Bay throughout the survey period were very similar to intertidal feeding counts.
Observations at rising and high tides here, revealed the *Spartina* areas to be rather underused as feeding areas in comparison with other sites. Presumably in part due to the unique alternative feeding opportunities offered along the shorelines, embankments and outflows which could all be utilised here.
The most popular outflow was in the north east sector of Holes Bay where there was always at least one Little Egret to be found fishing from the rocks, probably the same bird. Occasionally birds also ventured up the outflow channels.
Areas under the railway bridges were also popular, with birds patiently waiting at the water's edge for an unsuspecting fish to swim by.
A bird was found feeding at the edge of the large pond within the woods on the west side of the Country Park on a couple of occasions.

Wytch Causeway

Really just a continuation of the myriad of long creeks that extend far beyond the mudflat feeding areas of the Wych Channel. Being this far up they are the very last areas to be inundated and so provide some valuable extended feeding times. Quite a few pools have also formed in the area providing more feeding opportunities.

Seymer's Pools, Brownsea Island

Seymer's Pools during the autumn regularly attracted double figures of Little Egrets, no doubt helped by the site's immediacy to Brownsea Lagoon high tide roost.
High counts were 13 birds on 29th July and 14 on 8th September 2017. Away from the 'autumn' period only one or two recorded.

Gold Point clay pit

The seemingly barren shorelines of the flooded clay pit provided some alternative high tide feeding for a small number of birds. Usually one or two. On the 25th October five birds were present of which two were feeding and three roosting at the time.

Brownsea Lagoon

Brownsea Lagoon appeared only to be used for feeding as a consequence of its attraction as a high tide roost site. By way of evidence, during the winter for example, a feeding Little Egret was a rarity.

Beaches and shorelines

Beach and rocky shoreline areas also provided valuable feeding areas, with many remaining workable during high tides. With the harbour having over 100km of indented shoreline, there was no shortage of choice.

With more beach area than most, Studland South beach and the rocky shoreline out to Old Harry was a popular site. Regularly attracting small numbers, with up to six on a few occasions, mostly in October and November. Birds could find somewhere to feed here at all tidal states, at low tide working the tideline or at higher tides the stranded rocky pools or seaweed strewn areas of the upper beach.

The shorelines of Goathorn attracted up to three to four birds, with neighbouring shorelines of Green Island, Furzey and the southern side of Brownsea Island all regularly frequented.
Also popular was the beach area below Ham Common, including Rockley Bay with up to three here. One or two ventured further east working the very small beach areas along the Hamworthy shoreline.
Further east again, one or two Little Egrets could be found feeding almost anywhere from the Poole Quay Breakwater to Parkstone Bay to Sandbanks. There were a few favourite spots including a small beach area at the bottom of a garden immediately east of the Salterns Marina and a rocky area with stranded pools at the base of Evening Hill.
The beaches along the western shores of Long and Round Island were a regular haunt.
Away from these areas any stretch of beach could be investigated.

Arne Moors

Only used when there were flooded areas, generally attracting two or three birds. High count of four birds after heavy rain in March. There were often a couple of birds poking about after the grass had been cut in the late summer.

Bestwall and Wareham Water Meadows

Again, only really used when particularly waterlogged. Up to four were recorded at Bestwall after heavy rain. The Frome Valley, which is covered later, was not specifically used as a high tide feeding area, with birds present there throughout the tidal cycle. Similarly the Piddle Valley.
As with Arne Moors, the late summer cutting of the grass attracted birds, keen to see what creatures had been inconvenienced.

Poole Park

A regular haunt particularly in winter. Favoured areas were at the edges of the man-made reed fringed islands and other shoreline areas. Most of the time one to three birds. Occasionally the water level was lowered, exposing more potential areas and attracting further birds, with a maximum count of seven on 2nd February 2017.

Little Egrets were also regularly encountered at Swineham gravel pits, along the narrow exposed shoreline areas. Up to two or three at times here, occasionally birds also used the reed margins.
The reed fringed edges of Little Sea were a favourite for one or two. Also here were various pools, marshy bits and other inundated areas to be investigated.

Cattle fields

Cattle fields have proved to be a very important feeding habitat for Poole Harbour's Little Egrets in winter. The muddier the better. Such cattle fields occur throughout the harbour recording area, but it always seems to be the same rather specific fields that are used.
Although the Little Egrets feeding habits and diets have been exhaustively covered by a wealth of studies, no one has apparently realised they regularly use cattle fields to feed in winter, despite the first wintering Little Egret occurring back in 1987.

Below is an extract from a typical publication.

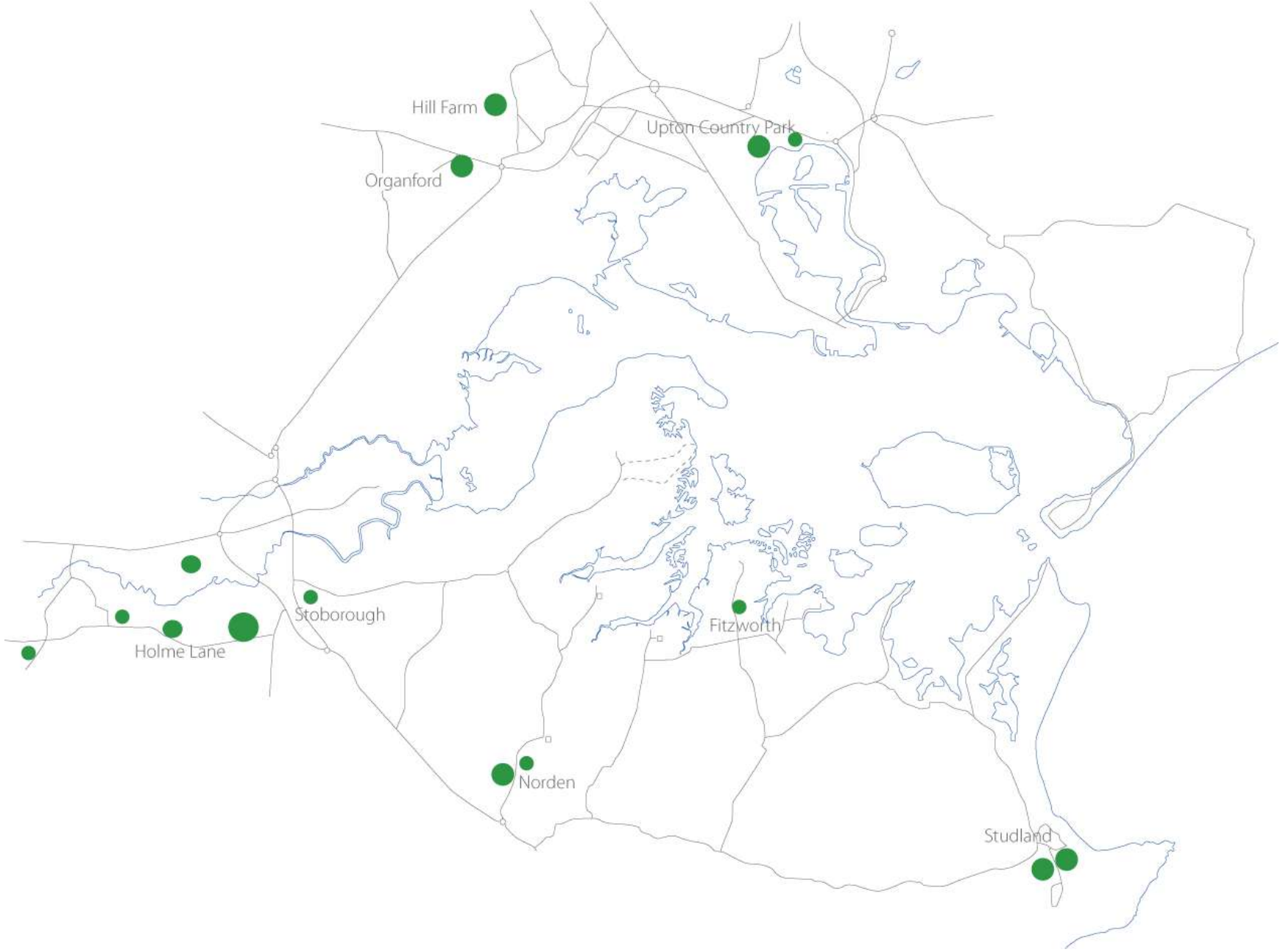
"The Little Egret typically feeds in open or sparsely vegetated shallow to very shallow water using a wide variety of habitats, both inland and coastal, such as the banks of gently flowing rivers and streams, shallow lakes, pools, lagoons, irrigation canals, flooded meadows, open areas in swamps and marshes, coastal mud flats, sandy beaches, rocky shores, coral reefs, mangrove covered shores, tidal streams, rice fields, ornamental fish ponds, and irrigation pools"

There is the odd reference to birds using cattle fields in 'drier areas' where there are no better alternatives. Assuming the 'drier areas' are not a reference to Savannah but sites without water bodies, this is still far short of the mark as Poole Harbour has a wealth of perfectly good alternative habitats available which are ignored by a significant number of birds in favour of cattle pasture in winter.

During this survey, all cattle fields that were visited by Little Egrets were permanent pasture apart from a couple of brassica fields that the cows were eating their way through.
Interestingly, only very small numbers of birds frequented the Frome Valley despite the presence of cattle here.

The fields regularly used were at Holme Lane, Norden, Manor Farm at Studland and Upton Country Park. Very occasionally birds were also found at fields at Fitzworth and Stoborough. A number of permanent pasture fields to the west of Lytchett Minster, just beyond the recording area were also used by a significant number that roosted in Poole Harbour. A handful also occasionally ventured south of the Manor Farm fields at Studland to fields south west of Ulwell, just north of Swanage.

Fig 89. Little Egret frequented cattle fields



Holme Lane fields

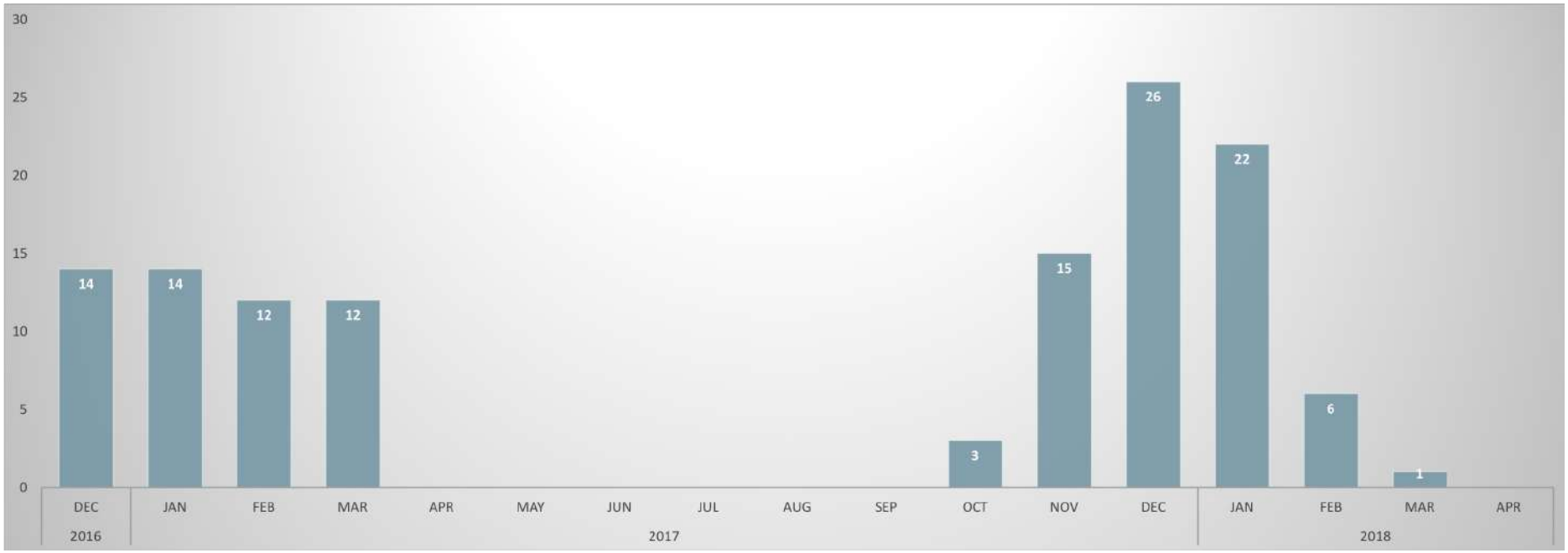
During the first winter period, two main fields along the Holme Lane were used. The field at Bog Lane was the most regularly used and attracted the most birds. The other field being a short distance west along Holme Lane.

A field on the northern side of the valley just below Worgret Manor Farm was also regularly attended. There were not always cattle here but certainly always Little Egrets. Closer inspection revealed that particular field to be constantly waterlogged by a source of water. A field next to Holme Priory was also occasionally used when cows were present.
During the second winter period, nearly all singularly used the field at Bog Lane. Only the field just below Worgret Manor Farm was also used.
The highest count at the Bog Lane field was 26 in December 2017.

The Bog Lane field was particularly attractive as there was a choice of feeding environments. Toward the top end of the field were the feeding cages where many of the cattle spent their time. It was here that most of the mud was churned up. The bottom of the field was at a lower elevation and a lot more waterlogged, often having standing water. Most birds spent their time in either one of these areas.

During the first winter period, the very muddy cattle field further west along the lane at SY904865 was very popular. Numbers were highest here during the late afternoon when it became an informal pre-roost feeding area, being only a reasonably short flight to Holme Heath Plantation roost.
In the second winter period, cattle were only present for a short while and as soon as they had left the Little Egrets completely lost interest in the field.
The field at Holme Priory occasionally held cattle, being only used by Little Egrets in February and November 2017.

Fig 90. Holme Lane fields monthly maxima



The chart below shows how dominance of the Bog Lane field.

Fig 91. Holme Lane fields monthly maxima

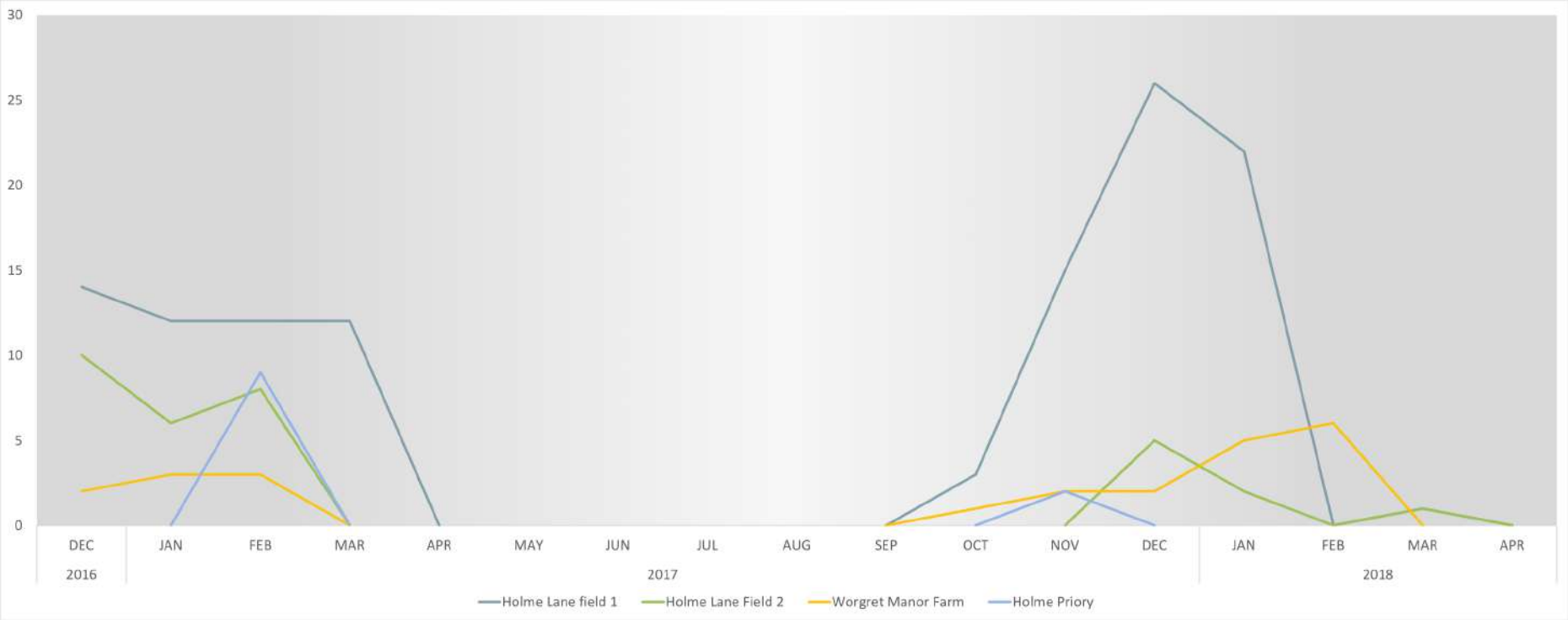


Table 44. Fields monthly maxima

	2016	2017							2018			
	Dec	Jan	Feb	Mar	Apr/Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Holme Lane, Bog Lane	14	12	12	12	0	3	15	26	22	0	1	0
Holme Lane, SY904856	10	6	8	0	0	0	0	5	2	0	0	0
Worgret Manor Farm field	2	3	3	0	0	1	2	2	5	6	0	0
Holme Priory field	0	0	9	0	0	0	2	0	0	0	0	0
Total population	14	14	12	12	0	3	15	26	22	6	1	0

Fields west of Lytchett Minster

Although not in the recording area, fields west of Lytchett Minster were regularly used during the second winter period by Poole Harbour birds.
One was a large field immediately west of the Bakers Arms roundabout, the second a field north from the Bakers Arms and just north of Hill Farm.
No birds were found using any other fields in this area during the first winter period.

The highest single site count was at the Organford field, with 22 on 17th January 2018.
The highest combined count for the two fields was 32 on 16th January 2018; 19 at the Organford field and 13 at Hill Farm field.

In March up to 14 were still regularly commuting on a similar route out of Lytchett but were now using a different field which was not able to be located.
Four birds continued commuting into early April.

Table 27. Combined monthly maxima (March and April refer to fields other than Organford and Hill Farm)

2017		2018			
Nov	Dec	Jan	Feb	Mar	Apr
13	20	32	18	14	4

Norden fields

A couple of fields at Norden were a reliable source of food for up to 11 throughout both winter periods.
The most popular field was located immediately west of the lane running from Norden roundabout to Middlebere and just north of the railway line at SY957838. The other just to the south and lying east of the lane contained Angus cattle.
Another field directly north of the A351 just to the south west of the main field was also used very irregularly by one or two birds.
Although cattle were present for the majority of the winter months during the survey, when they were not present no Little Egrets were seen.

The chart below represents combined totals for these three fields, although many of the counts were attributable to just the larger field.

There was also an unusual record of a single bird using the Angus cattle field in the middle of May.

Fig 92. Norden fields monthly maxima

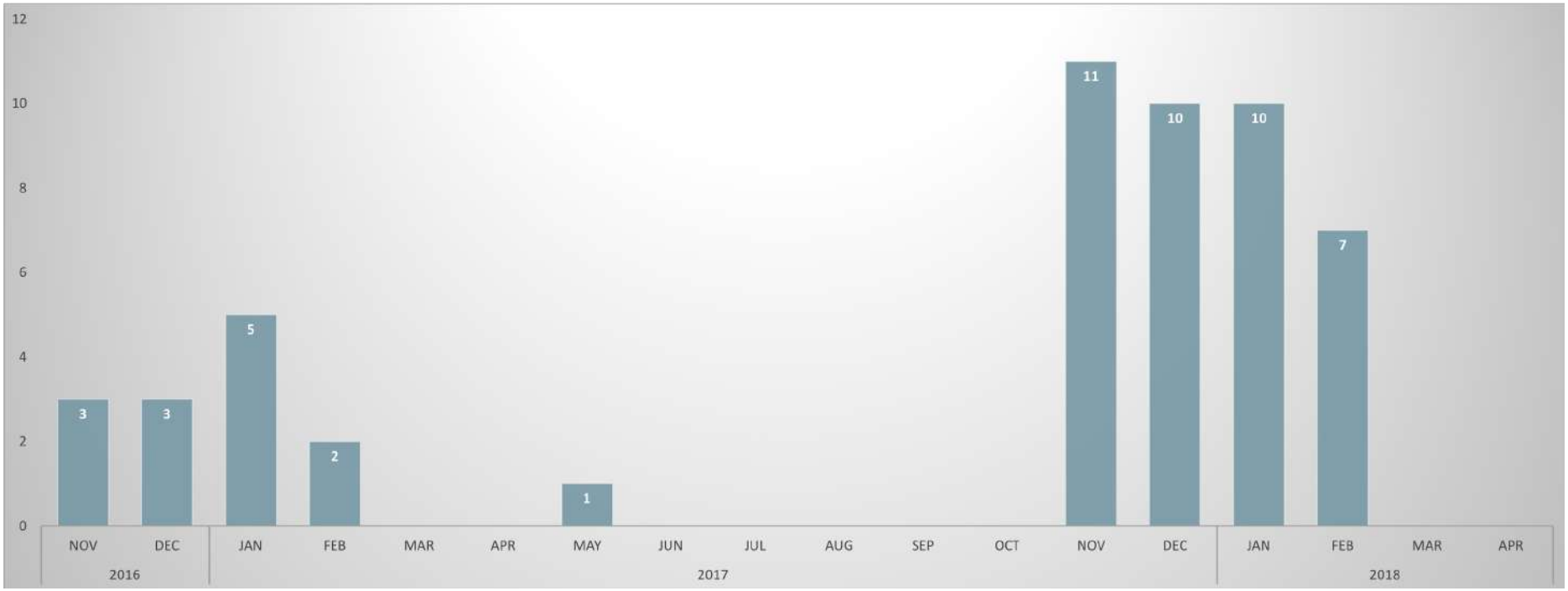


Table 45. Monthly maxima Norden fields

2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
3	3	5	2	0	0	1	0	0	0	0	0	11	10	10	7	0	0

Manor Farm fields

A mixture of pasture and brassica fields directly south of Studland village, straddling the track to Glebelands Estate.

Fig 93. Manor Farm Fields

Fig 94. Manor Farm fields monthly maxima

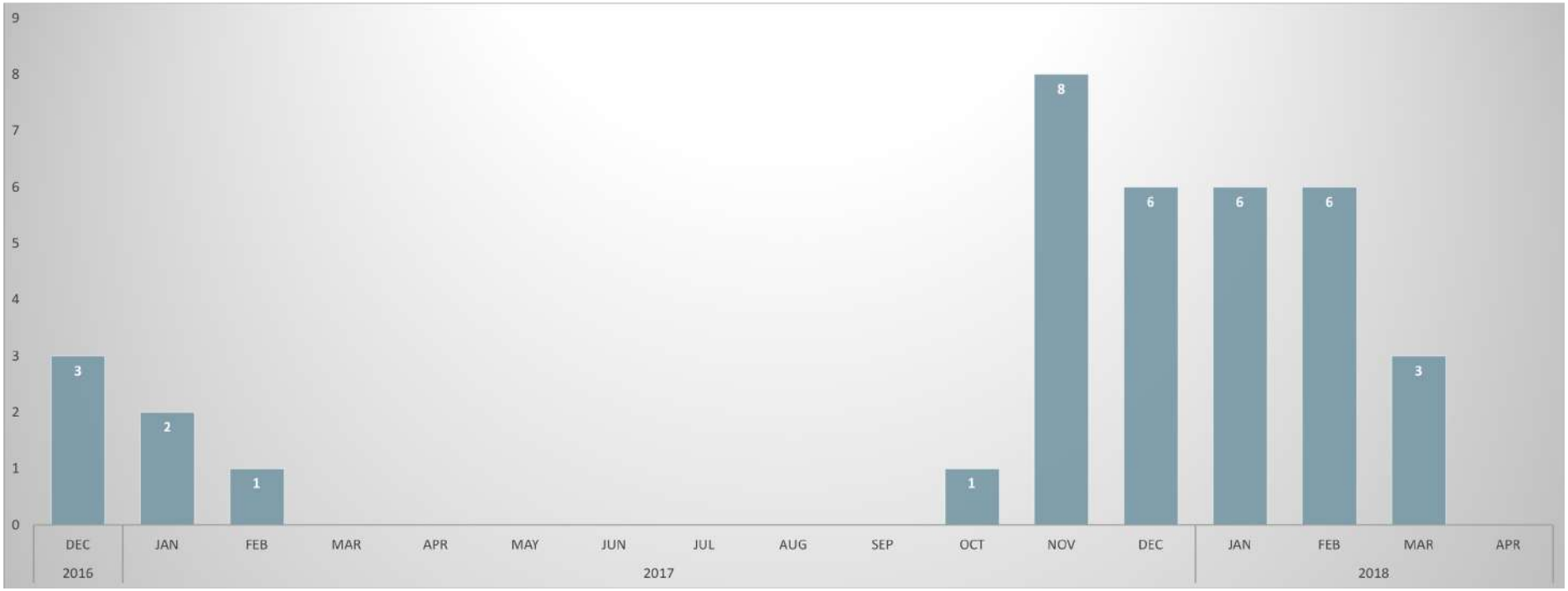


Table 46. Manor Farm fields monthly maxima

2016	2017												2018			
Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
3	2	1	0	0	0	0	0	0	0	1	8	6	6	6	3	0

During the first winter period the cattle were in fields to the east of the track to Glebelands. A small permanent pasture field (1 on map) and a very large brassica field (2 on map) that the cows were gradually munching through. Up to three birds regularly visited these fields.

The large brassica field had quite a gradient, at the lower end of which a pool of water often formed. When the Egrets were not feeding amongst the cattle they could often be found loafing and preening here.

In the second winter period the cattle were moved to three brassica fields to the west of the track. Interestingly however, only one was ever visited by the Little Egrets (3 on map). Initially only one or two visited, the first as early as 17th October. Eight turned up on 8th November but were only seen on a few occasions. Three regular birds from mid-November increased to six regulars from early December until mid-February. No birds were seen here after 22nd

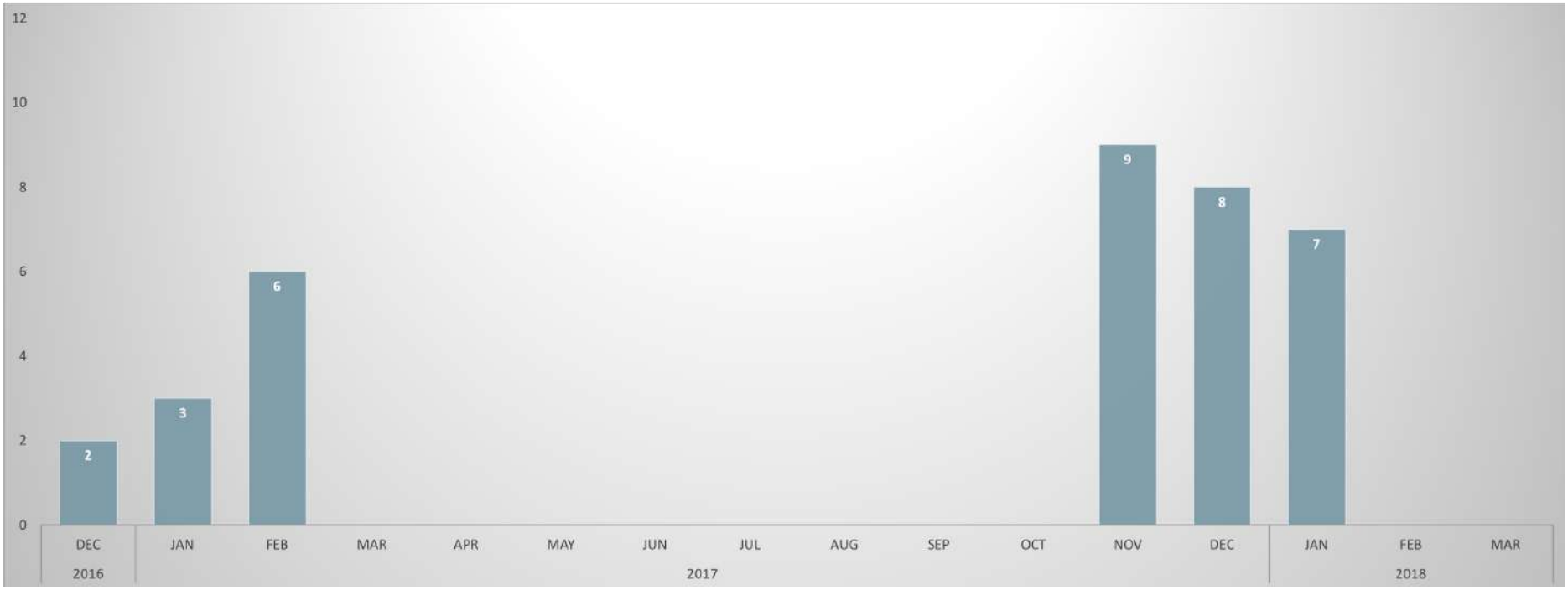
February. The field included a low-lying area at the foot of an incline, resulting in this part being by far the wettest and boggiest, becoming a complete quagmire by January. Of the other two fields, one was located on the slopes and visibly drier, (4 on map) the other further west was not particularly boggy.

Unlike some of the other cattle fields around the harbour, birds here became habituated to the farmer and his tractor. On his arrival instead of fleeing, they would merely fly a short distance away and casually preen whilst waiting for him to leave.

Upton Country Park

Fields bordering the north west sector of Holes Bay. Another traditionally used area over the years, the precise fields used determined by the location of the local cattle at the time.

Fig.95. Upton Country Park cattle fields monthly maxima



During the first winter period, just two or three regularly visiting birds. As has been discussed, the cattle fields here were also visited by birds returning from other areas to roost at Pergin's Island. Many came in quite early to form a part of their daily feeding routine, with up to six being recorded toward the end of the day in February. None were seen using the fields after February.

The second winter period, as with many other cattle field sites, experienced a noticeable increase in numbers compared to the first. The highest count nine birds in November, with a maximum of eight in December and seven in January. None were seen using these fields beyond January 2018.
As with the first winter period, the highest counts were invariably during the late afternoon after numbers had been gradually building up following the arrival of birds from other areas that were attending the roost at Pergin's Island.

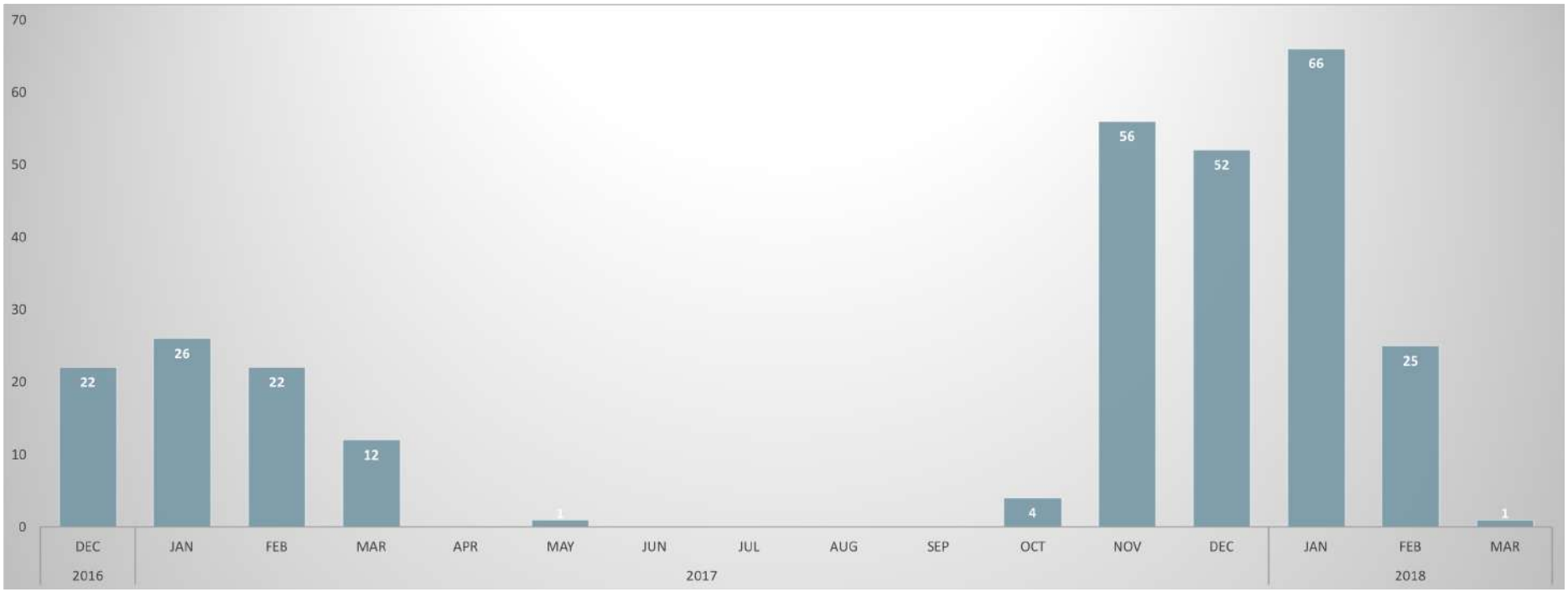
Other cattle fields sites

A cattle field at Melancholy Farm, Stoborough was irregularly visited by a single bird in both winter periods, with two birds present on 22nd November 2017.
A group of four visited a cattle field at Nutcrack Lane, Stoborough on 28th January 2017.
Up to two birds on a number of occasions in with cattle at Fitzworth, both winter periods.

Cattle field using population

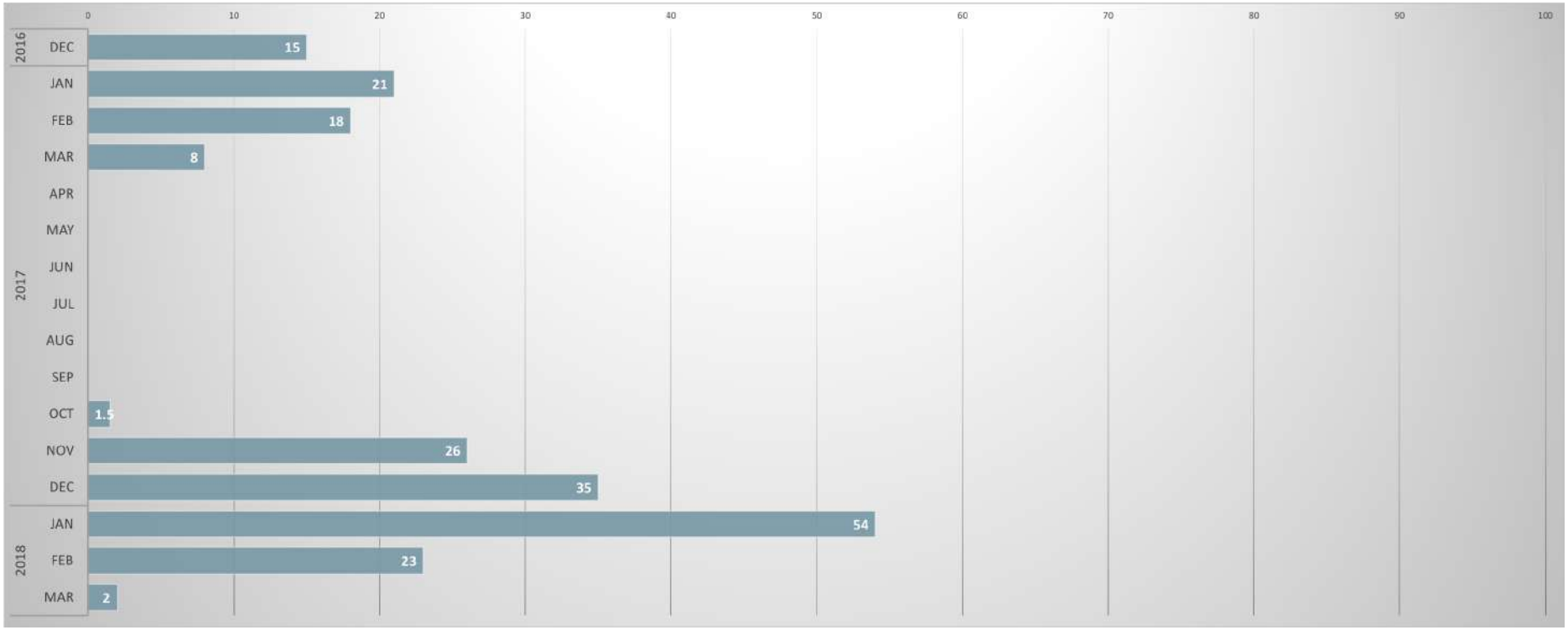
The chart below shows the combined monthly maximum totals of cattle field using Little Egrets. The most distinctive feature is the rather significantly higher number of birds using the cattle fields in the second winter period. For both winter periods field usage is highest in January.

Fig 96. Combined monthly maximum totals of cattle field using Little Egrets



The numbers can also be expressed as a percentage of the total Little Egret population at the time.

Fig 97. Percentage of Poole Harbour's Little Egrets using cattle fields to feed.



For the first 'winter' period a maximum of just over 20% of the population were using cattle fields. During the second winter period however the January figure rises to a significant 54% of the population. It is obviously not known which is the more representative figure, but it is clear that cattle fields are an important habitat for wintering Little Egret.

It must also be said that the numbers are a possible undercount. Pretty much all birds within the recording area would have been identified, however for birds leaving the area to fields beyond, perhaps not all were. The number missing however would have been quite small.

An interesting phenomenon was the avoidance by Little Egret of some very favourable looking cattle fields. A situation that was not particular to this survey with observations in recent years recording the same empty fields.
The most obvious fields to be ignored were some very boggy cut up cattle fields south of Kingswood Farm to the west of Studland Heath. What these fields and a number of other ignored fields had in common however was the presence of alternative cattle fields nearer to the roost sites. Perhaps the reason is no more complicated than that.

River valleys

Much literature suggests that the most important habitat for wintering Little Egrets are river valleys. This was found not to be the case for the river valleys within the Poole Harbour recording area.
Perhaps a reason for this is that unlike many of the other river valleys that are frequented in Dorset by Little Egrets, the valleys in and around the Poole Harbour recording area have better feeding alternatives.
Although the fields at Holme Lane bordered the Frome valley floodplain, their location next to the floodplain was not a factor in their suitability or use.

Frome Valley

Just two or three regularly frequented the Frome Valley from Wareham Water Meadows up to Holme bridge in the first winter period and three to four during the second winter period. For each winter period, observations suggested that the counts involved the same regular birds.
Even when numbers of birds using the nearby cattle fields fluctuated markedly in numbers, the numbers encountered in the Frome Valley were always the same.
The Valley however was a reasonably important feeding area for breeding birds with up to eight or nine birds seen foraging here from April to June and up to six in July.

The most popular feeding areas were either along the top edges of the river banks with birds regularly seen patrolling up and down, or more likely at the water's edge itself. The man-made ditches were also regularly visited.
After periods of wet weather, birds could also venture away from the rivers and ditches to feed on the floodplain.
Cattle were often feeding on the floodplain but the Little Egrets were rarely seen in association with them.

Occasionally, groups could be encountered amongst the *Juncus* at the outer edges of the floodplain. However, these were only short-term visits from birds that had temporarily been disturbed from the cattle fields. If the disturbance lasted a while, they would make a bit of an effort to have a poke about.

The only other time a significant number were recorded in the valley was during the particularly cold weather in February 2018, which saw temperatures plunge well below freezing for a number of days. During this period not just the cattle fields but pretty much all ground was frozen solid and the only option left for the birds that had not already decided to completely abandon the area was to congregate in the few areas of the river bank that allowed access to the free-flowing water.
At least 12 were still about at the start of the cold period, during which time they would often just be hunched up together at the side of the river, with only a few attempting to feed at the water's edge.

Other river systems

There are three other river systems that drain into Poole Harbour, The Piddle, The Corfe and The Sherford.
The Piddle Valley regularly attracted one or two birds. The area directly north of Wareham Common was the most regularly visited. To the west of the by-pass the odd birds could be encountered, but the lower part of the Piddle valley to the Wareham Channel was little used.
The Corfe River valley has a much narrower floodplain area but did occasionally attract the odd bird or two. Mostly on the high tide when birds would make their way up from the western arm of the Wych Channel.
The Sherford drains into Lytchett Bay, alongside Lytchett Fields and is covered in that section.

High tide roosting

As discussed, the many *Spartina* bluffs that snaked around the edges of the intertidal areas provided many local roosting sites.
Away from these locations there were however a few dedicated high tide roost sites.

Brownsea Lagoon attracted the largest numbers of high tide roosting birds by some distance, accounting for 19 of the highest 20 counts of the survey.
The highest being a very impressive 112 on 16th August. Everything must have been aligned on this date as this was more than double the next highest count.
The only sites to break the chain of high counts was Holes Bay and the Wareham Channel, although technically these all involved an aggregation of small loosely grouped gatherings.

Brownsea Lagoon

Fig 98. Brownsea Lagoon Little Egret roosting monthly maxima

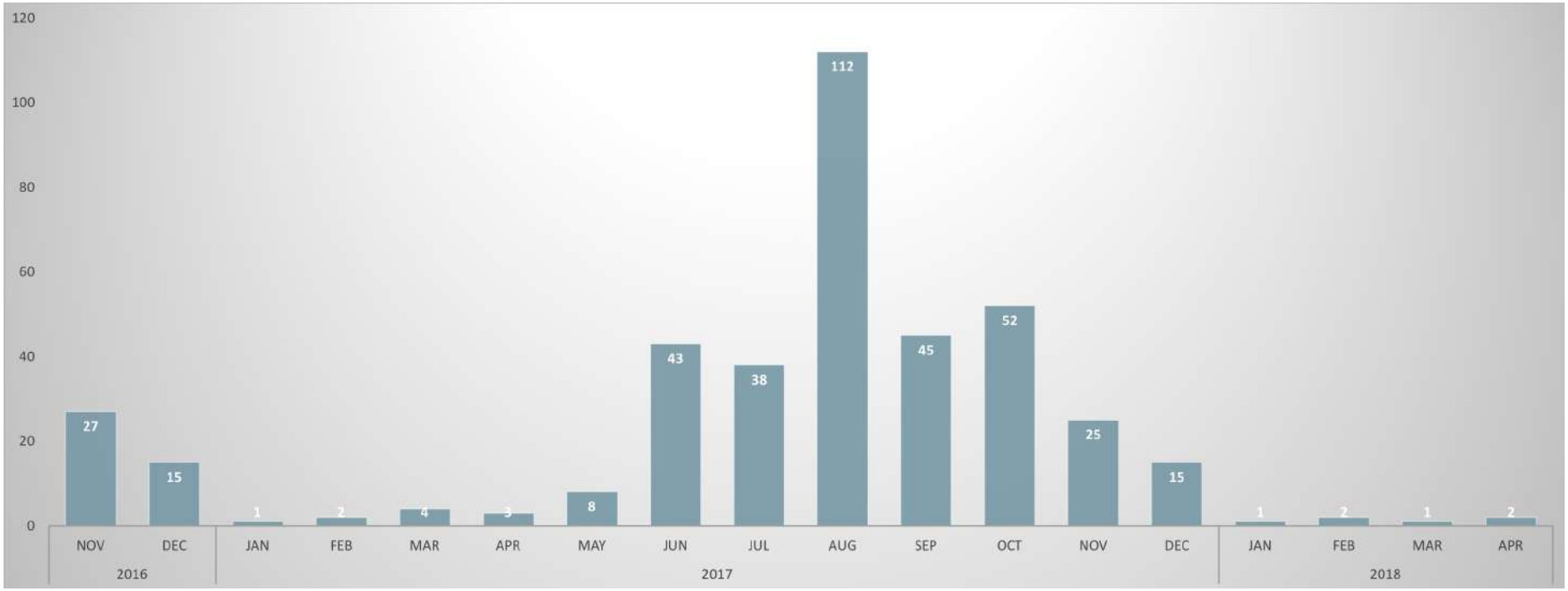


Table 47. Brownsea Lagoon Little Egret roosting monthly maxima

2016		2017												2018			
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
27	15	1	2	4	3	8	43	38	112	45	52	25	15	1	2	1	2

Some quite disparate counts here, the site being largely unused during the main winter months but very much used during the peak influx of birds post breeding season. The first few arrivals as early as May suggesting perhaps a few failed breeders. The pace of arrivals picks up in June with the usual influx of dispersing juveniles. Then a real spike in August with 112 birds, with normal service resuming in September and October. A gradual drifting away of birds through November and December until just one bird was left in January.
As has been discussed, the lack of high tide roosting birds in the core winter months are presumably a result of the reduced daylight feeding hours and less efficient feeding during this time, necessitating continued feeding at high tide.

Wareham Channel *Spartina*

As with Brownsea, a significantly larger number of birds spending the high tide roosting here in the 'autumn' months. A simple product in the most part of the higher population present, but away from this period there is a genuine reduction in relative numbers roosting here. As well as the issue of daylight hours in the winter months, from April and May many birds in this area will be busying in their nidification.

Fig 99. Wareham Channel roosting monthly maxima

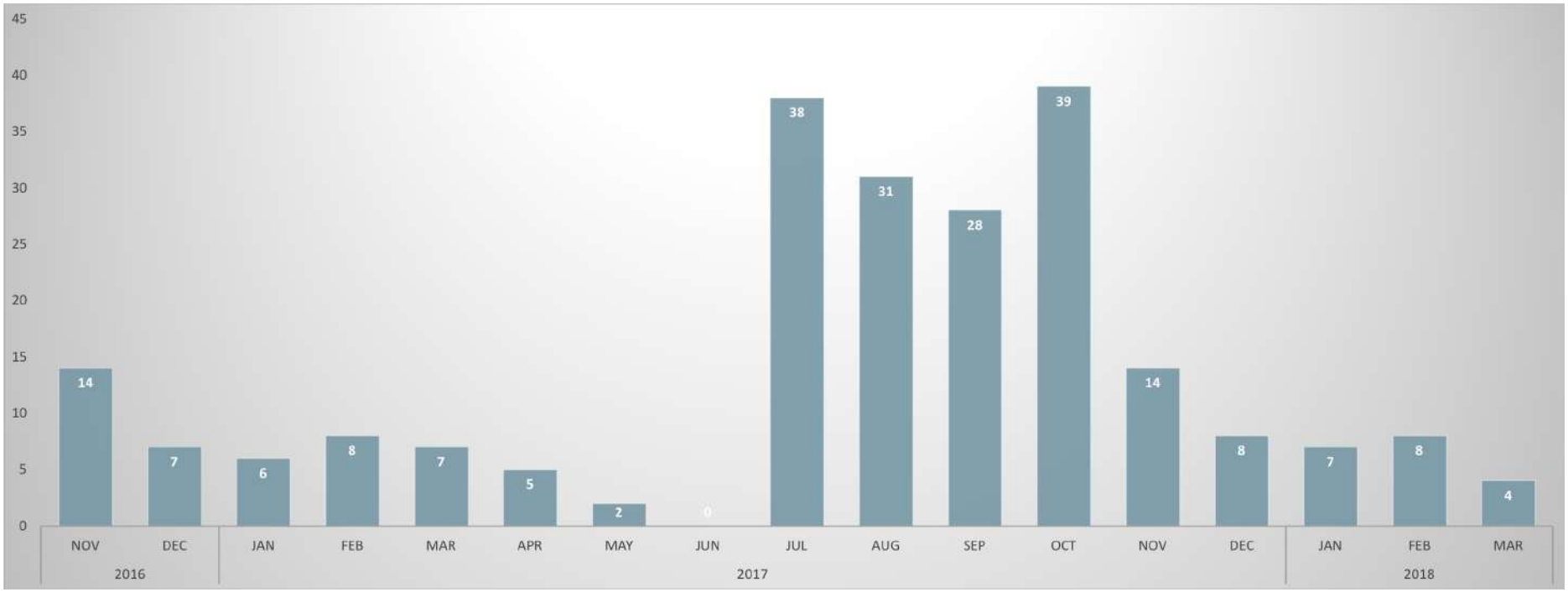


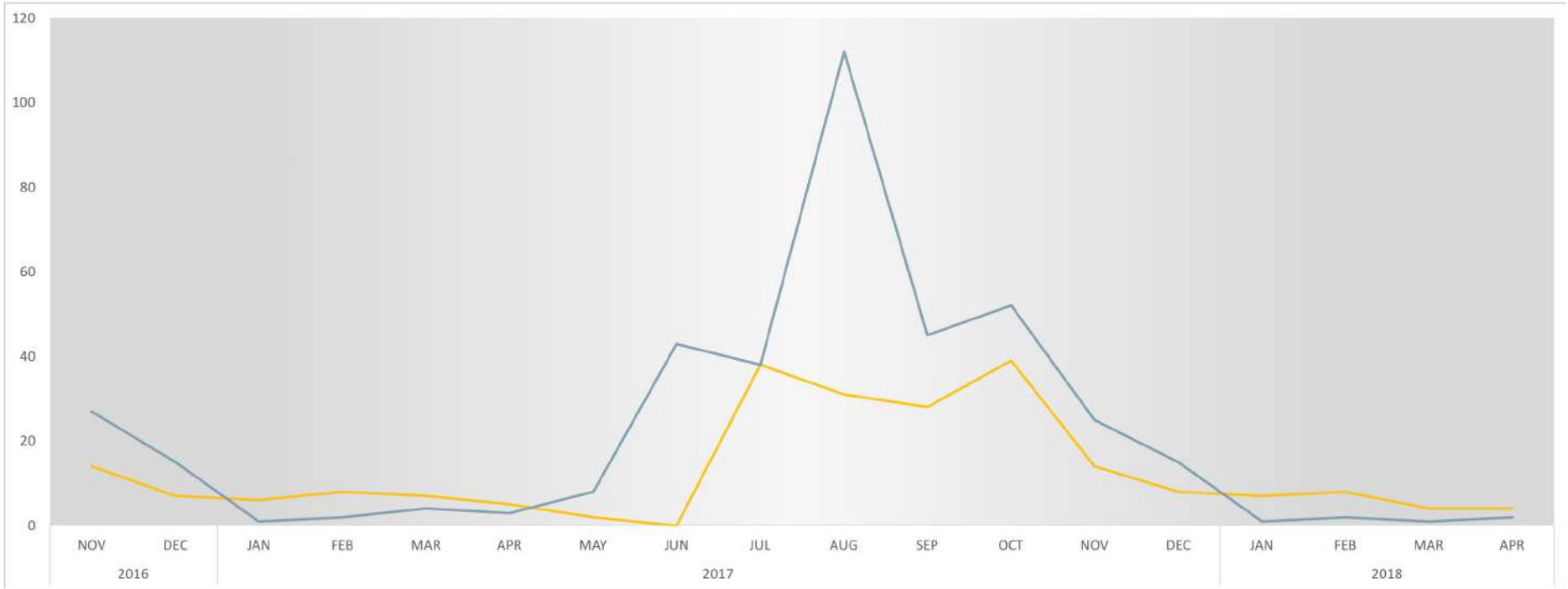
Table 48. Wareham Channel roosting monthly maxima

2016		2017												2018		
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
14	7	6	8	7	5	2	0	38	31	28	39	14	8	7	8	4

Specific *Spartina* bluffs bordering the shoreline were generally used. The most regular site near Keysworth Point, attracting up to 15 birds.
Another specific site was along the south side of Shag Looe Head, with the odd one or two regularly encountered anywhere in between.
To the north, the beach at Holton Bay was a regular gathering area for up to 20 birds and a site at Rockley Bay attracted up to 19.
Gatherings could also occur on the *Spartina* banks of the main gull island.

During the time the Arne Heath pond night roost was occupied, birds would also occasionally use the nearby tall trees at high tide. When they were using the Arne Plantation roost, this was never seen to happen.
Two dates in the middle of September saw a lone bird roosting in the same tree at the back of Holton Bay during the high tide. No birds were seen here before or after.

Fig 100. Brownsea and Wareham Channel day roosting numbers compared



From September through until April, both sites show a very similar pattern of numbers, even down to the detail of a second peak in October. Where they differ is in June when numbers at the Wareham Channel drop to zero but rise at Brownsea as the site starts to receive its first failed breeders. From then onwards, putting aside the freak count of 112 in August at Brownsea Lagoon, the patterns are very similar again.

Holes Bay

As mentioned, birds that fed at Holes Bay tended to stay in the area over the high tide.
The highest count of day roosting birds was 51 on 10th August, slightly higher than the maximum 44 count achieved at low tide on the same day. No doubt due to a number of birds hidden whilst feeding in the deeper creeks of the upper *Spartina* areas which they often did here despite the availability of low tide feeding.
Birds here seemed particularly loyal to certain areas. For example in winter, when roost leaving times coincided with high tides, instead of birds flying to alternative feeding areas such as the cattle fields, they would still fly to their area of choice and sit out the high tide, and they must have been hungry. Maybe they just didn't like worms.

The railway embankment that crosses Holes Bay was also a regularly used high tide roost site. It was mostly used by Grey Herons but these were regularly joined by a few Little Egrets.

During spring tides, birds could also use the tall trees toward the shoreline at the north west part of Upton Country Park.

Trees

Particularly during spring high tides when many areas of *Spartina* were inundated, the Little Egrets last resort was to take to the trees.
Over the years, traditional tree roosting sites have evolved and all of these were found to be at least occasionally used during this survey.

Sites at Gold Point on the northern shoreline of the peninsula, dead trees at the back of Arne Bay and trees at Goathorn on the western boundary of Brands Bay being the primary sites. Numbers however never exceeded single figures.

A couple of birds were also discovered roosting in small trees above the culvert at the far end of the 'PC World drain', that flowed into north east Holes Bay. Presumably birds that had been feeding in the outflow channel.

From July to October only, trees on the island of the main gravel pit at Swineham could be used during high tides. Up to 14 in September and up to 10 in October, even though the tides at this time were not especially high.

Small islands in the middle of clay pits

The small island on the Gold Point clay pit, chiefly used by Grey Herons was occasionally used by one or two Little Egrets to roost.

Breeding

The first documented UK breeding of Little Egret was at Brownsea Island, when two pairs raised three young in 1996.
Within 4 years, 46 pairs were breeding in the tall pines at Brownsea. In 2005 the site was deserted after being decimated by a local pair of Ravens. The following year 8 pairs had relocated to the heronry plantation at the far southern end of Arne Heath, being joined by a further 12 pairs the following year. Since then the numbers of breeding pairs have apparently been between 20-25 pairs, although monitoring by the RSPB has been at best haphazard, and not even annual. The latest survey by the RSPB in 2016 recorded an "assumed 23 pairs"

During this survey, 32 pairs nested in 2017 and only 11 in 2018.

Interestingly for both breeding seasons there were a lot more birds using the roost than were breeding. In 2017 the roost count was 130 birds meaning that only 49% of the birds were nesting.
Similarly, back in 2007, when an estimated 20 pairs were breeding, a count undertaken as part of a wider survey that year recorded 87 birds, just 46% of the total.

2018 was not a good year for the Little Egrets at the Arne Plantation. It was abandoned as a roost site at the beginning of September following illegal shooting. Although birds did begin to return in mid-December the numbers were always low. The very cold snap in February 2018 caused yet further disruption, reducing the number of roosting birds to four. March saw numbers increase again but by May the colony still only contained half as many birds as the previous year with 62 present.
The breeding survey revealed just 11 pairs nesting, a mere 35% of the birds using the roost.

Eurasian Bittern

Introduction

A very secretive yet well-known bird of wet, tall marshy habits, mostly *Phragmite*s but also vegetation of similar structure.
Formerly widespread and abundant, the Bittern was probably already in decline in the UK by the 1600's due to drainage and hunting. As with the Grey Heron, it was considered good eating. It was also a rather revered bird, the distinctive booming call a familiar feature of the rural landscape of medieval England. As a result it populates place names, literature and folklore and has over 20 colloquial names. Bog-bumper, Bog-drum and Bottle Bump being a few. At its most widespread, it seems inconceivable that the booming call was unknown in Poole Harbour.

The rate of the Bittern's decline increased steadily through the 1800's as land drainage, hunting and egg collecting took its toll. Ultimately, its rarity making it a target of the vibrant taxidermy market that brought its final demise as a UK breeding bird in 1868.

An attempted recolonisation in 1900 only lasted 20 years. A second from 1940 was a lot more successful with numbers peaking in the late 50's at 80 booming males. From the 1960's however the Bittern was back in decline, a decline that picked up pace in the 70's and 80's, thought to have been a result of habitat degradation, eutrophication, and a decrease in water quality through pollution and turbidity.

In 1997 only 11 booming males were recorded, finally prompting some action in the form of a programme of habitat restoration and recreation.
The programme has proved a great success with the latest survey in 2017 detecting no less than 164 booming males.
In 2013 the first booming bird in Dorset for many years was heard and it has since been suspected of breeding. Not in the harbour as yet, but we have hopes.

Poole Harbour's reedbeds in the meantime however, have been enriched by more regularly wintering Bitterns. Although not from the British population, who's adult birds remain at their breeding grounds throughout the year, even in the harshest winters. Ours are from the continent, most likely it seems from Scandinavia and the Baltic states which have also recently seen big habitat improvements and increases in breeding bird numbers.

History of the Bittern in Poole Harbour

Specifics from older historical records for Poole Harbour and its environs are rather limited. Pulteney (1799) stated that it was more common on the Frome than the Stour. Mansel-Pleydell (1888) referring to Dorset, considered Bittern to be a not uncommon winter visitor and felt compelled to mention that 'One was shot at Wareham January 6th 1877… Mr Pike informs me that when residing in the neighbourhood of Wareham in hard winters he often had Bitterns brought to him and that his brother once killed one with a gunshot or two off Wareham Bridge'.
Blathwayt writing in 1945 also regarded the bird as a not uncommon winter visitor to Dorset.

Since then the Swineham / Arne Moors area has been the traditional wintering area within the harbour. Studland, in particular Little Sea, also has a number of records, largely a result of its location, being ideally positioned to receive weary birds arriving in from the east.
The most incongruous Bittern sighting was probably a bird in a garden in the built-up area of Parkstone in 1963.

After that terrible winter, there were no more records until 1975, with a single bird in ditch at Swineham on 21st September. The Bittern was certainly at a low ebb during this time with even the very cold winter of 1978/79 only producing one bird here. The 1981/82 winter was equally bad and did produce three as did some severe weather in early 1985. A near run of blank years to 1995 when a very cold period produced two birds.

1997 saw the first signs that, at least in Europe, the Bittern's fortunes were improving when a bird spent a mild winter here; followed by two birds and then three in the subsequent rather mild winters. Since then, colder winters have brought even more birds. The highest being 10 in the very cold winter of 2009/10.
The following winter was also very cold, inducing eight birds. A further six in 2011/12 and another eight in the somewhat colder winter of 2012/13.
Presumably, it was colder on the continent but a couple of mild winters here in 2013/14 and 2014/15 both brought four wintering birds.
Two wintered in 2015/16, the third-warmest winter in the UK since 1910.

Winter

As we know, Bitterns are very secretive, creeping about for hours in their cryptic plumage in the middle of reedbeds. If you want to count them in the summer, you can locate their booming calls, but in the winter they are silent.
All is not always lost however, provided there is some fragmentation of the habitat that renders their feeding areas apart from their roost site. When this occurs, the birds have to make a short commuting flight. If the habitat is continuous however they will walk, skulk or indeed clamber across the area. Anything to avoid flying and breaking cover. In these circumstances one must follow the method suggested by (Gilbert et al 1998)
'Record any sightings of bitterns between August and February'. Wise words.

Trampling through reedbeds to see what comes out has been used as a technique at some sites, but these are within areas where there were known to be multiple numbers of birds wintering. For Poole Harbour this method was felt to be too intrusive to the reedbed ecosystem, when measured against the probability of an encounter.
The decision was therefore to undertake a series of dusk vantage point watches at all likely sites.

Results

All confirmed sightings were confined to the Swineham /Arne Moors area. All related to single birds seen in December, January and early February. Efforts were made to determine an exact number for this area and results were not conclusive, however two were suspected to be wintering in the area.
Most sightings were dusk flights within the gravel pit areas, with the occasional sighting at the north end of Arne Moors and the mouth of the river Frome of birds flying toward the gravel pits. There were no patterns at all in the flight directions and timings
Single bird sightings also occurred on a number of dates in February at the reed edge of the Gravel Pits.

During the second winter period all survey sightings were again confined to the Swineham / Arne Moors area. The first bird was noted on 18th November flying into reeds at the edge of the gravel pits. This or another bird was also seen commuting between Arne Moors and the gravel pits early morning on 26th November.
Later, sightings at both the gravel pits and Arne Moors in January confirmed two wintering birds.
A Bittern was reported on 13th December flying down the Middlebere channel and out toward Round Island in the middle of the day. Dusk watches at these areas observed no activity.

Early spring

Migrant birds have long been suspected of using at least parts of Poole Harbour as a stop off site.

The only way to identify a stop-over site is to observe birds leaving (Puglisi and Baldaccini 2000). Although feeding solitarily by day, they like to migrate at night in small groups, leaving together at dusk. The group is formed by an individual that rises into the air in a circling flight and calls continuously. Others join it, calling in turn. Eventually all birds leave together. This conspicuous behaviour makes it possible to detect the presence of passage birds and to evaluate their numbers ensuring all birds are seen to conclusively leave the area.

Research into this phenomenon is still rather in its infancy, although some work has been conducted in Italy (Puglisi and Baldaccini 2000) and France (Provost and Massez 2008). They found that the optimum leaving conditions were a clear sky and a gentle tail wind or no wind at all. Timings were from late February to April, with the peak dates in the middle of March and between 50 minutes before and 60 minutes after sunset, although 50 minutes before sunset was considered exceptional. Most birds tended to leave between 25 and 40 minutes after sunset.

For this survey, a series of early evening coordinated watches were conducted in March 2017 at likely sites during likely weather conditions. In addition, the Swineham area was monitored on all nights that were suggested as ideal but also on nights that were not considered ideal.

Results

It was found that the Swineham area is a stop-off site for migrants. A total of eight birds being seen to leave the area during March 2017.
The earliest date was 2nd March and the latest 16th March.

Despite three coordinated counts at a number of other sites around the harbour, no other Bitterns were recorded leaving. Although disappointing, at least the results agreed with the conclusion that no other birds were wintering in the harbour.

The second spring period in 2018 recorded a total of seven leaving. Again, all from the Swineham area. Although no coordinated watches were undertaken this time, a number of other sites were also monitored but again no birds were observed leaving.
The first to leave this time was on 4th March, the last moving through on 26th March.

All birds left in a north east direction, apart from one bird which left east north east. All birds were followed until out of sight. On two nights, birds were seen to rise, circle and call but then come back down.

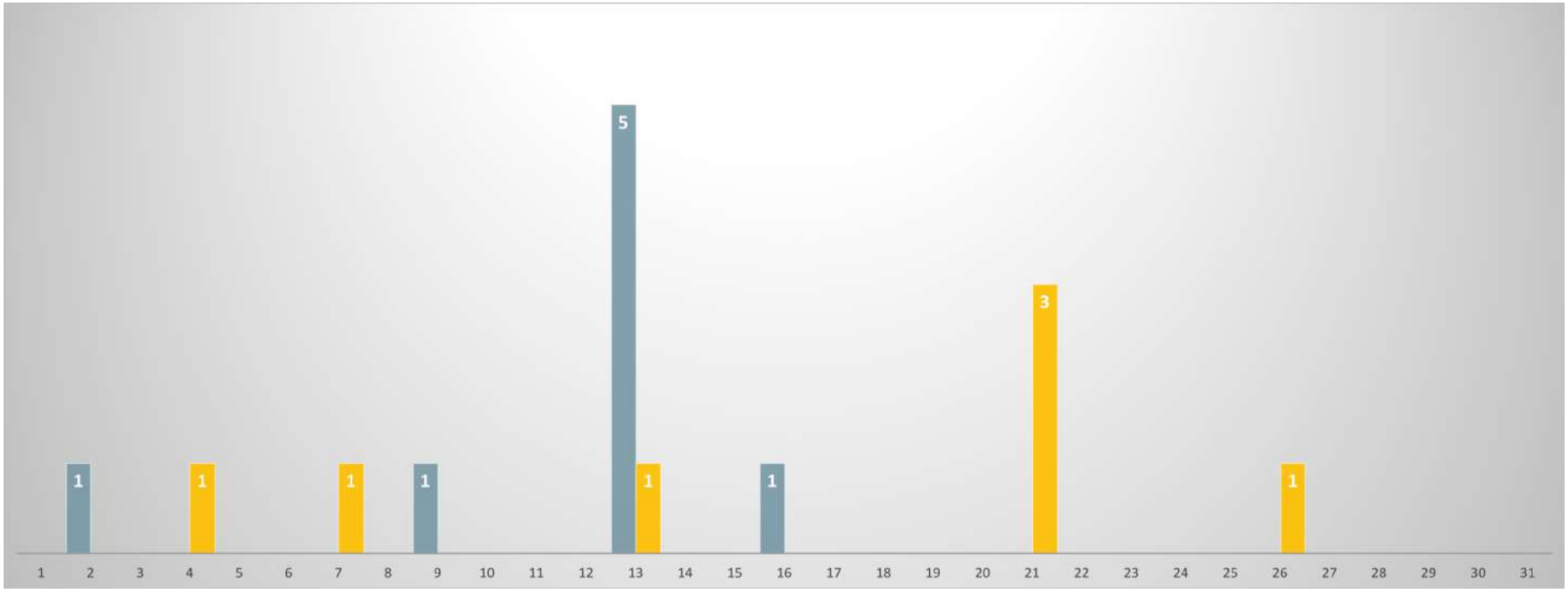
During the first period, after the first bird was seen to leave on 2nd March, every night including those with just moderately reasonable weather was monitored.

The next was seen to leave on 9th March, but the real surprise came on the 13th March when no less than five birds were observed circling up and leaving the site. These however did not all leave at the same time with three leaving together, then a gap before a further two birds got up and left.

A further bird on 15th, in rather damp conditions, did rise into the air and utter a couple of calls but decided not to leave. What was presumed to be this bird left the following night on 16th. The next few nights were far from ideal, however later in the month some very good leaving conditions failed to produce any more birds. Observations continued until 2nd April.

For the 2018 season the same principles were applied, with less than ideal nights also being covered. The earliest departing bird was 4th March. A second left on 7th and a 3rd on 13th. The largest leaving group was recorded on 21st when three eventually met up and left together. Eventually, as all three birds started from totally different places. The first bird up came from the far back of the gravel pits, not too much in the way of circling but plenty of calling as it headed across the pits. Then a moment to remember: as it was being watched approaching overhead, a second came straight out of a reedy ditch just metres away to rise up and join the bird. It had obviously been skulking there all the time virtually under my nose! On reaching the bird, it proceeded to fly straight at it, requiring it to take immediate avoiding action to prevent a collision. Still more interaction and evasive manoeuvres until eventually both birds settled down and began to head north east. At this point, a third bird was attracted into the air, coming up somewhere around Keysworth, with all three then heading off together into the gloom.
The final bird moved through on 26th March. As with the previous year, observations were continued into April but there were no further sightings.

Fig 101. Departing Bitterns from the Swineham area during March 2017 (Grey bars) and 2018 (Yellow bars)



Although first departing dates for both years are very similar, the leaving periods are quite different. All birds in 2017 had been observed moving through by 16th March but the last bird observed to move through in 2018 was 10 days later.

It is very tempting to say that the very cold period at the end of 2018 delayed things but it didn't put off the two who left on cue on 4th and 7th March.
One of the most interesting observations was the departure sites of the birds, with 12 of the 15 all appearing to depart from somewhere within the gravel pits area. Of the other three, one came out of a ditch less than 100m to the north of the gravel pits, one was suspected to have come up from Bestwall to the south west of the gravel pits and the third bird came up out of the Keysworth reedbed.

Another point of interest was the weather conditions associated with some of the departing birds. The decision to monitor nights considered far from ideal certainly paid off with birds on a number of occasions departing on these nights.
For instance, the five departing on 13th March 2017 did so under full cloud cover, presumably the light w/sw 2 tailwind being the most important factor.
On another day, one bird left literally minutes before a rain shower with the wind strength well beyond what would be considered light. One thing that was noted however was no bird left in any sort of headwind.

From the eleven leaving events over the two periods, all leaving times were within just 15 minutes of each other, ranging from the earliest at 32 minutes after sunset to the latest at 47 mins after. The difference in light levels however was more pronounced, with some leaving in quite reasonable light levels and others with very little light left. One bird leaving over 40 minutes after sunset under full low cloud cover, when it was, for all intents and purposes, dark.

There was also no correlation between the leaving times and the dates throughout the month.

Further observations were undertaken in April and May but no booming Bitterns were heard.

Discussion

No birds were seen to arrive, but their consistent departures to the north east does suggest an origin from the south west. Devon and Cornwall are important wintering areas and must be considered a source of at least some if not all of the birds passing through the harbour. Studies of birds wintering in Spain and France show them to cut across mainland Europe, occasionally drifting as far north as the north coast of France but not across the channel.

It is known that migrating Bitterns will drop into less than suitable habitat during migration, but Swineham's geographical location as the first large body of fresh water for a bird arriving from the west or south west has seemingly made it a bit of a migration hot spot for Bitterns (in local terms, with numbers well into three figures being recorded from some migration sites in Italy!).

Judging by the lack of sightings during the coordinated counts, it could also be that its geographical position is to the detriment of other hopeful sites scattered about the harbour, putting them in somewhat of a 'rain shadow'.

Great White Egret

Introduction

The European breeding populations of the Great White Egret have increase dramatically since 1980. During this time the breeding range has expanded north and west from central Europe to encompass 13 countries, including for the first time England. A reversal in habitat loss, habitat degradation and persecution which nearly brought the species to extinction is the main reason for its recovery and subsequent expansion. Climate change is also thought to have been a factor.
Since 2000 there has also been a substantial increase in the wintering populations of central and western Europe, including the UK.

History in the Harbour

The first documented record for Poole Harbour, which was also Dorset's first record was of a bird at Ridge on 5th August 1951. The second bird for Dorset flew over Brownsea on 12th June 1974, having visited Lodmoor the day before and Christchurch Harbour the day after. Then a similar wait of just over 23 years to the next bird that dropped into Arne on 2nd February 1998.
The next record wasn't until 2005 with a bird at Little Sea. Gaps between records then continue to decrease, with records in 2009, 2011 and 2012.

First multiple records in 2014, with at least three, including two together in September.

In January 2015 the Great White Egret in Dorset was regular enough to be removed from the Dorset Rare Birds Panel, increasing records well beyond how many birds there actually were. "Determining the number of birds present in Poole Harbour has proven to be difficult with records from a number of sites……" Dorset Bird Report.

Records during the survey

Methods

Great White Egrets like to move about throughout the day. Sometimes a lot. This has become a bit of an issue at times in the harbour with claims of two or three often being the result of one wandering bird or even one stationary bird and two Little Egrets.
For this survey, as well as feeding birds, wherever possible the roosting sites were also located. When more than one roost site was found, coordinated observations were undertaken.
To help in the assessment of numbers of birds, sightings from other reliable observers were also included. Here, either coordinated observations or birds actually seen together were recorded.

Results

Fortunately, the regular wintering bird which has been coming back for a number of winters now, remained loyal to the Little Sea Little Egret roost for the entirety of the survey, making it readily available to be counted when needed.

Observations from the survey during the first winter period strongly suggested that just the regular bird wintered.
Its most favoured feeding areas were Salterns west of the Middlebere Channel, Wych, Goathorn, and Little Sea. When seen leaving from Salterns toward dusk it always flew east in the direction of Little Sea roost and during mornings regularly left to the west.

A migrant pitched up briefly at Hatch Pond on 24th November before heading off north east, being seen at Longham Lakes the next day.
The wintering bird was last seen in the area on 10th March.

Two migrant birds were recorded in April with one flying over Oakdale on 15th and another bird spending two days in the Frome Valley on 19th and 20th.
No records from May and June.
In July a single record of a bird loafing on *Spartina* at Keysworth with Little Egrets.

What was presumed to be the regular wintering bird was first seen again 14th August at Little Sea roost. A few days later two together at Middlebere, thereafter just single birds seen.
A whole series of sightings in September at a wide range of sites, the sheer increase in sightings strongly suggesting at least two individuals being involved, possibly more. A series of sightings, presumably relating to the same bird, at Holes Bay from 23rd to 27th September was noteworthy.

On 8th October a bird flew north over Upton House and continued strongly north.
On 25th October a bird turned up at dusk at the Little Egret temporary pond roost at Arne Heath. After a few failed landing attempts, the bird eventually found a sturdy enough branch to settle on. All was not well however and after about 15 minutes of fidgeting it gave up the idea and took off to the south west where it was watched flying off into the distance. Interestingly a Little Egret also went with it. The same evening two Great White Egrets roosted together at Little Sea confirming the presence of three birds.
Five days later, a bird was seen at Brownsea on 31st and later going to roost at Pergin's Island that evening. It flew off north at dawn.

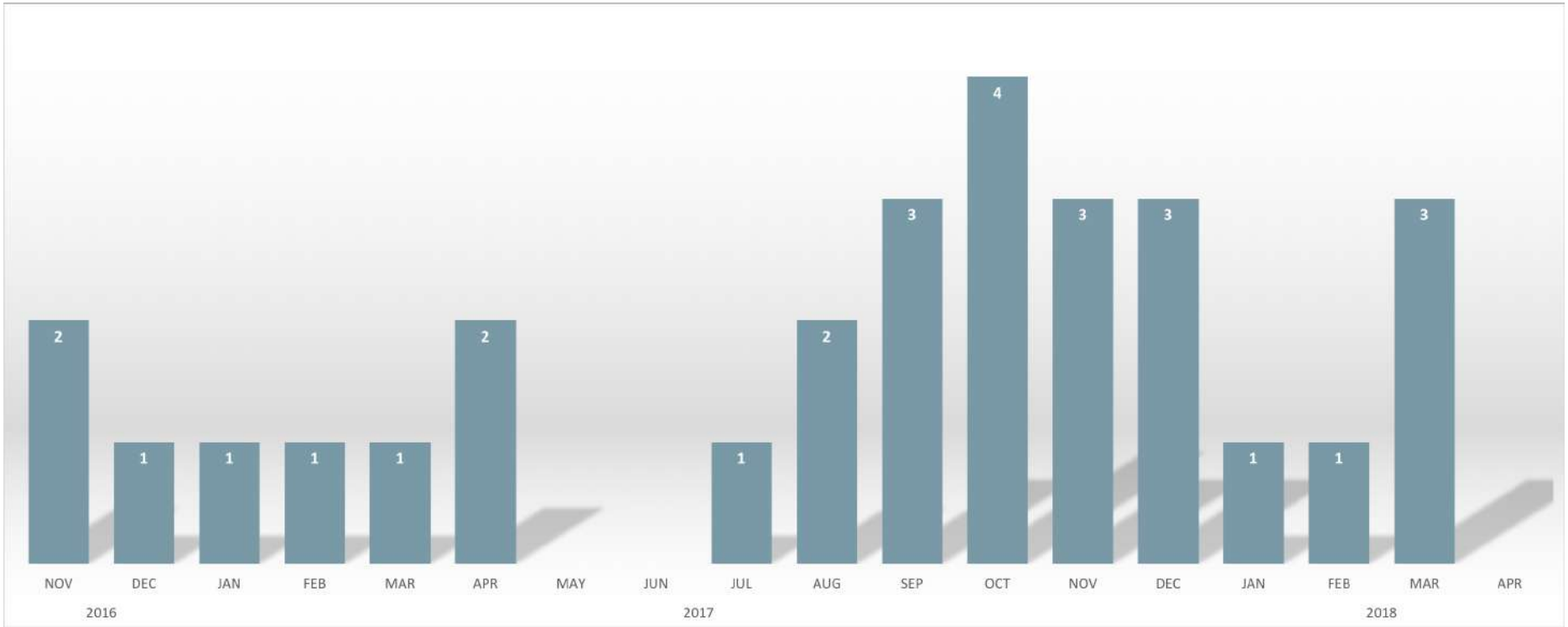
In November a bird flew over Creekmoor ponds on 14th, and on 16th a bird heading west over Christchurch Harbour was located that afternoon on Brownsea Lagoon.

December was a busy month with the resident bird being joined by two other birds for most of the month. All three were seen together at Middlebere on 4th, the two visitors later seen trying to roost with the Little Egrets at their temporary pond roost at Arne Heath. The outcome however, was the same as the last time a Great White Egret tried it, with both birds having real problems trying to balance on the wispy branches, before eventually giving up and leaving. All three were seen together again at Middlebere on 13th. There was no evidence to suggest any other sightings that month didn't refer to anything other than these birds.
The two visitors eventually left toward the end of December, leaving the resident bird back on its own again from January. It stayed in the harbour until at least 16th March.

A new arrival also roosted at Holton Lee plantation on 16th, and what was quite possibly a further bird, based on the lack of any sightings during the intervening period, roosted at Arne Heath plantation on 27th before earlier being seen at the Piddle valley and Lytchett Fields.

No birds were seen in April until the end of the survey.

Fig 102. Number of individual birds recorded by month



As we have been at pains to point out, determining Great White Egret numbers is fraught with danger, and although the numbers presented each month on the above chart are considered accurate it would be foolhardy to try and estimate from these, the actual numbers of individual birds involved. So that's what's going to happen.
Based on various timings, behaviour and some assumptions, then putting all of this data into a really sophisticated computer programme, the number that comes out is 13.

Site summary

The most favoured feeding area of the semi-resident bird was centred around Middlebere. More precisely, the Salterns and Slepe Moor to the west. When not here it was invariably feeding at Wych, Goathorn, Little Sea or East Lake.

For other birds, most sightings were from Middlebere, which was also the only feeding site that attracted multiple birds, perhaps a result of the presence of the local bird.
The Wych channel area was the next most favoured feeding area, at least in terms of numbers of sightings. The Lytchett area recorded Great White Egret 11 times thanks to extensive coverage. Oddly many of these visits were very short.

Other sites with multiple encounters were the Wareham Channel and Brownsea Lagoon, all single birds on scattered dates and probably relating to different birds apart from a bird on Brownsea on 16th and 17th November 2017.

Roosting

The Little Sea Little Egret roost was used by the regularly returning wintering bird throughout its stay. It was joined on only one occasion by a transient bird on 26th October.
In August and September, it was one of the last birds to leave the roost in the morning. During this time the Little Egrets were leaving on average over 30 mins before sunrise when this bird was leaving up to 20 mins after sunrise.
As the year advanced, leaving times became earlier, no doubt daylight hours related and by late November it could be seen leaving with the Little Egrets some 30 mins before sunrise. This pattern continuing throughout the winter.

As mentioned, on 25th October a Great White Egret attempted to roost at the temporary Little Egret pond roost site at Arne Heath. The rather insubstantial willow bushes proving too inadequate and the bird eventually left to the south west. On 6th December two attempted to roost here with exactly the same results. However, rather oddly on 16th December after the Little Egrets had moved back to the traditional plantation roost, a bird was found successfully roosting here. Presumably the best branches now being available. The bird stayed here at least two nights and probably more, being seen in the area until 23rd before moving on.

The only other roosting birds located were at the Pergin's Island Little Egret roost where one roosted on 25th September with another there on 31st October 2017.

Conclusions

Given the numbers of sightings and the estimated numbers of birds passing through the harbour, one might have hoped that more than one bird would be wintering here.

Cattle Egret

Introduction

Arguably the world's most successful bird. More closely related to *Ardea* than anything *Egretta* it is a native of Africa that evolved alongside elephants and buffalo, but has been quick to transfer its loyalties to domestic animals. It has now expanded its range to reach all seven continents, including being the most regularly encountered vagrant in Antarctica.
Its range expansion into the UK was an inevitability, one might even say, what took it so long!

History in the Harbour

Up to 1995 there were less Cattle Egret records in Poole Harbour than Squacco Heron.
In 1996 the first Cattle Egret was found at the Wytch Farm area on 26th August, staying until 31st December.
As recently as 2000 Cattle Egret was still as rare as Squacco Heron in the harbour until a bird was found at Middlebere on 29th July.

2007 marked a bit of a turning point when at least five birds turned up in November. Three further birds in 2008, three in 2009 but then only single birds in 2010, 11 and 12 followed by blank years in 2013, 14 and 15.
It does seem odd that since the initial invasion in 2007 numbers of annual records gradually decreases down to zero. At the commencement of the survey in November 2016 the last record of Cattle Egret in the harbour was a memory from April 2012.

Were the ever-decreasing numbers of records just remnants of wandering birds from a one-off invasion in 2007, was it all just a flash in the pan? Had their attempt at world domination faltered at the northern shores of the English Channel! Or could they improve on the Romans and be second time lucky.

Records during the survey

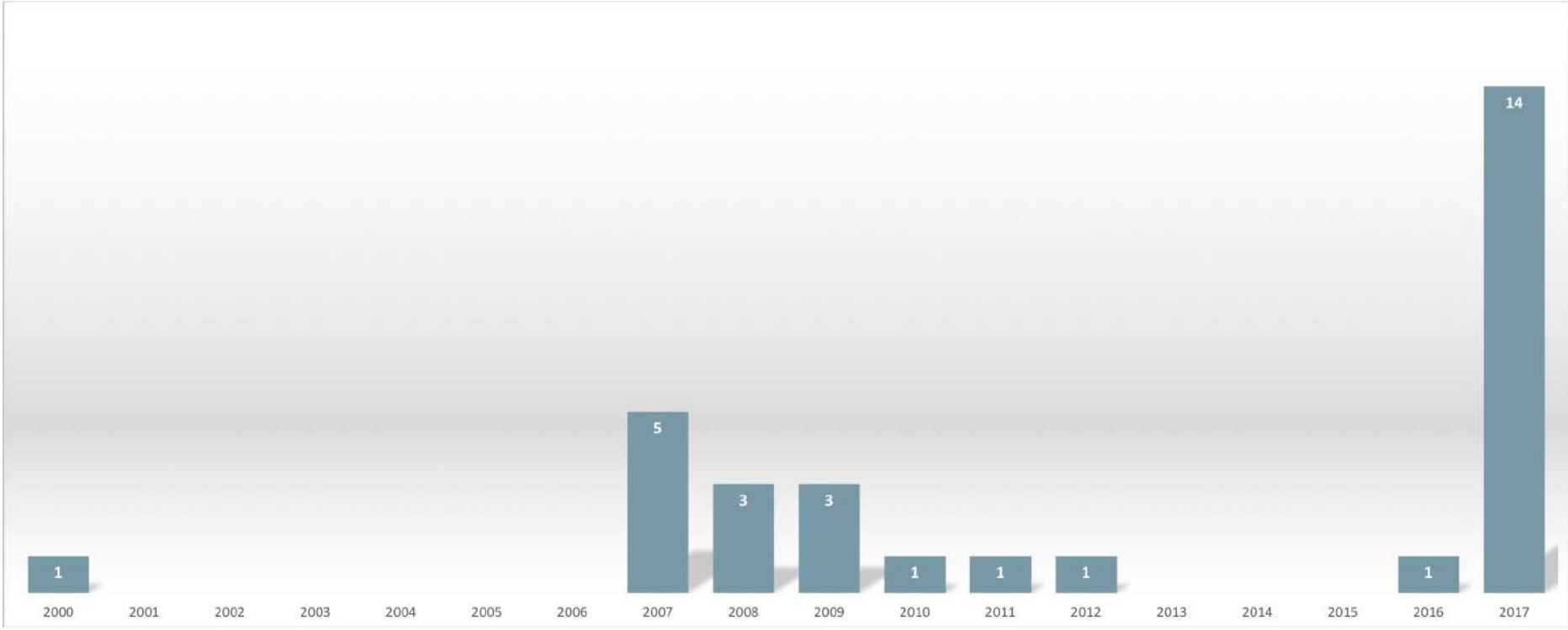
As it turned out there was an anticipated further wave of birds into the harbour. Including other accepted records during the period of the survey no less than 14 individuals were encountered.
Efforts at the most important Little Egret cattle field feeding site along Holme Lane recorded the first bird on 12th December, staying until 28th. The next was found roosting in trees on the main island at Swineham gravel pits on 13th March. It also roosted the following evening but was not subsequently seen.
Two turned up at Lytchett Fields on 3rd April and what were probably the same two, were later seen feeding in the Frome Valley from 10th-12th.
The next record was a bird frequenting Arne Moors and Bestwall from 24th-26th April showing traces of ochre tints. The bird stayed around through May, developing into summer plumage and visiting the Little Egret colony at Arne Plantation. With a lack of a mate it moved on in June.

On 16th July there was a cracking record of eight Cattle Egrets flying up the Middlebere Channel. Scrutiny of the photo revealed three adults and five juveniles. Unfortunately, this was just a one-off sighting of birds moving through the area.

On 17th October a bird was flushed from Ballard Down by a farmer. It flew north and was not relocated.
On 3rd November a bird flew north up the Wareham Channel in the early evening, the next morning being found at Lytchett Bay.

The chart below puts these recent records into historical perspective.

Fig 103. Cattle Egret occurrences since 2000.



The survey ended on 30th April 2018 with no further records in the harbour.

1st May 2018

Quite unbelievably, the very next day after the cessation of the 18-month survey, two further Ciconiiformes, a White Stork and a Glossy Ibis along with another Cattle Egret (first since November) were all seen in Poole Harbour.

What other species of this fascinating order of birds will grace Poole Harbour in the coming years?

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