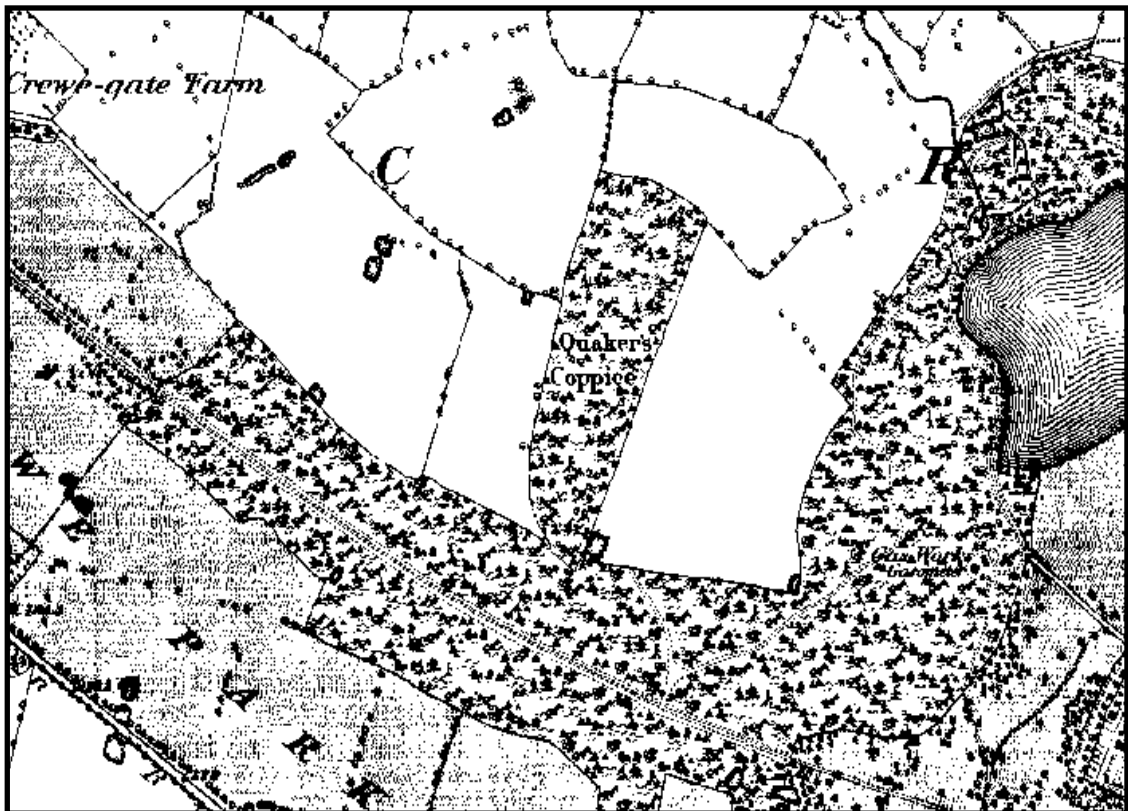


Quakers Coppice Nest Box Report

1985 - 2017



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Front cover – Ordnance Survey Map of 1882

Introduction

In 2009 we took over the duties of surveying, recording and reporting the nest boxes in Quakers Coppice from Colin Lythgoe and Bryan Perkins who began their surveying in 1985. We produced a report in 2012, reviewing the records and looking at long term trends. We feel that now, with records covering more than 30 years, it is a suitable time to update that report to include the more recent data.

This document includes the analysis of Blue and Great Tit data received from the British Trust for Ornithology (BTO).

We are extremely grateful for the BTO for supplying the data and we would also like to acknowledge the following:-

- Colin Lythgoe & Bryan Perkins — for the sterling work since 1985
- David Cookson of Cheshire Swan Ringing Group for providing the weather data
- the SECOS Committee for supporting us

The views expressed and any conclusions drawn are not necessarily those of any society, organisation or committee mentioned in this paper.

Bill Fox, Geoff Gibson & John Thompson

Some background about Quaker's Coppice Nature Reserve

For those of you new to the Society and / or reading our report for the first time, here's some background about the Nature Reserve we have been able to track down.

It is described as: -

" 5.4 hectares of deciduous woodland with ponds".

" .. owned by the local authority & managed by Cheshire Wildlife Trust since May 1986. The woodland extends to approximately 12 acres and stands on heavy clay. The signs are that the wood consists of secondary woodland on an ancient woodland site."

p.s. – site appears on the Tithe Maps of 1836–51 (Crewe Library) in the same 'shape' as today. The woods are best accessed from the path leading from Mallard Close, off Electra Way.

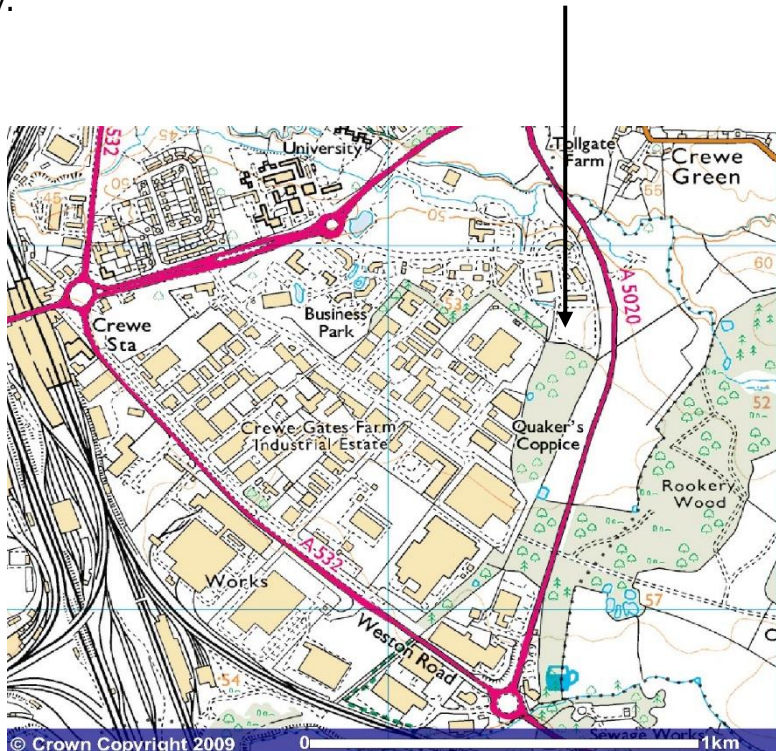


Image reproduced with kind permission of Ordnance Survey and Ordnance Survey of Northern Ireland.

At the time of writing this report, the 'Visit Cheshire' website had a leaflet (including a map) about a walk on Quakers Coppice which you can download – "Quakers Coppice – Walks for All" which may be of use if you are thinking of coming to the reserve.

The following is a section of a report written by Colin Lythgoe in December 2008 to staff managing the reserve ...

"Nest boxes were first provided at Quakers Coppice in 1985 by Cheshire Wildlife Trust, who managed the area for the owners, Crewe and Nantwich Borough Council. They were numbered 1 to 16. Additional small hole boxes were provided by Colin Lythgoe in 1988 and 1991.

Several large hole boxes specifically for Stock Doves were provided in 1991. These were monitored in detail from April to September each year from 1991 to 2001. Juveniles were ringed in the nest each year but there were no recoveries. Nest box use has been monitored since 1985 by Colin Lythgoe and Bryan Perkins.

When one considers the heavy usage of Quakers Coppice by dog walkers and the subsequent limited ground vegetation, the following extract from a leaflet produced by Cheshire Wildlife Trust in 1985 is interesting. "The reserve is closed during the main nesting season March to June inclusive. Damage and disturbance to birds and other wildlife is minimised at other times of the year if visitors would please keep to the paths. Please note that dogs are not allowed on the reserve."

There are a number of obvious changes that have occurred:

Since 2004 the number of pairs of Blue Tits increased significantly.

Since 2001 the number of pairs of Great Tits increased very significantly.

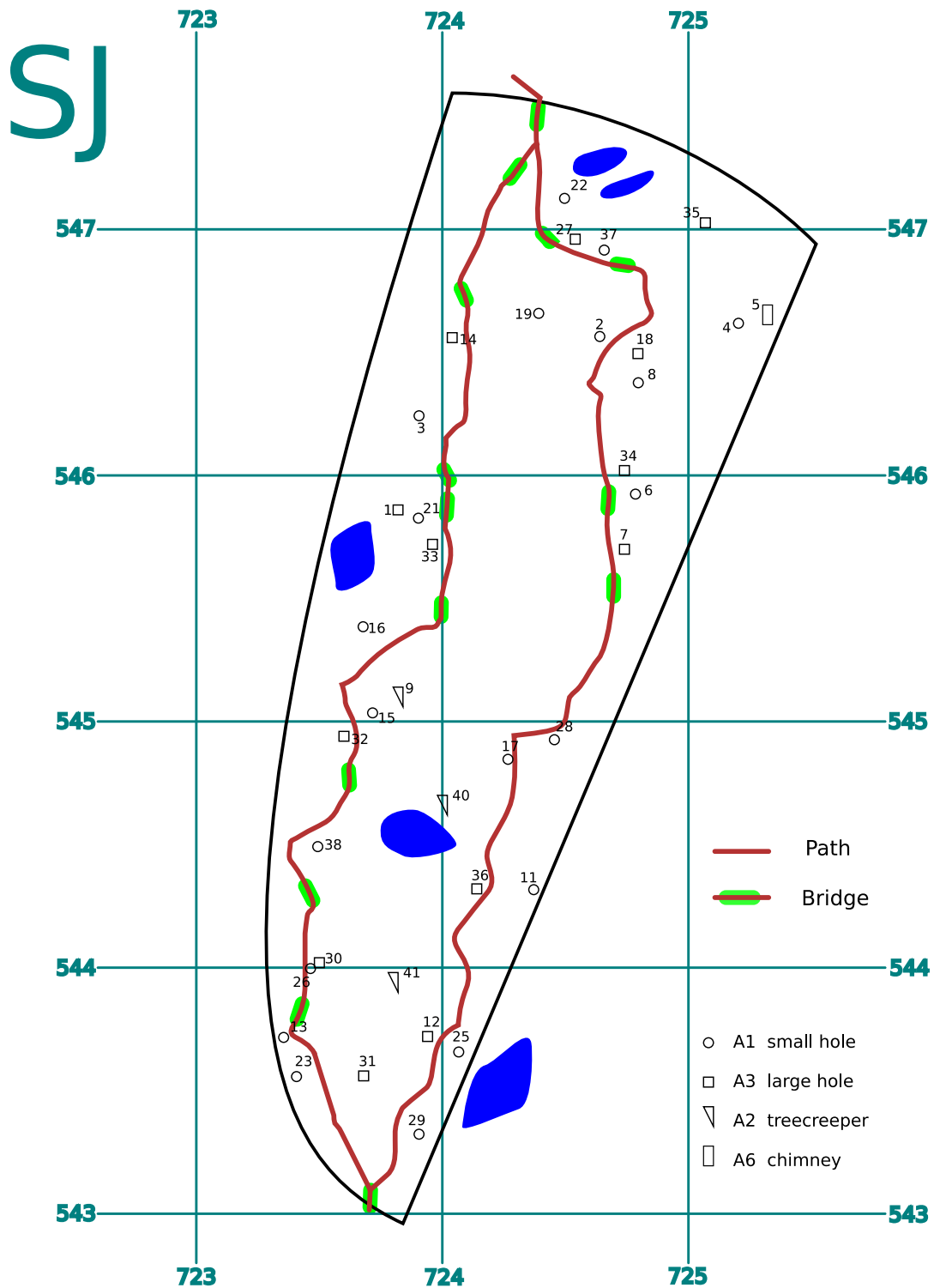
Since 2003 the productivity of both species has decreased. The changing weather patterns affecting the availability of food for young will have definitely had some effect. Also the final outcome of fledged young was not monitored quite so closely before that year."

When Colin first visited the area in the early 1980s there were no paths, ground vegetation was mainly dense brambles and it was difficult to walk in the wood!

Those of you who have visited the reserve since 2009 will have seen the creation of a grit path, numerous footbridges and a pond-dipping platform. Much of the new path is on a different route to that already trodden. The consequence of this is there is little or no ground vegetation to be seen during the breeding season. Sufficient live food for the chicks must have been extremely difficult to come across for the adults. The site is used heavily by dog walkers, and also by pedestrians and cyclists, so the vegetation and wildlife suffers much disturbance. If the wildlife, particularly ground nesting birds and small mammals, are to be encouraged to use the reserve we feel there needs to be additional 'protection'. Perhaps the middle could be fenced off to allow the ground vegetation to regenerate – similar to that in operation on Wigg Island.

We are unable to establish when the management of the reserve changed hands, but ANSA Environmental Services Ltd is now responsible for Quakers Coppice. Ansa is a company wholly owned and controlled by Cheshire East Council.

We are grateful to Geoff, who joined us last season, for taking the time to plot not only the nest boxes, but also the footpath and provide the very detailed map below: -



Quakers Coppice - Nest Box Locations

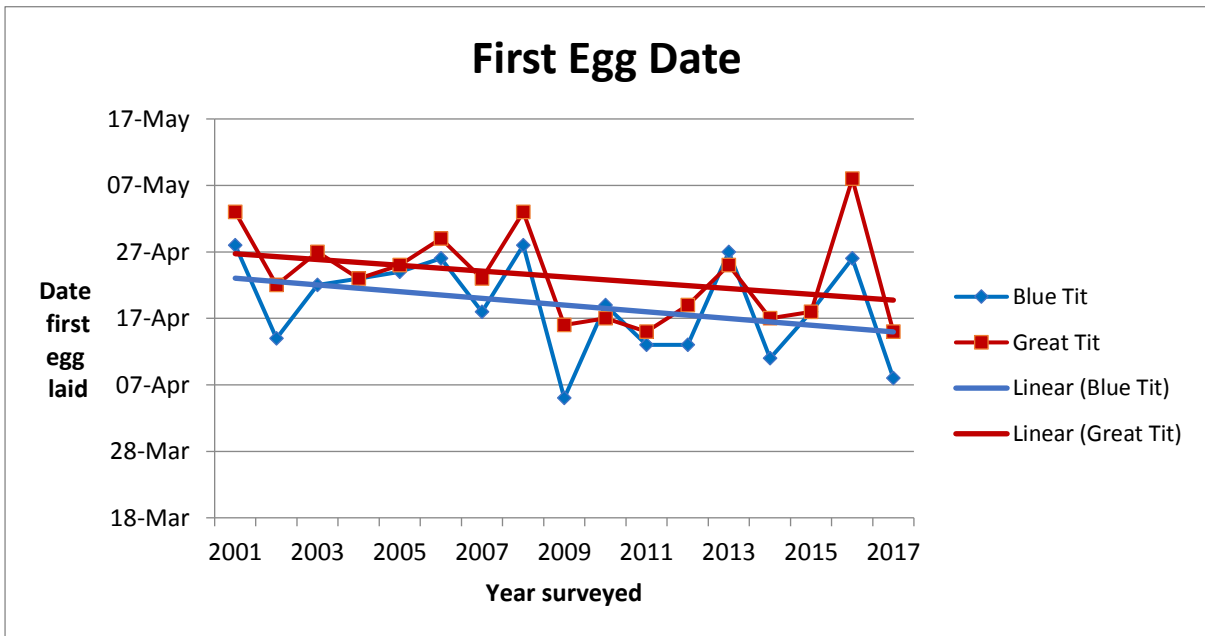
SECTION 2 - Blue and Great Tit Data

This next section looks at the historical data and computes trends from when Colin and Bryan began the survey work in 1985 up to the present. We have done some 'number-crunching' using the data we have added to that previously collected by Colin and Bryan.

First Egg Date

The trend lines on the First Egg Date chart shown below indicate that on average the first egg date is now about 7 or 8 days earlier than in 2001 (the earliest date for which we have this data).

Looking at the chart below, it seems that Blue Tit first egg dates are generally a few days earlier than Great Tits. Does this mean that a Blue Tit tends to get to a nest box first, before a Great Tit, and so has an advantage, or is a Great Tit aggressive enough to oust an occupying Blue Tit?

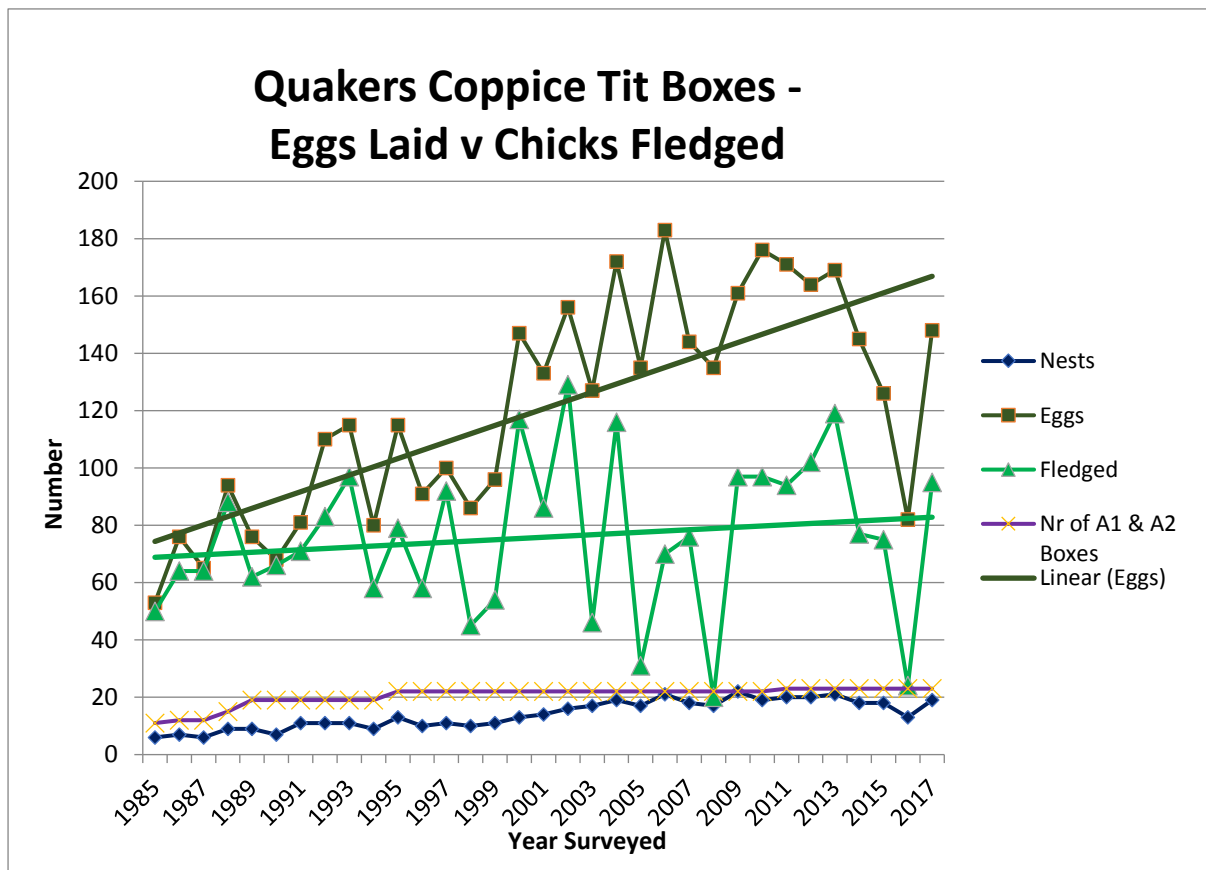


Eggs and Chicks

As shown in the chart below, the number of small hole (A1 and A2) nest boxes installed increased to 22 in 1995, with one more being installed in 2011.

The number of nests surveyed increased steadily over the period from 1985 to about 2005 but remained about the same since then. It is interesting to note that although the number of nest boxes available doubled over a relatively small number of years, the number of nests surveyed only rose relatively slowly and steadily. Could this be due to some territorial or other population competition issues?

As more tit boxes were erected, pairs occupied them and the results recorded. As might be expected, as the number of nests increased then the number of eggs laid also rose; the chart confirms that. However, the number of chicks which subsequently fledged has a much smaller increase.



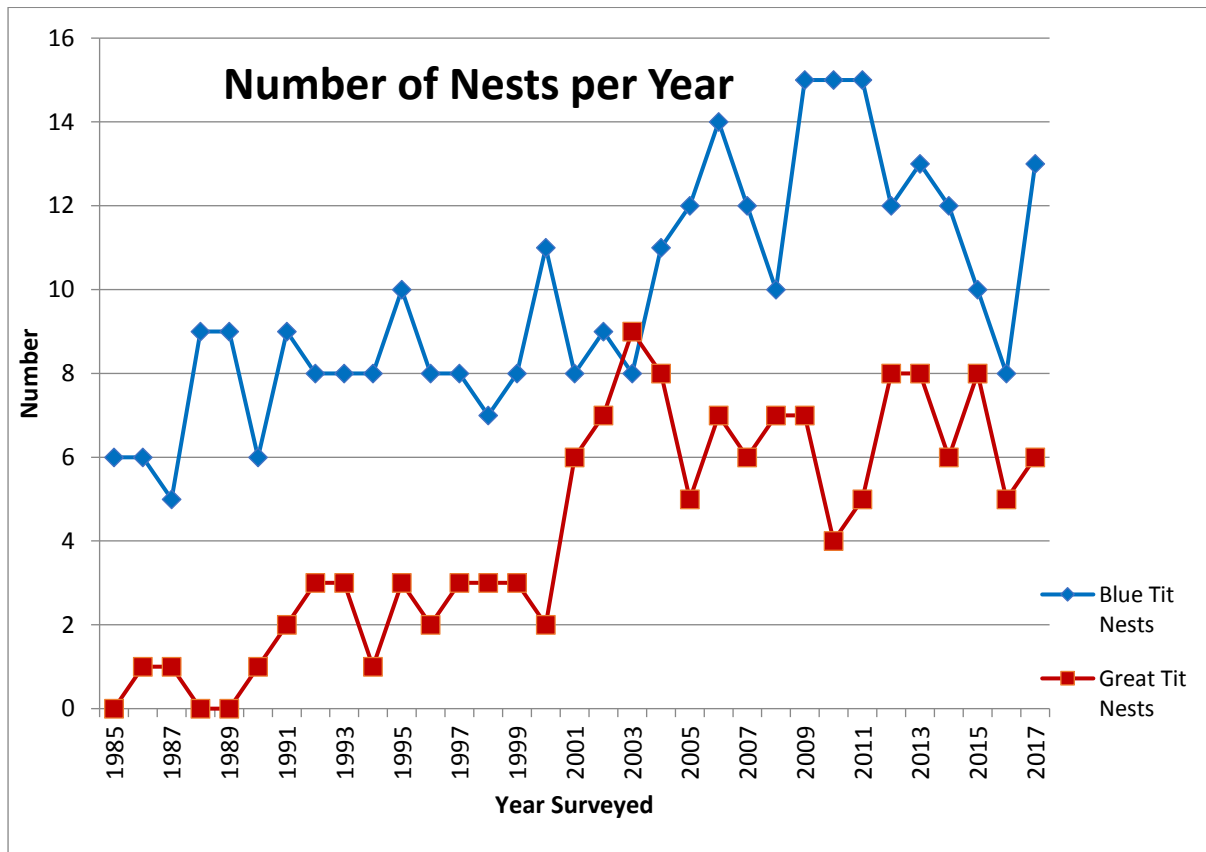
Blue and Great Tit "Productivity"

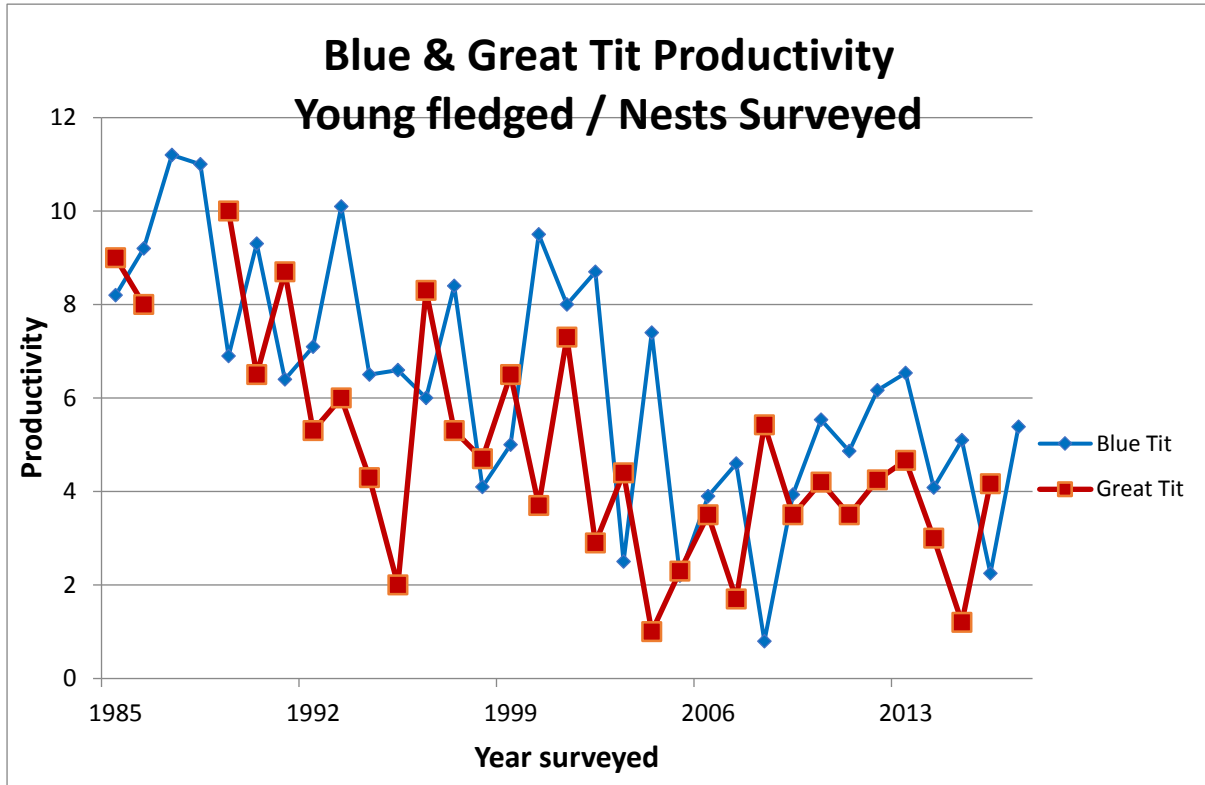
The next two charts show in more detail the number of nests built per year, and "productivity" i.e. the number of young fledged per nest surveyed. The "Nests per Year" chart indicates that in recent years there have been about twice as many Blue Tit nests as Great Tit nests.

These charts show that the number of both Blue and Great Tit nests per year have increased to about 2005 and then levelled off.

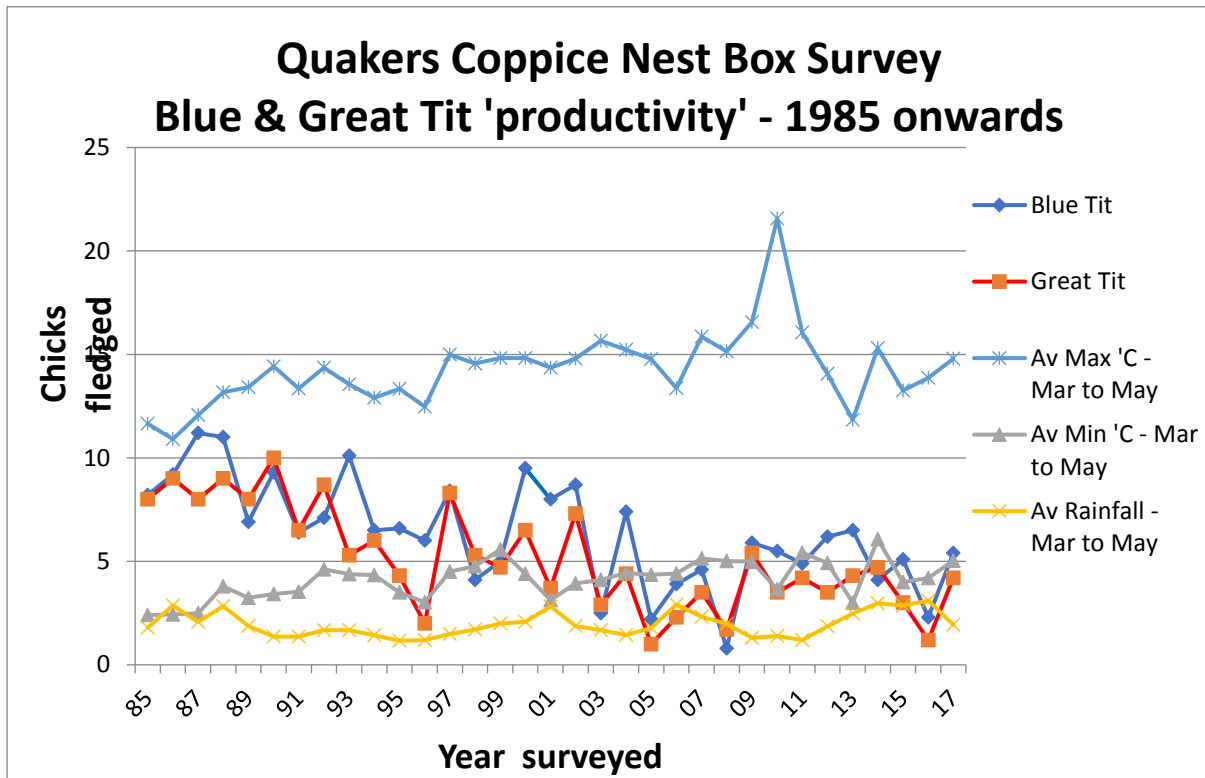
The "Productivity" chart shows that there has been a steady decline in the number of young fledged per nest to about 2005 and then the number levelled off.

So although the "Eggs Laid vs Chicks Fledged" chart above shows a small overall increase in the number of young fledged, the charts below show that the productivity per nest has declined significantly from 1985 to about 2005. Following a comment from Colin in 2009 about the biomass possibly having reached capacity, perhaps this data supports that theory. Could the reduced productivity also be related to the rapid industrialisation of the surrounding area in recent years? In addition, the impact of increased public use of the Coppice may have had an effect.





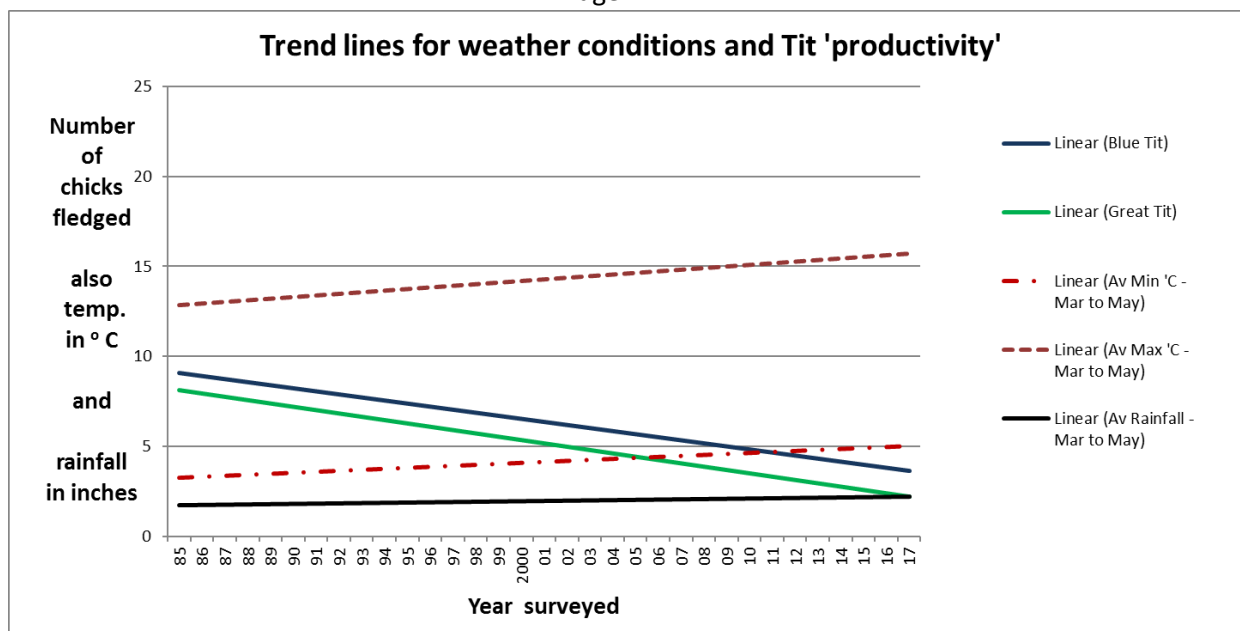
We thought it would be interesting to consider if we could get weather related data covering the same period. We are grateful to David Cookson of the Cheshire Swan Study Group¹ for supplying us with the information.



The rather 'busy' graph above shows the productivity of the Blue and Great Tits using the nest boxes over the 30+ years and we have overlaid the max. and min. temperatures, plus average rainfall for the months of March to May.

The graph on the next page shows the same data, but uses trend lines² to represent the information and it reveals some 'disturbing' results: -

- that even though more boxes have been made available and more pairs are using them, productivity has dropped at a similar rate for both Blue and Great Tits over the period
- average temperature and rainfall for the breeding season has remained constant or risen slightly over the 30+ years - suggesting 'climate change' may not be a factor or if the slight rise in the average min. and max. temperature is having an effect, it is having a detrimental one!



What conclusions can we draw from this information?

Not all of the boxes erected are used each year. So it is also likely that the species we have been monitoring over the years have also been nesting in natural nest sites on the reserve. We have not been able to identify any recently to record their successes. We have no way of checking how they are faring.

While on our weekly Spring visits to the reserve we often hear and see the migrants - Chiffchaff, Willow Warbler, Blackcap, etc. They, too, will want to feed themselves and their brood.

Other nesting records:

During the visits over the years there has been evidence of other species nesting at Quakers Coppice. These include Great Spotted Woodpeckers in holes in the trees - we have heard young calling; a Goldcrest's nest in a yew tree; a Wren nesting on the ground, young Moorhen on the pond at the south end of the reserve.

What is contributing to the decline in productivity?

Could it be: -

- the weather conditions (although relatively constant) were unfavourable
- the biomass can only support a certain number of fledged chicks
- human disturbance -
 - encroachment of industrial units / business park
 - dog walkers and others visiting the wood
- man-made nests distort the productivity of the total population
- has the feeding station been regularly 'topped up'? Have some birds been depending on it?
- decline in recent years of the biomass surrounding the reserve due to change of land use from farmland to industrial and commercial premises

References: -

1 Cheshire Swan Study Group Website -

<http://www.record-lrc.co.uk/Group.aspx?Mod=Article&ArticleID=G0012001> and the Forum site is <http://www.record-lrc.co.uk/forum/viewforum.php?f=30>. On behalf Cheshire Swan Study Group (including North Wales Swan Study Group) British Swan Study Group, Cheshire and Wirral Ornithology Society and Wildfowl and Wetlands Trust.

2 a trend line is (usually a straight line) used to depict trends in your existing data or forecasts of future data

The next two pages give us a detailed breakdown of both Blue and Great Tit occupancy & nesting data covering the whole study period.

Blue Tit

Year	No. of nests	Eggs	Hatched	Fledges	Productivity (i.e. fledges ÷ nests)	1st egg date
1985	6	53		50	8.2	
1986	6	66		55	9.2	
1987	5	57		56	11.2	
1988	9	94		88	11	
1989	9	76		62	6.9	
1990	6	58		56	9.3	
1991	9	65		58	6.4	
1992	8	83		57	7.1	
1993	8	89		81	10.1	
1994	8	72		52	6.5	
1995	10	96		66	6.6	
1996	8	79		54	6	
1997	8	73		67	8.4	
1998	7	65		29	4.1	
1999	8	77		40	5	
2000	11	134	124	104	9.5	
2001	8	93		64	8	28-Apr
2002	9	100		78	8.7	14-Apr
2003	8	74		20	2.5	22-Apr
2004	11	107		81	7.4	23-Apr
2005	12	103	84	26	2.2	24-Apr
2006	14	133	99	54	3.9	26-Apr
2007	12	108	86	55	4.6	18-Apr
2008	10	90	76	8	0.8	28-Apr
2009	15	111	94	59	3.9	05-Apr
2010	15	149	135	83	5.5	19-Apr
2011	15	131	110	73	4.9	13-Apr
2012	12	115	95	74	6.2	13-Apr
2013	13	122	99	85	6.5	27-Apr
2014	12	107	95	49	4.1	11-Apr
2015	10	82	77	51	5.1	18-Apr
2016	8	61	51	18	2.3	26-Apr
2017	13	110	98	70	5.4	08-Apr
Average	9.8	91.9	94.5	58.3	6.3	19-Apr

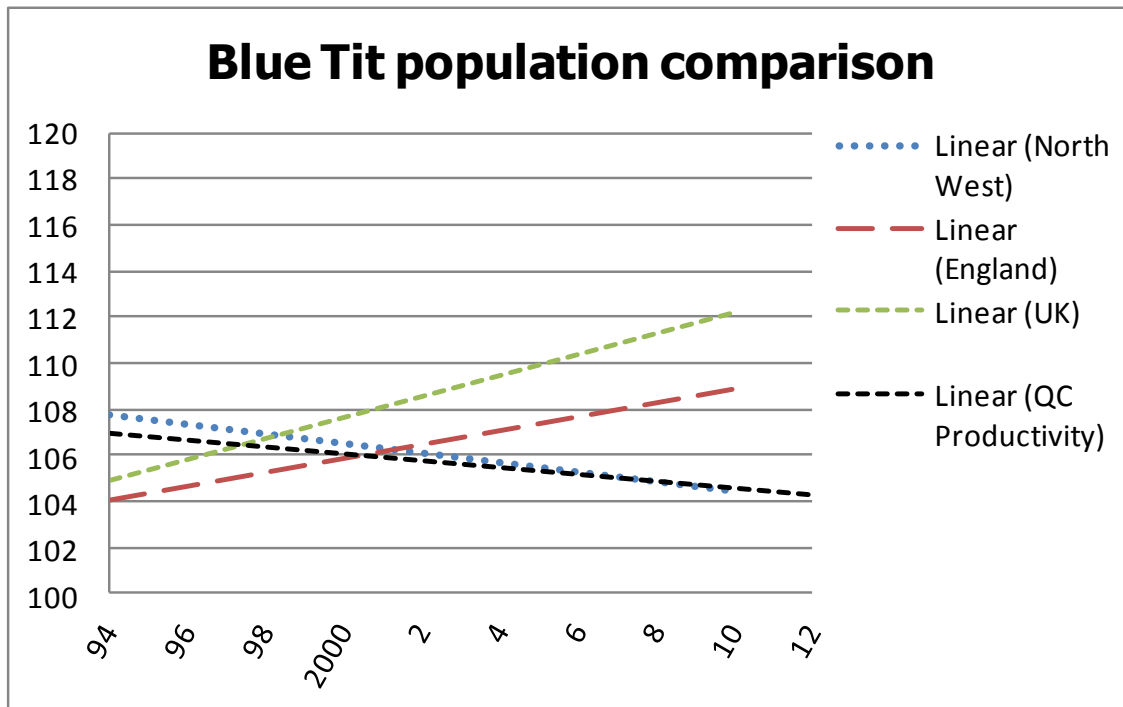
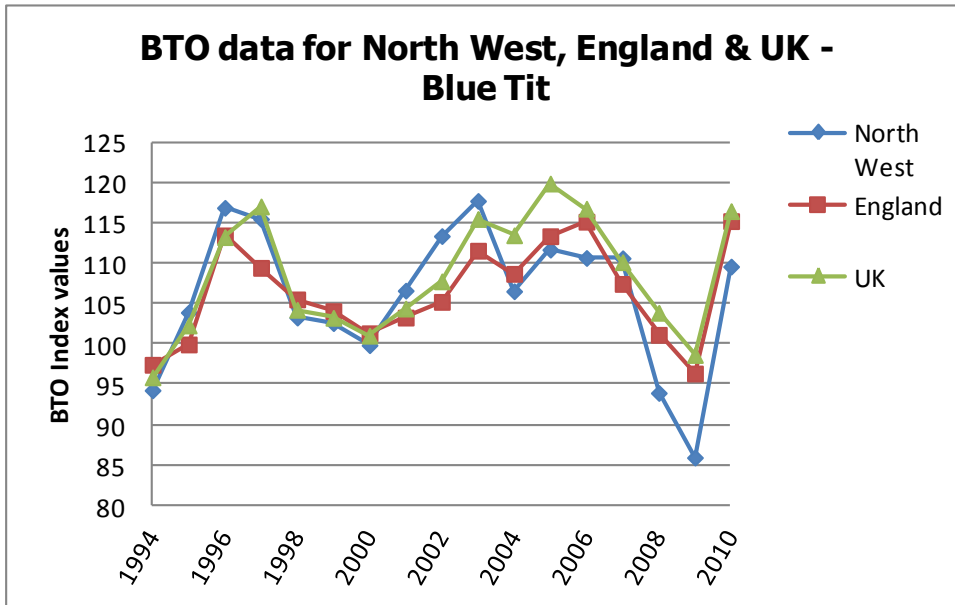
Great Tit

Year	No. of nests	Eggs	Hatched	Fledges	Productivity (i.e. fledges ÷ nests)	1 st egg date
1985	0					
1986	1	10		9	9	
1987	1	8		8	8	
1988	0					
1989	0					
1990	1	10		10	10	
1991	2	16		13	6.5	
1992	3	27		26	8.7	
1993	3	26		16	5.3	
1994	1	8		6	6	
1995	3	19		13	4.3	
1996	2	12		4	2	
1997	3	27		25	8.3	
1998	3	21		16	5.3	
1999	3	19		14	4.7	
2000	2	13	13	13	6.5	
2001	6	40		22	3.7	03-May
2002	7	56		51	7.3	22-Apr
2003	9	53		26	2.9	27-Apr
2004	8	65		35	4.4	23-Apr
2005	5	32	23	5	1	25-Apr
2006	7	50	20	16	2.3	29-Apr
2007	6	36	33	21	3.5	23-Apr
2008	7	45	32	12	1.7	03-May
2009	7	50	45	38	5.4	16-Apr
2010	4	27	25	14	3.5	17-Apr
2011	5	40	35	21	4.2	15-Apr
2012	8	49	45	28	3.5	19-Apr
2013	8	47	44	34	4.3	25-Apr
2014	6	38	33	28	4.7	17-Apr
2015	8	44	36	24	3.0	18-Apr
2016	5	21	15	6	1.2	08-May
2017	6	38	37	25	4.2	15-Apr
Average	4.2	31.6	31.1	19.3	4.8	23-Apr

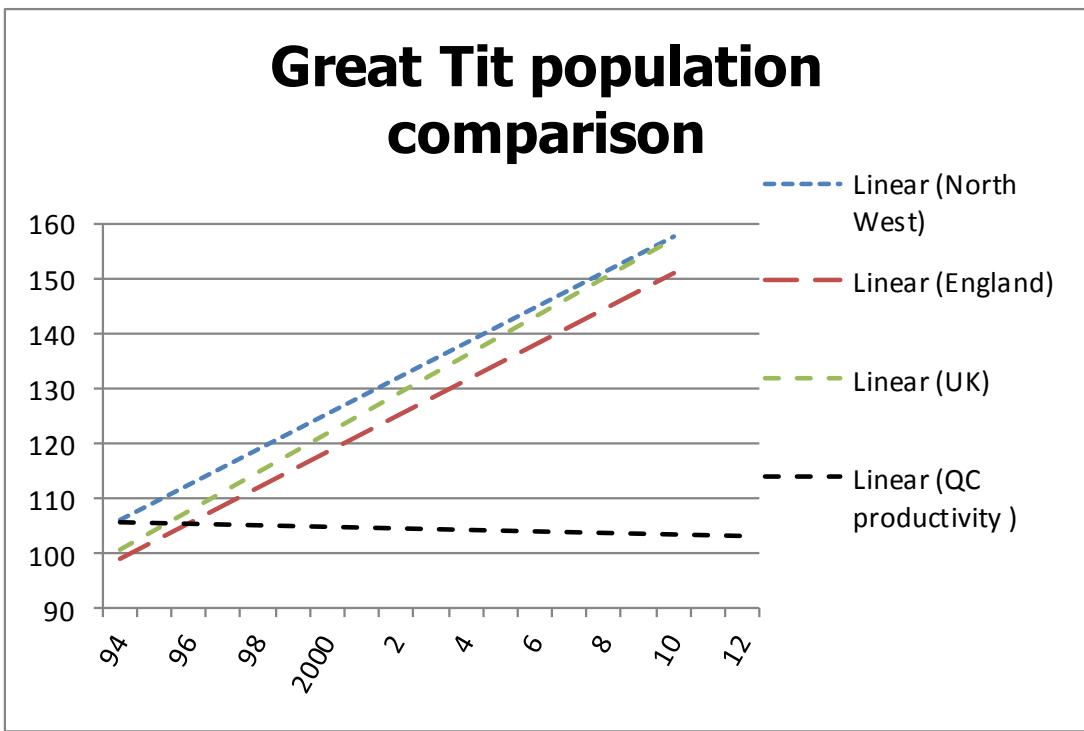
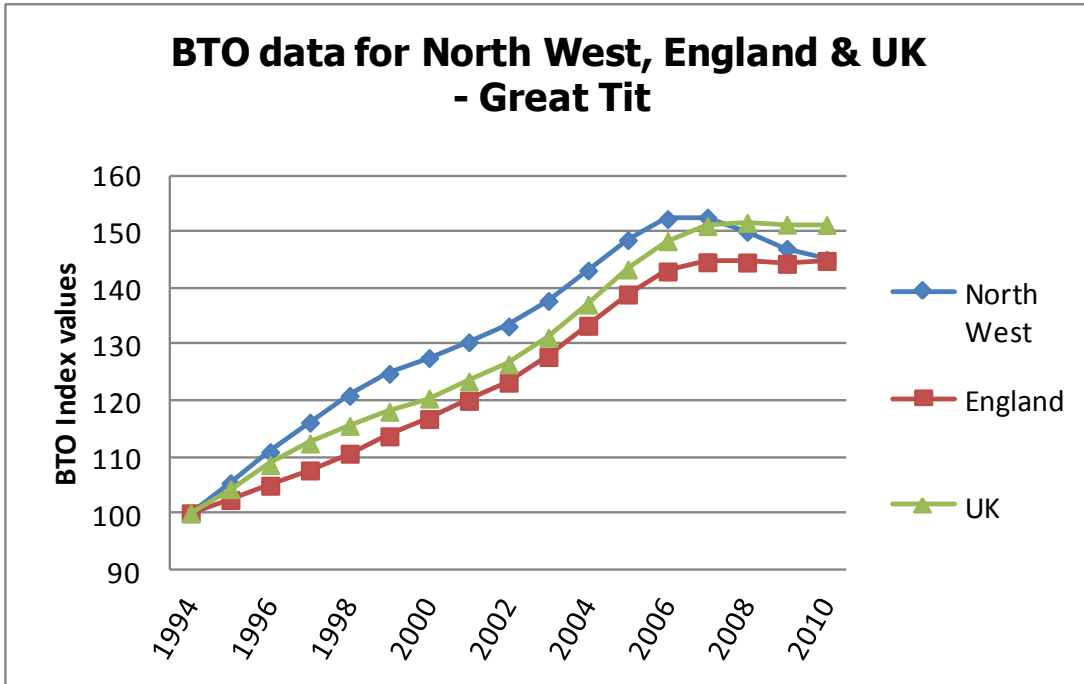
Productivity Comparisons – Quakers Coppice against BTO data

The graphs on pages 16 & 17 show the data provided by the BTO in 2012 and show the 'index value' for the North West, England and the UK for Blue Tit and Great Tit gathered during their annual Breeding Bird Surveys. The graphs below show the graphs 'smoothed out' into trend lines (or linear) with Quakers Coppice data superimposed for comparison.

We would be interested to hear any conclusions you draw from them?



The Quakers Coppice Blue Tit line reflects that of the data collected throughout the North West.



The Quakers Coppice Great Tit line shows no resemblance to either of the regional lines!

About BBS population trends

The BBS is a line-transect survey based on randomly-located 1-km squares. Squares are chosen through stratified random sampling, with more squares in areas with more potential volunteers. The difference in sampling effort is taken into account when calculating trends.

Through comparing standardised annual counts, BBS provides reliable population trends for a large proportion of our breeding species. Trends can also be produced for specific countries, regions or habitats. For these analyses, we take the higher count from the two visits for each species, summed over all four distance categories and ten transect sections. Only squares that have been surveyed in at least two years are included in the analyses. Population changes are estimated using a log-linear model with Poisson error terms. Counts are modelled as a function of year and site effects, weighted to account for differences in sampling effort across the UK, with standard errors adjusted for overdispersion.

In 2009, additional randomly selected 1-km squares surveyed as part of the Scottish Woodland BBS and the Upland BBS were added to the Scotland and England BBS data respectively. These squares were surveyed using the same methodology as standard BBS squares.

For more information about BBS trend calculations, see the [Methodology](#) section on the BTO website.

Caveats

Work has been carried out to assess the reliability of BBS trends, to ensure that reported trends are based on reliable data and sufficient sample sizes.

** please note that the spreadsheets supplied by the BTO simply contains the index values for each year, rather than any actual bird counts.

SECTION 3 - Further Analysis

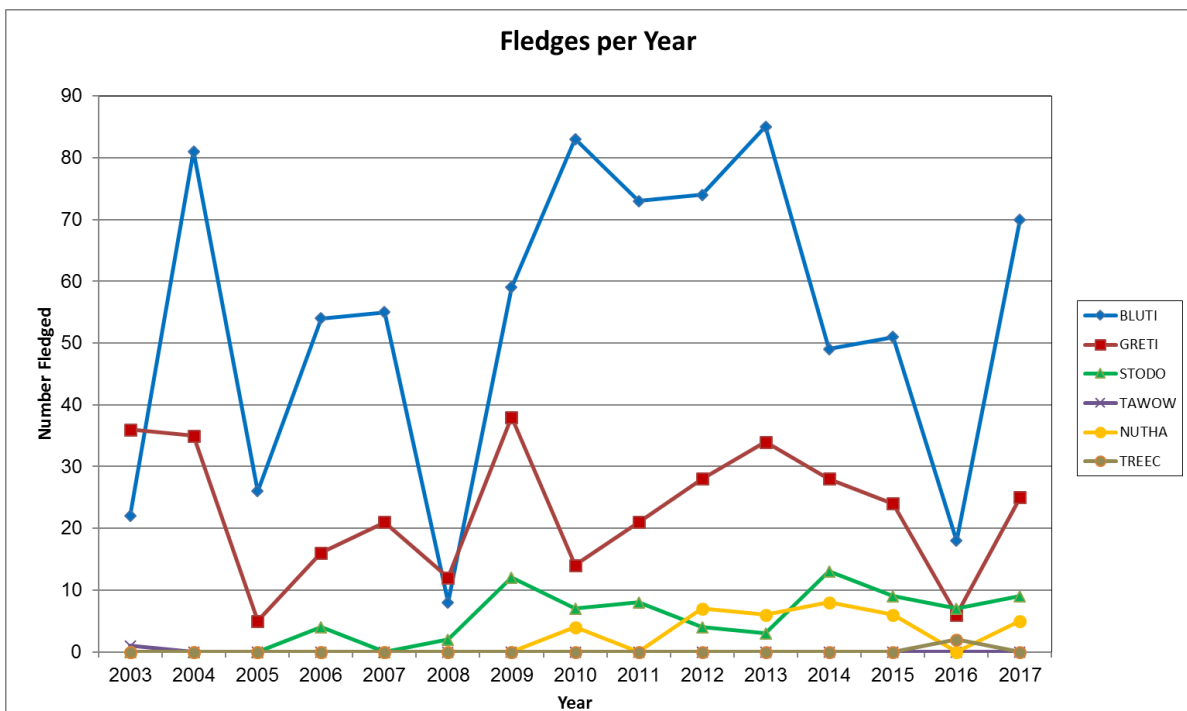
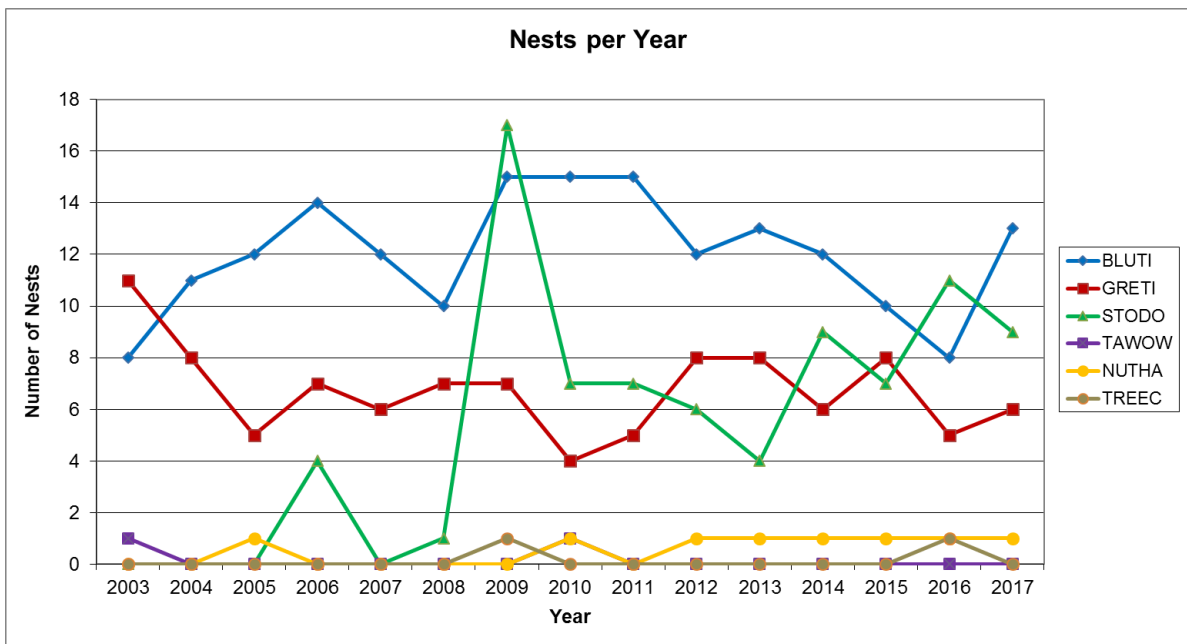
Nests and Fledges Per Year

The next two charts summarise the number of nests surveyed over the years 2003 to 2017, and the number of young fledged. Section 2 earlier in this document gives this data for the Blue and Great Tits for the full period of 1985 to 2017

Stock Doves nest from April to Sept, but we only survey their nests during the Tit nesting period, which usually takes place from April to June.

The chart below indicates that the number of nests per year does seem to vary considerably, apart from the Nuthatch, which has had one nest per year over the last few years. 2009 was an exceptional year for Stock Doves – more than one clutch per nest box during the survey period.

As might be expected, the number of fledges varies quite a bit from year to year.



Productivity

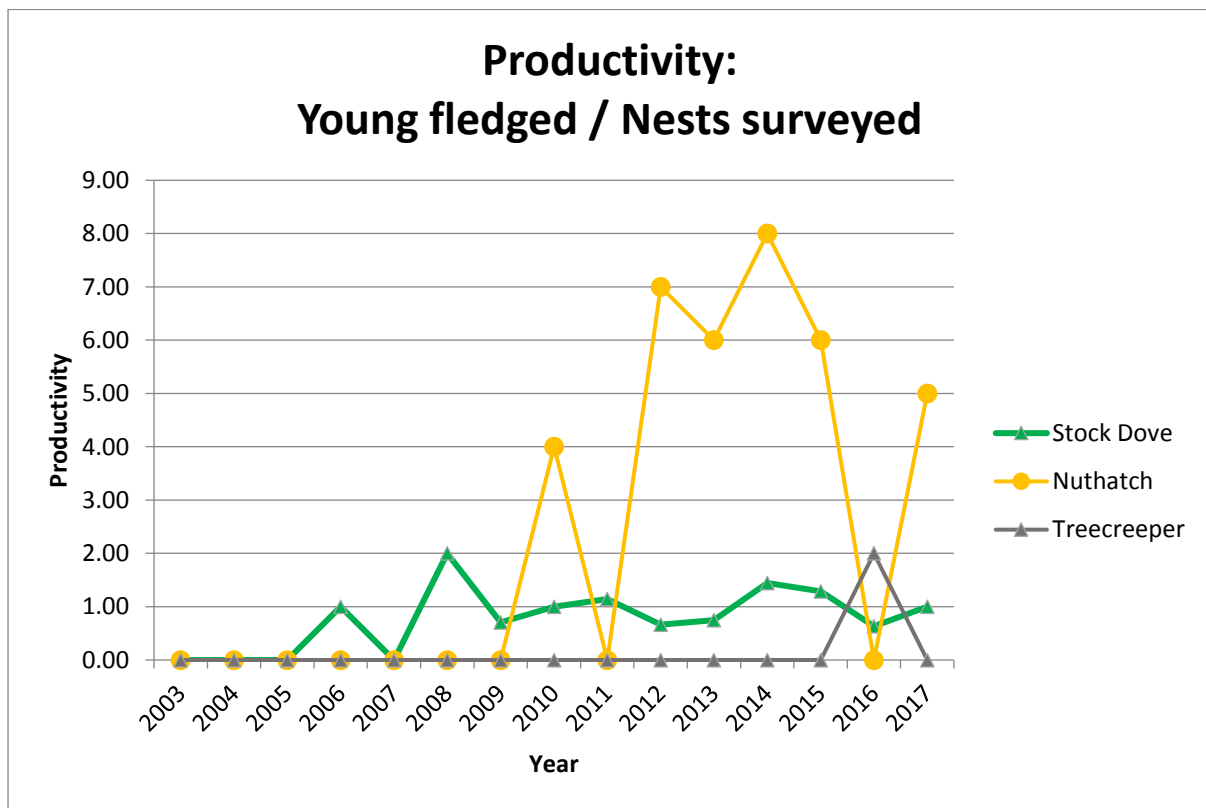
The “productivity” of the Tit nests for 1985 to 2017 is reviewed in the Blue and Great Tit Data Section earlier in this document.

The chart below shows the productivity for the Stock Dove, Nuthatch and Treecreeper.

There has been just one Nuthatch nest per year recently, so it is not surprising that its productivity varies from zero to eight young. It is good to see that it generally achieves a reasonable fledging success.

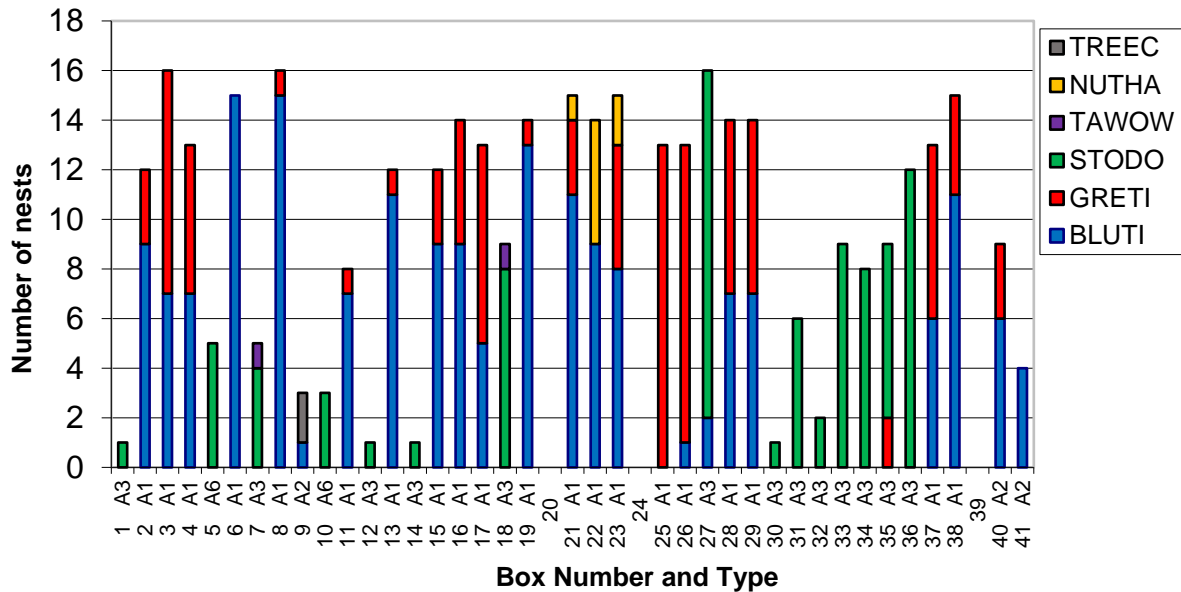
There have been two Treecreeper nests in recent years but only one had fledging success.

Over recent years there have been an average of about 8 Stock Dove nests in the April to June recording period. Perhaps the average productivity of about 1 fledge per nest is about right for a bird which typically lays 2 eggs.



Box Usage

Number of times box used from 2003 to 2017



Looking back through old records, we understand that 17 boxes were erected in 1985, 3 more in '86, 10 more between '87 & '89, another 10 between '92 & '95 and one more in 2011. Numbering goes up to 41 although three have come down and not been replaced.

Unsuccessful Tawny Owl nests were found in box 7 in 2003 and in box 18 in 2010.

A Treecreeper nested in 2009 in box 9, a Treecreeper box. Apart from that, this box has only had one Blue Tit nest in it since 2003.

Nuthatches have nested a few times in recent years, in boxes 21, 22 and 23. Despite being numbered consecutively, these boxes are in the centre, north and south of the coppice.

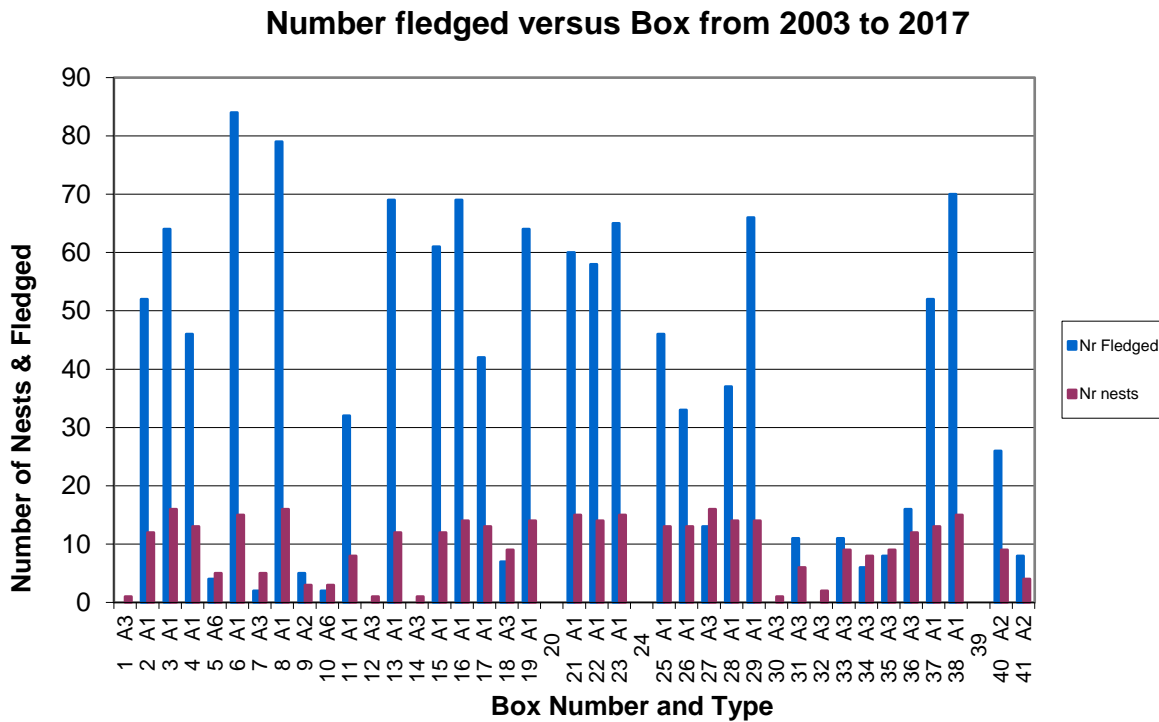
Boxes 27 and 35 are "large hole" (A3) boxes, but there are 2 records of a Blue Tit nest in 27, and 2 of a Great Tit nest in 35.

Of the 20 small hole (A1, tit) boxes, and over the 15 years (2003 to 2017), box 11 has only been used 8 times, but two boxes (3 and 8) have been used 16 times and the others have been used between 12 and 15 times. This would seem to give a fairly high average usage of the boxes, so perhaps the boxes are providing significantly more nest sites than are available naturally in the area.

Of the A3 and A6 boxes, four boxes (1, 12, 14, 30) have only been used once each between 2003 and 2017; these boxes are located across the coppice, so location is unlikely to be a factor. Six of the boxes (18, 27, 33 to 36) have been used 8 or more times; five of these boxes are in the northern third of the coppice but box 36 (with 12 nests) is towards the south end.

Numbers Fledged

The chart below shows the number of nests (ie: the number of times the box has been used) and the number of young successfully fledged from each box.



Of the fifteen A3 and A6 boxes, five (1, 12, 14, 30, 32) have not achieved any fledges. Boxes 31, 33, 36 have achieved more than 1 fledge per nest, the remaining seven having less than one fledge per nest.

Of the 20 small hole (A1, tit) boxes, most appear to have relatively high success rates; over the years 19 of these boxes have had 12 to 16 nests. Only box 11 has less, with 8 nests. The three A2 (Trecreeper) boxes, have been used just 16 times, (11 by Blue Tits, 3 by Great Tits and 2 by Trecreeper). Perhaps this is understandable as the boxes must be a bit cramped for a Great or Blue Tit.

A review of the locations of the more, and less, successful nest boxes shows that they are generally spread throughout the reserve; so geographic or specific location is unlikely to be a reason for the outcome.

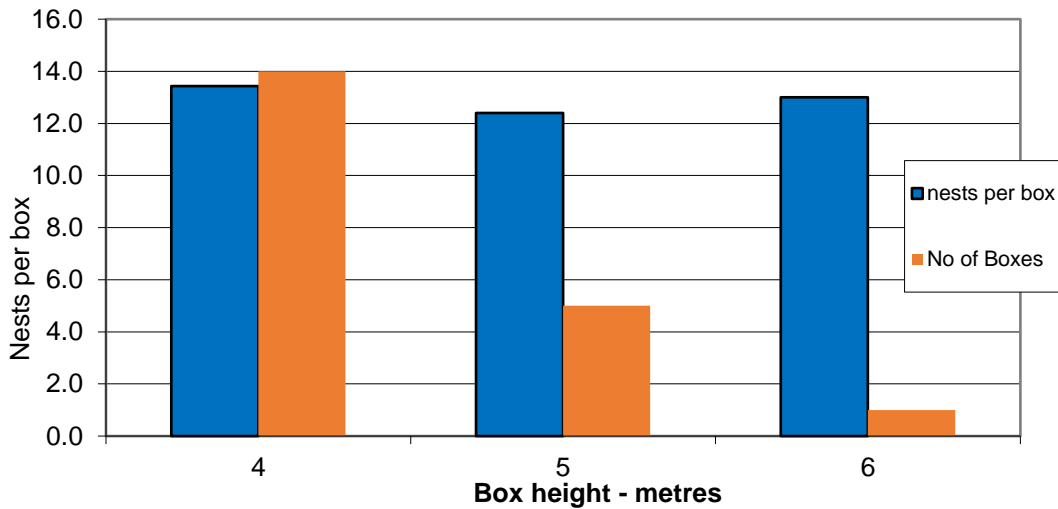
Positioning of nest boxes.

Usually boxes in public areas such as Quakers Coppice are mounted higher and out of easy reach to avoid human interference, whereas in private woodland lower mounting is usually safe from interference and can make for easier inspection.

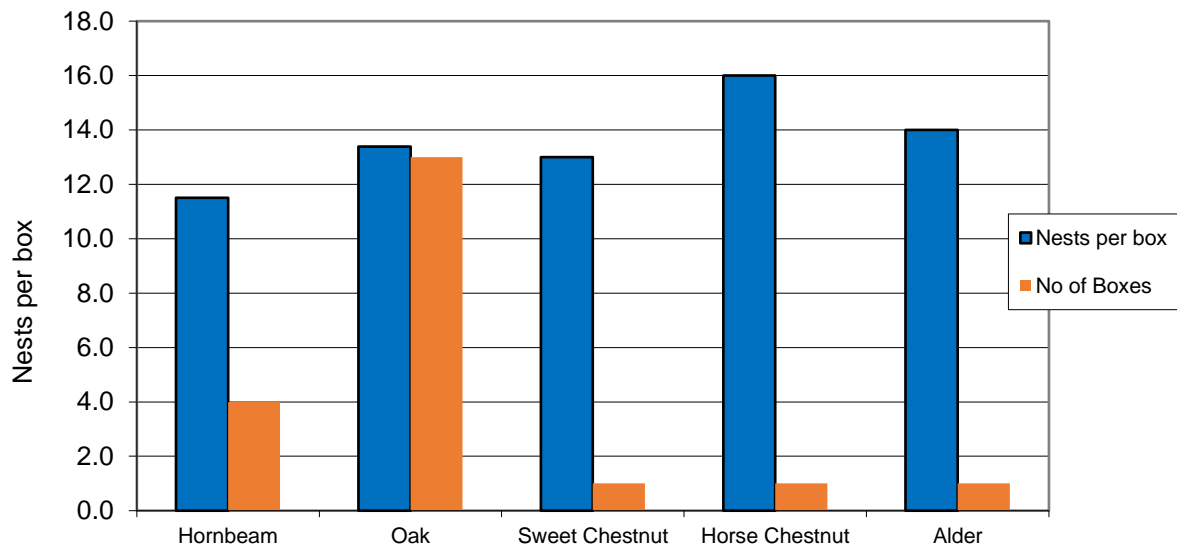
For each box, we have a record of the height at which it is mounted, the species of tree it is mounted on, and the aspect (direction) it faces (N, S, etc).

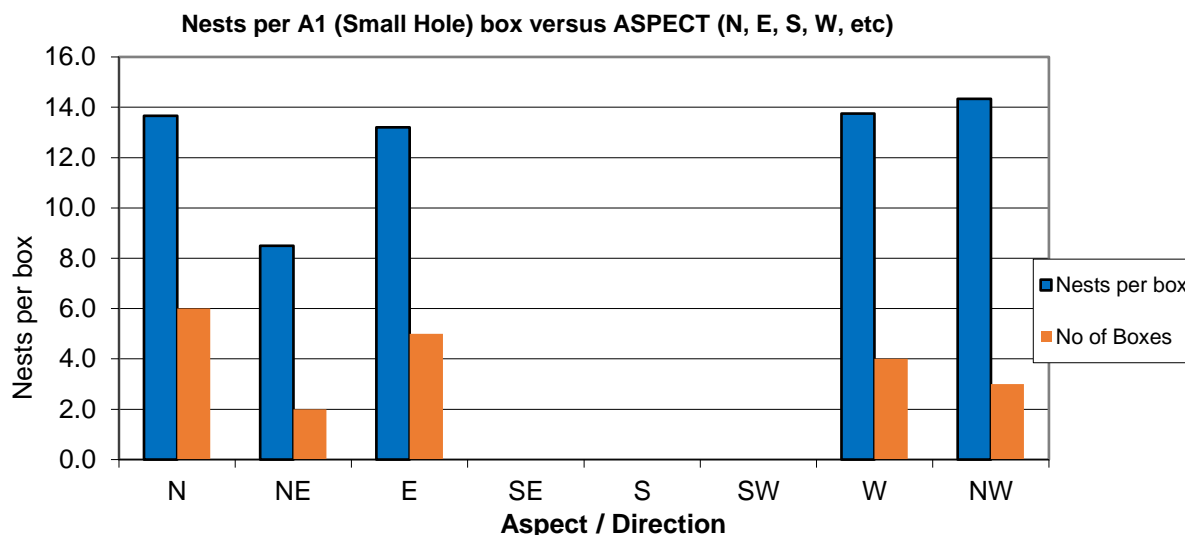
As shown in the three charts below, looking at this data for the Small Hole (A1) boxes, it does not appear that any particular height or tree type or aspect, has a significant impact on the usage of individual nest boxes.

Nests per A1 (Small Hole) box versus the HEIGHT the box is mounted



Nests per A1 (Small Hole) box versus TREE SPECIES





Looking at the "Aspect" chart above, for the lowest (NE) and highest (NW) "nest per box" figures, there are 2 NE facing boxes (11, 22), which have 6 nests per box; and there are 3 NW facing boxes (2, 3, 6), which have 9.3 nests per box. All 5 of these boxes have mostly been used by Blue Tits. There are no small hole boxes facing SE, S, or SW in the coppice. It is generally accepted that boxes should not face a southerly direction to avoid them becoming too warm.

Conclusion.

The data above indicates that for the Blue and Great Tits:

- between 1985 and 2005 the number of Blue and Great Tit nests recorded increased, and then appears to have levelled off;
- between 1985 and 2005 Blue and Great Tit productivity (number fledged/nest) declined, and then appears to have levelled off;
- over the period from 2001 to 2017 the Blue and Great Tit first egg dates have become several days earlier;

The nest box "aspect" data suggests that the positioning of the small hole boxes (height, tree species and aspect), has not significantly influenced their usage. Also, the whereabouts of a box within the reserve does not appear to have an effect.

Given the quite high usage of many of the nest boxes, they certainly seem to serve a need in Quakers Coppice. Without the boxes, the number of Blue, Great Tits and Stock Doves fledged in the area would probably be considerably reduced.