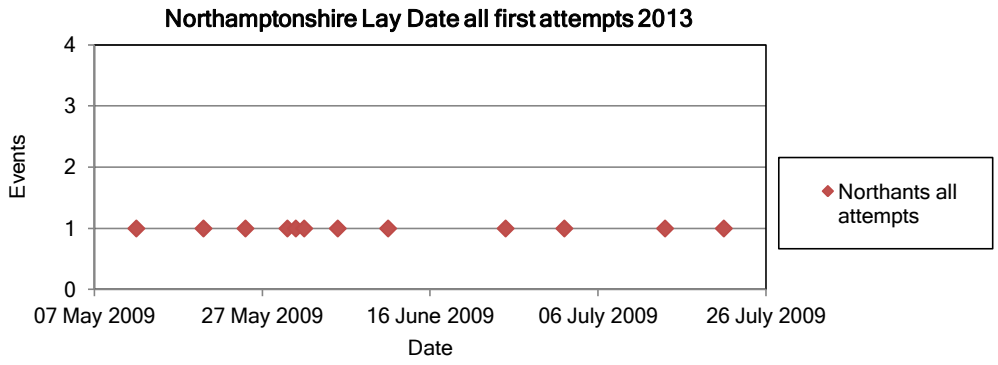
BREEDING IN NEST BOXES IN 2013

Data for individual monitored box sites where breeding occurred in 2013 is shown in *Appendix 5*.

Breeding began on 13th May following a brief warm and sunny period. For the first time there were no attempts begun in either March or April and only three pairs commenced clutches in May *(Figure 1)*. It is possible some early failed attempts were not recorded but unlike 2012 there was little evidence of failed clutches.

The average laying date for all first attempts was 13th June and nearly 6 weeks later than the project mean of 3rd May, In 2013 the first egg dates for first clutches ranged from 13th May -22nd July and there were no second attempts.

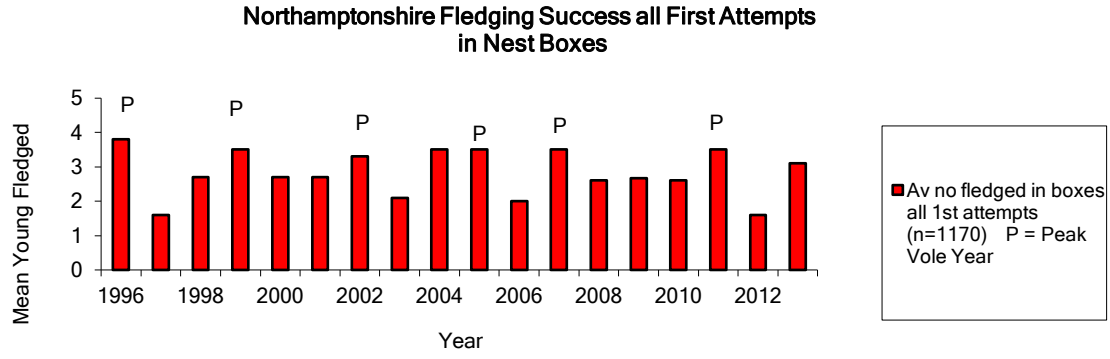
Figure 1



We monitored 13 breeding attempts including 10 late attempts in boxes. 2 attempts failed, one at clutch stage and the other with small young. There were 8 sites where either pairs or unpaired singles were present but not breeding at first monitoring visit although it was possible but unlikely they may have gone on to breed elsewhere later in the year.

The average clutch was 3.8 for all attempts, mean brood size was 3.2 and brood depletion 8.9%, considerably lower than the mean of 16% for the project. Productivity for all attempts was 2.9 *(Figure 2)* slightly above overall mean of 2.6. Barn Owl occupancy declined by 61% in 2013 and breeding pairs by 75%.

Figure 2

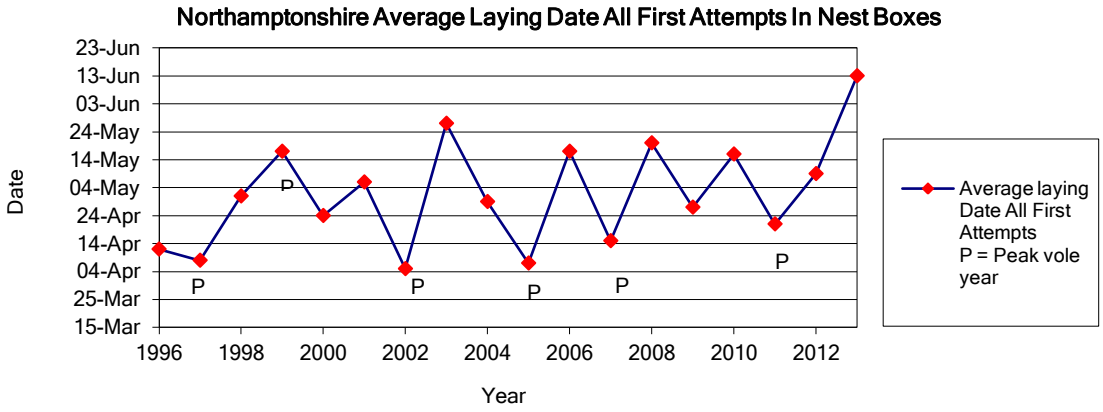


The special study site had only one first but late breeding attempt in 2013 successfully fledging five young in early September.

A comparison of the graphs for 'Fledging Success' with 'Egg Laying Dates' *(Figures 2 and 3)* shows that excepting in 1999 the higher productivity of peak vole years for first attempts is related to an early average lay date.

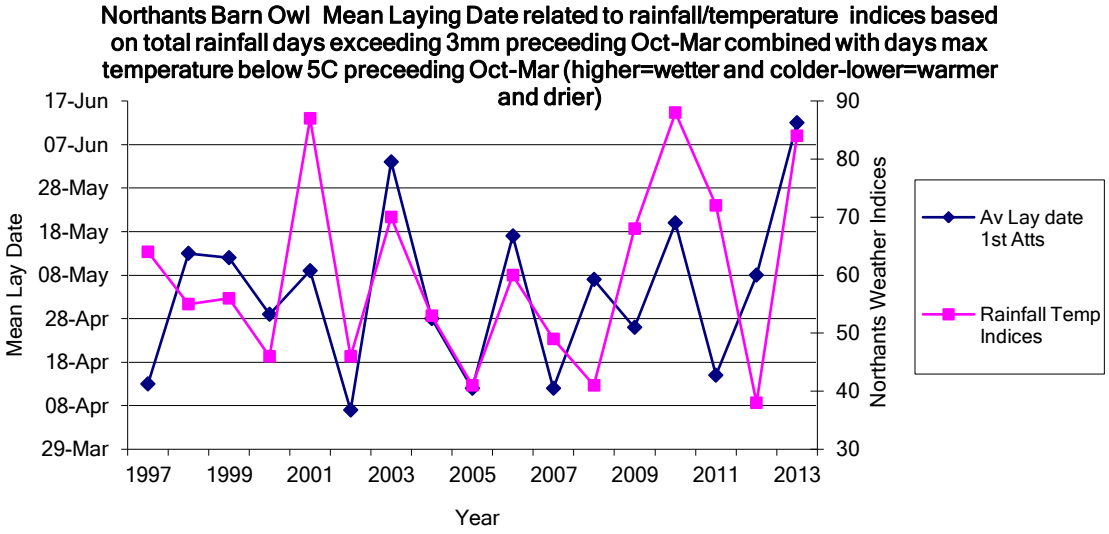
Early laying of first clutches increases the opportunity for pairs to breed twice and also, potentially, overall productivity per pair. This may be a critical factor in both sustaining and increasing the population over the long term. The relative importance of double brooding is the subject of further research by the author.

Figure 3



The fact that laying dates and occupancy are broadly synchronous has been established by others but the variation in productivity is evidence of the mitigating influence of weather on breeding outcome. To what extent weather affects the foraging ability of the owls or the availability prey species is less certain. The graph below *(Figure 4)* showing mean laying date relative to weather indices has been developed to show the combined affects of both rainfall and temperature on mean laying dates.

Figure 4



Rainfall is measured as the number of days that rainfall exceeds 3mm in the preceding October to March and temperature as the number of days the maximum temperature was below 5C in the preceding October to March. These two figures are then combined and the value used as the indices in the chart.

The weather indices correlated with mean lay date in all years excepting 2008 and 2012. In 2008 a warm winter with only eight days with mean maximum temperature below 5C created the low value whilst at the same time the wettest March so far recorded had a major and over riding impact on food supply and Barn Owl condition and subsequent lay dates. In 2012 the warm dry winter changed to a

sustained wet spring almost over night and delayed breeding by many pairs causing inverse relationship seen in the graph.

In 2011 the relatively high weather indices value was due mainly to sustained low temperatures early in the winter of 2010-11. The early laying date being facilitated by the warm February combined with low rainfall and numerous calm wind-free days/nights enabling successful foraging of abundant prey.

In 2013 the high weather indices was due mainly to the cold winter and prolonged spring. Combined with significant periods of snow cover this resulted in an exceptionally late mean laying date. Any future model relating weather indices to lay dates would probably be improved by extending rainfall and temperature parameters to include data for April and May. At this critical early egg laying stage of the breeding cycle Barn Owls clearly respond rapidly to intense or prolonged rainfall and extended cold. Predictive power of the model may be further improved by including other parameters based on a more detailed analysis of rainfall and temperatures during this period.