The Barn Owl *Tyto alba* in Shropshire

The first five years of the Shropshire Barn Owl Group 2002-2006

1. Aims of the Shropshire Barn Owl Group

The Shropshire Barn Owl Group (SBOG) formed in 2002 and aims to increase the breeding population of barn owls in Shropshire by providing nestboxes in areas of suitable habitat and working with farmers and landowners to enhance their habitat. In order to achieve this, SBOG:

• Conducts site surveys and promotes the conservation of barn owl habitat with farmers, landowners, statutory authorities, conservation organisations and other interested individuals.

• Operates a nestbox scheme for barn owls in Shropshire to replenish natural nest sites in trees and buildings lost to decay and development.

• Monitors nestboxes and natural sites for occupation by breeding and roosting barn owls on an annual basis under licence from English Nature.

• Maintains a database of breeding sites, nestbox occupation and breeding success.

• Provides advice and practical assistance to local authorities, developers and home owners where planning applications affect barn owl nest sites.

• Observes barn owls throughout Shropshire and researches aspects of their behaviour in order to better understand their habitat requirements.

• Shares its findings and knowledge of barn owls through reports, general articles, illustrated talks, guided walks and events.

2. Status of the Barn Owl in Shropshire

In 1932 there were 287 breeding pairs of barn owl in Shropshire. In 2002 SBOG estimated the population at 121 to 140 pairs: - a loss of around 150 pairs. (Bishton & Lightfoot 2002).The national population has declined from 12000 pairs to 4000 pairs and the barn owl is amber-listed (medium conservation concern) in the UK (Gregory et al 2002). The barn owl is also on the Biodiversity Steering Group Conservation Concern List and is a target species in the Shropshire Biodiversity Action Plan. The steep decline has been attributed to a number of factors but mainly the loss of prey-rich foraging habitat on farmland. A reduction in the availability of nest sites in old trees and barns, urbanisation, pesticides and road casualties (Cayford 1992).

3. What Barn Owls need

Research has shown that a breeding pair of barn owl range over around three square kilometres, depending upon the habitat, and hunt mainly within 1 kilometre of their nest site in summer but will feed or roost up to 5 kilometres away in winter (Cayford 1992). Within their range they require a minimum of 4 hectares (10 acres) of damp, tussocky grassland which is permanent and ungrazed or 8 kilometres of 3 to 5 metre wide grassy margins (Taylor 1994). Ideally, margins should be 6 metres wide. The structure of the grass is important and should comprise a thick sward 20-40 cm high and remain largely unmanaged to allow a dense thatch of fallen stems and leaves to develop at the base of the tussocks. This will create shelter and nest places for field voles, the barn owls primary prey.

Suitable tussock forming perennial grasses grasses include false oat-grass, timothy grass, cocksfoot, meadow foxtail, meadow fescue and wood false-brome. A mix that incorporates some softer, less fibrous grasses to provide nutritious food for field voles is preferable and could include Yorkshire fog, smooth meadow grass, rough meadow grass, small cat's-tail, sweet vernal grass or velvet bent.

Grassed linear edge features on farmland such as hedgerows, headlands, drainage ditches, fence lines, bank slopes and woodland edge provide habitat for field vole and other small mammal prey such as wood mice and common shrew and are therefore important hunting areas for barn owls. Grassy margins sowed around arable fields under the agri-environment schemes are an increasing and valuable hunting habitat for barn owls. In urban areas, road verges, railway embankments, green field sites and other unmanaged grassland provide suitable foraging habitat. Intensively grazed land or rough grazing with patches of scrub and bracken is poor habitat.

4.Site surveys and the nestbox scheme

Farmers and other landowners were initially contacted through articles in farming and conservation magazines or by direct approach. Articles tend to produce a surge of requests but all sites are visited and surveyed. By the end of 2006 141 sites surveys had been completed. Many sites were found to support habitat of little value to barn owls but surveys did succeed in identifying sites with areas of permanent, tussocky grassland or grassy field margins created as part of an agri-environment scheme. However, the lack of natural cavities for barn owl nest sites appeared to be restricting the breeding potential of the barn owl and an intensive programme of nestbox installation was identified as a priority.

SBOG uses modified tea chests for internal sites and rectangular or 'A' shaped nestboxes for external sites on isolated trees or on a pole where there are no trees available. The flat roofed rectangular boxes are now preferred which, unlike the 'A' shaped nestboxes, provide a platform on which young owls can settle and exercise prior to fledging. Convention was initially followed and at least two tree nestboxes were installed in close proximity, perhaps less than a few hundred metres apart, to provide both nesting and alternative roosting sites. Experience found that though one box might be occupied by a breeding pair, the second often remained empty which indicated that the birds already had a suitable substitute roosting site in the area. Over the years we have found several examples of barn owls roosting elsewhere such as in dense coniferous plantations without the need for cavities and we now tend to install just one box on an isolated tree directly in good barn owl grassland habitat, being prepared to install a second nestbox as an alternative roost site if necessary. This policy is more cost effective in terms of both materials and time spent installing and monitoring the boxes.

5. Nestbox occupation

Table 1 summarises the occupation of nestboxes by barn owls for both breeding and roosting purposes for the five years 2002 to 2006. Roosting birds are either recorded by direct observation of a barn owl in situ or by the presence of recent barn owl pellets on the floor of the nestbox. This does not infer that the nestbox has been occupied all year by a roosting bird. In reality, barn owls are likely to have several roosting sites and to use each one sporadically The average occupancy rate is 32% and is greater for tree nestboxes,33%, than building nestboxes, 30%. The occupancy rate of 37% for pole nestboxes should be treated with caution due to the low number of nestboxes of this type installed to date but might indicate that the effectiveness of positioning nestboxes on poles directly within good barn owl hunting habitat and where the absence of suitable isolated trees might have been restricting nesting attempts. 61% of nestboxes have been occupied by breeding or roosting barn owls at some point since they were installed.

Table1. Nestbox occupation by Barn Owls
2002-2006
Shropshire Barn Owl Group

Year	No. nestboxes monitored	Building				Tree				Pole				% of nestboxes occupied by breeding pairs	% of all nestbox types occupied B and R birds
		No. boxes	Breeding	Roosting	%	No. boxes	Breeding	Roosting	%	No. boxes	Breeding	Roosting	%		
2002	13	7	0	3	42	6	1	0	16	0	0	0	0	7	30
2003	48	26	2	4	23	22	1	6	31	0	0	0	0	6	27
2004	97	41	4	5	21	51	4	14	27	5	0	4	80	8	31
2005	135	48	9	10	39	76	13	18	40	11	0	3	27	16	39
2006	160	63	0	20	31	85	2	22	28	12	1	2	25	1	29
Total	453	185	15	42	30	240	21	60	33	27	1	9	37	8	32

5.1. Time lapse between nestbox installation and occupation by a breeding pair

The shortest time lapse for occupation of a nestbox by a breeding pair of barn owl was 8 months for both a tree and building nestbox. The mean lapse time is 17 months (n=12). The mean lapse time is 13 months (n=7) for tree nestboxes, 18 months (n=5) for building nestboxes and 32 months (n=1) for pole nestboxes. Nestboxes installed in 'Hot' sites, that is with barn owls known to be present in adjacent 1km grid squares, were occupied in 13 months (n=10) on average compared to 25 months for 'Cold' sites (no known barn owls in adjacent grid squares).

Roosting barn owls can be enticed to use nestboxes quicker than breeding pairs: for example, a pole box succeeded in attracting a roosting barn owl within 28 days and tree nestboxes have been occupied by roosting barn owls within 2 months.

6. Breeding success of barn owls in nestboxes and natural sites

Table 2 summarises breeding success for nestboxes and natural nest sites monitored by SBOG for the five years 2002 to 2006. Only those nest sites successfully producing chicks are included for analysis. Breeding success is measured as chick productivity rather than number of young fledged as this can be ascertained on one monitoring visit to a nestbox site and repeat visits to sites is not feasible due to manpower and time restraints.

106 chicks have been produced in SBOG nestboxes and 108 in natural sites. Tree and building nestboxes have produced an average of 3.2 chicks per nest site. Natural nest sites have produced an average of 2.91chicks. Productivity is highest in natural nest sites in at 3.2 chicks but the relatively small amount of data from buildings should presently be treated with caution.

Table 2. Number of chicks produced according to type of nest site 2002-2006 Shropshire Barn Owl Group

Figures in parentheses refer to number of broods

Year	Building nestbox		Tree nestbox		Pole nestbox		Building natural		Tree cavity natural		Total No. chicks	Mean No. chicks
	No. chicks	Mean	No. chicks	Mean	No. chicks	Mean	No. Chicks	Mean	No. chicks	Mean		
2002	0 (0)	0	4 (1)	4.0	N/A	N/A	0 (0)	0	20 (6)	3.3	24 (7)	3.4
2003	6 (2)	3.0	2 (1)	2.0	N/A	N/A	2 (1)	2.0	18 (8)	2.2	28 (12)	2.3
2004	12 (4)	3.0	12 (4)	3.0	0	0	5 (1)	5.0	14 (5)	2.8	43 (14)	3.0
2005	27 (8)	3.3	40 (12)	3.3	0	0	6 (2)	3.0	39 (12)	3.2	112 (34)	3.2
2006	0	0	0	0	3 (1)	3	0	0	4 (2)	2.0	7 (3)	2.3
Total nest sites	14		18		3		4		33		70	
Total chicks	45		58		3		13		95		214	
Mean No. chicks	3.2		3.2		3.0		3.2		2.8		3.0	

The mean number of chicks per pair produced in Shropshire for the five years 2002-2006 is 3.0. A long-term average production of about 3.2 young per pair is required to maintain a viable population (Taylor 1994). Although the figure for Shropshire relates to chicks produced and not necessarily young successfully fledged, as indicated above, it is feasible that the production of 3.0 chicks per pair might only be just enough to maintain the population in Shropshire. SBOG's policy of targeting nestboxes at farms enrolled in agri-environment schemes with extensive areas of grassy headlands and siting networks of new nestboxes near to existing pairs to allow for occupation by dispersing young is intended to assist the creation of viable populations of barn owl.

2005 was an exceptional year with many nestboxes occupied by breeding pairs for the first time. At one site, Allscott Sugar Factory, barn owls bred for the first time in over twenty years in a nestbox installed by SBOG in the previous year. 20 successful breeding pairs of barn owl in 2005 exceeded the previous three years of 12 pairs combined. Similarly 110 chicks produced in all sites with 67 in nestboxes exceeded the previous three year combined total of 95 chicks for all sites and 35 for nestboxes.

Clearly, 2006 was a poor breeding season for barn owls in Shropshire, the worst since our records began in 2002. Despite the low level of breeding activity the nestbox occupancy rate of 29.37% was only a little below the average occupancy rate for the previous four years of 33.25%,

suggesting that that barn owls, although not engaged in breeding activity, were still present in relatively normal numbers.

Barn owl populations are known to fluctuate in response to field vole numbers which tend to peak every three years and then decline (Taylor 1994). Comparing 2006 with the previous poor breeding season of 2003 when 12 sites produced 28 chicks, only 7 chicks were produced in just three sites in 2006. This suggests that the 2006 breeding season was particularly poor and factors other than a cyclical dip in the field vole population may have been involved.

Below average temperatures in March 2006 and wet weather in early spring probably inhibited the growth of fresh grass and further depleted the field vole population. The Barn Owl Trust noted higher than normal rates of barn owl mortality and SBOG recorded four barn owl road casualties in April for the first time, suggesting hunger may have driven some barns owls further afield to marginal habitats in search of food. However, the relatively normal rate of nestbox occupancy is at odds with any evidence of abnormal rates of mortality.

Above average rainfall in May 2006 probably made it difficult for barn owls to hunt and two of the nests monitored by SBOG produced clutches which subsequently failed to hatch, suggesting pairs may have abandoned breeding activity due to a lack of prey and the consequent failure to sustain breeding condition. At one site, an unusual predominance of stached young rats further pointed to a paucity in the availability of the barn owls primary prey, field voles. The possibility that pairs remained alive but not breeding is supported by direct observations made by SBOG. In the two instances of failed clutches, both members of the pair where recorded alive and roosting in the nest site or adjacent cavities on a subsequent site visit. Many barn owls do not occupy their breeding sites all year round, but leave them in the autumn and return early in spring only if they are in sufficient breeding condition (Shawyer 2006). Otherwise, the tendency is for them to roost elsewhere nearby and to return the following year to breed successfully

It's a sobering thought that, according to Shawyer (2006) three quarters of Britain's barn owl population now use nestboxes for breeding. He warns that the barn owl will face extinction if we fail to maintain, replace and supplement these nestboxes.

7. Natural tree nest sites

Three tree species are utilised as breeding sites by barn owls in Shropshire – ash, oak and sycamore. Table 3. 68% of nest sites were in ash, 25% in oak and 7% in sycamore (n=28 trees). 73% of nest sites comprise a cavity in the tree trunk and 27% were in a branch. 96% of nest sites were in live trees. The average height of the nest hole above ground for all natural tree sites was 4.9 metres, range 3 to 10 metres. The actual nest platform inside the cavity can be some depth below the entrance and in one instance where the nest hole was 10 metres above ground level the nest platform within the tree trunk was actually at ground level.

Examination of the trees indicated that the cavities in the tree trunks comprised a hole or gash which had exposed the heart wood to infection and rot. Nest sites in branches were located at some point along the branch where part of the branch had snapped off or where the branch adjoined the trunk and the whole branch had fallen away, again exposing the heart wood to decay.

Table 3. Tree nest sites 2002-2006 Shropshire Barn Owl Group						
Tree species	% (No.)	Mean height (m)	Trunk % (No.)	Branch % (No.)	Live tree % (No.)	Dead tree % (No.)
Ash	68 (19)	5.0	84 (16)	16 (3)	94 (18)	6 (1)
Oak	25 (7)	5.0	43 (3)	57 (4)	100 (7)	0
Sycamore	7 (2)	4.5	50 (1)	50 (1)	100 (2)	0
Total	100 (28)	4.8	73 (19)	27 (7)	96 (27)	4 (1)

Trees utilised for breeding situated in hedgerows within fields, hedgerows along the roadside or in isolated trees in fields: trees at the edge of woodland were ignored. It is unlikely that barn owls have a preference for any particular tree species but that they utilise those trees that are predominant in the landscape and that have a propensity to form suitable holes large enough to support a brood of barn owls. It is most probable that any large, mature tree that formed cavities of the required dimension would be utilised.

8. Natural building nest sites

Only four natural nest sites in buildings have been identified by SBOG in the five years 2002 to 2006. These included two in agricultural buildings and one each in a large wooden dovecote and a chimney in a historical ruin.

Compared to the number of natural nests sites identified in trees the occupation of buildings by breeding barn owls is low. The reason for this is unclear at this stage but is unlikely to be due to building nest sites going undetected on site surveys. 141 site surveys have been conducted and whilst not all of the sites supported suitable outbuildings, where they did they were surveyed.

It is feasible that farmers with barn owls breeding in buildings are keeping the sites confidential but this would equally apply to known nest sites in trees. It may be that suitable farm buildings are now relatively scarce or those that remain are unsuitable to breeding barn owls and the only alternative is to occupy cavities in trees.

9. Road casualties

SBOG has been collating data on barn owls found dead on roadsides since 2002. Many of the birds are found by members of the group or reported to us or The Shropshire Ornithological Society. Birds found dead on roads are likely to be the result of collisions with vehicles. The light weight and buoyant flight of barn owls hunting over grassy verges adjacent to main roads renders them vulnerable to being caught up in the slip-stream of a passing vehicle and death is usually caused by collision with the following vehicle

Table 4 indicates that that A5 and A483 cause the most deaths and are a serious threat to barn owls. Two casualties were recorded on B roads for the first time in 2005. Of the 59 road victims identified, 66% relate to the winter period October to March. This period correlates with the dispersal of juveniles from the natal site and an increase in the hunting range of adult barn owls.

Four road casualties were recorded in the month of April for the first time in 2006. The inadequate availability of field voles and weather detrimental to hunting in the early spring of 2006 may have prompted some barns owls to hunt further a field from their usual feeding ranges resulting in an increased movement of birds and ultimately collision with vehicles.

One male found dead at Montford Bridge in February 2006 weighed 330 g within the normal weight range for male barn owls of 330g. A female on the A5 at Sandford weighed 320g in August 2006 and another on the A449 at Church Stretton in October weighed 290g, considerably below the normal weight for females of 370g. Death can be attributed to starvation when male and female body weights fall below 240g and 250g respectively (Shawyer 1998).

Table 4. Barn Owl Road Casualties

2002-2006

Shropshire Barn Owl Group

Road	Male	Female	J	F	M	A	M	J	J	A	S	O	N	D	Total
A5 Telford–Oswestry	2	2	1	5	1	2				2	1	1	4	2	19
A483 Pant–Oswestry	3	1		3	2				1						6
A49 Ludlow-Whitchurch					3						3	1			7
A41 Albrighton-Whitchurch		1										2	1		3
A495 Oswestry-Whitchurch		3		1					1				2		4
A53 Market Drayton Bypass	1			1	1	1					3				6
A458 Halfway House-B'north												1	1		2
A442				1											1
Other A roads		1		3							3		1		7
B roads						1			1	1		1			4
Total	4	8	1	14	7	4			3	3	10	6	9	2	59

10. Is it working?

141 site surveys and 212 nestboxes later are there any signs of an increase in the barn owl population? Our current database of 181 possible to confirmed breeding pairs compared to a possible maximum of 137 in 2002 would suggest that there is. Though this figure should for the moment be treated with a little caution, SBOG continually identifies hitherto unknown barn owl sites and with a steady flow of high quality records coming in from the Shropshire Ornithological Society our database continues to expand and to become more reliable. Particularly encouraging are the 33 successful breeding attempts and 106 chicks in SBOG nestboxes since 2002. These are birds that probably would not have arisen without some intervention to create nesting cavities and must constitute a positive recruitment to the barn owl breeding population.

Just how effective the policy of targeting nest sites in areas of good barn owl habitat and in close proximity to known breeding pairs to allow for occupation of nestboxes by dispersing juveniles can be is exemplified by one of SBOG's projects on the Weald Moors. The Weald Moors comprises an area of mixed farmland covering 50 square kilometres immediately north of Telford. Historically marshland, much of the land has been continuously drained by drainage ditches since at least 1576. However, the water table remains near the surface and barn owls are able to hunt along the grassy ditch banks and patches of marsh. Several farms are enrolled in agri-environment

schemes with grassy margins and low density grazing providing extensive areas of good barn owl habitat. In 2002, only one pair of barn owl was known to breed and, clearly, the lack of suitable nest sites was inhibiting the population. Initially funded by the Environment Agency on a few farms the nestbox scheme was widened to other farms on the Weald Moors by the dissemination of information and asking for permission to install nestboxes. By 2005, with 29 nestboxes in place, there were nine breeding pairs of barn owl, eight of them in nestboxes, and 39 chicks have been produced since 2002.

Ironically, urbanisation in places such as Shrewsbury and Telford has occasionally had a beneficial, if short-lived effect, on barn owls where grassland on green field development sites is taken out of agriculture and subsequently remains undisturbed and free to develop naturally over several years. Field voles become established and barn owls have been recorded hunting successfully over the fields. However, we must remain vigilant. Urbanisation continues to encroach on barn owl hunting habitat and tree nest sites, making it unviable for barn owls, and the disturbance and development of buildings known to support breeding barn owls continues.

In the farmed landscape the signs are encouraging. When we started out in 2002, farms enrolled in agri-environment schemes and offering the required permanent rough grassland for barn owls as part of their farm conservation plans were few and far between. In the last few years we have noticed a definite surge in grassy margins, either wide arable margins several metres in width or more recently, one metre wide margins following the lines of hedgerows. As they mature and attract field voles, and so long as we continue to provide nestboxes and there are no sudden adverse climatic conditions or unforeseen environment problems detrimental to barn owls, we are optimistic that the breeding population in Shropshire can recover.

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