BTO Research Report No. 131

The Effects of the Woodland Initiative on Bird Populations and the Bird Strike Potential at Birmingham International Airport

by

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December 1993

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EXECUTIVE SUMMARY

1. The threat of strikes by birds is a serious risk to aviation safety at airports. Gulls, Lapwings and Pigeons which are large, flocking species, are the most common cause of bird strikes but other smaller, flocking species also pose a threat. The bird hazard problem at each airport is unique and is determined by local environmental factors.

2. The Woodland Initiative is a proposal by Solihull Metropolitan Borough Council to plant 78 acres of commercial and amenity woodland to the south-west of Birmingham International Airport. This report is part of the feasibility study for the proposed woodland and concentrates on the potential threat to aircraft using the Airport posed by birds attracted to the Woodland Initiative.

3. Large mixed flocks of corvids form communal nocturnal roosts in winter and feed during the day on grassland and other habitats including airfields. In the spring Crows and Jackdaws disperse to breed whereas Rooks nest communally in colonies. Pigeon species similarly flock in the winter and become more scattered during the breeding season. The largest winter roosts are formed by Starlings whose favoured habitat is evergreen woodland. They feed mainly on grassland, preferring short grass for visibility.

4. The composition of the Woodland Initiative and the published information on bird behaviour leads to the conclusion that the woodland species presenting the greatest risk to aviation safety would be Rooks, Starlings and Woodpigeons. Starlings would be a potential serious problem as the woodland matures whereas Rooks and Woodpigeons would not become a serious risk until the woodland was fully-grown and provided suitable nesting sites.

5. Mitigation measures to minimise the risk of woodland birds causing strikes to aircraft can be adopted, with the emphasis on control of birds using the airfield in order to preserve the amenity of the woodland. Habitat management, especially a long grass policy, and direct control of bird numbers at the airport, along with tree thinning, scrub clearance and bird scaring in the woodland, are important measures that will decrease the densities of risk species.

1. BIRD STRIKES AT AIRPORTS

1.1 Introduction

The threat to aviation safety posed by birds has existed since the earliest days of flying. Today the increasing number of aircraft flying at greater speeds, together with the susceptibility of the jet engine to damage, means that the hazard of bird strikes has become a serious and expensive problem. For civil aircraft about 75% of all bird strikes occur in the vicinity of airports during take-off and landing, because the normal flying altitude of aircraft (30,000 ft) is well above that of most birds (Burger 1985).

Serious bird strikes do not occur as a consequence of an abnormal situation at an airport but may happen at any time at most airports under typical aircraft activity (Thomas 1990). Bird strike statistics reveal that on a worldwide basis gulls present the greatest threat to aircraft (Blokpoel 1976). The risk posed by a particular species of bird is determined both by its size and its tendency to flock. For this reason large birds such as gulls, and also Lapwings, that are found in flocks, are the most common cause of bird strikes. Gulls and Lapwings are attracted to airfields as places to rest and feed, particularly if they are situated near the coast (Burger 1985). The high percentage of these species in bird strikes may in part be due to the fact that they are more easily seen by pilots (leading to higher reporting rates), cause more damage and leave easily identifiable remains (Blokpoel 1976).

Solitary, small birds do not present a significant threat to aircraft but when they flock near an airport they can cause costly and potentially disastrous damage to passenger aircraft. Blokpoel (1976) reported that Dunlin, a small wading species similar in size to Skylark, occur occasionally in flocks of several thousand on Vancouver Airport and have been involved in bird strikes which have caused damage to large aircraft. The worst bird strike accident in aviation history occurred in 1960 when a Lockheed Electra took off from Boston Airport and ran into a flock of Starlings which caused it to crash into the sea, killing 62 people (Feare 1984).

Table 1 shows the number of reported bird strikes to UK-registered aircraft worldwide by different species between 1986 and 1990 (Thorpe, pers. comm.). The data support the above comments on the threat posed to aircraft by gulls and Lapwings and also small flocking species such as Starlings. They also reveal the importance of other large flocking species such as pigeons and Rooks in causing bird strikes. The difference in strike rates between Rooks and Carrion Crows is probably a reflection of differences in flocking behaviour as the latter species is usually found singly or in pairs.

Species	Reported bird strikes
Gull spp.	c. 700
Lapwing	259
Pigeon spp.	125
unidentified passerines	92
Starling	41
Rook	31
Carrion Crow	6
Linnet	5
Crow spp.	4
Blackbird	4
Pied Wagtail	3
Meadow Pipit	2
Redstart	1
Song Thrush	1
Magpie	1
Jackdaw	1
House Sparrow	1
Greenfinch	1

Table 1. Reported bird strikes to UK-registered aircraft between 1986 and 1990, including all reported carcasses found on UK airfields (Thorpe pers. comm.).

Every airport faces a unique bird hazard problem, the nature of which is determined by environmental factors that influence the type of birds present, their numbers and behaviour. These factors include the location of the airport (inland or coastal), environmental features of the surrounding land and the nature of the airfield itself. Thomas (1990) stated that " a study of the ecology and behaviour of birds found on the airfield and in the surrounding countryside is a necessary prerequisite to the development of a bird hazard management programme". This programme should aim to assess the risk posed by each species in the

vicinity of the airport, identify why they use the airfield and how their behaviour is a danger to aircraft and attempt to remove or reduce this danger.

1.2 Birmingham International Airport

Birmingham International Airport is located to the south-east of Birmingham in the 10km square SP18. It is adjacent to urban areas to the west and north, the National Exhibition Centre to the east and farmland (mostly arable) to the south, which includes the area intended for the Woodland Initiative.

Bird strike data for Birmingham International Airport from 1990-1993 is provided in Appendix 1. These data were supplied by the CAA from their national Bird Strike Database. The statistics reveal that Lapwings, Swifts, Swallows and martin spp. have been the principal causes of bird strikes at Birmingham over the past four years, though at least ten other bird species have also been involved in strikes. Other data supplied by the CAA indicate that Lapwings, Starlings and hirundines are encountered in flocks and sometimes cause multiple strikes to aircraft whereas other species such as gulls, pigeons, and birds of prey are struck singly, even though the two former groups commonly occur in flocks.

2. THE WOODLAND INITIATIVE

Solihull Metropolitan Borough Council are proposing to plant a commercial and amenity woodland on 78 acres of land to the south-west of Birmingham Airport. This proposal was originally part of the Special Recreation Zone development which covered a larger area of land and was designated for major recreational facilities. The Special Recreation Zone has now been shelved but the plans for a managed woodland scheme remain and this report is part of the feasibility study for such a scheme.

The area consists of two habitats: i) a small area of grass and scrub (18 acres), adjacent to a housing estate, which would be planted in Spring 1994, and ii) an area of arable farmland (60 acres) with hedges and ditches to the east of the scrub (see Figure 1). On a field visit (9 December 1993) bird activity was minimal in the scrub area, while there was a flock of Woodpigeons (50-100 birds) feeding in the ploughed arable fields, together with two Carrion Crows.

It is proposed that 50-60% of the area will be planted commercially with a mixture of predominantly Oak and Lime, together with Cherry, Hornbeam, Alder and a small percentage of pine as winter interest. Hazel and Sweet Chestnut coppices are also a possibility. The commercial forestry will be managed on a rotational basis with selective thinning to achieve a twelve foot spacing between trees when the crop is mature. The rest of the area is designated for amenity planting to create a variety of habitats. An indigenous Oak woodland mix will be planted, mainly bordering the land currently used for arable farming, to establish an area of permanent native woodland. The scheme also includes the creation of a wetland area, wild flower meadows and the enhancement of existing ponds in the area which is currently scrub.

The principal feature of the Woodland Initiative will therefore be broadleaved woodland managed for public access and commercial harvesting.

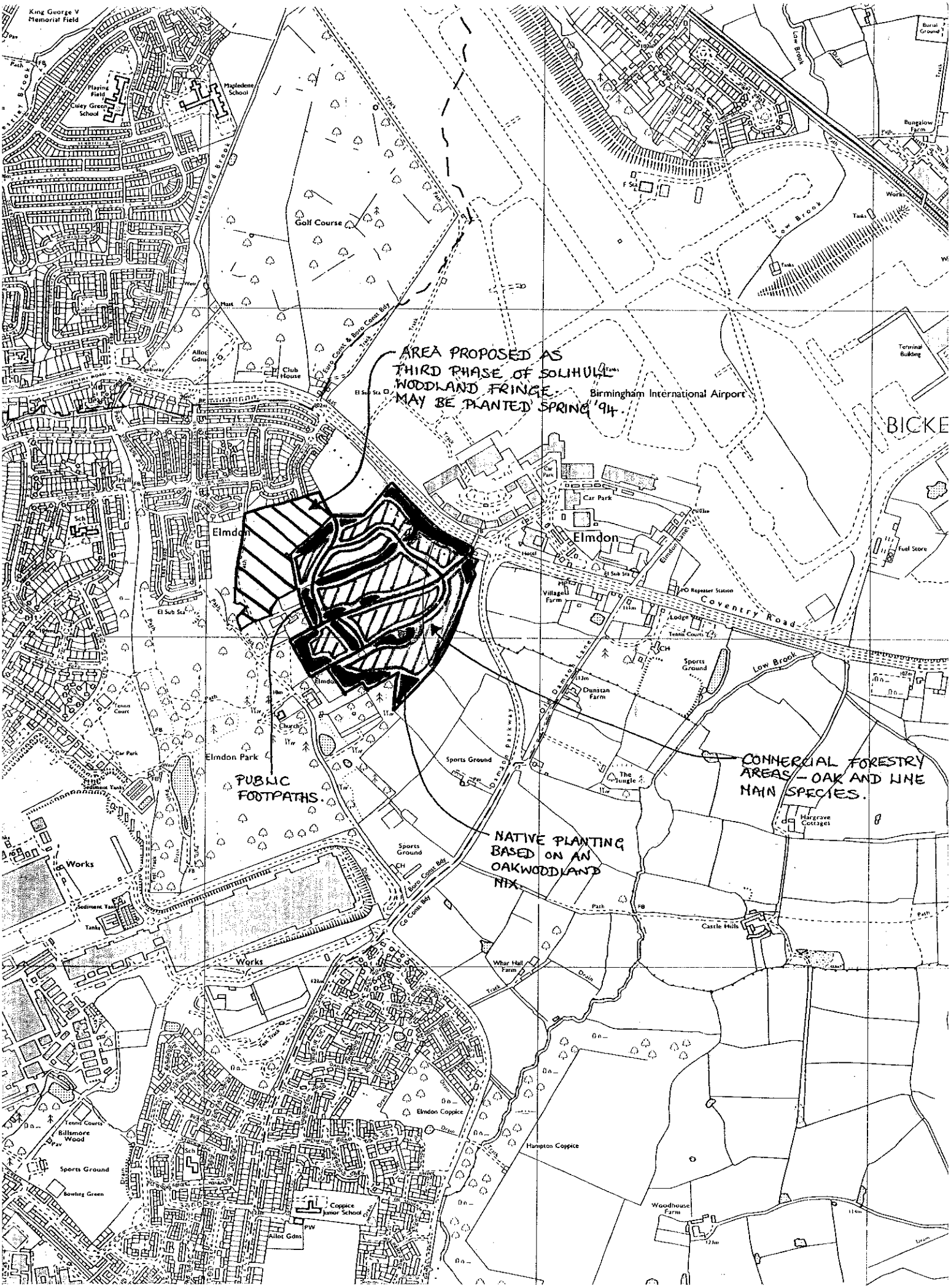

Figure 1. The composition and location of the Woodland Initiative, Solihull

3. TARGET WOODLAND BIRDS

Introduction

The following species accounts cover those woodland bird species that are most likely to be involved in bird strikes of aircraft (see Table 1). The general biology of each species is summarised from the literature and the local data that we have available for each species is outlined. 'Local' in this case is defined as the 10km square SP18 which contains Birmingham International Airport and the site of the Woodland Initiative, plus the three adjacent 10km squares SP17, 27 and 28.

3.1 Corvids

3.1.1 Carrion Crow

3.1.1.1 General Biology

During the winter, breeding Carrion Crows usually remain on their territories whereas non-breeding birds, juveniles and migrant birds form flocks (Lack 1986). They are omnivores, feeding on vegetables, weeds, carrion, fruit and small mammals. In winter, an important source of food is grain, from stubble fields and livestock feeding sites and from newly-sown crops in the autumn and spring (Holyoak 1968). Carrion Crows feed on earthworms and in the spring and summer they take a wide range of insect species from grassland. They feed in herbage taller than that tolerated by Jackdaws and Rooks (Lockie 1955).

During winter evenings, the flocks join together in communal roosts which are usually in dense woodland (Lack 1986). Carrion Crows may roost on their own, or they may collect together with Rooks and Jackdaws to form roosts which may contain over 10,000 birds.

3.1.1.2 Local Data

Data for Carrion Crow from *The Atlas of Wintering Birds in Britain and Ireland* (Lack 1986) *(The Winter Atlas)* gives a peak winter count of 1131 in the south-east Birmingham area (10km squares SP17, 18, 27, 28). *The Winter Atlas* data indicate that Carrion Crows are relatively abundant in the West Midlands. An entry for Coleshill Woods in the Ornithological Sites Register from the mid 1970s states that there were up to a hundred Carrion Crows wintering in this mixed woodland.

3.1.2 Rook

3.1.2.1 General Biology

Rooks are common birds of agricultural country and their noisy breeding colonies, rookeries, are conspicuous in the tops of tall trees. These rookeries may contain several hundred nests and are mainly found in mature Elm, Oak, Beech, Ash and also pine trees (Bruce Wilmore 1977). During the breeding season, which begins in March, Rooks utilise grass fields to a large extent, feeding on insects and earthworms. At least 50% of feeding time is spent on grassland throughout the year and short grass is preferred for ease of detecting prey (Lockie 1955). As the summer progresses Rook density at feeding sites drops as prey are depleted and alternative food sources such as caterpillars in oak woods are utilised (Yeates 1934).

As the autumn approaches the scattered feeding flocks coalesce into larger flocks that feed on grain and acorns as well as earthworms (Holyoak 1968). In the winter these flocks become concentrated into large, dense gatherings that roost communally in large woods, often the site of the largest rookery in the district (Yeates 1934). The Rooks depart from the roost at dawn to feed nearby and at dusk they gather into large 'pre-roost assemblies' before the final flight into the roost for the night. These communal roosts are often shared with large flocks of Jackdaws.

During the winter Rooks return to their rookery at the beginning and end of feeding activity, even though they are using the communal roost (Patterson *et al* 1971). As spring approaches their behaviour alters and they gradually spend more and more time at the rookery until by the middle of March the communal roost is abandoned.

3.1.2.2 Local Data

The 1975 Rookeries Survey did not record any rookeries in the 10km squares SP18 and SP28. *The Winter Atlas* has a peak winter count for Rook in the area covered by SP17, 18, 27 and 28 of 2207, which is not particularly abundant. The West Midlands Bird Club Report for 1987 reported that a new rookery was becoming established at Packington Park with 2 nests occupied. Four years later, the West Midlands Bird Club Report for 1991 reported that there were 4 rookeries in the square SP28 with a total of 98 nests, but did not give their exact location. Thus the available evidence indicates that Rook breeding populations are increasing in the area. Historical data collected in the mid 1970s for the Ornithological Sites Register indicates that Packington Park was a winter roost site for several hundred Rooks.

Recent data from *The New Atlas of Breeding Birds in Britain and Ireland: 1988-1991* (Gibbons *et al* 1993) *(The New Breeding Atlas)* reveals that Rooks are not confirmed as breeding in the 10km square SP18 which covers the airport and the site of the Woodland Initiative. This square covers Solihull and the south-east suburbs of Birmingham and contains very little farmland. Rooks are confirmed as breeding in SP17, 27 and 28 (the squares to the south and east).

3.1.3 Jackdaw

3.1.3.1 General Biology

Jackdaws are among the most gregarious of passerines, commonly associating with Rooks at feeding sites and in roosts (Lack 1986). Like Rooks, they spend about half their feeding time throughout the year on grassland, taking small surface prey and searching a wider variety of grassy habitats than Rooks including long vegetation (Lockie 1955). Jackdaws are principally birds of open grassland although they can be found feeding in woods in the spring when caterpillars are abundant and also in the autumn when acorns are available (Holyoak 1968). In hard weather they move into towns and scavenge around rubbish tips.

During the winter Jackdaws roost in woods, plantations and on buildings (Bruce Wilmore 1977). The large woodland roosts typically combine Jackdaws and Rooks, and also occasionally Carrion Crows and Ravens, although not the latter species in the Midlands (Lack 1986).

3.1.3.2 Local Data

The Winter Atlas indicates that Jackdaws are not very abundant in the south-east Birmingham area, with a winter peak count of 810 for SP17, 18, 27 and 28. In the mid 1970s, Packington Park supported several hundred wintering Jackdaws as indicated by the Ornithological Sites Register.

3.2 Pigeons

3.2.1 Woodpigeon

3.2.1.1 General Biology

The Woodpigeon is primarily a bird of deciduous Oak and Beech woodland, although it can be found in open country associated with arable farming (Murton 1965). It is this association that led to the large-scale increase in Woodpigeon numbers and range during the nineteenth and twentieth centuries as arable farming developed and intensified. In particular, the provision of winter crops such as clover and turnips, and more recently oilseed rape, supplies Woodpigeons with a plentiful food source during the lean winter months (Lack 1986).

In the autumn, Woodpigeons feed in large flocks in stubble fields and also take acorns and beechnuts from woods. As winter arrives they switch to winter-sown cereals, clover leys, weed leaves and oilseed rape (Murton *et al* 1964). At this time, they roost communally in large woods and move to and from the feeding grounds in compact flocks. These movements are most frequent in September and early October when food supplies are still good (Murton 1965). As winter progresses and food becomes scarcer the birds have to spend more time at feeding sites and they tend to leave the roost at dawn.

3.2.1.2 Local Data

The West Midlands Bird Report for 1987 states that there were up to 2000 Woodpigeons at Great Packington in the winter. The Report for 1991 noted that 500 Woodpigeons were seen near Coleshill in January. From *The Winter Atlas* data Woodpigeons would appear to be fairly abundant in this area with a winter peak of 3430 recorded for SP17, 18, 27 and 28. *The New Breeding Atlas* confirms that Woodpigeons breed in each of these squares.

3.2.2 Stock Dove

3.2.2.1 General Biology

Like the Woodpigeon, the Stock Dove has expanded its range in Britain very markedly since the early nineteenth century when it was restricted to southern and eastern England (O'Connor and Mead 1984). It is typically found in open woodland and parkland, though again like the Woodpigeon it has adapted to arable farming and in many areas it shares the same farmland habitat (Murton 1965). Within this habitat the two species do not tend to compete for food but occupy different niches. The Woodpigeon specialises on clover and plant leaves in winter whereas the Stock Dove searches old stubble and ploughed land for weed seeds (Murton *et al* 1964). In the spring and summer, Stock Doves feed on cereal sowings and ripe cereal grains along with other pigeon species but weed seeds remain the most important component of their diet. In the autumn they rarely feed on woodland foods, unlike Woodpigeons.

3.2.2.2 Local Data

The West Midlands Bird Report has information on Stock Doves at Packington Park. In 1986 a number of large flocks of Stock Doves were reported and in 1987 there was a maximum of 60 in February. In 1991, 100 Stock Doves were counted at Packington in December. *The Winter Atlas* recorded Stock Dove as being present in large numbers in SP17, 18, 27 and 28, with a winter peak count of 331.

3.2.3 Collared Dove

3.2.3.1 General Biology

The Collared Dove is a relatively recent arrival in Britain and has rapidly established itself so that it is now widely distributed and locally common (Lack 1986). A major expansion across north-west Europe began in about 1930 and the first bird reached Britain in 1952. This colonisation was only possible because of the ready availability of food, in particular grain, inadvertently supplied by man. Collared Doves take seeds and berries and some invertebrates but they rely largely on grain fed to livestock or spilled in farmyards (Goodwin 1967). For this reason they occur commonly around human habitations but are generally scarce in the open countryside.

During the winter, large flocks of Collared Doves gather at prime feeding sites such as grain stores, flour mills and chicken farms. They roost communally and choose sites that offer protection from predators as well as shelter from the elements: conifers, Holly and Ivy are preferred (Lack 1986).

3.2.3.2 Local Data

Hudson (1972) stated that Collared Doves were common in the suburbs of Birmingham and also Solihull. *The Winter Atlas* data show Collared Dove to be fairly numerous in south-east Birmingham with SP17, 18, 27 and 28 containing a winter peak of 181 birds. Considering the preference of this species for built-up areas, it is not surprising that it should be common around Solihull.

3.2.4 Feral Pigeon

3.2.4.1 General Biology

Feral pigeons are all domesticated strains of the Rock Dove which have subsequently escaped to form free-living populations (Murton 1965). Within the feral pigeon population are freshly-escaped domestic pigeons, lost racing pigeons and individuals which are indistinguishable from the wild type. Feral pigeons are widespread though they are scarce in upland areas and are most abundant in towns where they breed and roost on buildings and under bridges (Goodwin 1967).

Rural populations of feral pigeons feed mainly on farmland and can aggregate on fields in large numbers (Lack 1986). They often feed together with Stock Doves and Woodpigeons, taking weed seeds from the soil surface. Pigeons that roost in towns may fly out to the countryside to feed, though those that live in large towns usually remain there. Rural populations, like the town-dwellers, tend to choose man-made roosting sites such as old buildings, barns and under bridges (Goodwin 1967).

3.2.4.2 Local Data

As would be expected, feral pigeons are common around the built-up area of south-east Birmingham. *The Winter Atlas* peak count for SP 17, 18, 27 and 28 is 897. This is a combined count for feral pigeon and Rock Dove.

3.3 Starlings

3.3.1 General Biology

The main feature of the wintering Starling population is the large communal roosts that are formed from mid-autumn until spring. During the breeding season, most birds roost in their nesting holes and only the non-breeding birds form communal nocturnal roosts. Towards the end of the breeding season, the non-breeders are joined by juveniles and the roosts start to

expand. They are greatly augmented from late September to early November by large numbers of immigrants from continental Europe (Brough 1969). Symonds (1961) noted that autumn and spring roosts can contain 20,000 to 250,000 Starlings whereas mid-winter roosts can contain up to 1.5 million birds. The total wintering population of Starlings in Britain and Ireland has been estimated at 37 million (Potts 1967) though this figure may have declined due to decreases in the breeding population of Starlings in northern Europe caused by land-use changes (Brough 1969).

Starlings roost in reedbeds, scrub, woodland and town centres. Their principal requirement is shelter from the prevailing wind and for this reason their favoured woodland sites are conifers and evergreens as the dense foliage provides protection (Feare 1984). These nocturnal roosts are usually within 20km of suitable feeding areas to which the birds depart at dawn each day. Studies with radar have shown that Starlings depart from large overnight roosts in waves, with immediate and purposeful flight in all directions at a height of about 100-200 feet (Harper 1959). When Starlings reach the feeding ground they break up into small flocks to feed. During the day the birds may use daytime roosts adjacent to the feeding ground in order to rest and preen. Unlike nocturnal roosts the daytime roosts tend to be in the tops of tall deciduous trees from which the birds can keep a look-out for predators (Feare 1984). Towards evening, the day roost grows as more birds join it from the feeding area and eventually it merges into a 'pre-roost assembly'. These assemblies can involve huge numbers of birds and are broken up as birds leave in flocks for the night-time roosts.

Starlings are essentially grassland feeders and take invertebrates and seeds from the grass leaves and top layer of soil. They are very adaptable in their feeding habits and utilise refuse tips, orchards, grain spillages and sewage farms as alternative sources of food (Feare 1984). Grassland is the main feeding site for most of the year and short grass is preferred because it provides more visibility and is easier to walk through. Starlings also prefer old pasture to newly-sown grass because it supports a higher earthworm density and a more diverse community of invertebrates. In the spring and summer they can feed on aerial insects.

3.3.2 Local Data

The Winter Atlas gives a peak winter count of Starlings in the south-east Birmingham area (10km squares SP17, 18, 27, 28) of 6123. There are no data available on Starling roosts in the vicinity of the airport.

3.4 Others

3.4.1 General Biology

Both thrushes and finches form feeding and roosting flocks in winter. The nocturnal roosts can contain hundreds or thousands of birds which split up at dawn into smaller feeding flocks.

Finches are specialist feeders and food sources do not tend to overlap between species though they use similar habitat as roosting sites and sometimes form mixed roosts (Newton 1972).

Immigrant Chaffinches and Bramblings often roost together in rhododendrons or young conifer plantations (Lack 1986). During the day Chaffinches feed on seeds on the ground while Bramblings concentrate on beechmast (Newton 1972). Goldfinches roost in thick deciduous scrub or evergreens and use their long, thin bills to feed on thistles, ragwort and teasels which they find by ranging over wide areas. Siskins form small flocks usually up to 50 birds and feed on Alder along with Redpolls which also feed on Birch.

Fieldfares and Redwings arriving from the Continent form the largest thrush flocks in winter (Simms 1978). They often feed and roost together in loose assemblies, though they display some interspecific differences in choice of roosting site. Fieldfares prefer conifers, tall hedgerows and shrubs whereas Redwings are found at lower levels in thick shrubberies, plantations and dense hedgerows (Simms 1978). Several hundred birds is a common number for a roost although they can contain thousands. Fieldfares forage on open ground for invertebrates and also feed on fruit and hawthorn hips. Redwings associate with Fieldfares on fields but unlike Fieldfares they forage in woods in cold weather, turning over the leaf litter like Blackbirds (Lack 1986). Mistle Thrushes and Song Thrushes are fairly sedentary in winter and do not show any strong flocking tendencies (Simms 1978). They can be seen feeding on earthworms in the company of Blackbirds, and Mistle Thrushes in particular defend fruit supplies ensuring a food source throughout the winter (Lack 1986).

3.4.2 Local Data

The Winter Atlas data show Redwings and Fieldfares to be numerous in the four squares SP17, 18, 27 and 28 during the winter with peak counts of 1028 and 2036 respectively. Goldfinches, Siskins and Redpolls are all fairly abundant with peak counts of 103, 360 and 165 respectively. Chaffinches are less numerous in this part of the country than others according to *The Winter Atlas* distribution map and Bramblings are scarce winter visitors with a peak of only 17 for the four squares.

The Ornithological Sites Register entry for Packington Park in the mid 1970s recorded the presence of several hundred Fieldfares and Redwings. Redpolls and Chaffinches were also recorded in those numbers while Siskins, Goldfinches and Bramblings were present but less numerous.

4. SPECIES RISK ASSESSMENT

4.1 Corvids

4.1.1 Carrion Crow

The mixed deciduous woodland which will characterise the Woodland Initiative is unlikely to be used by Carrion Crows as a winter roosting site because they prefer dense woodland that offers more shelter. The size of the proposed wood is too small to support a large number of Carrion Crows and the CAA report that they occur on airfields only in odd pairs rather than flocks (CAA 1990). It would therefore not seem likely that the Woodland Initiative will significantly increase the risk of Carrion Crows causing bird strikes at the airport, a risk which is already fairly low (Appendix 1).

4.1.2 Rook

Rooks often feed on grass at airports and their abundance during the breeding season may be related to the size and proximity of the nearest rookery (CAA 1990). When the trees in the proposed woodland are mature they may well attract Rooks to start a breeding colony, particularly Oak and pine trees which are favoured nesting sites, especially as Rook populations are increasing in the area. Rooks nesting in the woodland would be very likely to use the airfield as a feeding site because of its proximity to the colony. Numbers of Rooks on the airport would therefore increase, especially during June and July when juveniles start feeding independently. Seventy percent of Rook strikes occur during these months on civil airports (CAA 1990). There have been no recorded incidents of Rooks striking aircraft at Birmingham International Airport during the last four years (see Appendix 1) but the potential development of a rookery in the proposed woodland could lead to Rooks posing an increased risk to aircraft using the airfield.

The proposed woodland is not likely to be used as a communal winter roost by Rooks because of its small size and because Rooks prefer to use long-established rookeries as winter roosts. Should a rookery become established in the woodland, however, it will be visited daily during the winter by its resident Rooks, whose flights could present a risk to aircraft using the airport.

4.1.3 Jackdaw

Jackdaws associate with Rooks at feeding and roosting sites and are often part of communal Rook roosts in woodland. The Woodland Initiative is not likely to be used as a communal roost by Jackdaws for the reasons mentioned above. It is possible that Jackdaws will be attracted into the woodland at certain times of year to feed on caterpillars and acorns but

their use of the woodland will be limited and they are not likely to pose a serious threat to aircraft.

4.2 Pigeons

4.2.1 Woodpigeon

The CAA states that the greatest problems caused by Woodpigeons on airports are during spring and summer when they feed on weeds and seeds in the grass (CAA 1990). Pigeons have been positively identified as the cause of 3 out of the 80 bird strikes that have occurred at Birmingham during the last 4 years (see Appendix 1), thus they are not a major risk at present. However, the Woodland Initiative could prove attractive to Woodpigeons as a nesting site, particularly since they prefer Oak. Woodpigeons are however already abundant in the vicinity of the airport (a large flock was observed feeding on arable land during a field visit on 9 December 1993) and it is very likely that they will nest in the proposed woodland once it is mature. This could lead to an increased use of the airfield as a feeding site by Woodpigeons and a greater risk of them becoming involved in bird strikes. There is, however, much arable and mixed farmland to the south-east which would probably be preferred.

4.2.2 Stock Dove

The Woodland Initiative is unlikely to attract Stock Doves, especially initially, since they prefer to nest in holes found in old deciduous trees and farm buildings and they rarely feed in woodland, preferring farmland. They can be a problem on airfields in the summer when they feed on weed seeds (CAA 1990) but it is questionable whether planting the proposed woodland would increase the risk they currently present to aircraft at Birmingham.

4.2.3 Collared Dove

Collared Doves form flocks in the winter that choose dense vegetation in which to roost. The broadleaved woodland proposed for the Woodland Initiative will not provide an attractive roost site for Collared Doves and neither will they feed in it, preferring sources of grain around human habitation. The bird strike data from the CAA (Appendix 1) does not identify individual pigeon species thus it is impossible to know the extent to which Collared Doves have been involved in bird strikes. However, it does not seem likely that the Woodland Initiative will increase the risk they currently pose to aircraft.

4.2.4 Feral Pigeon

Feral pigeons do not frequent woodland habitat but remain on farmland to feed and roost. As with the other pigeon species it is impossible to identify from the bird strike data the number of incidents involving feral pigeons, but planting a woodland next to the airport is unlikely to increase this figure. The main hazard presented by pigeons to aircraft comes from the resident pigeon populations on airfields and the flights of racing pigeons during the summer (CAA 1990).

4.3 Starlings

As previously mentioned in Section 1, flocking species pose a threat to aircraft because they can be hit in large numbers and can cause serious damage to an engine. Starlings therefore are much more of a risk in the winter when they fly in large flocks between roosting sites and feeding grounds. At Manchester Airport, Thomas (1988) reported that during the winter months, tens or hundreds of thousands of Starlings flew across the runway at dawn and dusk to and from a nearby night roost. They were only in the path of approaching aircraft for a few seconds each day but if a strike had occurred, it would have been extremely serious. There have been only three bird strikes at Birmingham Airport between 1990 and 1993 in which Starlings were identified as the cause and in each case the aircraft encountered a small flock of birds (Appendix 1).

The preference of Starlings for dense coniferous woods as nocturnal roosting sites suggests that the proposed woodland will not attract this species because of the low percentage of pine planted. It is possible that it may serve temporarily as a night roost for Starlings while in the middle stages of growth before being thinned. At this stage the dense growth of Hawthorn and Hazel can provide ideal roosting habitat (Brough 1969). When the wood reaches maturity it could be used as a daytime roost by Starlings feeding on the airfield and in surrounding fields. The tops of the deciduous trees would provide a convenient resting place with a good all-round view. The presence of a suitable daytime roost might attract more Starlings to feed on the airfield, increasing the risk of a bird strike.

4.4 Others

There was only one case of a thrush striking an aircraft at Birmingham between 1990 and 1993: a Fieldfare was struck by a Cessna during take-off. The Woodland Initiative may provide cover for thrush flocks, and also Goldfinch flocks, when it is in the middle stages of growth and a thick scrubby ground cover has formed. Finch flocks are unlikely to use the open grass of the airfield but thrushes such as Fieldfares and Redwings feed on grass and could fly in flocks between the woodland and the airport presenting a risk to aircraft. The woodland will be much less attractive to thrushes and finches as a roosting site once it is mature.

4.5 Summary

This section has highlighted those woodland species that would be attracted to the Woodland Initiative and that are most likely to present a risk to aircraft using Birmingham International Airport . From the background knowledge of bird behaviour available in the literature and the information on the composition of the Woodland Initiative those species presenting the greatest risk to aviation safety would be Rooks, Starlings and Woodpigeons. For Rooks and Woodpigeons the risk would not be serious until the woodland has matured and presents an attractive nesting habitat for these species. The greatest potential risk posed by Starlings

would be during the middle stages of growth of the woodland if there was sufficient dense cover to create a suitable roosting habitat.

5. MITIGATION MEASURES

5.1 Habitat Management

5.1.1 Woodland

The proposal for the Woodland Initiative states that the CAA recommendation of thinning the trees to a twelve foot spacing will be adopted. This will help to reduce the density of the canopy when the trees are fully grown. When the woodland is in the middle stages of growth the canopy may close over at a fairly low level and this, together with thick shrubby undergrowth, would create an ideal roosting site for Starlings, thrushes and finches. It is essential that thinning of the trees takes place before the canopy closes over.

Thinning the canopy has been found to be successful in preventing Starlings from roosting (Feare 1984). At the Lahr Airbase in Germany, Starlings roosted by the thousand in a stand of dense, tall shrubbery next to the runway, creating a very serious hazard to aircraft (Blokpoel 1976). This problem was solved by clearing the shrubbery.

Clearing of thick scrub during the middle stages of growth of the woodland will also be beneficial, in terms of reducing bird strike risk, by removing roosting sites for finch and thrush flocks.

5.1.2 Airport

The risk to aircraft from birds using the proposed woodland can be reduced by making the airfield as unattractive to them as possible, thereby minimising the number of flights made by birds between the wood and the airfield. The technique behind this is habitat management which is explained by the CAA in its handbook 'Bird Control on Aerodromes' (CAA 1990) thus: "the principle underlying habitat management as a bird control technique is the removal wherever possible of all those features of the aerodrome and its surroundings which are attractive to birds, and to avoid the creation of new attractants". This involves reducing the food resources available to birds as much as possible and modifying the nature of the airfield to remove areas that are attractive to birds as feeding, roosting or 'loafing' sites. Habitat manipulation at JFK Airport, New York included removing trees used as roosts by Starlings, removing ponds and wet areas and eliminating food sources such as berry bushes and rubbish dumps (Burger 1985).

An important method of deterring birds from using airports is long grass policy. Studies have found that many species of bird prefer feeding on short grass to long grass because insect prey are easier to locate, all-round visibility is much better and movement through the grass is not impeded. Starlings and Rooks in particular, as mentioned in Section 3, prefer short grass. Experimental work at 10 RAF fields from 1967 to 1969 showed that gulls, Lapwings, pigeons, corvids and Starlings were at least twice as numerous on short (2 inches) as on long (6 to 10 inches) grass (Blokpoel 1976).

The CAA (1990) states that the maintenance of long grass is the single most effective method of habitat management designed to reduce the number of birds found on an airfield. At Manchester Airport the grass-cutting regime is timed so that a 6-8" stand is achieved by July and is maintained through to February (Campion, pers. comm.). This regime is aimed at reducing the number of gulls and Lapwings using the airfield; those being the main problem species there. In order to deter species such as Rooks and pigeons, which could be nesting in the proposed woodland, it is important that a grass height of 6" is achieved by early May when young birds will be leaving the nest and feeding independently (CAA 1990). It is also important to allow grasses to flower before being cut so that the woody flower stems provide support for the grass leaves throughout the winter and prevent them from becoming flattened (Campion, pers. comm.).

Maintaining long grass over as much of the airfield as possible not only reduces the number of birds on the airfield by minimising resting and feeding areas, but also assists in the control of birds through scaring techniques (CAA 1990). The reduced number of birds means that scaring measures will have to be used less often and as a result will be more effective because the birds have less chance to become habituated to them.

In view of the amenity value of the Woodland Initiative, it would be preferable to concentrate habitat management techniques, designed to discourage birds, on the airfield rather than the woodland. Scrub and canopy thinning should still remain a priority in the woodland, however.

5.2 Bird Control

5.2.1 Woodland

Roosts of Starlings have been destroyed using dynamite or spraying with poison (Feare 1984). It is unlikely that these measures will result in the long-term reduction of a Starling population. To achieve this the average annual mortality, which would include the control measures, would have to exceed 50% which is the natural level of annual mortality. In addition such bird control techniques would detract from public enjoyment of the wood. More effective in dispersing a roost is the use of tape-recorded distress calls, to which birds do not become accustomed, unlike artificial scarers such as shellcrackers and sirens. A distress call is a characteristic species-specific call made by a bird which has been caught by a predator. Brough (1969) reported that when Starling distress calls were broadcast at a roost on successive evenings they were successful in causing Starlings to abandon the roost. In all, 31 out of 33 roosts were cleared using this method. Once emptied the roosts often remain unoccupied for the rest of the season but may become occupied in the following year.

If the proposed woodland becomes the site of a Starling roost it can be effectively dispersed by playing tape-recorded Starling distress calls over several nights. The birds may return in the following autumn, in which case the procedure would have to be repeated. Similarly, distress-calls could be employed to discourage Rooks from breeding in the woodland once it is mature. This type of dispersal method cannot be used with pigeons because they have

no distress calls in their 'vocabulary' (CAA 1990). They may however be induced to fly away by the sight of other species taking flight in response to distress calls, but they may return later.

Under the Wildlife and Countryside Act 1981, it is permissible to kill or destroy the nests of certain species for the purpose of preserving air safety (RSPB 1993). These species include Carrion Crow, Jackdaw, Rook, Starling, Feral Pigeon, Woodpigeon and Collared Dove. Thomas (1990) reported that a culling operation was introduced to reduce the size of a rookery on the southern boundary of Manchester Airport. In general though, shooting birds to remove them as a risk to aircraft has its limitations because as long as the environment remains attractive other birds will replace them. The main value of shooting is as a reinforcement of other scaring techniques such as shellcrackers (CAA 1990).

5.2.2 Airport

Thomas (1990) reported that the most effective method of scaring birds on an airport is to use distress calls reinforced with explosive flares. Distress calls provide long-term dispersal whereas flares and shellcrackers provide immediate but short-term dispersal (CAA 1990). Automatic bird-scaring equipment such as gas cannons and model predators have limitations because of the ease with which birds become habituated to them and it is essential that the use of such methods is combined with human intervention in the form of bird patrol units and the use of shotguns. Brough (1969) also noted that the use of rockets, shellcrackers etc. is inadequate if used alone.

Manchester Airport has employed full-time bird control staff since 1985 to implement a bird hazard management programme. The modification of habitat, plus the effective application of bird-scaring techniques in conjunction with trained bird-control staff has led to a decline in the bird strike rate and a decline in the number of birds using the airport. In 1983, the bird strike rate for Manchester was 4.4 per 10,000 aircraft movements (take-offs and landings), whereas in 1988 the rate was down to 1.8 (Thomas 1990).

5.3 Summary

General mitigation measures can be adopted to minimise the risk of birds using the proposed woodland causing strikes to aircraft taking-off or landing at Birmingham International Airport. These measures should be concentrated on the airfield, to preserve the amenity value of the woodland, and include management of the airfield environment to minimise its attractiveness to birds as a feeding, resting and loafing area, and direct control of bird numbers at the airport through the use of distress calls and shellcrackers. Mitigation measures can be incorporated into the management plan for the Woodland Initiative to reduce the attractiveness of the habitat to risk species, without compromising the amenity value to the public. Thinning trees to a standard spacing and cutting back thick scrub are a priority. Other measures, such as dispersing Starling roosts with broadcast distress calls or the culling of Rooks and Woodpigeons, can be carried out as necessary if either of those species becomes a problem.

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APPENDIX 1

Birmingham International Airport Bird Strike Data, 1990-1993

Species	Year			
	1990	1991	1992	1993 (to August)
Lapwing	5	5	5	1
Starling	2	0	1	(1)
Swift	3	5 + (1)*	2 + (1)	0
Kestrel	4	0	0	0
Gull	1	1 + (1)	1 + (1)	1
Pigeon	1	1	1 + (1)	0
Skylark	1	0	0	0
Swallow	0	1 + (1)	3	1
Martin spp.	0	1	0	0
Crow spp.	0	(1)	1	0
Fieldfare	0	0	1	0
Hawk	(1)	0	(1)	0
Snipe	0	0	2	0
Unknown	4	2	8	5

* either Swift or Swallow

() indicate possible identification