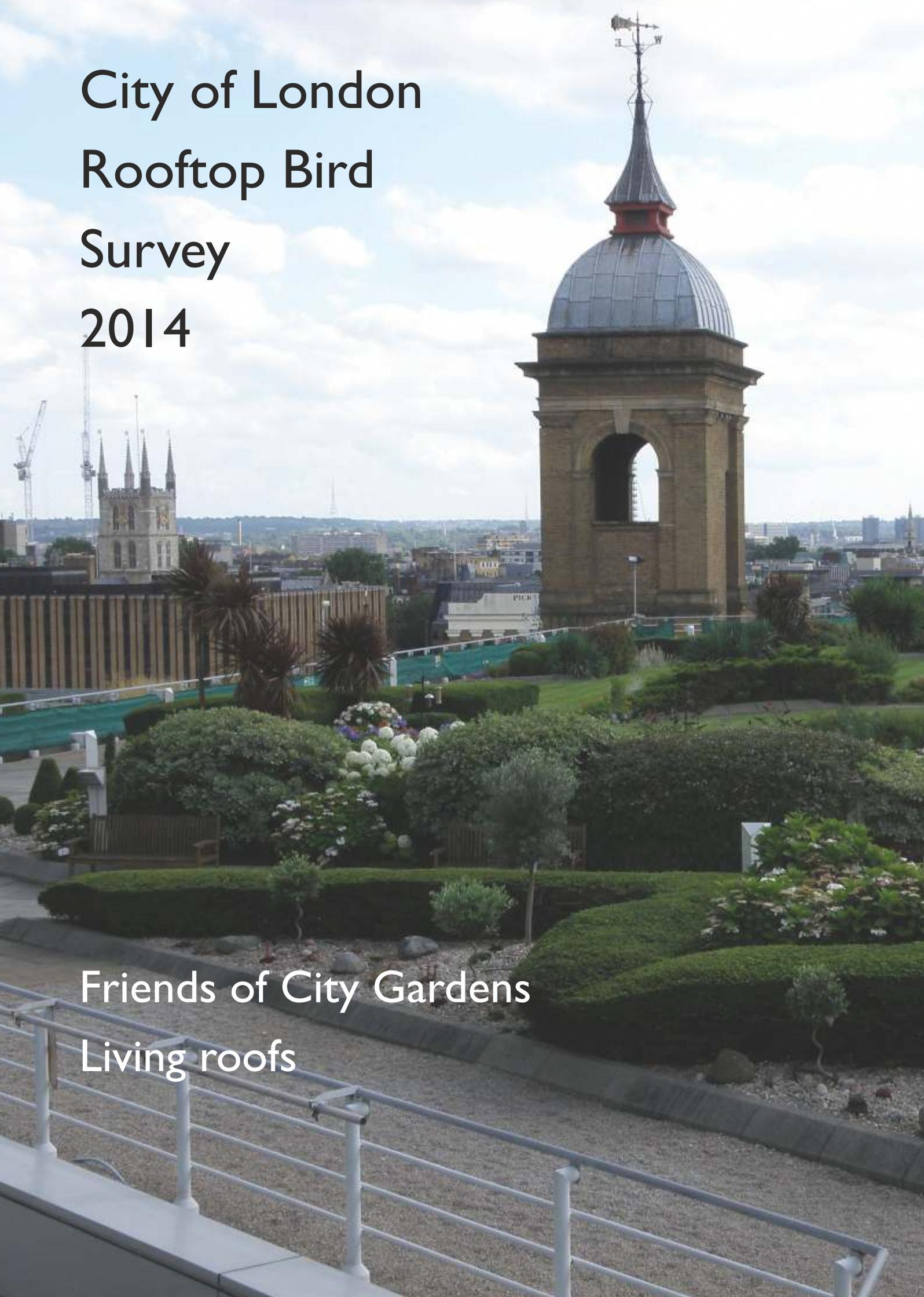


City of London Rooftop Bird Survey 2014



Friends of City Gardens
Living roofs

1. Executive Summary	1
2. Aims and scope of survey	1
2.1 Introduction	2
2.2 Types of green roof	2
2.3 Site Selection	3
3. Methodology	6
3.1 Survey timing	6
3.2 Volunteers	6
3.3 Observation recording	6
3.4 Weather	6
4. Survey results	6
4.1 Target species	7
4.1.1 Black redstart (<i>Phoenicurus ochruros</i>)	7
4.1.2 Peregrine Falcon (<i>Falco peregrinus</i>)	8
4.1.3 House Sparrow (<i>Passer domesticus</i>)	8
4.2 Other breeding territorial birds	9
4.2.1 Blackbird (<i>Turdus merula</i>)	9
4.2.2 Blue Tit (<i>Cyanistes caeruleus</i>)	9
4.2.3 Dunnock (<i>Prunella modularis</i>)	10
4.2.4 Goldfinch (<i>Carduelis carduelis</i>)	10
4.2.5 Great Tit (<i>Parus major</i>)	10
4.2.6 Pied Wagtail (<i>Motacilla alba</i>)	10
4.2.7 Starling (<i>Sturnus vulgaris</i>)	10
4.2.8 Woodpigeon (<i>Columba palumbus</i>)	11
4.3 Other bird sightings	11
4.3.1 Red Kite (<i>Milvus milvus</i>)	11
4.3.2 Swift (<i>Apus apus</i>)	11
5. Green roofs as a habitat for birds	11
6. Conclusions and recommendations	11
Acknowledgements	13



"Surveys like this are really useful for our occupiers; the results improve their environmental ratings and can justify spending on biodiversity enhancements"

Serena Sukkar
Broadgate Estates



"The survey results are confirmation that our biodiversity strategy is working and that is important for our business"

Dave Crowley
Nomura International plc



" Survey results show the biodiversity impact of both intensive and extensive green roofs on the breeding bird populations in the City"

Dusty Gedge
livingroofs.org

1. Executive Summary

Today the City of London has about seventy thousand square metres of green roofs. These vary from intensively planted roof terraces to extensive green roofs that may be sedum mats or wild flower meadows with areas of bare pebbles. These rooftop areas are important new habitats for wildlife in the City. The main purpose of the 2014 Rooftop Bird Survey was to assess the impact of these new habitats on the City's bird population. The objectives of the study were to:

- provide a snapshot of which birds were using the roofs in the early summer and for what purposes - for example nesting or foraging
- examine the differences in bird behaviour and numbers between those using extensive and intensive green roofs
- determine whether the three target species of the City of London's biodiversity strategy were present and to give an indication of whether their numbers had increased since the last Rooftop Bird Survey in 2004.

The Survey took place on two dates in April and May 2014 over a total of eight hours on seven sites across the City. These sites were chosen as vantage points from which to maximise the coverage of the surrounding areas. Sightings of all birds, whether perched or in flight were noted. In total over 300 observations were recorded of twenty-three different species. In addition to the Survey results, this report has drawn on the on-going recording of bird species on two additional green roofs and on data from ground level surveys of typical garden birds recorded as part of the annual RSPB Big Garden Birdwatch.

The Survey confirmed that the new habitats on green roofs have enhanced the biodiversity of the City's bird life and that there were distinct differences between how birds used extensive and intensive green roofs. This was evidenced by sightings that suggest that the increase in extensive green roofs has had a positive impact on the numbers of birds whose preferred habitat is relatively bare and exposed - namely Black Redstarts and Peregrine Falcons. The Survey identified at least four Black Redstart territories in the City; two or possibly three in the central Cheapside area and a further two in the North and North East of the City (see map on pages 4 and 5). Peregrine Falcons were also observed during the Survey and it is known that there is a nesting pair in the North of the City.

The Survey findings suggest that intensive green roofs appear to be the preferred habitat of birds such as tits, blackbirds, finches, wagtails, starlings and wrens that require shrub cover in which to roost and nest. These typical garden birds are known to feed and nest at ground level in the City and appear to be adopting roof terraces and intensive green roofs as additional habitat.

Both the Black Redstart and the Peregrine Falcon are target species for the City's Biodiversity Action Plan (BAP). The 2014 Survey confirmed that both species are present and flourishing. The third target species is the House Sparrow and here the picture is not so encouraging. No individuals were observed on either of the 2014 survey dates. Evidence from other surveys suggests that the City has not escaped the marked decline in House Sparrow populations that have been particularly marked in urban areas.

The City will be refreshing its BAP in 2015 and clearly needs to address the decline in House Sparrow numbers.

The Survey has also demonstrated the importance of green roofs to the biodiversity of the City and the BAP will seek to encourage best practice amongst building managers and owners through facilitating the exchange of information. The importance of surveys both at ground level and roof top level to evaluate the success of biodiversity enhancements will be a key part of the BAP and the City will seek the support of building managers and owners to achieve this.

2. Aims and scope of survey

2.1 Introduction

The purpose of the survey was to establish how birds were using the roofscape of the City of London and in what numbers. All bird activity observed in the City at roof level from seven different locations was recorded over two four-hour sessions on 27th April and 11th May 2014. The sites selected enabled observations of a substantial area of the central and southern part of the Square Mile. There was a specific focus on target bird species that are identified in the City of London's Biodiversity Action Plan, namely the Black Redstart (*Phoenicurus ochruros*), House Sparrow (*Passer domesticus*) and Peregrine Falcon (*Falco peregrinus*). However, all birds, with the exception of the feral pigeon, that were observed during both sessions were recorded and the results are discussed in this report.

An earlier rooftop bird survey was undertaken in the City in May 2004. In the intervening years there has been a substantial increase in the area of green roofs in the Square Mile - from approximately 10,000m² in 2004 to just under 70,000m² in 2014. The 2014 survey sought to establish the impact this increase in

green roofs has had on bird populations in general and the target species in particular.

The Survey was organised by the Friends of City Gardens, a volunteer-led community group based in the City of London and Livingroofs.org, the green roof consultancy founded by Dusty Gedge that provided the green roof and ornithological expertise.

2.2 Types of green roof

Green roofs can be classified as :

Intensive:

These green roofs consist of a deep growing medium that is necessary to support a full range of vegetation, from ground cover to large trees. These green roofs are generally better described as roof terraces. They are usually accessible to the occupiers of the building - so they may be subject to disturbance and are generally managed to provide amenity rather than for biodiversity, although some are managed for both purposes.

Extensive:

These are green roofs constructed with shallow growing mediums and are generally intended to be self-sustaining in that they require little to no maintenance. Some may be initially sown with wildflowers or sedum mats, others are allowed to colonise naturally. They may be relatively bare with exposed stones or log piles. These roofs are generally not accessible except for maintenance and are left undisturbed.



1 Wood Street; an extensive green roof

2.3 Site Selection

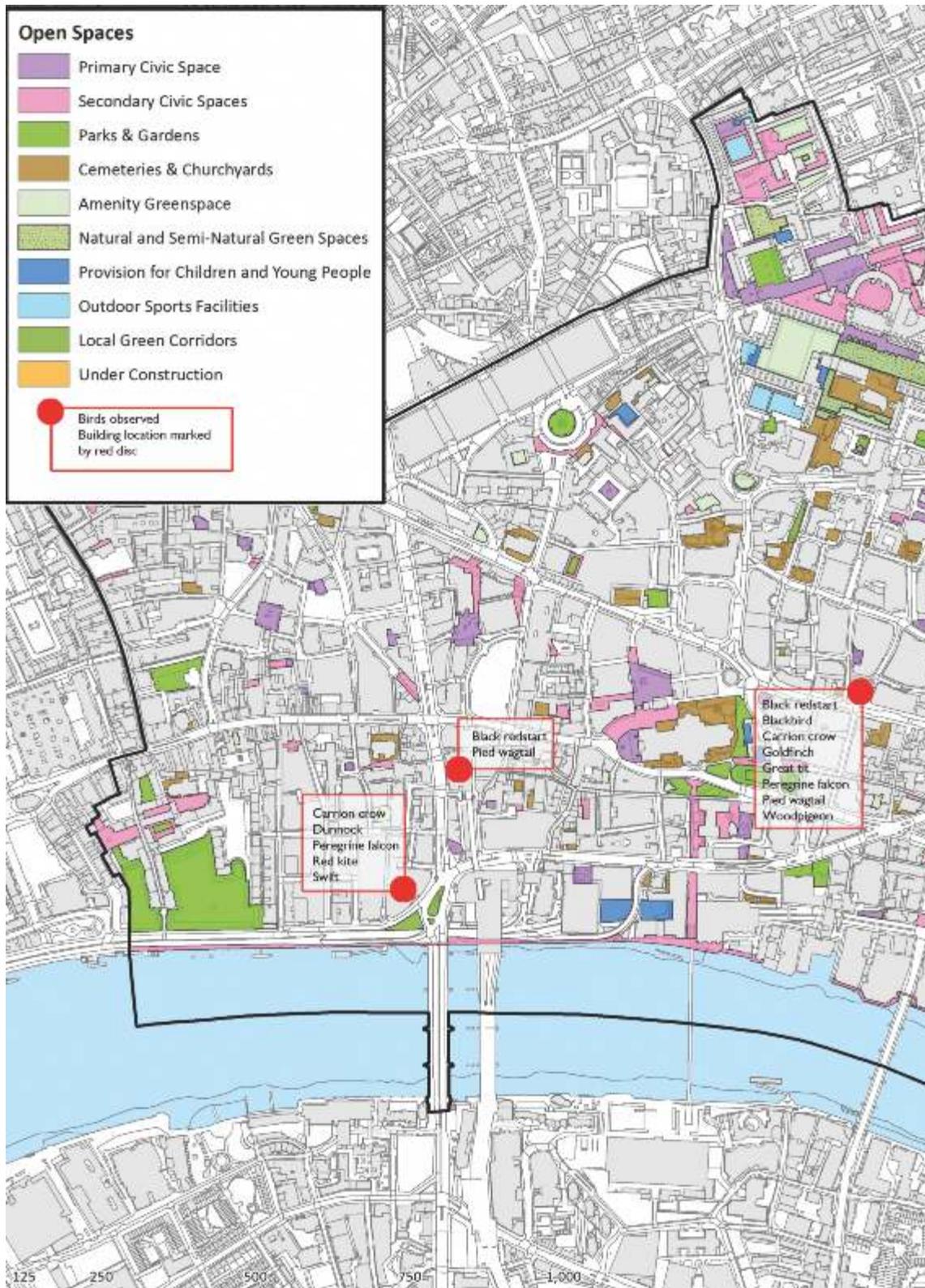
The following green roofs or roof terraces were selected to give as wide a coverage as possible across the Square Mile, all were included in both 2014 survey dates. The location of these roofs and the species observed from each are shown on the map on the following pages.

Location	Type of green roof	Coverage
Unilever House 100, Victoria Embankment, EC4Y 0DY 8th floor	Intensive green roof with shrubs and grasses and paved areas.	360°, with good views South over the Thames and East/West along the Thames corridor.
1, Wood Street EC2V 7WS 8th floor	Extensive green roof - sedum blanket with features added to increase biodiversity (mounds, wildflowers, logs), swift and tit boxes, bird bath and feeders and a small area of food growing.	360°
1, Basinghall Avenue, EC2V 5DD 11th floor	Extensive green roof, sedum and gravel.	360°
25 Ropemaker Place, EC2Y 9AR 16th floor	Intensive green roof with nectar rich planting, birch trees, bird boxes, feeders and insect hotels.	270° N/S/W
201 Bishopsgate, EC2M 3AB 12th floor	Extensive green roof designed for biodiversity with log piles and wildflower meadow, and exposed pebbles.	360°
1, Bishop's Square, E1 6AD 10th floor	Intensive green roof with nectar rich planting and paved areas.	270° E/S/W
1, Angel Lane, EC4R 3AB 11th floor	Extensive green roof, sedums with additional nectar rich planting. Bee hive. Lower level intensive green roof with nectar rich planting and food growing area.	360° with good views over adjacent buildings along the Thames corridor.

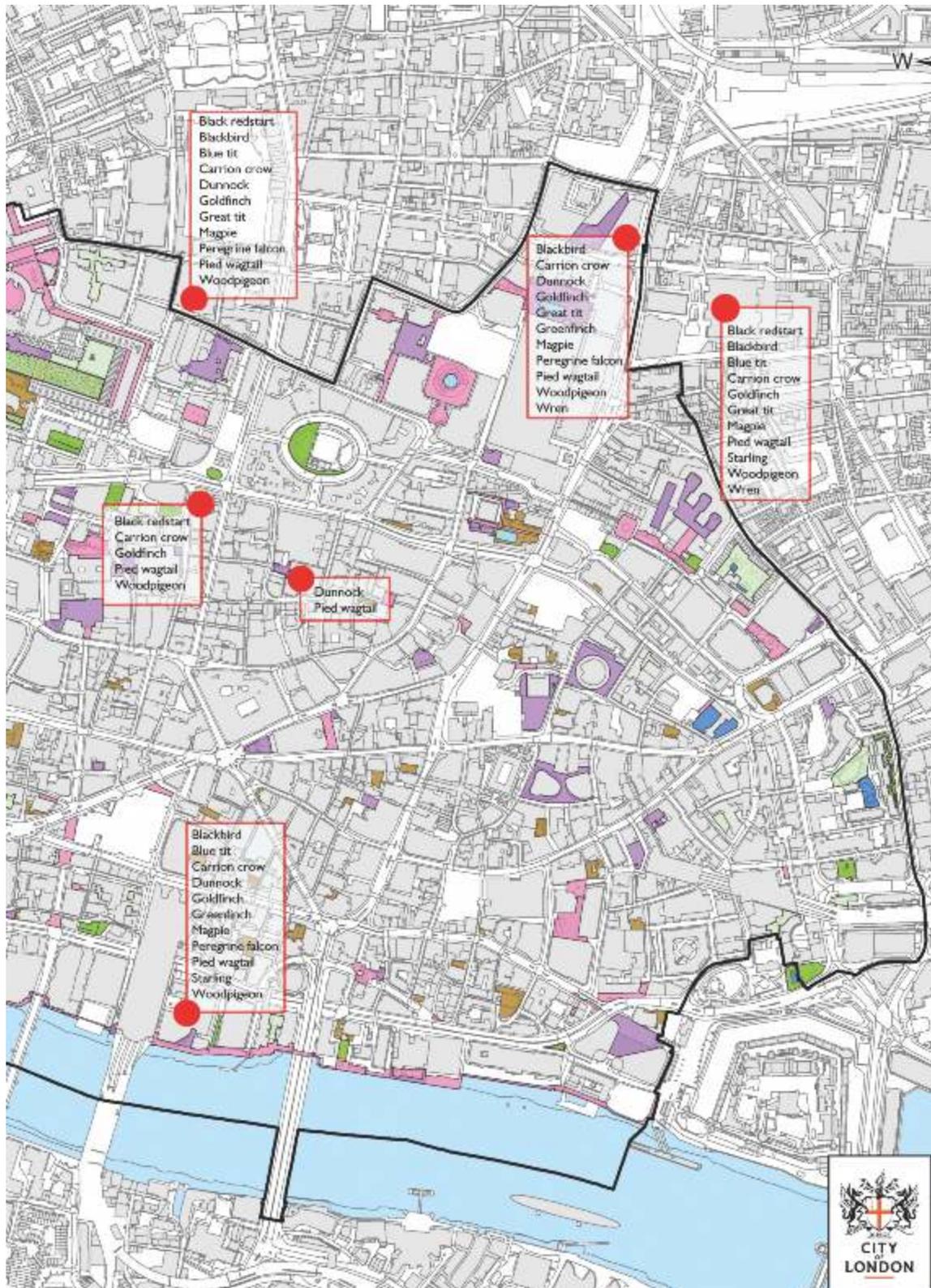
Observations from two further roofs have been used in this report although the roofs were not included in the survey.

Location	Type of green roof	Coverage
100, New Bridge Street EC4V 6JA 6th floor	Extensive green roof, wild flower meadow	270° E/S/N
12 Throgmorton Avenue EC2N 2DL 14th floor	Extensive green roof overlooking lower intensive roof terrace	270° E/S/N

**Map 1 Observation locations and birds observed
Western sector**



**Map 2 Observation locations and birds observed
Eastern sector**



3. Methodology

3.1 Survey timing

The Survey took place over two four-hour sessions on the mornings of Sunday 27th April and 11th May between 04.30 and 08.30. It was considered that this would give volunteer observers some space between surveys and increase the chance of clement weather conditions. Furthermore some species, such as Black Redstarts can start territorial activity in late March and early April. If successfully paired, they can be relatively quiet in May - so an additional survey date in April was selected. The 2004 Survey was held over a single weekend of 15th May between 17.30 and 20.30 and on the morning of 16th May between 05.30 and 08.30.

3.2 Volunteers

The Survey would not have been possible without experienced ornithologist volunteers. These were recruited through the London Biodiversity Partnership network, City Parks and Gardens Trust and the London Natural History Society. The volunteers were from a variety of backgrounds including local government ecology officers, birdwatchers and professionals working for a number of wildlife organisations. Volunteers from Friends of City Gardens were paired with these experienced ornithologists for both sessions.

3.3 Observation recording

Rooftops surrounding each survey location were identified and numbered. Where possible, the location of observed target species (Peregrine Falcon, Black Redstart and House Sparrow) was mapped. Other species that surveyors deemed important were also added to the map.

Observations of all birds were recorded with the time, location and activity using the British Trust for Ornithology Common Bird Census abbreviations and behaviour symbols.

3.4 Weather

The weather on both Sundays was cold and on 11th May it was also very windy and wet.

4. Survey results

The Survey is only a snapshot of bird activity across the City's rooftops. Furthermore there were some areas of the City that it was not possible to survey - in particular the far west, north west and south east. The following results are only for those areas of the City surveyed during the two recording sessions.

The observations include records of birds singing but not necessarily seen. Where the presence of singing males was recorded it is likely that these individuals were holding territories and in some cases it was possible to deduce they were part of a breeding pair. Where this was not possible they were recorded as individuals. This means that the Survey results probably underestimate the number of pairs.

The number of other individuals of each species is also an estimate based on the observations made at each location during the four-hour sessions. Clearly over four hours some individuals were recorded more than once. To give an estimate of the number of individuals the maximum number of birds of



each species that was sighted at any one time during the four hour observation period on each roof was noted and added to similar data for each of the other roofs. This gives an estimated number of individual birds for the areas of the City included in the Survey. This is a conservative method of estimating numbers and it is likely that the number of individual birds is understated.

It is difficult to draw meaningful comparisons between the 2014 results and those of the 2004 Survey. Only one of the buildings used in 2004 was included in 2014. This was because a number of sites have been redeveloped in the intervening ten years. In 2014 the number of green roofs had increased substantially. In 2004 observations were generally made from rooftops rather than green roofs.

4.1 Target species

In the City there are three target species; Black Redstart, Peregrine Falcon and House Sparrow. Observations of these species are shown in Table 2 below. No House Sparrows were observed.

Table 2: Sightings of target species 2014

	27-April			11-May		
	Observations	Potential pairs	Potential other individuals	Observations	Potential pairs	Potential other individuals
Black Redstart	6	4	2	8	1	2
Peregrine Falcon	3	1	1	2		1

4.1.1 Black redstart (*Phoenicurus ochruros*)

The Black Redstart is a small robin-sized bird named for the distinctive red tail. The RSPB estimates that there are fewer than 100 breeding pairs in the UK, and for that reason it is on the amber list of Birds of Conservation Concern on the UK Biodiversity Action Plan (1995). The Black Redstart is protected under the Wildlife and Countryside Act 1981 and is a Red Data Book species. It is a priority species for both the London and the City's Biodiversity Action Plans.

The Black Redstart's natural habitat is cliffs and bare, stony areas. It has adapted to live in industrial and urban areas and in the City the bomb sites left after WW2 became an ideal habitat. The rooftops and green roofs of the City of London continue to be a very important habitat for these birds. The Black Redstart feeds on insects, spiders, worms, berries and seeds, often taking insects from the air.

Breeding birds occur mainly in urban areas of Greater London, Birmingham and the Black Country with a few pairs in Nottingham, Liverpool, Manchester and Ipswich, and the odd pair at cliff sites and power stations along the south coast. In addition to the small resident breeding population there are approximately 400 over-wintering birds and some summer migrants.



The 2014 Survey identified four or possibly five Black Redstart territories within the City. These were:

- Three singing males in the Guildhall/Cheapside area on both dates, two heard singing from One Wood Street and occupying territories to the west and south, and possibly an additional male singing from east of Guildhall.
- Male holding territory to the south of Bishop's Square on the north east of the City on both survey days.
- Male seen feeding on Ropemaker Place, also to the north of the City.

In addition, Black Redstarts have recently been observed in the New Bridge Street area holding territory close to Ludgate Circus.

The 2004 Survey did not report any Black Redstart territories, although other observations have provided evidence of Black Redstarts in the City over a number of years:

- Around Guildhall singing males have been observed annually since at least 1998 suggesting there are established territories in this area.
- Bishop's Square - over the last seven years, males have been observed singing from buildings in this area.
- The roof of the Bishopsgate Goods yard and surrounding area was monitored by two of the 2014 observers in the mid-2000s. This area has held up to four singing males in some years.
- The Shoreditch area between Curtain Road and City Road has also held several singing males throughout the 2000s.

The presence of singing males is not conclusive evidence of breeding as this is often difficult to establish. However it strongly suggests that there are established breeding pairs in the City. The number of simultaneous

sightings in 2014 suggests that the breeding population has increased in the last ten years and this will be investigated further in future surveys.

4.1.2 Peregrine Falcon (*Falco peregrinus*)

The Peregrine Falcon is afforded the highest degree of legal protection under Schedule 1 of the Wildlife and Countryside Act 1981. In the



1960s the population was devastated by the effects of persecution together with organochlorine pesticides, which thinned the walls of their eggs.

N u m b e r s

dropped to about 360 pairs. Since the banning of these pesticides and the protection against persecution the population has grown to over 1,500 pairs and the RSPB estimates there are at least 20 pairs of Peregrines in Central London. One pair regularly nests in the City and has successfully raised young since 2000. Like the Black Redstart, the Peregrine's natural habitat is cliffs and rocky places. In the City Peregrines are attracted to tall buildings that mimic their wild habitat. They construct nests on ledges in scrapes of stones and feed on the abundant food source of feral pigeons.

There was a London Species Action Plan for the Peregrine until 2008, and it is still a London priority species and a target species under the City's BAP.

The 2014 Survey recorded three sightings over the two survey sessions. On 27th April two female adult peregrines were observed flying in the north of the City and an adult male was also noted flying over the east of the City. On 11th May observers on the Unilever building in the south of the City noted an adult male flying north across the City, possibly from the Tate Modern tower where peregrines are known to perch. The presence of two adult females is consistent with known competition between adult pairs for an established nest site in the City. Other observations in 2014 have confirmed the continuing existence of a breeding pair in the City and a male and a

female chick were successfully raised and fledged.

In 2004 there was a sighting of a single immature individual in the north of the City.

4.1.3 House Sparrow (*Passer domesticus*)

The RSPB has reported the severe decline in the UK House Sparrow population, estimated as dropping by 71 per cent between 1977 and 2008 with substantial declines in both rural and urban populations. It is estimated that Greater London lost 70% of its sparrows between 1994 and 2001. Because of these large population declines, the House Sparrow is now red-listed as a species of high conservation concern. In urban areas the decline is thought to be the result of a loss of nesting sites and food sources, particularly a lack of insects to feed



their young. The House Sparrow is a priority species of both the London BAP and the City of London BAP.

There were no sightings of House Sparrows in the 2014 Survey. In 2004 three to four males were reported in the Middlesex Street area. Unfortunately this location was not included in the 2014 Survey. However, other observations confirm the decline of House Sparrow populations in the City. In 2010 nearly 30 individuals were recorded in the Barbican but by 2014 this colony had declined to one or two individuals.

4.2 Other breeding territorial birds

The increase in area of both intensive and extensive green roofs has created opportunities for common breeding birds to take up residence at roof level. The City's parks and gardens at ground level are all relatively small in area. The density and height of buildings, some observers have noted, might mean that birds find it difficult to move between these green spaces. Whether or not this is the case, there is evidence that common bird species have successfully colonised these new green spaces at rooftop level.

Table 3: Other breeding territorial birds

	27-Apr			11-May		
	Observations	Potential pairs	Potential other individuals	Observations	Potential pairs	Potential other individuals
Blackbird	24	3	1	23	1	4
Blue tit	3	1	1	2		2
Carrion crow	21	3	4	24		13
Cormorant	5		3	17		11
Dunnock	5	1	2	4	2	
Egyptian goose	1		4			
Greylag goose				5		3
Goldfinch	8	2	2	11	3	3
Greenfinch	1		1	2		3
Great tit	4	1	1	6	1	3
Herring gull	7	1	12	14	1	14
Red kite				1		1
Lesser black backed gull	14		32	31	1	23
Mallard	5		9	11		17
Magpie	6		6	1		1
Pied wagtail	8	1	9	4		5
Starling	7		13	5		4
Swift				1		1
Wood pigeon	14	1	10	11	2	8
Wren	2		3			
Total	135	14	113	173	11	116

4.2.1 Blackbird (*Turdus merula*)

In 2014 four pairs of Blackbirds were observed: at least three roofs were part of territories for this species and one roof, Cannon Street, had a nest in a low shrub. This seems to be a favoured location and a breeding pair was also recorded here in the 2004 survey.

In 2014 one pair was seen feeding in a small area of food growing and shrubs at 1 Wood Street, although no nest was observed on the roof. This suggests that the nest was probably lower down in a tree or a shrub at ground level

and the roof was a suitable feeding area. The male bird was also successfully foraging for worms on the extensive portion of the green roof.

4.2.2 Blue Tit (*Cyanistes caeruleus*)

In 2014 one pair was observed nesting on a green roof on Cannon Street, using an artificial nest box. It is also likely that a Blue Tit observed on Ropemaker Place was using the nest box on the 16th floor intensive green roof. In both locations there were well-stocked bird

feeders. This species was also observed on One Angel Lane.

4.2.3 Dunnock (*Prunella modularis*)

The Dunnock appears to have been particularly successful in establishing nesting sites on green roofs. The 2014 Survey recorded at least three pairs using the roofs. There was a distinct preference for intensive green roofs that can provide a reasonable level of ground and shrub cover for this species.

- A nest was observed at One Angel Lane
- A possible nest was identified on a green roof above Cannon Street station
- A possible further nesting site was noted on a green roof to the east of Angel Lane
- On the twelfth floor intensive roof terrace on Throgmorton Avenue, which was not included in the full survey, a nest and pair were observed in late March 2014.
- An individual was noted flying from Angel Lane north towards One Poultry, suggesting that these birds are using green roofs as high level corridors to navigate round the City.

Therefore it is safe to say that at least four pairs of Dunnocks were using intensive green roofs in the City of London in 2014. In comparison, in 2004 one territory was recorded in the St. Paul's area and a pair was breeding on an intensive green roof at Cannon Street.

4.2.4 Goldfinch (*Carduelis carduelis*)

Goldfinches were observed on six of the seven sites in 2014 over both recording sessions and it is likely that there were at least three pairs. In comparison Goldfinches were recorded at only three locations in 2004. The increase in Goldfinch numbers has been observed in the

RSPB Big Garden Birdwatch which up to 2012 recorded only the odd individual but in recent years has noted substantially increased numbers. Wildflower plants that have been allowed to go to seed on extensive green roofs are likely to be an attractive food source for this bird.

4.2.5 Great Tit (*Parus major*)

An adult was recorded feeding in a small area of intensive green roof at 1 Wood Street in the 2014 Survey. It is assumed that this adult was paired and was foraging for food to feed its young somewhere in the vicinity.

In 2004 one territory was observed in the St. Paul's area.

4.2.6 Pied Wagtail (*Motacilla alba*)

This species was observed on several roofs in 2014. However the most interesting observation was that seven were recorded at dawn on one roof to the east of One Angel Lane. It is likely that these birds were using the roof to roost. At least one other roof - Basinghall Street - had two feeding together suggesting that they were paired and that the roof was part of a territory.

4.2.7 Starling (*Sturnus vulgaris*)

In 2014 one nest was noted on Cannon Street and a flock of up to thirteen individuals was seen feeding on the 27th April on the intensive green roof above the station. The presence of these birds foraging for brief periods on both Survey dates suggests that there were possibly other nests within the general vicinity.

Cannon Street was also identified as an area with nesting Starlings in 2004.



Angel Lane, an intensive green roof

4.2.8 Woodpigeon (*Columba palumbus*)

Wood pigeons were also observed on a number of extensive green roofs. This is a relatively common breeding bird in the City. Both intensive and extensive green roofs offer additional feeding habitat for this species.

4.3 Other bird sightings

4.3.1 Red Kite (*Milvus milvus*)

Observers on Unilever House on 11th May noted a Red Kite carrying food along the Thames and being mobbed by gulls. This bird is still a relatively rare visitor to inner London although it is now seen occasionally and numbers are growing. The RSPB estimates there are now about 1,600 breeding pairs in the UK although it is on the Amber list for conservation. Its population at the beginning of the 20th century was restricted to a few pairs

in Wales following persecution and predation by egg collectors. A reintroduction programme using Welsh and Swedish birds in the 1980s and 1990s has been very successful. From the release of 93 birds in the Chilterns, Red Kites have spread east and are now seen close to the centre of London.

4.3.2 Swift (*Apus apus*)

One Swift was observed from Unilever House on 11th May flying along the river. Swifts are summer visitors that journey from Africa to breed in the north of Europe. They can be seen in the UK from April to August. One of the survey sites had nesting boxes for Swifts but none of them appeared to be occupied. Rooftop sites are the preferred nesting place - often under the eaves of houses where there is protection from the rain and shade from the sun.

5. Green roofs as a habitat for birds

Most of the green roofs that have been installed since 2004 in the City have been extensive. Other surveys have established that the majority of bird species that nest in the City are typical garden birds, such as blackbirds, robins, finches, tits, starlings and wrens. Extensive green roofs are not really a suitable nesting habitat for these species. Ground nesting birds are known to use extensive green roofs, especially very large ones in cities such as Munich and Vienna. The location of these roofs tends to be on the periphery of these cities. There are also records of Meadow Pipits and Skylarks nesting on large green roofs in rural areas in the UK.

The extensive green roofs in the City do appear, however, to provide suitable forage areas for many species. In 2004 there were no extensive green roofs included as survey sites as the first ones were only just being installed. So there are no comparable data from the earlier survey. In 2014, however, a number of species were noted using the roofs as feeding areas. Woodpigeon, Pied Wagtail, Starling, Goldfinch and Blackbird were all observed feeding on extensive green roofs. No Black Redstarts were observed feeding, although there is substantial evidence that this species uses such roofs as important forage areas.

Whether the increase in foraging sites available for these species at roof level, through the increase in extensive green roofs, has led to an increase in populations in the City is an interesting question. However this was not the remit of the survey, being a snapshot of birdlife at roof level. It would require full breeding surveys at ground level and roof level over the coming years to answer that question.

6. Conclusions and recommendations

The purpose of the London Rooftop bird survey was to provide a snapshot of what was happening at roof level. Back in 2004 the idea of roofs being of value to birds had not been widely accepted. However, through the efforts of many biodiversity professionals green roofs have been installed at many locations across London in the last ten years. These roofs are intended to enhance biodiversity as well as mitigate the effects of climate change. It is still early days to understand fully what effect this provision of additional habitat has had on the City of London's bird populations. However this Survey does show that intensive green roofs, even as high as 16 floors above street level, do provide both nesting and foraging habitat for common breeding species.

The survey has the following recommendations.

Nesting boxes: Tit boxes had been installed on a number of roofs and some of these appear to have been used. Boxes for swifts were also installed on one roof although they did not appear to have been occupied. Location of these boxes needs to be carefully considered as the exposed roof may be too hot and sunny. It would be interesting to record how many of these boxes have been used when annual cleaning takes place in the autumn. This is something that Friends of City Gardens volunteers would be happy to undertake.

Target species: The Black Redstart and the Peregrine Falcon, both target species for The City of London BAP, have established breeding pairs on green roofs over the last ten years. It would be interesting to extend the survey to those areas of the City not covered in 2014 to get a more accurate picture of the numbers of Black Redstarts holding territories on green roofs.

Biodiversity Action Plan: The absence of sightings of the third target species - the House Sparrow - and the results of other surveys confirming the decline of sparrow populations in the City are disappointing. The City's BAP is due for renewal in 2015 and will cover the next five years. It is important that the BAP includes actions to conserve and hopefully increase existing populations. This may include a programme of habitat improvements to provide better forage and nesting sites for this bird.

Future surveys: Livingroofs.org and Friends of City Gardens would like to continue the London Green Roof Bird Survey in future years. It would be hoped that funding can be found to undertake the roof top survey at least every two years. In addition, alternating the roof top survey with a ground level survey of breeding birds undertaken at the same time of year would provide corroborating evidence of breeding patterns and habitat preferences.



201 Bishopsgate

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Image Credits

www.piqs.de Page 8 (Sparrow)

Derek Read Pages 2, 10, 12, front cover

Jon Fairey Page 1

Dusty Gedge Cover and page 7 (Black Redstart and Pied Wagtail)

Mathew Frith Page 6

Ted Reilly Cover and page 8 (Peregrine Falcon)

Serena Sukkar Page 1

City of London Rooftop Bird Survey 2014

August 2014

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