The Biodiversity Impact of Waterside Campus

An interim report on the bird surveys

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Executive summary

- Surveys of winter and spring bird diversity are being carried out to assess the effects of construction activities and habitat creation on local biodiversity at the University of Northampton's new Waterside Campus.

- These results are compared to pre-construction baseline surveys in winter 2012-13 and spring 2013, undertaken as part of the ecological impact assessment of the site.

- Results after two repeat sets of surveys (winter 2014-15 and 2015-16; spring 2015 and 2016) are presented, with birds grouped into RSPB Green, Amber and Red categories.

- Winter bird diversity has dropped from 41 species to 31 species; more Red and Amber listed birds have been lost than Green listed species.

- Spring bird diversity has dropped from 40 to 36 species; more Green and Amber listed birds were lost, but the number of Red listed species increased slightly.

- As well as losing species the site has gained birds that were not recorded in the baseline surveys, including Green-listed Coot and Treecreeper, the Amber-listed Stock dove, and the Red-listed House sparrow.

- In addition, most of the "missing" birds are known to occur at sites 500m to 1000m from Waterside and could return following the end of construction and appropriate habitat creation.

- Surveys will continue until after Waterside Campus opens in 2018, and analyses will be undertaken to tease out how these changes in bird numbers are related to changes to both the local and regional environments.

- Outputs from this project so far include two conference presentations and two final year dissertations (one completed and one planned). At least one peer-reviewed research paper is anticipated.

Introduction

All human activities can potentially have an impact on the biodiversity of the local environment in which they occur. That impact can be positive, neutral, or negative, depending upon how activities are planned and managed, how impact is mitigated. This is particularly true of large infrastructure developments such as sizable buildings, housing developments, roads, and, of course, a category close to home for us at the moment - **new university campuses**. All of these are subject to regulatory impact assessments for the planning application process but **rarely do these ecological assessments continue during and after the construction phase**.

As part of the University of Northampton's Changemaker Challenges, the social and broader environmental impact of Waterside Campus is being evaluated. **This includes an assessment of the effect that the development has on the wildlife in and around this urban site**. Measuring ecological impacts are especially important as Waterside Campus is located in the middle of the **Nene Valley Nature Improvement Area (NIA)**, and very close to **internationally important sites for birds**, which includes areas **with EU Special Protection Area (SPA) and United Nations' Ramsar designation** (Figure 1).

During 2014 meetings took place between JO & JJ, and the Waterside project's landscape architects Land Use Consultants (LUC), other partners from the NIA project board, and the local Wildlife Trust. During these meetings the **plans for the green infrastructure of the campus**, and how biodiversity could be enhanced, were discussed.

This resulted in a revised Ecology Strategy document produced by LUC that shows that there will **be more than 10 hectares of habitat creation on the site**, including species-rich grassland, woodland patches, brown and green roofs, swales and damp areas, and recreated brownfield habitat. To put the 10 hectares into perspective, the adjacent Wildlife Trust Local Nature Reserve of **Barnes Meadow is only 20 hectares in area, so the proposed mitigation is equivalent to expanding that site by another 50%.** If all goes to plan, Waterside could have an important positive effect on biodiversity, setting a benchmark standard for creating room for nature within the Enterprise Zone along Nene Valley, and be a **showcase to other developments and Higher Education institutions**.

An important question is: **How will we know that this habitat creation has been successful and how can we measure "success"?**

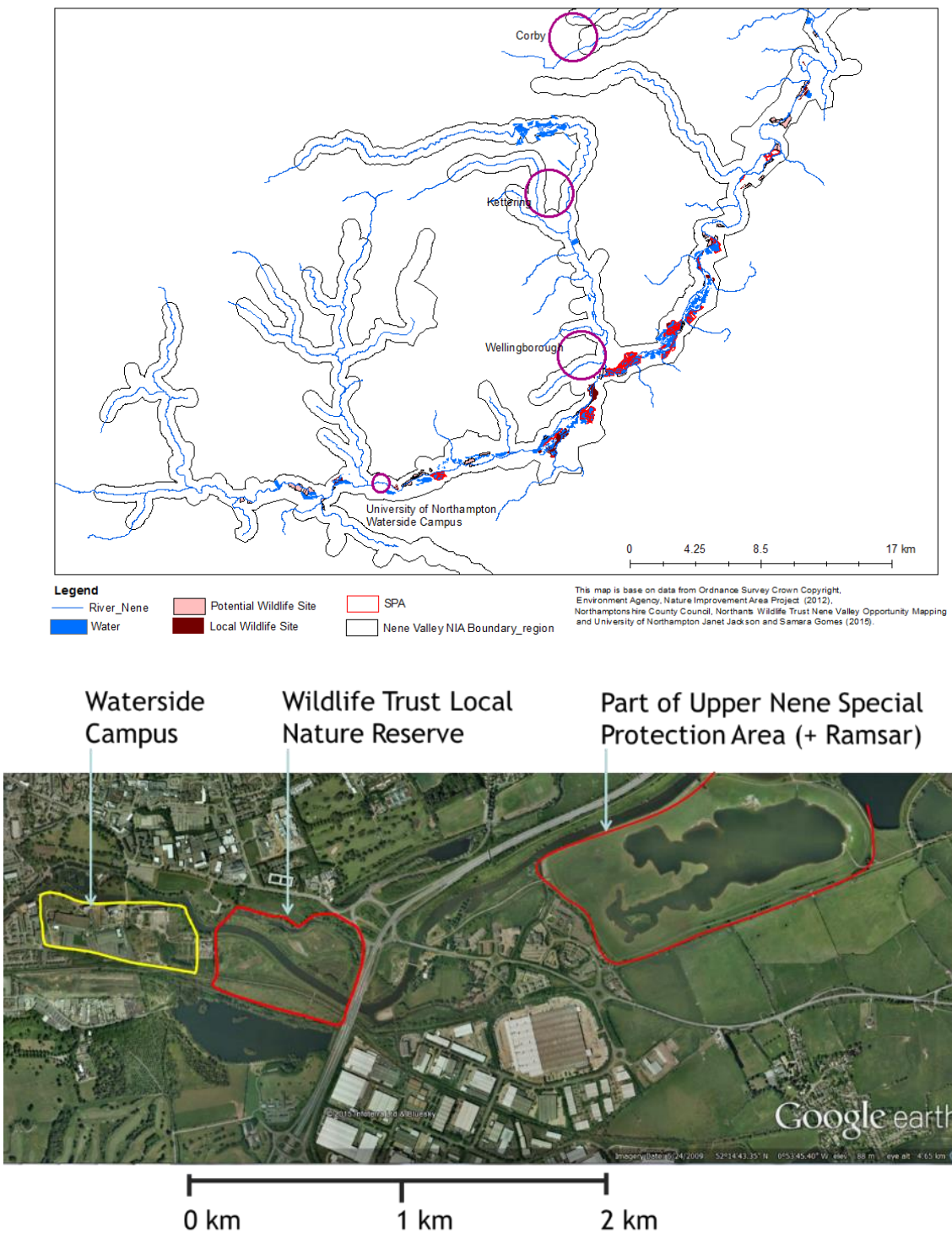

Figure 1: The national and international context for biodiversity conservation at Waterside Campus showing: (top) the Nene Valley Nature Improvement Area (NIA) and related designated sites; and (bottom) sites of particular nature conservation interest adjacent to the development. Not marked on this figure, but also of interest, are the Delapre Abbey and Delapre Lake sites to the south of Waterside Campus.

Monitoring of wildlife at the Waterside Campus is key to answering that question and base-line surveys of birds, plants and invertebrates from before work started, conducted by Betts Ecology during 2012-13 can be compared with later surveys during and after the campus build**. That process started in winter 2014-15 and spring 2015** when we began repeat bird surveys (**three winter and three spring surveys, following the same protocols as for the baseline surveys** – see Figure 2). The aim is to understand how the initial site clearance, ground works and construction are affecting the presence of birds in and around the development, including those using the River Nene. The plan is to **continue these surveys up to and after the campus opens in 2018**, to give us a data series showing the influence of the Waterside Campus on bird diversity and abundance.

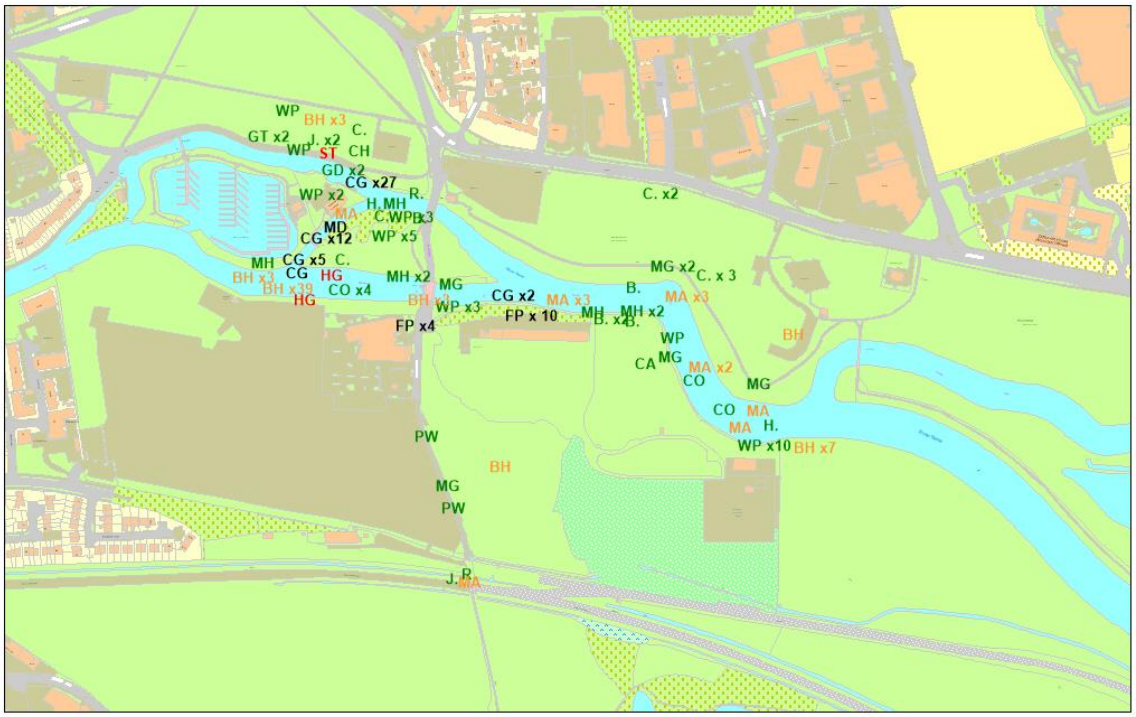

Figure 2: An example of the post-survey mapping of birds in and around Waterside Campus. This survey was undertaken 17th December 2015. Letters refer to standard BTO bird abbreviations, colour-coded according to RSPB Green, Amber, or Red List designations (see Appendix 1). Birds in black text are not designated, e.g. because they are introduced species.

Interim results – winter surveys

The three baseline winter 2012-13 surveys identified **41 bird species** with RSPB Green, Amber, or Red designation (i.e. excluding undesignated species such as Feral Pigeon and Domestic Duck – see Appendix 1). That figure dropped to **28 species in winter 2014-15 survey, rising slightly to 31 species in winter 2015-16**; more Red and Amber listed birds were lost than Green listed species (Figure 3, Appendix 2).

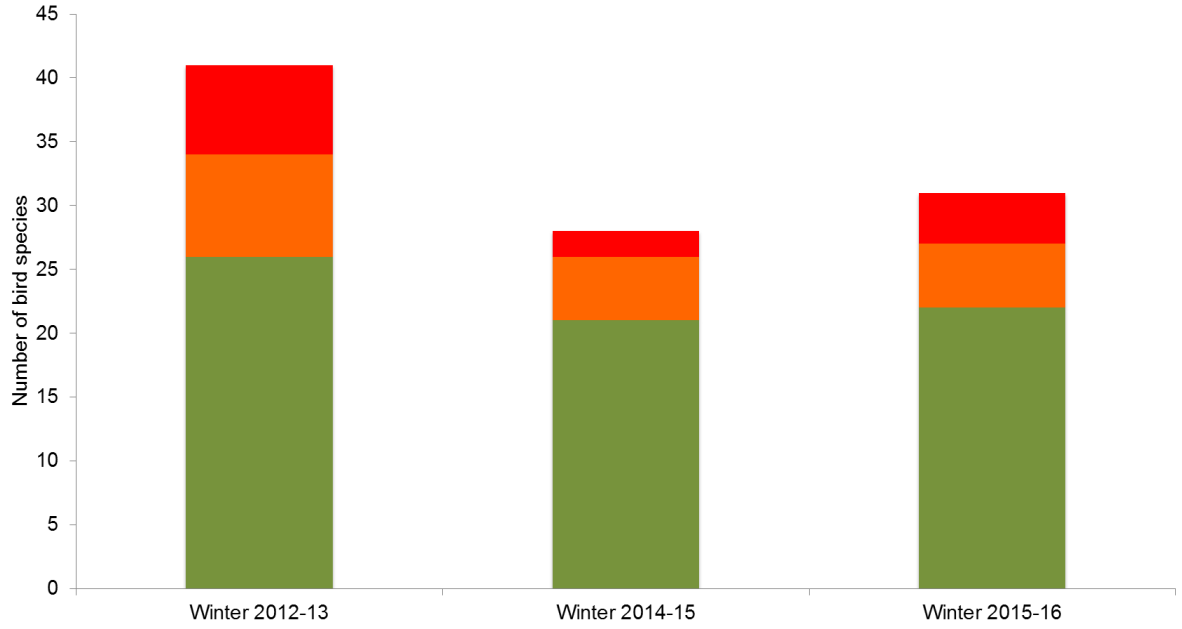

Figure 3: Numbers of bird species recorded during the three baseline winter 2012-13 survey compared to repeat surveys in winter 2014-15 and winter 2015-16. Birds have been categorised using RSPB Green, Amber, or Red List designations (see Appendix 1).

Interim results – spring surveys

The baseline spring 2013 surveys identified **40 bird species** with RSPB Green, Amber, or Red designation. That figure dropped slightly to **37 species in the spring 2015 surveys, and 36 species in spring 2016;** more Green and Amber listed birds were lost, and in fact the number of Red listed species increased slightly (Figure 4, Appendix 3).

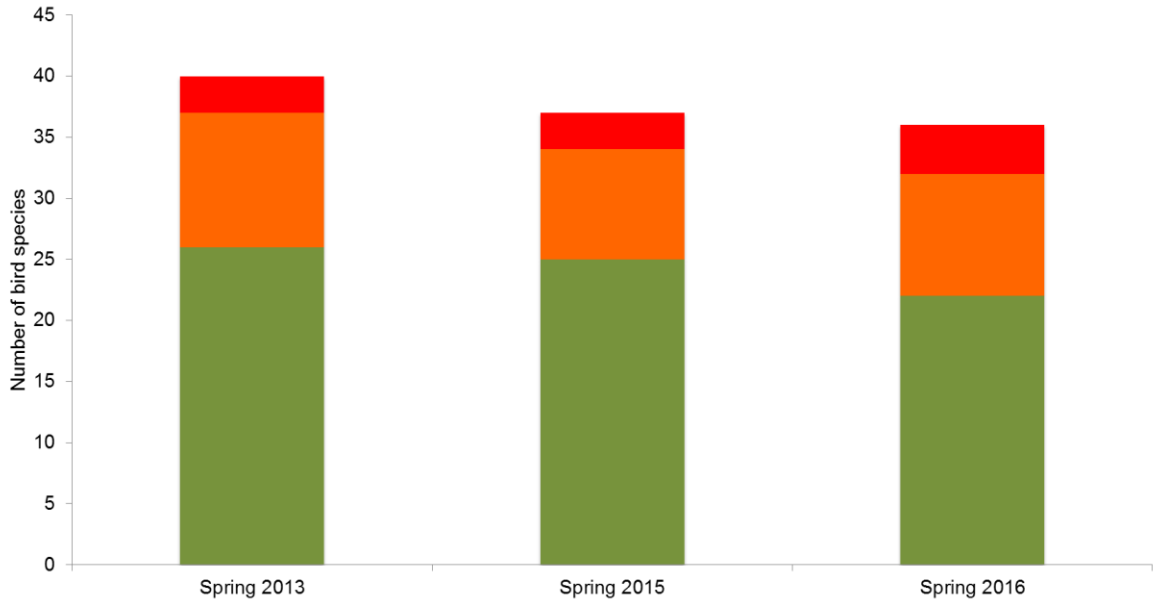

Figure 4: Numbers of bird species recorded during the three spring 2013 surveys of birds compared to repeat surveys in spring 2015 and spring 2016. Birds have been categorised using RSPB Green, Amber, or Red List designations (see Appendix 1).

Losses and gains in more detail

The broad figures presented above hide a lot of detail, however. For example, there has been **some addition of species in the winter and spring repeat surveys** not recorded in the baseline surveys, including Coot, Treecreeper, the Amber-listed Stock dove, and the Red-listed House sparrow (Figure 5). This partly balances some of the losses of species but, more importantly, emphasises **the dynamic nature of the bird assemblag**e in and around Waterside Campus. In addition, some of the Amber status birds that we did not record during our repeat surveys we know from additional surveys are **still present in habitats within 500 metres** of the development, for example Green woodpecker, and Bullfinch. Similarly, **Red status birds such as winter migrant Fieldfare and Redwing occur within at least one kilometre of the site**.

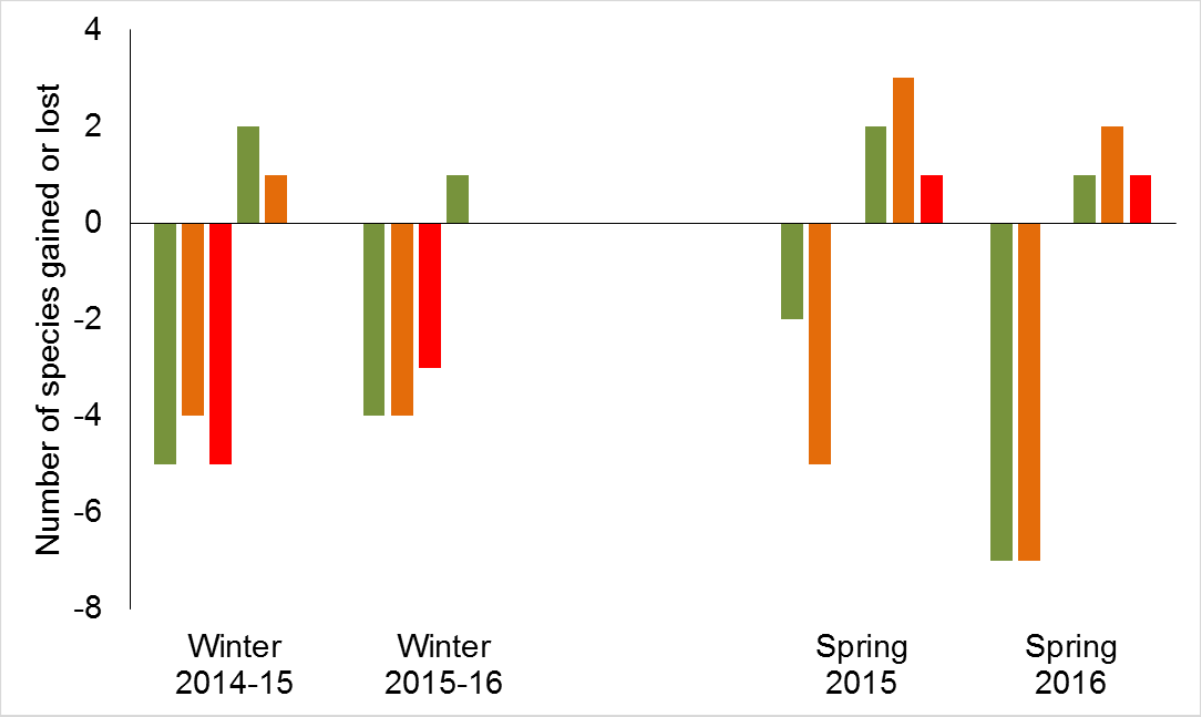

Figure 5: Numbers of bird species gained (positive values) or lost (negative values) during the spring and winter repeat surveys relative to the baseline surveys of winter 2012-13 and spring 2013. Birds have been categorised using RSPB Green, Amber, or Red List designations (see Appendix 1).

Conclusions

Clearly **winter bird diversity has declined much more than spring diversity**, which is rather surprising given that it is breeding birds in spring that we would expect to be most sensitive to the noise and disruption of the works being carried out at Waterside Campus. The modest loss of species, the gaining of other species to the site, and the presence of "lost" species close to Waterside Campus give us **some cause for optimism** that, ultimately, the development will be at least as diverse in bird life as it was originally. **Future surveys and analyses will be undertaken to tease out how these changes in bird numbers are related to changes to both the local and regional environments.**

Biodiversity monitoring on large infrastructure developments is rarely done because there is no statutory requirement. However we would argue that **universities have a societal obligation to manage and monitor biodiversity on their campuses** that can in turn provide opportunities for research and student learning, frequently in combination.

Outputs from this project

This project so far has already resulted in: **two conference presentations** by JO; **one final year dissertation** for CB; **a second dissertation** scheduled for JU; and **at least one peer-reviewed research paper** is planned for the future.

Acknowledgements

We thank The University of Northampton for its continued support; staff at Betts Ecology and LUC; Neil Rowley (Savills); and Alan Smith and colleagues of the Wildlife Trust for Bedfordshire, Cambridgeshire and Northamptonshire.

Appendix 1

RSPB Green, Amber, or Red list designation criteria – taken from: http://www.rspb.org.uk/birds-and-wildlife/bird-and-wildlife-guides/bird-guide/status_explained.aspx (accessed 1st November 2016).

Red list criteria

- Globally threatened
- Historical population decline in UK during 1800–1995
- Severe (at least 50%) decline in UK breeding population over last 25 years, or longer-term period (the entire period used for assessments since the first BoCC review, starting in 1969).
- Severe (at least 50%) contraction of UK breeding range over last 25 years, or the longer-term period

Amber list criteria

- Species with unfavourable conservation status in Europe (SPEC = Species of European Conservation Concern)
- Historical population decline during 1800–1995, but recovering; population size has more than doubled over last 25 years
- Moderate (25-49%) decline in UK breeding population over last 25 years, or the longer-term period
- Moderate (25-49%) contraction of UK breeding range over last 25 years, or the longer-term period
- Moderate (25-49%) decline in UK non-breeding population over last 25 years, or the longer-term period
- Rare breeder; 1–300 breeding pairs in UK
- Rare non-breeders; less than 900 individuals
- Localised; at least 50% of UK breeding or non-breeding population in 10 or fewer sites, but not applied to rare breeders or non-breeders
- Internationally important; at least 20% of European breeding or non-breeding population in UK (NW European and East Atlantic Flyway populations used for non-breeding wildfowl and waders respectively)

Green list

- Species that occur regularly in the UK but do not qualify under any or the above criteria

Appendix 2 – Bird species observed in the 2012-13 winter baseline surveys of Waterside Campus, and the repeat surveys of winter 2014-15 and winter 2015-16. Present of a species in a particular year is indicated by ●

Amber and Red status species	Species	2012-13	2014-15	2015-16
	Bullfinch	●		
	Black-headed gull	●	●	●
	Common gull	●	●	●
	Dunnock	●		●
	Greylag goose	●		
	Kingfisher	●		
	Mallard	●	●	●
	Mute swan	●	●	●
	Stock dove		●	
	Marsh tit	●		
	Mistle thrush	●		●
	Redwing	●		
	Starling	●		●
	Song thrush	●	●	●
	Herring gull	●	●	●
	Fieldfare	●		
Total species =	**16**	**15**	**7**	**9**
		Number species unrecorded =	**9**	**7**
		Rate of re-observation (%) =	**40.0**	**60.0**
		New species =	**1**	**0**

Green status species	Species	2012-13	2014-15	2015-16
	Blackbird	●	●	●
	Blue tit	●	●	●
	Carrion crow	●	●	●
	Collared dove	●		
	Chaffinch	●	●	●
	Coot		●	●
	Cormorant	●	●	●
	Goosander	●	●	●
	Goldcrest	●	●	●
	Goldfinch	●	●	●
	Grey heron	●	●	●
	Greenfinch	●		
	Green woodpecker	●		
	Great crested grebe			●
	Great spotted woodpecker	●	●	
	Great tit	●	●	●
	Jay	●	●	●
	Little grebe	●		●
	Long-tailed tit	●	●	●
	Magpie	●	●	●
	Moorhen	●	●	●
	Peregrine	●		●
	Pied wagtail	●	●	●
	Robin	●	●	●
	Sparrowhawk	●		
	Siskin	●		
	Treecreeper		●	
	Woodpigeon	●	●	●
	Wren	●	●	●
Total species =	**29**	**26**	**21**	**22**
		Number species un-recorded =	**5**	**4**
		Rate of re-observation (%) =	**82.6**	**91.3**
		New species =	**2**	**1**

Appendix 3 – Bird species observed in the 2013 spring baseline surveys of Waterside Campus, and the repeat surveys of spring 2015 and spring 2016. Present of a species in a particular year is indicated by ●

		2013	2015	2016
Amber and red status species		**Present**	**Present**	**Present**
	Grey Wagtail		●	
	House sparrow			●
	Mistle thrush	●		●
	Starling	●	●	●
	Song thrush	●	●	●
	Black-headed gull		●	
	Bullfinch	●		
	Common tern	●	●	
	Dunnock	●	●	●
	Green woodpecker	●		
	Greylag goose	●	●	
	House martin			●
	Kingfisher		●	●
	Lesser black backed gull			●
	Mallard	●	●	●
	Mute swan	●	●	●
	Reed bunting	●	●	
	Stock dove	●		●
	Swallow		●	●
	Swift			●
	Whitethroat	●		●
Total species =	**21**	**13**	**12**	**14**
		Number of species un-recorded =	**5**	**7**
		Rate of re-observation (%) =	**61.5**	**84.6**
		New species =	**4**	**3**

		2013	2015	2016
Green status species		**Present**	**Present**	**Present**
	Blackbird	●	●	●
	Blackcap	●	●	●
	Blue tit	●	●	●
	Carrion crow	●	●	●
	Collared dove	●	●	
	Chaffinch	●	●	●
	Chiffchaff	●	●	●
	Coot	●	●	
	Cormorant	●	●	●
	Goldcrest	●	●	
	Goldfinch	●	●	●
	Grey heron	●	●	●
	Greenfinch	●	●	●
	Great tit	●	●	●
	Great spotted woodpecker			●
	Jackdaw		●	●
	Jay		●	●
	Lesser whitethroat	●		
	Little Egret	●		
	Long-tailed tit	●	●	●
	Magpie	●	●	●
	Moorhen	●	●	●
	Peregrine	●	●	
	Pied wagtail	●	●	●
	Robin	●	●	●
	Reed warbler	●		
	Sedge warbler	●	●	●
	Woodpigeon	●	●	●
	Wren	●	●	●
Total species =	**29**	**26**	**25**	**22**
		Number of species un-recorded =	**2**	**7**
		Rate of re-observation (%) =	**88.5**	**80.8**
		New species =	**2**	**1**