

Appendix 12.5

Bird Vantage Point Survey

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1 Introduction

1.1 Background

1.1.1 This report presents the results of bird vantage point (VP) surveys undertaken by CH2M Fairhurst Joint Venture (CFJV) around Insh Marshes, where the A9 crosses the River Spey and its floodplain. Surveys include both winter season and breeding season vantage point surveys. The surveys have been undertaken to inform the Design Manual for Roads and Bridges (DMRB) Stage 3 Environmental Impact Assessment (EIA) and the accompanying Habitats Regulations Appraisal (HRA).

1.1.2 Project 9, Crubenmore to Kincaig, of the A9 Dualling Programme includes the crossing of the River Spey at Kingussie, where the existing A9 road passes over Insh Marshes National Nature Reserve (NNR). Insh Marshes has a number of statutory designated sites which are designated for ornithological interest features including a Ramsar site, Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI). The ornithological interest features of each statutory designated site are presented in **Table 12.5.1**.

Table 12.5.1: Ramsar, SPA and SSSI bird interest features

Statutory Designated Site	Bird Interest Features
River Spey – Insh Marshes Ramsar	Features applicable to River Spey – Insh Marshes SPA criteria
River Spey – Insh Marshes SPA Non – breeding	<ul style="list-style-type: none"> Hen harrier <i>Circus cyaneus</i>, 11 individuals representing at least 1.5% of the wintering population in Great Britain (5-year mean, 1990/ 1-1994/ 5) Whooper swan <i>Cygnus cygnus</i>, 190 individuals representing at least 3.5% of the wintering population in Great Britain (5-year peak mean 1991/ 2-1995/ 6)
River Spey - Insh Marshes SPA Breeding	<ul style="list-style-type: none"> Osprey <i>Pandion haliaetus</i>, four pairs representing at least 4.0% of the breeding population in Great Britain (count as at early 1990s) Spotted crake <i>Porzana porzana</i>, three individuals representing at least 6.0% of the breeding population in Great Britain (5-year mean, 1990-1995) Wood sandpiper <i>Tringa glareola</i>, two pairs representing at least 20.0% of the breeding population in Great Britain (5-year mean, 1990-1995) <p>This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:</p> <p>During the breeding season:</p> <ul style="list-style-type: none"> Wigeon <i>Anas penelope</i>, 37 pairs representing <0.1% of the breeding Western Siberia/Northwestern/ Northeastern Europe population (Mid 1990s)
River Spey - Insh Marshes SSSI	Breeding bird assemblage including: Osprey <i>Pandion haliaetus</i> , wigeon <i>Anas Penelope</i> , goldeneye, <i>Bucephala clangula</i> , shoveler <i>Anas clypeata</i> and a range of breeding waders including redshank <i>Tringa totanus</i> , common snipe <i>Gallinago gallinago</i> and Eurasian curlew <i>Numenius arquata</i>

1.1.3 During the design and development of Project 9, the need for a more detailed understanding of habitat functionality in proximity to the A9 River Spey crossing was identified. This includes use of habitats within the Ruthven compartment of the NNR by non-breeding whooper swan, notably during flood events on the River Spey, and breeding wigeon. Ruthven compartment is one of multiple Royal Society for the Protection of Birds (RSPB) Scotland survey compartments within

Insh Marshes NNR and is the closest compartment to the A9 River Spey crossing. The location of RSPB Insh Marshes survey compartments is illustrated on **Drawing 12.40, Volume 3**.

- 1.1.4 The requirement to understand whooper swan distribution within Insh Marshes was highlighted by RSPB, who identified that whooper swan may move away from traditional foraging areas to the edge of the floodplain, where shallower water depths allow continued foraging during flood conditions. This behaviour is detailed in a study of overwintering whooper swan within the Insh Marshes between 2005 and 2007 (Mitchell, 2007).
- 1.1.5 In addition, a requirement to better understand functional use of habitats surrounding the River Spey crossing by breeding wigeon was also identified by RSPB. The scope of vantage point surveys during the breeding and non-breeding season was therefore focussed on breeding wigeon and non-breeding whooper swan.
- 1.1.6 The survey also set out to record presence of other breeding/ non-breeding SPA qualifying features (see **Table 12.5.1**) and provided an opportunity to examine the distribution of other notable wader, wildfowl and scarce raptor species.

1.2 Target Species Background Information - Wigeon

- 1.2.1 Wigeon are a scarce breeding species in Scotland. Forrester and Andrews (2007) cite a Scottish population of 240-400 pairs, and note that there can be considerable year-on-year variation in populations. An average of 37 breeding pairs regularly occur within River Spey-Insh Marshes SPA (JNCC, 2012). During the years 2004 to 2009, the Insh Marshes NNR supported an average of 14 pairs (RSPB, 2010). Scottish Ornithologists' Club (SOC) (2017) summarise breeding data for Insh Marshes between 2006 and 2015 which is shown in **Table 12.5.2**. Up to 50 pairs are reported breeding within the wider Spey valley (Forrester and Andrews, 2007).
- 1.2.2 Breeding bird data provided by RSPB highlights that between 2015 to 2017, a maximum of two breeding pairs were observed within the Ruthven compartment of Insh Marshes NNR. The location of wigeon registrations recorded within Insh Marshes RSPB survey compartments during the 2015 to 2017 breeding season are shown on **Drawing 12.15.1 in Confidential Appendix 12.15, Volume 2**.

Table 12.5.2: Breeding wigeon totals Insh Marshes 2006 – 2015 (Source SOC, 2017)

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
14	16	13	12	12	11	16	No data	26	35

- 1.2.3 The species breeds along the shores of islands and upland pools or lochs. While wigeon have been considered vegetarian, well-established grazing feeding patterns observed in wintering grounds have provided a more detailed understanding of the species diet (studies reviewed by Jacobsen, 1991). This review shows that the species is heavily reliant on chironomid midge larvae. Jacobsen (1991) details that the emergence of midge larvae is a key factor in the timing of wigeon breeding efforts. The choice of chironomids and change in diet during breeding is associated with changes in metabolic requirements around breeding and is more pronounced in males than in female dabbling ducks.
- 1.2.4 Given the foraging requirements of wigeon, surveys continually scanned both grassland habitats for grazing activity and open water habitats to search for any wigeon foraging on chironomid larvae. The time of day of chironomid emergence has also been reported as influencing wigeon feeding behaviour. Jacobsen (1991) reported that early in the breeding season much emergence

occurred throughout the day, whereas later in the season this occurred during early morning and in the evening/ at night. The study showed most female wigeon switched from grazing to gleaning midge larvae, and that gleaning from emergent vegetation tended to occur in early morning/ evening whilst during mid-day periods gleaning was primarily from open water surfaces.

- 1.2.5 Pöysär *et al.* (2017) reviewed habitat preferences of breeding wigeon by pairs and broods, and identified a preference for stands of horsetail (*Equisetum* sp.). The review correlates declining wigeon populations with a reduction in horsetail stands where lakes within the study area had shown a decline in this habitat type. This habitat selection reflects a preference for areas of good cover when selecting nest sites (Snow and Perrins 1998).
- 1.2.6 A review of RSPB breeding bird data (2015 to 2017) for Insh Marshes shows breeding wigeon are associated with the presence of open water features, or where these are not present, breeding registrations are located close to the River Spey. This reflects the stated nest site preferences of wigeon which include the shores or islands of upland pools and lochs or in marshes or bogs (Forrester and Andrews, 2007) (Snow and Perrins, 1998). Nest sites are typically very close to open water, though have also been recorded up to 250m away from water (Snow and Perrins 1998). The typical close association with areas of open water is thought to relate to the reliance (most prominent in females) on chironomid midge larvae described above. *Anas* duck species are unable to store enough energy reserves to incubate a clutch of eggs or brood of ducklings continuously and therefore are required to break from incubation periodically to feed (Ringelman *et al.* 1982). The need to recess from incubation to feed is also likely to drive nest sites to be within close proximity of feeding areas.

1.3 Target Species Background Information – Whooper Swan

- 1.3.1 Whooper swan arrive in Britain on migration every winter to feed on marshes and agricultural land, generally in coastal areas, as well as roosting on freshwater lakes (JNCC, 2012). Winter counts from 2003/ 2004 to 2008/ 2009 recorded an average of 117 whooper swans within Insh Marshes NNR (RSPB, 2010). Peak counts of whooper swan have declined from a peak during the 1980s and 1990s of almost 200, to an average of 113 over the 5 years from 1995/ 1996 to 1999/ 2000 (Robinson *et al.* 2004).
- 1.3.2 Insh Marshes includes a range of habitats suitable for non-breeding whooper swan, including inundated grassland, swamp, marshy grassland and watercourses recorded through a combination of Phase 1 Habitat Survey, National Vegetation Classification (NVC) survey and review of aerial imagery. Such habitats provide traditional winter feeding grounds for whooper swan in the UK and Ireland where the species typically forages on tubers and root stalks of *Potamogeton* sp, *Elodea canadensis*, *Glyceria* sp, *Equisetum* sp. and *Rorippa palustre* in freshwater lakes and marshes. Over the past 40 to 50 years however, whooper swan foraging behaviour has adapted to foraging habitat present within agricultural landscapes. This use of agricultural land is partly attributed to agricultural intensification in the wintering areas (Robinson *et al.* 2004). The Insh Marshes is an example of traditional whooper swan overwintering habitat.
- 1.3.3 Mitchell *et al.* (2007) showed that whooper swan utilise a large proportion of the Insh Marshes NNR. The study showed a preference to forage in areas characterised by mixed sedge swamp habitats. The study also noted that the swans did not show a preference for rush pasture and areas dominated by reeds *Phragmites australis*.

2 Methodology

2.1 Non-Breeding

- 2.1.1 A series of seven vantage point surveys were undertaken between the 1st December 2016 and the 23rd March 2017.
- 2.1.2 The survey area (up to a minimum of 1km east and 500m west from the existing A9 embankment at the A9 River Spey crossing) was divided into a series of plots developed partially by distance from the road and partially by areas which were characterised by habitat types (wetter areas or drier areas).
- 2.1.3 East of the existing A9 was divided into plots A, B and C which are located within 500m of the existing A9, with compartments D, E, F and G between 500m and 1km. West of the existing A9 was divided into areas A to K, all of these areas are within 500m of the existing A9, with the exception of some areas of K. See **Figure 12.5.1** for the location of each plot.

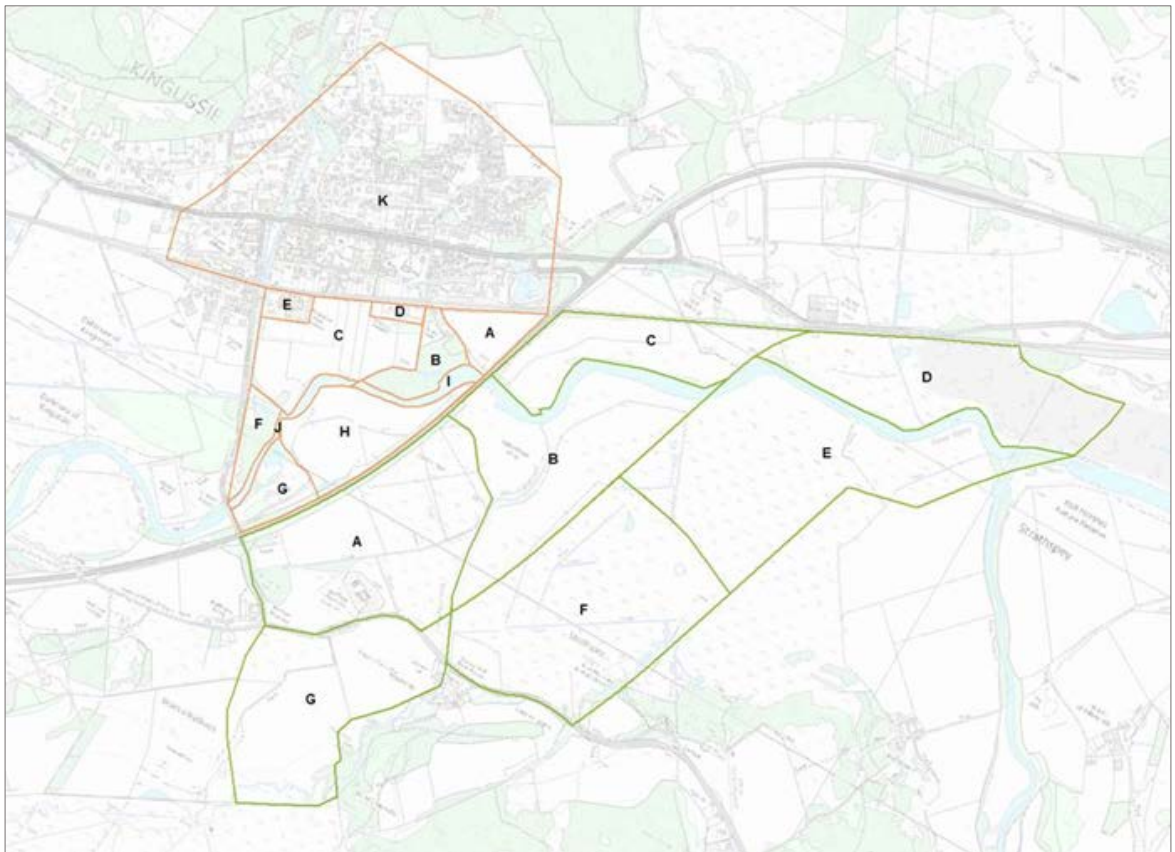


Figure 12.5.1: Lettered plots east and west of A9 River Spey Crossing

- 2.1.4 The vantage point surveys were undertaken in-line with the following methodology, developed to the bespoke requirement of the survey, whilst considering guidance on vantage point survey methodology developed by SNH (2014):
- VPs were identified prior to undertaking any fieldwork. The selection of vantage points had regard to SNH (2014) *'Recommended bird survey methods to inform impact*

assessment of onshore wind farms', to minimise human disturbance to target species whilst maximising visibility across the survey area. Each VP was identified by specific grid reference to facilitate monthly comparisons.

- The two VP locations are indicated on **Drawing 12.48, Volume 3**. Both are situated on the embankment of the A9, slightly above the floodplain of the River Spey, allowing an elevated viewpoint of the surrounding area. The eastern facing location is at grid reference NH 76428 00361 and the western facing location is at NH 76260 00078. Surveys from each VP were undertaken simultaneously, to enable mapping of flight lines which crossed the road and avoid double counting birds. Two-way radios were used to ensure both surveyors were aware of notable activity or approaching flights.
- Any areas where views of the study area were significantly impeded were noted and are described in **Section 2.3**. Avoidance of restricted view areas was identified where possible using viewshed analysis in the selection of VP locations. An illustration of the approximate viewsheds from proposed vantage points is provided in **Figure 12.5.2** and **Figure 12.5.3**.
- Each vantage point survey was undertaken over three hours. Surveyors recorded weather conditions at the start, on each hour and on completion of each VP survey. Surveyors arrived at VPs no less than 30 minutes prior to the start of each survey and exercised care when accessing VPs to minimise any potential observer effects on bird distribution or behavior.
- Surveys were undertaken in weather conditions with good ground visibility (ideally > 2km). Surveys were not undertaken where visibility fell below 1km.
- Surveys were planned to be undertaken following rainfall events where possible, in order to record details during flood events of the River Spey. Additional data was recorded to establish baseline conditions outwith flood events (normal conditions). Local weather was monitored each week and SEPA river levels at Kincaig were noted, with surveys timed at high water levels where possible, see **Section 2.3** for constraint details.
- Habitats within view on east and west of the existing A9 were divided into plots (see **Figure 12.5.1**) to record the presence of birds, counts of which were recorded at 30-minute intervals. Topographical and other features were used to plot the locations of individual birds and groups. Where possible, the distance between the VP and the closest group of birds was recorded using laser range finders (Hawke LRF 600 and Viking Optical), up to 500m (the outer range of the devices). Whooper swan present at greater distances were mapped using reference distance bands, topographical features and field boundaries to record locations as accurately as possible.
- Surveyors recorded notable flights into and/ or out of the survey area that occurred between 30-minute intervals (e.g. disturbance, direction of flight, number of birds *etc.*) to minimise double-counting. Flight recording has included wader, wildfowl and notable raptor flights.

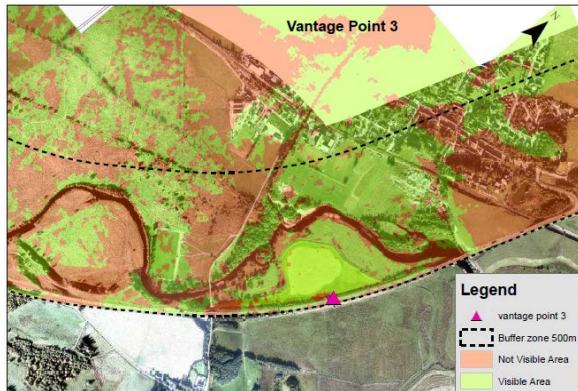


Figure 12.5.2: Viewshed Analysis West of A9

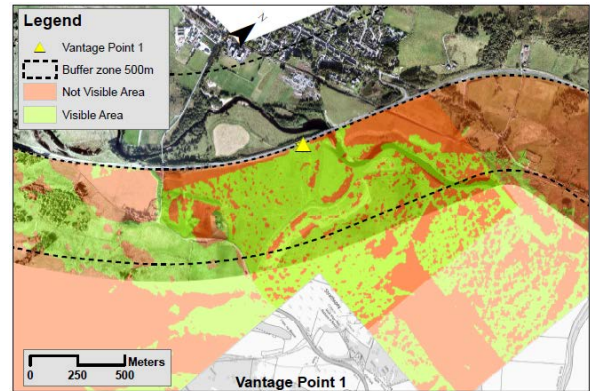


Figure 12.5.3: Viewshed Analysis East of A9

2.1.5 A total of 21 hours of vantage point observations were undertaken between 1st December and the 23rd March 2017.

2.1.6 An overview of the dates, times and weather conditions recorded during the surveys are presented in **Table 12.5.3**. River level data has been taken from SEPA readings for Kincaig. SEPA measurements consider all readings at <2.0m as ‘normal’.

Table 12.5.3: Overview of non-breeding vantage point survey meta data

Visit	Date	Sunset / sunrise	Times	Temperature (°C)	Cloud x/8	Precipitation	Wind (bf)	River Level (m)
1	01.12.16	08:30	09:20 - 12:20	8	7-8	nil	West force 1-3	0.6m
2	08.12.17	08:42	10:00 - 13:00	5	2-8	nil	South west force 1-3	0.45
3	06.01.17	08:52	09:00 - 12:00	7	6-8	nil	West force 2-3	0.6
4	19.01.17	16:16	13:45 - 16:45	4	6-8	nil	West force 0-3	1.2
5	02.02.17	16:47	13:00 - 16:00	6	6-8	Occasional light rain	West force 2-4	0.6
6	23.02.17	07:24	10:00 - 13:00	1-2	8	nil to heavy snow	North east force 1-3	1.0
7	23.03.17	06:09	07:15 - 10:15	8	2-6	nil	South west force 0-1	0.8

2.2 Breeding

2.2.1 In Scotland, wigeon typically arrive at breeding grounds during mid-April, and egg laying occurs in May and June. Incubation typically lasts 25 days and fledging occurs up to 40 to 45 days after that (Forrester and Andrews, 2007).

2.2.2 The study area for the breeding bird vantage point survey, which aimed to identify breeding wigeon activity, included a 500m buffer around the existing A9 where it crosses the River Spey.

2.2.3 Guidance on survey methods for dabbling ducks (Gilbert *et al.* 2011), was adapted to be undertaken from a vantage point setting and made bespoke to the aims of the vantage point survey (to detect functional use of habitats as opposed to presence or absence of breeding pairs). Vantage point surveys were carried out at intervals of between 10 to 14 days across the following timescales in order to capture key behaviour/ activity:

- April to early May: courtship and display

- May to June: egg laying/ nest establishment/ incubation
- June to July: brood counts – this included a focus on areas of open water where wigeon tend to lead young to feed on aquatic invertebrates such as chironomid larvae

2.2.4 The vantage point surveys recorded the distribution of wigeon during the breeding season (and other notable species of interest) within, and up to a minimum of 500m, east and west of the A9 River Spey crossing.

2.2.5 The vantage point surveys were undertaken in line with the following methodology:

- VPs were identified prior to undertaking any fieldwork. The selection of vantage points had regard to SNH (2014)¹, to minimise human disturbance to target species whilst maximising visibility across the Ruthven compartments. Each VP was identified by specific grid reference to facilitate monthly comparisons.
- Three VP locations were utilised and are indicated in **Figure 12.5.2-4** (VP1), **Figure 12.5.2-5** (VP2) and **Figure 12.5.2-6** (VP3). All are situated above the floodplain of the River Spey and therefore allowing an elevated viewpoint of the surrounding area. The eastern facing locations are at grid reference NH 76526 00554 and NH 76353 00179, the western facing location is at NH 76340 00227. Surveys from each VP were undertaken simultaneously in Visit 1, and on separate occasions on Visits 2 to 7.
- Surveys were undertaken in weather conditions with good ground visibility (ideally > 2km). Surveys were not undertaken where visibility fell below 1km.
- A minimum of six hours of VP survey effort was undertaken in each month throughout the breeding season. In each month, a minimum of three hours of survey effort was included at dawn and/ or dusk.
- Surveyors recorded weather conditions at the start, on each hour and on completion of each VP survey. Meta data for the breeding vantage point surveys is provided in **Table 12.5.4**.
- Surveyors recorded notable flights into and/ or out of the Ruthven compartments that occurred (e.g. disturbance, direction of flight, number of birds etc.) to minimise double-counting.
- Surveyors liaised with RSPB staff to avoid clashes with ongoing monitoring undertaken in the Insh Marshes.
- Any areas where views of the study area were significantly impeded were noted. Restricted view areas were identified and avoided where possible using viewshed analysis in the selection of VP locations. An illustration of the approximate viewsheds from proposed vantage points is included in **Figure 12.5.4** (VP1), **Figure 12.5.5** (VP2) and **Figure 12.5.6** (VP3).
- Photographic views from VPs 1, 2 and 3 are presented in **Photographs 12.5.1, 12.5.2 and 12.5.3** for reference.

¹ SNH. (2014), Recommended bird survey methods to inform impact assessment of onshore wind farms

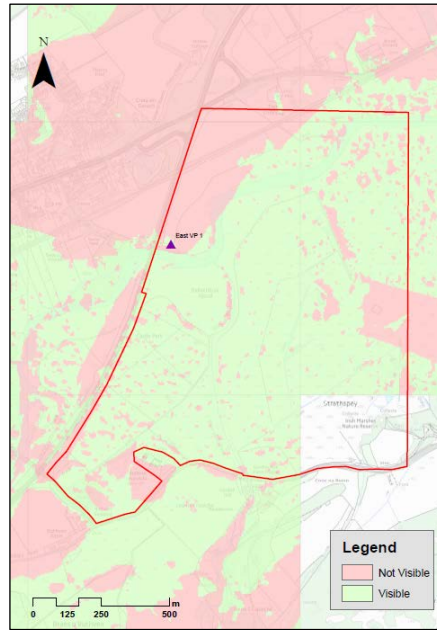


Figure 12.5.4: Viewshed Analysis East of A9 VP1 (Ruthven South)

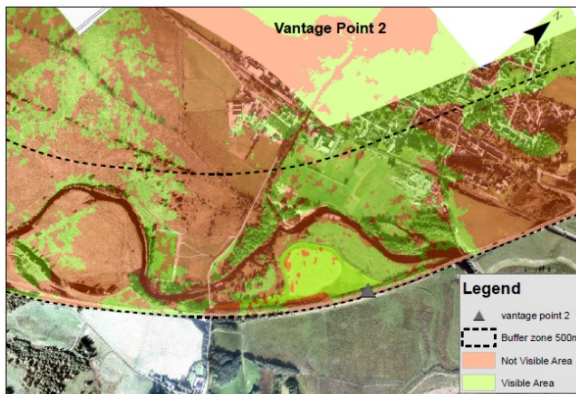


Figure 12.5.5: Viewshed Analysis West of A9 VP2

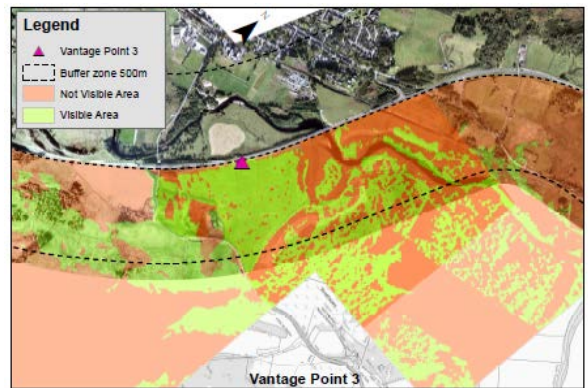


Figure 12.5.6: Viewshed Analysis East of A9 VP3



Photograph 12.5.1: Typical view from VP1 (Primary VP looking over Ruthven South)



Photograph 12.5.2: Typical view from VP2 (VP overlooking Ruthven North)



Photograph 12.5.3: Typical view from VP3 (secondary VP looking over Ruthven South)

Table 12.5.4: Overview of breeding vantage point survey meta data

Visit	Date	Sunset/Sunrise	Location	Times	Temperature (°C)	Cloud x/8	Precipitation	Wind (bf)	Glare
1a	26.04.17	20:51	VP1 and VP2	18:30 – 21:30	6	6-7	Nil to light rain at 22:00	Wind force 1 to 3	Nil
1b	27.04.17	05:37	VP1 and VP2	05:30 – 08:30	4 - 5	7-8	Nil to light rain at 08:30	Wind force 1 to 3	Nil
2a	03.05.17	05:27	VP1	18:50 – 21:50	8 - 11	5-8	Nil	Wind force 2 to 3	Nil
2b	04.05.17	05:20	VP2	09:30 – 12:30	9 - 15	1 - 3	Nil	Wind force 2 to 3	Slight
3a	15.05.17	21:29	VP2	16:45 – 19:45	11	8	Nil	Wind force 2	Nil
3b	16.05.17	04:55	VP1	04:25 – 07:25	7 - 8	4 - 8	Nil	Wind force 3 to 4	Nil to Strong E
4a	25.05.17	21:47	VP1	19:30 – 22:30	18 - 24	0 - 1	Nil	Wind force 1 to 2	Nil to Strong W
4b	26.05.17	04:38	VP1 and VP3	07:00 – 10:00	20 - 24	1 - 2	Nil	Wind force 0 to 3	Strong to SE
5a	08.06.17	22:03	VP2	15:00 – 18:00	13	8	Rain	Wind force 1	Nil
5b	09.06.17	04:23	VP1	04:00 – 07:00	9 - 10	8	Drizzle to light rain, some dry spells in between	Wind force nil to 1	Nil
6a	22.06.17	22:15	VP1	19:45 – 22:45	11 - 13	8	Light rain to rain	Wind force 2 to 4	Nil
6b	23.06.17	04:21	VP2	07:00- 10:00	13	5 - 8	Nil to light rain	Wind force 2 to 4	Nil
7a	11.07.17	22:04	VP2	14:10 – 17:10	15 - 20	4 - 8	Nil to rain	Wind force to 2	Slight to Moderate
7b	12.07.17	04:39	VP1	04:10 – 07:10	9 - 11	5 - 6	Nil	Wind force 1	Slight

2.3 Survey Constraints

Non-Breeding

- 2.3.1 All efforts were made to plan and conduct overwintering vantage point surveys during or immediately after flood events within the River Spey floodplain and specifically within the Ruthven compartment. The winter of 2016/ 2017 was, however, a notably dry period² with relatively few significant flood events. While surveyors monitored relevant SEPA flood gauges throughout the survey period, there were no events which exceeded 2.0m (considered to be high). Elevated water levels reaching 1.6m occurred around the end of December, however no surveys were mobilised during this period. No data has been obtained to reflect the effect of 'high' water levels.
- 2.3.2 While the non-breeding VP locations selected gave views which confidently identified the presence of whooper swan within the study area, smaller and more cryptic plumaged wildfowl and waders were obscured from view at longer ranges (>500m) by vegetation and some minor topographical features such as flood banks. Given the primary aim of the non-breeding vantage point surveys was to gather information on the distribution of whooper swan, the limitations on visibility are not considered to be a significant constraint. Any ecological assessment of effects on other wildfowl will be supported by data provided by RSPB for the Insh Marshes.

Breeding

- 2.3.3 Excessive glare on visit 4b meant that the survey of Ruthven South was moved from VP1 to VP3 to avoid constraints due to strong glare from the south.
- 2.3.4 While it is noted that it is possible that wigeon may feed nocturnally, no night time observations were undertaken. However, each survey visit included up to an hour before dawn or after dusk to capture activity within crepuscular periods in the day. Given the background information reported in **Section 1.2**, which illustrates the most important feeding periods for wigeon, this is not considered a constraint on the findings of the report.

² Met Office 2017. Winter Weather Summary 16/17. Available online at:
<http://www.metoffice.gov.uk/climate/uk/summaries/2017/winter> (accessed 05.09.17)

3 Results

3.1 Non-Breeding

This section sets out the results of non-breeding vantage point surveys.

Whooper swan

- 3.1.1 **Table 12.5.5** sets out the distribution results for whooper swan within the lettered plots. All observations of whooper swan were recorded east of the River Spey crossing; therefore, plots west of the crossing are not considered. The numbers represent the maximum peak count of whooper swans in each plot at any point in the survey. A peak count of 33 whooper swan was reported during visit 4 in mid-January.
- 3.1.2 Throughout all survey visits, groups of whooper swan were noted to be undertaking a combination of feeding and resting. Changes between feeding and roosting behaviour were noted during the vantage point survey. The primary area where both behaviours were noted was within the Gordonhall compartment of Insh Marshes NNR typically in locations where some open water was present (see **Drawing 12.40, Volume 2** for location of Gordonhall compartment). The presence of birds around areas of open water within Gordonhall was recorded prior to sunrise; therefore, it is likely that roosting occurs in this area. The distribution of whooper swan feeding and resting activity within the study area was restricted to Gordonhall compartment of the NNR and further east, with exception of two swans recorded on the River Spey adjacent to Ruthven compartment. Movement between different areas of Insh Marshes was very limited, with the species appearing to be relatively sedentary in preferred feeding areas in Gordonhall.

Table 12.5.5: Summary of whooper swan distribution detected during winter VP surveys

Plots	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6	Visit 7
A	0	0	0	0	0	0	0
B	7	0	6	15*	8	0	25
C	0	0	0	0	0	0	0
D	0	0	0	0	0	0	0
E	3	3	18	3	0	0	1
F	7	0	6	15*	0	0	0
G	0	0	0	0	0	0	0
Total	10	3	30	33	0	0	26

* Denotes a herd of 30 whooper swan which were present overlapping the boundary of plots F and B.

- 3.1.3 The total number of swans observed within 500m of the A9 River Spey crossing on each survey visit is presented in **Table 12.5.6**. The estimated distance of swans recorded within 500m of the crossing has been included along with the number of swans. The number of swans located over 500m from the crossing (up to 1km from the crossing) is also presented in **Table 12.5.6**.

Table 12.5.6: Whooper swan distances from A9 River Spey crossing

Distance from A9 River Spey crossing	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6	Visit 7
0-500m	0	0	2 - 150m 4 - 350m 3 - 450m	15 - 470m	8 - 450m	0	25 – 450m
500m – 1000m	3	3	18	19	0	0	1

Other notable non-breeding bird species recorded east of A9 River Spey crossing

- 3.1.4 The most numerous non-breeding bird species observed within the study area were greylag goose *Anser anser*. In addition, pink-footed goose *Anser brachyrhynchus* were recorded during March. Other species recorded included: wigeon, goldeneye *Bucephala clangula*, teal *Anas crecca*, mallard *Anas platyrhynchos*, little grebe *Tachybaptus ruficollis*, lapwing *Vanellus vanellus* and oystercatcher *Haemotopus ostralegus*. Species distribution is illustrated on **Drawing 12.50, Volume 3**.
- 3.1.5 Greylag goose and pink-footed goose were most numerous in agricultural fields, comprising improved pasture in plot G east of the existing A9. Both species were also present throughout Insh Marshes NNR and were recorded in areas adjacent to the A9 River Spey crossing (feeding and roosting).
- 3.1.6 The number of notable non-breeding wildfowl and waders recorded in each plot east of the River Spey crossing is presented in **Table 12.5.7** using the following abbreviations: greylag goose (GJ); pink footed goose (PG); goldeneye (GN); wigeon (WN); mallard (MA); teal (T); red breasted merganser (RM); lapwing (L).
- 3.1.7 Counts for the smaller species are only considered to be reasonably accurate where they occur within 500m of the existing embankment to the east (plots A, B, C and parts of G).

Table 12.5.7: Notable non-breeding bird species east of A9 River Spey crossing

Plot	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6	Visit 7
A	TE - 6	0	0	0	0	LA - 1	PG - 26
B	GN - 1 WN - 95 MA - 20 T - 6	GJ - 4 GN - 1 WN - 6 MA - 2 RM - 1	GJ - 60 WN - 7	GN - 1 WN - 25 MA - 5	GG - 31	L - 16 250 <i>Anas</i> sp.	GJ/ PG - 180 WN - 81 L - 8
C	L - 12	0	0	0	0	GJ - 6 GN - 2	PG - 40 WN - 40
D	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
F	0	MA - 45	GJ - 4 MA - 35 TE - 30 L - 51	WN - 20 MA - 20 L - 35	GN - 6 WN - 50 MA - 20	GJ - 26 WN - 16 L - 8	0
G	0	GJ - 6 WN - 5	0	0	0	GJ - 71	GJ/ PG - 406

Other notable non-breeding bird species recorded west of A9 River Spey crossing

- 3.1.8 During the overwintering period, use of terrestrial habitats within land west of the A9 River Spey crossing (Ruthven compartment) was limited. The distribution of species discussed in the following paragraph is presented on **Drawing 12.50, Volume 3**.
- 3.1.9 Greylag goose were noted in small numbers grazing areas adjacent to the River Spey on two occasions. Mallard were noted frequently in small numbers using the smaller pools at the foot of the bridge embankment on several visits, the species was also regularly present on the River Spey in plot I. Goldeneye were also frequently noted on the River Spey in plot I, as was pochard, red breasted merganser and tufted duck. During the final survey visits in March lapwing was present in plot H, establishing breeding territories.
- 3.1.10 The number of notable non-breeding wildfowl and waders recorded in each plot west of the River Spey crossing is presented in **Table 12.5.8** using the following abbreviations: greylag goose (GJ); goldeneye (GN); wigeon (WN); mallard (MA); red breasted merganser (RM); lapwing (L); pochard (PO); tufted duck (TU).

Table 12.5.8: Notable non-breeding bird species west of A9 River Spey crossing

Plot	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6	Visit 7
A	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0
D	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
F	0	0	0	0	0	0	0
G	MA - 1	0	0	0	0	GJ - 8 GN - 1	GJ - 9
H	0	0	0	0	0	MA - 1 L - 2	GJ - 2 L - 7
I	PO - 1	MA - 11 PO - 4	GN - 3	PO - 1	MA - 2 GN - 2	0	GN - 1
J	PO - 1	GJ - 1 RM - 1 TU - 1	0	TU - 1	0	0	0
K	0	0	0	0	0	0	0

Flight records

Whooper swan

- 3.1.11 A small number of whooper swan flights were recorded during the surveys and are shown On **Drawing 12.48, Volume 3**.

Hen harrier

- 3.1.12 Hen harrier was noted twice during the surveys. Both recordings comprised either a female or immature bird and were likely to be the same bird. During the first observation at 10:30am, the bird was noted low over the Insh Marshes hunting around reedbeds and elevated grassland/scrub within Gordonhall compartment. On the second occasion at 12:49pm, one was noted

carrying a prey item and being mobbed by a peregrine falcon *Falco peregrinus* moving east across the Insh Marshes. Both records were reported during severe winter weather which is likely to have prevented any dispersal to roosting areas on higher ground / moorland for hunting. Hen harrier flight records are displayed on **Drawing 12.49, Volume 3**.

3.1.13 No indication of roosting behaviour was detected within the study area.

Golden eagle

3.1.14 A single golden eagle was observed flying east over Insh Marshes NNR on the 23rd February (visit 6) at 12:09pm. The bird was flying at low elevation (15-20m above road level) over the River Spey crossing. This record was reported during severe winter weather which is likely to have displaced the bird from higher ground. The golden eagle flight is displayed on **Drawing 12.49, Volume 3**.

Peregrine falcon

3.1.15 A single peregrine falcon was noted on one occasion on February 2017 (visit 6) at 12:49pm. The bird was noted mobbing a female/ immature hen harrier which was carrying prey east across Insh Marshes. The peregrine flight record is displayed on **Drawing 12.49, Volume 3**.

Merlin *Falco columbarius*

3.1.16 Merlin was noted on one occasion (visit 6) pursuing a small passerine across Insh Marshes and heading west across the A9 at 12:29pm, the bird crossed the road at an estimated height of 10m. On the west side of the A9, it was then recorded hunting over the River Spey. The merlin flight record is displayed on **Drawing 12.49 in Volume 3**.

Other raptor species

3.1.17 Sparrowhawk *Accipiter nissus* was hunting using scrub on the A9 embankment as cover, kestrel *Falco tinnunculus* was reported on a single occasion hunting over Insh Marshes and common buzzard *Buteo buteo* were present on a regular basis, perched and actively hunting within Insh Marshes.

Greylag goose and pink-footed goose

3.1.18 Flight records of goose species were frequent throughout all visits, with greylag goose being the most abundant species recorded flying over the A9 throughout the survey period. Routine movements between roosting areas within and adjacent to the Insh Marshes, and foraging areas further west, were noted. The vast majority of flights followed a southwest to northeast direction, with birds recorded either returning to Ruthven and Gordonhall compartments, or areas outside Insh Marshes NNR. These species were also recorded flying southwest beyond the study area, suggesting a well-used area of land in this direction.

3.1.19 Diurnal patterns indicated that movements in the early morning were from large groups of birds as well as individuals roosting within and adjacent to Insh Marshes NNR. **Table 12.5.9** shows a summary of the number of geese flights and peak counts shown for both west and east of the A9 River Spey crossing. Where flight heights have been noted, they indicate that the majority of geese commute along the valley at considerable height (30m + above road level). The only exception to this was where they crossed the route after leaving roost sites, noted in visit 3. All flights reported refer to greylag geese except during visit 7 where large numbers of pink footed geese were present.

Table 12.5.9: Summary of geese flights per visit

Visit	No. of flights	Maximum count	Total geese crossing A9 River Spey crossing	Flight height (range recorded)
Visit 1	14	40	172	>30m above embankment)
Visit 2	5	13	29	>30m above embankment
Visit 3	13	20	39	10-30m
Visit 4	0	0	0	-
Visit 5	5	7	24	30-50m
Visit 6	1 flushed by eagle	8	8	C10m
Visit 7	11	145	145	50m

3.1.20 While geese were the most numerous species flying over the route, a number of other species were recorded, namely black-headed gull *Chroicocephalus ridibundus*, common gull *Larus canus* and herring gull *Larus argentatus*. Small numbers of wildfowl including wigeon, mallard and goosander *Mergus merganser* were also noted. During surveys in March small numbers of oystercatcher routinely flew across the route at heights of approximately 10m. These flights were considered to be birds moving into breeding habitats/ territories.

3.1.21 Through the winter period a small number of lapwing flights across the A9 at heights of >30m were recorded, with group sizes ranging from 2 to 50. Movements noted were between Gordonhall compartment and an unknown location west of the A9 River Spey crossing. No movements into parts of Insh Marshes NNR west of the crossing were reported.

Existing sources of disturbance noted

3.1.22 Very little disturbance, anthropogenic or otherwise, to whooper swan was reported during the vantage point survey period. A single flight over the A9 River Spey crossing, considered to be a result of disturbance (unknown source), was reported in early December. Also in early December, a helicopter overflying Insh Marshes briefly (<3 minutes) at relatively low altitude (estimated between 300-400m) elicited an alert response (heads lifted) from a group of seven whooper swan located within Gordonhall compartment. The swans were deterred from feeding for short period of time. Activities within or adjacent to Insh Marshes NNR comprises vehicle use along Ruthven road and the existing A9. No observed response to any of these sources of disturbance was noted by whooper swan, although all activities were distant to feeding and roosting groups. Fencing activities were also noted which took place within an estimated 400m of a group of whooper swan with no observed response noted.

3.1.23 Greylag geese were more susceptible to disturbance. The helicopter flight noted above flushed a group of 40 birds from foraging grounds within Insh Marshes. Similarly, vehicles travelling along Ruthven road typically elicited an alert response from geese feeding in fields adjacent to the road or in some cases birds were flushed from feeding areas.

3.2 Breeding

3.2.1 This section sets out the results of breeding vantage point surveys.

Wigeon

3.2.2 Wigeon were recorded in the study area on four of the seven survey visits, see **Table 12.5.10**. A maximum of four individuals (a group of males) were noted during the surveys, on the River Spey

in late June. All wigeon sightings arose from a single locality. A pair was noted on three occasions, in the same general location. Only adult birds were recorded, with no juveniles recorded throughout the survey period.

- 3.2.3 One flight by a pair (male and female) of wigeon was recorded on visit 1, where a pair following the River Spey flew from the west of the A9 over the current Spey crossing (10m high over road), where they were lost from view to the east of the road. After this flight, two wigeon (pair) were noted within the study area to the east of the crossing. Given the location of the later sighting the birds were considered to be the same as those recorded in flight earlier.
- 3.2.4 The presence of a pair of wigeon and subsequently a group of four males early in the breeding season, with continued presence thereafter indicates a potential breeding attempt. Details on the location of wigeon breeding activity is treated confidentially due to the scarce nature of wigeon as a breeding species in Scotland. The vantage point records of wigeon are presented alongside Insh Marshes RSPB breeding bird data for wigeon (2015 to 2017) on **Confidential Drawing 12.15.1 in Confidential Appendix 12.15.**

Table 12.5.10: Summary of wigeon distribution detected during VP surveys

Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6	Visit 7
Pair flight from west to east landed within study area.	0	Pair present within study area.	Pair present within study area.	0	Four males present within study area.	0

Wood sandpiper

- 3.2.5 A possible wood sandpiper was noted on visit 5b, 9th June 2017, feeding in a small pool along the Burn of Ruthven, approximately 330m from the existing A9 River Spey crossing. Positive identification could not be confirmed due to the distance and brief view obtained.

Breeding osprey

- 3.2.6 An osprey was recorded on visit 5 on 8th June 2017 at 17:42, flying east over the A9 River Spey crossing at an estimated height of >50m.

Breeding spotted crane

- 3.2.7 Spotted crane was not recorded during the surveys.

Other notable breeding bird species recorded

- 3.2.8 The most numerous waterfowl species observed using the study area during the breeding season were greylag goose, mallard, and teal. The majority of these species were noted utilising habitats throughout the Ruthven compartment (east and west of A9 River Spey crossing) and around Ballochbuie Island (east of the crossing). The most numerous recordings were noted on the River Spey itself or adjoining habitat. Goldeneye and red breasted merganser and gosander were observed on and around the River Spey. Goldeneye, with broods of young, were present at the first downstream meander of the River Spey in June.
- 3.2.9 Waders were also numerous and included lapwing, oystercatcher, redshank, common sandpiper *Actitis hypoleucos*, curlew *Numenius arquata* and snipe *Gallinago gallinago*. Movement of wader species across the A9 was reported and was most frequently observed for oystercatcher and lapwing. An overview of general flight frequency and height of wader species is summarised in **Table 12:11.**

Table 12:11: Overview of breeding wader flight activity across the existing A9

Species	Flight Height (over road level) observed	Frequency
Snipe	>50m	Observed as display / calling flights on 1 occasion
Redshank	5m – 10m	4 flight records reported crossing the existing road.
Curlew	5m- 100m (single flight record at 5m)	Curlew flights across the existing road were infrequent and typically at heights of >20m
Oystercatcher	10-50m	Recorded crossing the scheme on most survey visits – included records of flights below existing bridge deck.
Lapwing	5m – 60m (typically reported at 10m)	Recorded crossing the scheme on most survey visits

- 3.2.10 During access and egress to vantage points along the existing embankment and bridge observations were made of any bird strike on the roads. The only bird corpse located was that of a blackbird *Turdus merula*.
- 3.2.11 Gulls were also frequently recorded, including black-headed gull, common gull and smaller numbers of herring gull and lesser black-backed gull *Larus fuscus*.
- 3.2.12 Most wildfowl and waders were recorded feeding within the numerous small pools or grassland areas within the study area. The edges and sand banks on the River Spey are also regularly supported gulls, wildfowl and displaying waders. **Drawing 12.47, Volume 3** shows the distribution of notable species within the study area.
- 3.2.13 Most flyovers concerned gull species, but waders such as oystercatcher and wildfowl such as mallard were recorded. Merlin was also recorded during the breeding bird vantage point survey. An adult female was noted on visit 1, flying low (under 5m) and in westerly direction over the River Spey crossing.
- 3.2.14 **Table 12.5.11** provides an overview of notable observations / behaviours observed during vantage point surveys relating to breeding birds present to the east of the A9 River Spey crossing. **Table 12.5.12** provides an overview of breeding birds recorded west of the A9 River Spey crossing. These survey observations provide an indication of functional use of habitat within the study area by breeding species.

Table 12.5.12: Overview of notable breeding bird species observations east of A9 River Spey crossing

Species	Closest courtship recorded to existing A9	Closest feeding activity noted to existing A9	Closest juveniles feeding to existing A9
Black-headed gull	None recorded	No specific feeding activity recorded	No pre-fledging birds recorded
Common sandpiper	None noted	>40m on mud and gravels on River Spey Banks. Species restricted to the River Spey corridor within study area. Routine use of mud banks / gravel bars downstream of existing bridge.	None recorded
Oystercatcher	Directly below A9 road bridge where scrape was later formed	Immediately adjacent / underneath bridge.	Immediately adjacent/ underneath bridge.
Redshank	None within 100m	>25m (pair feeding) within grassland in Ruthven compartment. Regular feeding use of exposed fine sediment adjacent to gravel bar >70m from existing bridge structure.	None recorded
Snipe	Calling (song) noted though definitive location could not be located from VP. Pair noted within 30m of embankment.	>30m	None recorded
Lapwing	>50m	>40m post breeding flocks of adult and juvenile gathered on flood banks surrounding Ballochbuie Island (east of crossing). Habitat use appeared to be widespread throughout, though no activity in immediate proximity to the A9 embankment was recorded	None recorded
Curlew	>150m within grassland/ rush pasture	>60m feeding within grassland	None recorded
Goldeneye	None recorded	Regular presence on first downstream meander of the crossing	>160m downstream, regular presence from first downstream meander form existing crossing.

Table 12.5.13: Overview of notable breeding bird species observations west of A9 River Spey crossing

Species	Closest courtship recorded to existing A9	Closest feeding activity noted to existing A9	Closest juveniles feeding to existing A9
Black-headed gull	None recorded	>20m, post breeding group of 29 resting and feeding on pools at base of A9 bridge embankment	No pre-fledging birds recorded
Common sandpiper	N/A	N/A	None noted
Oystercatcher	NA	<10m. feeding noted around open water at foot of embankment	160m within grassland outside of flood bank
Redshank	N/A	c50m, feeding noted in a pool feature at a breach in the embankment.	None noted
Snipe	<10 m, snipe were recorded displaying from areas of marshy grassland at the foot of the A9 bridge embankment.	<500m, snipe was recorded feeding at a pool at an existing breach in the flood bank, feeding was likely undetected in marshy grassland at the foot of the embankment.	None noted
Lapwing	<20m	c10m, lapwing adults and juvenile routinely fed and sheltered on and around areas of marshy grassland open water at the foot of the A9 embankment	<10m
Curlew	None noted	>60m, present outside flood bank in grassland	None noted
Goldeneye	None noted	>50m, a significant pool feature is present immediately upstream of the existing River Spey bridge crossing, this feature is routinely used by goldeneye feeding during the breeding season	None noted

4 Evaluation and Overview of Results for SPA

Qualifying Species

Non-breeding whooper swan

- 4.1.1 Distances of whooper swan from the existing A9 River Spey crossing were generally over 450m. The closest rangefinder readings were at 477m, from the large group of 30 noted between plot B and F. The closest observation of whooper swan to the River Spey crossing comprised of two whooper swans on the River Spey, at an approximate distance of 150m. As noted in the constraints section of this report the distribution of whooper swan recorded are considered to be typical of 'normal' conditions as no flood events occurred during the non-breeding vantage point surveys.
- 4.1.2 Whooper swan were recorded on five of the seven survey visits. On visits when swans were recorded, total numbers ranged from 3 to 33 birds. On all occasions, they were recorded to the east of the River Spey, most often within plots B, E and F which includes the River Spey and comprises a mosaic of pools and swamp which provide ideal foraging habitat for whooper swan. These plots correspond to Gordonhall, and to a lesser degree Invertromie Fen, RSPB Insh Marshes survey compartments (see **Drawing 12.40, Volume 3**). NVC habitat maps of Insh Marshes (Maier and Cowie 2002) show a change in vegetation types to wetter fen and swamp habitats east of the burn of Ruthven (plot B).
- 4.1.3 No whooper swans were recorded within the Ruthven compartment during the surveys and they were not recorded using NNR habitat west of the River Spey crossing.
- 4.1.4 The River Spey - Insh Marshes SPA is designated for supporting 190 whooper swans, representing at least 3.5% of the wintering population in Great Britain (5 year peak mean 1991/2-1995/6). The presence of up to 33 whooper swans within the study area (>500m from the River Spey crossing) represents 17% non-breeding whooper swan SPA population.

Breeding wigeon

- 4.1.5 The breeding vantage points surveys identified one pair of wigeon within the study area. Details of the location of breeding wigeon in relation to the A9 River Spey crossing is provided in the **Confidential Appendix 12.15, Volume 2**. The River Spey – Insh Marshes SPA is designated for supporting 37 pairs representing <0.1% of the breeding Western Siberia/ Northwestern/ Northeastern Europe population (Mid 1990s). The presence of one pair of wigeon within the study areas represents around 3% of the SPA breeding wigeon population.

Non-breeding hen harrier

- 4.1.6 Hen harrier was recorded twice during the same visit in February 2017. Both records involved flight lines only. No indication of roosting behaviour has been recorded within the study area during vantage point surveys. Active foraging was identified at the outer limit of the 500m study area only.
- 4.1.7 The recording of hen harrier coincided with observations of other notable raptors (golden eagle, merlin and peregrine) during a period of poor winter weather (heavy snow fall). It is suspected

that the severe weather prevented hen harrier moving from roost locations in the Insh Marshes to higher ground.

- 4.1.8 The River Spey - Insh Marshes SPA is designated for supporting 11 hen harrier individuals representing at least 1.5% of the wintering population in Great Britain (5 year mean, 1990/1-1994/5). The presence of 1 hen harrier noted within the study area represents 9% of SPA non-breeding hen harrier SPA population.

Breeding osprey; breeding wood sandpiper; breeding spotted crake

- 4.1.9 During the breeding vantage point surveys one osprey flight and a single foraging wood sandpiper was noted within the study area. No evidence of breeding was noted for these species. Spotted crake was not recorded during the breeding vantage point surveys.

5 References

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