

Visitor behaviour in sensitive woodland habitats – repeat photographic survey at Boat of Garten Woods





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COMMISSIONED REPORT

Commissioned Report No. 634

**Visitor behaviour in sensitive woodland
habitats – repeat photographic survey at
Boat of Garten Woods**

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COMMISSIONED REPORT

Summary

Visitor behaviour in sensitive woodland habitats – repeat photographic survey in Boat of Garten Woods

Commissioned Report No.: 634

Contractor: Walking-the-Talk

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Background

Boat of Garten woods are considered to be an important breeding site for capercaillie and the birds are sensitive to disturbance by people and dogs. There has been a sustained public campaign to reduce the potential for disturbance to capercaillie and this research has sought to understand how effective these efforts have been. Baseline data collected prior to the campaign by MBEC Ltd in 2011 has been compared with repeat survey conducted by Walking-the-Talk in 2013.

A set of motion-triggered cameras were installed at defined points within the wood for a period of two weeks in 2011 and 2013, recording visitors and recreational activities during these times. The images were analysed to determine the numbers of people and dogs as well as activities and observed behaviour.

Main findings

From 19th June – 3rd July 2013 there were 558 walkers, 57 runners, 80 cyclists and 313 dogs recorded, some of which were repeat visits. Compared with 2011, there was a decrease of 14% in people, but 66% fewer visits by dogs recorded. Of the 313 dogs, 28% were seen on a lead, but 71% were recorded as being under close control.

The survey has shown that there has been a measurable, positive change in behaviour by people using the woods between 2011 and 2013 surveys. The most significant changes represent the numbers of dogs on a lead and the large reduction in the number of visits with dogs, which are thought to have been displaced to other sites.

We have concluded that the campaign to raise awareness of the sensitivity of part of the area for breeding capercaillie has shown positive outcomes and that the people using Boat of Garten woods have modified their behaviour. This represents an important part of protecting breeding capercaillie on this site and demonstrates the potential for people to react positively to clearly defined requests for people to take responsible access, particularly with dog owners. Uncertainty remains about behaviour at other times of the year and where people now exercise their dogs. In addition, there is scope to investigate the degree of impact of the campaign amongst dog owners.

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1. INTRODUCTION

1.1 Background to the Study

In 2011 Scottish Natural Heritage (SNH) requested that a survey of people using the woods at Boat of Garten be undertaken as part of the environmental assessment for a planning application for housing. The survey, commissioned by the developers, was designed and implemented by MBEC Ltd of Edinburgh. A summary of the methodology and findings were presented in the paper that was submitted to the Cairngorms National Park Authority (CNPA), MBEC (2011).

Boat of Garten woods are considered to be an important breeding site for capercaillie and the birds are sensitive to disturbance by people and dogs. SNH and CNPA, together with Seafield Estate, the Community Council and the Boat of Garten Community Company, have been actively involved in trying to reduce the potential for disturbance to capercaillie and have sought to understand how effective these efforts have been. The two organisations have been involved in public awareness raising through community consultation exercises, installation of advisory signage in the woods and creation of a dedicated post of seasonal ranger working to promote responsible access.

People are now requested to keep dogs on a short lead during the most sensitive period 1 April – 15 August, in parts of the wood where the habitat is suited to capercaillie raising their broods (The Responsible Access Area, see Figure 1). The aim is to reduce the risk of disturbance to capercaillie caused by dogs ranging off paths. The rationale is that capercaillie chicks and eggs are especially vulnerable to disturbance by dogs, because they cannot escape. If the hen is driven away, the brood can become chilled, or killed by the dog, and is more vulnerable to attack from predators such as crows, foxes or pine martens.

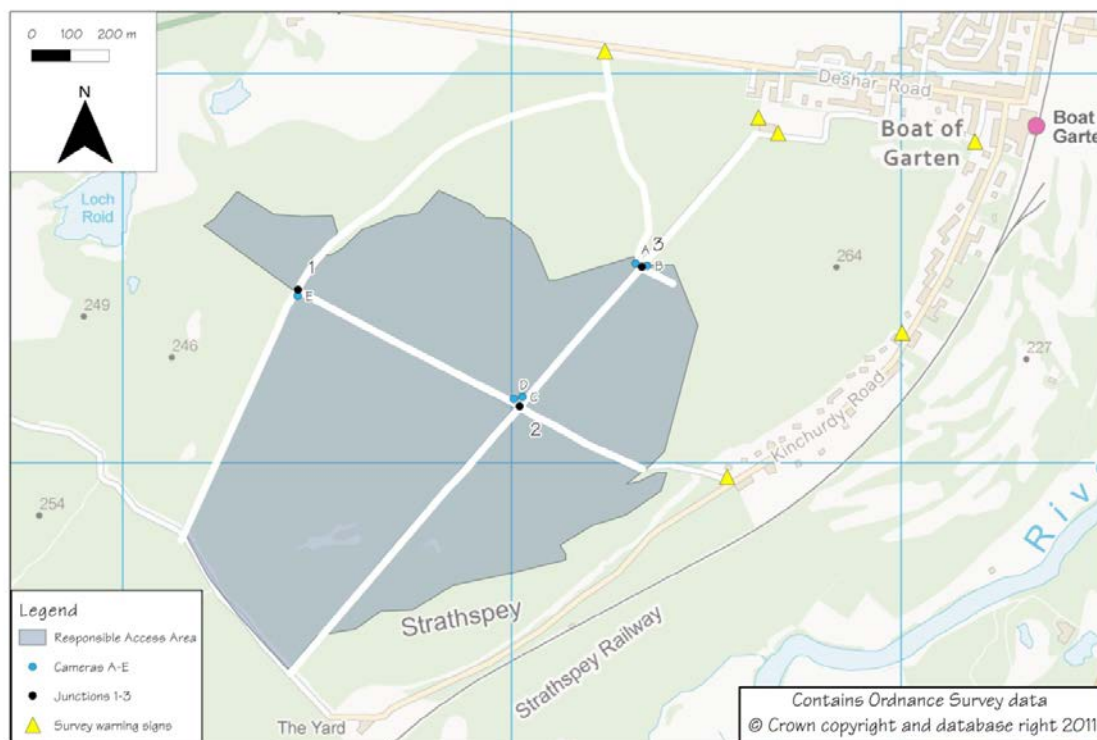


Figure 1. Area where responsible access is requested and location of cameras and signs.

1.2 Objectives

Following a campaign of awareness-raising in the local area SNH wanted to measure whether there has been any change in behaviour by visitors to the wood, so this repeat survey was commissioned. The main objective was to collect comparable data during the same time period as the previous survey (2 weeks in June / July) and to provide a more detailed analysis of the data available.

2. METHODOLOGY

2.1 Overview

The original study was designed by MBEC Ltd and the contract specification for this repeat gave clear guidance for the data collection to ensure that the data would be comparable between the two surveys.

Data was required for a fixed time period from 19th June to 3rd July, overlapping the start of the local school summer holiday, matching a similar period in 2011. The data comprises photographic images collected using automatic cameras located at predetermined positions within the wood (see Figure 1). These cameras use infra-red sensors to detect movement, which triggers the shutter. The images collected are subject to the Data Protection Act, 1988.

2.2 Project considerations

The methodology specified the use of automatic cameras and this meant that strict data protection procedures are required to ensure that the privacy of individuals is not compromised. The following issues were dealt with prior to the data collection period:

Data Protection – Walking-the-Talk is a registered Data Controller under the Data Protection Act, and kept the images secure during the project as well as securely deleting the images afterwards (see section 2.6).

Local community awareness – SNH notified the community council in advance that the project was taking place and the controls that would be put in place to protect identities of those photographed. An article was also published in the local community newsletter

Police Scotland – Walking-the-Talk discussed the legal implications of the project with the local Wildlife Crime Liaison Officer and took advice regarding notification and dealing with enquiries from the public. The local police station in Aviemore was made aware of the project and an incident number was raised as a precaution, to deal with any enquiries from the public. There were no enquiries to Police Scotland.

Information signs – a set of signs were placed at the main entrances to the woods letting people know that the project was taking place (see Figure 1 for locations and Figure 2 for the wording). This included the dates and a contact telephone number. The wording was agreed with Police Scotland and SNH. There were no calls from the public.



Figure 2: A copy of the signs placed during the survey.

2.3 Adaptations to the original methodology

During the camera testing phase it became apparent that the original methodology would not record all visitors at the three junctions using the original camera locations. This is the result of track widening and removal of trackside trees, which was carried out after the original survey. Appendix 1 demonstrates the issue with regard to triggering the sensors on the cameras.

An additional camera was installed at Junction 1 to capture images from all three paths. However, at Junction 2 it was not possible to find placements for the two cameras to cover all four paths. The testing at Junction 2 showed that all directions of interest to the Responsible Access Area were covered with the revised positioning (see Appendix 1).

The contract specification required the placement of all cameras for the period 19th-26th June and to leave the camera at Junction 3 for 26th June to 3rd July to make the data directly comparable. In discussion with the client it was proposed to leave all cameras on site for the full two weeks and analyse the data if resources allowed.

In the original MBEC study, the analysis of dogs was based on whether or not a dog was on a lead. However, the Scottish Outdoor Access Code (SOAC) uses the term 'under close control' when describing responsible access with dogs, so this was analysed in addition to the number of dogs seen on a lead. As part of a study looking at the impacts of recreation on designated features of the Loch Lomond Islands (Morris et al, 2010), Walking-the-Talk devised a protocol that more closely meets the meaning of 'under close control' than simply observing whether or not the dog is on a lead. This protocol is currently in use by the Loch Lomond and The Trossachs National Park Ranger Service and **'under close control' is defined as the dog being within 5m of its owner and not running**. The same definition was used in assessing the images collected during this project.

2.4 Data collection

The five cameras were placed on 18th June and tested using multiple passes both on foot and bicycle to ensure that they were triggered from different positions on the track. The SD cards in the cameras were then reformatted and all cameras were operational from midday on 19th June until midday on 3rd July. They were placed in trees using a step ladder at a minimum height of 3m.

All data was downloaded on 26th June and their functionality checked. The cameras were removed on schedule after midday on 3rd July and all signs were removed.

2.5 Data analysis

The high volume of images from five cameras meant that a sophisticated analysis technique was required. A relational database was written to store the quantitative analysis of the images, which means that the images are kept separate from the resultant dataset. A form was used to categorise the content of each image (see Figure 3) and a separate form was used for quality control of the data (see Figure 4). The images in these Figures have been selectively blurred to protect the identities of those photographed.

The categorisation of data captured the number of people in the image, the activity and the number of dogs. The direction of travel was recorded, and it was noted whether the people had appeared at other cameras (to avoid double counting at a junction or within the wood). In addition a qualitative measure was made of whether dogs were under control (the dog is either on a lead or within 5m of the owner and not running). Figure 3 has been annotated to illustrate a dog categorised as not under control.

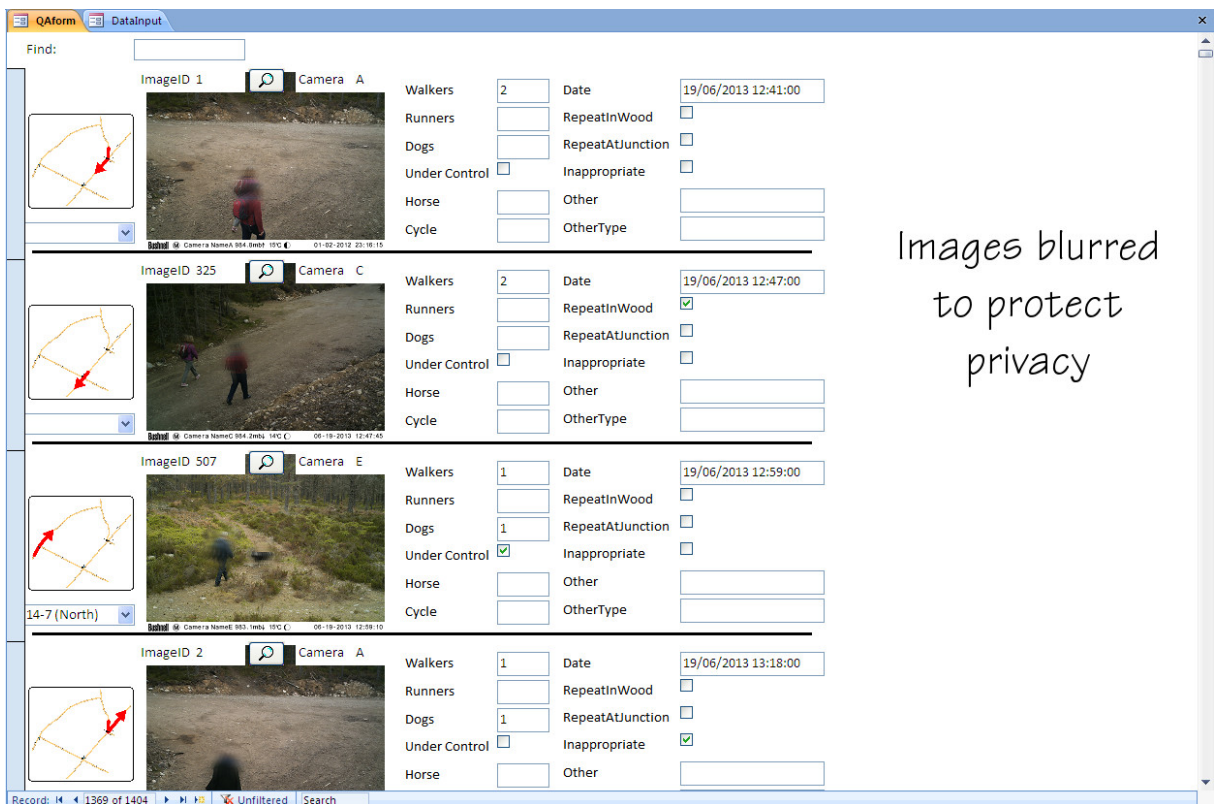
In order to directly compare data with 2011, the images with dogs were further scrutinised and a variable was added for whether or not the dog was on a lead. The dataset was also divided into two weeks, so that the totals would be comparable between years.

The content of all images was independently checked by a second member of staff. The data were subsequently analysed using pivot tables and charts, and the results are outlined in Section 3. A spatial database was also used to assist with visualisation of the results and a series of maps were produced using Ordnance Survey 1:25,000 Open Data.



Images blurred to protect privacy - annotations to explain analysis

Figure 3: database form for categorisation of image content.



Images blurred to protect privacy

Figure 4: form for quality control.

2.6 Data Protection

The photographs of members of the public were not shared with any other individual or organisation. After analysis, they were deleted. The images stored on the SD cards were securely deleted using a software programme called 'Kill-Disk'. This operates by overwriting each sector on the disc to destroy the data. This removes rather than 'hides' the data (which is what happens when files are 'deleted' by an operating system such as Windows, Linux or OSX). During the data analysis phase the images were stored on a laptop which is secured with encryption software and the images were deleted using the same method as for the SD Card.

2.7 Issues with data collection and analysis

One of the cameras reset itself on 2nd July and the timestamp was reset to 1st January 2012. Fortunately it was possible to compare a number of images from other cameras to calculate the time of reset and 'shift' the timestamp for the remaining images from this camera.

Camera B had a period of three hours where it was being triggered without any apparent reason. However one image shows a small bird perched on a branch at the corner of the image, so it is possible that the images were caused by a flock of birds using the tree for a period. The placement of Camera B also proved problematic as people were able to skirt beneath it without triggering the camera – an informal path next to the camera appears to be more frequently used than anticipated. The width of the track and location of the tree meant that it was not possible to get a satisfactory angle of the camera that would be triggered by all visitors so the final position was a slight compromise. The data analysis from Junction 2 revealed a small number of people who had come past Junction 3 but were not recorded. It is not possible to determine the exact number of people who were missed but it is considered to be a small proportion of visitors.

The cameras have under recorded dogs. Comparing data from different cameras it is possible to determine cases where people appear with and without their dog. Data have been categorised using the visual evidence and are consistent within a single visit, so the results are a 'minimum' number of people and dogs. However there are a number of cases where a person visiting each day has no dog on one or more occasion. Whilst it is likely that they were walking their dog (from the time of day), this has not been included in the data. Therefore dog numbers, particularly those not under control are likely to be slightly higher than the number stated.

3. RESULTS

The analysis stage removed duplicate images at each junction and it was possible to identify where visitors moved between junctions to determine overall numbers as well as numbers at each junction. It should be noted that in the presentation of these results when referring to people or dogs, this does not equate to unique individuals. Repeat visitors can be recognised in the dataset, although the proportion of repeat visits has not been calculated. Some of these repeats are multiple visits per day (commonly dog walkers) and there were some visitors who use the woods daily, throughout the survey period. It would be difficult to accurately determine the figures for repeat visitors or unique individuals. There may be a 'pattern' to the timing of daily visits, probably determined by work patterns and dog exercising, but this has not been confirmed.

During the data collection period a total of 711 people were recorded, with 313 dogs counted (see Table 1).

Table 1: total number of people and dogs (by activity).

Date	Walkers	Runners	Cyclists	Other	Dogs
Wednesday 19-June	21	4	4	0	12
Thursday 20-June	30	2	3	1	22
Friday 21-June	42	4	9	0	22
Saturday 22-June	46	5	1	2	23
Sunday 23-June	29	1	4	0	19
Monday 24-June	29	4	4	1	19
Tuesday 25-June	35	6	1	1	13
Wednesday 26-June	36	6	6	1	26
Thursday 27-June	34	1	3	1	14
Friday 28-June	40	2	6	0	23
Saturday 29-June	61	3	3	2	23
Sunday 30-June	51	9	19	0	37
Monday 01-July	55	5	6	5	21
Tuesday 02-July	32	4	7	2	28
Wednesday 03-July	17	1	4	0	11
Grand Total	558	57	80	16	313

Activities covered by 'Other' include buggies (n=9), motorbikes (n=4), wheelchair (n=1), tag-along bike (n=1) and a car (n=1). During the testing phase one horse rider was seen in the wood, but none were recorded during the data collection period.

A summary of the weather conditions during the study period is shown in Table 2.

Table 2: Weather summary from image records.

Date	Midday Temperature (C)	Weather summary
Wednesday, June 19, 2013	16	overcast
Thursday, June 20, 2013	14	overcast
Friday, June 21, 2013	15	overcast
Saturday, June 22, 2013	14	overcast
Sunday, June 23, 2013	11	prolonged rain
Monday, June 24, 2013	11	prolonged rain
Tuesday, June 25, 2013	11	bright, cloudy
Wednesday, June 26, 2013	13	sunny intervals
Thursday, June 27, 2013	12	overcast
Friday, June 28, 2013	15	showers and sunny intervals

Saturday, June 29, 2013	14	sunny intervals
Sunday, June 30, 2013	14	sunny intervals
Monday, July 01, 2013	14	sunny intervals
Tuesday, July 02, 2013	12	bright, cloudy
Wednesday, July 03, 2013	17	overcast

It is likely that the prolonged rain on Sunday 23rd June reduced the number of visitors to the wood, although there is still a 'core' of dog walkers that visit in all weather conditions.

The average (mean) number of people / dogs in each visit is shown in Table 3, but the most common (mode) group size was one for all activities, including dog-walking. This confirms that 'quiet informal recreation' is the most common activity in the woods.

Table 3: Mean number of people in each group.


	Walkers	Runners	Cyclists	Dogs
Week 1	1.31	1.15	1.22	1.23
Week 2	1.52	1.08	1.75	1.22
Mean in each group overall	1.42	1.12	1.55	1.23










3.1 Use of different parts of the wood


The numbers at each junction help to indicate how people are using the woods, with Table 4 showing both the junctions and direction of travel for all visits and it should be noted that Table 1 excludes the 'duplicates' shown in Table 4 (i.e. where the same person was recorded at more than one junction), hence the difference in the totals. This is summarised in Figure 5 for each junction.









Table 4: Breakdown of activities and direction of travel, by junction.

Direction	Walkers	Runners	Cyclists	Others	Dogs
Total at Junction 1	98	15	16	0	62
	9	7	0	0	7
	16	1	4	0	12
	27	5	5	0	18
	8	1	6	0	7
	23	0	1	0	10

Direction	Walkers	Runners	Cyclists	Others	Dogs
	15	1	0	0	8

Direction	Walkers	Runners	Cyclists	Others	Dogs
Total at Junction 2	328	57	65	12	141
	121	24	47	8	52
	127	24	14	2	48
	3	0	0	0	1
	3	0	0	0	4
	12	1	3	0	8
	20	0	0	2	10
	16	4	0	0	6
	24	1	1	0	10
	0	3	0	0	0

Direction	Walkers	Runners	Cyclists	Others	Dogs
	2	0	0	0	2

Direction	Walkers	Runners	Cyclists	Others	Dogs
Total at Junction 3	503	61	49	24	262
	55	13	27	5	21
	35	11	8	0	22
	90	7	0	3	81
	52	14	0	1	38
	112	6	8	5	42
	136	9	6	3	36
	13	0	0	1	10
	10	1	0	6	12

	Walkers	Runners	Cyclists	Others	Dogs
Grand Total (all junctions)	929	133	130	36	465

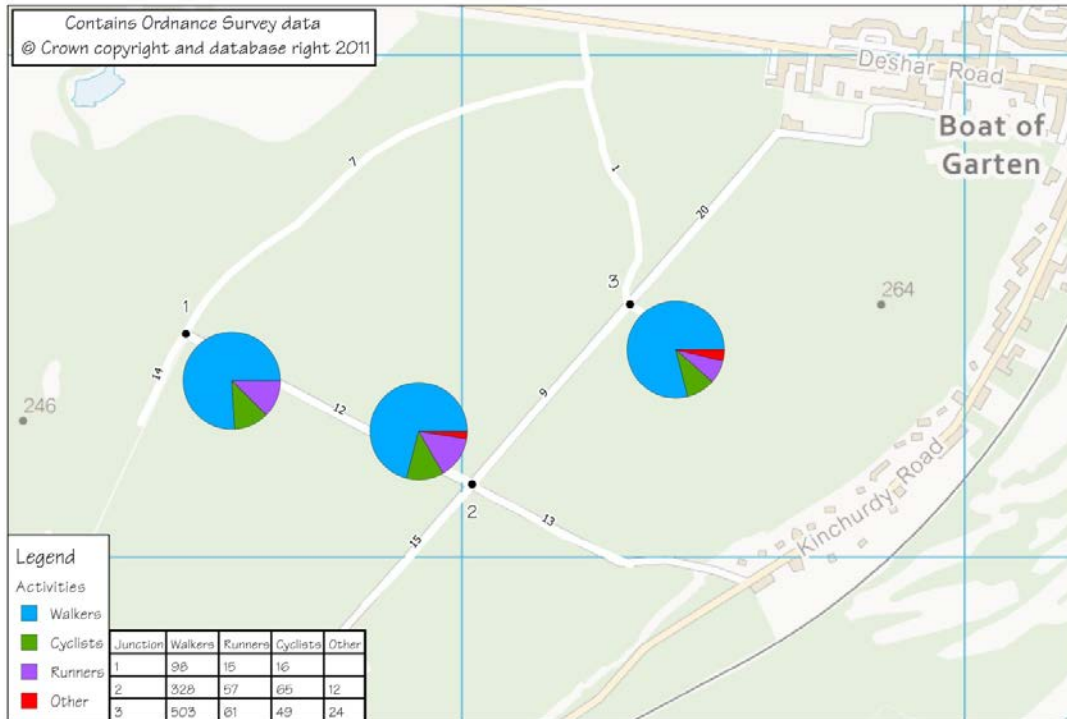


Figure 5: Visitors at different junctions, shown by activity.

The data can also be plotted to show the use of different paths for different activities (as shown in Figure 6). Although there is some double-counting on paths 12 and 9 which meet more than one junction the relevant records have been adjusted to remove the duplication (the records for path 12 that apply to both junction 1 and 2, have been halved, as have those for path 9 that relate to both junction 2 and 3). There is a small error where people have not been picked up at both junctions, but this is minimal.

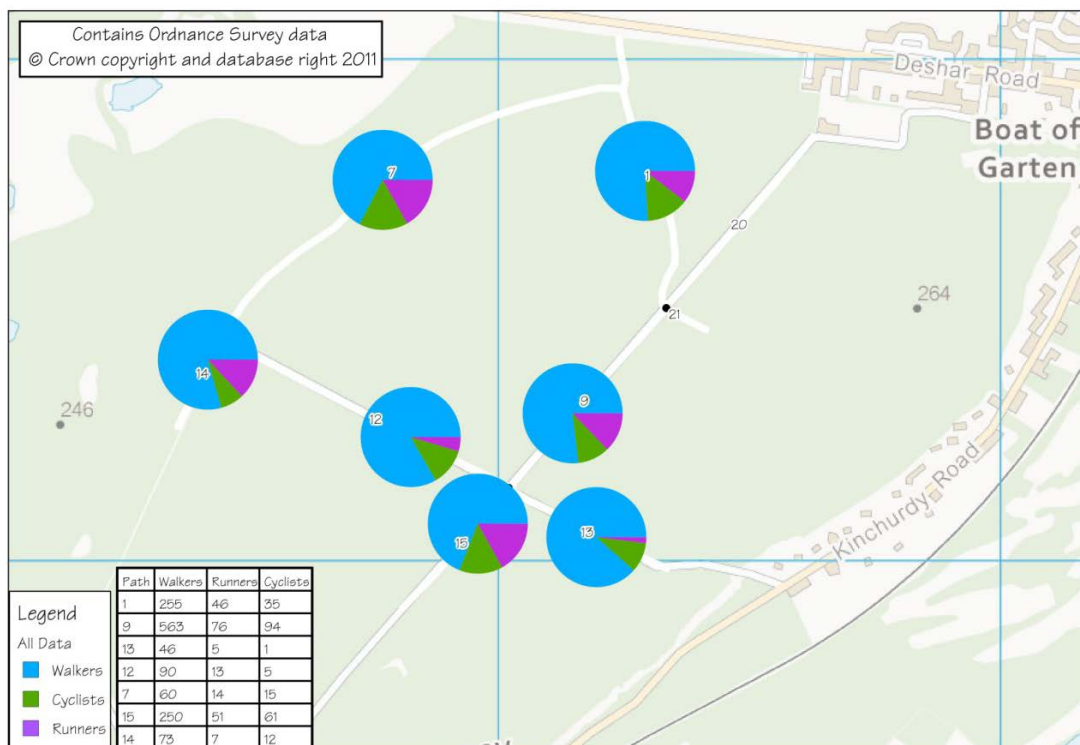


Figure 6: Activities on each path.

A subdivision of the data by 'study week' reveals that there is no significant difference in the patterns of use (numbers at each junction) by different activity. The proportions of each activity are very similar in both weeks, although the actual numbers were higher in the second week.

3.2 Visitors with dogs

During the survey period, there were 206 groups or individuals with a dog and a total of 313 dogs counted. This is shown in Figure 7 - the totals within the diagram include people / dogs seen at more than one junction and the numbers without a dog are included for comparison.

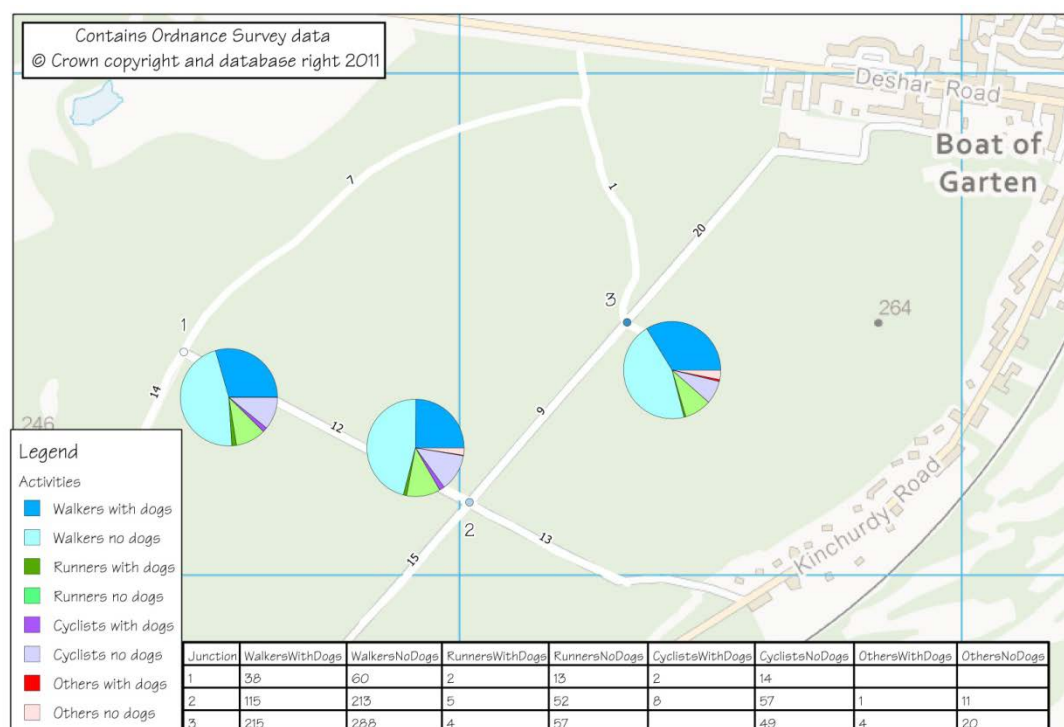


Figure 7: Visitors at different junctions, shown by activity and dogs.

For images where people can be seen with dogs, or dogs are present without a person, it is also possible to determine how often dogs were under control or not, during the study period. Table 5 shows the proportions of dogs that are under control and this is listed according to location as well as by sum of dogs, or count of occasions (i.e. whether or not a person has one or more dogs). Table 5 also shows the difference between the first time that a dog is seen and for all instances (i.e. where a dog is seen at different junctions during the same visit). Figure 8 shows the status of dogs at different junctions.

Table 5: Status of dogs in the woods.

	Status	When first seen		All junctions	
		Dogs	Occasions	Dogs	Occasions
All	Not under control	(102) 32.6%	(82) 32.5%	(135) 29.0%	(110) 28.9%
	Under control	(211) 67.4%	(170) 67.5%	(331) 71.0%	(270) 71.1%
1	Not under control	31.0%	28.6%	27.4%	25.5%
	Under control	69.0%	71.4%	72.6%	74.5%
2	Not under control	33.3%	30.4%	27.0%	25.8%
	Under control	66.7%	69.6%	73.0%	74.2%
3	Not under control	32.7%	34.2%	30.4%	31.6%
	Under control	67.3%	65.8%	69.6%	68.4%

The nuance of the difference between the proportion of dogs under control when first seen and for all junctions reflects the variation in behaviour through the wood. A dog may be recorded at more than one junction, but behaving differently at each. There is a very high proportion of dogs that are seen with consistent behaviour at more than one junction, suggesting that the criteria used in this study do reflect whether or not a dog can be considered under close control (i.e. a dog consistently remains close to the owner throughout its visit). *Of the 313 dogs recorded in the woods during the survey period, 211 (67.3%) were under control when first seen.*

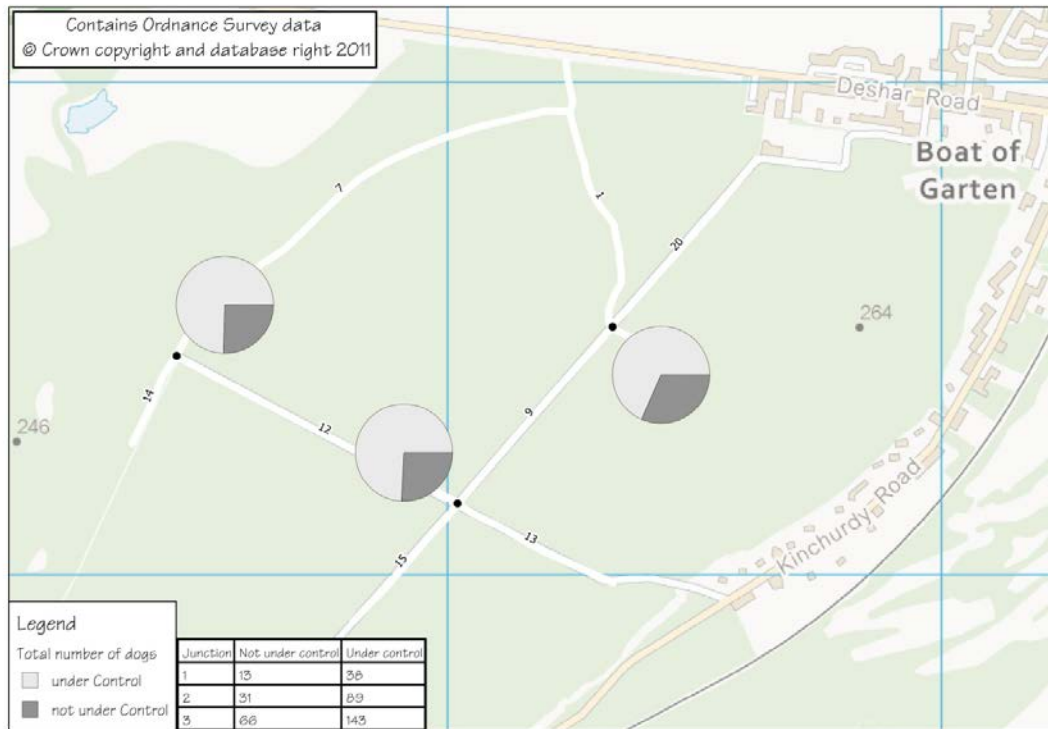


Figure 8: Status of dogs in different parts of the wood.

Within this subset of the data are images that show only dogs (i.e. the owner is not within view). There are 76 images of dogs only, of which 49 have been classed as 'not under control'. *From the images and site visits it was clear that one particular dog, although it appeared repeatedly without its owner, should be considered 'under control' as it is old and arthritic – the owner can be seen in separate images and was observed on site with the dog.*

It is possible to plot the number of dogs and their status on each path, as shown in Figure 9. This shows the proportions of dogs under control and each pie chart is proportionally sized to the number of dogs on each path (to give an impression of the relative use).

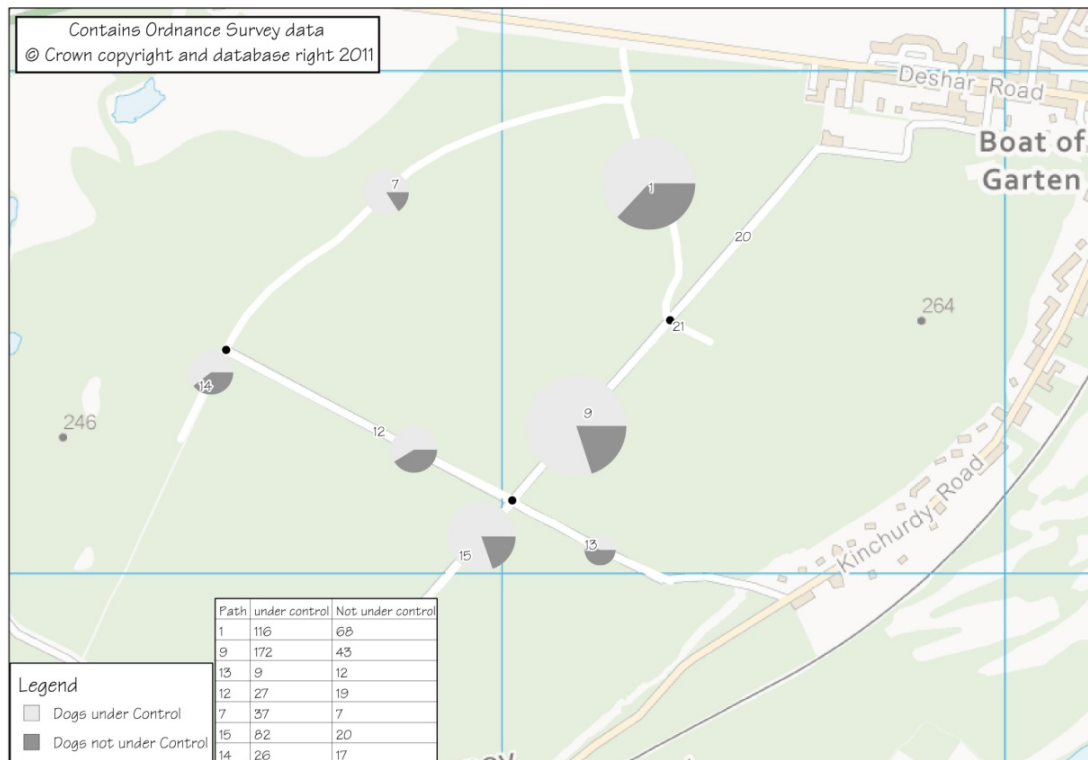


Figure 9: status of dogs on each path.

There is a difference between different activities and this aspect is summarised in Table 6. It can be seen that runners and cyclists with dogs are highly likely to have the dog under control, although this may reflect the nature of the activity rather than the attitude of the owner. *The single occasion of a runner having a dog recorded not under control is a 'more mature' dog which is lagging behind, in the centre of the track, so this may not realistically pose a threat to capercaillie.* Table 6 excludes images where dogs appeared alone as it was not always possible to attribute the activity of the person accompanying the dog. This is the reason for the apparent difference compared with Table 5.

Table 6: Number of times dogs were observed under control or not.

Junction	Status of dogs	Accompanied by		
		Walkers	Runners	Cyclists
All	Not under control	(n= 60) 21.0%	(n= 1) 9.1%	0.0%
	Under control	(n=226) 79.0%	(n= 10) 90.9%	(n= 10) 100.0%
1	Not under control	12.1%	0.0%	0.0%
	Under control	87.9%	100.0%	100.0%
2	Not under control	16.1%	20.0%	0.0%
	Under control	83.9%	80.0%	100.0%
3	Not under control	25.3%	0.0%	N/A
	Under control	74.7%	100.0%	N/A

In the 2011 study by MBEC the data were presented according to whether or not dogs were on a lead. In order to make an accurate comparison a further trawl through the images with dogs was made, to count dogs visibly on leads (either fixed or extending type), as shown in Table 7.

Table 7: Dogs on lead at each junction.

Junction	Status	First seen		All instances	
		Proportion of dogs	Proportion of occasions	Proportion of dogs	Proportion of occasions
All	Not on lead	69.0%	70.6%	71.5%	73.4%
	On a lead	31.0%	29.4%	28.5%	26.6%
1	Not on lead	95.2%	94.3%	90.3%	92.2%
	On a lead	4.8%	5.7%	9.7%	7.8%
2	Not on lead	71.4%	71.4%	70.9%	72.5%
	On a lead	28.6%	28.6%	29.1%	27.5%
3	Not on lead	63.0%	65.2%	67.3%	69.4%
	On a lead	37.0%	34.8%	32.7%	30.6%

Without being able to interview a sample of visitors it is not possible to confirm the reason for the difference between the number of times dogs were recorded as being on a lead (101 / 26.6%) compared with the number that have been classified as under close control (270 / 71.1%). However, as observed above, the fact that same dogs are consistently recorded as under control at different junctions (and on different days, although this has not been quantified) suggests that these owners deliberately keep their dogs close to them in the woods.

An additional analysis was made for people with dogs leaving the 'Responsible Access Area' heading towards the Community Centre. This was requested to see if there is a measurable difference in behaviour as people leave this area. Table 8 shows the results for people heading north along path 20.

Table 8: Status of dogs leaving the 'Responsible Access Area'.

	Not under control	Under Control	% under control	On a lead	Not on a lead	% on a lead
week 1	22	20	47.6%	12	30	28.5%
week 2	19	31	62%	13	37	26%
Total	41	51	55.4%	25	67	27.2%

3.3 Time of day

More complex analysis was required to look at potential disturbance periods (i.e. when people are using the woods). The 'non-repeat' data (i.e. number of visits) were divided into weeks, days and hours to provide classes for analysis (see

Figure 10).

This shows that during week 1 there was someone using this part of the wood every day between 7am and 10am and between 4pm and 7pm, but during week 2 there was someone in the wood each day between 9am and 7pm. However the woods were being used on most days between 6am and 8pm, by small numbers of people every hour (low intensity, high frequency).

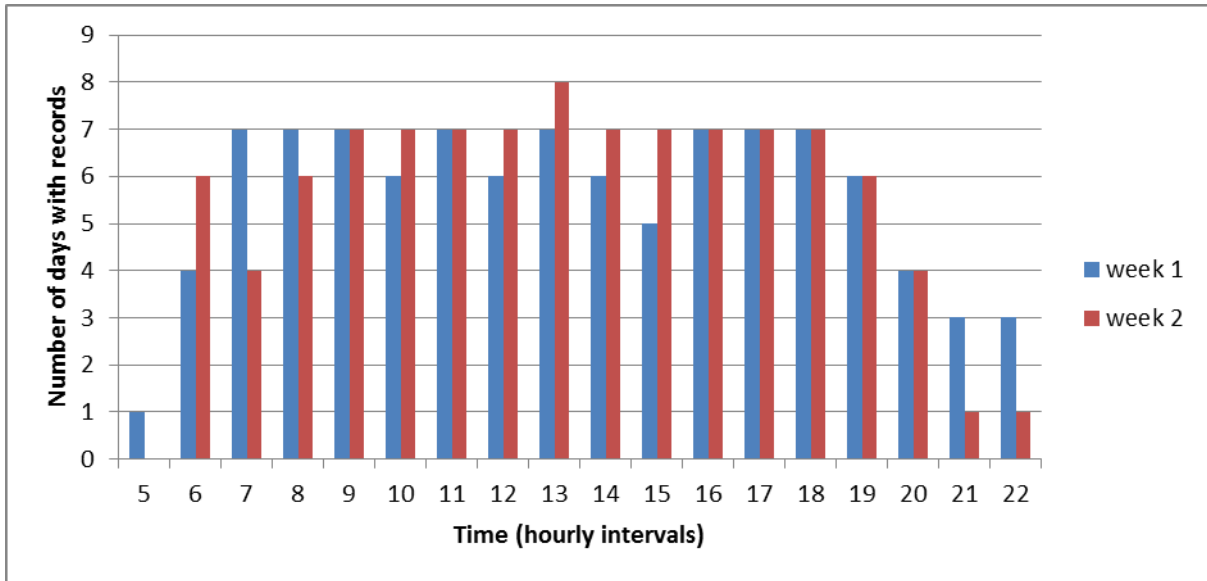


Figure 10: Daily and hourly records of visitors in the wood.

Taking the subset of data of visitors with dogs,

Figure 11 shows the time intervals where dogs have been recorded under control or not – this is a cumulative count from each day rather than a total number of incidents in each time period.

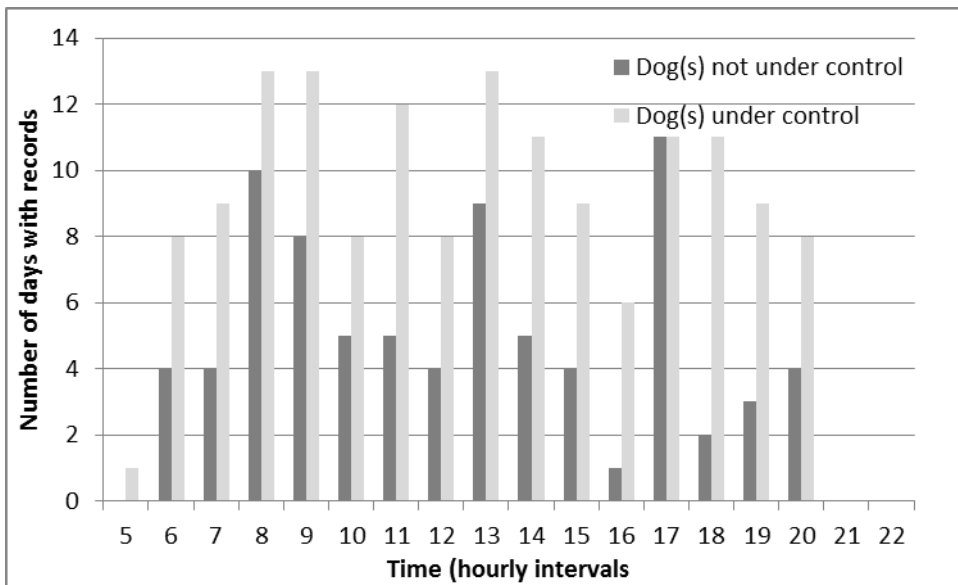


Figure 11: Status of dogs by time interval.

These analyses show that there is frequent use of the tracks throughout daylight hours by both people and dogs.

3.4 Responsible behaviour with respect to capercaillie

The survey period did not reveal behaviour on camera that would be likely to cause undue disturbance to capercaillie, although a small number of images may indicate that such behaviour does take place. On two occasions small groups of people were seen carrying dead wood at Junction 2 (possibly for use as firewood). *Although the source of the wood is unknown, collecting firewood could potentially cause disturbance, through people wandering*

off-path into the breeding habitat. However, this is not considered to be a significant issue due to the low number of incidents.

During the testing phase a visitor with two dogs was observed within the 'Responsible Access Area' using a 'wheecher' (a tennis ball launcher) to throw a ball off the track for one of their dogs to find. In discussion with the client, a further analysis of the data was made using the subset of images recorded showing dogs to look for potential frequency of this behaviour. Where a dog or owner was shown with a 'wheecher' / ball, Frisbee or a stick the image was flagged as 'inappropriate behaviour' (i.e. more likely to disturb capercaillie near the paths). Table 9 shows how frequently this occurred (the number of times, rather than number of dogs involved).

Table 9: comparison of inappropriate behaviour of dogs.

Status of dog	Inappropriate behaviour recorded	Total number of images with dogs	Proportion of occasions
Not under Control	13	110	11.8%
Under Control	16	270	5.9%
Combined	29	380	7.6%

The number of occasions where dogs were recorded with inappropriate behaviour (n=29) is a low proportion (7.6%) of total visits by dogs (n=380). *Dogs that are not under control appear to be twice as likely to be recorded with inappropriate behaviour, but through analysing this aspect of the dataset, it is apparent (but not quantified) that this behaviour is restricted to a small number of individuals who make repeat visits to the wood.*

3.5 Change in visitors between 2011 and 2013

In order to make valid comparisons between the two datasets, SNH attempted to control the potential variables as much as possible. Cameras were placed at the same junctions and the timing of the survey remained constant in relation to the beginning of the summer holiday for local schools.

In 2011, according to the MBEC report, the weekend of 26/27 June was cool and showery, whereas the weekend of 2/3 July was warm and sunny. This is broadly comparable with the weather conditions in 2013 (see Table 2) so there has been no attempt to adjust the data to control for weather differences.

The comparable data are shown in Table 10 and Table 11, and represent data from the first week of data collection.

Table 10: Comparison of activities between 2011 and 2013 (week 1).

Summary data	2011 survey	2013 survey	Change
Percentage of people walking	79.3%	79.7%	↑ 0.4%
Percentage of people running / power walking	4.0%	9.2%	↑ 5.2%
Percentage of people cycling	16.7%	8.5%	↓ 8.2%
Total number of individual groups of people	312	266	↓ 46 / ↓ 14.7%
Average number of people in each group	1.4	1.3*	↓ 7%

* represents walkers only, for cyclists and runners average group size was 1.2 and 1.1 respectively

Table 10 shows that although the number of groups / individuals has decreased by almost 15%, the proportion of people walking has remained consistent. There has been a 5% increase in runners, while cyclists have decreased by 8%.

Table 11: Comparison of people with dogs between 2011 and 2013 (week 1).

Summary data	2011	2013	Numeric change	% Change	2011	2013
Total number of dogs	318	142	↓ 176	↓55.3%		
Groups without dogs	84 *	266	↑ 182	↑216.7%	26.90%	62.00%
Groups with dogs	228 *	77	↓ 151	↓66.2%	73.10%	38.00%
Groups with more than 1 dog	81 *	23	↓ 58	↓71.6%	26.00%	9.00%
Dogs on lead	55 *	53	↓ 2	↓3.6%	17.30%	37.32%
Dogs not on lead	263 *	89	↑ 174	↓66.2%	82.70%	62.68%

* calculated value from the summary data available

Table 11 shows a dramatic change in the numbers and proportions of people who use the woods for exercising dogs, with a decrease by 66% and less than half the number of dogs. The use of percentages masks the real change in behaviour between the two surveys. Although there has only been an increase of 20% in the proportion of dogs that are on a lead, when taken together with the reduced frequency of use, this equates to 174 fewer dogs not on a lead in the woods during the survey period (a reduction by 66%).

In the previous study, MBEC provided additional analysis for two of the paths, which were considered to be more sensitive for disturbance to capercaillie. The equivalent data were extracted from the 2013 dataset and are presented alongside the previous data for comparison in Table 12 to Table 15.

Table 12: Path 7 people comparison for 2011 and 2013 (weeks 1 and 2).

Summary data	Week1		Week 2	
	2011	2013	2011	2013
Percentage of people walking	87.5%	65.8%	56.0%	68.6%
Percentage of people running / power walking	0.0%	18.4%	16.0%	13.7%
Percentage of people cycling	12.5%	15.8%	28.0%	17.6%
Total number of people	8	38	25	51

Table 13: Path 7 dogs comparison for 2011 and 2013 (weeks 1 and 2).

Summary data	Week 1			Week 2		
	2011	2013	Change	2011	2013	Change
Total number of dogs	7	21	200.0%	21	23	9.5%
Dogs on lead	0.00%	14.3%	Entire	0.00%	13.0%	Entire
Dogs not on lead	100.00%	85.7%	157.1%	100.00%	87.0%	-4.8%
Dogs under control		81.0%			73.9%	
Dogs not under control		19.0%			17.4%	

On Path 7, there was a large (300%) increase in people for week 1 between 2011 and 2013 but a smaller relative change in week 2. Likewise the number of dogs has increased, and (in this case) it is possible to identify a small number of dogs using the route on a daily basis in 2013 comprising the majority of all recorded visits. It is unknown how repeat visits compares between the surveys as this information is not available for 2011. Table 13 shows the change (in absolute terms) in numbers of dogs that are on a lead, although this needs to be considered against the fact that 81% of the dogs were recorded as under control.

Table 14: Path 1 people comparison for 2011 and 2013 (weeks 1 and 2).

Summary data	Week1		Week 2	
	2011	2013	2011	2013
Percentage of people walking	87.5%	74.7%	56.0%	70.8%
Percentage of people running / power walking	0.0%	16.0%	16.0%	10.9%
Percentage of people cycling	12.5%	6.0%	28.0%	12.9%
Total number of people	123	150	342	202

Table 15: Path 1 dogs comparison for 2011 and 2013 (weeks 1 and 2).

Summary data	Week 1			Week 2		
	2011	2013	Change	2011	2013	Change
Total number of dogs	117	84	-28.2%	302	100	-66.9%
Dogs on lead	17.90%	40.5%		31.4%	24.0%	
Dogs not on lead	82.10%	59.5%	-47.9%	68.6%	76.0%	-63.3%
Dogs under control		57.1%			68.0%	
Dogs not under control		42.9%			32.0%	

On Path 1, there was a small increase in people (22%) for week 1 between 2011 and 2013 but a large reduction (41%) in week 2. There was a large drop in the number of dogs in week 2 and Table 15 shows the change (in absolute terms) in numbers of dogs that were on a lead. Although the proportion of dogs recorded as under control is higher than those on a lead, these figures are relatively low for the 2013 survey (see Figure 9).

4. DISCUSSION

It was not possible to gain access to the original spreadsheets used for 2011 data analysis, so it has only been possible to compare summary data that was publicly available, and assumptions have had to be made that the data represent the same things. It has been assumed that the 'total number of individual groups of people' (MBEC 2011, Table 8.1) means the number of images showing one or more person, and that it was possible to remove duplicates (i.e. people shown at more than one junction). It is further assumed that duplicates of dogs have also been removed and that 'total number of dogs' (MBEC 2011, Table 8.2) represents number counted (i.e. where more than one dog is visible in a single image) rather than total number of records. The difference between using the summative total for one aspect and a count of records for another is significant – the count represents 'potential disturbance events' (i.e. the number of times that one or more person visited the wood), whereas the summative total suggests that each individual could cause disturbance.

4.1 Recreation patterns

Analysis of the time of day for visits shows that the paths were used throughout daylight hours on most days of the study, even during poor weather. This suggests that capercaillie in areas close to the paths could encounter people or dogs at any time of day. The woods are used for quiet recreation by small groups or individuals and their behaviour is not, in general, likely to have any additional impact on capercaillie. However the intensity of use is not very high at any one time. The analyses also indicate the times when educational initiatives about capercaillie sensitivity to disturbance and the need to keep dogs under close control might be most usefully targeted (e.g. 8-10am or 5-6pm).

The 2013 dataset does not show such a marked difference between weeks 1 and 2 as compared with figures available for 2011. Highland Council schools closed for summer on Friday 28th June 2013, but not all schools in Scotland were closed on this date; this compares with all schools having closed by Friday 1st July 2011 (except Dumfries and Galloway) with some having closed a week earlier. It is unknown how much of an influence this would have had on the results had all other factors been controlled. It is likely that the increase in people in the wood in the section week can be accounted for by visitors to the area rather than a change in behaviour by local residents.

There has been an increase in the numbers of people using path 7 since 2011, and the characteristics of this informal route may be important for 'potential disturbance events'. The narrow path line means that dogs that are not under control may be more likely to explore beyond the path itself than on the wide, surfaced tracks. It may be necessary to encourage higher levels of vigilance with dog owners along this path to reduce the risk of actual disturbance taking place.

4.2 Visitors with dogs

The two datasets show a significant change in behaviour of dog owners. Although there is only a 15% decrease in 'potential disturbance events', *there is a 66% decrease in the number of visits that include dogs in 2013*. This suggests that either there has been a large decrease in dog ownership (considered unlikely), or fewer people are using Boat of Garten woods to exercise their dog(s). It is not possible to confirm whether there has been displacement to other paths in the area and there is no data available that would demonstrate this. It may be possible to conduct interviews with local dog owners to gain a better understanding of the issue. One possibility for the change in results is that a segment of the local population did not use the woods during the period of the survey as a means to avoid their photograph being taken. Although it is not possible to prove this from the data available, this has been discounted as the observations made by the Ranger over a

prolonged period give a remarkably similar picture suggesting that the photographic survey is reasonably representative.

Despite not having a comparable baseline for the whether or not the dogs are kept under close control, *there has been an increase in the proportion of dogs that are on a lead in 2013 compared with 2011.*

The Ranger Report (Henderson, 2013) provides additional evidence of whether dogs are on leads although the data collection was not structured, so cannot easily be extrapolated to represent all times. However, the Ranger observed a similar proportion of dogs on leads during patrols (29% within the Responsible Access Area compared with 28% recorded by the photographic survey, see Table 7), which suggests that *the actual proportion of dogs on leads is very close to the observed data.*

The photographic survey also showed that although a relatively small proportion of dogs are actually on a lead, a high proportion of visitors kept their dogs under close control (71% of dogs were recorded as under control). This is lower than the observations by the Ranger (100%), but it is not clear whether the same criteria were used. This suggests that *the photographic survey provides a useful minimum level of measuring dogs that are under close control.*

In considering whether or not there is a difference in behaviour within the Responsible Access Area compared with outside (but still within the woods) the data in Table 8 indicate that the proportion of dogs on a lead heading north from Junction 3 is marginally lower than the average for the survey (27.2% for path 20 compared with 29.4% overall) and fewer dogs are recorded as under control (55.4% compared with 71.0% overall). However, it would be optimistic to suggest from the data available that there is a significant difference in behaviour as people leave the Responsible Access Area. This may instead indicate that people consider the whole area of the woods as being sensitive to disturbance but this cannot be confirmed with the available data. Without qualitative data about attitudes *it is not reliable to suggest that people change their behaviour as they pass a particular point in the woods,* even though it has been demonstrated that overall there has been a change in behaviour since the 2011 survey. Recording behaviour in another part of the wood away from the Responsible Access Area would potentially give a more useful insight than looking at a small subset of those recorded who are close to its boundary.

The small number of occurrences of dogs with Frisbees or tennis balls is of potential concern with respect to minimising the potential to disturb capercaillie. Although there is no empirical evidence relating to the reaction of capercaillie to running dogs, *it is suggested that encouraging dogs to chase (balls, Frisbees, sticks etc) within the wood is more likely to cause disturbance, and throwing an item off the track increases that risk as the dog will be searching through the breeding habitat of the birds.* This behaviour is therefore suggested as being inappropriate to the location, particularly as there are opportunities for dog owners to exercise their dogs in this way in the playing field next to the community centre. It should be stressed the this is NOT intended as being the advice in areas of low sensitivity, and may not be a problem in this part of the wood outwith the breeding season.

It may be possible to draw a parallel with control of dogs around livestock, where it is reasonable to ask people to take greater and more visible care to keep their dog(s) under control when crossing a field with livestock than an area that is unstocked. The precarious breeding status of capercaillie means that disturbance by people and dogs could have a measurable impact on the local breeding population, and additional vigilance is required during their sensitive breeding period.

5. CONCLUSIONS

The survey has shown that there has been a measurable, positive change in behaviour for people using the woods between 2011 and 2013. The most significant changes represent the numbers of dogs on a lead, and the large reduction in the number of visits with dogs, which are assumed to have been displaced to other sites.

Between these two photographic surveys there has been a sustained campaign to raise awareness of the sensitivity of part of the area for breeding capercaillie. We have concluded that this campaign has shown positive outcomes and that the people using Boat of Garten woods have modified their behaviour.

It is considered reasonable to conclude from the data available that:

The photographic survey provides a reliable record of recreational activities within the survey area over a defined period, which is a more cost-effective option than having manual observations for the same period.

The 'richness' of data collected allows detailed analysis of recreational behaviour which would not be apparent from automatic people counters, and the results are consistent with observations made by the Ranger. Although it may not represent typical behaviour throughout the breeding season, or indicate behaviour at other times of year, the methodology is sufficiently robust to compare between survey years with confidence.

Local residents and visitors have taken a more responsible approach to recreation in the woods with dogs since the 2011 survey, with an increase from 17% of dogs on leads in 2011 to 37% in 2013 (for the comparable period). There were a relatively small number of dog walkers who used the woods frequently but did not have their dog(s) on a lead, which skews the results.

The majority of people with dogs visiting the sensitive part of the woods during the 2013 survey kept their dogs under close control (71%) even if they were not on a lead. This measure of responsible behaviour is more closely aligned to the Scottish Outdoor Access Code and gives a more realistic assessment of the risk of disturbance to capercaillie than recording whether or not a dog is on a lead.

There was a reduction of 14% in the number of individuals or groups visiting the survey area but an increase in the numbers of people using Path 7 in 2013 indicating that this path has become more popular. Of greatest significance is that there were 66% fewer dogs between the 2011 and 2013 surveys. This suggests that unless dog ownership in the area has dramatically reduced, dogs are being exercised elsewhere.

We have concluded that it is very likely that a significant proportion of people exercising dogs have changed their behaviour to avoid disturbance to capercaillie and that because this coincides with the extensive awareness raising programme, these efforts have been effective. This suggests that the communication activities by the Ranger and others have been understood and that people using the woods have been receptive to the messages and responded positively. However, further research is required to confirm the reasons for behavioural change and the degree to which this is related to their knowledge and opinions of the sensitivity of capercaillie to disturbance.

There is no reason to believe that people will revert to their previous behaviour or, conversely that the levels of compliance will increase further. As with many awareness raising campaigns, sustaining the effort will require continued resources and innovation to help people to appreciate the ongoing need for responsible access to the Boat of Garten woods as part of the overall effort to protect the capercaillie.

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