

## **Appendix 7M**

### **Arboreal Mammal Survey Report**

Welsh Government  
**Global Centre for Rail Excellence  
(GCRE)**  
Arboreal Mammal Survey Report

Rev A | 18 June 2020

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.




Job number 264904

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**ARUP**

# Document verification

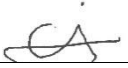
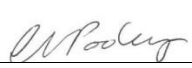

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# Document Verification

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# Contents

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	Page
<b>1 Introduction</b>	<b>1</b>
1.1 Background	1
1.2 Objectives	1
<b>2 Project Description and Context</b>	<b>2</b>
<b>3 Site Description</b>	<b>3</b>
<b>4 Study Area</b>	<b>4</b>
<b>5 Legislation</b>	<b>5</b>
<b>6 Methodology</b>	<b>6</b>
6.1 Desk Study	6
6.2 Field Surveys	6
6.3 Limitations	7
<b>7 Results</b>	<b>8</b>
7.1 Desk Study	8
7.2 Field Surveys	8
<b>8 Conclusions</b>	<b>11</b>

## Figures

Figure 1 Study Area

Figure 2 Arboreal mammal transect route and transect survey results

Figure 3 Feeding station locations

## Photographs

Photograph 1: Scat collected during September transect

Photograph 2: Mustelid tracks with 40cm stride identified during May transect

Photograph 3: Mustelid prints considered too small for pine marten, identified during May transect

Photograph 4: Small mustelid prints identified during May transect

Photograph 5: Squirrel feeding signs identified during May transect

Photograph 6: Squirrel feeding signs identified during May transect

Photograph 7: Polecat at station 3 in October

Photograph 8: Rabbit at station 3 in June

Photograph 9: Passerines at station 1 in July

Photograph 10: Grey squirrel at station 2 in July

Photograph 11: Jays at station 2 in July

Photograph 12: Red fox at station 3 in August

Photograph 13: Mouse at station 3 in September

## Appendices

### Appendix A

Weather Conditions

### Appendix B

EcoWarwicker Scat DNA Analysis Results

# 1 Introduction

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## 1.1 Background

Ove Arup & Partners Ltd (Arup) was commissioned by the Welsh Government (WG) to undertake a range of consultancy services in relation to the Global Centre for Rail Excellence (GCRE), hereafter referred to as ‘the Project’.

As part of that commission, a range of ecological surveys have been undertaken to identify the baseline ecological conditions of the Project area, to inform the assessment of impacts as part of the Environmental Impact Assessment (EIA) process.

This document describes the arboreal mammal surveys undertaken for the Project.

## 1.2 Objectives

The objectives of the arboreal mammal survey were to ascertain the presence/likely absence of the following protected and/or notable<sup>1</sup> arboreal mammal and mustelid<sup>2</sup> species (the ‘target species’):

- pine marten (*Martes martes*);
- red squirrel (*Sciurus vulgaris*); and
- polecat (*Mustela putorius*).

Otter (*Lutra lutra*) and badger (*Meles meles*), are reported separately.

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<sup>1</sup> ‘Notable’ species and habitats considered in this report include species and habitats of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales, in response to section 7 of the Environment (Wales) Act 2016, in addition to any species considered to be of significance for nature conservation such species listed in red data books, the Royal Society for the Protection of Birds (RSPB) ‘Birds of Conservation Concern’ lists and or Local Biodiversity Action Plans (LBAPs).

<sup>2</sup> Of the Mustelidae family, including pine marten, polecat, American mink, stoat, weasel, badger and otter.

## 2 Project Description and Context

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The WG are proposing to develop a rail testing, maintenance, research, development and storage facility (also referred to as the Global Rail Centre for Excellence) at the site of the Onllwyn washery and Nant Helen open cast mine site. The site for development is approximately 475 ha.

The proposed site is currently being mined by Celtic Energy, who will cease extraction operations in 2021, at which point Celtic Energy will be required to restore the land in accordance with regulatory requirements and agreements with Powys County Council (PCC) and Neath Port Talbot County Borough Council (NPTCBC). This includes Section 106 planning obligations and planning conditions that need to be discharged.

Celtic Energy has submitted two recent planning applications for the site, including: the revised restoration strategy for approval (Planning reference number: 19/1899/REM) which would change the existing approved restoration scheme (for planning application ref 18/1070/REM). And, the Nant Helen complementary earthworks application for approval (Planning reference number: 20/0738/FUL) The purpose of these applications is to allow for a 'flexible and adaptable landform for a variety of future uses on restoration, including the use of the site as a rail testing and storage facility, proposed by the WG.



### 3 Site Description

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The study area is shown on Figure 1 and is hereafter referred to as the 'site'.

The site is within the Dulais Valley located within Powys and Neath Port Talbot, with the Brecon Beacons National Park Authority boundary immediately to the north. Nearby settlements include Onllwyn, Seven Sisters, Ystradgynlais, Caehopkin, Abercrave or Coelbren.

The site is predominantly brownfield land that has been heavily worked by open cast mining. Much of the site has been revegetated.

## 4 Study Area

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The study area encompasses the majority of land within the Nant Helen open cast operational site, which at the time of commencing the ecological surveys was considered to be the likely boundary of the project site.

The survey was carried out within the coniferous plantation woodland to the north-west of the study area. This was considered to be the only habitat suitable to support the target species, in particular pine marten and red squirrel, within the study area.

## 5 Legislation

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Pine marten and red squirrel are fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (WCA). This protects them against intentional killing, injuring or taking, and against their possession and trade. They are also protected from disturbance through prohibition of actions that could affect places they use for shelter.

Pine marten and red squirrel, along with polecat are also listed as priority species of principle importance for the conservation of biodiversity in response to Section 7 of the Environment Act (Wales) 2016. This legislation places duties on public bodies in Wales to conserve and enhance biodiversity in the exercise of their functions, including the consideration of the resilience of ecosystems in terms of their diversity, connectivity, adaptability, scale and condition.

Pine marten, red squirrel and polecat are also all listed as UK Biodiversity Action Plan Priority Species. Action Plans exist for each UK BAP Priority Species to demonstrate the UK's commitment to help reduce or halt the significant losses in global biodiversity<sup>3</sup>.

Actions which are prohibited by legislation can be made lawful on the approval and granting of a licence from Natural Resources Wales (NRW), subject to conditions.

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<sup>3</sup> The UKBAP was succeeded by the 'UK Post-2010 Biodiversity Framework' in July 2012. The UK list of priority species, however, remains an important reference source and has been used to help draw up statutory lists of priority species.

## 6 Methodology

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### 6.1 Desk Study

A data search was obtained from the Biodiversity Information Service (BIS<sup>4</sup>) for Powys & Brecon Beacons National Park on 21<sup>st</sup> November 2018. The data search included all historic records of protected and/or notable<sup>1</sup> species from the last 10 years within a 5 km radius of the site (Figure 1). This included records of the target species, which are summarised in the Desk Study Results section below.

Targeted surveys for these species were not undertaken in preparation for the previous Environmental Statement (ES) undertaken by Celtic Energy<sup>5</sup>. Nevertheless, the previous ES was reviewed for any incidental records, along with publicly available ordnance survey mapping and aerial imagery to identify suitable habitat<sup>6;7;8</sup> for the target species within the study area (Figure 1).

### 6.2 Field Surveys

#### 6.2.1 Transect Survey

The transect route was located within an area of coniferous plantation woodland to the north-west of the study area, which was considered suitable habitat for the target species. The route was approximately 8.5 km in length and is shown on Figure 2. The transect survey was carried out six times: once per month between May and October 2019 (inclusive).

Surveyors (Suitably Qualified Ecologists (SQE)) walked the transect looking for evidence of target mammal species including footprints, trails, scats (pine marten and polecat), live sightings, red squirrel feeding remains and red squirrel dreys (nests), as per best practice guidance<sup>9, 10</sup>. Any mustelid scats found were collected and sent for DNA analysis at EcoWarwicker Ecological Forensics<sup>11</sup>. The dates and the weather during each of these transect survey visits are detailed in Appendix A.

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<sup>4</sup> Aderyn is a Local Environmental Records Centres (LERC) Wales system, developed and maintained by the Biodiversity Information Service (BIS).

<sup>5</sup> Celtic Energy Ltd (2011). *Environmental Statement*.

<sup>6</sup> <https://www.britishredsquirrel.org/red-squirrels/dreys-nests/> Accessed 13<sup>th</sup> November 2019.

<sup>7</sup> <https://www.mammal.org.uk/species-hub/full-species-hub/discover-mammals/species-pine-marten/> Accessed 13<sup>th</sup> November 2019.

<sup>8</sup> <https://www.mammal.org.uk/species-hub/full-species-hub/discover-mammals/species-pine-marten/> Accessed 13<sup>th</sup> November 2019.

<sup>9</sup> O'Mahony et al. (2006). *National Pine Marten Survey of Ireland 2005*.

<sup>10</sup> Gurnell et al. (2009). *Practical techniques for surveying and monitoring squirrels*. Practice Note. Forestry Commission.

<sup>11</sup> [https://warwick.ac.uk/fac/sci/lifesci/research/archaeobotany/ecological\\_forensics/](https://warwick.ac.uk/fac/sci/lifesci/research/archaeobotany/ecological_forensics/)

## 6.2.2 Camera Trapping Survey

Three feeding stations were installed along the transect route with two motion-sensitive camera traps (Bushnell Trophy Cam HD) placed at each station (six camera traps placed in total). Feeding station 1 was located at National Grid Reference (NGR) SN 80770 11642, feeding station 2 was located at NGR SN 81159 11820 and feeding station 3 was located at NGR SN 82196 11866. The feeding station locations are shown on Figure 3.

Bait (dried mealworms, nuts, seeds, jam sandwiches, peanut butter, eggs and/or dog food) was placed on a platform in the centre of the two camera traps at each feeding station. Feeding stations were deployed for 125 days between 14<sup>th</sup> June 2019 and 17<sup>th</sup> October 2019. The SD cards within the cameras, and the bait on the feeding platform were refreshed once per month during the transect surveys.

Camera trap footage was recorded as a combination of jpeg images and ten-second mp4 video clips onto SD cards, which were subsequently analysed to determine the presence of target species.

## 6.2.3 Surveyors

Field surveys were carried out by a combination of SQE: Pete Wells BSc MSc CEnv MCIEEM, Alexandra Escott BSc (Hons) MSc, Eloise Arif BSc (Hons) ACIEEM, and Alexandra Kinsey BSc (Hons).

## 6.3 Limitations

Surveyors were unable to find feeding station 1 during the August survey visit due to a GPS mapping error. As such, the bait was not refreshed in August at feeding station 1. This is not considered to have negatively affected the survey results however, as animals were still recorded visiting feeding station 1 between the August and September survey visit, and the survey effort overall is considered to still be sufficient enough to be confident in the results.

The findings presented in this study represent those at the time of survey and reporting, and data collected from available sources. Ecological surveys are limited by factors which affect the presence of flora and fauna, factors such as the time of year and natural behaviour of the animals. Nevertheless, these surveys were conducted at the optimal survey periods and using methodologies which are in accordance with published guidelines.

## 7 Results

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### 7.1 Desk Study

The BIS provided four records of polecat within 5 km of the site from the last 10 years. The closest of these was located approximately 1.5 km north east. No recent records of red squirrel or pine marten were returned, although there was one record of a red squirrel sighting from 1998 located approximately 3.7 km south west.

The desk study identified one area of coniferous plantation woodland to the north west of the site, which was considered the only habitat suitable to support pine marten and red squirrel within the study area. Polecat, if present, would also use this habitat.

### 7.2 Field Surveys

#### 7.2.1 Transect Survey

The transect survey results are shown on Figure 2. One scat was collected during the August transect survey visit, and five scats were collected during the September transect survey visit for DNA analysis. All six scats collected were considered to potentially be from pine marten, due to their shape (dark and coiled) (Photograph 1) and their smell (musty sweet scent, not unpleasant)<sup>12</sup>. However, the DNA analysis revealed that all six scats were produced by fox, not pine marten.

Mustelid prints were identified on three occasions during the May transect: prints with a 40 cm stride were identified at the western end of the transect route (Photograph 2), prints that were considered too small for pine marten were identified near feeding station 3 (Photograph 3) and small prints were identified near feeding station 2 (Photograph 4). Due to the small size of these prints, it was considered more likely that they were from polecat, ferret (*Mustela furo*), or a polecat-ferret hybrid<sup>13</sup>, rather than pine marten<sup>14;15</sup>.

Squirrel feeding signs in the form of a stripped pine cone<sup>16</sup> (Photograph 5 and Photograph 6) were also identified in May. However, grey squirrels (*Sciurus carolinensis*) and red squirrels both feed in this distinctive way<sup>17</sup> and as such, this

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<sup>12</sup><https://pine-marten-recovery-project.org.uk/our-work/field-signs> Accessed 5th November 2019

<sup>13</sup>The Vincent Wildlife Trust (2014) Polecats and Ferrets. <https://www.vwt.org.uk/wp-content/uploads/2015/04/polecat-ferret-leaflet-.pdf> Accessed 8th November 2019

<sup>14</sup>The Vincent Wildlife Trust (2017) A guide to identifying evidence of pine martens in Wales. <https://www.vwt.org.uk/wp-content/uploads/2017/11/Evidence-of-Pine-Martens-in-Wales.pdf> Accessed 8th November 2019

<sup>15</sup>Wiltshire Mammal Group (2015) Small mustelid footprint ID guide.

<sup>16</sup><https://www.mammal.org.uk/sites/default/files/Red%20Squirrel%20Field%20Sign%20Guide%20PDF.pdf> Accessed 7th November 2019

<sup>17</sup><https://treesforlife.org.uk/into-the-forest/trees-plants-animals/mammals/red-squirrel/red-squirrel-feeding-signs/> Accessed 7th November 2019

cannot be considered conclusive proof of red squirrel presence within the woodland. Grey squirrels were observed on several occasions during the transect surveys.

No other signs of target species were identified during the transect survey.

## 7.2.2 Camera Trapping Survey

The camera trapping survey recorded one instance of a polecat on 6<sup>th</sup> October at feeding station 3 (Photograph 7). No activity of other target species (pine marten and red squirrel) was recorded. Non-target species recorded include red fox (*Vulpes vulpes*), rabbit (*Oryctolagus cuniculus*) some unidentifiable mouse species (considered most likely to be wood mouse (*Apodemus sylvaticus*)), birds, and numerous instances of grey squirrel, a naturalised non-native species listed on Schedule 9 of the WCA.

The volume of grey squirrel activity recorded is considered to contribute to the lack of red squirrel activity. The species identified at each feeding station in each month are summarised in Table 1, and locations of feeding stations are shown on Figure 3.

Table 1: Species recorded at each feeding station during camera trapping survey

Month	Feeding Station Ref.	Target Species Recorded	Other Species Recorded
June	1	None	Birds (robin ( <i>Erithacus rubecula</i> ), jay ( <i>Garrulus glandarius</i> ), coal tit ( <i>Periparus ater</i> ), great tit ( <i>Parus major</i> )); mice; grey squirrel; red fox.
	2	None	Grey squirrel; mice.
	3	None	Red fox; rabbit; grey squirrel; mice.
July	1	None	Grey squirrel; mice; birds (robin, great tit, blue tit ( <i>Cyanistes caeruleus</i> ), great spotted woodpecker ( <i>Dendrocopos major</i> ), blackbird ( <i>Turdus merula</i> )).
	2	None	Red fox; grey squirrel; mice; birds (jay).
	3	None	Red fox; grey squirrel; mice; birds (jay, blackbird); rabbit.
Aug	1	None	Red fox; grey squirrel; mice; birds (robin, blue tit, jay).
	2	None	Red fox; grey squirrel; mice; birds (jay).
	3	None	Red fox; rabbit; grey squirrel; mice; birds (great tit, jay).
Sept	1	None	Mice; birds (great tit, jay, robin, blue tit).
	2	None	Red fox; grey squirrel; mice; birds (robin, great tit, blue tit, jay).
	3	None	Red fox; rabbit; grey squirrel; mice, birds (jay, robin, great tit).
Oct	1	None	Red fox; mice; birds (passerines, magpie ( <i>Pica pica</i> )).

Month	Feeding Station Ref.	Target Species Recorded	Other Species Recorded
	2	None	Grey squirrel; birds (jay).
	3	Polecat	Red fox; rabbit; grey squirrel; mice; birds (jay).

Red squirrel are considered likely to be absent from the survey area due to the lack of recent and nearby desk study records, the high volume of grey squirrel activity, and the inconclusive feeding signs identified during the transect survey.

Pine marten are also considered likely to be absent from the survey area due to the lack of desk study records and the lack of evidence identified during the field surveys. However, it should be noted that a pine marten re-introduction project has been undertaken in mid-Wales<sup>18</sup>, and, as such, pine marten are likely to be present (in low numbers) in the vicinity of the study area despite the lack of records.

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<sup>18</sup> <https://www.vwt.org.uk/projects-all/pine-marten-recovery-project/> Accessed 14<sup>th</sup> November 2019



## 8 Conclusions

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The camera trapping survey identified the presence of polecat at feeding station 3 in October. Red squirrel and pine marten were found likely to be absent from the survey area. Numerous other native UK species were recorded during this suite of surveys, including red fox, rabbit, jays, mice, and numerous bird species.

A full ecological impact assessment will be included within the Environmental Statement for the project and this will include an assessment of the significance of impacts from the project on protected and/or notable mammal species. This will also detail any mitigation or compensation measures required to ensure there is no significant effect on arboreal mammals within the site.

This report is the result of the survey work undertaken during 2019. This report refers, within the limitations stated, to the condition of the site at the time of the surveys. Changes in legislation, guidance, best practice, etc. may necessitate a re-assessment/survey, as may the passage of time.

The results of these surveys are considered valid for a minimum of 18 months to a maximum of 3 years. If more than 18 months elapses before any planning application is submitted, the requirement for repeat surveys should be reviewed<sup>19</sup>.

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<sup>19</sup> Chartered Institute of Ecology and Environmental Management (2019). *Advice Note on the Lifespan of Ecological Reports and Surveys*.

## Figures

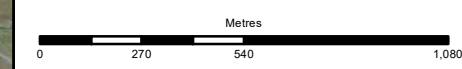
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**LEGEND**

Study Area

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Issue	Date	By	Chkd	Appd

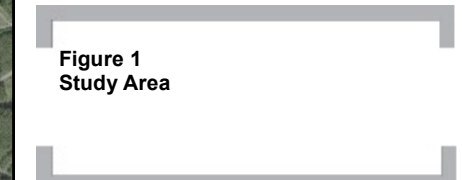


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**Figure 1  
Study Area**

Scale at A3  
**1:20,000**

Job No <b>264904</b>	Drawing Status <b>For Issue</b>
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Drawing No <b>001</b>	Issue <b>F1</b>
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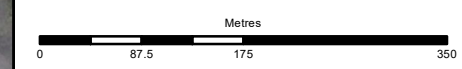
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



- LEGEND**
- Study Area
  - Arboreal mammal transect route
  - ▲ Mustelid prints
  - ▲ Squirrel feeding signs
  - ▲ Scats collected for DNA analysis

F1	2019-11-14	EA	CP	NH
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Issue	Date	By	Chkd	Appd



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**Figure 2**  
**Arboreal mammal transect route and transect survey results**

Scale at A3  
**1:6,500**

Job No <b>264904</b>	Drawing Status <b>For Issue</b>
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Drawing No <b>002</b>	Issue <b>F1</b>
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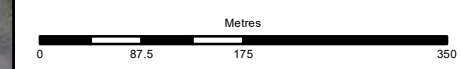
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



**LEGEND**  
 Study Area  
● Feeding stations

F1	2019-11-14	EA	PW	NH
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Issue	Date	By	Chkd	Appd



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**Figure 3**  
**Feeding station locations**

Scale at A3  
**1:6,500**

Job No <b>264904</b>	Drawing Status <b>For Issue</b>
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Drawing No <b>003</b>	Issue <b>F1</b>
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

## **Photographs**

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Photograph 1: Scat collected during September transect



Photograph 2: Mustelid tracks with 40cm stride identified during May transect



Photograph 3: Mustelid prints considered too small for pine marten, identified during May transect



Photograph 4: Small mustelid prints identified during May transect





Photograph 5: Squirrel feeding signs identified during May transect



Photograph 6: Squirrel feeding signs identified during May transect



Photograph 7: Polecat at station 3 in October



Photograph 8: Rabbit at station 3 in June



Photograph 9: Passerines at station 1 in July



Photograph 10: Grey squirrel at station 2 in July



Photograph 11: Jays at station 2 in July



Photograph 12: Red fox at station 3 in August



Photograph 13: Mouse at station 3 in September

## **Appendix A**

### **Weather Conditions**

## A1 Weather Conditions

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Table A1: Weather conditions during arboreal mammal transect survey visits

Survey Visit	Date	Temp. (°C)	Wind Speed (Beaufort Scale)	Wind Direction	Cloud Cover (%)	Comments
Transect 1	23/05/2019	18	2	SW	10	Sunny
Camera trap and feeding station install	14/06/2019	13	1	E	100	Dry
Transect 2	28/06/2019	21	4	NE	0	Sunny
Transect 3	25/07/2019	27	2	SW	20	Sunny
Transect 4	29/08/2019	14	2	SW	100	Light drizzle
Transect 5	11/09/2019	16	3	W	100	Stead rain
Transect 6	17/10/2019	12	2	S	90	Dry

## **Appendix B**

### **EcoWarwicker Scat DNA Analysis Results**



8 October 19

Re: Identification Results for Alexandra Kinsey, Arup

Job number 14632, received 19 September 2019

Sample labelled: GCRE Pine marten transect. Poss. Mustelid scat sample 1

PCR amplification successful. DNA sequence:

CCACCTACACACCTCAAACAACGTGGGATAATATTCCGACCCCTTAGTCAATGCCT  
ATTCTGACTTCTAACCGCAGACC

Phylogenetic analysis identification: *Vulpes vulpes*

Confirmed by maximum likelihood, maximum parsimony, bootstrap 100%.

Best regards,

Professor Robin Allaby

The results and conclusions in this report are based on an investigation of mtDNA sequence analysis. The results obtained have been reported with accuracy. The interpretation represents the most probable conclusion for the DNA sequence obtained rather than the sample provided given current levels of species data. It should be borne in mind that different circumstances might produce different results. Therefore, care must be taken with interpretation of the results especially if they are used as the basis for commercial recommendations.

**Professor Robin Allaby**

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8 October 19

Re: Identification Results for Alexandra Kinsey, Arup

Job number 14633, received 19 September 2019

Sample labelled: GCRE Pine marten transect. Poss. Mustelid scat sample 2

PCR amplification successful. DNA sequence:

CCCATAATGATGAAAGGGTGTCCACCTACACACCTCAAACAACGTGGGATAATATT  
CCGACCCGTTAGTCAATGCCTATTCTGACTTCTAACCGCAGACCTC

Phylogenetic analysis identification: *Vulpes vulpes*

Confirmed by maximum likelihood, maximum parsimony, bootstrap 100%.

Best regards,

Professor Robin Allaby

The results and conclusions in this report are based on an investigation of mtDNA sequence analysis. The results obtained have been reported with accuracy. The interpretation represents the most probable conclusion for the DNA sequence obtained rather than the sample provided given current levels of species data. It should be borne in mind that different circumstances might produce different results. Therefore, care must be taken with interpretation of the results especially if they are used as the basis for commercial recommendations.

**Professor Robin Allaby**

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8 October 19

Re: Identification Results for Alexandra Kinsey, Arup

Job number 14634, received 19 September 2019

Sample labelled: GCRE Pine marten transect. Poss. Mustelid scat sample 3

PCR amplification successful. DNA sequence:

CCACCTACACACCTCAAACAACGTGGGATAATATTCCGACCCCTTAGTCAATGCCT  
ATTCTGACTTCTAACCGCAGACCTCCTCAC

Phylogenetic analysis identification: *Vulpes vulpes*

Confirmed by maximum likelihood, maximum parsimony, bootstrap 100%.

Best regards,

Professor Robin Allaby

The results and conclusions in this report are based on an investigation of mtDNA sequence analysis. The results obtained have been reported with accuracy. The interpretation represents the most probable conclusion for the DNA sequence obtained rather than the sample provided given current levels of species data. It should be borne in mind that different circumstances might produce different results. Therefore, care must be taken with interpretation of the results especially if they are used as the basis for commercial recommendations.

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8 October 19

Re: Identification Results for Alexandra Kinsey, Arup

Job number 14635, received 19 September 2019

Sample labelled: GCRE Pine marten transect. Poss. Mustelid scat sample 4

PCR amplification successful. DNA sequence:

CCACCTACACACCTCAAACAACGTGGGATAATATTCCGACCCCTTAGTCAATGCCT  
ATTCTGACTTCTAACCGCAGACCTCCTCAC

Phylogenetic analysis identification: *Vulpes vulpes*

Confirmed by maximum likelihood, maximum parsimony, bootstrap 100%.

Best regards,

Professor Robin Allaby

The results and conclusions in this report are based on an investigation of mtDNA sequence analysis. The results obtained have been reported with accuracy. The interpretation represents the most probable conclusion for the DNA sequence obtained rather than the sample provided given current levels of species data. It should be borne in mind that different circumstances might produce different results. Therefore, care must be taken with interpretation of the results especially if they are used as the basis for commercial recommendations.

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8 October 19

Re: Identification Results for Alexandra Kinsey, Arup

Job number 14636, received 19 September 2019

Sample labelled: GCRE Pine marten transect. Poss. Mustelid scat sample 5

PCR amplification successful. DNA sequence:

CCACCTACACACCTCAAACAACGTGGGATAATATTCCGACCCCTTAGTCAATGCCT  
ATTCTGACTTCTAACCGCAGACCTCCTCA

Phylogenetic analysis identification: *Vulpes vulpes*

Confirmed by maximum likelihood, maximum parsimony, bootstrap 100%.

Best regards,

Professor Robin Allaby

The results and conclusions in this report are based on an investigation of mtDNA sequence analysis. The results obtained have been reported with accuracy. The interpretation represents the most probable conclusion for the DNA sequence obtained rather than the sample provided given current levels of species data. It should be borne in mind that different circumstances might produce different results. Therefore, care must be taken with interpretation of the results especially if they are used as the basis for commercial recommendations.

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8 October 19

Re: Identification Results for Alexandra Kinsey, Arup

Job number 14638, received 19 September 2019

Sample labelled: GCRE Pine marten transect. Poss. Mustelid scat sample 7. Point D.

PCR amplification successful. DNA sequence:

CCACCTACACACCTCAAACAACGTGGGATAATATTCCGACCCCTTAGTCAATGCCT  
ATTCTGACTTCTAACCGC

Phylogenetic analysis identification: *Vulpes vulpes*

Confirmed by maximum likelihood, maximum parsimony, bootstrap 100%.

Best regards,

Professor Robin Allaby

The results and conclusions in this report are based on an investigation of mtDNA sequence analysis. The results obtained have been reported with accuracy. The interpretation represents the most probable conclusion for the DNA sequence obtained rather than the sample provided given current levels of species data. It should be borne in mind that different circumstances might produce different results. Therefore, care must be taken with interpretation of the results especially if they are used as the basis for commercial recommendations.

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