

Havant Thicket Reservoir Project

Environmental Statement Volume 4 - Appendices

Appendix A9 Biodiversity

A9.10 Reptile Survey Report

Portsmouth Water Ltd.



**HAVANT THICKET WINTER STORAGE RESERVOIR,
ROWLAND'S CASTLE, HAMPSHIRE**

**APPENDIX 9.10
REPTILE SURVEY REPORT**

Final Document (Rev.1)

August 2019

Preliminary Ecological Appraisals • Protected Species Surveys and Licensing • NVC • EclA • HRA • Management Plans
Habitats • Badger • Bats • Hazel Dormouse • Birds • Reptiles • Amphibians • Invertebrates • Riparian and Aquatic Species

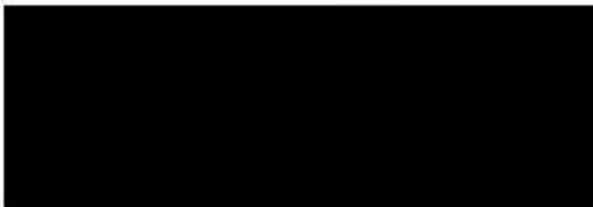
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ECOSA Quality Assurance Record

This report has been produced in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Report Writing 2017 (CIEEM, 2017). Survey work has been undertaken in line with references within CIEEM's Source of Survey Guidance (CIEEM, 2017).

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HAVANT THICKET WINTER STORAGE RESERVOIR, ROWLAND'S CASTLE, HAMPSHIRE

REPTILES SURVEY REPORT

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1.0 INTRODUCTION

1.1 Background

Ecological Survey & Assessment Limited (ECOSA) have been appointed by Portsmouth Water Limited (Portsmouth Water) to undertake a reptile assessment of their land at Havant Thicket, Rowland's Castle, Hampshire. The site is centred on National Grid Reference (NGR): SU 715 097 (**Map J1**).

The reptile report is required as a result of Portsmouth Water's plan to construct a winter storage reservoir, Havant Thicket Winter Storage Reservoir (HTWSR), for public water supply in the centre of the site. At the time of survey, the final designs were not confirmed, although the extent of the development was proposed to be approximately 1.6 kilometres from east to west and 800 metres from north to south with a storage capacity of approximately 8,700 million litres. It was understood water would be pumped into the reservoir from Portsmouth Water sources at Havant and Bedhampton Springs, providing a sustainable supply of water with no requirement to change the existing abstraction licence.

At the time the surveys were undertaken the planning application red line boundary (see Figure 2.1 in ES Volume 3) had not been defined and therefore the Site Boundary (the site) and Ecological Enhancement Area (wider site) boundaries referred to in this report were provisional boundaries available at that time. Within this report where mention is made of 'the site' this refers to the reservoir footprint and other areas used for built development and habitat creation. This area is referred to as the 'Reservoir Footprint' in the Environmental Statement (as the Site includes the reservoir footprint, the pipeline corridor as well as land around the reservoir footprint being used for ecological mitigation and compensation). Where reference is made in this report to the 'wider site' this includes the reservoir and the area proposed for ecological enhancement within Forestry England's (FE) Havant Thicket woodland to the north and Bell's Copse to the west of the site and Staunton Country Park (SCP) to the south of the site. This area is similar to the area referred to as the 'Reservoir Site' in the Environmental Statement. The areas covered by 'the site' and 'wider site' in this report are shown in **Map J1** and the key ecological and landscape features mentioned in this report are shown in **Map J2**.

1.2 Aims and Scope of Report

The information within this report is based on a desktop study and reptile surveys carried out by ECOSA between 2005 and 2008 and April and October 2018.

The scope and aims of the 2018 reptile survey were agreed through discussions with the Local Planning Authority (LPA), Natural England (NE) and Hampshire and Isle of Wight Wildlife Trust (HIWWT).

In the interim, between 2007-2008 and 2018, the habitats at the site have remained broadly similar, apart from a reduction in grazing pressure over the last two years. During 2018 this resulted in a taller sward at the site, especially on Gipsies Plain, which was horse grazed during 2007-2008. As a result of the limited changes in on-site habitats and intensive nature of the 2007-2008 surveys, it was agreed 2018 survey methodology would comprise sampling of broad habitat types within the site. The distribution and abundance of reptiles in each broad habitat type could then be used to check whether any changes had occurred between 2007-2008 and 2018, particularly as a result of the management changes at the site. Further details on the 2018 reptile survey methodology is provided in Paragraph 2.5.1.

The report provides details of the ecological survey work undertaken.

2.0 METHODS

2.1 Introduction

This section details the methods employed during the field survey and reptile surveys undertaken for the HTWSR site during 2018. Any significant limitations to the survey methods are also discussed. This section also includes information on the desktop study data from relevant historical ECOSA reptile surveys undertaken between 2005 and 2008.

2.2 Zone of Influence

To define the total extent of the study area for this appraisal (Zone of Influence¹), the proposed scheme was reviewed to establish the spatial scale at which reptiles could be affected. The appropriate survey radii for the various elements of the appraisal (i.e. desktop study and field survey) have been defined in the relevant sections below. These distances are determined based on the professional judgement of the ecologist leading the appraisal, taking into account the characteristics of the site subject to appraisal, its surroundings and the nature and scope of the development proposals and the ecology of the species of focus within this report.

2.3 Desktop Study²

2.3.1 Biological Records Centre

Hampshire Biodiversity Information Centre (HBIC) was consulted on 30th April 2018 for records of reptiles located within two kilometres of the site boundary.

2.3.2 Multi-Agency Geographic Information for the Countryside

The Multi-Agency Geographic Information for the Countryside (MAGIC)³ database was reviewed on 12th June 2018 to establish the location of statutory designated sites for nature conservation located within the vicinity of the site which were either designated for reptiles or include reptile species within their citation for a reason for designation. This included a search for all internationally and nationally designated sites such as Special Areas of Conservation (SACs), Wetlands of International Importance (Ramsar sites), Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs) and Local Nature Reserves (LNRs) within two kilometres of the site.

2.3.3 Other Sources of Information

Online mapping resources, including aerial photography, at an appropriate scale, were used to identify the presence of habitats such as woodland blocks, grassland,

¹ The Zone of Influence (Zoi), as defined by CIEEM, is the area over which ecological features may be subject to significant effects as a result of the proposed project and associated activities.

² Due to the age of this data an updated desk study has been undertaken in 2020 and details are included in Appendix 9.1.

³ www.defra.magic.gov.uk

heathland, ponds, and watercourses in the vicinity of the site. These habitats may offer resources and connectivity between the site and suitable habitat in the local area, which may be exploited by reptile populations.

ECOSA undertook reptile surveys at the site between 2005 and 2008 (ECOSA, 2013). Surveys undertaken in 2005 and 2006 were aimed at establishing presence/likely absence of reptiles within the site, with a subsequent population assessment carried out in 2007. In 2008, the survey was extended north into Forestry England land of Havant Thicket. This was in relation to when the scheme was previously proposed.

2.4 Site Suitability Survey

2.4.1 Survey Methods

The field site suitability survey was undertaken to assess the proposed reservoir site's suitability to support reptiles. The reptile appraisal was based on an assessment of the suitability of the habitat present within the site to support a population of reptiles.

Reptiles particularly favour scrub and rough grassland interfaces and the presence of these is a good indication that reptiles may be present on-site. In addition, reptiles may utilise features such as bare ground for basking, tussocky grassland for shelter and compost heaps and rubble piles for breeding and/or hibernating.

Information on previous reptile survey work undertaken at the site, particularly in relation to the habitat types and management regimes was also considered.

2.4.2 Survey Details

The site suitability survey was carried out by Simon Boswell of ECOSA on 22nd December 2017. The weather conditions were overcast with 100% cloud cover, an ambient temperature of 8°C and no wind.

During the survey, the surveyor was equipped with 10x40 binoculars, a digital camera and information on previous survey work undertaken at the site.

At the time of the field survey the mitigation and compensation areas required in Havant Thicket woodland were unknown and, therefore, this area was not subject to a field survey. This was not considered to be a significant limitation considering the results of the reptile surveys undertaken in these areas have superseded the requirement for an initial assessment of their suitability for reptiles.

2.4.3 Site Suitability Survey Limitations

There were no significant limitations to the site suitability assessment.

2.5 Reptile Survey

2.5.1 Survey Methods

The reptile surveys were based on the recommendations of current best practice guidelines (Froglife, 2015).

Two separate reptile surveys were undertaken, one within the site and the other within Havant Thicket woodland. Both surveys consisted of the laying of bitumen felt mats approximately 500 millimetres x 500 millimetres within survey areas. The locations of these mats within the site are marked on **Map J4** and within Havant Thicket woodland on **Map J9**.

The use of such refugia is an effective way of surveying for all species of reptile and current survey guidance states that seven inspections are sufficient to confirm presence/likely absence. Survey visits were undertaken in marginal weather conditions such as cold but sunny weather or hazy and somewhat overcast conditions, as this will maximise the thermal value of the refugia for basking reptiles.

During each visit surveyors also undertook a visual inspection survey of other suitable refugia in the site and other suitable basking locations.

The reptile survey within the site targeted areas of different habitat types to help establish typical populations levels. It was not considered necessary to cover all suitable areas of reptile habitat at the site, as was undertaken during the previous surveys. This was because the habitat within the site has remained broadly similar and, therefore, reptile populations were considered unlikely to have significantly altered. The 2007-2008 was also extensive, including 1600 refugia laid on a grid system, and re-surveying at this level was considered unlikely to provide information which would alter the overall assessment.

2005-2008 survey data was used to identify broad habitats within the site where reptiles were recorded previously, e.g. good number and variety of species recorded along woodland edges with lower numbers on open grassland, especially in the west of the site. During 2018 the refugia distribution was designed to sample these habitats, and other habitats within the site to see if populations had changed since 2007-2008. Habitat types covered within the survey included neutral grassland, woodland edge, ditch, rush pasture and woodland clearing as shown on **Map J4**. All refugia were deployed in lines.

A separate reptile survey was undertaken in Forestry England Havant Thicket woodland immediately north of the site. The refugia were located within areas proposed for reptile mitigation and compensation in the draft OEMCS to assess these areas for

the presence/likely absence of reptiles. The aim of the survey was to ascertain the suitability for these areas to act as receptor sites for reptiles moved from the site, and to compensate, through appropriate management, for loss of on-site reptile habitat. Therefore, these areas were not optimal habitats for reptiles. The refugia were also located in representative habitat along woodland edges, trackways, including the proposed access track onto the site and alongside water courses as shown on **Map J9**. Each row of refugia was marked with a wooden post to aid ecologists undertaking surveys.

In addition to the formal reptile surveys outlined above ecologists were encouraged to record ad-hoc reptile records during other surveys undertaken at the site during 2018. The records were plotted onto an overarching ad-hoc records map and then included in the data provided within this report.

2.5.2 Survey Details

A total of 417 reptile refugia were distributed across various habitats on site between 19th April 2018 and 2nd May 2018. **Table J1** provides details of each reptile survey at the site. The number of survey visits was increased, from a standard seven visits to nine visits, to take account of temporal variations in usage of the site by reptiles, as a result both the spring and autumn survey periods were covered. In accordance with good practice reptile refugia were allowed to 'bed in' for at least two weeks before the first survey.

The gap between 20th June and 18th September 2018 also took account of dominance of warm, sunny weather during this period⁴. Hot, sunny conditions are not conducive to effective reptile surveys because air temperatures are high enough for reptiles to rely less on artificial refugia to increase their body temperature.

Table J1: Reptile survey details – the site

Survey Date	Air Temperature (°C)	Weather Conditions
22 nd May 2018	15	Cloudy with occasional sun, 75% cloud cover, light breeze
23 rd May 2018	14	Overcast, mild, occasional showers, moderate breeze
29 th May 2018	17	Overcast, warm, occasional showers, light breeze
1 st June 2018	14	Overcast, light breeze
13 th June 2018	18	Warm, 5% cloud cover, light breeze

⁴ Met Office Summer 2018 Summary: <https://www.metoffice.gov.uk/climate/uk/summaries/2018/summer>

Survey Date	Air Temperature (°C)	Weather Conditions
20 th June 2018	16	Overcast, light breeze
18 th September 2018	20	Overcast, moderate breeze
25 th September 2018	17	Sunny, 0% cloud cover, calm
18 th October 2018	16	Sunny, 20% cloud cover, light breeze

A total of 229 reptile refugia were distributed across Havant Thicket woodland on 23rd August 2018. **Table J2** provides details of each reptile survey within Havant Thicket woodland. In accordance with good practice reptile refugia were allowed to 'bed in' for at least two weeks before the first survey.

Table J2: Reptile survey details – Havant Thicket woodland

Survey Date	Air Temperature (°C)	Weather Conditions
10 th September 2018	17	Sunny, 15% cloud cover, light breeze
12 th September 2018	12	Cloudy, 95% cloud cover, light breeze
20 th September 2018	18	Overcast, light breeze
24 th September 2018	12	Overcast, strong breeze
26 th September 2018	18	Sunny, 15% cloud cover, light breeze
28 th September 2018	11	Sunny, 10% cloud cover, light breeze
2 nd October 2018	17	Overcast, light breeze

The reptile surveys on-site and within Havant Thicket woodland were organised by Simon Boswell of ECOSA and undertaken by Brian Hicks, Senior Field Ecologist of ECOSA, Hugh Turner, Ecologist of ECOSA, Helen Butt, Assistant Ecologist of ECOSA, Owen Jeffreys and Nancy Inman Assistant Ecologists of ECOSA.

2.5.3 Survey and Desk Study Limitations

The HBIC desk study data mainly originates from ad-hoc surveys by volunteers and other records from members of the public. Therefore, the data search results cannot be taken as an accurate representation of reptile distribution in the area.

During the survey work the grassland on site was only partially grazed and therefore those refugia located in field interiors were marked using a GPS device to aid surveyors. However, it was not always possible to locate every single refugia, but the majority of refugia were found on each visit, and therefore this was not considered to

be a significant limitation given that the survey only aimed to sample habitats across the site.

Since the previous surveys of the site undertaken by ECOSA between 2005 and 2008 grazing pressure had reduced at the site, resulting in an increase in dense tussocky grassland in certain areas. Whilst this alteration in management has retained the suitability of habitat at the site for reptiles, it has created more challenging conditions to identify reptiles basking away from refugia, potentially resulting in an under representation of reptile populations at the site. However, this limitation to the 2018 surveys is negated by the breadth of survey data available of the site over a number of survey years.

2.6 Criteria used to Assess Ecological Value

Evaluation of reptiles has been undertaken with reference to selection criteria for designated sites at various geographic scales as detailed in **Table J3**. The Geographic scales beyond national are not included as there are no UK reptile species included in Annex II of the Habitats Directive and, therefore, no reptile population or assemblage is considered to be of importance beyond the national level.

Table J3: Criteria for geographic scale of importance for reptiles

Importance	Criteria
Site	Supports habitat that is likely to provide a resource for reptiles, but this resource is not considered to be significant to the local reptile population.
Local	Supports habitat that is likely to provide a significant resource for reptiles in the local area but would not qualify for Local Wildlife Site status in accordance with 'Criteria for Local Wildlife Site status in accordance with 'Criteria for the Selection of Local Wildlife Sites in Hampshire' (Hampshire Biodiversity Information Centre, 1996)
County	Supports a reptile population or assemblage that would qualify for Local Wildlife Site status in accordance with 'Criteria for the Selection of Local Wildlife Sites in Hampshire' (Hampshire Biodiversity Information Centre, 1996)
National	Supports a reptile population or assemblage that would qualify for SSSI status in line with criteria set out in 'Guidelines for the Selection of Biological SSSIs' (JNCC, n.d.)

Evaluation of the site for reptiles is based on ECOSA's best professional judgement considering the following factors:

- **Species rarity** - Relative rarity of reptile species in England is based on guidance set out in the Reptile Habitat Management Handbook (Edgar, et al., 2010). **Table J4** shows the relative rarity for different species of reptile. Rarer species are considered to be of greater ecological value.

Table J4: Relative rarity of UK reptile species

Rarity within England	Species
Common	Slow worm Grass snake Common lizard Adder
Rare	Sand lizard Smooth snake

- **Species distribution** - The National Amphibian and Reptile Recording Scheme (NARRS) Report 2007-2012 (Wilkinson & Arnell, 2013) and Article 17 reporting (JNCC, 2013) is used to determine the distribution of reptile species at various geographic scales.
- **Population size class of populations present** - Population size class is estimated using guidance in Froglife's 'Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10' (Froglife, 1999). **Table J5** shows the Froglife guidance for assessing the population size of reptile species known to be present at the site, based on a refugia density of 10 per hectare which is less than the density used at the site.

Table J5: Criteria for population size assessment based upon a refugia density of 10 per hectare

Species	Low Population	Good Population	Exceptional Population
Slow-worm	<5	5-20	>20
Common lizard	<5	5-20	>20

- **Habitat quality and connectivity** - The assessment of habitat quality is based on information within a number of publications including Reptile Habitat Management Handbook (Edgar, et al., 2010). Online mapping resources are referenced to assess the habitat quality and connectivity in the wider area.

3.0 BASELINE ECOLOGICAL CONDITIONS

3.1 Introduction

This section details the results of the 2018 reptile survey work undertaken for the HTWSR site, along with survey data from previous years. It assesses the baseline ecological conditions of the site in respect to reptiles at the time of the desktop study and field surveys. The baseline draws on a wealth of historical and present data, relevant data from historic surveys has been included in the report to increase the understanding of the site in terms of reptiles.

3.2 Baseline Ecological Conditions

Desktop Study Results

The HBIC data returned records of slow worm, common lizard, grass snake and adder within two kilometres of the site. Slow worm, common lizard and adder were recorded within Havant Thicket, with the most recent records from 2008 for slow worm and common lizard and 2016 for adder. Grass snake have been recorded within the previous ten years from one to two kilometres north west of the site. The locations of reptile records returned from HBIC within the 500 metres of the site are shown on **Map J3**.

A single HBIC record related to 73 slow worm associated with a 'release site' in an area located along the northern site boundary. Investigation of this record with HBIC revealed that it related to a release undertaken by Ecological Planning and Research (EPR) between 25th April and 20th July 2007. When they were contacted in January 2019 EPR could not provide further details of exactly where these animals were released, where they came from, or which landowner agreed the release. Given the presence of an exceptional population of slow worm within the site, the release of these animals is not considered to have implications for this assessment.

The MAGIC search revealed that there are no internationally and nationally designated sites for nature conservation within two kilometres of the site. A LNR, Hazelton Common LNR, is located approximately 1.1 kilometres to the north-north-west of the site, and whilst the Natural England designation citation does not include reptiles, information from Horndean Parish Council specifies that common lizard adder and grass snake are present.

During 2005, ECOSA surveys comprised fifty refugia placed within the site. A peak count of 48 common lizard was made, with this species widely distributed across the site. Slow worm were also distributed widely. Grass snake records were concentrated around The Avenue, where the western edge was particularly favoured with up to eight animals recorded beneath refugia and basking along the woodland edge. A maximum

count of six adder was made, with individuals found predominantly on the north-eastern boundary of the site.

In 2007 1,600 refugia were distributed across the site, which were checked between August and October 2007. These refugia were then resurveyed between April and June 2008. Common lizard and slow worm were again widely distributed with a peak of 48 slow worm on a single survey. Grass snake was the scarcest species encountered with approximately 13 animals recorded along woodland edge and ditch habitat. Records were relatively well distributed, reflecting the pattern also shown by both common lizard and slow worm during 2005-2008. Although no grass snake were recorded on the far western edge of the site. A maximum count of 11 adder on a single survey was made, with individuals again found predominantly on the north-eastern boundary of the site, along the edge of Havant Thicket woodland.

During surveys of Havant Thicket woodland in 2008, 554 refugia were distributed across optimal and suboptimal habitat to identify areas suitable for reptile translocation. Peak counts were of one grass snake, one adder, 67 slow-worms and 86 common lizards. The results of these surveys were then combined with habitat data to provide an assessment of the habitat suitability for reptiles. The information on habitat quality or distribution of records has not been included in this report given the age of the data, the significant change in some habitats over the last 10 years, and fact that mitigation and compensation proposals in Havant Thicket woodland has altered significantly since 2008.

Full details of the 2005-2008 reptile surveys on-site and within Havant Thicket woodland can be obtained on request. The 2005-2008 data is still considered important for the reptile assessment because the on-site habitats have remained broadly similar between the previous surveys and 2018, and therefore the conclusions and survey results obtained previously are still considered to be valid (as explained in Paragraph 1.2).

2018 Field Survey

During the 2018 field survey the habitat within the site comprised a combination of neutral grassland, rush pasture, woodland, stream corridors, ditches and boundary vegetation. A proportion of the eastern edge of the site had been 'topped' with a tractor mounted flail and fields in the west were being grazed by Highland Cattle and a small number of horses. The on-site habitats were broadly similar to those recorded in 2005-2008, apart from the Gypsies Plain area (see **Map J2**) which was previously heavily grazed by horses but has since become more tussocky, as a result of reduced grazing pressure.

The woodland edges, stream corridors and tussocky grassland were assessed to have suitability for common species of reptiles.

2018 Reptile Survey

The surveys undertaken in 2018 on the site involved the deployment of 416 refugia and recorded similar numbers of slow worm to those undertaken between 2005 and 2008.

The results of surveys undertaken in 2018 on the reservoir site indicated that all four species remain present on site with an exceptional population of slow worm present, a good population of common lizard and a low population of adder and grass snake. In Havant Thicket woodland located to the north of the site a low population of slow worm and grass snake was recorded, with no common lizard or adder recorded.

A peak count on a single survey of 41 slow worm was recorded on 20th June 2018, given that fewer refugia were used in 2018 it is possible that the population of this species has increased at the site. The northern site boundary and northern extent of the western edge of The Avenue were particularly favoured by this species. Other records were scattered around the site mainly associated with boundary features such as ditches and woodland edges.

Numbers of common lizard, grass snake and adder were lower than previous surveys with the peak count on a single survey, of seven common lizard, four grass snake and two adder. However, the 2018 surveys were designed (see Paragraph 1.2) to sample the on-site habitats rather than be a repeat of the previous surveys, and a lower number of animals would be expected given that fewer refugia were distributed.

Common lizard were recorded widely and showed less preference for boundary features than the other species. There was a particular concentration of common lizard in the north-west corner of the site, although the maximum number of common lizard recorded in this location on any one survey was two females and one male.

Grass snake records were mainly focussed around the northern site boundary or within and adjacent to The Avenue. Only two records of grass snake were made in 'central field' locations indicating a lower density of the species in these areas.

Adder records were located along the northern site boundary, north-western site boundary and on Gipsies Plain. The majority of records were associated with boundary features apart from two 'central field' location in the north-west of the site. As was noted with other reptile species it likely that this species is present at extremely low densities away from boundary features such as woodland edges and ditches.

The 2018 survey data are shown in **Table J6**, which shows adults as the unbracketed number and juveniles in brackets.

During a site visit unrelated to the reptile assessment undertaken by Simon Boswell, ECOSA Principal Ecologist on 3rd May 2018 four adder were recorded along the north western edge of the site, representing the peak count for this species during 2018. Adder records on Gipsies Plain were recorded during breeding bird surveys undertaken in April 2018 (see **Map J8**). These records indicate that the number of adder records made during the reptile surveys (as presented in **Table J6**) is likely to be an under representation of the population of the species at the site.

A number of other records of adder, slow worm, grass snake and common lizard were made across the development site by ecologists undertaking other surveys. This information has been plotted on **Map J4** to **Map J8**.

Table J6: Reptile survey data from 2018 – the site

Survey No	Survey Date	Common Lizard	Slow worm	Grass Snake	Adder
1	22 nd -23 rd May 2018	0(0) ⁵	34(20)	3(0)	1(0)
2	29 th May 2018	0(0)	0(1)	0(0)	0(0)
3	1 st June 2018	4(0)	39(10)	2(0)	1(0)
4	13 th June 2018	2(0)	32(1)	3(0)	0(0)
5	20 th June 2018	5(0)	41(0)	0(2)	0(0)
6	18 th September 2018	3(0)	14(28)	1(1)	2(0)
7	25 th September 2018	7(0)	5(5)	4(0)	0(0)
8	18 th October 2018	0(0)	0(17)	1(0)	0(0)
From 417 refugia	Peak Count:	7(0)	41(28)	4(2)	2(0)

Numbers of reptiles recorded in Havant Thicket woodland were low, most likely due to the more densely wooded nature of the FE land being less suitable for reptiles. This was expected in suboptimal young woodland compartments which were targeted as potential mitigation and compensation areas suitable for habitat enhancement, but even along tracks numbers were low. A peak count of only two slow worm and one grass snake was recorded. The survey data are shown in **Table J7**, which shows adults as the unbracketed number and juveniles in brackets.

⁵ Juveniles are shown in brackets

Table J7: Reptile survey data from 2018 – Havant Thicket woodland

Survey No	Survey Date	Common Lizard	Slow worm	Grass Snake	Adder
1	10 th September 2018	0(0) ⁵	0(0)	1(0)	0(0)
2	12 th September 2018	0(0)	0(0)	0(0)	0(0)
3	20 th September 2018	0(0)	2(0)	1(0)	0(0)
4	24 th September 2018	0(0)	0(0)	0(0)	0(0)
5	26 th September 2018	0(0)	1(0)	0(0)	0(0)
6	28 th September 2018	0(0)	0(0)	0(0)	0(0)
7	2 nd October 2018	0(0)	0(0)	0(0)	0(0)
From 229 refugia	Peak Count:	0(0)	2(0)	1(0)	0(0)

In terms of habitats, one slow worm was recorded on a single occasion (20th September 2018) in a relatively open area of bracken on the northern edge of Bells Copse. Another slow worm was recorded on two surveys (20th September and 26th September 2018) along the edge of an open ride of the western side of Havant Thicket woodland. The grass snake records were under the same refugia on the western edge of Havant Thicket woodland.

In addition to these records two adders were recorded in Havant Thicket woodland during other survey work undertaken at the site (see **Map J10**), both were recorded along rides. The survey results indicate that the habitats surveyed within Havant Thicket woodland which have been identified as suitable to be managed as compensatory habitat for those areas lost within the site contained extremely low densities of reptiles. This was particularly true for the birch dominated areas, coniferous woodland and stream corridors where no reptiles were recorded.

3.3 Discussion

Reservoir Site

The habitat within the reservoir site remains suitable for all four common species of reptile. Whilst the data from 2005-2008 and 2018 is not directly comparable due to different methodologies employed across years, there are some notable similarities and differences between the results.

In all years there was a notable lack of records in south-west corner of the site, potentially as a result of disturbance from the adjacent Leigh Park and Warren Park

residential area. During 2018 records of slow worm were particularly concentrated along the northern edge of the site, but this was not the case during 2005-2008 when relatively few slow worm were recorded in this area.

The results from 2005-2008 identified an exceptional population (Froglife, 2015) of all four common species of reptile on site. Given that the habitat remains broadly similar, and fewer refugia were deployed in 2018 it is unlikely that this assessment will have changed in the intervening period.

All four species were again recorded within the site during 2018, the number of individuals recorded in each broad habitat type sampled is set out in **Table J8**. There is a clear preference for 'edge' habitats within the site and these areas are likely to contain higher concentrations of reptiles across the site, especially the south-facing northern boundary.

Table J8: Peak counts of each species recorded in each habitat type on site (during a single visit)

Habitat Type	Number of Refugia	Habitat Area / length	Grass snake	Common lizard	Slow worm	Adder
Habitat Along Ditches	119	2644m	0	0	11(1) ⁵	0
Neutral Grassland	123	108.31ha	0	3	1	1
Rush Pasture / Developing Rush Pasture	32	31.84ha	0	2	1	0
Woodland Clearing in The Avenue	7	0.43ha	0	0	0	0
Woodland Edge	136	3075m	3	2	28 (21)	1

Guidelines developed for assessing reptile populations (Hill, 2005) suggest that sites which support three or more species of reptile or an exceptional population of a single species should be considered as a 'key reptile site'. The site is therefore considered to be a 'key reptile site' based on data collected both in 2005-2008 and 2018.

The 2007/2008 surveys were undertaken using a grid system and therefore the areas where reptiles were recorded provides a relatively accurate assessment of their distribution on site. This information has been combined with the 2018 records to understand the area over which each species was recorded at the site correlated to

habitat type (**Table J9**). Where suitable reptile habitat is present but no reptiles were recorded, or only a small number of individuals were found it has been assumed that these areas contain populations of slow-worm and common lizard at low densities. Area where adder and grass snake were not recorded are considered to either not contain these species, or have low density populations that are difficult to detect. The total area of habitat where reptiles, of any species, were recorded on the site during the 2005-2008 and 2018 surveys is approximately 59 hectares.

The information about usage of habitats (**Table J8** and **Map J11** to **Map J14**) and core area where each species was recorded has been used to provide a site population estimate (**Table J9**). The 'key area recorded in hectares' presented in **Table J9** and **Map J11** to **Map J14** relates to the extent of habitat where each species was regularly recorded during the course of all surveys undertaken at the site. Outlier records, where species were recorded infrequently have been excluded from the assessment as these areas are unlikely to contain the core populations of each species within the site.

The population estimates in **Table J9** are based on recorded populations in 2005-2008, 2018, the habitat present within the site, and ECOSA's experience of reptile translocations. The numbers quoted are designed to be a broad estimate rather than an accurate figure.

Table J9:Total core area where each species was recorded and site population estimate

Species	Key Area Recorded in Hectares (2005-2008 and 2018)	Peak Count (2005-2008)	Peak Count (2018)	Population Estimate
Adder	8.75	11	4	30-50
Grass Snake	14.83	13	4	30-50
Common Lizard	49.55	48	7	750-2,000
Slow worm	16.49	48	41	750-2,000

Havant Thicket woodland

The areas surveyed within Havant Thicket woodland comprise suboptimal reptile habitat in the form of mature conifer plantations, dense thickets dominated by regenerating birch *Betula* species, shaded stream corridors and pond enhancement areas. These areas were surveyed as they have been identified as suitable for ecological enhancement and to be used as receptor sites for reptiles displaced and translocated from the site (**Table J10**).

In addition, the survey included a section of track along the western edge of Havant Thicket woodland which is suitable for reptiles and would require upgrading as part of

the development of the reservoir. An additional bracken dominated land is located at the northern end of Bell's Copse, this area is a potential location for a car park for the visitor centre and was, therefore, included in the Havant Thicket woodland survey.

Table J10: Habitat identified in Havant Thicket woodland identified and potential habitat compensation areas

Habitat	Description in relation to reptiles
Young woodland thickets dominated by birch	Heavily shaded and extremely dense birch dominated woodland with limited suitability for reptiles. Limited deadwood and areas suitable for shelter and use as hibernacula present. These areas have never been thinned and therefore are consistently unsuitable for reptiles across the area covered by this habitat.
Mature conifer woodland	Dense and shaded conifer woodlands that have not been thinned. Limited deadwood and areas suitable for shelter and use as hibernacula present.
Shaded Stream Corridor	The stream corridors within Havant Thicket woodland have mostly become overgrown with dense vegetation creating a shaded habitat with limited suitability for reptiles
Pond Enhancement Areas	The pond enhancement area comprises a series of waterbodies surrounded by dense conifer woodland. The ponds have limited suitability for reptiles as they are shaded and lacking in emergent vegetation. The surrounding habitat is shaded, with limited ground flora and is of limited suitability for reptiles.

The results indicate that extremely low populations of reptiles are present in the Havant Thicket woodland areas, and only in two sections surveys, the bracken dominated areas on the northern edge of Bells Copse and along the western access track. Indeed, reptiles are likely to either be absent, present only occasionally or at extremely low densities in the areas identified as suitable for management to provide compensation for loss of reptile habitat within the site.

In the context of the presence of suitable reptile habitat within the local landscape, and populations of reptiles present the site is considered to be of County value.

The areas within Havant Thicket woodland identified as suitable to be managed to create compensatory habitat for habitat loss associated with reservoir construction are considered to be of site value to reptiles.

4.0 CONCLUSIONS

4.1 Conclusion

Survey work in 2005-2008 and 2018 indicate that the site contains populations of all four species of common reptile.

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Map J1 Site Location Plan

Map J2 Key Site Features

Map J3 Reptile Desktop Study Data

Map J4 2018 Reptile Refugia Distribution and Habitat Types

Map J5 Slow-worm Records 2018

Map J6 Common lizard Records 2018

Map J7 Grass Snake records 2018

Map J8 Adder Records 2018

Map J9 Reptile Records 2018: Havant Thicket (Forestry England)

Map J10 Havant Thicket Woodland - Additional Adder Records

Map J11 Core Areas where Slow-worm Recorded 2005-2008 and 2018

Map J12 Core Areas where Common Lizard Recorded 2005-2008 and 2018

Map J13 Core Areas where Grass Snake Recorded 2005-2008 and 2018

Map J14 Core Areas where Adder Recorded 2005-2008 and 2018