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November 2010

Knepp Castle Estate

Reptile Survey

Head Office: Compass House, 60 Priestley Road, Guildford, Surrey GU2 7YU Tel 01483 466000
Cardiff Office: Williams House, 11-15 Columbus Walk, Cardiff CF10 4BY Tel 02920 020674
Leeds Office: Calls Wharf, 2 The Calls, Leeds, LS2 7JU Tel 0113 247 3780
www.thomsonecology.com

DP World (London Gateway Port Ltd)

Knepp Castle Estate

Reptile Survey

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	Name	Signature	Position
Author	Tim Buckland		Ecologist
Checker	Paul Franklin		Principal Ecologist
Approved By	Richard Arnold		Technical Director

Contents

1 SUMMARY AND MAIN RECOMMENDATIONS

1.1 SUMMARY

1.1.1 The London Gateway development project is to be constructed progressively over approximately 10 years at the former oil refinery site and adjacent land at Shell Haven, Essex. The development consists of the construction of a Deep Sea Port (Port Development) and Logistics and Communications Park (Park Development). Associated with the development is the construction of a new access road.

1.1.2 Reptile surveys of the Port and Park development areas were undertaken in 2007 and 2008. All four common, native species of reptile were recorded; common lizard *(Zootoca vivipara)*, slow worm *(Anguis fragilis)*, grass snake *(Natrix natrix)* and adder *(Vipera berus)*.

1.1.3 In order to avoid offences being committed with regards to reptiles and to comply with planning obligations during development of the London Gateway development site, reptiles are being captured and removed from the Port and Park areas prior to commencement of development. Captured reptiles are translocated and released at suitable receptor sites. A number of receptor sites are currently being used. However, due to the large number of reptiles being captured at the London Gateway site, more receptor sites are required.

1.1.4 Thomson Ecology was commissioned in September 2010 to undertake a reptile survey of a potential receptor site for reptiles. The survey area is located within Knepp Castle Estate, West Sussex.

1.1.5 The main objective of the survey was to determine if populations of reptiles currently exist on the site and provide an estimate of population size. Thomson Ecology was also commissioned to provide a report on the survey methodology, results and an assessment of the suitability of the site as a receptor area for reptiles. The location of the site is given in Figure 1.

1.1.6 Until recently, Knepp Castle Estate was managed under traditional arable and dairy farming methods. Since 2001 there has been a shift into restoration of natural habitats with a view to 're-wilding' the area. As a result the area has become well established with coarse grassland vegetation and scrub throughout.

1.1.7 It was decided not to survey the entire area for reptiles, due to its large size (over 1,000ha). Instead an area of approximately 27.8ha, with representative habitats and potential as a receptor site, was chosen within the area.

1.1.8 Seven survey visits were made to the Knepp Castle Estate survey area during September and October 2010 in appropriate weather conditions. One individual grass snake (*Natrix natrix)* and two slow worms *(Anguis fragilis)*, were recorded during the survey. Locations of reptile records are shown in Figure 2 and full survey results are given in Appendix 1.

1.1.9 Suitable habitat for reptiles was found in most of the survey area, including habitats such as coarse grassland, scrub and open water. This area provides good habitat structure and likely abundance of invertebrate prey species which would support translocated populations of slow worm *(Anguis fragilis)* and common lizard *(Lacerta zootoca)* reptile species. Appropriate management and additional enhancements in the form of log piles and hibernacula would enable the area to support a large population.

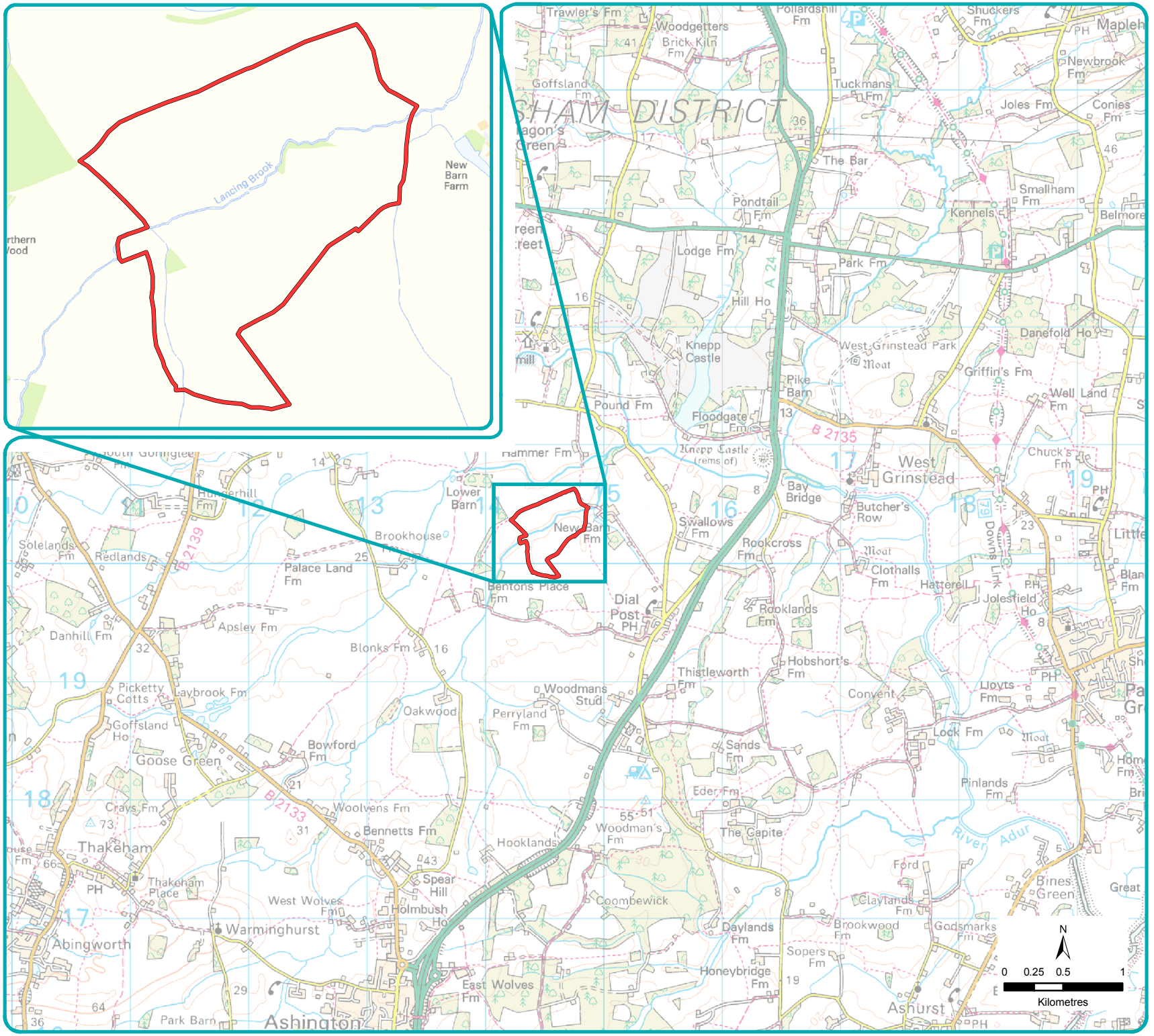
1.1.10 A single grass snake was recorded during the survey in the middle of one of the fields in the north western area of the site. Grass snakes are often associated with aquatic habitats and amphibian prey species; therefore as long as the series of ditches are enhanced the site would be suitable for the translocation of grass snakes. The addition of a series of ponds, basking sites, log piles and an egg-laying site (farmyard manure pile) would enable the area to support a large population of grass snakes.

1.1.11 Although no adders were recorded during the survey, suitable habitat is present. It is proposed that adders could be translocated at the same time as slow worms and common lizards which would supplement small mammals, which are likely to be abundant throughout the site, as a food source. Appropriate habitat management and enhancement with the addition of log piles and purpose-built hibernacula is recommended to maintain and improve the habitat present.

1.1.12 It is proposed that following the suggested enhancements and provided appropriate management can be maintained, up to 2,000 common lizards and 4,870 slow worms could be translocated to the survey area at Knepp Castle Estate in spring/summer 2011 to establish populations of these species and that 200 grass snakes could be translocated to bolster a possible existing small population. Providing enhancements discussed in this report are made it would also be possible to translocate 200 adders. A further 220 common lizards, 540 slow worms and 20 adders and grass snakes could be translocated to the fields in the north east of the site, which are currently unsuitable, once the habitat has developed sufficiently.

1.1.13 Fields which neighbour the survey area and those which are known to have the same land use history as the fields surveyed would also be suitable reptile receptor sites for reptiles from the London Gateway development.

1.1.14 Post translocation monitoring of the population is recommended for at least five years following release.



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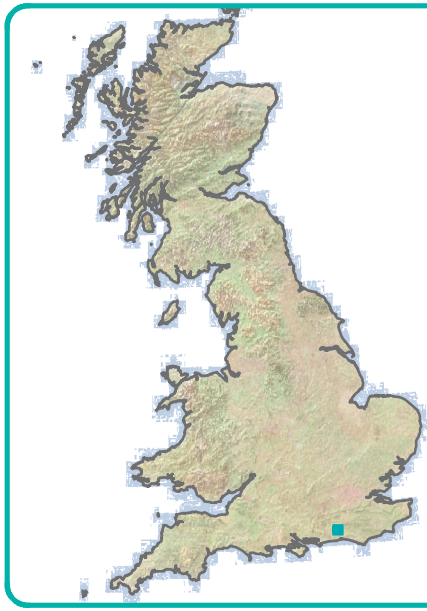
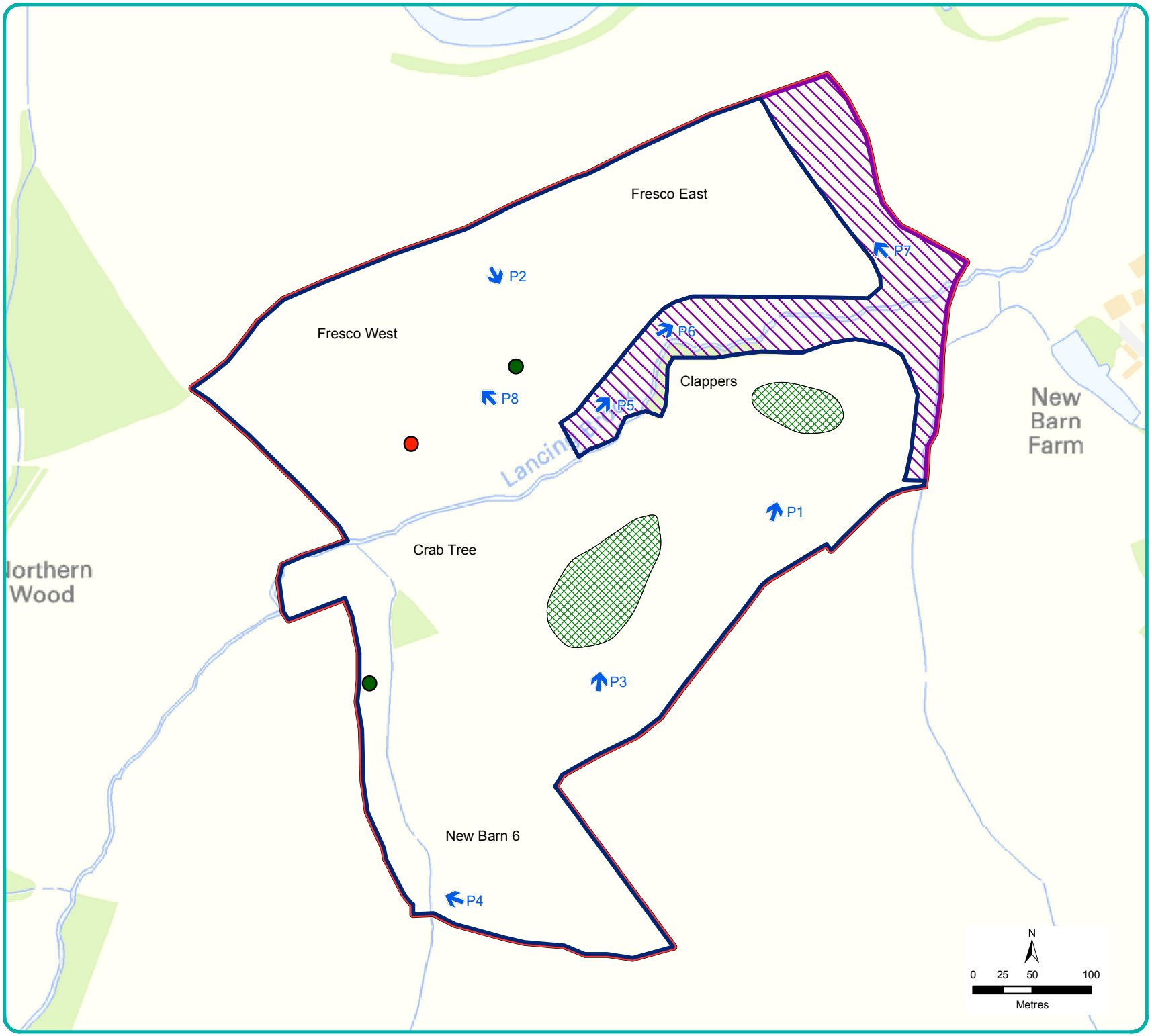


Legend

Survey Boundary

Figure: 1
Site Location

For: DP World
Drawing Ref: ODPW125/6817/1
Drawing Size: A4
Drawn By: Thomson Ecology (NS)
Checked By: Thomson Ecology (TD)
Date: 02/11/2010



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Legend

Reptile Species Observed

- Grass Snake
- Slow Worm
- Location and Direction of Photograph
- Woodland
- 25 ha Suitable Habitat
- 2.8 ha Unsuitable Habitat
- Survey Boundary

Figure: 2
Reptile Survey Results

Surveyed For: DP World
Drawing Ref: ODPW125/6818/1
Drawing Size: A4
Drawn By: Thomson Ecology (NS)
Checked By: Thomson Ecology (TD)
Date: 02/11/2010

2 INTRODUCTION

2.1 DEVELOPMENT BACKGROUND

2.1.1 The London Gateway development project is to be constructed at the former oil refinery site and adjacent land at Shell Haven, Manorway, near Stanford-le-Hope, Essex (hereafter referred to as 'the site'). The six-figure grid reference for the centre of the site is TQ 726821.

2.1.2 The London Gateway development project comprises the following main elements:

1. Deep Sea Container Port (hereafter referred to as the 'Port Development') to be constructed primarily for container traffic;
2. Logistics and Commercial Park (hereafter referred to as the 'Park Development') adjacent to the Port site, together with a new access road linking to the existing A1014 at Stanford-le-Hope and other enhancements to the existing road network including A13 and Junction 30 of the M25;
3. Re-routing of the existing rail corridor running between the Port and Park developments and construction of an off-site bend in the rail corridor to the South of Stanford-le-Hope;
4. Construction of an Access Road running from Park in the South, through Great Garlands Farm, up to the Manorway; and
5. Flooding of Site A and Site X for the creation of mudflats.

2.1.3 The London Gateway development project will be constructed progressively over about 10 years and, when complete, will be approximately 443ha in size with the Port Development at approximately 161ha and the Park Development at approximately 282ha. The London Gateway development project is owned by DP World.

2.1.4 London Gateway Port and Park Developments received planning permission from Government on the 30th May 2007. The permissions were awarded in the form of Outline Planning Permission for the Park Development and a Harbour Empowerment Order for the Port Development.

2.1.5 An obligation in the Outline Planning Permission required adherence to an Ecological Mitigation and Management Plan (EMMP). The EMMP gives a list of requirements during the development construction phases for the protection of species. Amongst other protected species, the commitments outlined in the EMMP involved protecting and monitoring translocated reptile populations (EMMP).

2.2 ECOLOGY BACKGROUND

2.2.1 Reptiles were first identified in 2001 and 2002 by Royal Haskoning during surveys that were required for the Environmental Impact Assessment, which made up part of the Outline Planning Application (OPA).

2.2.2 Reptile surveys have been undertaken over the whole of the London Gateway development site, including the Park and Port development areas, Site A, the route of the Access Road and the area of the off-site rail bend proposed alterations. All four common, native species of reptile were recorded; common lizard *(Zootoca vivipara)*, slow worm *(Anguis fragilis)*, grass snake *(Natrix natrix)* and adder *(Vipera berus)*. Population size estimates vary from low to medium in different areas of the site. Full survey results can be found in the following reports:

- Cambridge Ecology 2007, London Gateway Reptile Report (Port development and parts of Park development);
- Thomson Ecology 2008 – Ref. ODPW106/005/001, London Gateway Access Road Reptile Survey (route of new access road);
- Thomson Ecology 2008 – Ref. ODPW106/003/001, London Gateway Reptile Survey July 2008 (areas of Park, Port, Sorells Roundabout and Site A); and
- Thomson Ecology 2008 – Ref. ODPW106/006/001, London Gateway Reptile Survey October 2008 (remaining areas of Park development).

2.2.3 As set out in Appendix 3, all reptiles are protected by the Wildlife and Countryside Act 1981 (as amended) from intentional killing and injuring. However, mitigation for these species is not subject to licensing by Natural England. Reptiles also have UK Biodiversity Action Plan Priority status and are Species of Principal Importance (SPI) under Section 41 of the NERC Act 2006.

2.2.4 Given that the development works are likely to result in killing or injury to reptiles, without mitigation, the development would contravene legislation protecting reptiles. However, using established techniques it is possible to:

- Avoid killing or injuring reptiles during the development process by removing reptiles from the site prior to site clearance; and
- Safeguard the reptile population removed by translocation to a suitable receptor site.

2.2.5 The development can therefore be made compliant with the above legislation regarding reptiles by undertaking appropriate mitigation.

2.2.6 In order to avoid offences being committed with regards to reptiles during development of the London Gateway development site, reptiles are being captured and removed from the area prior to commencement of development. Reptile translocations have previously been completed from some areas of the development, however, further removal of reptiles from some areas is required in 2011.

2.2.7 The methodology for translocation and mitigation works regarding reptiles at the London Gateway site are given in the following reports:

- Thomson Ecology 2008 – Ref. ODPW106/001/002, Reptile Ecological Action Plan (covering Swift development);
- Thomson Ecology 2008 – Ref. ODPW106/002/001, Ecological Action Plan (Part 2) Reptiles (covering Rest of Park development);
- Thomson Ecology 2008 – Ref. ODPW106/004/002, London Gateway Site A Reptile Mitigation Method Statement (covering Site A); and
- Thomson Ecology 2009 – Ref. NLNG101/003/004, London Gateway West Port Reptile Method Statement (covering West Port development).

2.2.8 Captured reptiles are translocated and released at suitable receptor sites. A number of receptor sites have already been used. However, due to the large number of reptiles being captured at the London Gateway site, more receptor sites are required.

2.2.9 In order to secure suitable receptor areas for reptiles, DP World commissioned Thomson Ecology in July 2010 to conduct a search for suitable sites. One of the areas identified with potential was an area of Knepp Castle Estate, West Sussex.

2.2.10 An initial site visit to an area of Knepp Castle Estate was made in July 2010 to assess the site's potential as a receptor site. The area of Knepp Castle Estate (see Figure 1) visited included a series of fields which had recently come under a new management scheme of restoration and have since become well established with rough grassland and scrub. The area was assessed as having suitable habitat and good potential for reptiles.

2.2.11 In order to assess the suitability of the site as a receptor for translocated reptiles, a survey was required to determine whether there were existing populations of reptiles on the site.

2.3 THE BRIEF AND OBJECTIVES

2.3.1 DP World commissioned Thomson Ecology in September 2010 to undertake a reptile survey within a given area of Knepp Castle Estate, West Sussex. The brief was to:

- Carry out a reptile survey of suitable reptile habitat within the site boundary, comprising one visit to deploy artificial refugia and seven subsequent visits to check the refugia during suitable weather conditions;
- Provide a report on the survey giving the methods and current status of reptiles within the areas surveyed, and a discussion of the suitability of the site as a receptor site for reptile translocation; and
- Provide a digitised map of the survey results.

2.4 LIMITATIONS

2.4.1 The first five surveys were conducted within September which is considered an optimal survey period for reptiles. Although the last two visits were made in October, which is outside the main survey period for reptiles, all surveys were carried out during suitable weather conditions, and so this was not considered as a limitation.

3 METHODOLOGY

3.1 GENERAL APPROACH

3.1.1 The survey area encompassed approximately 27.8ha of grassland. Of this total area approximately 25ha was deemed to be habitat currently suitable to support populations of reptiles. The survey area comprised fields named: Fresco East, Fresco West, New Barn Lagg, Clappers, Crabtree and New Barn 6 (see Figure 2).

3.1.2 Two survey methods were used to determine the presence or possible absence of reptiles. These were a visual search for basking reptiles and the checking of artificial refugia laid down specifically to attract reptiles.

3.2 VISUAL SEARCH

3.2.1 On seven occasions when there was intermittent or hazy sunshine, the survey area was walked around, whilst slowly looking for basking reptiles. Any reptiles seen were approached cautiously so as not to disturb them and to allow species identification. Particular attention was directed towards areas highly suitable for basking reptiles such as patches of bramble, rocks or bricks and piles of dry logs and sticks.

3.3 REFUGIA SEARCH

3.3.1 On 17th September 2010, a total of 1000 artificial refugia were placed in suitable locations throughout the survey area, giving an approximate density of 40 artificial refugia per hectare.

3.3.2 The artificial refugia were 0.5m x 0.5m cuts of roofing felt. The refugia were positioned so that they were in contact with the ground, with the black side facing upwards and exposed to sunlight.

3.3.3 The artificial refugia were cautiously checked for reptiles both on top and underneath on seven visits on separate days. If any reptiles were found the species and the numbers of reptiles were recorded. The exact locations of observations were recorded by GPS as an ordnance survey grid reference.

3.3.4 On hot, sunny days, the survey was conducted during the early morning or late afternoon and on cooler, cloudy days, the survey was conducted in mid- to late morning or early to mid- afternoon, when the temperature beneath the refugia was not above 22 degrees centigrade. The air temperature in the shade was recorded on each survey visit.

3.3.5 The artificial refugia were collected up and removed from the site after the end of the survey.

3.4 POPULATION ESTIMATION

3.4.1 Herpetofauna Groups of Britain and Ireland (HGBI) guidelines were used to allocate a population size class to each species recorded. The guidelines determine a low population of slow worm to be less than 50 individuals per hectare and common lizards to be less than 20 per hectare. A low population of adders and grass snakes is deemed to be less than two individuals per hectare of suitable reptile habitat.

3.5 DATES OF SURVEY

3.5.1 All refugia were checked during optimal temperature and weather conditions over seven visits. Table 1 shows the dates, air temperature and weather for each of the seven visits.

Table 1: The date, temperature and weather conditions of each visit

Visit No.	Date	Air Temp ^{0}C	Conditions
1	21/09/2010	18 - 23	Dry, 50% cloud cover, with light wind
2	22/09/2010	19 - 22	Dry, 50% cloud cover, with light wind
3	23/09/2010	13 - 17	Dry, 20% cloud cover, with light wind
4	29/09/2010	14 - 17	Dry, 100% cloud cover, light wind
5	30/09/2010	13 - 17	Dry, 10% cloud cover, light wind
6	01/10/2010	13 - 15	Dry, 100% cloud cover, moderate wind
7	04/10/2010	11 - 15	Dry, 90% cloud cover, with light wind

4 RESULTS

4.1 BACKGROUND

4.1.1 The contents of the results section are the factual results of the reptile survey. Figure 2 shows the distribution of reptiles recorded within the survey area. Full survey results are given in Appendix 1 and a summary is provided below.

4.2 VISUAL AND REFUGIA SEARCH

4.2.1 Two species of reptile (grass snake and slow worm) were recorded during the survey. One individual grass snake and two slow worms were recorded during refugia checks. The peak adult daily count (maximum number recorded on any single visit) of reptiles recorded during both the visual and refugia surveys are shown in Table 2.

Table 2: Peak adult count of reptiles recorded during the survey

Species	Common Lizard	Adder	Grass Snake	Slow Worm
Peak Adult Daily Count	0	0	1	2

4.3 POPULATION ESTIMATION

4.3.1 The population estimates of the reptile species recorded derived from the peak adult counts are shown in Table 3.

Table 3: Species Population Estimates

Species	Common Lizard	Adder	Grass Snake	Slow Worm
Population Estimate	None	None	Low	Low

5 ASSESSMENT OF RECEPTOR SITE SUITABILITY

5.1 GENERAL GUIDANCE

5.1.1 Guidance on selection, preparation and monitoring of receptor sites for reptiles is given in the Joint Nature Conservation Committee Herpetofauna Workers' Manual (HGBI). This advises that receptor areas should:

- Be of a suitable size for the number of animals to be moved;
- Provide good quality habitat according to known ecological requirements of the translocated species;
- Be safe, at least in the foreseeable future, from land-use changes that would harm the population; and
- Preferably hold some form of protected status or be open land of low intensity use where survival is highly likely.

5.2 SIZE OF RECEPTOR SITE AND HABITAT SUITABILITY

5.2.1 The Knepp Castle Estate site has an approximate total area of over 1,000ha, of which approximately 27.8ha has been surveyed for reptiles. Currently the area has approximately 25ha of high quality habitat for reptiles (see photographs 1-4, Appendix 2A). Land at Knepp Castle Estate used to be managed under traditional arable and dairy farming techniques until 2001, and as such would have been largely unsuitable for reptiles, except possibly for the field boundaries and any unused areas. Since 2001, land at Knepp Castle Estate has undergone a series of habitat regeneration and restoration projects which have stimulated the return of many species of grass and wildflowers to the area.

5.2.2 Although the area has become increasingly more suitable for reptiles the time for colonisation has been limited and consequently reptiles are absent (common lizard and adder) or in low numbers (slow worm and grass snake), at least in the area surveyed.

5.2.3 Since being taken out of the arable and grazing regime the fields have become dominated by typical pioneer species such as common ragwort (*Senecio jacobaea*) and common fleabane (*Pulicaria dysenterica*) which readily invade bare ground and have exploited the elevated nutrient levels (see photograph 8, Appendix 2B).

5.2.4 In the centre of Crabtree and Clappers fields (see Figure 2) there are two large parcels of goat willow (*Salix caprea*). Even though these have very low suitability for reptiles, they do offer high quality reptile habitat around the margins.

5.2.5 If there are no neighbouring populations of common lizard or adder then colonisation of the site as the habitat became suitable would not have been able to occur. The survey records for grass snake and slow worm suggest that these species may have previously been present in low numbers, possibly on field margins (see photograph 2, Appendix 2A) or other small areas of suitable habitat, or may have colonised from neighbouring areas as the habitat became suitable. However the survey results suggest that these species of reptiles are only present in low numbers and the carrying capacity of the habitat has not been achieved.

5.2.6 The nature of the habitat currently existing within the area surveyed makes it likely that abundant invertebrate prey species for slow worms and common lizards are present. It is considered likely that translocated populations of these species would flourish and would then spread into neighbouring habitats and consequently into more recently grazed areas within the area surveyed, if that habitat is allowed to develop into similar coarse grassland.

5.2.7 Grass snakes are often associated with aquatic habitats, with amphibians as an important prey item. The stream and the series of ditches (see photograph 4, Appendix 2A) within the survey area may not currently provide appropriate habitat or abundance of prey items to support larger numbers of grass snakes than those which already exist in the area. Improvements to the stream and ditch system are therefore required, or other aquatic habitats, such as small ponds should be provided.

5.2.8 Translocated adders are also likely to become well-established within the area surveyed provided they are translocated at the same time as slow worms and common lizards which would provide a food source in addition to small mammals, likely already to be abundant on the site.

5.2.9 Neighbouring fields to the survey area are known to have a similar land use history and reptile surveys in these areas would be likely to give similar results. Neighbouring fields around the survey area and other areas within Knepp Castle Estate with similar land use histories are therefore also likely to have potential as reptile receptor sites.

5.3 PROPOSALS FOR HABITAT ENHANCEMENT

5.3.1 All of the fields within the survey area (except New Barn Lagg and the north-eastern corner of Fresco East) are currently considered suitable for the release of common lizard, slow worm, grass snake and adder. However, prior to release it is recommended that some habitat enhancement works are undertaken to provide further habitat features of benefit to these species and enable the habitat to support a large population. Photographs of potential

habitat enhancements which could be installed to benefit reptiles at Knepp Castle Estate are given in Appendix 2C.

5.3.2 The enhancements proposed consist of log piles with core hibernation chambers constructed of concrete slabs and bricks. The hibernation chamber will provide opportunities for communal hibernation by adders and the log pile will provide basking sites, hibernation sites and cover for all reptiles, as well as a source of invertebrate prey items for slow worms and common lizards. The size of these enhancement features would be approximately 1 metre high and 2 metres in diameter.

5.3.3 To provide suitable habitat for a large population of grass snakes, the area could be enhanced by digging a series of small ponds and clearing out any ditches to provide good breeding habitat for amphibians, the principal prey of grass snakes. Provision of any egg-laying site in the form of a farmyard manure pile would also be beneficial.

5.4 NUMBERS OF REPTILES PROPOSED FOR RELEASE

5.4.1 The number of reptiles proposed for release is based on the area of habitat available and the estimated carrying capacity of the habitat for the different reptile species proposed for translocation. Carrying capacity estimates are based on experience of numbers trapped and removed from the London Gateway donor sites and figures given in the HGBI guidelines.

5.4.2 Table 4 shows the estimated carrying capacity for reptiles on the area of suitable habitat currently available within the survey area at Knepp Castle Estate (~25ha). These reptiles could be translocated in summer 2011.

Table 4: Carrying capacity of suitable habitat within the survey area at Knepp Castle Estate (~25ha)

Species	Estimated carrying capacity per hectare	Approximate carrying capacity in 25ha of suitable habitat ***
Common lizard	80 **	2,000
Slow worm	195 *	4,870
Grass snake	8 *	200
Adder	8 *	200

* - highest density recorded from trapping at London Gateway donor sites

** - lower figure of high population density given in HGBI guidelines

*** - Figure rounded to nearest ten

5.4.3 Table 5 shows the estimated carrying capacity within the survey area at Knepp Castle Estate, not currently suitable, but which could become suitable in the future (~2.8ha). These reptiles could be translocated in late summer 2011, provided the habitat within Fresco East and New Barn Lagg has become suitable.

Table 5: Carrying capacity of additional habitat which could become available for reptiles within the survey area at Knepp Castle Estate later in 2010 (~2.8ha)

Species	Estimated carrying capacity per hectare	Approximate carrying capacity in 2.8ha of suitable habitat ***
Common lizard	80 **	220
Slow worm	195 *	540
Grass snake	8 *	20
Adder	8 *	20

* - highest density recorded from trapping at London Gateway donor sites

** - lower figure of high population density given in HGBI guidelines

*** - Figure rounded to nearest ten

5.5 FUTURE MANAGEMENT OF THE RECEPTOR SITE

5.5.1 Management of the site following the translocation of reptiles should aim to maintain the coarse grassland habitat type with some bramble and early scrub encroachment.

5.5.2 The land at Knepp Castle Estate underwent a scheme of restoration in 2001 and the grassland is currently under a very low density grazing management regime. This level of grazing is perfect for creating tussocky vegetation as well as open areas in which reptiles can bask.

5.5.3 The current series of ditches and the stream running through the survey area should be maintained and prevented from drying up. The wide margins of rough, long, marginal vegetation should be maintained, and the introduction of fish and waterfowl should be avoided. Invertebrates and amphibian numbers should flourish, encouraging grass snake colonisation.

5.5.4 It is recommended that monitoring of the habitat and reptile populations be undertaken.

5.6 MONITORING OF TRANSLOCATED REPTILES

5.6.1 It is proposed that monitoring of reptiles at the release site should be carried out annually for at least five years following the release. The methodology used for the monitoring will be similar to that outlined in this report. A series of seven survey visits can be made in early spring to monitor presence of reptiles after the winter hibernation period and to identify and document use of communal hibernacula by adders. A second series of visits can be made in September to record evidence of breeding success and estimate population size.

5.6.2 Translocated adders will be photographed prior to release to enable future identification of individuals at the same time as the habitat and reptile monitoring studies.

6 CONCLUSION

6.1.1 This reptile survey recorded only one individual grass snake and two slow worms. However, suitable habitat enhancements could allow the area to support large populations of translocated common lizards, slow worms, grass snakes and adders.

6.1.2 It is known that the fields surrounding the survey area have similar land use history and so it can be anticipated that these areas could also be suitable reptile receptor sites for the London Gateway development.

7 REFERENCES

7.1.1 Cambridge Ecology (2007) London Gateway Reptile Report

7.1.2 Gent, A.H., & Gibson, S.D., eds. 1998. *Herpetofauna worker's manual*. Peterborough, Joint Nature Conservation Committee

7.1.3 Herpetofauna Groups of Britain and Ireland (1981) Evaluating local mitigation/translocation programmes: Maintaining Best Practice and Lawful Standards. *HGBI advisory notes for Amphibian and Reptile Groups. HGBI, c/o Froglife, Halesworth. Unpubl.*

7.1.4 London Gateway Ecological Mitigation and Management Plan (EMMP)

7.1.5 The (London Gateway Logistic and Commercial Centre) Outline Planning Application 2002 (OAP)

7.1.6 Thomson Ecology (2008) Reptile Ecological Action Plan for DP World. *Thomson Ecology Ltd* (ODPW106/001/002)

7.1.7 Thomson Ecology (2008) Ecological Action Plan (Part 2) Reptiles (ODPW106/002/001)

7.1.8 Thomson Ecology (2008) London Gateway Site A Reptile Mitigation Method Statement (ODPW106/004/002)

7.1.9 Thomson Ecology (2008) London Gateway Access Road Reptile Survey (ODPW106/005/001)

7.1.10 Thomson Ecology (2008) *London Gateway Reptile Survey July 2008* (ODPW106/003/001)

7.1.11 Thomson Ecology (2009) London Gateway Reptile Survey October 2008 (ODPW106/006/001)

7.1.12 Thomson Ecology (2009) London Gateway West Port Reptile Mitigation Merthod Statement (NLNG101/003/004)

8 APPENDIX 1 - REPTILE SURVEY RESULTS

		Number of observations														
		Slow worm (Af)				Common lizard (Zv)				Grass snake (Nn)			Adder (Vb)			
Survey Date	Visit Number	M	F	J	U	M	F	J	U	A	J	U	M	F	J	U
21/09/2010	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
22/09/2010	2	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
23/09/2010	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29/09/2010	4	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
30/09/2010	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/11/2010	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04/11/2010	7	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0

= Visit from which peak adult count was calculated

M = Male, F = Female, J = Juvenile, U = Life stage and/or sex undetermined

9 APPENDIX 2A - PHOTOGRAPHS OF EXISTING SUITABLE REPTILE HABITATS

Photograph 1
Coarse grassland throughout the site is currently suitable for reptiles.

Photograph 2
Marginal vegetation around field boundaries throughout the site is currently suitable for reptiles and provides good connectivity with neighbouring areas.

Photograph 3
Suitability for reptiles throughout the survey area is increased by the presence of bramble patches which provide cover, and basking sites.

Photograph 4
The series of ditches and streams throughout the survey area could become suitable for grass snakes.

10 APPENDIX 2B - PHOTOGRAPHS OF SUB-OPTIMAL REPTILE HABITATS

Photograph 5

Photograph 6

The grassland within New Barn Lagg and to the north eastern corner of Fresco East has been more recently managed and is currently of low suitability due to a lack of cover and probable low abundance of prey items. Provided this area is not intensively grazed or cut it could become suitable habitat for reptiles next year.

Photograph 7
There is an obvious boundary line in the north eastern corner of Fresco East.

Photograph 8
The centres of all of the fields have become dominated by common ragwort and common fleabane.

11 APPENDIX 2C - PHOTOGRAPHS OF POTENTIAL REPTILE HABITAT ENHANCEMENTS

Photograph 9

Photograph 10

Log piles, placed on reptile receptor sites, provide additional cover, basking and hibernation sites for reptiles. After a short period of time they blend well into the coarse grassland habitat.

Photograph 11
Stone piles, placed on reptile receptor sites, provide hibernation sites.

Photograph 12
Adders often hibernate communally in underground, dry, frost free chambers. Artificial hibernation chambers for adders can be incorporated into larger stone piles, log piles or existing structures.

12 APPENDIX 3 - BRITISH REPTILES

12.1 INTRODUCTION

12.1.1 A summary of the biology of British reptiles, the legislation that protects them and other mechanisms of highlighting species of conservation concern is provided below.

12.2 BIOLOGY

12.2.1 There are six British species of reptiles, comprised of three snake species, adder *(Vipera berus)*, grass snake *(Natrix natrix)* and smooth snake *(Coronella austriaca)*, and three lizard species, common lizard *(Zootoca vivipara)*, sand lizard *(Lacerta agilis)* and slow worm *(Anguis fragilis)*. In addition, there are a few introduced species, which may be encountered occasionally, arising from escapes or illegal releases. A summary of each species is given below, based on information provided in Arnold (1995), Beebee and Griffiths (2000) and Gent and Gibson (1998).

Adder

12.2.2 The adder has a distinctive zig-zag pattern running down the back. Adders emerge from hibernation from March onwards and bask in open areas, particularly in spring. The mean temperature of a basking adder is about 33°C. Adders do not feed before mating each year, with this occurring in April and May. The young are born in late August to September and hibernation commences in October. Adders are venomous and small mammals make up most of their diet.

12.2.3 The adder has a widespread but patchy distribution in Britain and is more abundant in the south than the north but nevertheless occurs in northern Scotland. They require undisturbed, open sunny areas in the vicinity of thick cover. South facing chalk or sandy slopes with mixed vegetation may be ideal, and adders may be found in heathland, moorland, coarse grassland and scrub.

Grass snake

12.2.4 The grass snake is the largest snake in Britain. They emerge from hibernation in March and, during spring in particular, bask in open areas in order to raise their body temperature. Active grass snakes maintain temperatures of between 26 and 30°C. Eggs are laid in June and July with the young hatching in September. Their main food items are amphibians and fish, which they hunt when swimming or in vegetation.

12.2.5 The grass snake has a lowland distribution in Britain and is absent from Scotland. It is widespread and locally common in the south-east of England.

The grass snake is essentially an aquatic species, occurring mainly where there are good populations of amphibians. Nearby open areas with direct sunshine in the vicinity of dense cover are also important, as are suitable egg-laying sites.

Smooth snake

12.2.6 The smooth snake is superficially similar in appearance to the adder, though lacks the clearly defined zig-zag stripe running down the back. They emerge from hibernation from late February onwards though still spend much of their time below ground. They bask mainly by wrapping themselves around vegetation, rather than in open areas, although they may also lie under sheet material, such as corrugated tin. Their preferred operating temperature is between 28 and 33^{o}C. Live young are produced in August and September. Their main prey is small mammals and other reptiles.

12.2.7 The smooth snake is the rarest species of reptile in the UK, occurring almost exclusively on lowland dry heathland in the southern counties of England, namely Dorset, Hampshire, Surrey and West Sussex.

Common lizard

12.2.8 The common lizard is the smaller of the two British lizards with the typical legged body form. Common lizards emerge from hibernation from January onwards. Common lizards do bask in open sunny areas and try to achieve an optimum operating temperature of around 30^{o}C. The young are born from mid-July to mid-September and hibernation commences in October. The main food items of this species are invertebrates.

12.2.9 Common lizards have a widespread distribution across England, Wales and Scotland and are also native to Ireland. They prefer undisturbed ground, with dense but short vegetation and patches of bare ground or promontories that are fully exposed to the sun. South facing slopes are often favoured. They are found in a variety of open habitats including roadside verges, railway embankments, woodland clearings, rough grassland, scrub, heathland and coastal sand dunes.

Sand lizard

12.2.10 The sand lizard is the other British lizard with the typical legged body form. Sand lizards emerge from hibernation from February onwards. They bask in open, sunny areas in spring but spend little time basking in the height of summer. They try to achieve a body temperature of between 27.5 and 32.5^{o}C. Eggs are laid from the beginning of June to the end of August and hatch between 7 and 12 weeks later. Hibernation commences in early October. The main food items of this species are invertebrates.

12.2.11 The sand lizard has very specialised habitat requirements and occurs naturally only on lowland sandy heathland in areas of Dorset, Hampshire and Surrey, and in Merseyside on coastal dunes densely vegetated with marram grass *Ammophila arenaria*. They have also been introduced to parts of Berkshire, Cornwall, West Sussex, Devon and North Wales in recognition of the fact that the species used to occupy a wider range encompassing these areas.

Slow worm

12.2.12 The slow worm is a legless lizard that superficially resembles a snake. Slow worms emerge from hibernation from March onwards. When active, slow worms rarely bask in open areas and instead try to maintain a body temperature between 14.5 and 28^{o}C mainly by contact with warm surfaces. The young are born from mid-August to mid-September and hibernation commences in October. The main food items of this species are invertebrates.

12.2.13 Slow worms have a widespread distribution across England, Wales and Scotland, but are particularly common in southern and eastern England. They require fairly thick vegetation interspersed with sunny areas for thermoregulation and underground or covered refuges. They are found in a wide variety of habitats including rough grassland, heathland, moorland, downland, hedgerows, scrub and woodland edge. Good populations can sometimes be found on railway embankments, motorway verges and allotments.

12.3 SITE DESIGNATION

12.3.1 The most important sites for reptiles in the UK receive statutory protection under the following legislation:

- Wildlife and Countryside Act 1981, as amended;
- The Countryside and Rights of Way Act 2000 (which amends the Wildlife and Countryside Act); and
- Natural Environment and Rural Communities Act 2006(which amends the Wildlife and Countryside Act).

12.3.2 Sites designated under the Wildlife and Countryside Act 1981 (WCA) are known as Sites of Special Scientific Interest (SSSIs). SSSIs received further protection under the Countryside and Rights of Way Act 2000 (CRoW) and the Natural Environment and Rural Communities Act 2006 (NERC).

12.3.3 Some SSSIs are designated for the populations of reptiles that they support. The criteria for selecting SSSIs on the basis of their reptile populations are provided in Guidelines for the Selection of Biological SSSIs (NCC, 1989):

- Sand Lizard – all important and established populations in Dorset and all established populations elsewhere;
- Smooth snake - all important and established populations in Dorset and all established populations elsewhere;
- Other reptiles – best locality in a given area with outstanding assemblages of at least 3 species of the 4 other reptile species.

12.3.4 Sites that qualify as SSSIs are considered to be of at least national importance for the reptiles they support.

12.3.5 Sites designated for nature conservation at the county level may also include reptile populations as part of the site qualifying criteria, although the criteria used may vary from county to county. Such sites are protected through the planning system and there is generally a presumption against development that affects such sites in local authority development plans.

12.4 SPECIES PROTECTION

Legislation

12.4.1 Both within and outside designated sites, individual smooth snakes and sand lizards are fully protected by law. Smooth snake and sand lizard are covered by the Conservation of Habitats and Species Regulations 2010 (which replaces the Conservation (Habitats &c) Regulations 1994). The Regulations make it an offence, with very few exceptions, to:

- Deliberately capture, injure or kill a smooth snake or sand lizard;
- Deliberately disturb a smooth snake or sand lizard in such a way as to be likely:
  - i. to impair its ability to survive, to breed or reproduce, or to rear or nurture its young; or
  - ii. to impair its ability to hibernate or migrate; or
  - iii. to affect significantly the local distribution or abundance of the species to which they belong.
- Damage or destroy a breeding site or resting place of a smooth snake or sand lizard;

- Keep, transport, sell or exchange, or offer for sale or exchange, any live or dead smooth snake or sand lizard, or any part of, or anything derived from a smooth snake or sand lizard.

12.4.2 In addition to the protection given to smooth snake and sand lizard under the Conservation of Habitats and Species Regulations 2010 already described, smooth snake and sand lizard are also partially protected in England under the Wildlife and Countryside Act, which adds the following offences (with certain exceptions):

- Disturbance while it is occupying a structure or place which it uses for shelter or protection; or
- Obstructing access to any structure or place used for shelter or protection.

12.4.3 If proposed work could cause killing, injury or disturbance to either of these species or damage to their habitats, appropriate mitigation which seeks to avoid these impacts should be devised and implemented under licence from Natural England.

12.4.4 Grass snake, common lizard, slow worm and adder also receive some protection under the WCA, though are protected from intentional killing, injuring and selling only. If proposed work could result in the killing and/or injury of grass snake, common lizard, slow worm or adder, appropriate mitigation should be devised and implemented with agreement from the local planning authority or Natural England. However, mitigation for these species is not subject to licensing by Natural England.

Planning Policy

12.4.5 Planning Policy Statement 9 Biodiversity and Geological Conservation (PPS9) and associated documents give further direction with respect to biodiversity conservation and land use change / development. PPS9 states that planning decisions should aim to maintain and add, enhance or restore biodiversity and that appropriate weight should be given to the presence of protected species, such as reptiles. The circular which accompanies PPS9 also states that all protected species are a material consideration for the planning authority when considering proposed developments.

12.5 UK BIODIVERSITY ACTION PLAN AND SPECIES OF PRINCIPAL IMPORTANCE

12.5.1 All British reptiles are listed as Priority Species in the UK Biodiversity Action Plan (HM Government 1994 *et seq.*). The UK Biodiversity Action Plan was published in response to the 1992 international Convention on Biological Diversity and was last updated in 2007. In addition, reptiles of any species may appear as Priority Species on Local or Regional BAPs. The

government circular which accompanies PPS9 makes clear that UK and local BAP species are capable of being a material consideration in the planning process.

12.5.2 As a Priority Species in the UK Biodiversity Action Plan, reptiles are also listed as Species of Principal Importance for the Conservation of Biodiversity in England under Section 41 of the NERC Act 2006. This places a duty on all government departments to have regard for the conservation of these species and on the Secretary of State to further, or promote others to further, the conservation of these species. In addition, every public authority, including local planning authorities, has a general duty to have regard for the purpose of conserving biodiversity. This duty does not extend specifically to the Section 41 list; however, guidance published by Defra indicates that the Section 41 species should be considered a priority when implementing the duty. Furthermore, PPS9 states that species of principal importance for the conservation of biodiversity should be protected form the adverse effects of development.

12.6 REFERENCES

12.6.1 Arnold, H.R (1995) Atlas of amphibian and reptiles in Britain. HMSO. London.

12.6.2 Beebee, T.J.C and Griffiths, R.A (2000) Amphibians and Reptiles. Harper Collins Pulishers. London

12.6.3 Gent, A.H and Gibson, S.D eds (1998) Herpetofauna Workers Manual. Joint Nature Conservation Committee, Peterborough.

12.6.4 HM Government (1994 *et seq*) Biodiversity: The UK Action Plan. JNCC, Peterborough.

12.6.5 HM Government (1998) Tranche 2 Action Plans: Volumes I and II. English Nature, Peterborough.

12.6.6 NCC (1989) Guidelines for Selection of Biological SSSIs. Nature Conservancy Council, Peterborough.