Habitat Suitability Assessment for Adders (*Vipera berus*)

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Kent Reptile and Amphibian Group

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Acknowledgements

The study described in this report was undertaken in association with Gaetan Rey and Lucille Chastel of the Conservatoire d'Espaces Naturels in the Nord Pas de Calais and Camilla Blackburn of Kent Wildlife Trust. Financial support was provided by the *Liparis* project of the European Commission's Interreg Programme. Field testing was undertaken with volunteers in both France and in the UK (see Annex 1) without whom this exercise could not have been completed.

Summary

Adder (*Vipera berus*) populations in Great Britain are declining and adder-friendly land management offers an important opportunity to improve the conservation status of this species. To this end, a simple site-level Adder Habitat Assessment Form was developed backed up by an Assessment Manual that together can be used to draw the attention of land managers to features of sites that would benefit from more appropriate management. In the longer term, the Form may have other uses such as to compare sites, to predict site suitability for occupation by adder, and/or to predict likelihood of presence.

The Form asks users to assess (on a scale of 1-4) eight habitat features. Volunteers in the Pas de Calais and in Kent have tested the Form on various habitat patches, including eight KWT wildlife reserves. As part of a training event, the same habitats were tested by multiple groups to give some measures of consistency. Subsequently, some of the trained surveyors made individual assessments of their own choice of KWT reserves. Volunteer feedback suggests that the Form and Manual are easy to use and the results are reasonably consistent.

The value of the data from the Form may be increased if the score for each habitat feature is weighted according to its importance for adder conservation. To do this the scores of habitat features (1-4) need to be converted into a Suitability Index (SI) on a scale ranging from of 1 (most suitable) to 0.01 (very unsuitable). Tentative SI values were assigned based on KRAG field experience. By calculating the geometric mean of all eight SIs a single overall Habitat Suitability Index (HSI) value is obtained from each site assessed.

Tentative HSI values for those KWT reserves assessed were favourable, with means falling in the range of 0.6 (good) to 0.8 (excellent). For the future, further testing of a wider range of habitats is required to demonstrate that the SI values adopted are effective in predicting habitat suitability. When this is completed, the Manual and Form will need to be developed into a package for easy use by land managers, and finally promoted to those who may be interested in the conservation of adders.

A leaflet promoting the adder as ‘A treasure of the Kent Countyside’ was adapted from an original developed by the Amphibian and Reptile Conservation (ARC) Trust. This is available in electronic format for download from the KWT and KRAG websites.

1. Introduction

Conservationists agree that populations of adder (*Vipera berus*) in Great Britain are declining; a range reduction of about 39% in recent times has been suggested (Gleed-Owen, 2013[1]). Consequently, the species is accorded national priority status in the UK Biodiversity Action Plan and is included in the Kent Red Data Book (2000). The main conservation threats are habitat loss and fragmentation, unsympathetic management of habitats, public pressure, and persecution.

An important opportunity to improve the conservation status of adders is to implement adder-friendly land management, especially at sites within the adder's current range that are either occupied, or unoccupied, or are unsuitable habitat patches that may be important corridors for the migration of adders between occupied sites. With the support of the *Liparis* Interreg project, financed by the European Commission, the Kent Wildlife Trust (KWT) contracted Kent Reptile and Amphibian Group (KRAG) to work with the Conservatoire d'Espace Naturels (CEN) to develop a simple, site-level, Adder Habitat Assessment Form (Annex 2) backed up by an Assessment Manual (Annex 3). The Form and Manual were elaborated from a previous study[2].

It is intended that this Habitat Assessment Form and Manual are used to draw the attention of land managers to features of a site that may benefit from more appropriate management. The Form requires a simple rating on a scale of 1 to 4 of several habitat features (see Annex 2). In the longer term, the Form may have other uses such as to compare sites, to predict site suitability for occupation by adder, or to predict likelihood of presence. To do this the ratings of habitat features (1-4) need to be converted into a Suitability Index (SI) on a scale ranging from of 1 (most suitable) to 0.01 (very unsuitable). Tentative SI values have been assigned based on KRAG field experience. A Habitat Suitability Index can be calculated from these scores.

The initial development of the Form and Manual was undertaken by desk study and during an exchange visit of CEN to Kent in December 2013. The system was then trialled for the first time in the Pas de Calais in May 2014. Subsequently, a revised Form and Manual were tested in Kent. A training event was organised for KWT volunteers and they used the Form and Manual to assess three patches of a single site. Subsequently, following further revision of the Manual, the volunteers undertook solo assessments at selected KWT reserves. This report gives details of the Habitat Assessment Form, the Manual, and the results obtain when the Form was used by volunteers.

As a further support to adder conservation, an A5 leaflet (Annex 4) promoting adders was adapted from an earlier design by the Amphibian and Reptile Conservation (ARC)

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[1] Gleed-Owen C. (2013). Adders – an attempt to measure their status. Herp Workers Meeting. Abstract only. http://www.arc-trust.org/Resources/Arc%20Trust/Documents/HWM2013-presentation-abstracts.pdf

[2] Brady L. & Phillips M. (2012). Developing a Habitat Suitability Index for reptiles. Amphibian and Reptiles Conservation Trust. Contract No: 1112/29/1. Typewritten, pp 83 = annexes. http://www.arc-trust.org/Resources/Arc%20Trust/Documents/Habitat-assessment-for-reptiles-report.pdf

Trust. It was recast to make it specific to the situation in Kent and is intended as a document that can be downloaded from the KWT and KRAG websites. CEN undertook to recast the same leaflet in the context of northern France.

2. Habitat assessment by teams at Boxley Warren

On Boxley Warren, eight teams of trained volunteers each made an assessment of the same three habitat patches (Fig. 1).

Figure 1: Volunteer assessment of Boxley Warren

The individual scores for each team for each patch are shown in Annex 5. The Coefficient of Variation of the teams' assessments by habitat factor and habitat patch is presented in Table 1.

Table 1: Coefficient of variation values for the ratings of habitat factors by teams at three different habitat patches on Boxley Warren (in red more extreme values)

	N*	Slope	Vegetation structure	Topography	Basking sites	Shade	Disturbance	Predation	Connectivity	Mean patch CV**
Patch 1	7	17.6%	33.1%	64.9%	29.3%	43.5%	28.5%	28.5%	9.8%	31.9%
Patch 2	7	12.0%	13.1%	15.0%	12.2%	18.0%	0.0%	34.0%	0.0%	13.0%
Patch 3	8	23.2%	15.3%	21.8%	21.8%	26.7%	18.9%	26.5%	9.1%	20.4%
	Mean factor CV**	**17.6%**	**20.5%**	**33.9%**	**21.1%**	**29.4%**	**15.8%**	**29.6%**	**6.3%**	21.8%

*N = number of assessments **Coefficient of variation

The teams found it easy to make the assessment with few queries about how they should to proceed. In the case of assessment of aspect there was very little variation between teams as this was easily determined using a compass. Other factors showed more variation. Assessments in Patch 1 stand out as being more variable than the others (CV 31.9%, Table 1) due to especially high variation in the values given to 'Vegetation structure', 'Topography' and 'Shade'. In contrast, Patch 2 stands has high variability with respect to only predation but overall very low variability (CV only 13%). Patch 3 was intermediate with a CV of 21.9%. As most teams made their first assessment on Patch 1 the results may indicate improvement with learning. These results were used to consider improvements in the wording of the Habitat Assessment Manual that were made before volunteers proceeded to undertake solo assessments on selected wildlife reserves.

3. Conversion of habitat assessment value into Suitability Indices

Based on experience of adder habitats, the KRAG Team assigned Suitability Index (SIs) values to the various scores (1-4) of the Habitat Assessment Form. These values are from a minimum of 0.1 to 1, where 0.1 is least suitable and 1 is most suitable. In the case of aspect and slope, these two factors were combined to give a new factor termed 'Orientation' the SI values for which are shown in Table 2.

Table 2: The 'Orientation' Suitability Index values (slope/aspect)

Slope/compass point	N	NE	E	SE	S	SW	W	NW
1- Flat	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
2- Slight slope	0.5	0.5	0.5	0.67	0.75	0.67	0.5	0.5
3- Moderate slope 5-15°	0.33	0.5	0.5	0.75	1	0.75	0.67	0.67
4 - Steep slope >15°	0.33	0.33	0.5	0.75	1	1	0.67	0.33

The SI values assigned to the other factors are shown in Table 3.

Table 3: The Suitability Index values assigned to habitat factors of the Habitat Assessment Form

Form score	Vegetation structure	Topography	Basking sites	Shade	Disturbance	Predation	Connectivity
1	0.01	0.33	0.5	0.67	0.9	1	0.33
2	0.33	0.5	0.67	1	1	0.67	0.67
3	0.67	0.67	0.75	0.67	0.67	0.33	0.75
4	1	1	1	0.33	0.33	-	1

The SI values for an assessment can be combined to give an overall Habitat Suitability Index (HSI) values. This is done by calculating the geometric mean of all the values, as follows

$$HSI = \sqrt[N]{SI_1 * SI_2 * SI_3 * SI_4 * SI_5 * SI_6 * SI_{7....}} * SI_N$$

4. Habitat Suitability Index values for wildlife reserves assessed by volunteers

KWT volunteers undertook solo assessments of wildlife reserves in the period July to September 2014. Many of the volunteers submitted several Forms per site together with photographs to illustrate the main features. The details of the assessments and the calculations of HSIs can be seen in Annex 6. A summary by site is shown in Table 4, where the sites are listed in order of decreasing mean HSI. There was a reasonable spread of values 0.62 to 1.00 and variation between the patches of the same site showed relatively low variation with all CVs below 20% and more than half below 10% (Table 4). However, this is to be expected since there will be a strong tendency for patches within a site may be similar; this was clearly not the case at Sandwich Bay and Ashford Warren.

Table 4: Maximum and mean values for HSI scores for wildlife reserves assessed by volunteers and the Coefficients of Variation for within site assessments

Reserve	N	Max HSI score	Mean HSI score	Coef. of variation
Green Hill	2	0.83	0.80	3.54%
Hunstead Woods	5	0.87	0.77	10.00%
Fackenden	4	0.79	0.76	3.10%
Queensdown	9	0.84	0.72	9.00%
Spuckles Wood	3	0.80	0.72	10.25%
Sandwich Bay	6	0.89	0.71	17.12%
Pegwell Bay	8	0.77	0.70	7.07%
Ashford Warren	13	1.00	0.73	17.00%
Ashford CW	1	0.66	0.66	-
Marden Meadow	14	0.68	0.64	7.02%
Hoad's Wood	3	0.66	0.62	8.06%

5. Prediction of the presence of adders on wildlife sites

A prediction of the possible presence of adders on a site can be made by considering the HSI for a site and its geographical location within the adder's known range in Kent. From KRAG's database of adder records, a range assessment scores can be assigned to any locality based on nearest neighbour analysis. The range categories used and their assigned SI values are shown in Table 5.

Table 5: Range assessment scores for the adder based on nearest neighbour analysis of adder records in the KRAG database, and assigned SI value for each defined range

Range defined by nearest neighbour analysis	Assigned SI value
Core range - nearest neighbour distance within which 75% of observations occur	1
Predicted range - nearest neighbour distance within which 95% of observations occur	0.67
Maximum expected range - distance from most isolated observation to nearest neighbour	0.33
Outside range	0.1

The known range of adder in relation to wildlife reserves investigated by the volunteer is shown in Table 6. Five sites are within the core range and all have previous records of adder.

Table 6: Mean HSI score for wildlife sites assessed by volunteers, location of each site with respect to the adder's range in Kent (defined in Table 5) and previous records of adders at the wildlife sites

Reserve	N	Mean HSI score	Adder range	Adder recorded
Green Hill	2	0.80	Core	Yes
Hunstead Woods	5	0.77	Core	Yes
Fackenden	4	0.76	Core	Yes
Queensdown	9	0.72	Core	No
Spuckles Wood	3	0.72	Outside	No
Sandwich Bay	6	0.71	Outside	No
Pegwell Bay	8	0.70	Outside	No
Ashford Warren	13	0.73	Predicted	No
Ashford CW	1	0.66	Outside	No
Marden Meadow	14	0.64	Outside	No
Hoad's Wood	3	0.62	Predicted	No

By multiplying the Adder Range SI (Table 5) and mean HSI for each habitat investigated (Table 6), values indicating the likelihood of presence of adders are obtained (Table 7).

Table 7: Likelihood of adder presence on wildlife sites predicted as the product of HSI and adder range SI

Reserve	N	Mean HSI score	Adder range SI	Likelihood of presence
Green Hill	2	0.80	1.00	0.80
Hunstead Woods	5	0.77	1.00	0.76
Fackenden	4	0.76	1.00	0.76
Queensdown	9	0.72	1.00	0.72
Spuckles Wood	3	0.72	0.67	0.48
Sandwich Bay	6	0.71	0.33	0.23
Pegwell Bay	8	0.70	0.10	0.07
Ashford Warren	13	0.73	0.67	0.49
Ashford CW	1	0.66	0.10	0.07
Marden Meadow	14	0.64	0.10	0.06
Hoad's Wood	3	0.62	0.67	0.42

6. Future prospects

The Habitat Assessment Form (Annex 2) and Manual (Annex 3) are now 'advanced drafts'. The SI scoring system is only tentative and much further testing, in a wide range of habitats, especially those considered unfavourable, is required before the system can be released for general use.

For the future, further testing of a wider range of habitats is required to demonstrate that the SI values adopted are effective in predicting habitat suitability. Further refinement of the Manual is possible by improvement of the illustrations used to describe each habitat feature and also by the addition of advice to land managers about how they might go about achieving greater degrees of habitat suitability. When this is completed, the Manual and Form can be promoted to those who may be interested in the conservation of adders.

Annex 1 - Volunteers helping with field assessments

Volunters in Kent	Volunteers in France
Andrew Wilkinson	Emmanuel Fernandez,
Ann Storey	Didier Braure
Carson Holmes	Céline Fontaine
Claire Browne	Gabrielle Delvart
Clare Stalford	Leslie Faucher
David Hope-Thomson	
David Watson	
Faheem Anwar	
Ian Rickards	
James Madden	
John Young	
Julie Merrett	
Katy Tennant	
Mary Bernard	
Pauline Holmes	
Sophie Lancaster	
Sophie Walkden	
Tara Hall	

Team for habitat assessment at Boxley Warren

1 David Watson and Julie Merrett
2 Pamela and Carson Holmes
3 Claire Brown and Katey Tennant
4 Ian Rickards and Andrew Wilkinson
5 Tara Hall and Sophie Walkden
6 Tom Knight, David Hope Thomson and Sophie Lancaster
7 James Madden and Mary Bernard
8 Ann Storey and John Young

Annex 2 - Habitat assessment recording form

Surveyor:		**Date:**	
Site:		**Grid Ref:**	
Air Temperature: (°C)		**Precipitation:** (none, light, moderate, heavy)	
Wind Speed: (none, light, fresh, strong)		**Wind Direction:** (N, NE, E, SE, S, SW, W, NW)	
Cloud Cover: (%)		**Ground Conditions:** (dry, damp, wet)	

Reptile species recorded on assessment patch or elsewhere in the locality

Time (GMT)	Assessment patch (AP) Y/N	Elsewhere (distance from AP)	Refuge material	Position (under/ on/ side)	Observations (Species, life stage, gender etc.)

ADDER HABITAT ASSESSMENT

SI	1	2	3	4	5	6	7	8	9	10
Factor:	Area	Aspect	Slope	Vegetation Structure	Topograph y	Basking Sites	Shade	Disturbance	Predation	Connectiv-ity
Value										
Notes	In hectares	Compas s point	Value 1-4	Value 1-4	Value 1-4	Value 1-4	Value 1-4	Value 1-4	Value 1-3	Value 1-4
Comments on site and notes of any photographic evidence										

Annex 3 - Adder Habitat Suitability Manual

The descriptions of factors below will enable you to assign values or categories to habitat features that are important for the wellbeing of adders. The value or category determined for each factor should be recorded in the appropriate box on the 'Adder Habitat Assessment Form ' (Annex 2). On the Form indicate the location of the habitat patch being assessed using a GPS or by reference to the UK Grid Reference Finder (http://www.gridreferencefinder.com/).

(1) Area

Record the size of the survey area in hectares (Ha). This can be measured from a map or using GIS. For small sites, the survey area can also be estimated in the field by pacing out the maximum length and width and multiplying these to give a result in square meters (an adult pace is about 1 metre). To express the result in hectares divide the number of square meters by 10,000. The assessed area should be 0.5 to 1 hectare.

Define the area for assessment

(2) Prevailing Aspect

Prevailing aspect is the compass direction of the majority of the sloping areas of a large site. The aspect is assessed using a compass and summarised as categories (S, SE, E, etc). For example a site with a generally south facing slope would be assigned the category S. If the site is flat then it may have no prevailing aspect.

Record the compass direction (aspect) of the majority of the sloping area

(3) Slope

The general slope of the site is measured along the compass direction of the prevailing aspect using a clinometer and summarised into the following categories:

1. Even ground- no detectable slope (<2 degrees)
2. Slight slope - 2 - 5 degrees
3. Moderate slope - 5- 15 degrees
4. Steep Slope > 15 degrees

(4) Vegetation Structure

The structural complexity of the herb layer. Note that species composition is not necessarily a factor in this assessment - unless the species present are important in increasing structural complexity.

1. Absent - No vegetation present within study area.
2. Low - Generally short sward perhaps with some rough margins, but poorly developed understory.
3. Moderate - Generally uneven sward, with some evidence of understory; Some brambles, nettles etc. may also be present.
4. High - Well developed ground vegetation; Tussocks, dead stems etc. clearly evident; Brambles, nettles etc. may also be present.

Poor vegetation structure (1)

Vegetation with complex sward (3)

(5) Topography

The structural complexity of the ground (not including vegetation).

1. Absent – Featureless; ground may be compacted; No evidence of any structures that could represent possible hibernacula.
2. Low - Generally featureless; some ground features (e.g. rocks) may be present; Ground may be somewhat compacted.
3. Moderate - Ground not featureless; a bank, gully or similar structure may be present; Refugia may be present; Ground not compacted.
4. High - Varied topography with banks and gullies etc.; Good opportunities for basking and shelter; ground undisturbed; Potential hibernacula clearly evident.

Topography absent/low (1)

Topography low (2)

Ground rising to a bank in the distance and in the foreground grass tussocks and ant hills (4)

Varied topography offered by a brown field site (3)

Bank offering good hibernation prospects (4) **Log piles offering excellent cover (4)**

(6) Potential Basking Sites

This is a measure of habitat features not taken into consideration when assessing vegetation structure and topography. Note that a site could be characterised by a large number of potential basking site, but the degree to which these are utilised may be constrained by high shade. Since shade is an independent category, the presence of potential basking sites should be assessed regardless of whether such features are located in a sunny or shady aspect. Potential basking features include interface habitat (e.g. between dense bramble cover and open grassland), rocks surrounded by vegetation, anthills surrounded by vegetation, log piles etc.

1. Absent - No features suitable for basking present within site
2. Low - Few potential features present (small and/or widely separated, evident at few locations within habitat and relatively difficult to find)
3. Moderate – Some potential basking features clearly evident (evident at some but not all locations in habitat, not much effort to find)
4. High - Many features that offer potential basking opportunities present within the study area (clearly visible at more or less any location within the habitat, very easy to find)

Basking sites

(7) Shade

A measure of ground/vegetation shade caused by shrub and/or tree canopy (height greater than 1.5 metres).

1. Absent - 0% shade
2. Low - < 25% shade
3. Moderate - 25-70% shade
4. High - > 70% shade

No shade

Moderate shade

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High shade

(8) Disturbance by grazing/mowing

Disturbance is measured in terms of factors that may cause adders to retreat or to be trampled. Common causes are unsympathetic management in the period March to September such as excessive use of grazing animals or of mowing either large areas or mowing frequently. However, some site management is essential to keep habitats suitable for adders and so mowing or grazing in a manner that might cause only low disturbance is a favourable indicator. Human access to sites may also be a problem although the extent to which this is detrimental is not clear, particularly as human presence may deter predators, especially birds, which would be a beneficial effect. However there is likely to be a limit to this and excessive human activity and/or persecution will be detrimental, this may have to be assessed by taking the advice of the land managers.

1. No Disturbance
    a. No livestock grazing and no mowing. Site remains in a mid-successional state naturally (e.g. by rabbit grazing).
2. Low Disturbance
    a. If grazing in the period March to September then this is extensive (≤1 GA/hectare[3]).
    b. No mowing or if mowing then this is confined to <10% of the site each year and done once.
3. Moderate Disturbance
    a. If grazing in the period March to September then this should not exceed 2 GA/hectare
    b. If mowing then this is confined to not more than 20% of the site each year and done not more than once
4. High Disturbance
    a. If grazing in the period March to September then this is intensive (≥3 GA/hectare)
    b. If mowing then this is done on more than 20% of the site each year in the reptile active period (March – September).

Significant area of site mown >20% twice a year

Site kept open by natural grazing

[3] *1 Grazing animal/hectare, this unit is chosen as a measure of disturbance since all grazers have four feet each of which can trample or disturb reptiles. When considering impact on vegetation then a more conventional measure is Livestock Unit (LU) where 1 unit is equivalent to one adult cow of 550kg and is proportional to feeding capacity rather than degree of reptile disturbance. The state of vegetation as affected by grazing is dealt with under the 'vegetation variable'. Determining grazing regimes often requires communication with the land manager.


High intensity grazing


Low intensity grazing

(9) Predation

Adder populations are naturally subject to predation and adders behave in such a way as to avoid this. However males are especially vulnerable at emergence from hibernation in spring when there is less cover and when they are preoccupied with reproduction. Gravid females are at risk when they are compelled to bask in the summer months to speed the development of their young.

1. Low Predation - predatory birds (corvids/ buzzard/ pheasants) and predatory mammals (foxes, badgers, weasels, hedgehogs, cats, wild boar) not in evidence
2. Moderate Predation - signs of predatory birds (corvids/ buzzards/ pheasants) or mammals (foxes, badgers, weasels, hedgehogs, wild boar)
3. High Predation - excessive stocking of game birds etc. (e.g. within a pheasant pen or release area)

Badgers

Cats

Foxes

Hedgehogs

Wild boar

Weasels

Short toed eagles

Buzzards

Pheasants

Crows

Magpies

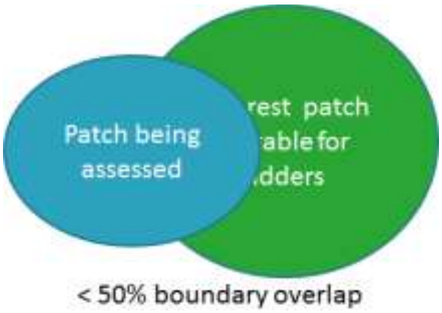
(10) Connectivity

A measure of how well connected the site is to other areas of apparently suitable habitat.

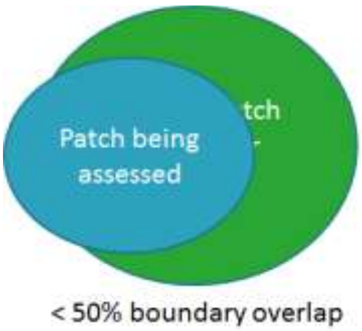
1. Isolated - site completely isolated by unsuitable habitat. Minimum distance to nearest suitable habitat patch greater or equal to 0.05 km.

2. Low - minimum distance to nearest suitable habitat patch less than 0.05 km. Or less than 10 % of site boundary directly connected with adjacent suitable habitat.

3. Moderate - less than 50% of site borders habitat that appears suitable for reptiles.



4. High - at least 50% of site boundary borders habitat that appears suitable for reptiles.



Annex 4 - Adder leaflet

Identification

The adder is easily recognised by the 'zig-zag' stripe along its back.

They can grow to around 60cm in length and have a rather stocky appearance.

Males' 'zig-zags' are black, females' are brown.

On occasion, completely black specimens are seen.

Female adder

Black 'melanistic' adder

TAKE A LOOK. ADDERS ARE EASY TO RECOGNISE!

What have I seen?

Britain has a third snake species, the smooth snake. This is only found on the heaths of Dorset, Hampshire and Surrey.

Slow-worm

They look like snakes, but are actually legless lizards. Commonly found under objects in gardens.

Photo: Fred Holmes

Grass snake

Also common in gardens, often associated with ponds. Olive green or brown in colour, with a distinctive yellow and black collar.

Photo: ARC Trust

Adder

Rarely found in gradens and slower moving than grassnakes, adders are easily recognised by the zig-zag pattern on their back.

Photo: Jason Steel

The Adder – A treasure of the Kent countryside

If you think that you may have been bitten by an adder:

DO NOT:

- ✗ Tie a tourniquet.
- ✗ Try to cut or suck the venom out of the bite.

DO:

- ✓ Stay calm and do as little walking as possible.
- ✓ Immediately arrange transport to the nearest hospital.

Around 70% of adder bites result in no symptoms or only local pain, swelling and inflammation. Most people recover quickly. However, all suspected bites must be treated as medically serious since reactions vary. Occasionally, bites can be life-threatening or cause problems for several months.

ADDERS CAN LIVE FOR OVER 20 YEARS!

Domesticated animals and adders

Pets and livestock are occasionally bitten by adders.

Most reported bites are in dogs. An unfortunate event with neither animal to blame, this generally happens when a dog investigates an adder, and the snake feels threatened.

Although the bites are painful they are rarely fatal and most dogs make a full recovery.

If you are in good adder habitat it is advisable to keep your dog under control for its own safety. This will also prevent disturbance to ground nesting birds such as the nightjar.

If your animal is bitten by an adder (or you suspect that it may have been) you should seek prompt Veterinary attention.

About Kent Reptile & Amphibian Group

Kent Reptile & Amphibian Group (KRAG) promotes and works to conserve,protect and increase the understanding of herpetofauna (reptiles and amphibians) in Kent, South-East England. KRAG would like to thank ARC Conservation for allowing KRAG to adapt their original leaflet.

c/o Kent & Medway Biological Records Centre, Brogdale Farm Office, Brogdale Rd, Faversham, Kent, ME13 8XZ
e: info@kentarg.org
www.kentarg.org

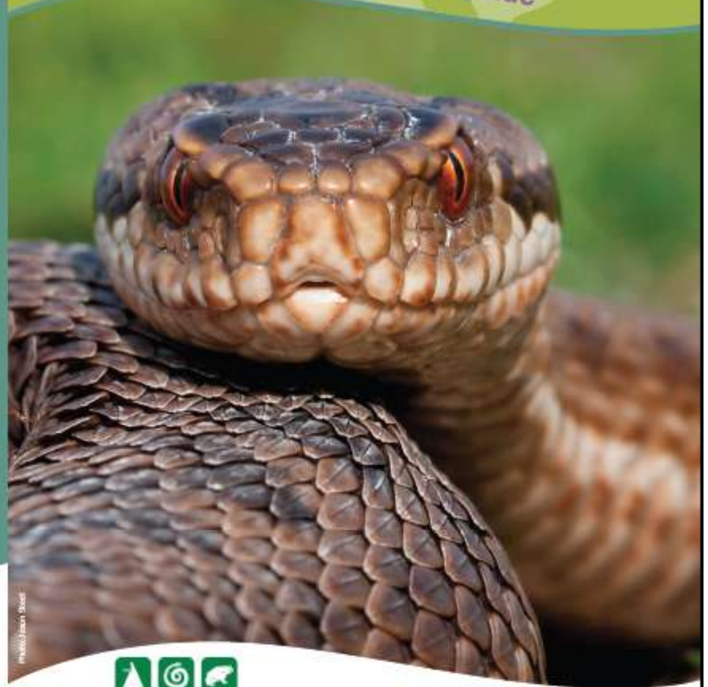
Booklet designed by The Design Unit
www.thedesignunit.com

Liparis

interreg

The Adder

A treasure of the Kent countryside



KRAG amphibian and reptile conservation

The Facts

1. In Kent the adder can be found on downland, heaths and coastal margins. A remarkable snake and the only one living within the Arctic Circle.
2. Adders hibernate to avoid cold weather in autumn and usually reappear in early spring but may emerge earlier if the weather is warm enough.
3. Female adders give birth to live young and bask in sunshine to help the babies develop quickly.
4. Females have a tough life and only breed every other year as they don't feed whilst gravid (pregnant).
5. This only leaves them about six weeks of feeding before entering hibernation.
6. Adders are only mildly venomous and are not aggressive unless handled or threatened.

LOOK BUT DON'T TOUCH!

Where do adders live?

In Kent they are generally found in **open 'wild' habitats** such as **chalk and coastal grassland, sea cliffs and woodland rides.**

It is very rare to find them in gardens, except when they are adjacent to the above mentioned habitats.

When will I encounter adders?

Spring and **summer** are the main periods when adders are active. They hibernate from October to mid February.

Adders are generally seen basking in the sun, but as long as it is above 9°C and not raining heavily they can be encountered in most weather conditions.

Downland

Open woodland

Coastal grassland

IF YOU ARE LOOKING FOR ADDERS THEN IT'S WISE TO WEAR TROUSERS AND STOUT BOOTS.

Protection under the law

All British reptiles (including the adder) are protected by law. It is illegal to injure, kill or sell them (Wildlife and Countryside Act 1981).

The adder is a priority species in the UK Biodiversity Action Plan and is thus recognised as being of principal importance for the conservation of biodiversity (Natural Environment and Rural Communities Act 2006).

MALE ADDERS DANCE TO COMPETE FOR FEMALES!

LET US KNOW!

Have you seen an adder?

To help conserve adders it is important to understand their distribution.

Go to **www.kentarg.org to submit a sighting.**

If you are interested in getting involved in conserving your native 'herpetofauna' why not join the Kent Reptile & Amphibian Group. This can be done from the website at www.kentarg.org/members/join-krag

Male adder

Conservation

All amphibian and reptile species are declining and under threat.

One of the biggest issues is fragmentation and loss of habitat.

The adder is considered one of the most vulnerable widespread species, as it is not very mobile and populations can become isolated.

ADDERS FEED MAINLY ON LIZARDS AND SMALL MAMMALS, SUCH AS VOLES!

Annex 5 - Volunteer team ratings for Habitat Assessment of Boxley Warren

	Area	Aspect	Slope	Veg structure	Topography	Basking sites	Shade	Disturbance	Predation	Connectivity
Summary of modal values										
Patch 1	0	S/SW	2	2	1	2	2	3	2	4
Patch 2	0	S	3	4	4	3	3	2	2	4
Patch 3	0	S/SW	3	3.5	3	3	2	2	2	4

Patch 1

Team	Area	Aspect	Slope	Veg structure	Topography	Basking sites	Shade	Disturbance	Predation	Connectivity
1	-	S	3	4	4	2.5	3.5	2	2	3
2	0.5	S	2	2	2	1	1	3	2	4
3	-	S	2	2	1	2	2	3	2	4
4	1	SSW	2	2	2	2	1	5	2	4
5	1	S/SW	2	2	1	2	2	4	2	4
6										
7	-	SSW	2	2	1	2	2	4	1	4
8	1	SW/SSW	2	2	1	3	2	3	1	4
Mode		S/SW	2	2	1	2	2	3	2	4
Mean			2.1	2.3	1.7	2.1	1.9	3.4	1.7	3.9
sd			0.4	0.8	1.1	0.6	0.8	1.0	0.5	0.4
CV			17.6%	33.1%	64.9%	29.3%	43.5%	28.5%	28.5%	9.8%

Patch 2

Team	Area	Aspect	Slope	Veg structure	Topography	Basking sites	Shade	Disturbance	Predation	Connectivity
1										
2	1	S	3	4	4	4	3	2	2	4
3	-	S	3	4	4	3.5	3	2	2	4
4	0.5	SSW	4	4	3	3	3	2	2	4
5	1	W	3	4	4	3	3	2	2	4
6	0.25	S	3	4	4	3	3	2	1	4
7	-	S	3	3	3	3	2	2	1	4
8	2	SSW	3	3	3	3	2	2	1	4
Mode		S	3	4	4	3	3	2	2	4
Mean			3.1	3.7	3.6	3.2	2.7	2.0	1.6	4.0
sd			0.4	0.5	0.5	0.4	0.5	0.0	0.5	0.0
CV			12.0%	13.1%	15.0%	12.2%	18.0%	0.0%	34.0%	0.0%

Patch 3

Team	Area	Aspect	Slope	Veg structure	Topography	Basking sites	Shade	Disturbance	Predation	Connectivity
1	-	S	2	4	4	4	2	2	2	3
2	1	S	2	3	4	4	2	2	2	4
3	-	S	2.5	4	3	3	2	2	2	4
4	1.5	SSW	4	4	4	4	1	2	2	4
5	1	SW	3	3	3	2	2	2	2	4
6	0.4	S	3	3	3	3	2	2	2	4
7	-	SW	3	3	2	3	2	2	1	4
8	3	SW/SSW	3	4	3	3	3	1	1	4
Mode		S/SW	3	3.5	3	3	2	2	2	4
Mean			2.8	3.5	3.3	3.3	2.0	1.9	1.8	3.9
sd			0.7	0.5	0.7	0.7	0.5	0.4	0.5	0.4
CV			23.2%	15.3%	21.8%	21.8%	26.7%	18.9%	26.5%	9.1%

Annex 6 - Habitat Assessments of various wildlife reserves made by volunteers

		Values												
Reserve	**Location**	**Area**	**Aspect**	**Slope**	**Veg. Structure**	**Topography**	**Basking sites**	**Shade**	**Disturb.**	**Predation**	**Connectivity**	**Adders range**	**Surveyor**	**H S I score**
Ashford CW	N5113464, E 00083751	0.5	E	2	4	2	3	3	3	2	4		S. Walkden	
		orientation		0.5	0.67	0.5	0.75	0.67	0.67	0.67	1	No		0.66
		Area	**Aspect**	**Slope**	**Veg. Structure**	**Topography**	**Basking sites**	**Shade**	**Disturb.**	**Predation**	**Connectivity**	**Adders range**	**Surveyor**	
Fackenden	TQ 52989 60811	0.7	W	2	4	3	3	3	2	2	3		C. Seabrook	
		orientation		0.5	1	0.67	0.75	0.67	1	0.67	0.75	Core		0.73
Fackenden	TQ53063 60578	1	W	3	3	3	3	3	2	2	4		C. Seabrook	
				0.67	0.67	0.67	0.75	0.67	1	0.67	1	Core		0.75
Fackenden	TQ53089 60323	1	W	3	3	3	3	3	2	2	4		C. Seabrook	
		orientation		0.67	0.67	0.67	0.75	0.67	1	0.67	1	Core		0.75
Fackenden	TQ53089 60323	1	SW	2	3	3	3	2	2	2	4		C. Seabrook	
		orientation		0.67	0.67	0.67	0.75	1	1	0.67	1	Core		0.79
Green Hill	TQ53089 60323	1	S	3	3	3	3	2	2	2	4		C. Seabrook	
		orientation		1	0.67	0.67	0.75	1	1	0.67	1	Core		0.83
Green Hill	TQ53089 60323	1	S	3	3	3	3	3	2	2	4		C. Seabrook	
		orientation		1	0.67	0.67	0.75	0.67	1	0.67	1	Core		0.79

		Area	Aspect	Slope	Veg. Structure	Topography	Basking sites	Shade	Disturb.	Predation	Connectivity	Adders range	Surveyor	
Hunstead Wds	51.2694 1.0058	0.5	E	1	4	3	1	4	1	2	3		Claire Browne	
		orientation		0.67	1	0.67	0.5	0.33	0.9	0.67	0.75	Pr*		0.65
Hunstead Wds	51.2685 1.0019	0.5	S	1	4	4	3	3	1	2	3		Claire Browne	
		orientation		0.67	1	1	0.75	0.67	0.9	0.67	0.75	Pr		0.79
Hunstead Wds	51.2701 0.9958	0.5	N	1	4	4	3	2	2	2	4		Claire Browne	
		orientation		0.67	1	1	0.75	1	1	0.67	1	Pr		0.87
Hunstead Wds	51.2704 0.9999	0.5	N	1	4	3	3	2	3	2	3		Claire Browne	
		orientation		0.67	1	0.67	0.75	1	0.67	0.67	0.75	Pr		0.76
Hunstead Wds	51.2702 1.0057	0.5	E	1	3	3	4	2	3	2	4		Claire Browne	
		orientation		0.67	0.67	0.67	1	1	0.67	0.67	1	Pr		0.78

*** Pr = within predicted range**

		Area	Aspect	Slope	Veg. Structure	Topography	Basking sites	Shade	Disturb.	Predation	Connectivity	Adders range	Surveyor	
Marden M.	1C	0.3	SSW	1	3	2	2	1	4	2	2		C. Holmes	
		orientation		0.67	0.67	0.5	0.5	0.67	0.33	0.67	0.67	No*		0.57
Marden M.	1D	0.4	SSW	1	3	3	3	1	3	2	2		C. Holmes	
		orientation		0.67	0.67	0.67	0.75	0.67	0.67	0.67	0.67	No		0.68
Marden M.	1E	0.5	SSW	1	3	3	3	1	3	2	2		C. Holmes	
		orientation		0.67	0.67	0.67	0.75	0.67	0.67	0.67	0.67	No		0.68
Marden M.	1F	0.4	SSW	1	3	3	3	3	3	2	2		C. Holmes	
		orientation		0.67	0.67	0.67	0.75	0.67	0.67	0.67	0.67	No		0.68
Marden M.	2A	0.7	SSw	2	3	3	2	2	4	2	2		C. Holmes	
		orientation		0.67	0.67	0.67	0.5	1	0.33	0.67	0.67	No		0.62
Marden M.	2B	1	SSW	1	3	2	2	2	4	2	2		C. Holmes	
		orientation		0.67	0.67	0.5	0.5	1	0.33	0.67	0.67	No		0.60
Marden M.	2C	1	SSW	1	3	2	2	1	4	2	2		C. Holmes	
		orientation		0.67	0.67	0.5	0.5	0.67	0.33	0.67	0.67	No		0.57

Marden M.	2D	1	SSW	1	3	3	3	1	3	2	2		C. Holmes	
		orientation		0.67	0.67	0.67	0.75	0.67	0.67	0.67	0.67	No		0.68
Marden M.	2E	0.8	SSW	1	3	3	3	1	3	2	2		C. Holmes	
		orientation		0.67	0.67	0.67	0.75	0.67	0.67	0.67	0.67	No		0.68
Marden M.	2F	1	SSW	1	3	3	3	1	3	2	2		C. Holmes	
		orientation		0.67	0.67	0.67	0.75	0.67	0.67	0.67	0.67	No		0.68
Marden M.	1/2E	1	SSW	1.5	3	2.5	3	2	4	2	3		J. Merrett	
		orientation		0.67	0.67	0.67	0.75	1	0.33	0.67	0.75	No		0.66
Marden M.	2E/F	0.8	SSW	1	3	2	3	3	4	2	4		J. Merrett	
		orientation		0.67	0.67	0.5	0.75	0.67	0.33	0.67	1	No		0.63
Marden M.	2C	1	SSW	1.5	3	2	3	2	4	2	3		J. Merrett	
		orientation		0.67	0.67	0.5	0.75	1	0.33	0.67	0.75	No		0.64
Marden M.	4A	0.9	WSW	2	2	2	3	2	4	2	3		J. Merrett	
		orientation		0.67	0.33	0.5	0.75	1	0.33	0.67	0.75	No		0.59

***No = outside range**

		Area	Aspect	Slope	Veg. Structure	Topography	Basking sites	Shade	Disturb.	Predation	Connectivity	Adders range	Surveyor	
Queensdown	TQ82872 62842 = i10	1	SE	4	2	3	2	2	3	2	4		J. Young	
		orientation		0.75	0.33	0.67	0.67	1	0.67	0.67	1	Core		0.69
Queensdown	TQ82984 62828 = J9, J8 K9, K8	4	N	2	3	2	2	2	2	2	4		J. Young	
		orientation		0.5	0.67	0.5	0.67	1	1	0.67	1	Core		0.72
Queensdown	J11, K11, K12	3	SE	2	4	4	3	3	3	2	4		J. Young	
		orientation		0.67	1	1	0.75	0.67	0.67	0.67	1	Core		0.79
Queensdown	TQ833261 63150 = M12	1	E	2	4	3	3	2	3	2	4		J. Young	
		orientation		0.5	1	0.67	0.75	1	0.67	0.67	1	Core		0.76
Queensdown	TQ83278 63139 M12	1	E	4	2	2	2	2	3	2	4		J. Young	

		orientation		0.5	0.33	0.5	0.67	1	0.67	0.67	1	Core		0.63
Queensdown	TQ 83020 62997 J10	0.5	SE	3	2	2	3	2	4	1	4		Claire Browne	
		orientation		0.75	0.33	0.5	0.75	1	0.33	1	1	Core		0.65
Queensdown	TQ83026 63130 J12	0.5	N	1	4	3	1	4	1	1	4		Claire Browne	
		orientation		0.67	1	0.67	0.5	0.33	0.9	1	1	Core		0.71
Queensdown	TQ82446 62850 E9	0.5	SE	3	2	3	3	2	3	1	4		Claire Browne	
		orientation		0.75	0.33	0.67	0.75	1	0.67	1	1	Core		0.73
Queensdown	TQ83253 63103 M/N12	0.5	SE	3	3	3	3	2	2	1	4		Claire Browne	
		orientation		0.75	0.67	0.67	0.75	1	1	1	1	Core		0.84

		Area	**Aspect**	**Slope**	**Veg. Structure**	**Topography**	**Basking sites**	**Shade**	**Disturb.**	**Predation**	**Connectivity**	**Adders range**	**Surveyor**	
Pegwell Bay	TR338 624	0.5	N	2	4	2	4	3	2	2	4		A. Wilksinson	
		orientation		0.5	1	0.5	1	0.75	1	0.67	1	No*		0.77
Pegwell Bay	TR337 624	1	N	1	4	2	2	4	2	2	3		A. Wilksinson	
		orientation		0.67	1	0.5	0.67	0.33	1	0.67	0.75	No		0.66
Pegwell Bay	TR338 627	0.5	S	2	2	3	4	2	5	2	4		A. Wilksinson	
		orientation		0.75	0.33	0.67	1	1	0.33	0.67	1	No		0.66
Pegwell Bay	TR343 631	1	N	2	4	2	4	2	5	2	4		A. Wilksinson	
		orientation		0.5	1	0.5	1	1	0.33	0.67	1	No		0.70
Pegwell Bay	TR342 631	0.6	S	2	4	3	4	2	5	2	4		A. Wilksinson	
		orientation		0.75	1	0.67	1	1	0.33	0.67	1	No		0.76
Pegwell Bay	TR342 632	1	S	1	4	2	4	2	5	2	4		A. Wilksinson	
		orientation		0.67	1	0.5	1	1	0.33	0.67	1	No		0.72
Pegwell Bay	TR343 635	1	E	1	3	3	3	1	3	1	2		A. Wilksinson	
		orientation		0.67	0.67	0.67	0.75	0.67	0.67	1	0.67	No		0.71
Pegwell Bay	TR342 635	0.55	S	1	2	3	4	3	5	1	2		A. Wilksinson	
		orientation		0.67	0.33	0.67	1	0.75	0.33	1	0.67	No		0.63

*No = outside range

		Area	Aspect	Slope	Veg. Structure	Topography	Basking sites	Shade	Disturb.	Predation	Connectivity	Adders range	Surveyor	
Sandwich Bay	TR3496 6212	?	W	2	4	2	2	1	2	2	3		A. Wilksinson	
		orientation		0.5	1	0.5	0.67	0.67	1	0.67	0.75	No*		0.70
Sandwich Bay	TR3523 6164	1	E	2	2	2	3	1	2	2	3		A. Wilksinson	
		orientation		0.5	0.33	0.5	0.75	0.67	1	0.67	0.75	No		0.62
Sandwich Bay	TR3527 6139	0.5	S	2	4	4	4	1	2	1	3		A. Wilksinson	
		orientation		0.75	1	1	1	0.67	1	1	0.75	No		0.89
Sandwich Bay	TR3536 6085	0.5	W	2	3	3	3	2	2	1	4		A. Wilksinson	
		orientation		0.5	0.67	0.67	0.75	1	1	1	1	No		0.80
Sandwich Bay	TR3555 5991	1	S	1	3	3	4	2	4	1	3		A. Wilksinson	
		orientation		0.67	0.67	0.67	1	1	0.33	1	0.75	No		0.72
Sandwich Bay	TR3572 5920	0.5	NE	1	2	3	3	1	5	1	1		A. Wilksinson	
				0.67	0.33	0.67	0.75	0.67	0.33	1	0.33	No		0.55

*No = outside range

		Area	Aspect	Slope	Veg. Structure	Topography	Basking sites	Shade	Disturb.	Predation	Connectivity	Adders range	Surveyor	
Spuckles Wood	?	0.5	NE	3	3	4	2	4	3	1	4		D. Hope-T.	
		orientation		0.5	0.67	1	0.67	0.33	0.67	1	1	Emr*		0.69
Spuckles Wood	?	0.78	W	4	2	2	3	1	3	1	4		D. Hope-T.	
		orientation		0.67	0.33	0.5	0.75	0.67	0.67	1	1	Emr		0.66
Spuckles Wood	?	0.8	E	4	3	4	3	2	3	1	4		D. Hope-T.	
		orientation		0.5	0.67	1	0.75	1	0.67	1	1	Rmr		0.80

*** Emr = within expected maximum range**

		Area	Aspect	Slope	Veg. Structure	Topography	Basking sites	Shade	Disturb.	Predation	Connectivity	Adders range	Surveyor	
Old Park	TR 299 434	0.1	SW	3	3	3	2	2	3	2	4			
	Cell F2	orientation		0.75	0.67	0.67	0.67	1	0.67	0.67	1	Core	J. Madden	0.75

		Area	Aspect	Slope	Veg. Structure	Topography	Basking sites	Shade	Disturb.	Predation	Connectivity	Adders range	Surveyor	
Hoads Wood	North	2	NW	2	3	4	4	4	3	2	3		Ian Rikards & Holie Weatherill	
		Orientation		0.5	0.67	0.67	1	0.33	0.33	0.67	0.75	Pr		0.58
	South	1.8	SE	2	3	3	4	3	3	2	4			
		Orientation		0.67	0.67	0.75	1	0.67	0.33	0.67	0.75	Pr		0.66
	C7 on KWT map	1	NW	3	3	3	3	3	3	2	1		Tara Hall & Sophie Walkden	
		Orientation		0.33	0.67	0.67	0.75	0.67	0.67	0.67	0.33	Pr		0.57

*** Pr = within predicted range**

		Area	Aspect	Slope	Veg. Structure	Topography	Basking sites	Shade	Disturb.	Predation	Connectivity	Adders range	Surveyor	
Ashford Warren	A	1.5	NW	3	2	3	4	4	2	2	4		Ian Rikards & Holie Weatherill	
		Orientation		0.67	0.33	0.67	1	0.33	1	0.67	1	Pr*		0.65
Ashford Warren	B	0.75	NW	2	4	3	3	3	2	2	4			
		Orientation		0.5	1	0.67	0.75	0.67	1	0.67	1	Pr		0.76
Ashford Warren	C	1	E	2	2	2	2	2	4	2	4			
		Orientation		0.5	0.33	0.5	0.67	1	0.33	0.67	1	Pr		0.58
Ashford Warren	D	2	SW	2	3	3	3	4	2	2	4			
		Orientation		0.67	0.67	0.67	0.75	0.33	1	0.67	1	Pr		0.69
Ashford Warren	E	3	NE	2	3	3	3	4	2	2	3			
		Orientation		0.5	0.67	0.67	0.75	0.33	1	0.67	0.75	Pr		0.64
Ashford Warren	F	3	S	3	2	3	3	4	4	2	4			

		Orientation		1	0.33	0.67	0.75	0.33	0.33	0.67	1	Pr		0.58
Ashford Warren	G	2	N	2	3	3	4	4	2	2	1			
		Orientation		0.5	0.67	0.67	1	0.33	1	0.67	0.33	Pr		0.60
Ashford Warren	Not grazed	2	SE	2	4	4	4	3	2	2	4			
		Orientation		0.67	1	1	1	0.67	1	0.67	1	Pr		0.86
Ashford Warren	51.1614 0.8621	0.5	S	2	3	2	4	2	4	1	4		Claire Browne	
		Orientation		0.75	0.67	0.5	1	1	0.33	1	1	Pr		0.73
Ashford Warren	51.1627 0.8602	0.5	N	1	4	2	2	4	3	1	4		Claire Browne	
		Orientation		0.67	1	0.5	0.67	0.33	0.67	1	1	Pr		0.69
Ashford Warren	51.1641 0.8569	0.5	S	3	4	4	4	2	2	1	4		Claire Browne	
		Orientation		1	1	1	1	1	1	1	1	Pr		1.00
Ashford Warren	51.1661 0.8517	0.5	S	1	4	3	3	3	2	2	4		Claire Browne	
		Orientation		0.67	1	0.67	0.75	0.67	1	0.67	1	Pr		0.79
Ashford Warren	51.1661 0.8543	0.5	E	2	4	4	4	2	2	2	4		Claire Browne	
		Orientation		0.5	1	1	1	1	1	0.67	1	Pr		0.87

*** Pr = within predicted range**

		Area	**Aspect**	**Slope**	**Veg. Structure**	**Topography**	**Basking sites**	**Shade**	**Disturb.**	**Predation**	**Connectivity**	**Adders range**	**Surveyor**	
Boxley Warren	1	1	S/SW	2	2	1	2	2	3	2	4		Multiple	
		orientation		0.67	0.33	0.33	0.67	1	0.67	0.67	1	Core		0.62
Boxley Warren	2	1	S/SW	3	4	4	3	3	2	2	4		Multiple	
		orientation		0.75	1	1	0.75	0.67	1	0.67	1	Core		0.84
Boxley Warren	3	1	S/SW	3	3.5	3	3	2	2	2	4		Multiple	
		orientation		0.75	0.83	0.67	0.75	1	1	0.67	1	Core		0.82