



Reptile Survey

**St Michael's Church, Dalston, Carlisle, Cumbria, CA5 7LN
2012**

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1. Introduction

- 1.1.1 This report details a reptile presence / likely absence survey and population size class assessment conducted at St Michael's Church, Dalston, Carlisle, Cumbria, CA5 7LN.
- 1.1.2 Cumbria Amphibian and Reptile Group (CARG) were commissioned by Dalston Parish Council to conduct a full reptile survey following reports from a member of the public (Mr David Hickson) that slow worms may have come to harm as a result of the grounds maintenance management regime having changed. It is understood that the frequency and extent of grass cutting in the church yard increased and a total of 2 no. Dead slow worms were discovered on site in the areas subject to the altered management regime.
- 1.1.3 This report presents the findings of the reptile survey and makes recommendations as to how future management of the site should proceed with due regard for reptiles as a legally protected species and so as to ensure that relevant legislation is not breached.

2. Species Information and Legislation

2.1 GENERAL

2.1.1 The laws protecting wildlife exist regardless of the requirements of any planning consent.

2.1.2 The legal protection of animals and plants in the United Kingdom is mainly provided for by:

- The Wildlife & Countryside Act 1981 as amended by the Countryside and Rights of Way Act 2000,
- The Habitats and Species Directive (92/43/EC) enacted through the Conservation of Habitats & Species Regulations 2010.

2.1.3 The level of protection for each species varies according to the conservation status of the species.

2.1.4 The Countryside and Rights of Way Act 2000 supplemented existing legislation for wildlife protection by prohibiting reckless acts that result in the killing or injuring of protected species.

2.1.5 The Natural Environment and Rural Communities Act 2006 requires that every public authority in exercising its functions must have regard as far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity. Section 41 of this Act requires the Secretary of State to have prepared lists of species and habitats which are considered to be of principal importance for the purpose of conserving biodiversity [The UK Biological Action Plan (BAP) species].

2.2 REPTILES

2.2.1 Common reptiles, including common lizards, slow worms and grass snakes, are protected under the Wildlife & Countryside Act 1981. It is illegal to: Injure, capture, kill, keep, transport or sell a reptile (Sub-Sections 9 (1) and 9 (5)). These species are listed in Schedule 5.

2.2.2 Common reptiles are also a UK Biodiversity Action Plan Priority Species and Species of Principal Importance in England. Furthermore, all species of reptiles in Cumbria are Cumbria Biodiversity Action Plan species (from 2010) for which a species statement has been prepared by Cumbria Biological Data Network.

2.3 SLOW-WORM (*ANGUIS FRAGILIS*)

- 2.3.1 The slow-worm (*Anguis fragilis*) is a limbless lizard native to the United Kingdom. The species is widespread and common in the south of England but has a more local distribution in northern counties and Scotland. Slow-worms are naturally absent from Ireland, but have been subject to an unofficial introduction in and around Burren in County Clare. Slow-worms appear to occur in fragmented and isolated populations in northern Cumbria but recorder effort is an issue with reptiles in Cumbria and it is likely that all existent populations have not been recorded. However, slow-worms are certainly not a common species in the area and where they are known to occur, populations are often small and in some cases perceived to be declining.
- 2.3.2 Slow-worms can be considered to be a semi-fossorial (burrowing) lizard spending much of the time hiding underneath objects although not capable of true burrowing. Being reptiles, slow-worms have a smooth, scaly skin and are ectothermic meaning they are unable to physiologically regulate their body temperature but instead regulate their body temperature largely by exchanging heat with its surroundings. Like many other lizards, slow-worms are capable of autotomy, meaning that they have the ability to shed their tails in order to escape predators. The tail regrows, but remains smaller.
- 2.3.3 Adult slow worms can grow to be about 50 cm long and can live to about thirty years in the wild and up to fifty-four years in captivity (this record is held by a male slow worm that lived at the Copenhagen Zoo from 1962 to 2009). Coloration is very variable and although it is often said that individuals can be reliably sexed using colour and pattern, this is an unreliable method of sexing slow-worms. The female often has a stripe along the spine and dark sides while the male may have blue spots dorsally (although this is extremely rare in Cumbria having never been observed by the author). Juveniles of both sexes are gold with a dark brown belly and sides with a dark stripe along the spine and cannot be reliably sexed using none invasive methods until at least 2 years old.
- 2.3.4 Slow-worms are generally considered to be crepuscular, meaning they are most active during twilight, however they can regularly be found during daylight sheltering beneath objects (rocks, wood etc.) in suitable habitat. They are carnivorous and will eat a wide range of soft bodied invertebrates. Neonates and juveniles will often be found in ant nests (particularly *Lasius niger* and *L. flavus*) and adults are known to prey on slug / snails (Gastropoda) and earthworms (Oligochaeta). Luiselli (1992) identified that the diet of a population of slow-worm in north east Italy consisted of around 35% Gastropoda and 33% Oligochaeta with the remaining 32% being made up of spiders (Araneidae), aphids / leafhoppers (Homoptera), beetles (Coleoptera), butterflies / moths (Lepidoptera) and flies (Diptera).

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- 2.3.5 Slow-worms are ovoviviparous meaning that they give birth to live young. This is subtly different from placental viviparity (as seen in mammals) in that the female retains zygotes in the body, but there are no trophic interactions between zygote and mother. This is an adaptation to living in cooler climates and allows a female to effectively carry her clutch of eggs with her to maintain optimal temperatures for incubation.
- 2.3.6 Slow-worms will live in a wide range of habitats. Open woodland, rough grassland, hedgerows, gardens, allotments, road / rail embankments and urban wasteland are all favoured. Slow-worms are the reptile species most commonly encountered in urban and suburban parks and gardens. Although protected against intentional killing and injuring, habitat used by slow-worms is not legally protected. Slow-worms are extremely poor at dispersal and entire populations can easily be wiped out by unsympathetic habitat management and development operations. Slow-worm numbers are thought to be declining in the UK but the species does not currently appear to be globally threatened.

3. Existing Site Description

- 3.1.1 St. Michael's in Dalston is a red sandstone church with a chancel that dates from the 13th Century. The current building was erected in 1750 and restored in 1850. St. Michael's is part of the Church of England United Benefice.
- 3.1.2 The church is located on the western bank of the River Caldew in the centre of Dalston village. The church grounds surround the church building and currently consist of 'formal' and 'informal' areas. To the west and north of the church building grass is mown and a short sward is maintained. Areas towards the south of the church yard are less intensively managed with a reduced mowing regime. The western bank of the River Caldew is essentially un-managed. A range of native and ornamental tree species exist throughout the church yard.
- 3.1.3 Grassland within the church yard is generally species rich. Clearly the mown areas are somewhat less species rich than the longer grassland. The site is shaded from the east by a row of large mature trees on the western bank of the River Caldew.
- 3.1.4 It is understood that the management of the church grounds changed following a public consultation initiated in December 2010. At this time Dalston Parish Council had received a number of complaints that the old churchyard (the less intensively mown section) looked untidy and a number of local residents had commented that they would prefer for it to be cut with the same frequency as the closely mown cemetery area. Problems had been encountered with garden waste being dumped in the church yard. This was seen to be as a result of the fact that this area was mown during the autumn only and consequently looked untidy. Following the consultation it was decided to increase the mown areas of the church yard. The areas which were brought into the new management regime were the areas between the church building and the low wall which separates the church grounds from the village square. A new mown path was also created along the southern boundary adjacent the taller stone wall which lines Church Lane. The new mowing regime has been suspended whilst a reptile survey is completed.
- 3.1.5 Figure 1 shows an indicative site plan of the church grounds when the reptile survey commenced (June 20th 2012). The site plan is indicative only (i.e. location of individual trees may be inaccurate) and is not to scale however gives an indication of the extent of different habitats on site. As it is the physical structure of the habitats on site, rather than the specific vegetation communities which affects habitat suitability for reptiles, no detailed investigation of vegetation communities has been conducted.

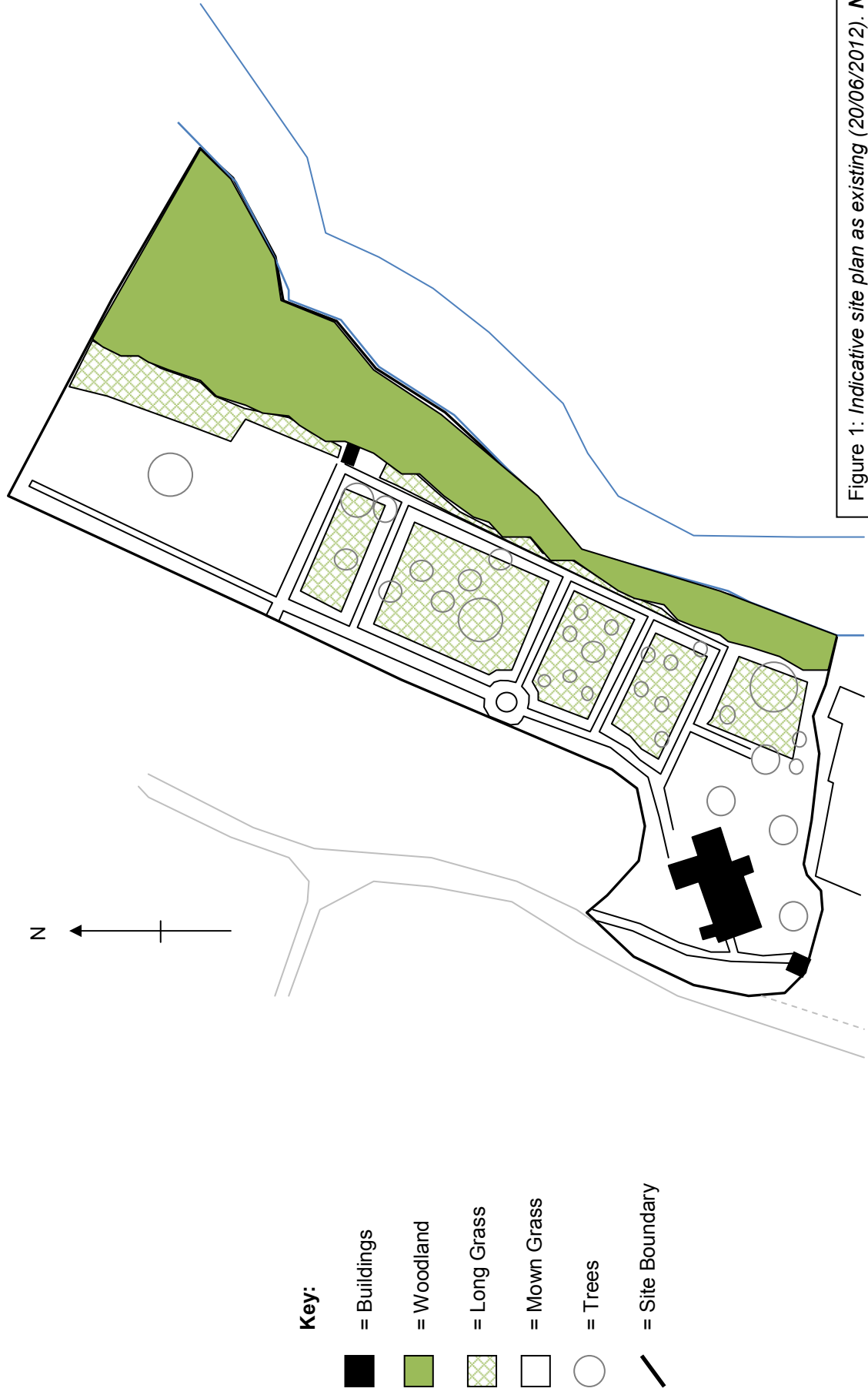


Figure 1: Indicative site plan as existing (20/06/2012). **Not to scale.**

4. Survey and Site Assessment

4.1 PRE-EXISTING INFORMATION ON SPECIES AT SITE

4.1.1 Records obtained from Cumbria Biodiversity Data show that slow-worms have been recorded in Dalston Church grounds since 1983. Local residents report slow-worms being present in the church yard since the 1960's (pers. comms.) but as this may be the limit of living memory for those individuals it is considered likely that slow-worms have been present from an earlier time. The site is isolated from other known populations of slow-worms but considering the known and suspected age of the population on site it is likely that the population is a remnant of an historic larger population in the area rather than an unofficial introduction as is sometimes the case.

Observation Record Type	Observed Abundances	Comment	Date	Year	Spatial Reference	Location	Location Name
Field Record	4 Count of Adult		11/06/1983	1983	NY369502	Dalston	
Field Record	3 Count of Adult		June 1989	1989	NY370501	Dalston	
Field Record	1 Count of Adult		19/03/1999	1999	NY369501	Dalston	Dalston Churchyard
Field Record	1 Count of Adult	Tail partly eaten by something	26/03/2000	2000	NY369501	Dalston	Churchyard
Field Record	1 Count of Adult		14/04/1991	1991	NY369501	Dalston	
Reported to Recorder	2 Count of Adult	On compost heap in churchyard	2008	2008	NY369502	Dalston	
Reported to Recorder		On stone slab inside the church	25/10/2009	2009	NY369502	Dalston	
Field Record	1 Count of Adult		14/04/1991	1991	NY369501	Dalston	

Table 1: *Historic records of slow-worm (Anguis fragilis) at Dalston, held by Cumbria Biodiversity Data Centre, at the time of writing (21/08/2012)*

4.2 OBJECTIVE OF SURVEY

4.2.1 The objective of the survey was to conduct an assessment of habitat suitability for reptiles and ascertain the presence / likely absence of reptiles on site and if found to occur, conduct sufficient survey effort to complete a population size class assessment.

4.3 SURVEY AREA

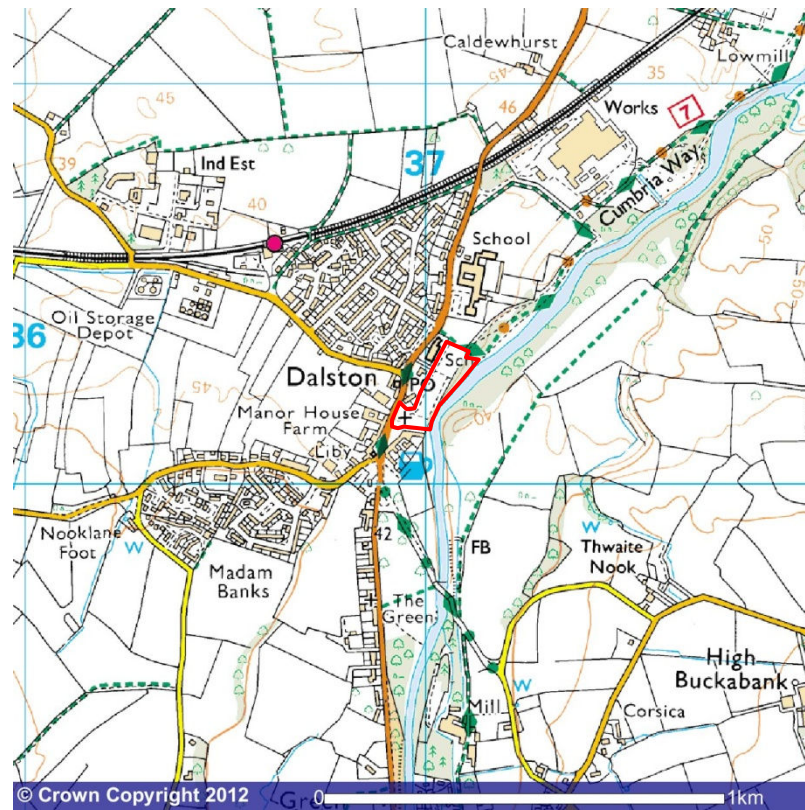


Figure 2: Showing the location of the survey area.

- 4.3.1 The survey area incorporated the entire grounds of St. Michael's Church, Dalston. No formal survey effort was conducted outside of the church grounds.

5. Field Survey

5.1 METHODS

5.1.1 Habitat Suitability Assessment

5.1.2 A daytime inspection of the site was conducted during which all areas of the site were inspected in detail during a walk over survey.

5.1.3 The following list gives characters that influence reptile habitat suitability;

- Location in relation to species range
- Vegetation structure
- Isolation
- Aspect
- Topography
- Surface geology
- Connectivity to nearby good quality habitat
- Prey abundance
- Refuge opportunity
- Hibernation habitat potential
- Disturbance regime

5.1.4 The site was inspected with a view to assessing each of the above habitat characters and classified as negligible, poor, good and exceptional. The assessment of reptile habitat suitability is subjective and based on a personal experience of the surveyor, but considers all the above characters. The habitat suitability assessment was conducted prior to commencing the presence / likely absence survey and was used to help inform the placement of artificial refugia. The presence or absence of reptiles was therefore not used as a criterion for assessing habitat suitability.

5.1.5 Presence / Likely Absence Survey

- 5.1.6 Artificial refugia cut from bituminous roofing felt measuring approximately 50cm² were placed on site in all poor, good and exceptional habitat. In total 25 artificial refugia were laid. Numerous existing 'natural' refugia (for the purposes of this survey report 'natural' refugia refers to any refugia already present on site; i.e. wood, plastic, metal, rubble etc. *It should be noted that some refugia classified as 'natural' were actually placed by Mr D Hickson*) were also noted. Refugia were positioned around features deemed to offer potential for reptiles (i.e. south facing slopes, near to cover etc.). All refugia were allowed to 'bed-in' for 7 days prior to survey commencing. All refugia were checked 10 times, during suitable weather conditions to ascertain presence / likely absence. This follows the suggested methodology in *Natural England (2010) Reptile Mitigation Guidance – CONSULTATION DRAFT* and is considered to be suitable to identify the presence / likely absence of all species of reptile currently known to occur in Cumbria.
- 5.1.7 Checking of refugia involved quietly approaching each felt, observing from a distance to check for reptiles basking on top, before lifting each felt from the edge, away from the sun so as to avoid shadow. The vegetation beneath the refugia was searched by hand to identify any reptile sheltering beneath vegetation. This is an appropriate technique for identifying presence / likely absence of all reptile species known to occur in Cumbria – not just slow-worms.
- 5.1.8 To compliment this technique, Visual Encounter Techniques (VES) were employed. This involves observing all habitat whilst slowly and quietly walking round the site. The noise of reptiles moving through the habitat was listened for and evidence of reptiles was also searched for (i.e. sloughed skins, droppings etc.).
- 5.1.9 The survey was conducted without prejudice as to the likely results, i.e. the methods employed would have identified common lizard (*Zootoca vivipara*), adder (*Vipera berus*) and grass snake (*Natrix natrix*).

5.2 TIMING & WEATHER CONDITIONS

- 5.2.1 The survey visits were conducted between 20th June 2012 and 20th July 2012. This represents a slight departure from published best practice guidelines which suggest that July is a suboptimal time of year for conducting reptile surveys. The reason for this is that reptiles will be very active during the warmest part of the year and may therefore be difficult to observe using standard survey techniques. During 2012 July was not a particularly warm month and leading up to this month weather conditions had been poor. It is therefore not considered to have been a serious constraint to this survey and indeed the highest counts of individual slow-worms were made in July rather than the survey visits conducted in June.

5.2.2 Survey visits were conducted when the weather was mild but not too warm (9°C - 18°C). Heavy rain and high winds were avoided. Surveys were generally conducted between 08:30 - 11:00hrs and between 16:00 – 18:30hrs so as to avoid the coldest and warmest parts of the day.

5.3 PERSONNEL

5.3.1 All reptile survey work was conducted by Sam Griffin (BSc AIEEM) who is the chairman of Cumbria Amphibian and Reptile Group (CARG) and is widely experienced at surveying for reptiles in Cumbria.

6. Results

6.1 HABITAT SUITABILITY ASSESSMENT

- 6.1.1 Reptile habitat suitability was assigned based on the characters listed in Paragraph 5.1.3. In all instances suitability is a combination of all characters.
- 6.1.2 The site as a whole is considered to offer good reptile habitat. The site is generally flat however the micro-topography, vegetation structure (where un-mown), surface geology and refuge opportunity are all suitable for reptiles. The site is considered to be more suitable for slow-worms than for any other species of reptiles due to the level of disturbance and extent of suitable habitat.
- 6.1.3 At a micro-scale the site is considered to represent a mosaic of reptile habitat suitability. The most highly suitable area is considered to be the extreme southern end of the church yard directly adjacent the wall which bounds the southern boundary. This area is deemed to be of the highest quality due to the facts that it has apparently been subject to the least intensive management for the longest time, it is directly adjacent a highly suitable hibernation feature (the stone wall) and it directly adjacent the wooded bank of the River Caldew which although not highly suitable for slow-worms themselves, is highly suitable for potential prey items and therefore represents a significant foraging resource. The mown path through this area (a new feature) is likely to have affected the habitat suitability but at the time of the site inspection, this area was still considered to offer the highest quality habitat on site.
- 6.1.4 The central areas of the site are considered to offer good quality reptile habitat. These sections are very similar to the area identified above as offering excellent reptile habitat, but are isolated from the area of excellent habitat and the wall identified as a likely hibernation feature by a series of paths. The paths in themselves are likely to represent only a minor barrier to dispersal however the fact that strips of grassland either side of the paths are mown is likely to increase the barrier to dispersal. The central area identified as offering good quality habitat includes the woodland edge towards the southern end of the site. This area is shaded and therefore cannot be considered to be highly suitable for reptiles, but along the woodland edge, the shade is dappled only and is considered to be good quality habitat due to prey abundance and vegetation structure.
- 6.1.5 The woodland lining the River Caldew is considered to offer poor quality reptile habitat primarily due to the dense shade. It is felt that this area could provide higher quality habitat but the dominance of Himalayan balsam (*Impatiens glandulifera*) is casting a deep shade and affecting natural vegetation structure and prey abundance.

6.1.6 Mown areas of the site are considered to offer negligible quality habitat. The vegetation structure is too low to offer suitable refuge opportunities and prey abundance and the open nature of these areas is entirely unsuitable for reptiles. It should be noted that thin strips of mown grassland directly adjacent longer grass can be of some value to reptiles as they allow basking opportunities closely associated with refuge opportunities. Away from the interface between mown and long grass the mown areas are considered to offer no potential for reptiles.

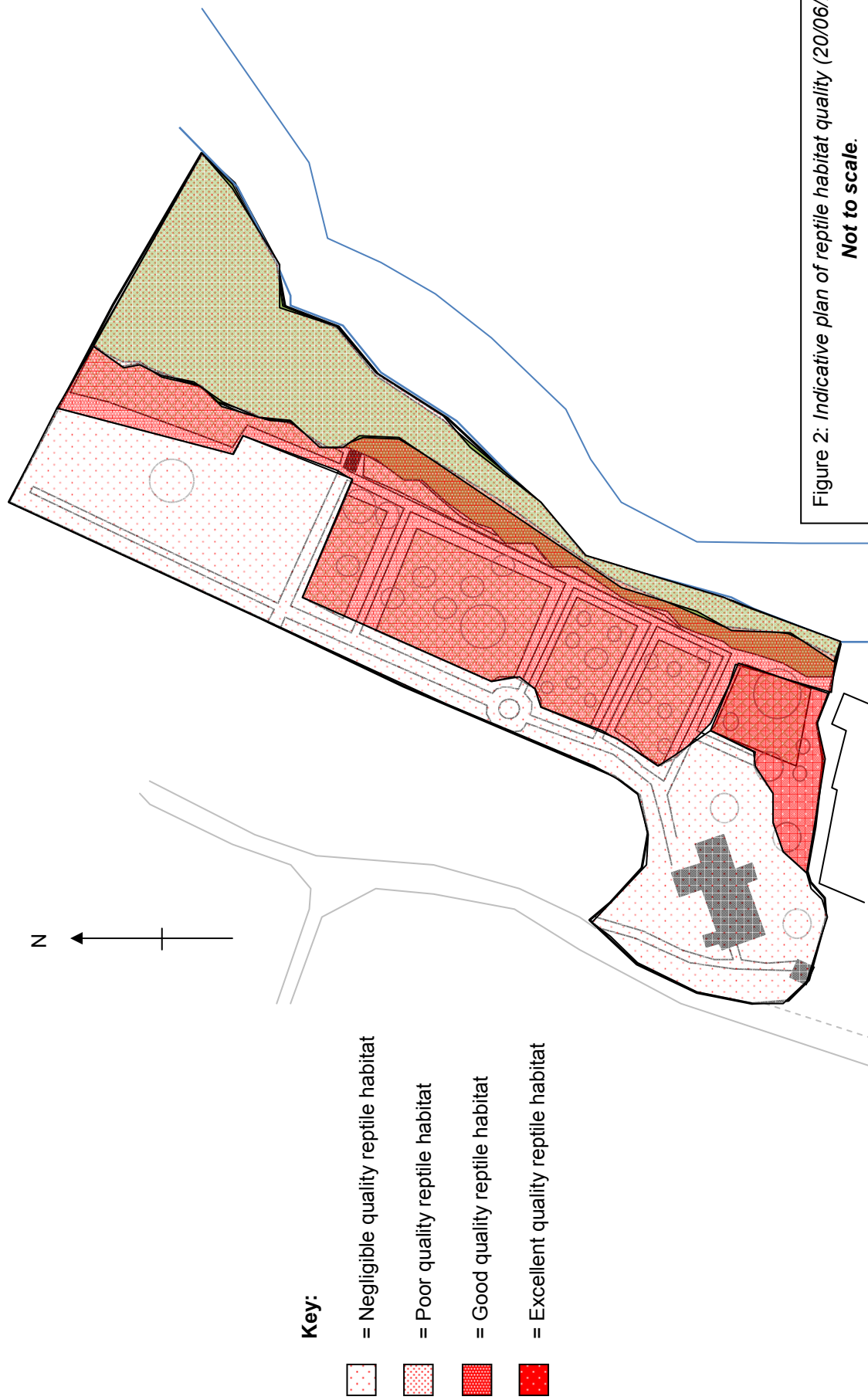


Figure 2: Indicative plan of reptile habitat quality (20/06/2012).
Not to scale.

6.2 CONSTRAINTS

6.2.1 As recognised above, assigning habitat suitability is very subjective and based almost entirely on the extensive personal experience of the surveyor.

6.2.2 The survey visits were conducted between 20th June 2012 and 20th July 2012. This represents a slight departure from published best practice guidelines which suggest that July is a suboptimal time of year for conducting reptile surveys. The reason for this is that reptiles will be very active during the warmest part of the year and may therefore be difficult to observe using standard survey techniques. During 2012 July was not a particularly warm month and leading up to this month weather conditions had been poor. It is therefore not considered to have been a serious constraint to this survey and indeed the highest counts of individual slow-worms were made in July rather than the survey visits conducted in June.

6.3 SURVEY RESULTS

Survey Visit	Species	Age Class	Sex	Comments
1 (27/06/12)	Slow-worm	2 Juv. 1 Adult	0.1.2	No other reptile species seen. Common toad (<i>Bufo bufo</i>) under refugia
2 (30/06/12)	Slow-worm	1 Juv. 1 Adult	1.0.1	No other reptile species seen.
3 (01/07/12)	Slow-worm	3 Juv. 3 Adult	2.1.3	No other reptile species seen.
4 (03/07/12)	Slow-worm	3 Juv. 4 Adult	2.2.3	No other reptile species seen. Juvenile hedgehog (<i>Erinaceus europaeus</i>) seen.
5 (09/07/12)	Slow-worm	4 Juv. 4 Adult	1.3.4	No other reptile species seen.
6 (15/07/12)	Slow-worm	3 Juv. 8 Adult	3.5.3	No other reptile species seen.
7 (16/07/12)	Slow-worm	4 Juv. 8 Adult	4.4.4	No other reptile species seen.
8 (17/07/12)	Slow-worm	3 Juv. 14 Adult	5.9.3	No other reptile species seen.
9 (19/07/12)	Slow-worm	6 Juv. 11 Adult	6.5.6	No other reptile species seen.
10 (20/07/12)	Slow-worm	5 Juv. 13 Adult	5.8.5	No other reptile species seen.

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- 6.3.1 Slow-worms were the only reptile species seen during the surveys. Slow-worms were observed during every survey visit, with between 2 and 18 individuals seen per survey visit.
- 6.3.2 The maximum number of adults seen during any one survey visit was 14. This equates to a 'good' population size class using the 'Key Reptile Sites' assessment criteria presented in Froglife's '*Advice Sheet 10 - Reptile Survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation*'. As no other reptile species were identified and as an exceptional population of slow-worms was not discovered, the site does not automatically qualify for the Key Reptile Sites Register under qualifying criteria 1-4 but may qualify under criteria 5 which states a site can qualify if it is of '*particular regional importance due to local rarity*'.
- 6.3.3 All individuals found were within the southern section of the church yard. Slow-worms were not restricted to habitat identified above as 'excellent' habitat but were also found in areas identified as currently offering 'poor' and 'negligible' habitat. Precise locations of observations were not taken and are therefore not presented here. Clearly the use of refugia to identify reptiles (particularly slow-worms) results in animals being identified in the location the refugia is placed. As such the methodology of the survey does not allow for a detailed population range to be produced. Slow-worms can move considerable distances and have been seen to travel approximately 400m over negligible quality habitat over a couple of days (pers. Obs.). Slow-worms should therefore be considered to be using all areas of suitable habitat on site.

6.4 POPULATION ESTIMATE

- 6.4.1 During the surveys individual chin pattern photographs were taken where possible. Detailed analysis of these images has not been completed, but early indications suggest a population size of >28 individuals. An addendum to this report will be produced once a detailed analysis of ID photographs has been completed.

7. Impact Assessment and Mitigation

7.1 IMPACTS

- 7.1.1 A 'good' population of slow-worms have been found to be present on site. Due to the size of the site and the number of individuals seen, it is prudent to consider slow-worms likely to occur anywhere on site although generally they are likely to be restricted to areas of long grass.
- 7.1.2 There is a need to maintain the church grounds in a tidy state. It is apparent that there is strong local feeling that sections of the site should be mown to maintain a tidy appearance and deter dumping of garden waste within the church grounds and to maintain the amenity of the site for the public.
- 7.1.3 As slow-worms have been found to occur on site and as mowing of grassland areas is necessary there will always be a risk that individual slow-worms will be killed and / or injured. The law states that intentional and / or reckless killing or injuring of slow-worms is a crime punishable by a fine of up to £5000 or 6 months in prison (per animal affected). Equipment used to commit the offence including (but not limited to) vehicles can also be confiscated.
- 7.1.4 It is therefore necessary to carefully manage the risk so as to eliminate the risk of *intentional* killing or injuring and minimise the risk of *reckless* killing or injuring. A reckless act can be seen as any activity likely to affect an animal on a site known to be used by that animal. From a legal perspective, it is therefore essential that a management strategy is not only developed but also strictly observed so as to demonstrate that all reasonable measures have been taken to avoid killing or injuring slow-worms and therefore demonstrating that any activity which leads to the killing or injuring of slow-worms cannot be considered as 'reckless'.
- 7.1.5 From a wildlife conservation perspective the population of slow-worms identified in St. Michael's Church grounds represents an important population for the wider region being spatially distinct from all other known populations. This population has the potential to act as a seed from which animals could disperse into newly created suitable habitat in the area. Loss of this population would represent a significant loss for wildlife conservation generally and reptile diversity specifically in northern Cumbria.
- 7.1.6 As no detailed survey was carried out prior to the site management regime changing it is impossible to suggest how this may have affected slow-worms. It is felt likely that mowing of the south of the site led directly or indirectly to the death of at least 2 slow-worms although this potential offence cannot be proven. The assessment of impacts and recommendations made in the management strategy therefore deal with the situation as it currently exists.

7.2 MANAGEMENT STRATEGY

7.2.1 In terms of the on-going management of the church grounds a few key measures must be taken to avoid killing and injuring slow worms;

- All contractors employed to complete ground maintenance tasks on site should be provided with a summary of this report and agree to observe all relevant recommendations made herein.
- All grass cutting, regardless of where on the site it is occurring, will be conducted with caution in anticipation that individual slow-worms may be present.
- The blades / flails / cord of mowers and strimmers should never contact the ground.
- Any existing mown grassed areas > 50mm in height, should not be mechanically cut to < 30mm during the reptile active season (March – October inclusive). Any existing long grass should not be cut to <100mm during the reptile active. Long vegetation may be cut by hand provided extreme vigilance is observed at all times. As the ground undulates throughout the church yard extreme care must be taken in this respect. Mowing long grass is where the primary risk of killing individual slow worms occurs – although maintaining a minimum length of 30mm for ‘amenity’ grassland and 100mm for ‘long grassland’ will not remove this risk, it will substantially reduce it. Ideally, any grass longer than 50mm will not be cut during the reptile active season.
- Grass longer than 50mm may be cut in the hibernation season (November to February inclusive) by any means however the vegetation immediately adjacent the southern boundary wall should not be cut by mechanical means due to the risk of individual slow-worms being active during the hibernation season. It should be noted that these recommendations consider the impact on slow-worms only. Specific timing constraints relating to flowering plants etc. may be appropriate but this mowing regime should conform to the timing restrictions outlined for slow-worms as a legally protected species.
- Pernicious weeds within long grassland should be cut by hand to maintain the visual amenity of the area. Herbicides should not be used and strimming should not occur in the long grass areas during the active season.
- Any compost heaps or piles of debris present within the church yard should be subject to minimal disturbance and should under no circumstances be moved or burned during the reptile active season (as there is an intrinsic value in established compost piles and slow worms may be present during the active season).
- The high sandstone wall bounding the south of the site should not be demolished, rendered or pointed so as to exclude slow-worms which are highly likely to hibernate

within. If any repair work is required to this wall, it must be robustly justified and carefully planned to ensure that access to internal gaps is maintained. Similarly, as the grave slabs in the older section of the churchyard (between the church building and the village square) may also be used as hibernation sites, these should remain undisturbed and ideally grass allowed to grow long in these areas.

7.2.2 It would be highly desirable to enhance the site for slow-worms. It is understood that there is a willingness within Dalston Parish Council to provide enhancements for this species and it is felt that specific site enhancements could have a significant positive impact on the population. The recommended measures which follow are presented in order of decreasing value;

- The extent of long grassland on site is increased. This could be achieved by reducing the frequency of the mowing regime in certain areas, by removing / pruning small trees currently shading out the grassland and by removing and controlling the Himalayan balsam within the woodland lining the river. The grassland between the church building and the southern boundary wall particularly should be allowed to develop as this is an area identified as being used by slow-worms and offers many of the necessary habitat characters required by the species. If a formal mown path is needed, this should be regularly mown (as described above) and located away from the south eastern elevation of the building. Consideration should also be given to pruning back the ornamental cherry tree in this area to reduce shade.
- Vegetation structure is allowed to develop along the southern boundary wall. A strip measuring a minimum of 1m should be allowed to grow long so as to provide cover for slow-worms which may be using gaps in the wall for hibernation and / or refuge. Ideally this area will be allowed to return to how it has apparently been previously, with no mowing taking place and pedestrian access being achieved via informal 'desire line' paths through long vegetation.
- Partial barriers to slow-worm dispersal across the site are removed or reduced. This could be achieved by allowing 'bridges' to develop adjacent paths between central sections of the site. These bridges would consist of strips of grass which are allowed to grow long up to the path edge so as to reduce the area of unsuitable habitat which must be crossed in order to access central areas of the site.
- Hibernation mounds (or 'hibernacula') could be created towards the centre and north of the site (precise location open to discussion). These would be created by piling rubble and wood in suitable habitat and capping the pile with soil and / or turf. The hibernation mound should not be created in shaded areas. Hibernation features such as this allow reptiles to find suitably insulated and protected hibernation sites which are occasionally a limiting factor in population size and range. The precise design of the hibernation mound is flexible provided it provides insulated cavities within – successful examples have incorporated wooden seats set atop stone faced mounds capped with turf. Some basic examples are provided in the Appendix.

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- The woodland lining the river could be opened up so as to achieve less dense canopy cover and ground shade. This could be achieved by careful pruning of large trees, selective felling of small trees and the removal of Himalayan balsam and bramble scrub. Specifically the Leylandii to the north of the hearse house could be removed. Felling or pruning of other trees should consider the potential impacts on bats and breeding birds but could be conducted to create a more open woodland floor.
 - Public interpretation signs could be erected. These could inform visitors to the church yard of the presence of slow-worms, explain the significance of the population and explain the management measures adopted to ensure slow-worms are protected and allowed to thrive.
 - Habitat piles could be created in the church grounds. These are entirely different to hibernation mounds in that they do not provide hibernation potential but are features which may be used by slow-worms during the active season. Essentially these are compost heaps of wood, cut vegetation, dead leaves which provide refuge opportunities, a foraging resource and warmth (through decomposition) which may be beneficial to slow-worms.

7.2.3 The above points should be considered carefully when developing any kind of management plan for the church yard. These points relate to slow-worms only and there will be other factors to consider. It is felt that a long term management plan should be developed and copies held by the Parish Council. This management plan will no doubt need to be periodically reviewed and changes may be necessary, however any changes must consider the legal implications of any proposed action as a very minimum. Advice will always be available from Cumbria Amphibian and Reptile Group (CARG).

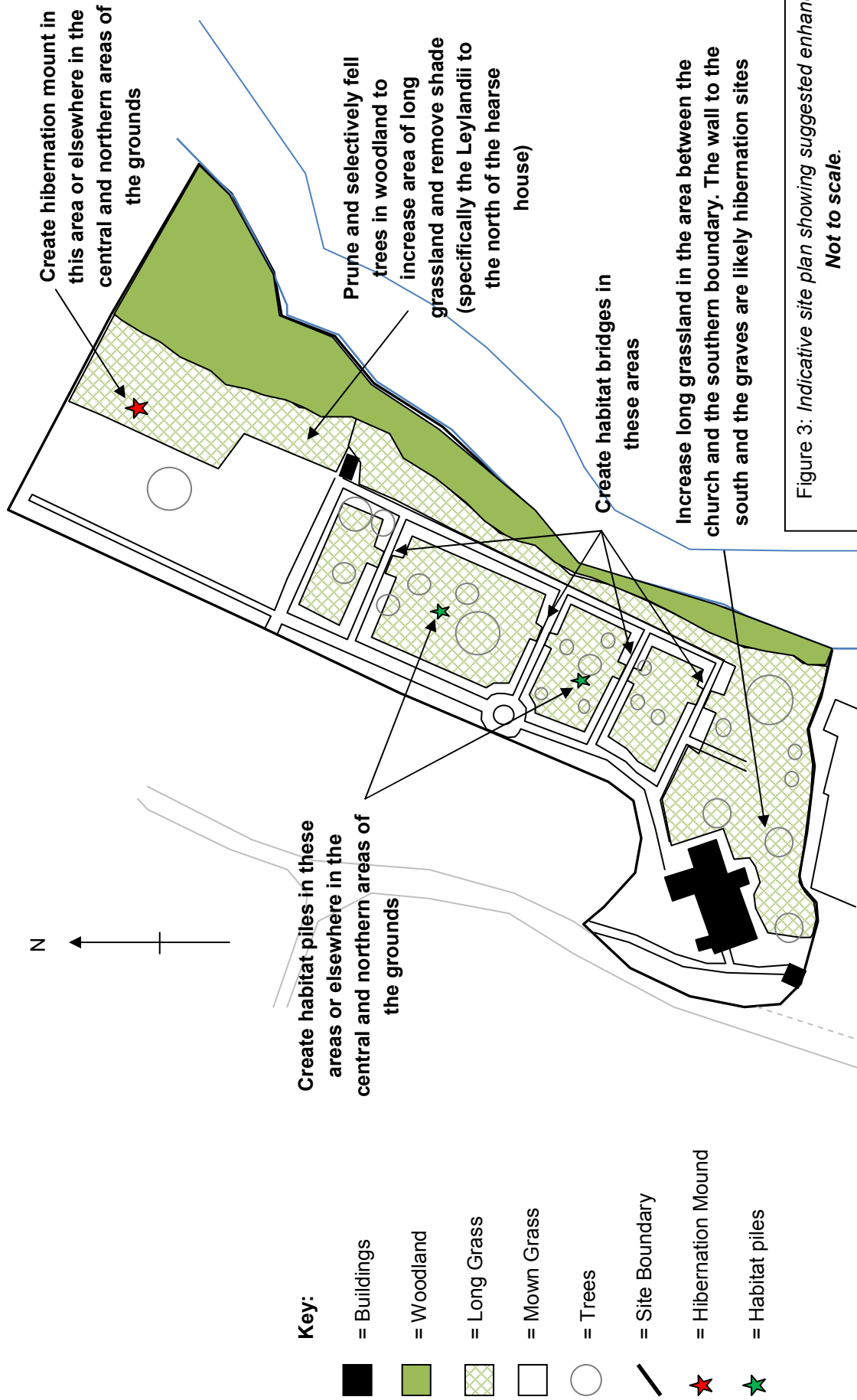


Figure 3: Indicative site plan showing suggested enhancements.
Not to scale.

8. Summary

- 8.1.1 This report details a reptile survey conducted at St Michael's Church, Dalston, Carlisle, Cumbria, CA5 7LN.
- 8.1.2 Following a full reptile survey a 'good' population of slow-worms has been identified on site.
- 8.1.3 A management plan and recommended enhancement measures are presented in this report to ensure protected species legislation is not breached and to enhance to site for slow-worms. An indicative plan of proposed measures and enhancements is provided. It should be noted that this is indicative only and should be used to inform a detailed plan. It may be that all recommendations are adopted as suggested. From a legal point of view it is important that all the bullet point recommendations made in Paragraph 7.2.1 are observed. The bullet point recommendations made in Paragraph 7.2.2 will serve to enhance the site for slow-worms.

9. References/Bibliography

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HMSO (1981). Wildlife and Countryside Act 1981, Schedule One

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Natural England (2010) Reptile Mitigation Guidance – CONSULTATION DRAFT

10. Appendix



Figure 4: Showing example of a vegetated hibernation mound.

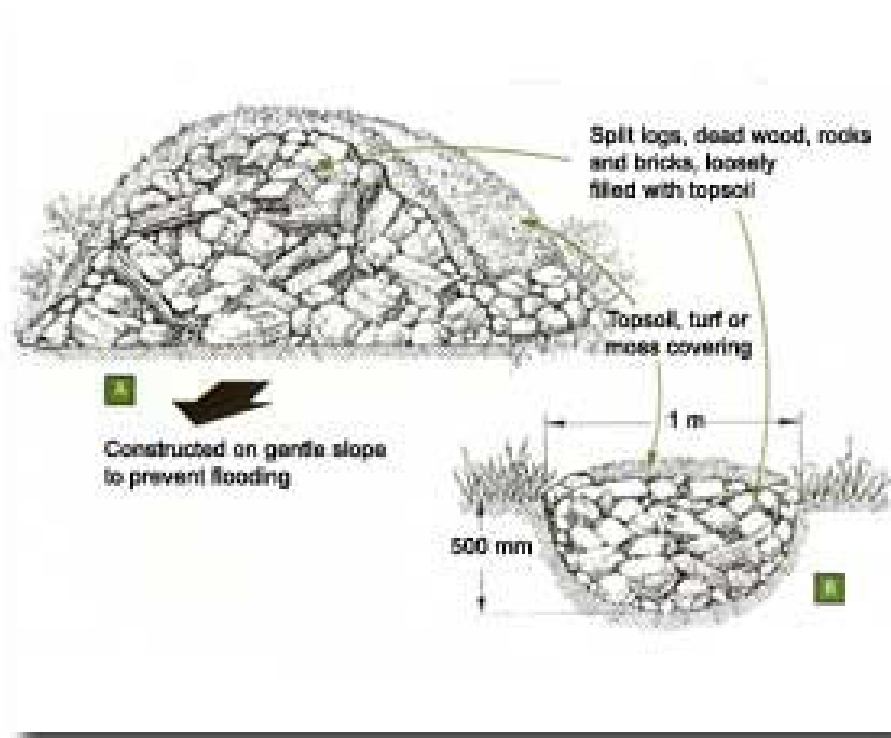


Figure 5: Showing basic design requirements of a reptile hibernation mound.

