



# *The Herpetofauna of Wiltshire*

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*March 2018*

*Wiltshire & Swindon Biological Records Centre and*

*Wiltshire Amphibian & Reptile Group*



## ***Acknowledgments***

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Purgle Linham, previously WSBRC centre manager, in particular, is thanked for her help in producing the maps in this publication, even after commencing a new job with Natural England! Adrian Bicker, of Living Record (livingrecord.net) is thanked for supporting wider recording efforts in Wiltshire.

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## ***About us***

### ***Wiltshire & Swindon Biological Records Centre***

Wiltshire & Swindon Biological Records Centre (WSBRC), based at Wiltshire Wildlife Trust, is the county's local environmental records centre and has been operating since 1975. WSBRC gathers, manages and interprets detailed information on wildlife, sites, habitats and geology and makes this available to a wide range of users. This information comes from a considerable variety of sources including published reports, commissioned surveys and data provided by voluntary and other organisations. Much of the species data are collected by volunteer recorders, often through our network of County Recorders and key local and national recording groups.

### ***Wiltshire Amphibian & Reptile Group (WARG)***

Wiltshire Amphibian and Reptile Group (WARG) was established in 2008. It consists of a small group of volunteers who are interested in the conservation of British reptiles and amphibians. The group is a mixture of keen amateurs and professional ecologists. It holds various events including newt surveying, toad patrols and identification sessions. It also provides advice to the public on matters concerning the welfare and conservation of Wiltshire's amphibians and reptiles.

## ***Citation***

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## Preface

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In a county dominated by, and typically associated with, chalk downland and farmland, it is sometimes easy to overlook other habitats and their species. I've certainly raised this issue with regards to the woodland bats and dormice of Wiltshire during preparation of the Wiltshire Mammal Atlas<sup>1</sup> but what of our wildlife in parks and gardens; the hedgehogs, the frogs and slow worms? Wiltshire's gardens provide a rich habitat for a range of wildlife and improving our understanding of these species is an urgent priority.

Reptiles and amphibians are in urgent need of some profile-raising and conservation effort in Wiltshire, for although the county's great crested newt populations are well-known (and bemoaned by some!) our other species are often overlooked. This atlas was borne from the success of the recently-published *Mammals in Wiltshire* (2<sup>nd</sup> Ed) which successfully stimulated increased and improved recording of a range of mammal and bat species across the county and improved the flow of data to WSBRC. Improved recording and data flow to WSBRC benefits the wider environmental community by increasing the availability of data used to inform planning processes, policy development, land management, agri-environment schemes and so much more.

Our hope in publishing this, the first review and atlas of Wiltshire's amphibians and reptiles, is that we can stimulate recording and promote the importance of these species. And hopefully we can review, update and publish a second edition in the near future!

Some species are known to be widespread in the county (such as great crested newt and common toad) but many others are remarkable by their apparent scarcity. Are palmate newts really so scarce in the county or are they simply overlooked? Are there significant populations awaiting discovery? Adder populations and distributions are poorly known in the county with almost no sites being regularly monitored for this species (Wiltshire Wildlife Trust reserves in the north and south of the county leading upon such monitoring). Are Adders really absent from the Salisbury Plain training area, a huge expanse of other suitable habitat? Smooth snake and sand lizard have not been reliably recorded in the county in many decades – are there relic populations remaining on the fringe of the New Forest awaiting discovery or perhaps already being monitored?

It's easy to fixate upon the rare and infrequently-encountered but Wiltshire's importance will be for the extent of habitat for the common and widespread species. And so, I return to urban parks and ponds. Improved recording of wildlife, truly upon our doorsteps, in our gardens is perhaps our greatest priority to improve the recording of all species using these habitats across the county. These are our most accessible species in our most accessible habitats. By contributing 10 minutes of your time, explore the hidden world of the garden pond at night; the frogs, newts, the foraging hedgehogs and the hunting bats. And help us promote and safeguard Wiltshire's wildlife-rich landscapes, habitats and species. Come on, join in.

Gareth Harris MCIEEM, *Wiltshire & Swindon Biological Records Centre, February 2018*

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<sup>1</sup> Harris, G. & Linham, P. (2017). *Mammals in Wiltshire. Second Edition. Wiltshire & Swindon Biological Records Centre, Wiltshire Mammal Group & Wiltshire Bat Group. March 2017*

## Foreword

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Like many others, my frequent visits to Wiltshire usually consist of passing through the county while heading west along the M4, or along the much maligned A303 (usually at a much lower speed). As my personal experience of the county has been largely restricted to what can be gleaned from a car window, until now my understanding of the county's amphibians and reptiles was rather fuzzy. As this atlas neatly shows, although Wiltshire may not have the herpetological diversity of Dorset or Hampshire, or the pond density of the Cheshire plain, it contains much that is noteworthy. Indeed, stretching from the Cotswold Water Park in the north to the New Forest in the south, Wiltshire contains a remarkable diversity of landscapes and habitats. These are reflected within the green and white stripes of the county flag, which emphasize the grassy plains and the rolling chalk downs.

For many decades, it seemed very difficult to persuade local naturalists to marshal their resources and enthusiasm in the cause of amphibians and reptiles. Fortunately, over the past 20 years or so this has all changed, and with the support of national bodies such as Amphibian and Reptile Groups UK, the Amphibian and Reptile Conservation Trust and Froglife, county groups are flourishing and growing. Based on over 10,000 records collated from a variety of sources, this volume is a very welcome addition to the growing number of county atlases documenting amphibian and reptile distribution. The records in this atlas date back to 1996, and in its short 10 year history the Wiltshire Amphibian and Reptile Group has given recording in the county a significant boost. However, recording amphibians and reptiles in the county does go back much further than this. In his book from 1901, 'The Life History of British Serpents' Gerald Leighton quotes correspondence from the Rev. E. H. Goddard of Wootton Bassett: "Though I have lived all my life in North Wilts I have never seen an adder. The ring snake, on the other hand, is common". Rolling forward some 80 years, as a diffident young student of herpetology I attended the first European symposium on amphibians and reptiles in Oxford in 1980. Sandwiched between presentations by the great and the good from across the continent was a paper by Julian Sims describing the past and present status of the common toad in Wiltshire. Interestingly, there is a lot in common between the preliminary map of toad distribution presented at that meeting and that in the present volume, although it is clear that two significant holes in the distribution at Cotswold Water Park and on Salisbury Plain have recently been plugged. Indeed, with concern over its national status growing, it is heartening to see that the common toad occupies more grid squares in Wiltshire than any other amphibian or reptile.

When I wander my local heaths and woodlands, or peer into my local pond, I often wonder what marvels of the natural world these habitats would have contained 100 years ago. Had I been born 100 years from now, my curiosity would have been easily satisfied, as local naturalists and recording groups have had the foresight to produce atlases such as this one. This volume has certainly inspired me to take a little time out and dwell more in Wiltshire the next time I am heading west. Wherever you are from and whichever direction you are heading, there are many herpetological treasures which are worth unearthing in the county, and may this atlas provide the platform from which to do so.

Richard A. Griffiths  
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*President, British Herpetological Society*

# 1. Introduction

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## 1.1. The Herpetofauna of Wiltshire

The current list of accepted species of reptiles and amphibians in Wiltshire is detailed, along with the year of most recent record, in Table 1.1.

Species / Binomial name	Species / Common name	Authority	Year of last record
Reptilia - Order: Squamata, Sub-order: Sauria			
Anguis fragilis	Slow-worm	Linnaeus, 1758	2017
Zootoca vivipara	Common Lizard	Jacquin, 1787	2017
Reptilia - Order: Squamata, Sub-order: Ophidia			
Natrix helvetica	Grass Snake	Linnaeus, 1758	2017
Vipera berus	Adder	Linnaeus, 1758	2017
Amphibia – Order: Anura			
Rana temporaria	Common Frog	Linnaeus, 1758	2017
Bufo bufo	Common Toad	Linnaeus, 1758	2017
Lithobates catesbeianus	American Bullfrog	(Shaw, 1802)	1996
Amphibia – Order: Caudata			
Lissotriton vulgaris	Smooth Newt	Linnaeus, 1758	2017
Lissotriton helveticus	Palmate Newt	Razoumovsky, 1789	2017
Triturus cristatus	Great Crested Newt	Laurenti, 1768	2017
Ichthyosaura alpestris	Alpine Newt	Laurenti, 1768	2013
Amphibia – Order: Chelonia			
Trachemys scripta elegans	Red-eared Terrapin	Wied, 1838	2011

Table 1: The official species list for Wiltshire

## ***1.2. Introduction to the landscapes and habitats of Wiltshire and their relevance to the county's herpetofauna***

Wiltshire's varied geology and topography provides suitable conditions for an abundance of amphibians and reptiles.

The low-lying clay vales of the Thames valley, Bristol Avon and Hampshire Avon supply rich wetlands supporting all five common and widespread amphibians as well as grass snake. The Thames Valley is characterised by a network of watercourses and associated wetland habitats within an area dominated by arable farmland and pasture. Within the Cotswold Water Park, the glacial sands and gravels of the Upper Thames valley have been subject, primarily since the 1950s, to an increasing area of mineral extraction, producing 160-plus lakes with increasing areas of reedbed, marsh and within a network of rivers and streams. Comprising one of the largest areas of man-made wetland in UK, the area supports an abundance of common frog, common toad, great crested newt and grass snake. Lying immediately to the south of the Cotswold Water Park, the Braydon Forest is an ancient Royal hunting ground, characterised by undulating heavy clays, permanent pastures, species-rich meadows and ancient woodlands. The woodland and in-field ponds of the Braydon Forest support an abundance of great crested newts, and notably, palmate newt.

Lying on the interface between the Cotswold Water Park and the Braydon Forest, the Wiltshire Wildlife Trust reserves of Sandpool Farm (part of the Lower Moor Farm – Clattinger Farm complex) and Blakehill Farm. These reserves were recipients of reptiles arising from a large-scale translocations project, supplementing the numbers of adder, common lizard, slow worm and grass snake already found here.

Overlooking the Thames valley, on the edge of the North Wessex Downs AONB, lies the borough of Swindon. Ponds associated with permanent pastures and wetland corridors support an abundance of great crested newts, as well as common frog, common toad, smooth newt and grass snake. That this area has been, and continues to be, subject to significant areas of built development as the expansion of Swindon continues, raises concerns over the continuing health of these populations, despite efforts in recent years to maintain and enhance habitat connectivity through green infrastructure initiatives.

The Thames & Avon clay vales extend south and west through Wiltshire, through Royal Wootton Bassett, Chippenham, Melksham and Warminster, offering a network of farmland, low-lying river valleys prone to inundation, ponds and ditches. The clay vales are notable for the distribution of great crested newt as well as the other common species.

In the east of the county lies the North Wessex Downs AONB, extending from central Wiltshire, through West Berkshire, Oxfordshire and beyond. The North Wessex Downs comprise a vast area of rolling chalk downland and intensive arable farmland, bisected by river corridors such as the Kennet and Og (feeding the river Thames) as well as the Kennet & Avon Canal. Dew ponds across the down support small populations of common frog and great crested newt, whilst the river corridors and canal corridor support grass snake. Small populations of common lizard may be found on steeper chalk grassland slopes, whilst within the Savernake Forest, another ancient Royal hunting forest, populations of adder may remain, whilst the numerous ponds of the forest support smooth newt and great crested newt.

Dominating central Wiltshire is the chalk plateau of Salisbury Plain, itself dominated by the extensive military training area greater in area than the Isle of Wight. The Plain is not renowned for its wetland ecology, and yet the extensive networks of dew ponds, temporary ponds and rutting created by tank training activity, support an abundance of species which favour such ephemeral waterbodies. Recent studies by Iain Perkins (Defence Infrastructure Organisation) demonstrate that the Plain supports significant populations of common toad adapted to the often-dry conditions, exhibiting asynchronous spawning in order to take advantage of suitable breeding conditions when available. Elsewhere, the Plain supports great crested newts in dew ponds and within pools associated with ephemeral watercourses (winterbournes). Bisecting Salisbury Plain are the upper reaches of the Salisbury Avon, which sourced close to Devizes in the Pewsey Vales, offering a permanently wet corridor supporting the common amphibians and grass snake. Salisbury Plain supports common lizard and slow worm, and yet intriguingly, despite the apparently suitable habitats available, no adders. Only a few kilometres south however, within woodlands of the Wylve, lie populations of adders.

Crossing the centre of Wiltshire and comprising the boundary between the vice counties of South Wiltshire and North Wiltshire, is the Kennet & Avon Canal, bisecting Wiltshire west to east. Although a man-made feature, it is nonetheless an important landscape feature, providing habitats for breeding reptiles and amphibians as well as opportunities for dispersal and hibernation.

South-west Wiltshire is characterised by the rolling chalk downland of West Wiltshire Downs and Cranborne Chase AONBs. A network of woodlands, farmland ponds and river corridors provide opportunities for the common amphibians. Populations of adder remain but are poorly known.

The southern edge of Wiltshire is characterised by the woodland landscapes of the New Forest National Park and although only a small part of the national park lies within Wiltshire, the landscape between Salisbury and the New Forest is well wooded, whilst the New Forest supports heathland, bogs, mires and woodland. Adder populations are monitored within Wiltshire's New Forest but no sand lizard or smooth snake are known within Wiltshire at present.

The Salisbury Avon continues its flow from Salisbury, south through Downton and to Fordingbridge, leaving Wiltshire for Christchurch Harbour. The extensive water meadows offer an abundance of habitat for amphibians and grass snake.

### 1.3. Designated sites in Wiltshire and other important landscapes

In Wiltshire 134 locations have been designated Sites of Special Scientific Interest (SSSI), of which none have been designated primarily for their reptile or amphibian interest. A number of the county's SSSIs support notable populations of reptiles and amphibians and some list them upon the citation as additional features of interest. The following list details a number of such sites (but is not an exhaustive list of SSSIs supporting reptiles and amphibians nor of those including these species upon the citation).

Site of Special Scientific Interest	Species listed on the SSSI citation
<a href="#">Landford Bog</a> (SU259185)	adder, common lizard and common frog
<a href="#">Pewsey Downs SSSI</a> (SU113636)	Great crested newt breeds in some of the remaining dew ponds.
<a href="#">Salisbury Plain SSSI</a> (ST950480 SU070500 SU200490)	Great crested newt occurs in dew ponds across the Plain and in pools along the Nine Mile River, together with smooth newt, common frog and common toad. Grass snake are also often seen near pools, and common lizard, slow worm and adder are present. [Note: there are no adder records to support this]
<a href="#">Savernake Forest SSSI</a> (SU215665)	great crested newt

Table 2. SSSI in Wiltshire including herpetofauna upon their citation

For further information regarding these locations and other designated sites please see the Natural England website.

## 1.4. Legal protection

The legal status and protection afforded to the herpetofauna of Wiltshire is complex and draws upon international legislation (primarily the EU Habitats Directive), domestic legislation (the Wildlife & Countryside Act 1981 as amended, to the Conservation of Habitats and Species Regulations 2010 and more recently, the Natural Environment and Rural Communities Act 2006) and national plans and policies (such as the UK Biodiversity Action Plan).

Furthermore, the Wiltshire Biodiversity Action Plan 2008 and the Cotswold Water Park Biodiversity Action Plan (2007-2016) detail a number of species of local or county conservation concern, primarily great crested newt.

Detailed information regarding the international and domestic legislation may be found on the JNCC website<sup>2</sup>. A summary of the legal protection is detailed in Table 1.4. This information is provided simply as a summary – this document does NOT constitute a legal document. For more detailed information, or for interpretation of legal status, please seek professional advice.

Species	INTERNATIONAL DESIGNATIONS			UK BAP LISTS		NATIONAL DESIGNATIONS	
	Bern Convention	Habitats Directive	Global Red list status	UKBAP priority species	Biodiversity Lists - England (The NERC Act)	Wildlife and Countryside Act 1981	The Cons. of Habitats and Species Regulations 2017
<i>Anguis fragilis</i>	Appendix 3			BAP-2007	NERC Act s41	Sch5 sect9.1 (kill/injuring) Sch5 sect9.5a	
<i>Zootoca vivipara</i>	Appendix 3		Least Concern	BAP-2007	NERC Act s41	Sch5 sect9.1 (kill/injuring) Sch5 sect9.5a	
<i>Natrix helvetica</i>	Appendix 3		Least Concern	BAP-2007	NERC Act s41	Sch5 sect9.1 (kill/injuring) Sch5 sect9.5a	
<i>Vipera berus</i>	Appendix 3		Least Concern	BAP-2007	NERC Act s41	Sch5 sect9.1 (kill/injuring) Sch5 sect9.5a	
<i>Rana temporaria</i>	Appendix 3	Appendix 5	Least Concern			Sch5 sect9.5a	
<i>Bufo bufo</i>	Appendix 3		Least Concern	BAP-2007	NERC Act s41	Sch5 sect9.5a	
<i>Lissotriton vulgaris</i>	Appendix 3		Least Concern			Sch5 sect9.5a	
<i>Lissotriton helveticus</i>	Appendix 3		Least Concern			Sch5 sect9.5a	
<i>Triturus cristatus</i>	Appendix 2	Appendix 2* Appendix 4	Least Concern	BAP-2007	NERC Act s41	Sch5 sect9.4b Sch5 sect9.5a Sch5 sect9.4c	Sch2

Table 3. A summary of legal status for Wiltshire's native herpetofauna

<sup>2</sup> Conservation Designations for UK Taxa, JNCC website: <http://jncc.defra.gov.uk/page-3408>. Update: 24<sup>th</sup> November 2016 (Accessed 29<sup>th</sup> January 2017) of which part is summarised and presented in Appendix 1. Only information relevant to European and domestic legislation and to Wiltshire (i.e. excluding Scottish and Northern Irish law and legislation) is included.

### **1.5. Herpetofauna species of local importance**

Local Biodiversity Action Plans (LBAPs) have largely fallen out of favour in the UK, being replaced by the Natural Environment and Rural Communities Act 2006 (and specifically section 41 which lists species of conservation concern in England). However, the LBAPs of Wiltshire and Cotswold Water Park represent a detailed review of the conservation status of species and habitats in the county, providing justification for the prioritisation of conservation action towards species of county and local interest.

With a limited assemblage of reptile and amphibian species within the county, all species should be considered to be of county or local importance. The following species however, are listed upon the Wiltshire Biodiversity Action Plan (2008) and the Cotswold Water Park Biodiversity Action Plan (2006-2016).

Publication of this document contributes to the delivery of conservation action supporting these species by establishing their current status in the county.

Species listed upon *Section 3 - Species* of the [Wiltshire Biodiversity Action Plan 2008](#) are slow worm, grass snake, adder, common toad, great crested newt and palmate newt. For further information please consult the [Wiltshire Biodiversity Action Plan 2008](#).

Great crested newt is listed upon the [Cotswold Water Park Biodiversity Action Plan 2007-2016](#) as an individual Species Action Plan, whilst additional action for other reptiles and amphibians are included within the Habitat Action Plan for Standing Open Water and Ponds. For further information please consult the [Cotswold Water Park Biodiversity Action Plan 2007-2016](#).

### **1.6. Recording and data collection**

Data contributing to this publication was sourced from a variety of organisations and projects.

A number of national recording schemes and organisations make their data available through their website, iRecord and/or through the National Biodiversity Network Atlas. This ensures that additional data collected in the county through national recording schemes remains available for use at a local level. These data have been included in this project. Such datasets include;

- Record Pool (Amphibian & Reptile Conservation)
- iRecord (general survey data)
- iRecord – the Consultants Portal (a partnership with Chartered Institute for Ecology & Environmental Management).
- Living Record (promoted within Wiltshire by WSBRC)

A number of national recording schemes were approached for data to contribute to this project including Froglife and the National Amphibian & Reptile Recording Scheme (NARRS), in order to access data collected by local volunteers contributing to these recording schemes. Unfortunately, these searches resulted in very small numbers of records, suggesting that there is limited uptake of these initiatives within Wiltshire.

Wiltshire & Swindon Biological Records Centre (WSBRC) receives a steady flow of amphibian and reptile records each year, primarily through the voluntary efforts of a small but dedicated pool of surveyors (relating primarily to Swindon and the Salisbury Plain military training area) as well as from ecological consultants delivering surveys for site assessments and built development, which often results in detailed surveys for reptiles and great crested newts.

Consequently, the majority of records included in this publication were generated by local volunteers and professional ecologists. These data are typically submitted to WSBRC as written reports and as copies of great crested newt Natural England licence returns. In recent years, increasing numbers of records (primarily casual observations rather than formal surveys) are being submitted to Living Record ([www.livingrecord.net](http://www.livingrecord.net)) and iRecord by volunteer recorders, whilst increasing numbers of consultant ecologists are also using the Consultants Portal (<http://www.consultantsportal.uk/>), which feeds data into iRecord.

All data arising from Wiltshire submitted to Living Record (one of WSBRC's preferred routes to receive data) is verified by the Wiltshire county recorder for amphibians and reptiles. These data have been harvested and included in this publication.

WSBRC routinely receives data from a variety of sources including members of the public, Wiltshire's team of county recorders and their recording schemes, the Wildlife Sites Project, Wiltshire Wildlife Trust staff, reserves and projects and an array of ecological consultancies. Furthermore, a number of organisations in the county also submit large datasets each year and these comprise a significant contribution to this publication; for example, Cotswold Water Park Trust and Defence Infrastructure Organisation.

Finally, Wiltshire Amphibian & Reptile Group (WARG), although a small recording group, includes a small number of recorders who submit their data each year, often as part of longer term studies, for example, in Swindon.

Those contributing data are too numerous to mention but all are warmly thanked and encouraged to continue their support of Wiltshire's environment by sharing their biological data. They are also encouraged to recruit and mentor new recorders to promote improved survey and monitoring of the county's herpetofauna.

### ***1.7. Frequency of occurrence in Wiltshire by kilometre square***

Over 10,100 records have been analysed in the production of this document. Analysis of records by occupied kilometre (km) square is present in Table 4 below. A small number of assorted records submitted at genus level or less are excluded from this analysis, for example field records of "small newts" arising from torch surveys of ponds.

Common toad has been recorded from the greatest number of 1km squares across Wiltshire, noted in 11.11% of the total number. Common frog (11.00%), smooth newt (9.94%) and great crested newt (9.19%) were noted in around ten percent of the county's 1km squares. Palmate newt in contrast has been recorded from only 2% of the county's 1km squares.

The reptile species have been recorded in a smaller percentage of the county's 1km squares. Grass snake has been recorded in 7.43%, slow worm in 7.19%, common lizard in 4.65% and adder in 1.32%.

Wiltshire is known to support widespread populations of great crested newt, and given this species' legal status, pond surveys are regularly and routinely required to guide built development and land management. For this reason, surveys of this species (and therefore the other amphibians) are regularly undertaken generating regular survey data. This is particularly so in the lower-lying clay vales and river valleys.

Common name	No. occupied 1km squares	% of total (Total=3701 km squares)	Ranked - % of total
Common Toad	411	11.11	1
Common Frog	407	11.00	2
Smooth Newt	368	9.94	3
Great Crested Newt	340	9.19	4
Grass Snake	275	7.43	5
Slow-worm	266	7.19	6
Common Lizard	172	4.65	7
Palmate Newt	77	2.08	8
Adder	49	1.32	9
Red-eared Terrapin	2	0.05	
American Bullfrog	1	0.03	
Alpine Newt	1	0.03	

Table 4: Frequency of occurrence of reptiles & amphibians in Wiltshire by occupied km square

Reptiles receive less survey effort in the county, perhaps in part because the county does not currently support the species protected under schedule 5 of the Wildlife & Countryside Act 1981, as amended, i.e. sand lizard and smooth snake. Given that large parts of the county are not subject to development pressure (for example, the extensive areas within the Salisbury Plain military training estate and the extensive areas of farmland and downland throughout the county, there is less pressure to undertake surveys for reptiles.

## **2. The Species Accounts**

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### **2.1. Introduction to the species accounts**

The accounts for those species recorded in Wiltshire are presented as follows. For each species, a brief account is provided of their ecology, behaviour and UK range. For more detailed information on these subjects, readers are encouraged to consult some of the many superb texts detailed in the bibliography at the end of each species account, as well as the general bibliography provided at the end of this document.

The second section of each species account comprises an assessment of the current distribution within Wiltshire. The sources of information used in each account are detailed at the end of each account.

### **2.2. The maps**

For each species, a single map is presented, displaying the distribution of field records. All maps display occupied one kilometre squares (monads) for each species, presenting records for the period 1996-2006 (in grey) and the period 2006-2017 (blue for reptiles, green for amphibians). Within the species accounts, the highlighted one kilometre squares indicate occupation only, without any indication of the numbers of records / intensity of recording. The background of the maps includes the river catchments (and the Kennet & Avon Canal) to provide some location context.

### **2.3. The study area**

For the purposes of this publication the administrative boundary of Wiltshire and Swindon Borough has been used, thereby incorporating the 3,701 km squares within or overlapping this boundary. See Figure 1.

### **2.4. Overview of records**

By the end of 2017, all recent records of herpetofauna received by WSBRC and Wiltshire Amphibian & Reptile Group had been verified and imported. For the purpose of this publication all records for the period 1996-2017 inclusive were exported for mapping and analyses. This amounted to over 10,100 records.

Survey and recording effort is unevenly distributed across Wiltshire. Figure 1 presents the key landscapes within Wiltshire, whilst figures 2 presents the distribution of occupied kilometre squares across the county. Figure 2 presents a greater density of records and recording activity in the north and west of the county, considered to relate to surveys contributing to built development in the vicinity of towns such as Swindon, Chippenham, Melksham and Trowbridge. The western side of the Salisbury Plain military training area, also known as the Imber Ranges, has also enjoyed considerable monitoring activity, notably of common toad within ephemeral waterbodies, and largely undertaken by a single observer, representing monumental survey effort.

The spread of all records is presented in Figure 2 and a graphic representation of survey effort is shown in Figure 3a and 3b.

Figure 1: The county of Wiltshire and Swindon Borough, highlighting the key landscapes, river catchments and settlements.

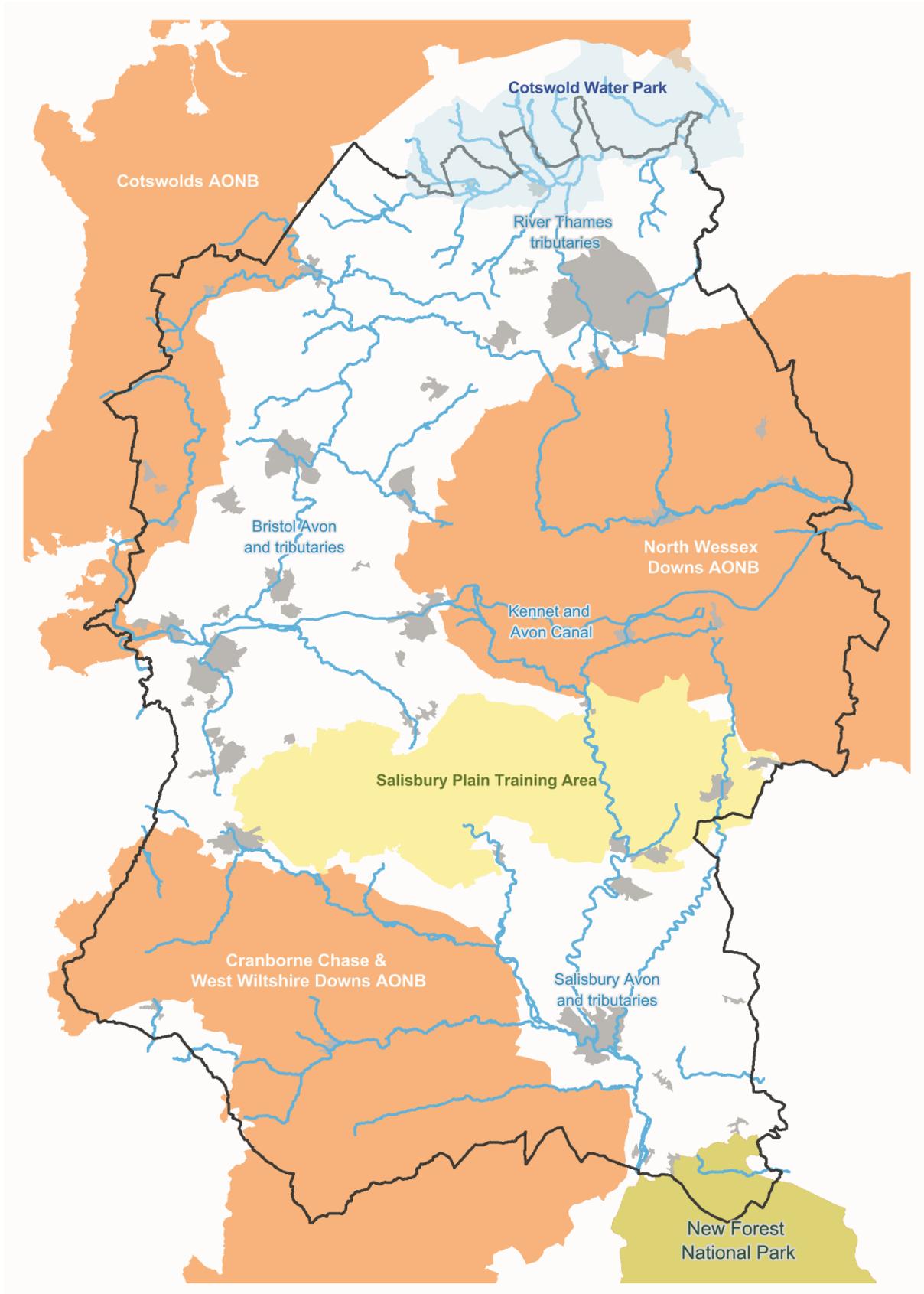
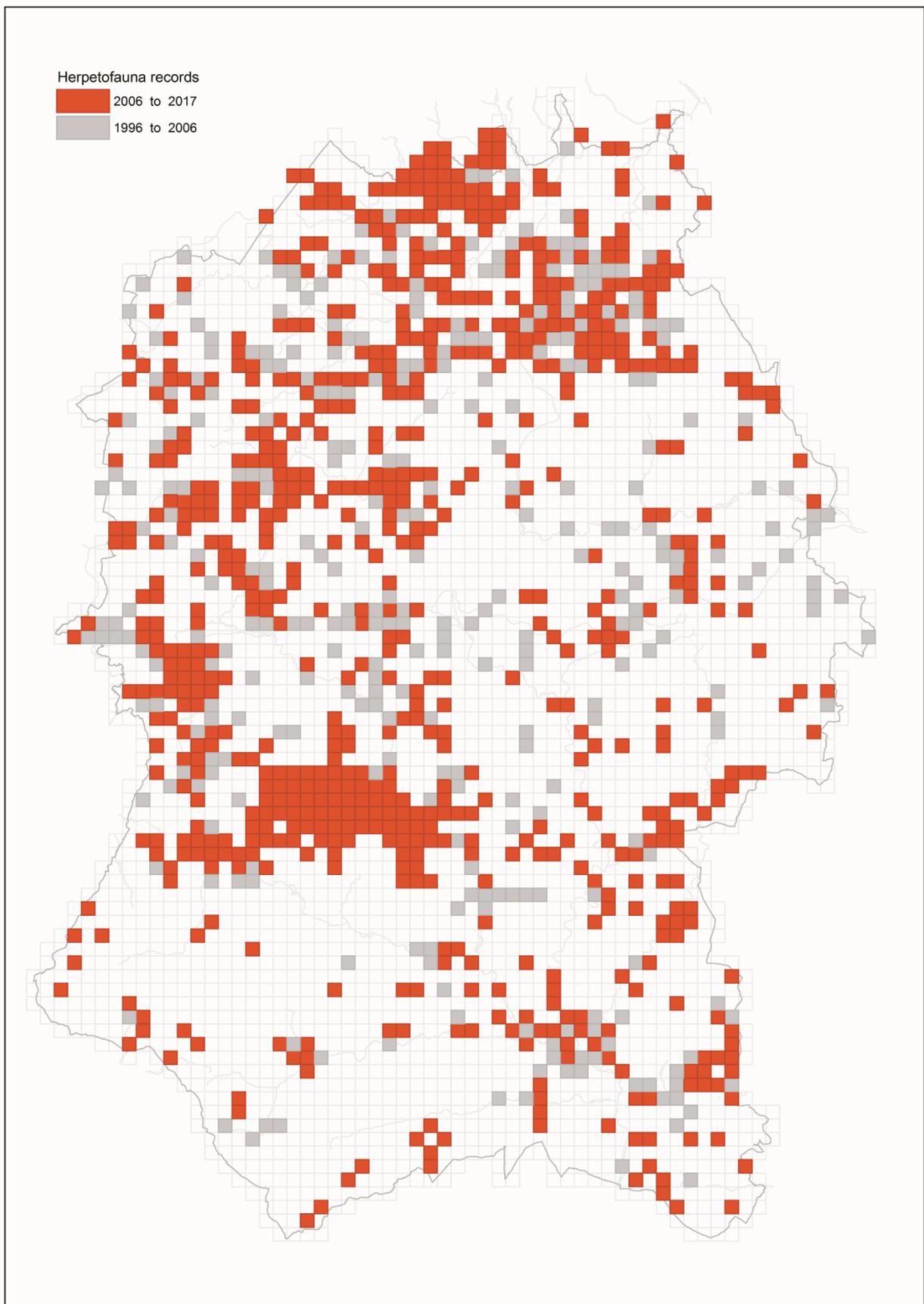
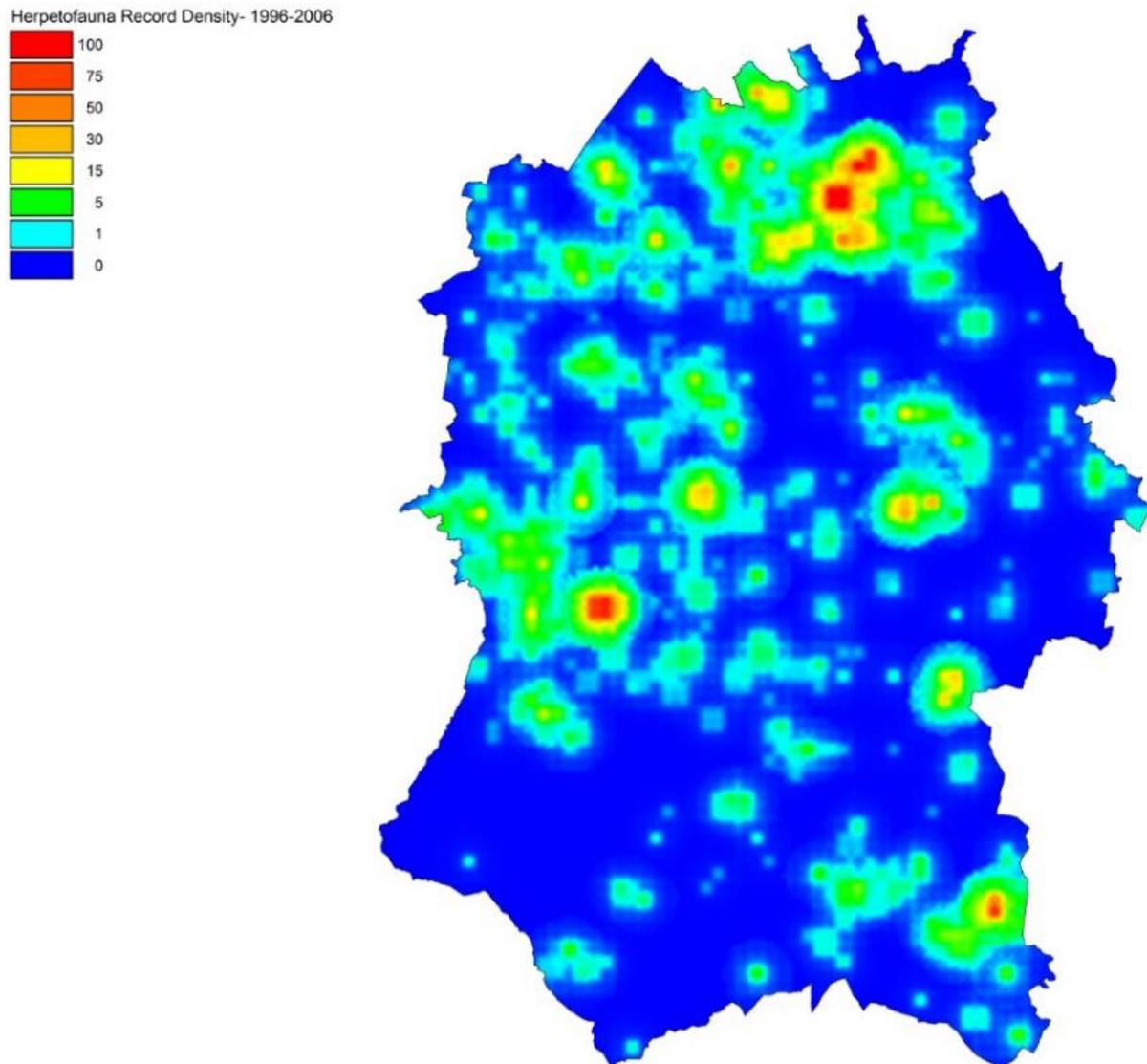


Figure 2: Amphibian & Reptile record distribution



Figures 3a and 3b present the density of records submitted for each 1km square, thereby representing a “heat map” whereby “warmer” colours represent greater numbers of records, and “colder” colours represents smaller numbers of records. In essence these are maps presenting recording effort, with those areas with the greatest effort represented by “warmer” colours. These have been split into the two survey periods, 1996-2006 and 2006-2017, in part to demonstrate how recording efforts in focussed areas account for the majority of the amphibian and reptile records submitted during 1996-2017.

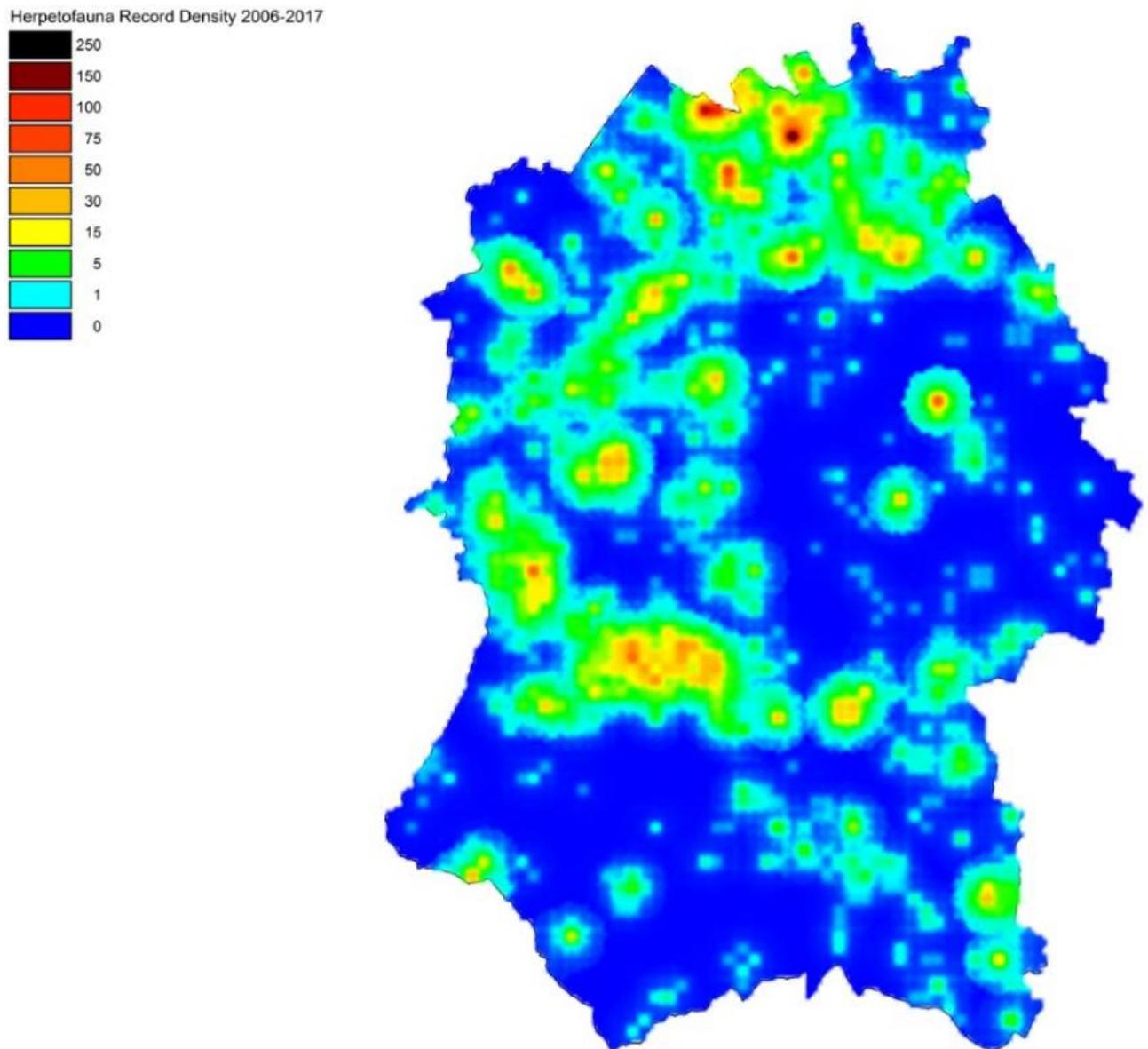
Figure 3a: Amphibian & reptile record distribution – “heat” map – 1996-2006



It is worth remembering that areas represented by green and blue shades have received 5 or less records per kilometre square, a very low level of recording effort. Areas of high recording effort are typically associated with settlements and developments, in particular Swindon borough and surrounding area and Trowbridge. These precise areas will vary over time as development sites progress.

There are, however, some notable exceptions to this. Recording effort upon Salisbury Plain, notably the Imber Ranges, represents recording effort relating to survey and monitoring for conservation purposes. Intense recording activity at Sandpool Farm WWT Reserve and Blakehill WWT Reserve relate to post-translocation monitoring.

Figure 3b: Amphibian & reptile record distribution – “heat” map – 2006-2017



Figures 3a and 3b highlight, in particular, that recording activity for the majority of the county is extremely low, with many 1 kilometre squares lacking any recording activity. Given that submitting only 5 records for a single garden pond would be enough to turn a “blue square” to a “green square”, the targeting of only moderate survey effort would greatly enhance our knowledge of the county’s herpetofauna.

## ***Reptilia: Order: Squamata, Sub-order: Sauria***

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### ***Slow worm, Anguis fragilis (Linnaeus, 1758)***

#### ***Ecology***

Although they may look like snakes, slow worms are in fact legless lizards. They usually grow to about 40cm but will sometimes be longer. A high proportion lose their tails, which grow back shorter giving them a stumpy appearance. The females are brown with dark sides and often have a dark stripe running along their back, whilst the males are greyish brown.

Slow worms are more likely to be found hiding under stones, logs and in compost heaps rather than out in the open. They eat slow moving invertebrates, such as slugs and are often found in gardens. Within the UK they occur in England, Scotland and Wales, where they are widespread.

Mating takes place in April and May. The females give birth to live young in late summer. The juveniles are initially very thin, about 4cm long and are often gold in colour. Slow worms hibernate between November and March.

#### ***Distribution***

Slow worms were the most recorded reptile in Wiltshire with 825 records between 1996 and 2017. They were recorded in a total of 266 squares, which equates to 7% of the total kilometre squares in the county.

There is a good distribution of the species in the north, west and south east of the county, but there is a large area across the centre of the county, including Salisbury Plain with a lack of records. This would be a good area to focus on for future surveys for this species.

#### ***Conservation***

Although widespread and able to reach high densities in good habitat, slow worms are often threatened by development putting increasing pressure on their habitat. Slow worms are frequently relocated from development sites to new habitat, however there is often little evidence to show how well translocated animals fare at their new receptor sites.

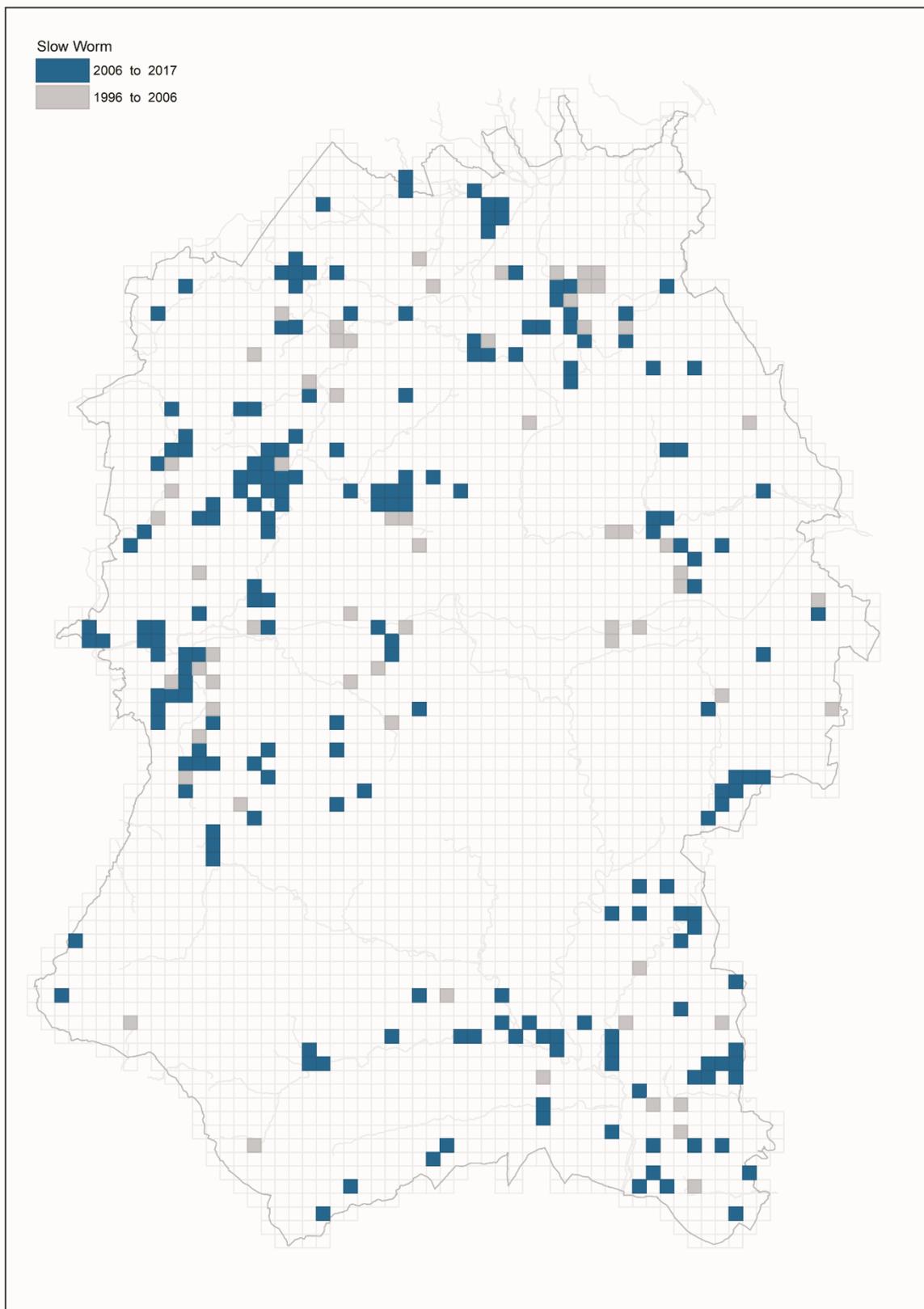
#### ***Bibliography***

Amphibian and Reptile Conservation website <https://www.arc-trust.org/slow-worm> accessed 18<sup>th</sup> January 2018

Froglife website <http://www.froglife.org/info-advice/amphibians-and-reptiles/slow-worm/> accessed 18<sup>th</sup> January 2018

Inns, H. (2009) Britain's reptiles and amphibians. Wild Guides, Old Basing, Hampshire.

Figure 4: Slow worm



## ***Common lizard, Zootoca vivipara (Jacquin, 1787)***

### ***Ecology***

Adult lizards are typically 15cm long. They are usually brown, although there may be a lot of colour variation with green, yellow and black individuals. They are patterned with a mixture of spots and/or stripes and can be distinguished from newts by their scaly skin and fast movements.

Within the UK they are found in England, Wales, Scotland and Ireland. They prefer dry, sunny habitats with some dense cover, and can be found on heaths, commons, moorlands, dry stone walls and railway embankments. Their main prey is invertebrates.

They can move rapidly and will disappear into the undergrowth if disturbed, and are known to readily shed their tail when attacked by predators

Common lizards hibernate between November and March, mating in spring and giving birth to live young in July and August.

### ***Distribution***

Between 1996 and 2017 there were 630 records of common lizards in Wiltshire. They were recorded in a total of 172 squares, which equates to 5% of the total kilometre squares in the county.

The records are spread across the county, but there are a lack of records from the north-west and south-west of the county. These would be good places to carry out surveys to find out if there is a genuine absence of lizards or just a lack of records from these areas.

### ***Conservation***

Although still reasonably widespread there is concern that common lizards are declining significantly in more southern areas where the species was once considered common. Understanding their distribution and monitoring populations is key to conserving this species.

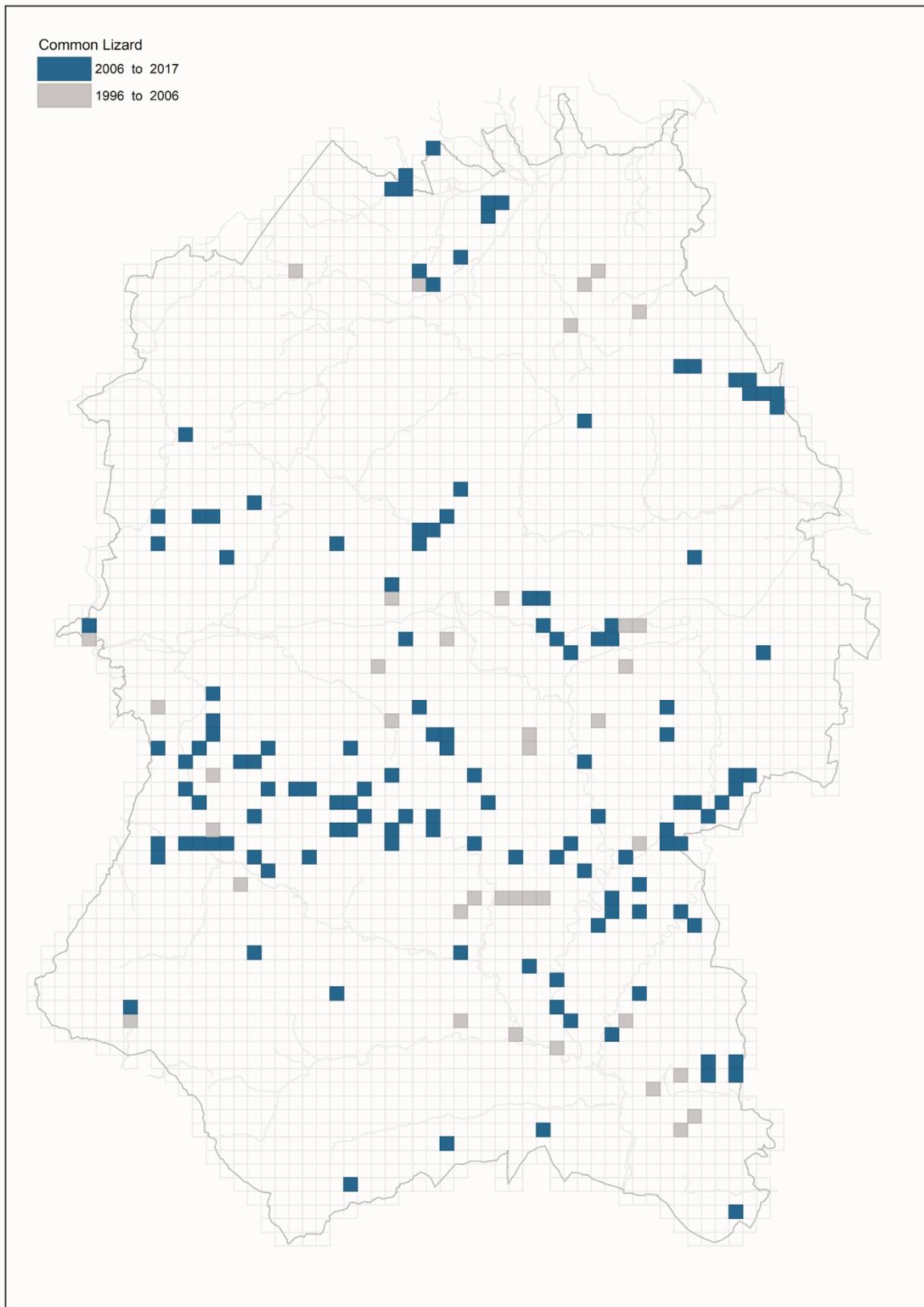
### ***Bibliography***

Amphibian and Reptile Conservation website <https://www.arc-trust.org/common-lizard> accessed 7<sup>th</sup> January 2018

Froglife website <http://www.froglife.org/info-advice/amphibians-and-reptiles/common-lizard/>  
Accessed 7<sup>th</sup> January 2018

Inns, H. (2009) Britain's reptiles and amphibians. Wild Guides, Old Basing, Hampshire.

Figure 5: Common lizard



## ***Reptilia: Order: Squamata, Sub-order: Ophidia***

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### ***Grass snake, *Natrix helvetica* (Linnaeus, 1758)***

#### ***Ecology***

The grass snake is the UK's longest native snake growing to over a metre in length and are typically a grey green colour with a distinctive yellow and black collar behind the head.

They often move quickly when disturbed, are non-venomous and will produce a foul-smelling excretion when handled.

Within the UK they are found in England and Wales but are absent in Scotland and Ireland. Their main prey includes amphibians and fish, so are often seen near to or swimming in freshwater.

Grass snakes are Britain's only egg laying snake, mating in April, then laying eggs in June or July. Their round eggs are often laid in rotting vegetation, including garden compost heaps. In late summer the young emerge and are small perfectly-formed versions of the adults. They hibernate in November, emerging in March or April.

#### ***Distribution***

Between 1996 and 2017 there were 750 records of grass snakes in Wiltshire. They were recorded in a total of 275 squares, which equates to 7% of the total kilometre squares in the county.

The records are spread across the county, with the majority of the records being close to rivers. Even though there is a good overall coverage of grass snake records in the county, further records from unrecorded kilometre squares would be useful to determine the true extent of the species in Wiltshire.

#### ***Conservation***

Grass snakes have declined in recent decades due to habitat loss and declines in amphibian populations. Creating habitat such as compost heaps for breeding, hibernacula for hibernation and ponds for improving prey numbers are some of the conservations measures being put in place for this species.

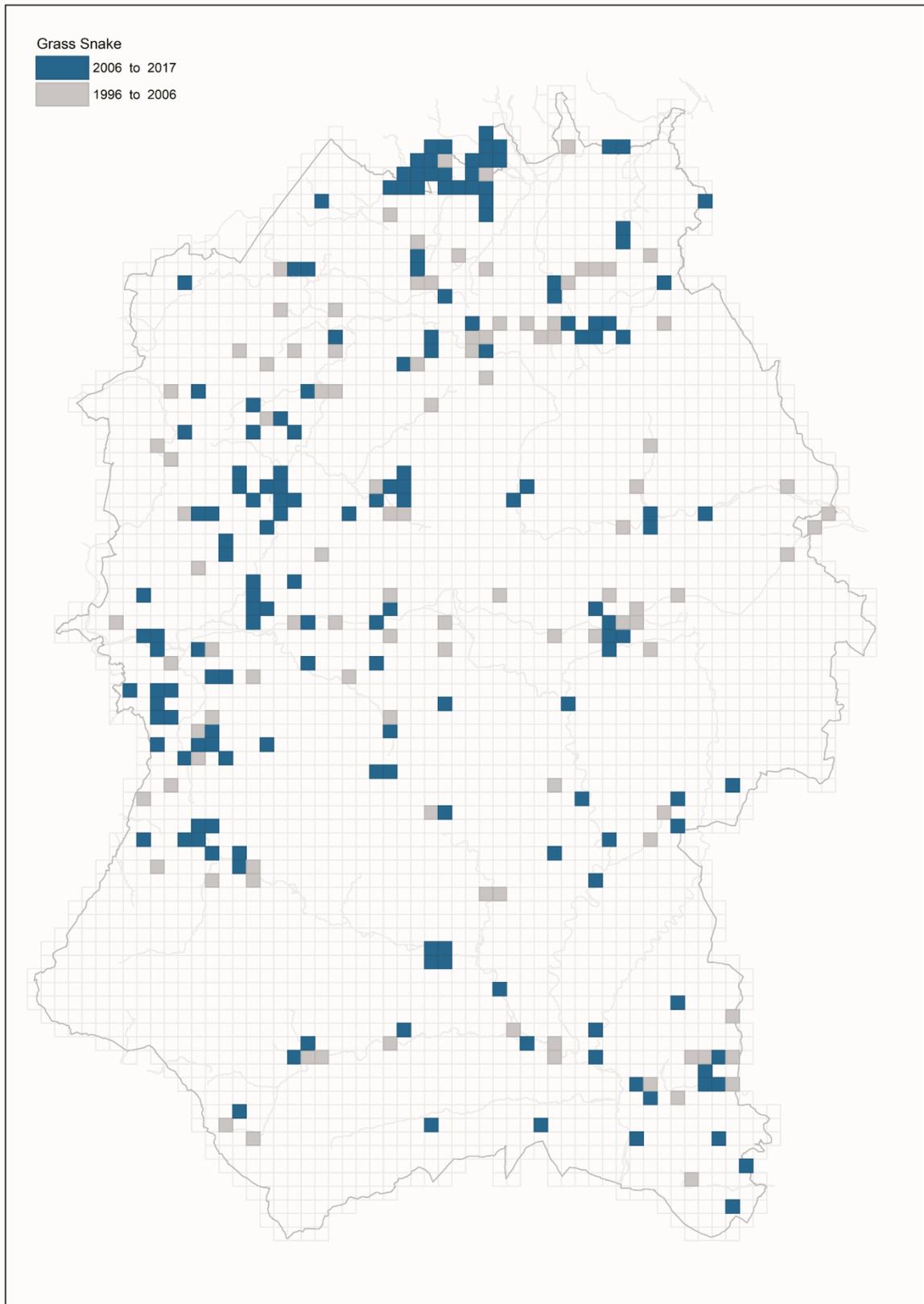
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Amphibian and Reptile Conservation website <https://www.arc-trust.org/grass-snake> accessed 1<sup>st</sup> January 2018

Froglife website <http://www.froglife.org/info-advice/amphibians-and-reptiles/grass-snake/> accessed 1<sup>st</sup> January 2018

Inns, H. (2009) Britain's reptiles and amphibians. Wild Guides, Old Basing, Hampshire.

Figure 6: Grass snake



## ***Adder, Vipera berus (Linnaeus, 1758)***

### ***Ecology***

Adders grow to about 60cm in length and have a stocky appearance. They can be distinguished from the other British snakes by the zigzag stripe along their back. This is usually black in males and brown in females. Males generally have grey bodies and females tend to be brown.

Adders are venomous, but are more likely to disappear into the undergrowth if disturbed and only bite if provoked.

Within the UK they are found in England, Wales and Scotland. Their main habitats are heathland, open woodland, natural grassland and dunes and are unlikely to be found in gardens unless adjacent to suitable habitat. Their main prey is small mammals and lizards.

Adders hibernate between November and March. They mate in April or May during which time the males are territorial and will 'dance' to attract females. The females give birth to live young in August or September.

### ***Distribution***

Between 1996 and 2017 there were 149 records of adders in Wiltshire. They were recorded in a total of 49 squares, which equates to 1% of the total kilometre squares in the county.

The majority of the records are from Savernake Forest, and the Wiltshire Wildlife Trust nature reserves at Blakehill Farm and Landford Bog. Blakehill Farm was the receptor site for a translocation of adders during 2010, with many of the records in that year being a result of the post-translocation monitoring.

There are a few scattered records from the east and south of the county. There are large areas across Salisbury Plain and between Swindon and Chippenham where there are no records of adders. Monitoring in these areas would be useful to determine whether there is a genuine lack of adders in these areas or the data is a result of lack of records for the species.

### ***Conservation***

Populations are known to be in decline in the UK, with loss of important basking and hibernation sites as well as fragmentation of habitat thought to be the biggest threat. Despite not being aggressive and bites being rare Adders are still known to be persecuted. Habitat protection and education are key to ensuring this long-term conservation of this species.

### ***Bibliography***

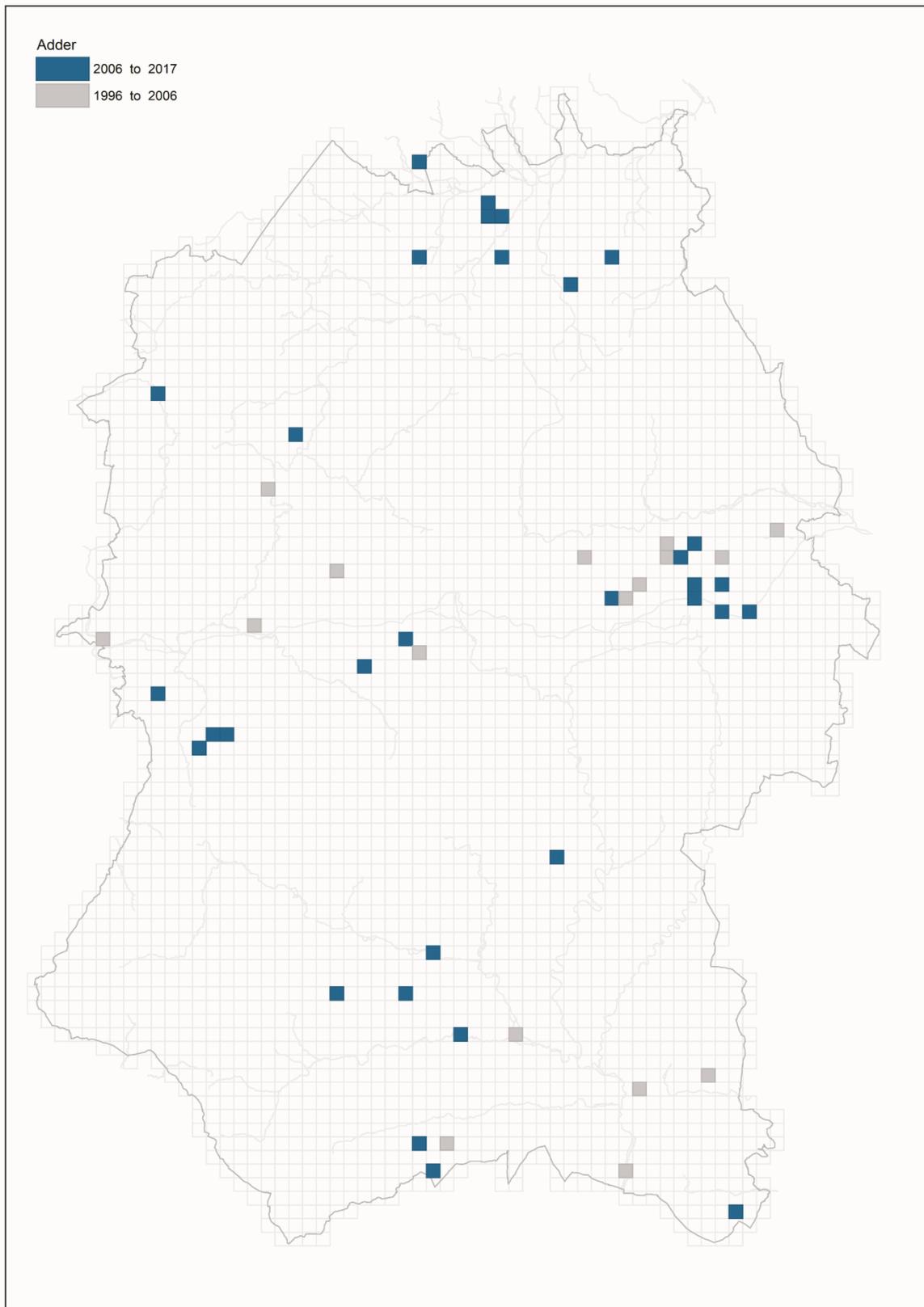
Amphibian and Reptile Conservation website [www.arc-trust.org/adder](http://www.arc-trust.org/adder) accessed 7<sup>th</sup> January 2018

The Adder, Amphibian and Reptile Conservation [www.arc-trust.org/Handlers/Download.ashx?IDMF=82f988ea-533b-4cd5-b50d-7305c4865128](http://www.arc-trust.org/Handlers/Download.ashx?IDMF=82f988ea-533b-4cd5-b50d-7305c4865128) accessed 7<sup>th</sup> January 2018

Froglife website [www.froglife.org/info-advice/amphibians-and-reptiles/adder/](http://www.froglife.org/info-advice/amphibians-and-reptiles/adder/) accessed 7<sup>th</sup> January 2018

Inns, H. (2009) Britain's reptiles and amphibians. Wild Guides, Old Basing, Hampshire.

Figure 7: Adder



## ***Amphibia: Order: Anura***

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### ***Common frog, Rana temporaria (Linnaeus, 1758)***

#### ***Ecology***

Widespread across the UK and Ireland the common frog can be highly variable in colour and ranges from different shades of green, grey and brown to some reds, oranges and yellows. Frogs are distinguishable from toads as they jump rather than crawl and have a smooth and slippery skin.

Adults range in size from 6 to 9 cm and a full-grown tadpole measures 3.5 cm. Frog spawn is laid in clumps often 10-15 cm across and containing up to 2000 eggs. The best time to observe common frogs is in the early spring when they congregate to breed in ponds. Spawning has been recorded as early as January in the southern counties of Britain.

#### ***Distribution***

The common frog is widespread across much of Wiltshire with higher densities of records in the north and close to populated areas. There are very few records in the east and south west of the county where it is likely the species is under recorded.

#### ***Conservation***

Common frogs are widespread and not thought to be threatened although some localised declines can occur if ponds are lost and habitat fragmented. Garden ponds in particular are important habitats for frogs within the UK.

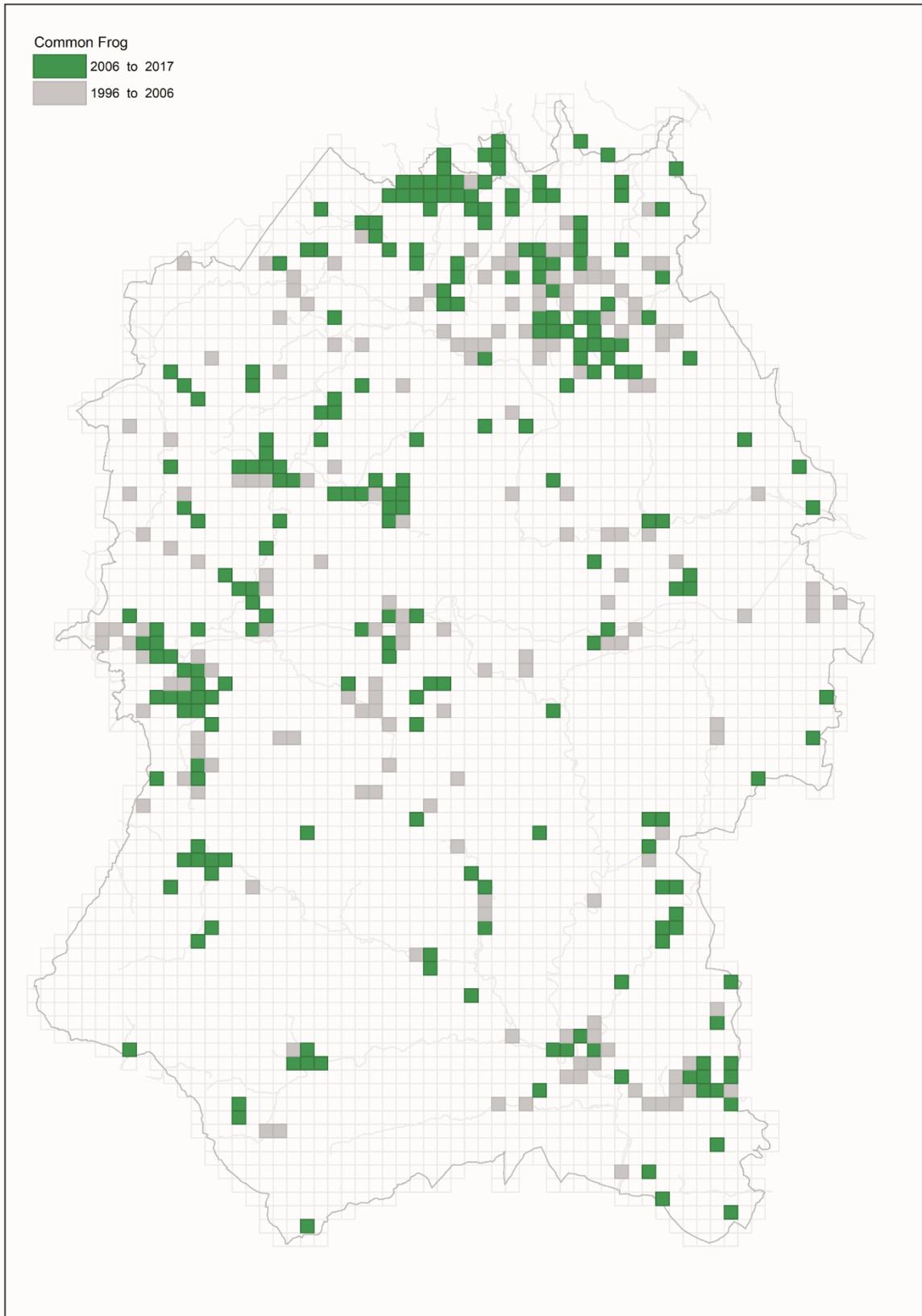
#### ***Bibliography***

Amphibian and Reptile Conservation website <https://www.arc-trust.org/common-frog> accessed 20th January 2018.

Froglife website <http://www.froglife.org/info-advice/amphibians-and-reptiles/common-frog-2/> accessed 20th January 2018.

Inns, H. (2009) Britain's reptiles and amphibians. Wild Guides, Old Basing, Hampshire.

Figure 8: Common frog



## ***Common toad, Bufo bufo (Linnaeus, 1758)***

### ***Ecology***

Toads have rough, warty skin and crawl rather than hop, so are readily identifiable from common frogs. Adult toads grow to around 13 cm (females) or 8 cm (males). Their colouration is generally brown but can be orange or black. The common toad is widespread across the UK but absent from Ireland. Common Toads emerge from hibernation in late February and start an often-hazardous journey to their breeding ponds, many are killed as they attempt to cross busy roads. Toads return to the same pond year after year. Strings of eggs are deposited in ponds in March-April. Larval development takes about 12 weeks but is dependent upon prevailing weather conditions.

### ***Distribution***

Common toad is the most widely recorded amphibian within Wiltshire and records are spread across the county, from the low-lying clay vales and river valleys to the ephemeral ponds on the chalk downs. Often favouring areas of deeper water, common toads are abundant and widespread in the Cotswold Water Park, found breeding in many of the deep lakes.

Recent research on the Salisbury Plain military training area of common toad using ephemeral ponds and puddles highlights an important but previously-overlooked population. Research demonstrates that unlike most common toad populations, spawning events on Salisbury Plain may be asynchronous and in response to rainfall, i.e. they may spawn multiple times during the year when rainfall fills ephemeral ponds (*pers.comm. I. Perkins 2017*).

A number of the records from across Wiltshire arise from “toad patrols”, teams of volunteers monitoring known road crossings as toads migrate each spring, often in large numbers, to their breeding ponds, some “toad patrols” are part of a Froglife-coordinated national scheme. With continued housing development and infrastructure provision across the county it is considered likely that there will be further impacts on toad crossing points which have often been in use for many years. Further work is needed to record these locations (for example, identifying roads with toad casualties) and feed this information into development plans in order to minimise negative impacts through smart construction and design. Local communities are urged to assist efforts to identify and support toad crossings, for example, by establishing new “toad patrols”.

### ***Conservation***

Toads are widespread but declining in wider countryside where pond loss and habitat fragmentation continues. Because toads tend to return to the same breeding ponds they are more vulnerable than frogs if ponds are lost. The loss of a breeding pond can eliminate the species over a relatively large area. Such effects are exacerbated by major development and infrastructure projects which can lead to the loss of breeding sites as well as a significant loss in landscape-scale habitat connectivity.

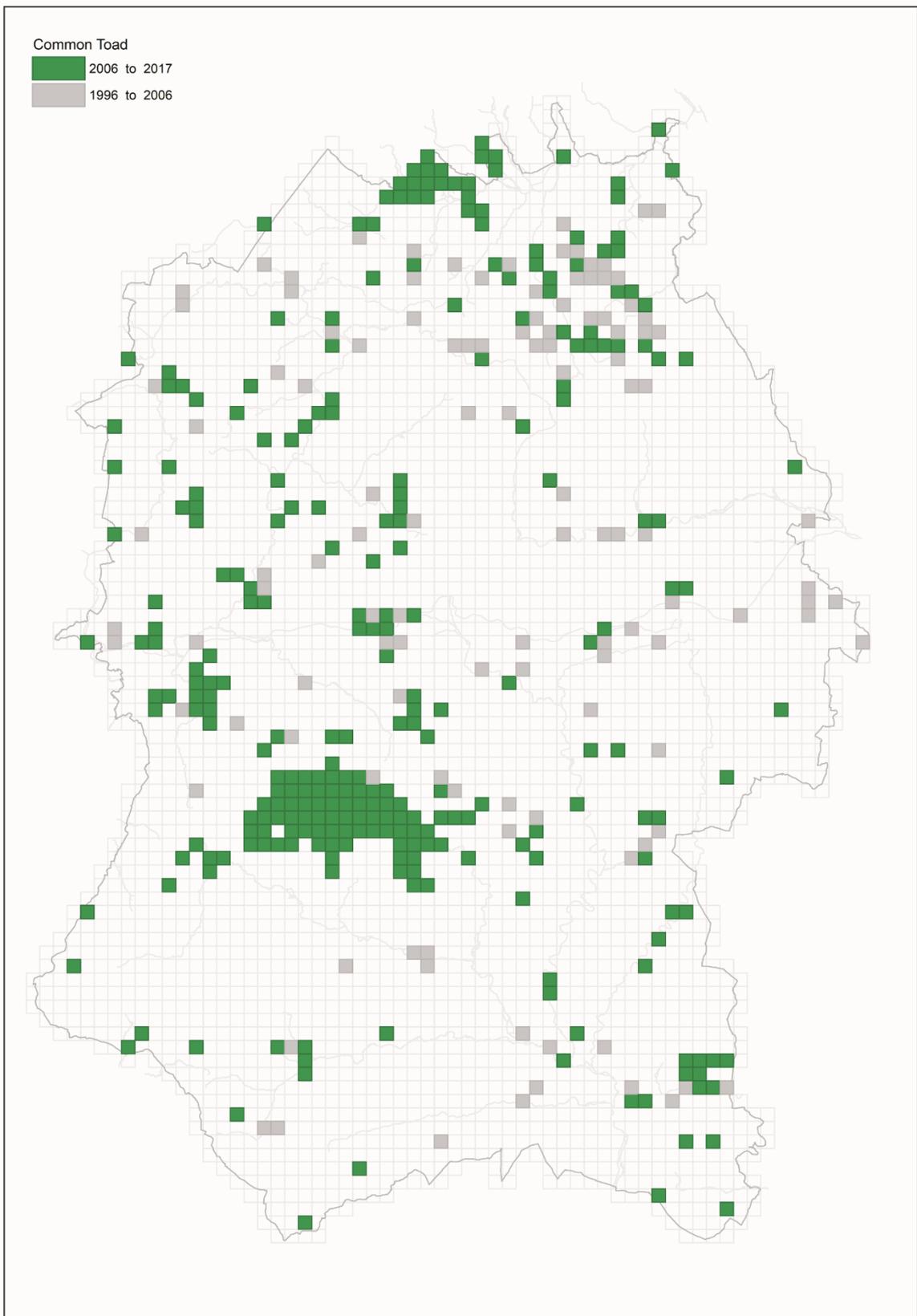
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Amphibian and Reptile Conservation website <https://www.arc-trust.org/common-toad> accessed 12th January 2018

Froglife website <http://www.froglife.org/info-advice/amphibians-and-reptiles/common-toad-2/> accessed 12th January 2018.

Inns, H. (2009) Britain's reptiles and amphibians. Wild Guides, Old Basing, Hampshire.

Figure 9: Common toad



## ***Amphibia: Order: Caudata***

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### ***Smooth newt, Lissotriton vulgaris (Linnaeus, 1758)***

#### ***Ecology***

The smooth newt is a medium-sized brown newt and the UK's most widespread newt species found across much of the UK and Ireland.

They are found in a variety of lowland habitats such as, ponds, ditches and amongst grassland and hedgerows during their terrestrial phase. Smooth newts return to ponds to breed in the spring where courting, mating and egg laying occur both day and night. Eggs are laid individually on the leaves of aquatic plants and males develop a continuous crest along the back and tail during the breeding season.

#### ***Distribution***

Within Wiltshire the smooth newt is the third most recorded amphibian with 1850 records between 1996 and 2017. The records are spread across the county but are denser in the north and west, being widely distributed across the low-laying clay vales and river valleys. Conversely, this distribution also broadly coincides with centres of population (where this species may be frequently recorded in garden ponds) and development pressure where there have been greater amphibian survey efforts (in relation to protected species surveys for great crested newt).

Surveys in the south and east of the county are encouraged to ascertain the range of this species beyond the areas currently well-surveyed by recorders and consultant ecologists.

#### ***Conservation***

The smooth newt is not thought to be in decline. Its resilience to development and agricultural intensification could be helped by its ability to cover large distances, tolerate high population densities and happily make use of even the smallest garden ponds.

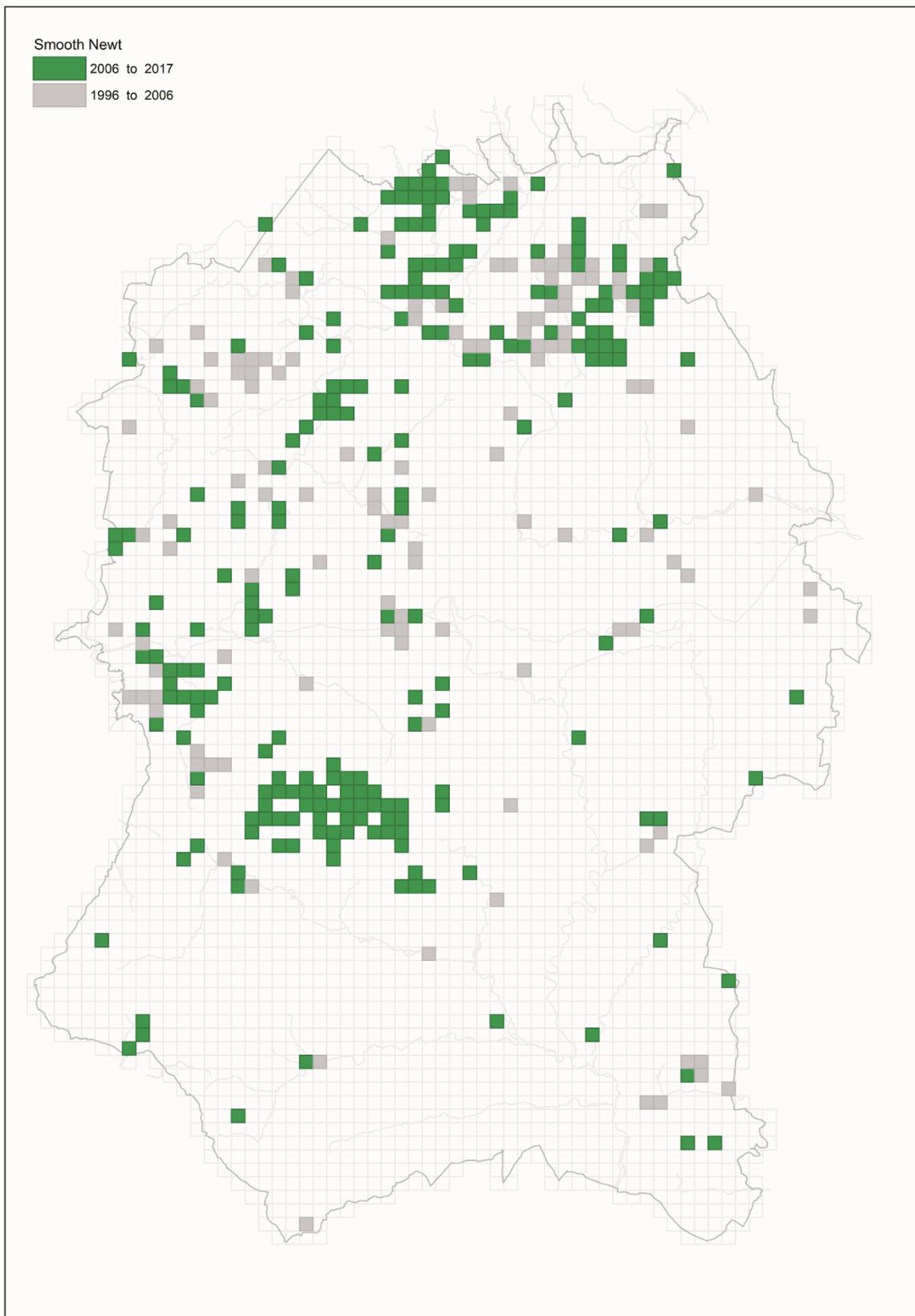
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Inns, H. (2009) Britain's reptiles and amphibians. Wild Guides, Old Basing, Hampshire.

Figure 10: Smooth newt



## ***Palmate newt, *Lissotriton helveticus* (Razoumovsky, 1789)***

### ***Ecology***

The palmate newt is Britain's smallest newt, with adults growing to 8–9 cm. It is often associated with more acid habitats such as heathland and bogs and is found across Britain including Scotland but it is scarce in parts of the midlands and eastern England.

The palmate newt gets its name from the distinct webbing that breeding males exhibit on their back feet during the breeding season. Palmate newts will spend winter under rocks or buried in mud, they will not go into full hibernation and will take advantage of milder weather to come out and forage on small invertebrates.

This species is easily overlooked by inexperienced observers and during torching surveys adults may be indistinguishable from smooth newts; differentiating the eggs and larva of these species is impossible in the field.

### ***Distribution***

A casual assessment of the distribution of current records suggest that palmate newts are widely distributed across the low-laying clay vales and river valleys, apparently absent from the chalk plateau of Salisbury Plain and the chalk downland. Conversely, this distribution also broadly coincides with centres of population and development pressure where there have been greater amphibian survey effort. Further survey across the county is therefore encouraged to ascertain the actual distribution of this species.

### ***Conservation***

Palmate newts, like all amphibians, are threatened by habitat loss and may be declining in some areas of the UK.

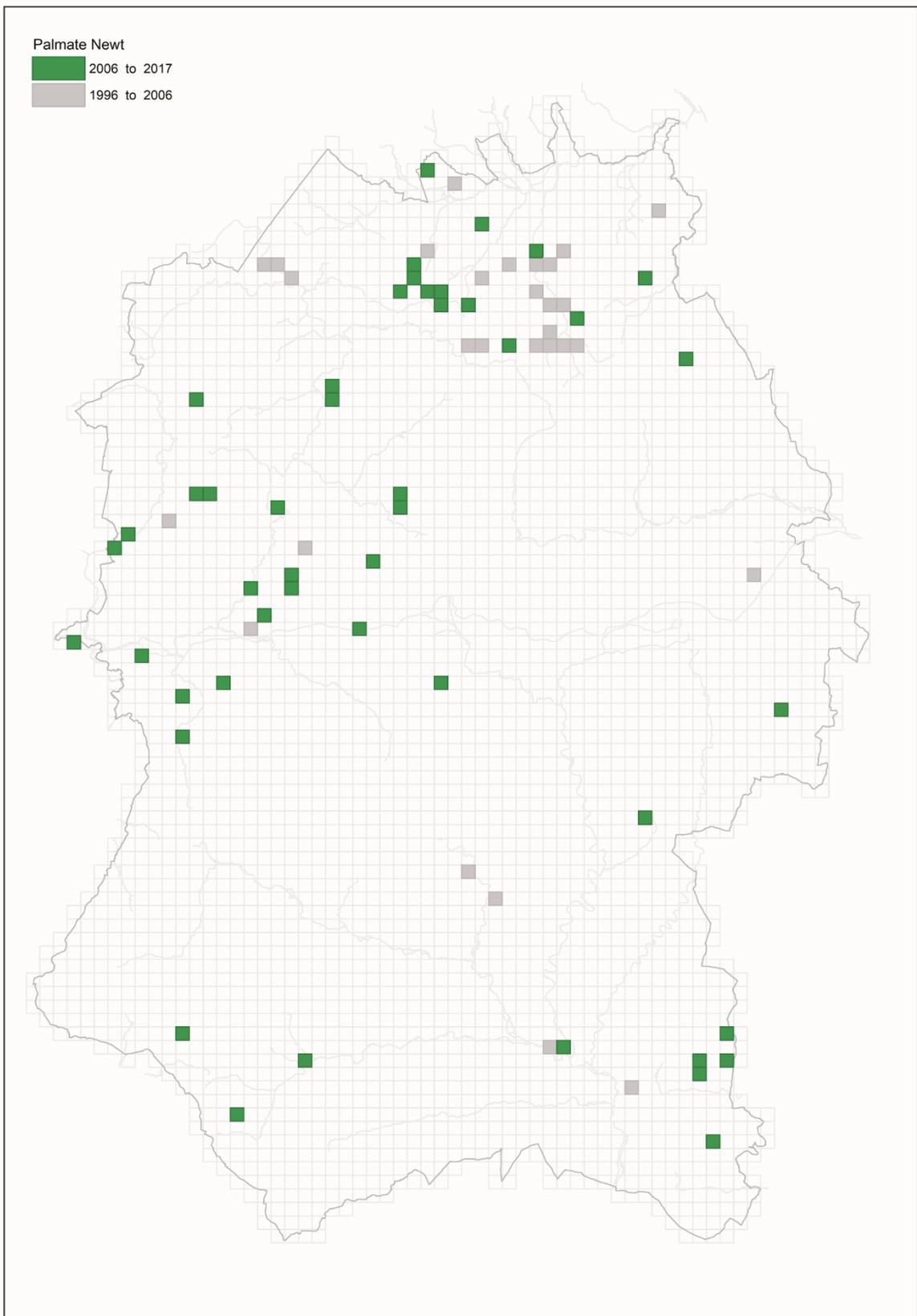
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Froglife website <http://www.froglife.org/info-advice/amphibians-and-reptiles/palmate-newt/> accessed 26<sup>th</sup> January 2018.

Inns, H. (2009) Britain's reptiles and amphibians. Wild Guides, Old Basing, Hampshire.

Figure 11: Palmate newt



## ***Great Crested Newt, Triturus cristatus (Laurenti, 1768)***

### ***Ecology***

This large impressive newt is found throughout mainland Great Britain but it is less common in the west. Adult males range in size between 12 and 14 cm and females between 13 and 16 cm. Both sexes have a bright yellow/ orange underside with irregular black blotches which give each individual a uniquely identifiable pattern. Males sport an impressive serrated crest and white blaze on the tail; the female lacks both.

After hibernating within terrestrial habitats, adults return to the ponds to breed. This is when the males exhibit their great crests and silver tail stripe in order to impress the females. Females will meticulously lay up to 200 individual eggs using their feet to fold each egg within a leaf.

### ***Distribution***

Great crested newts are the second most recorded amphibian in the county with almost 2000 records between 1996 and 2017. Most of the records are clustered in the north and north-west of the county, within the low-lying clay vales and river valleys, with fewer records elsewhere, in particular, on the chalk downland areas. Great crested newts are well known from ephemeral ponds and dew ponds on downland and Salisbury Plain reminding us that less recorded does not mean absent.

This species' protected status has stimulated considerable survey in the county in relation to development schemes and infrastructure projects and consequently this has driven survey work in areas close to major population centres, further skewing the known distribution.

### ***Conservation***

Although relatively widespread, populations of the great crested newt are often localised. Significant population declines were recorded in the latter half of the 20<sup>th</sup> century most of which were contributed to by pond loss, particularly from farmland. The great crested newt is protected by the Wildlife & Countryside Act and the European Habitats Directive.

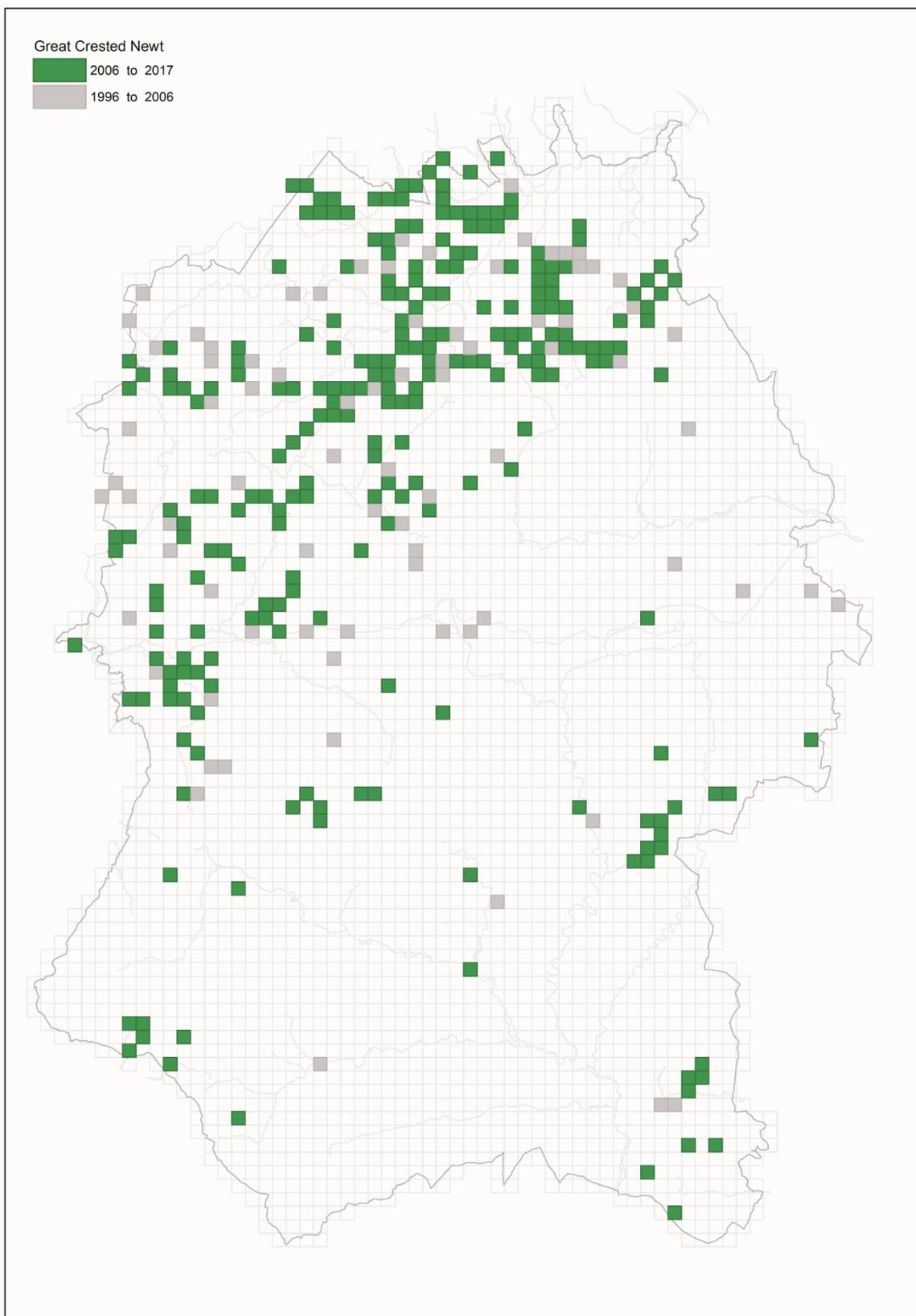
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Inns, H. (2009) Britain's reptiles and amphibians. Wild Guides, Old Basing, Hampshire.

Figure 12: Great crested newt



## ***Non-native species***

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Legislation relating to non-native species is complex and those interested in the subject are encouraged to seek resources upon the Great Britain Non-native Species Secretariat (NNSS).

### ***EU Regulation (1141/2014) on invasive alien (non-native) species***

“This imposes restrictions on a list of species known as ‘species of Union concern’, published in Commission Implementing Regulation 2016/1141. These are species whose potential adverse effects across the European Union are such that concerted action across Europe is required. The list is drawn up by the European Commission and managed with Member States using risk assessments and scientific evidence.” (GB Non-native Species Secretariat, <http://www.nonnativespecies.org/index.cfm?pageid=67>)

### ***Wildlife & Countryside Act 1981, as amended***

The Wildlife and Countryside Act 1981 (WCA) is the principal legislation dealing with non-native species. The WCA has been amended in relation to England and Wales by various pieces of legislation, including the Wildlife and Countryside Act 1981 (Variation of Schedule 9) (England and Wales) Order 2010, the Natural Environment and Rural Communities Act 2006 and the Countryside and Rights of Way Act 2000.

Section 14(1) of the WCA makes it illegal to release or allow to escape into the wild any animal which is not ordinarily resident in Great Britain and is not a regular visitor to Great Britain in a wild state, or is listed in Schedule 9 to the Act. The Schedule 9 list of animal and plant species has been amended by the Wildlife and Countryside Act 1981 (Variation of Schedule 9) (England and Wales) Order 2010.

The following non-native species have also been recorded in Wiltshire. In some cases, records are unconfirmed and further survey is required to ascertain their status in the county.

### ***Alpine Newt, *Ichthyosaura alpestris* (Laurenti, 1768)***

This attractive newt is native to central Europe but has become established in a few localities in Britain. Its presence in Britain is thought to be largely as a result of deliberate introductions from aquarium collections. Adults grow up to 11 cm and have similar breeding behaviour to our native newts. Adults are dark in colour with males appearing bluer during the breeding season when they also develop a blue flash along the tale and a spotted smooth dorsal crest<sup>345</sup>.

A single confirmed record of an adult trapped in 2013 by the county recorder, Gemma Harding, at a well-studied pond in Swindon. This pond has not been re-surveyed. A second record in 2013 at a different pond in Swindon remains unconfirmed. Listed on section 14, Schedule 9 of the Schedule 9 of the Wildlife and Countryside Act 1981, as amended, thereby prohibiting release into the wild in England and Wales.

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<sup>3</sup> Inns, H. (2009) Britain's reptiles and amphibians. Wild Guides, Old Basing, Hampshire.

<sup>4</sup> Amphibian and Reptile Conservation website <https://www.arc-trust.org/non-native-amphibians> accessed 26th January 2018.

<sup>5</sup> Froglife website <http://www.froglife.org/info-advice/amphibians-and-reptiles/alpine-newt/> accessed 26th January 2018.

Alpine Newts are known carriers of the deadly chytrid fungus *Batrachomyxoma dendrobatidis*. The fungus is not known to affect the alpine newts directly but it can be passed onto native amphibians and can have serious impacts to individuals and populations<sup>6</sup>.

### ***American Bullfrog, Lithobates catesbeianus (Shaw, 1802)***

A characteristically large, primarily aquatic frog from North America, growing up to 20cm in length. Tadpoles of this species were imported by the aquarium trade in the 1980s and some escaped into the wild. Breeding is possible in the UK, particularly in southern England and a breeding population was found in East Sussex in 1999, which was eradicated. This species is considered to be a significant threat to native amphibians, in part because it hunts underwater and predated other frog species.

A single record was submitted in 1996 relating to an individual seen close to a garden pond in a village near Devizes. This record remains unconfirmed due to lack of supporting evidence and no investigation at the time of submission.

Listed on section 14, Schedule 9 of the Wildlife and Countryside Act 1981, as amended, thereby prohibiting release into the wild in England and Wales<sup>7</sup>.

### ***Red-eared Terrapin, Trachemys scripta elegans (Wied, 1838)***

Imported to Britain through the pet and aquarium trade in vast numbers, their initial popularity was often been attributed to the popularity of a certain 1990s cartoon. Upon reaching a large size (30 cm diameter) their popularity with pet owners waned and many were released into urban ponds and parks. This species is hardy enough to survive the British winter but not to be able to breed here. It is considered a threat to native amphibians as well as other pond species.

Two confirmed records of adults observed at Coate Water country park and Stanton country park, Swindon in April 2011. Given that these were records of mature adults, it is remarkable that only two records have been submitted for these locations.

Given that this species has been recorded in the Cotswold Water Park on one or more lakes in recent years, albeit upon lakes outside of Wiltshire, this species is considered to be under-recorded in Wiltshire. Observers across the county are encouraged to report observations of this and related species.<sup>8</sup>

### ***European Pond Tortoise, Emys orbicularis (Linnaeus, 1758)***

Although native to continental Europe, and perhaps native to Great Britain after the last Ice Age, records of this species are today considered to result from escapes and introductions. Although smaller than a fully-grown red-eared terrapin, these species may be easily confused and both were readily imported for the pet trade.

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<sup>6</sup> Winchester, D. 2016. RISK ASSESSMENT SUMMARY SHEET. Alpine newt (*Ichthyosaura alpestris*). GB Non-native Species Secretariat. [www.nonnativespecies.org](http://www.nonnativespecies.org).

<sup>7</sup> Olaf Booy, Max Wade, Vicky White and Danial Winchester (Undated). North American Bullfrog. Factsheet from the GB Non-native Species Secretariat. [www.nonnativespecies.org](http://www.nonnativespecies.org).

<sup>8</sup> John Wilkinson (undated). Red-eared Terrapin. Factsheet from the GB Non-native Species Secretariat. [www.nonnativespecies.org](http://www.nonnativespecies.org)

One single record submitted of an individual observed in Peatmoor Lagoon, Swindon in 1995; this record was never confirmed or verified.

Listed on section 14, Schedule 9 of the Schedule 9 of the Wildlife and Countryside Act 1981, as amended, thereby prohibiting release into the wild in England and Wales.

### **3. General references & further information**

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#### **3.1. General references**

The following references are the primary references consulted throughout this publication.

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#### **3.2. Further information**

##### ***Wiltshire & Swindon Biological Records Centre***

Website: [www.wsbrc.org.uk](http://www.wsbrc.org.uk) Email: [brc@wiltshirewildlife.org](mailto:brc@wiltshirewildlife.org)

##### ***Wiltshire Amphibian & Reptile Group***

Website: <http://groups.arguk.org/warg>

##### ***Amphibian & Reptile Conservation***

Website: <https://www.arc-trust.org/>

##### ***Froglife***

Website: <http://www.froglife.org/> (Toad Patrol: <http://www.froglife.org/what-we-do/toads-on-roads/>).

##### ***Freshwater Habitats Trust***

Website: <https://freshwaterhabitats.org.uk/>