



**Springs and Seepages of Wessex
Wiltshire Invertebrate Survey**

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Summary

This is the report for the Wiltshire. The fourth area to be surveyed in the five year, Wessex Water funded project run by Buglife – The Invertebrate Conservation Trust. This report provides the results of survey work conducted there in Summer and Autumn 2013. The cold and wet spring meant the planned spring survey was delayed until better conditions prevailed. Survey methodology was discussed between Buglife and the surveyor and three-minute kick sampling was selected along with preservation of the bulk samples in the field and later processing by washing, sieving and sorting. Sweep netting for terrestrial invertebrates was also undertaken at each site for a period of twenty minutes and insects were selectively removed with a pooter (aspirator) and preserved in alcohol for later identification.

Eight sites thought to have good spring and seepage habitat were selected for survey and these were surveyed in summer and autumn 2013. The cold and wet spring meant the planned spring survey was delayed until better conditions prevailed.

Aquatic macro-invertebrates and terrestrial invertebrates were sampled from eight sites. All the target aquatic and terrestrial invertebrate material have been identified from 2012 and 2013 and the results are presented in this report. A total of 75 aquatic invertebrate species were recorded. Twenty-one terrestrial invertebrates accidentally taken in the pond net were also been recorded along with two species represented by pupal exuviae. A total of 220 terrestrial species were recorded by sweep netting. One Red Data Book and eleven Nationally Scarce species have been recorded. On the basis of these results it is suggested that Wiltshire possesses reasonable but not exceptional spring and seepage habitat.

1. Introduction

This report details the results for Wiltshire, the fourth area to be surveyed in the five year, Wessex Water funded project run by Buglife – The Invertebrate Conservation Trust. The surveyor was commissioned by Buglife to undertake the work. Survey methodology was discussed between Buglife and the surveyor and three-minute kick sampling was selected along with preservation of the bulk samples in the field and later processing by washing, sieving and sorting. Sweep netting for terrestrial invertebrates was also undertaken at each site for a period of twenty minutes and insects were selectively removed with a pooter (aspirator).

2. Location

A location map showing the sample sites are included in the report. Grid references were obtained using a Garmin eTrex global positioning system and are provided in Appendix 3.

3. Methodology

3.1. Aquatic survey method

The samples were collected with a standard pond net (supplied by EFE Field Equipment, Totnes) and represent 3-minute kick samples taken in the channels. Ideally, the material was processed by washing and sieving in the field but where sufficient water was not available in the field to do this, the samples were preserved and this was conducted later. Each sample was initially washed using a coarse (1cm) sieve and 500-micron sieve first to remove any twigs, leaves, seeds, large stones, etc. The coarse material retained by the 1cm sieve was retained along with the 500-micron fraction. The samples were preserved using 10% formalin. The preserved samples were later examined in the laboratory by placing small amounts of material into gridded petri-dishes and adding water. These petri-dishes were then examined carefully under a stereomicroscope. Each light fraction typically used 40-50 petri-dishes this way with the smaller elutriated fractions using 10-20 petri-dishes. The coarse fraction (>1cm in size) was examined in a white tray for large invertebrates such as large cased caddis and large aquatic snails. Aquatic invertebrates were removed from the fractions and counted at the same time. For particularly abundant taxa, sub-sampling was used to estimate the total number of specimens (i.e. individuals were counted from 20-25% of the dishes and multiplied up).

3.2. Terrestrial survey method

Sweep netting for terrestrial invertebrates was also undertaken at each site over bare ground, through low vegetation and through fringing scrub or low tree branches for a period of twenty minutes and insects were selectively removed with a pooter (aspirator). A 40cm diameter net supplied by Marris House Nets, Bournemouth and mounted on a metre long angling pole was used. Material was placed in alcohol in the evening for later examination.

3.3. Recording of environmental variables

Conductivity, pH, total dissolved solids and water temperature were measured using a Hannah HI98130 portable meter. However, the pH values appear to be high and may be incorrect. Turbidity was measured using a turbidity tube. Dissolved oxygen was measured in May 2011 using a Hannah HI9142 Dissolved Oxygen meter. The dissolved oxygen meter is temperamental and readings were not possible from all the sites. Other variables were estimated or measured with a meter rule.

The environmental variables recorded in June 2013 are provided in Appendix 3. These were also recorded again in November 2013 but these values have not been included in the report but can be included if requested

3.4. Identification

All aquatic macroinvertebrates have, in general, been identified to species level. For immature specimens and females not separable to species, identification has been left at the appropriate level. As usual, nematodes, oligochaetes, ostracods and copepods have not been identified further. Water beetle larvae and Diptera larvae have been identified to the most appropriate level. Interestingly, no flatworms were noted during the survey.

Identification concentrated on wetland associated species and consequently invertebrates associated with dry conditions such as bees, wasps and ants have usually not been identified. Other invertebrates with habits not associated with seepages or springs such as those associated with dung, carrion, fungi or decomposing plant matter such as the Diptera families Heleomyzidae, Sphaeroceridae, Scathophagidae and Anthomyiidae have also not been prioritised. Some of these groups are taxonomically difficult such as the Chironomidae and the time taken to identify them could not be justified. All unidentified material will be retained indefinitely by the surveyor.

3.5. Assessment

UK BAP species have been checked against the list at www.ukbap.org.uk Rarity statuses such as Red Data Book, Nationally Scarce (previously Notable) and Local have been developed and heavily used by Natural England, the Joint Nature Conservation Committee and associated organisations and are defined in Appendix 3. Since 1995, International Union for Conservation of Nature and Natural Resources (IUCN) categories has been adopted by the Joint Nature Conservation Committee as the new standard for Red Lists in Britain. JNCC aims to work towards assessing the status of all native species against standard criteria based on the internationally accepted guidelines developed by the IUCN (see IUCN, 2001, 2003). Only a few taxonomic groups have been given IUCN codes but these include the water beetles (Foster 2010) and Diptera belonging to the Empidoidea (Falk and Crossley 2005).

4. Selection of survey sites

The selection of the survey sites was based on the following:

- Studying the appropriate Ordnance Survey maps of the county to locate springs.
- Using the literature sources described below.

5. Previous data

Relatively little could be found on Wiltshire springs and seepages. The most useful sources in selecting sites were Pafford (1959) and Jordan (1998). Whitehead and Edmunds (2012) and Hart et al (2006) provide information on single sites not selected in the present survey. It was decided that Wootton Bassett mud springs would not be sampled because they are small and therefore easily damaged whilst Swallowhead Springs appeared to be on private land without public access. Water Meadows are found in Wiltshire (such as Britford Water Meadows SSSI and Lower Woodford Water Meadows SSSI) but it was felt that it was stretching the definition of seepages and springs to include these in the survey. Descriptions of the nature reserves owned and/or managed by the Wiltshire Wildlife Trust and the Woodland Trust were also studied so see if any included seepages and springs. Michelmores (1925) was not consulted and is unlikely to have information on seepage and spring sites but is mentioned here for completeness. No data on invertebrates recorded from Wiltshire springs or seepages was located.

6. Results and assessment

6.1. Weather conditions

A summary of the weather for spring 2013 taken from the Meteorological Office is presented here in order to explain why survey work was postponed until July. March 2013 was colder than any of

the winter months and the coldest for the UK since 1962. Any spells of warm weather through the season were short-lived. Overall this was the coldest spring for the UK since 1962 (marginally colder than spring 1979) and the fifth coldest since 1910 <http://www.metoffice.gov.uk/climate/uk/summaries/2013/spring>.

Survey Data	Weather Conditions
23 rd July 2014	Muggy with 100% cloud at start. Hot/warm later.
25 th July 2014	Ground and vegetation wet from overnight rain. Light rain at last site.
26 th July 2014	Warm and sunny. Hot later.
20 th September 2014	Dry, cloudy (90% cloud cover) with sunny intervals at the start. Cool.
17 th November 2014	Light drizzle at start, wet, mild.

Table 1: Weather conditions on the survey dates.

6.2. Species assessment

A total of 75 aquatic invertebrate species were recorded in 2013 (Appendix 1). A total of 21 terrestrial invertebrates accidentally taken in the pond net have also been recorded along with two pupal exuviae. A total of 220 terrestrial species were recorded by sweep netting in 2013 (Appendix 2). One Red Data Book3 and eleven Nationally Scarce/Notable species were recorded. These are listed below in table 2.

Red Data Book 3		
<i>Caricea brachialis</i>	Muscidae	Diptera

Nationally Scarce/Notable		
<i>Elodes elongata</i>	Scirtidae	Diptera
<i>Atypophthalmus inustus</i>	Limoniidae	Diptera
<i>Limonia trivittata</i>	Limoniidae	Diptera
<i>Paradelphomyia nielsenii</i>	Limoniidae	Diptera
<i>Dixa maculate</i>	Dixidae	Diptera
<i>Ptychoptera longicauda</i>	Ptychopteridae	Diptera
<i>Oxycera pardalina</i>	Stratiomyidae	Diptera
<i>Stratiomys potamida</i>	Stratiomyidae	Diptera
<i>Sphegina verecunda</i>	Syrphidae	Diptera
<i>Sapromyza basalis</i>	Lauxaniidae	Diptera
<i>Geomyza venusta</i>	Opomyzidae	Diptera

Table 2: Rare or local species recorded.

The Red Data Book *Caricea brachialis* is a poorly known muscid which has been recorded from single sites in Lancashire and Glamorganshire and four sites in Gloucestershire according to D'Assis Fonseca (1968). No habitat information appears to be available for this species.

Further information on the ecology, status and distribution of the Nationally Scarce species may be found in the national reviews, namely, Hyman and Parsons (1992), Foster (2000, 2010), Falk (1991), Falk & Chandler (2005), Falk & Crossley (2005) and Falk and Ismay (in prep.). All the Nationally Scarce species are associated with wetlands with the exception of *Sapromyza basalis* and *Geomyza venusta* which are normally associated with broadleaved woodland and grassland respectively (*S. basalis* may also show preference for damp woodland).

The hoverfly *Platycheirus aurolateralis* was described as new to science by Alan Stubbs in 2002 and has been recorded from 8 hectads in England since 1985 (Ball and Morris 2011) which would suggest it is worthy of Red Data Book status. No obvious habitat affinities have been detected as yet.

The snail-killing fly *Tetanocera montana* has only been recorded from Britain from a spring in the North Cotswolds (Stubbs 2009). Since the single specimen collected on the survey is a female, the determination may have to be regarded as provisional until it can be compared with other specimens. This species was also added to the Irish list in 2007.

The hemerodromid *Kowarzia madicola* is not officially on the British list but its occurrence in Britain has been known to the surveyor for several years. It appears to be local and associated with springs, seepages or small first order streams. Most of the surveyor's records have been taken with a pond net rather than with a sweep net.

Attelabus nitens and *Hilara morata* were downgraded from Notable in the most recent reviews.

A Paradelphomyia species in the samples proved difficult to identify and has been named as *P. nielsenii* in Appendix 2. These specimens should be checked since the aedeagus was shorter and thicker than those depicted in the identification works. An Erioptera species and a Platypalpus species could also be not named with certainty.

A feature of the records is that a relatively large number of Dolichopodidae recorded but few are uncommon or rare which would seem to be unusual for this predominantly wetland family.

The occurrence of the Red Data Book and Nationally Scarce species throughout the sample sites are summarised in Table 3.

Species	Bridewell	Church	Colerne	Holywell	Luccombe	Markham	Wellhead
<i>Caricea brachialis</i>							1
<i>Elodes elongata</i>				1			
<i>Atypophtha-lmus inustus</i>		1	1				
<i>Limonia trivittata</i>			1				
<i>Paradelphomyia nielsenii</i>		1	1				
<i>Ptychoptera longicauda</i>							1
<i>Dixa maculata</i>		1				1	
<i>Oxycera pardalina</i>		1	1		1		1
<i>Oxycera pygmaea</i>		1	1				
<i>Stratiomys potamida</i>		1					
<i>Sphegina verecunda</i>							1
<i>Sapromyza basalis</i>							1
<i>Geomyza venusta</i>		1					
<i>Kowarzia madicola</i>		1		1		1	1
<i>Platycheirus aurolateralis</i>					1		
<i>Tetanocera montana</i>	1						
	1	8	5	2	2	2	6

Table 3: Occurrence of Red Data Book and Nationally Scarce invertebrates throughout the sample sites.

6.3. Site assessments – General

Reference below is made to spring and seepage invertebrates but most of the invertebrates recorded can be considered to be stream invertebrates, many of which are associated with running clean, unpolluted water, high in dissolved oxygen. Few species are actually confined to springs or seepages and can exist in a range of associated habitats including headwater streams.

6.4. Bridewell Springs

Well known spring in Wiltshire folklore. No public access – I knocked at Hillcroft Farm up the track but no one answered. A stream appears at the bottom of the extended garden. Nothing appeared to be special about this site.

No Nationally Scarce species were recorded from Bridewell Springs but a single female snail-killing fly from here was identified as *Tetanocera montana*.

6.5. Church Springs

Three springs in a steep wooded hollow behind the church at Bratton. Public footpaths surround the site. The middle stream is chalk stream with clear water; the other two channels had little water in them, had more leaf litter and the substrate was more muddy. I sampled the main (middle) spring and springfed stream around ST9135451890 (Church1). I also sampled the furthestmost spring from the church (Church2).

This would appear to be the best site for rare and uncommon species associated with springs and seepages of the sites sampled. A total of eight noteworthy species were recorded namely *Atypophthalmus inustus*, *Paradelphomyia nielsenii*, *Dixa maculata*, *Oxycera pardalina*, *O. pygmaea*, *Stratiomys potamida*, *Geomyza venusta* and *Kowarzia madicola*.

6.6. Colerne Park

This is a Woodland Trust reserve and SSSI. I sampled at the foot of the wood at ST8393872301 (Colerne1). There is a spring marked here on the appropriate 1:25,000 Ordnance Survey map. There is only a thin layer of water flowing over the rocks in the spring and it proved difficult to sample aquatic macro-invertebrates.

I also sampled the capped spring on the southern side of Monk's Wood (Colerne2). There is only a trickle of water present here as well and only terrestrial invertebrates could be sampled.

I spoke to a local regarding access to the four springs at Eastrip and Lower Eastrip (centred on ST827721). Access permission was given but I could not fit these in to the schedule. White-clawed crayfish (*Austropotamobius pallipes*) occur here according to my contact.

Five Nationally Scarce species were recorded here namely *Atypophthalmus inustus*, *Limonia trivittata*, *Paradelphomyia nielsenii*, *Oxycera pardalina* and *O. pygmaea*. This was the third best site for Nationally Scarce species. All of the Nationally Scarce species are widespread and sometimes locally common which suggests that Colerne is not particularly special for uncommon spring and seepage invertebrates.

6.7. Holy Well

This is a well known spring in Wiltshire folklore. There is no public access but a well worn footpath leads to the spring.

Two noteworthy species were recorded namely the marsh beetle *Elodes elongata* and the hemerodromid *Kowarzia madicola*.

6.8. *Luccombe Springs*

Luccombe Bottom is a Public Right of Way (PROW). I sampled at the clear pool where water enters through a metal flap (Luccombe1). A stone structure is present here (ST9233951944). The Wessex Water pumping station is a short distance downstream. I also sampled the stream immediately downstream (Luccombe2).

The wooded stream valley leading down to the pumping station has at least three capped springs and a valley floor dominated by *Carex pendula* and a dry stream-bed. I sampled for terrestrial invertebrates where the dry stream channel crosses the footpath through two pipes at ST9231751856 (Luccombe3).

One Nationally Scarce species, the soldierfly *Oxycera pardalina* was recorded from this site. The hoverfly *Platycheirus aurolateralis* was also recorded.

6.9. *Markham Hill*

This is a Wiltshire Wildlife Trust Reserve. I parked in the lay-by on the northern side of the A4361 just northeast of the Elcombe turn-off. I then walked towards Wroughton, crossed the A4361 until I got to the footpath to Markham Hill and Clouts Wood. I followed the footpath until I got to the bridge over the chalk stream. I went upstream from here until the stream peters out at around SU1346279609 (Markham1). I also sampled immediately above the bridge where there is a spring on the northern side of the main channel (Markham2).

One Nationally Scarce meniscus midge, *Dixa maculata*, was recorded and the hemerodromid *Kowarzia madicola* was also recorded.

6.10. *Tiswell Spring, Bratton ST943523*

I couldn't get access to this site although there is a stream that flows under Lower Westbury Road near the alpaca farm. The springs appear to be on land owned by people with riding stables or Birchanger Farm. It may have been possible to get access from the stables but the spring may have been poached.

6.11. *Wellhead Springs*

Two springheads are present immediately below the pumping station. I sampled nearest at ST8764350113 (Wellhead1) and the farthest at ST8764850128 (Wellhead2).

One Red Data Book muscid, *Caricea brachialis* and four Nationally Scarce were recorded, namely *Ptychoptera longicauda*, *Oxycera pardalina*, *Sphegina verecunda* and *Sapromyza basalis*. The hemerodromid *Kowarzia madicola* was also recorded. This was the second best site for rare and uncommon species.

6.12. *General assessment of sites*

Compared with the three previous areas surveyed namely, the Blackdown Hills, the Lyme Regis coastline and the Mendips, the results are rather disappointing for Wiltshire in terms of rare and uncommon species. Hardly anything could be found on the invertebrates of seepages and springs in the county and it proved difficult to find and select sites. Several of the sites are located on the same springline along a thick belt of chalk (marked as the Grey Chalk Subgroup) that runs northeast from Lyme Bay up towards Salisbury and then runs around the northern edge of Salisbury Plain and then proceeds further north to form part of the Chiltern Hills. Only one Red Data Book species was recorded and many of the Nationally Scarce species are widespread and not that uncommon. The gently rolling chalk countryside in Wiltshire may have made it amenable

for farming and modification compared with the harder limestones in the Mendips and Lyme Regis coast and this may partly explain the less impressive results in the present survey.

7. Recommendations for Further Work

Further analysis might be conducted including the use of biotic indices such as the BMWP, Community Conservation Index (CCI) and LIFE scores. Other methods such as diversity scores, species richness and multivariate statistics might also be used. Parameters on the sample sites were collected which would allow the latter to be used and relationships between taxa and environmental factors could be established.

Two important Diptera families (Ceratopogonidae and Psychodidae) with aquatic larvae and which are highly characteristic of seepages and springs were not identified due partly to lack of time, large amount of material collected and difficulties associated with identification. These families could be identified.

8. Conclusions

Eight main sites thought to have reasonable spring and seepage habitat were selected for survey in Wiltshire in 2013.

All the target aquatic and terrestrial invertebrate material has been identified. The results are presented in this report. A total of 75 aquatic invertebrate species were recorded along with 21 terrestrial invertebrates accidentally taken in the pond net and two species only represented by pupal exuviae. A total of 220 terrestrial species were recorded by sweep netting in 2013. One Red Data Book and eleven Nationally Scarce/Notable species were recorded. The results indicate that Church Springs at Bratton is the best site for Nationally Scarce species closely followed by Wellhead Springs in Westbury. The results suggest that Wiltshire still possess reasonable but not exceptional spring and seepage habitat.

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Appendix 1: Aquatic invertebrates recorded from springs and seepages in Wiltshire in 2013

Appendix 2: Terrestrial invertebrates recorded from the springs and seepages in Wiltshire in 2013.

Appendix 3: Details of the spring and seepage sample sites in Wiltshire in 2013.