

# White-legged Damselfly Investigation Final Report



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## Summary

The White-legged Damselfly Investigation ran for five years from 2018-2022; its aim was to produce an up-to-date map of the distribution of White-legged Damselfly (*Platycnemis pennipes*) in Britain using data collected by members of the public as part of a simple citizen science project. The project also used this data to investigate overall species trends and examine changes in distribution on a Vice County level. The project report supports the findings of the State of Dragonflies 2021 analysis (Taylor *et al*, 2021) which reported that *Platycnemis pennipes* significantly increased in occupancy (geographical area within which a species is found) between 1970 and 2019 and, as a result, is not currently a species of conservation concern. However the project report also illustrated the species' dynamic shifts in distribution on a Vice County level, with different wetland sites being simultaneously abandoned and colonised. These observations are thought to reflect both the species' ability to utilise a range of lotic and lentic wetlands as well as its capacity to disperse in order to colonise new wetland sites. The apparent loss of *Platycnemis pennipes* from certain wetland sites likely indicates the habitat is no longer suitable for the species to breed; this raises concerns that the variables reducing habitat suitability may also be reducing overall ecosystem health and the wetlands' suitability for other aquatic species of conservation concern. Further research is needed to confirm *Platycnemis pennipes* have been lost from the wetland sites highlighted in this report and to identify the causes of local extinction. Further quantitative research is required to identify the variables that determine habitat suitability for *Platycnemis pennipes*; the results of which can be used to guide future wetland management.



## White-legged Damselfly (*Platycnemis pennipes*) Species Profile

### Larva Identification (Cham, 2012)

Length: 13-15mm

Distinctive in appearance with striped legs and blotch-patterned caudal lamellae tipped with long, fine filaments (image 1). Additional feature that can assist in species identification is the distinct angle of the hind margins of the head.



**Image 1.** *Platycnemis pennipes* larva; arrow pointing to caudal lamella filament. © Christophe Brochard



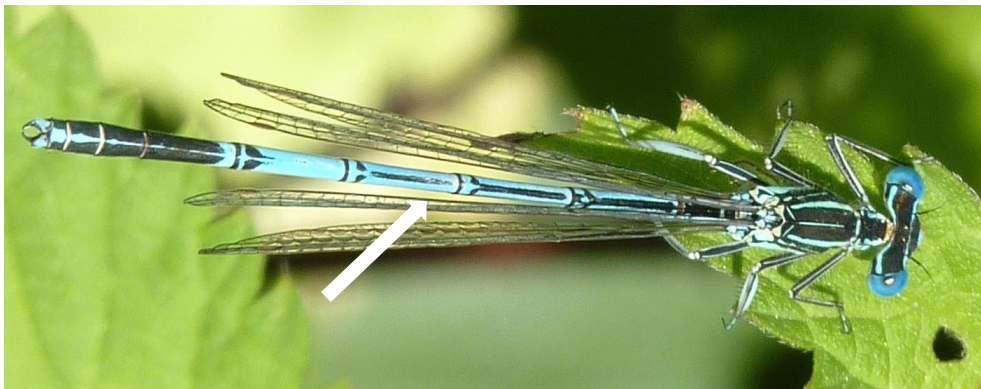
**Image 2.** *Platycnemis pennipes* larva; arrow pointing to angular hind margins of the head. © Christophe Brochard

### **Adult Identification (Smallshire and Swash, 2018)**

Length: 35-37mm

Identification features include the species' black markings that run down the back of the abdomen (image 3), the two stripes that feature on either side of the thorax (image 4), and the Damselfly's pale brown pterostigmata (wing spots) (images 4 and 5).

Males are pale blue and have wide tibiae (lower sections of the legs) with white edges (image 4). Females are pale yellow-green while immature adults of both sexes are creamy in colouration (or preferably "colour") with a pale brown thorax.



**Image 3.** Male *Platycnemis pennipes*; abdominal markings visible. © Dave Smallshire



**Image 4.** Male *Platycnemis pennipes*; arrows point to wide tibiae, pale pterostigma and thorax markings. © Novofotoo, flickr



**Image 5.** Female *Platycnemis pennipes*. © Gail Hampshire



**Image 6.** Immature male *Platycnemis pennipes*. © David Kitching

### **Life cycle**

Larvae can be found hunting in shallow areas of still or slow flowing water with lush vegetation; they take around 2 years to develop at which point they emerge as flying adults. Teneral (newly emerged adults) congregate in tall grass and vegetation near their natal wetlands and can, on occasion, be encountered in large numbers. The species' core flight period is within the months of June-July; adults are known to wander a significant distance from their natal waters, up to 5km (Smallshire and Swash, 2018), before returning to water to breed. Males are territorial and it has been theorised that the male's broad white tibiae are used to attract females and ward off male competitors. Mating may take up to 30 minutes following which mated pairs oviposit (egg lay) in tandem, and often in groups. The female inserts her eggs into floating vegetation (they have a strong preference for *Nuphar lutea*, Yellow Water lily (Martens, 1996)) and woody debris while the male guards her, keeping an eye out in the "sentinel position" (image 7).





**Image 7.** *Platycnemis pennipes* pairs ovipositing in rotten wood © Dave Smallshire

**Habitat (Cham et al, 2014)**

The species' primary breeding habitat consists of moderate to slow flowing waterways with muddy benthic sediment and well-vegetated margins but unshaded by tree or scrub growth (image 8). They also require abundant floating vegetation or other organic material for egg laying. The species also breeds in standing waterbodies, such as ponds, that support similar microhabitats needed to complete their life cycle (image 9).

# White-legged Damselfly Investigation

## Project aims

The project was proposed in 2017 due to the apparent lack of recent records for the species across some areas of its core range. While a reduction in records within an area could simply reflect a lack of recent recording effort it could also signify a decline in occupancy (geographical area inhabited by a species). It was determined that a concerted effort was required to map the current distribution of the species within Britain in order to better understand changes in the species distribution. As a result, the White-legged Damselfly Investigation citizen science project was developed to raise awareness of the species among recorders, and the general public, and encourage volunteers to actively search potential breeding sites for the species. As well as producing an up-to-date distribution map of *Platycnemis pennipes* in Britain, the project aimed to produce occupancy data for the upcoming State of Dragonflies 2021 report (Taylor *et al*, 2021), which assessed changes in species occupancy over a 50 year period from 1970.

## Methodology

The project recording activity focused on recording the presence of adult *Platycnemis pennipes* and habitat type at a minimum accuracy of 1km OS grid squares, monads. More experienced volunteers were encouraged to collect more detailed records (including count data, different life stages, and reproductive behaviour such as ovipositing) but this wasn't the core project activity promoted to the public. While this reduced the potential value of the resulting dataset it aimed to maximise the pool of potential volunteers who could participate and thus maximise the size of the resulting dataset. Species sightings were entered directly into [iRecord](#), or could be sent to [BDS County Dragonfly Recorders](#) for import into iRecord. All records were then reviewed by County Dragonfly Recorders.

Data collected via the BDS Recording Activity form on iRecord:

- Recorder name\*
- Recorder email address\*
- Species name (in this case *Platycnemis pennipes*)\*
- Date of sighting\*
- Location name\*
- Spatial reference (OS grid reference)\*
- Site type, options: Lake, Reservoir, Mill Lodge, Large Pond, Small Pond, Garden Pond, River, Stream, Ditch, Canal, Other (please specify).
- Life stage: Adult, Copulating pair, Ovipositing female, Larva, Exuvia or Emergent.
- Count of each life stage: 1, 2-5, 6-20, 21-100, 101-500, 500+.
- Photographic evidence
- Additional comments

\*fields that require an entry in order to submit a record.

Data collection was carried out over 5 years from 2018-2022.

Participants were engaged in the project via promotion at in-person events and through online and written communications. Information on the project and educational materials took the form of, but were not limited to:

- Posters on BDS event stands and partnership sites
- Paper handouts, including identification guides
- Videos on the BDS YouTube channel
- Social media posts on Facebook, Instagram and X (previously Twitter)
- Oral presentations at in-person and online BDS conferences
- A project webpage on the BDS website
- Articles in the BDS e-newsletter “Hawker”
- Articles in the BDS membership magazine “Dragonfly News”

Project guidelines were adjusted from 2020 onwards to reflect COVID-19 lockdown restrictions. Project promotion and engagement also moved entirely online while public gatherings and events were prohibited. Promotion material also changed focus to suggesting the project as a lockdown activity members of the public could participate in at sites in their local area. Project communications also promoted the health benefits of spending time outdoors near “blue spaces” (MacKerron and Mourato, 2013).

# Results

## Engagement

3487 individual *Platycnemis pennipes* records were entered and accepted (confirmed by County Dragonfly Recorders as correct) into the BDS database during the project years (2018-2022). This was a 100.9% increase on accepted records from the previous five years; in comparison, the overall number of records for all species accepted into the BDS database only increased by 52.6% between these two time periods (table 1).

The number of recorders that entered *Platycnemis pennipes* records during the project years (2018-2022) was at least 784. This was a more than 59.3% increase on the numbers during the previous five year period; it was, however, lower than the overall increase (65.8%) between the two time periods of recorders that contributed to the full BDS database (table 2).

<i>Platycnemis pennipes</i>		All Odonata	
Number of records 2013-2017	1736	Number of records 2013-2017	265118
Number of records 2018-2022	3487	Number of records 2018-2022	404497

**Table 1.** Number of *Platycnemis pennipes* records (at monad level) entered and accepted during the project period (2018-2022) and the previous five years (2013-2017) vs the number of all Odonata records (at monad level) entered and accepted during the project period (2018-2022) and the previous five years (2013-2017).

<i>Platycnemis pennipes</i>		All Odonata	
Number of recorders 2013-2017	492	Number of recorders 2013-2017	8859
Number of recorders 2018-2022	784	Number of recorders 2018-2022	14686

**Table 2.** Number of recorders that contributed *Platycnemis pennipes* records during the project period (2018-2022) and the previous five years (2013-2017) vs number of recorders that contributed any Odonata records during the project period (2018-2022) and the previous five years (2013-2017). These counts are based on the recorder names provided with each record entered and accepted into the BDS database; sometimes more than one name is entered for the same record so these figures only provide an estimate of recorder participation.

## Species trends

50.4% of *Platycnemis pennipes* records came from monads with historical records, while the rest came from monads with no historical records; sightings were confirmed in 18.1% of monads with historical records. On a coarser level 86.1% of records came from hectads (10km OS grid squares) with historical records, the rest came from hectads with no historical records; sightings were confirmed in 58.4% of hectads with historical records (table 3).

Records	Monads	Hectads
New - no historic records	536	41
Still present - historic records	545	255
Historic records only	2461	182
Total	1081	296

**Table 3.** Number of monads and hectads which either: had records reported during the project period (2018-2022) and have no historic records (pre-2018), had records reported during the project period and have historic records, or have historic records but didn't receive new records during the project period.

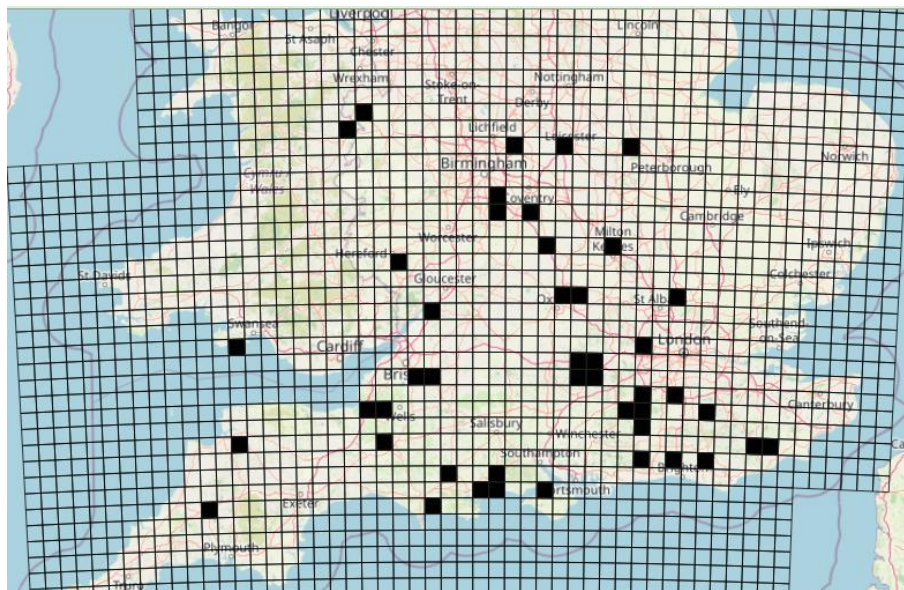
Records collected during the project years 2018-2019 contributed to the [State of Dragonflies 2021](#) analysis (Taylor *et al*, 2021) which looked at changes in species occupancy from 1970 to 2019. The occupancy-detection modelling, carried out by UK Centre for Ecology & Hydrology, found that *Platycnemis pennipes* had significantly increased in occupancy in Britain, specifically England, over this period.

State of Dragonflies 2021 (Taylor *et al*, 2021): *“White-legged Damselfly increased in occupancy most noticeably between 1988 and 2005, since when there has been a slight decline in records followed by a more recent recovery. Much of the increase in occupancy can be attributed to infilling within its traditional range in southern England and east Wales, with only marginal spread on the fringes of this. Although its distribution overall has increased, there has been concern for several years that the species is being lost from former strongholds.”*

Maps 1-6 show the expansion of *Platycnemis pennipes* occupancy in Britain at hectad level. Britain's first Odonata Mapping Scheme was set up 1968, hence the lack of records before 1970. From 1970 the records show the species consolidating its range in southern and central England, and the eastern edge of Wales. Hectads that produced their first records during the 2018-2022 period were, in the main, clustered on the eastern and western edges of the species' former range.



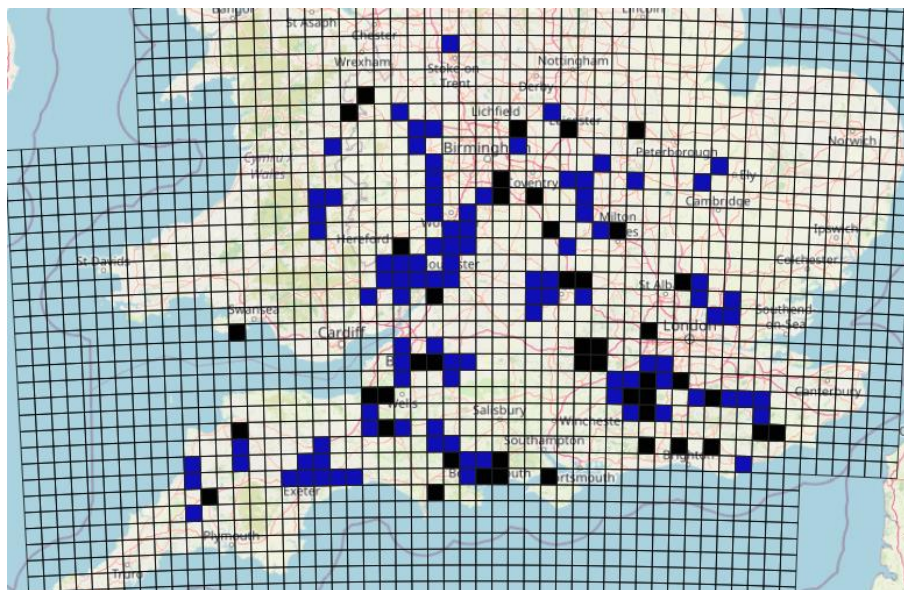
Maps series showing the period within which hectads produced their first *Platycnemis pennipes* records.



**Map 1.** Hectad map of *Platycnemis pennipes* records dating up to 1977 only.

**Key**

Time period that hectad produced its first record.

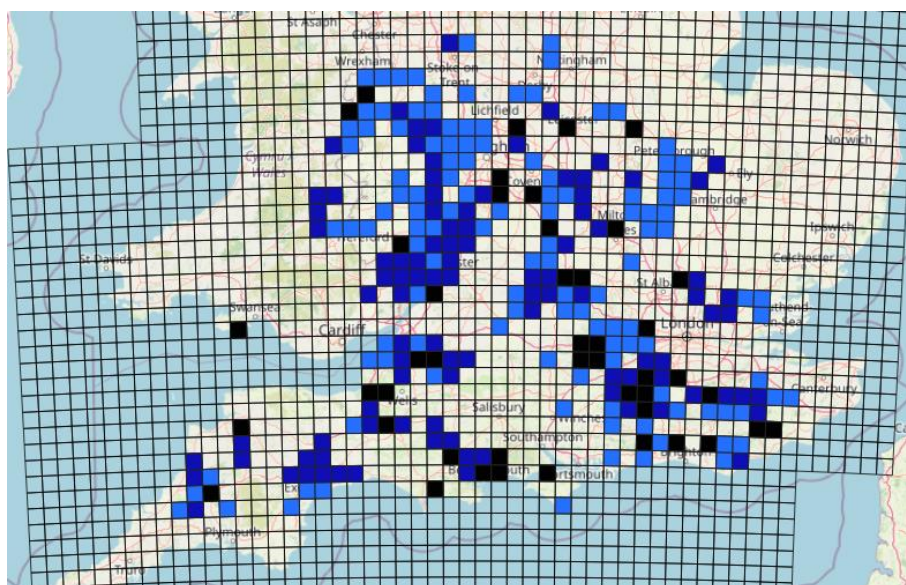


**Map 2.** Hectad map of *Platycnemis pennipes* records dating up to 1987 only.

**Key**

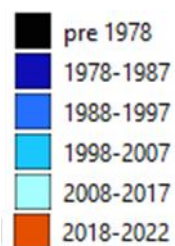
Time period that hectad produced its first record.



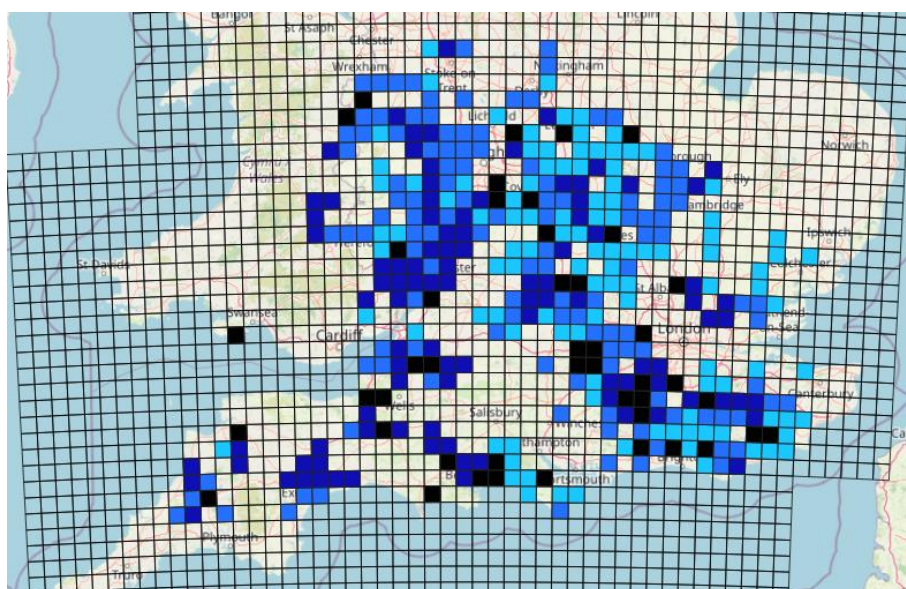


#### Key

Time period that hectad produced its first record.

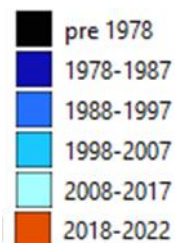


**Map 3.** Hectad map of *Platycnemis pennipes* records dating up to 1997 only.



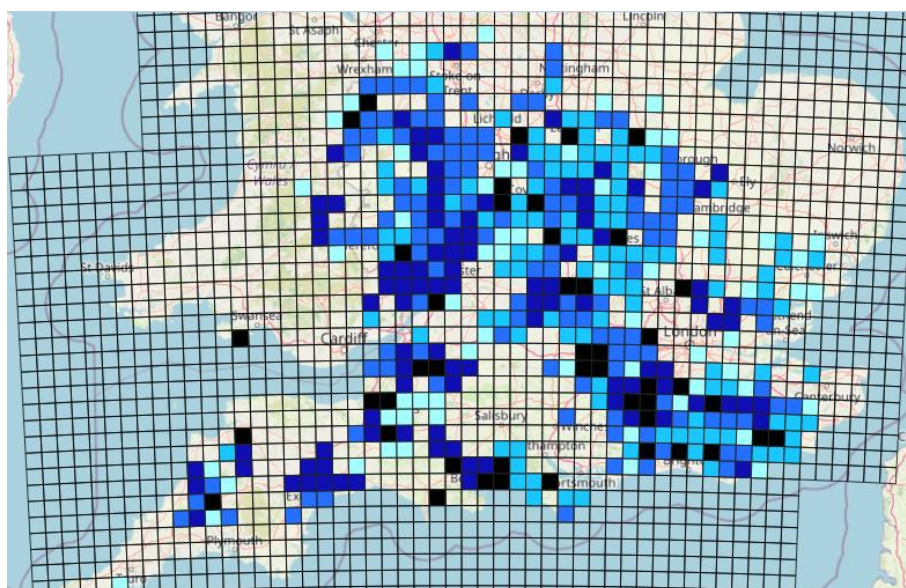
#### Key

Time period that hectad produced its first record.



**Map 4.** Hectad map of *Platycnemis pennipes* records dating up to 2007 only.

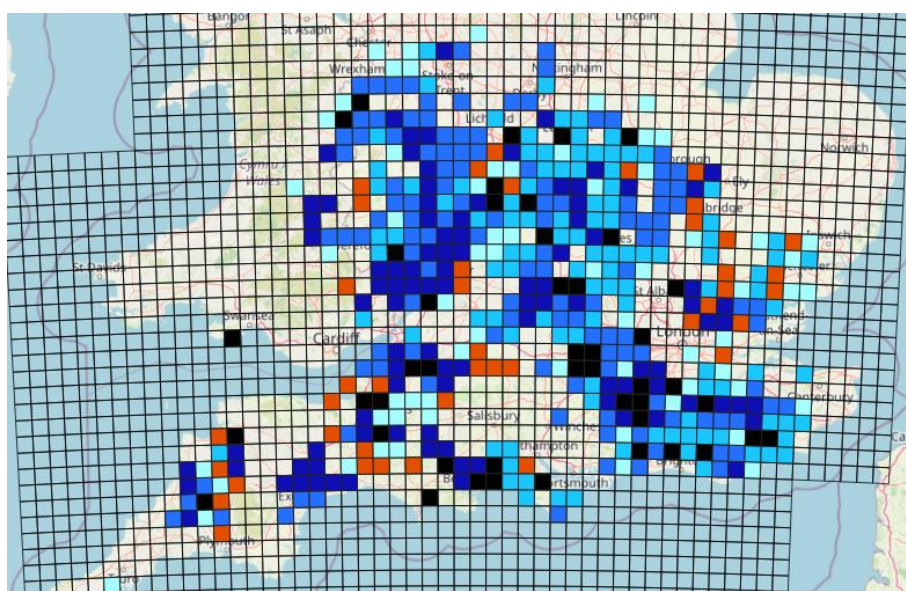
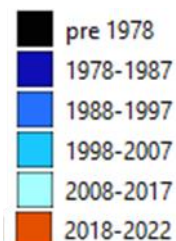




**Map 5.** Hectad map of *Platycnemis pennipes* records dating up to 2017 only.

#### Key

Time period that hectad produced its first record.

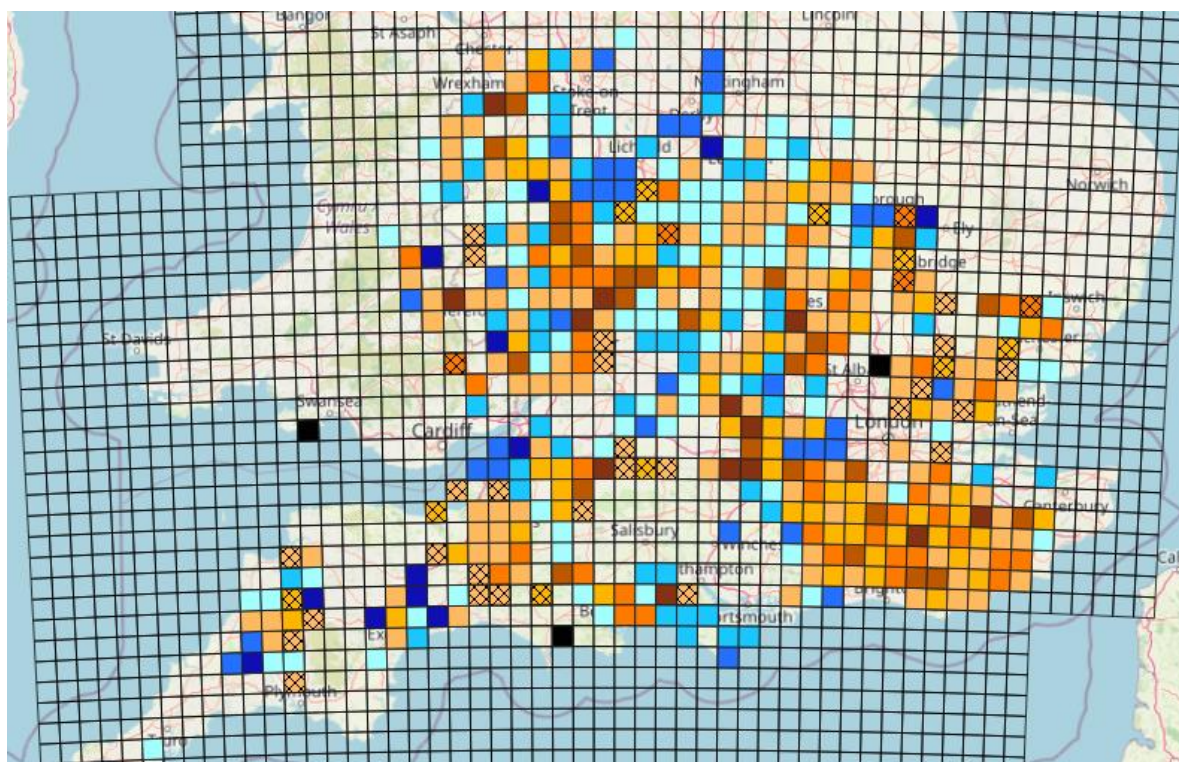


**Map 6.** Hectad map of *Platycnemis pennipes* records dating up to 2022.

#### Key

Time period that hectad produced its first record.






## Keys

pre 1978  
 1978-1987  
 1988-1997  
 1998-2007  
 2008-2017

Hectads that didn't produce records during the project period. Time period within which the monad produced its most recent record.

1  
 2  
 3  
 4  
 5

Hectads that produced records during the project period (2018-2022). The number of project years that produced records.

 First sighting recorded during a project year (2018-2022).

**Map 7.** The period within which hectads produced their most recent *Platycnemis pennipes* record. For hectads with sightings recorded during the White-legged Damselfly Investigation period (2018-2022) the number of project years which produced records is indicated.

The project confirmed the continued presence of *Platycnemis pennipes* across a significant proportion of the historic range, as illustrated in map 7. However the map also highlights scattered hectads across the species range that have produced no recent records. As the project only collected presence data, not absence data, it is hard to say that all potential *Platycnemis pennipes* sites within these hectads were searched. This is highly unlikely considering the amount of potential *Platycnemis pennipes* wetlands and the effort it would take to visit them all in the project's 5 year period. It is also worth noting that not all historically recorded sites may still be accessible to recorders. However, wetland sites or waterways with significant historical records that didn't produced sightings within the project period or the 10 years prior do represent a reasonable likelihood of local extinction.

## Habitat

Habitat group	Number of records	Habitat classification	Number of records
Lotic wetland	331	Lotic wetland, not classified	61
		River	198
		Canal	28
		Stream	44
Lentic wetland	194	Lentic wetland, not classified	28
		Lake	55
		Pond	84
		Ditch	19
		Peatland wetland	4
		Reservoir	4
Terrestrial	233	Heathland, scrub, hedgerow	55
		Arable land, gardens or parks	59
		Woodland	50
		Grassland	68
		Un-vegetated or sparsely vegetated habitats	1

**Table 4.** The habitats within which *Platycnemis pennipes* was recorded during the project period (2018-2022).

Of the records accepted that were accompanied with habitat information, 43.7% were from lotic wetlands, 25.6% from lentic wetlands, and 30.7% in terrestrial habitat. The large number of sightings recorded away from water reflects the species' tendency to disperse away from its wetland of origin. Of the sightings recorded in wetland habitat, 63% were from lotic wetlands and 37% from lentic wetlands; table 4 illustrates the species' ability to utilise a relatively diverse range of habitats in terms of size and flow. Of the records from lotic wetlands, records from "rivers" made up the highest percentage (59.8%); of the records from lentic wetlands, records from "ponds" made up the highest percentage (43.3%). It must be recognised that individual recorders' interpretations of the different classifications will vary and that the data entry form on iRecord did not provide definitions. In addition, a record of an adult sighting next to a certain waterbody does not prove that the wetland supports a population that is breeding successfully; this has to be confirmed by surveying for exuviae.

Very few records within the BDS *Platycnemis pennipes* dataset are accompanied by habitat information. Consequently, it provides limited insight into changes in *Platycnemis pennipes* breeding habitat preferences over time. Information on *Platycnemis pennipes* habitat requirements are primarily limited to observed associations between the species and specific habitat features noted by recorders. However, older literature categorises *Platycnemis pennipes* as a species of lotic wetlands that is only occasionally found on ponds and lakes (Merritt, 1996; Prendergast, 1988). The results of this project support the

anecdotal observations of long-term volunteers within the BDS recording community that the species is now utilising lentic wetlands on a more frequent basis.

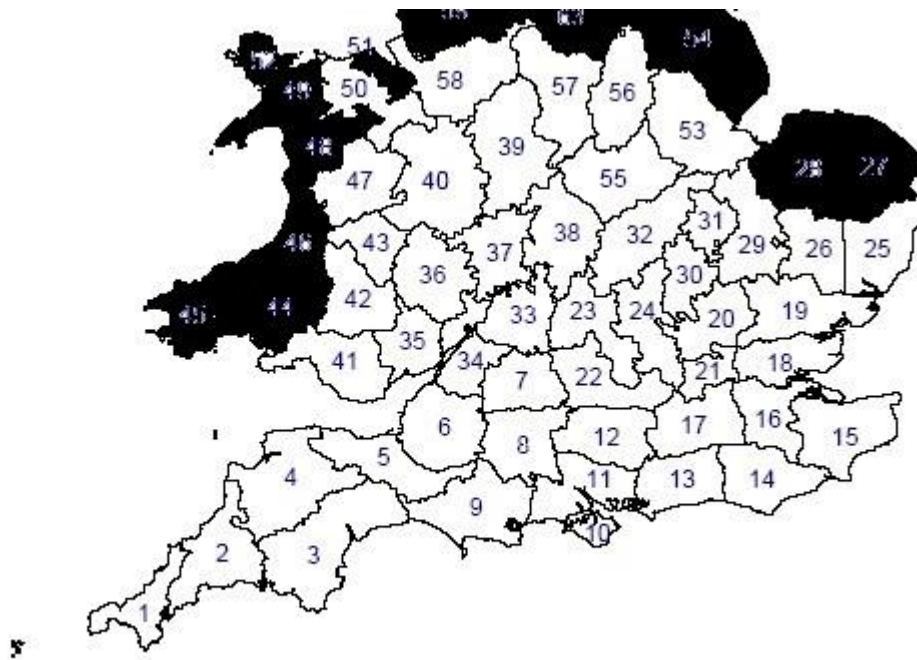


## Results by Vice County

While the State of Dragonflies 2021 report (Taylor *et al*, 2021) analysis and the results of this project agree that, overall, *Platycnemis pennipes* has increased in occupancy within Britain, map 7 suggests that concerns raised about the localised extinction of the species from historic waterways may be valid.

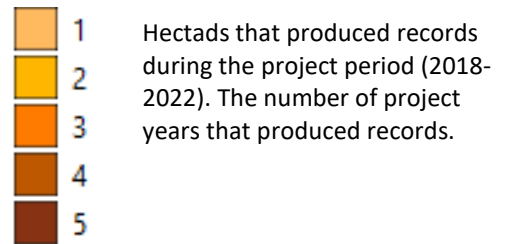
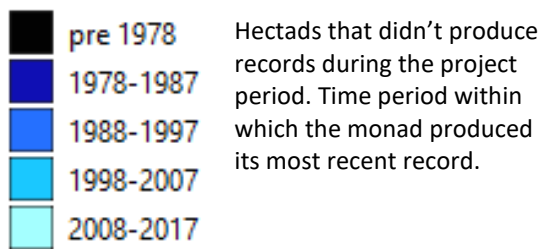
This section of the report looks at *Platycnemis pennipes* records at monad level divided by Watsonian Vice County reflecting the structure of the BDS Recording Scheme. For each Vice County, waterways and waterbodies that have produced significant records historically and/or during the project period are identified. Waterways and wetland sites, that have significant historical sightings but failed to produced records during the project period or 10 years prior are identified as areas of potential localised extinction. For listed waterways their 2022 ecological status is provided along with a link to their respective Environment Agency/ National Resources Wales classification webpage.


The BDS *Platycnemis pennipes* records can be viewed and downloaded from [NBN atlas](#). The GIS files for the maps included in this report can be downloaded from the project webpage.



**Map 8.** Vice Counties, identified by number, featured in this section of the report.

## Key for all Vice County maps

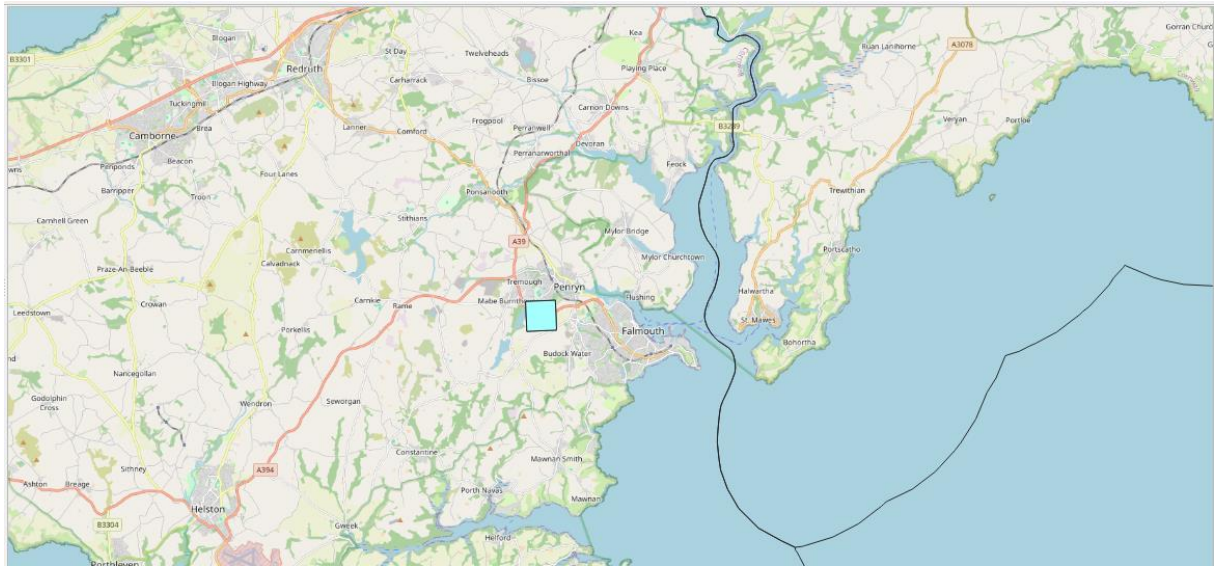


 First sighting recorded during a project year (2018-2022).

**Map 7.** The period within which hectads produced their



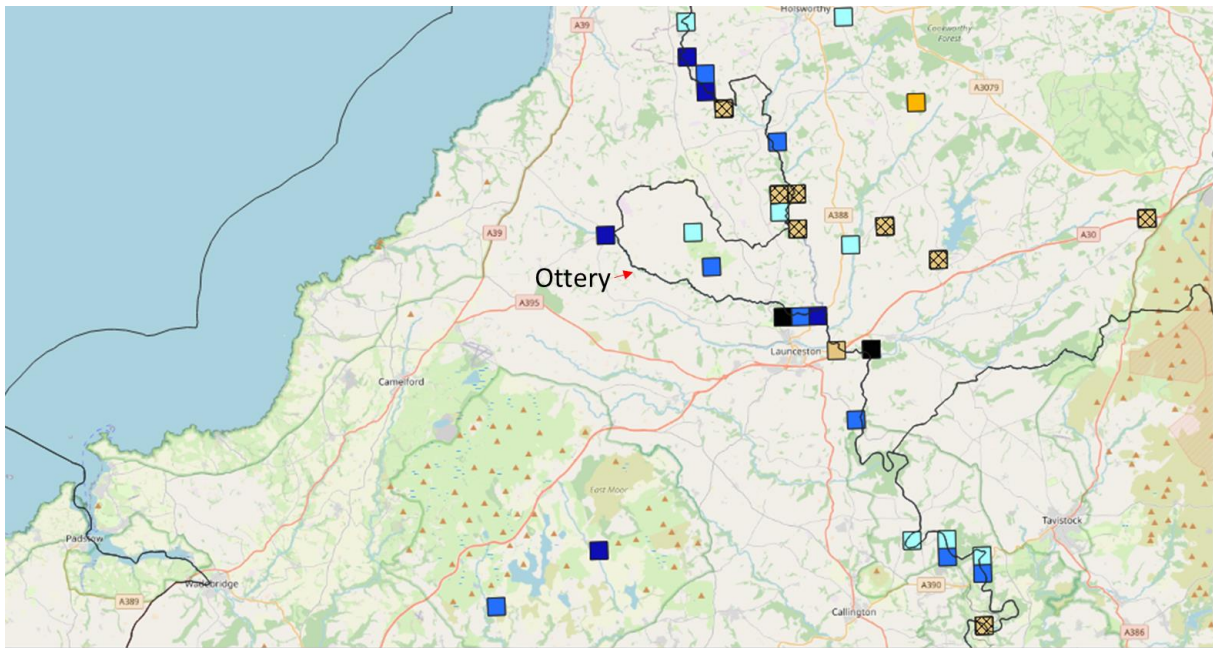
## 1: West Cornwall with Scilly



**Map 9:** *Platycnemis pennipes* records mapped at monad level for West Cornwall with Scilly.

**Vice County summary of *Platycnemis pennipes* distribution: there are currently no known populations within the Vice County.**

## 2: East Cornwall



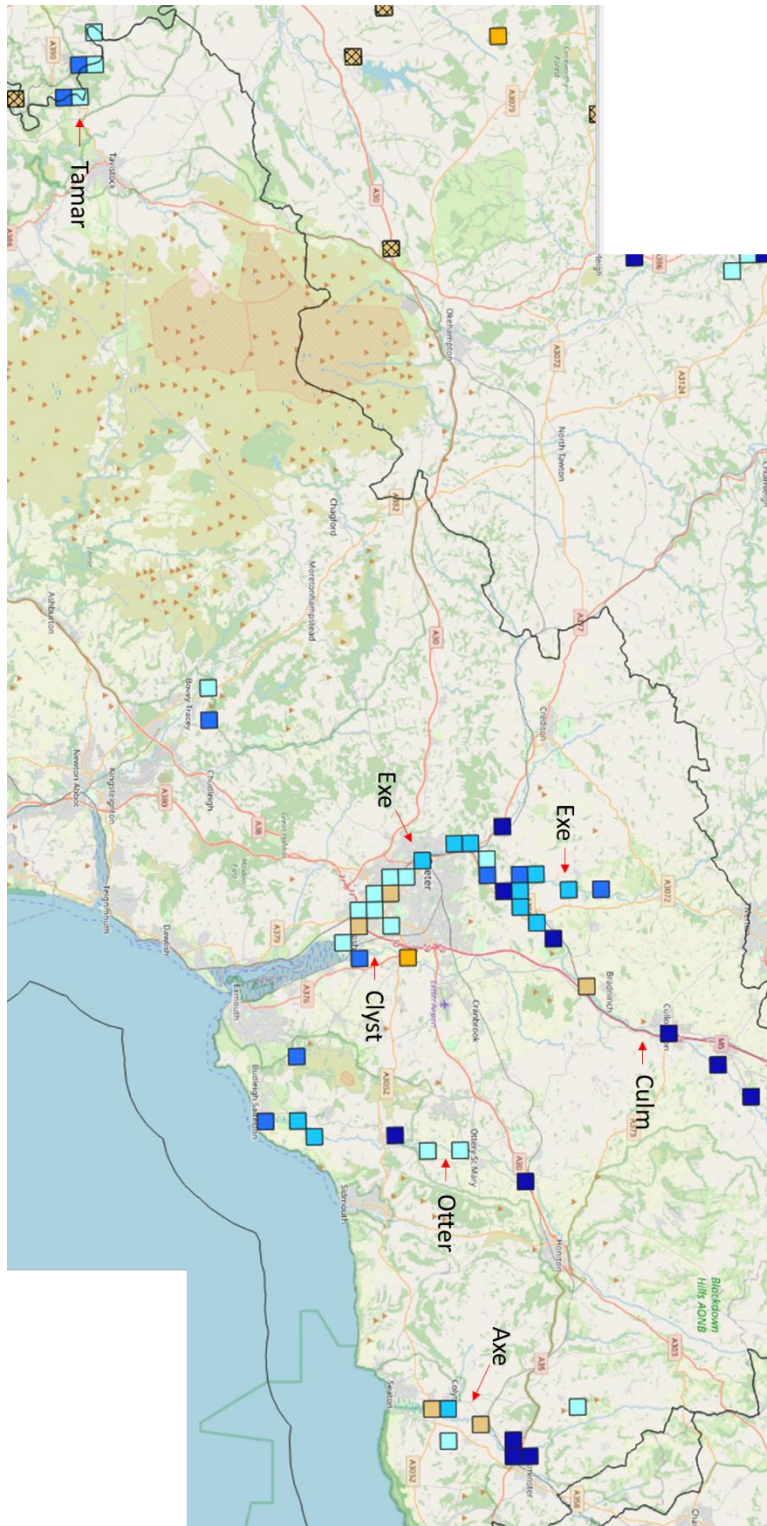
**Map 10:** *Platycnemis pennipes* records mapped at monad level for East Cornwall.

**Vice County summary of *Platycnemis pennipes* distribution:** the species is at the edge of its range within this Vice County and may now only be breeding along the border on the River Tamar.

**River Ottory:** a small number of historic records, the most recent dating from 1995; none were made during the project ([lower River Ottory's ecological status is "moderate"](#)).

**Additional sites:** there are a couple of historic records from **Cornwall AONB** from the 80s-90s only.

### 3: South Devon



**Map 11:** *Platycnemis pennipes* records mapped at monad level for South Devon.

**Vice County summary of *Platycnemis pennipes* distribution:** limited species distribution which may have become more restricted, particularly along the River Exe.

**River Axe:** a few sightings were recorded near Colyton ([Lower Axe; moderate ecological status](#)).

**River Clyst:** sightings came from a single monad near Cyst St Mary ([Lower Cyst; moderate ecological status](#)).

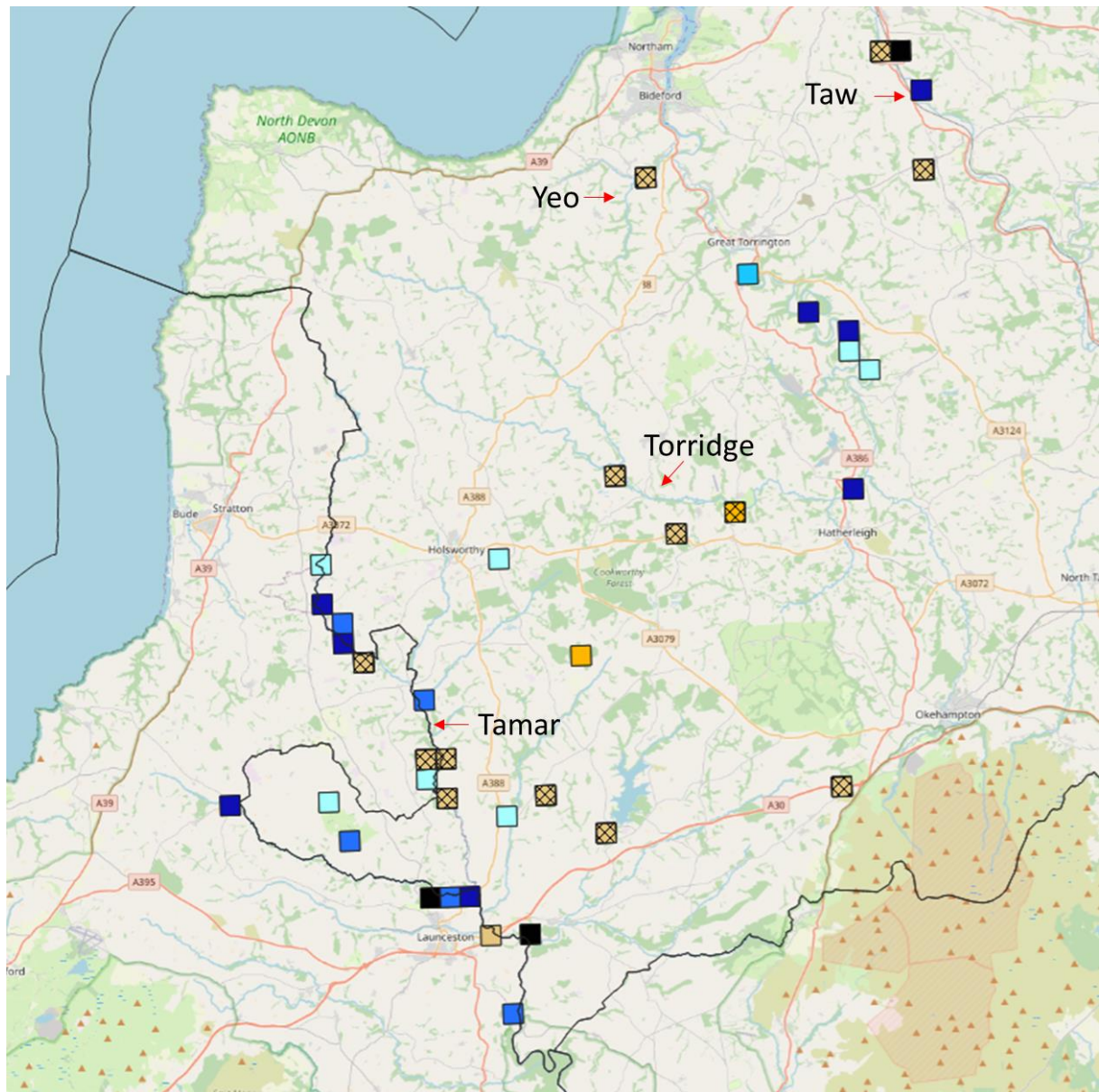
**River Exe:** monads with recent records (2008 onwards) are condensed on the lower reaches ([Exe \(Creedy to Estuary\); moderate ecological status](#)).

**River Otter:** didn't produce any records; the river's most recent sightings date from 2017 ([Lower River Otter; poor ecological status](#)).

**River Tamar:** recent records (2008 onwards) suggests a population persists on the lower reaches below Lockett ([Lower Tamar; moderate ecological status](#)).



#### 4: North Devon



**Map 12:** *Platycnemis pennipes* records mapped at monad level for North Devon.

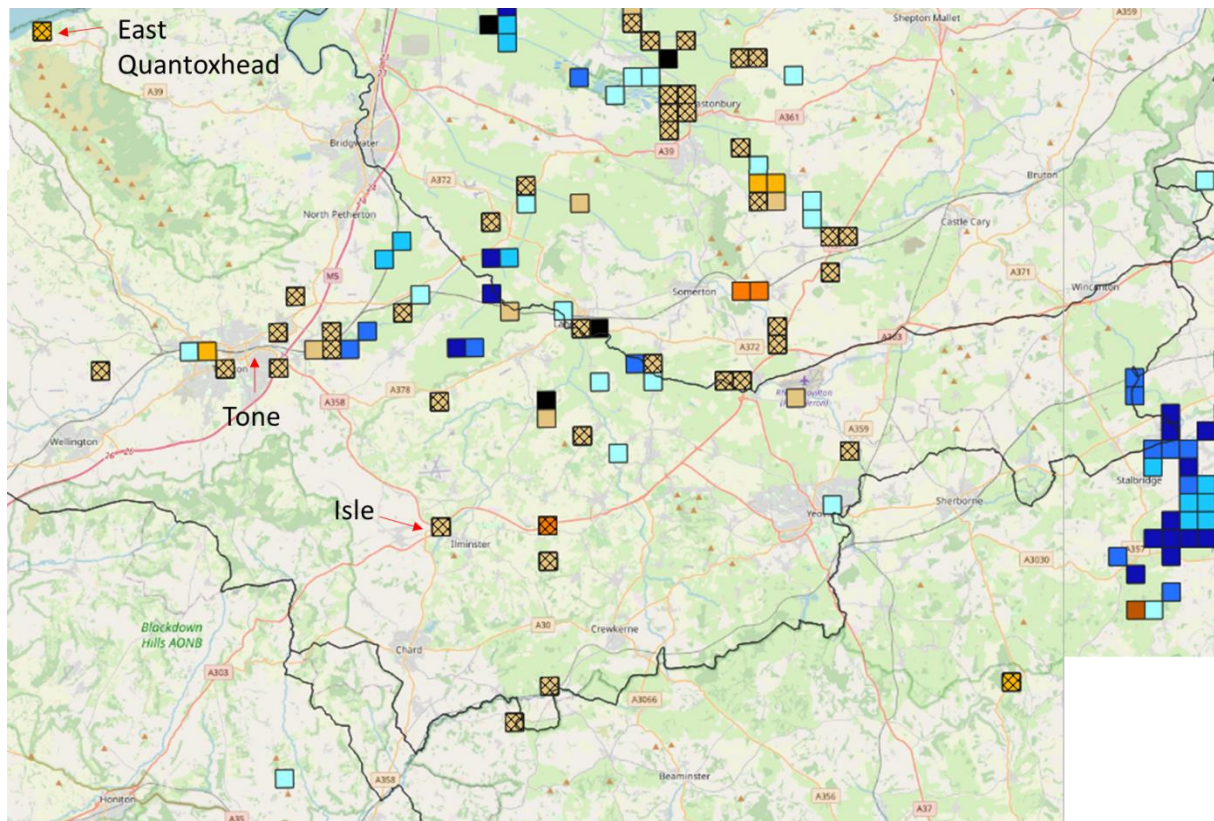
**Vice County summary of *Platycnemis pennipes* distribution:** limited to a few river catchments in the north-west of the Vice County. **River Tamar:** recorded on the river above Launceston ([Tamar \(River Ottery to River Deer\) Water Body; moderate ecological status](#)).

**River Taw:** still present on the river downstream of Chapleton where it was last previously recorded in 1975 ([Taw \(River Mole to Estuary\) Water Body; Moderate ecological status](#) ).

**River Torridge:** still present on the river which only has one previous record from 1978 ([Torridge \(Combe Lake to Lew\) Water Body; poor ecological status](#)).

**River Yeo:** produced its first record near Littleham ([Lower River Yeo \(Bideford\) Water Body; moderate ecological status](#)).

## 5: South Somerset



**Map 13:** *Platycnemis pennipes* records mapped at monad level for South Somerset.

**Vice County summary of *Platycnemis pennipes* distribution:** most common in the south of the Vice County; the project results suggest the species is more widespread than previously recorded.

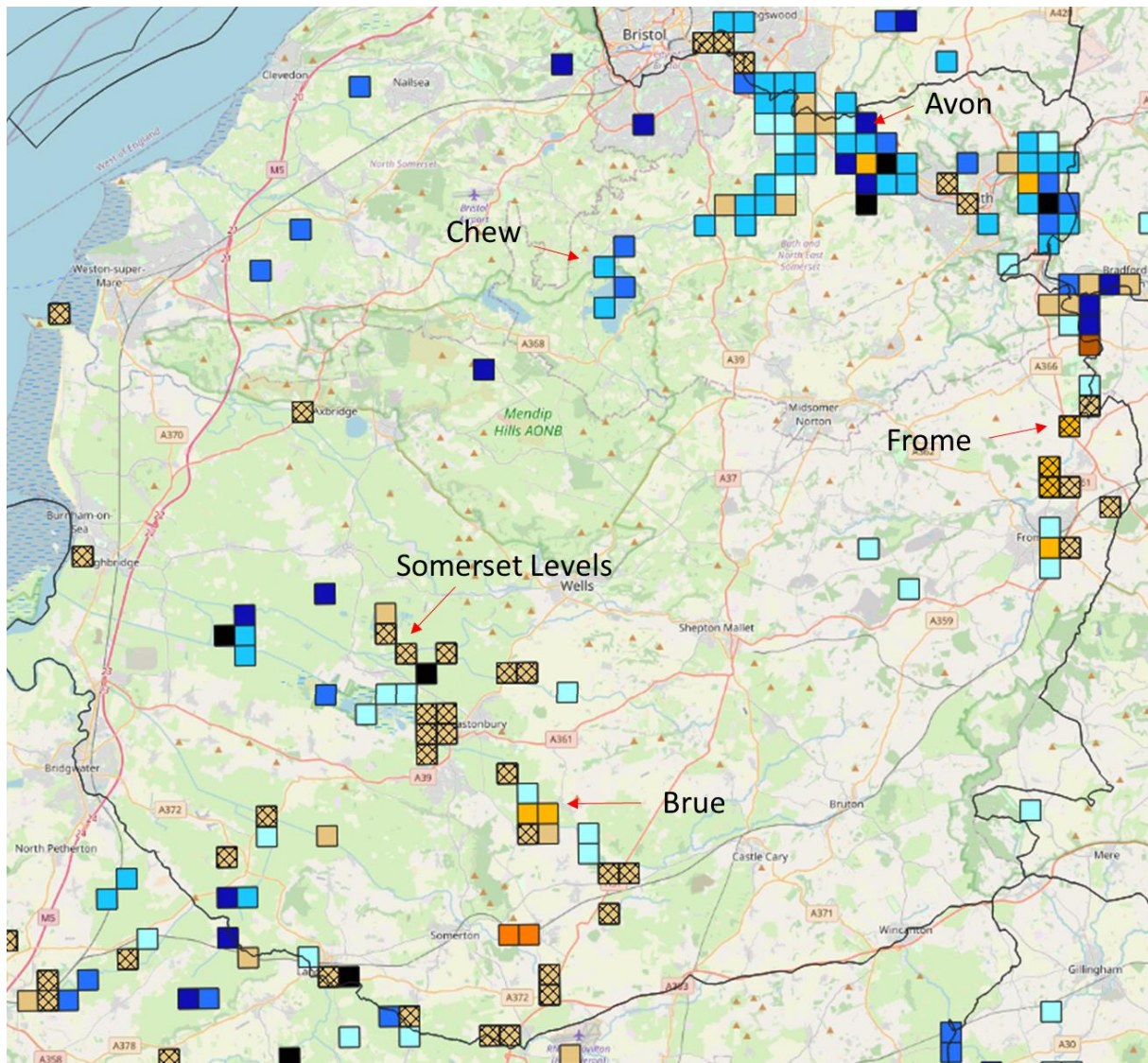
**River Isle:** produced its first sightings north-west of Ilminster ([Isle - Upper to conf Cad Bk; moderate ecological status](#)).

**River Tone:** the species was discovered to be more widespread on the river and its tributaries around Taunton than previously recorded ([Tone Ds Taunton; moderate ecological status](#)).

**Additional sites:** A new population was discovered at a pond at **East Quantoxhead** and scattered records came from novel monads in the south-east of the Vice County.



## 6: North Somerset



**Map 14:** *Platycnemis pennipes* records mapped at monad level for North Somerset.

**Vice County summary of *Platycnemis pennipes* distribution:** while absent from the Mendip Hills AONB the species was confirmed to still be present along the waterways in the north and south of the Vice County.

**River Avon:** still present between Bristol and Bath ([Bristol Avon \(Semington Bk to By Bk; moderate ecological status\)](#)).

**River Brue:** still present along the river near Glastonbury ([Coxbridge Brook \(Brue\); moderate ecological status\)](#)).

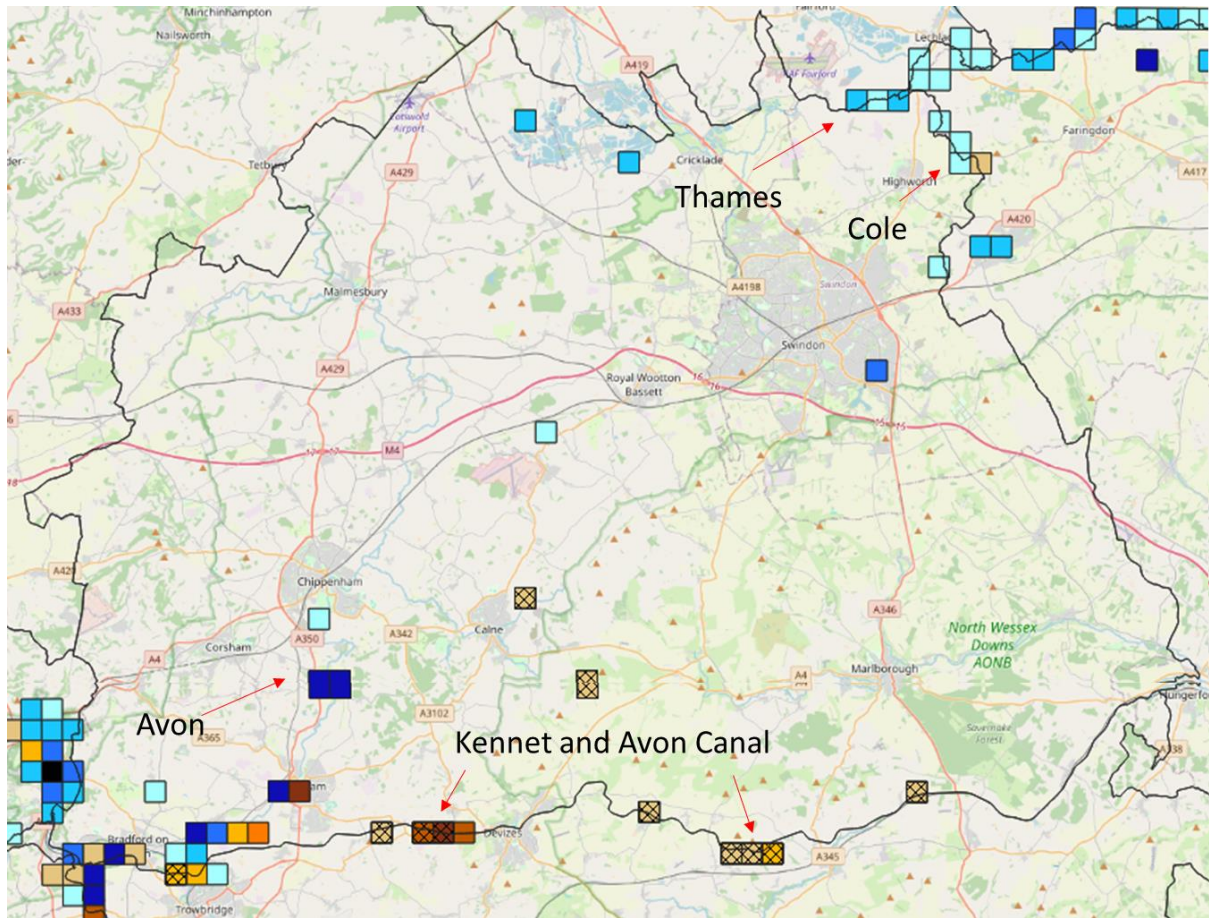
**River Chew:** still present downstream of Penford ([Chew - conf Winford Bk to conf R Avon \(Brist\); moderate ecological status\)](#)).

**River Frome:** still present along the river between Frome and Rode ([Somerset Frome conf with Mells to conf B. Avon Water Body; Moderate ecological status](#)).

**Additional sites:** multiple novel monads produced sightings within the **Somerset Levels**.



## 7: North Wiltshire



**Map 15:** *Platycnemis pennipes* records mapped at monad level for North Wiltshire.

**Vice County summary of *Platycnemis pennipes* distribution:** most widespread on the south-western boundary on the waterways around Bradford-on-Avon, and on the north-eastern boundary waterways around Highworth.

**Kennet and Avon Canal:** found to be more widely distributed along the river than previously recorded with sightings reported for the first time between Devizes and Wootton Rivers.

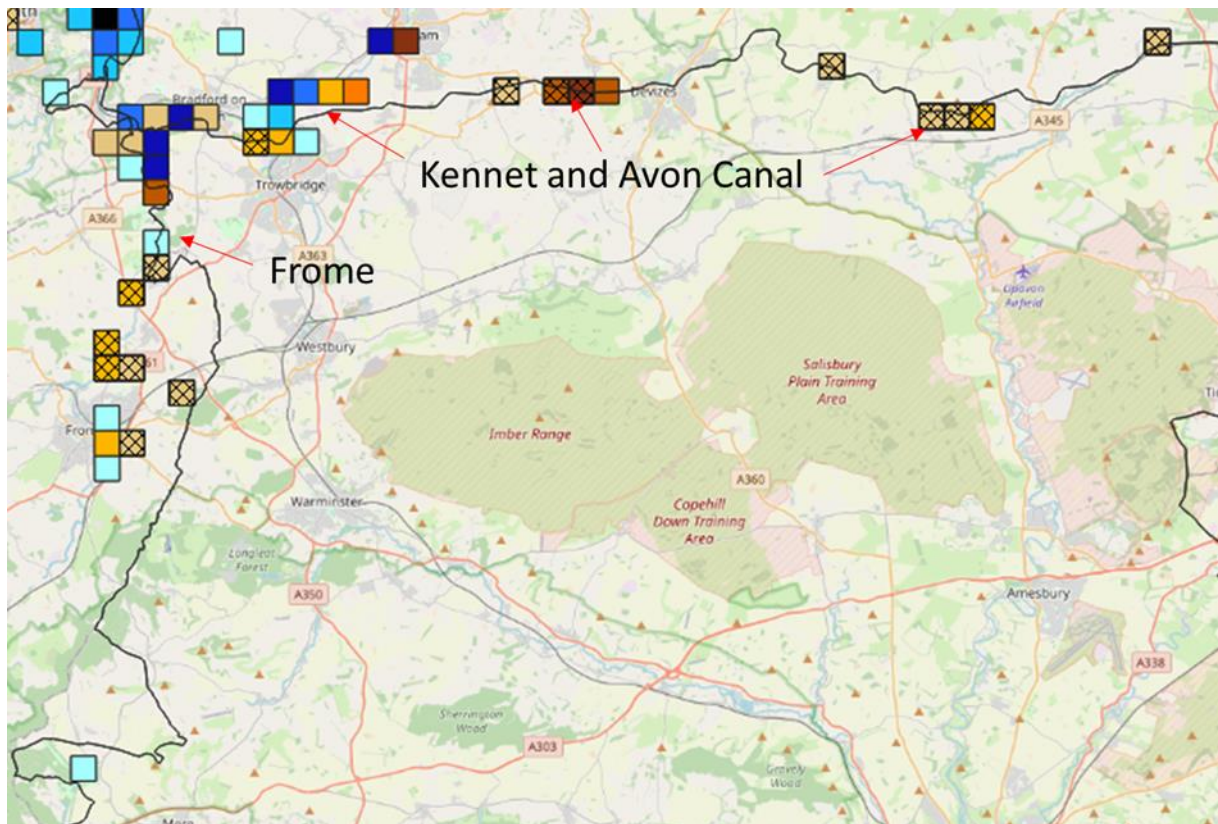
**River Avon:** recorded on the short section of the river around Bradford-on-Avon ([Bristol Avon \(Semington Bk to By Bk\); moderate ecological status](#)).

**River Cole:** recorded south of Highworth ([Cole \(Bower Bridge to Thames\) including Coleshill; moderate ecological status](#)).

**River Thames:** recent sightings (2008 onwards) on the short section that lies on the Vice County boundary ([Thames \(Churn to Coln\) Water Body; moderate ecological status](#)).

**Additional sites:** A couple of novel monads east of **Cain** produced large counts in 2018 but the wetlands west of **Cricklade** have not produced records since 2004.

## 8: South Wiltshire



Map 16: *Platycnemis pennipes* records mapped at monad level for South Wiltshire.

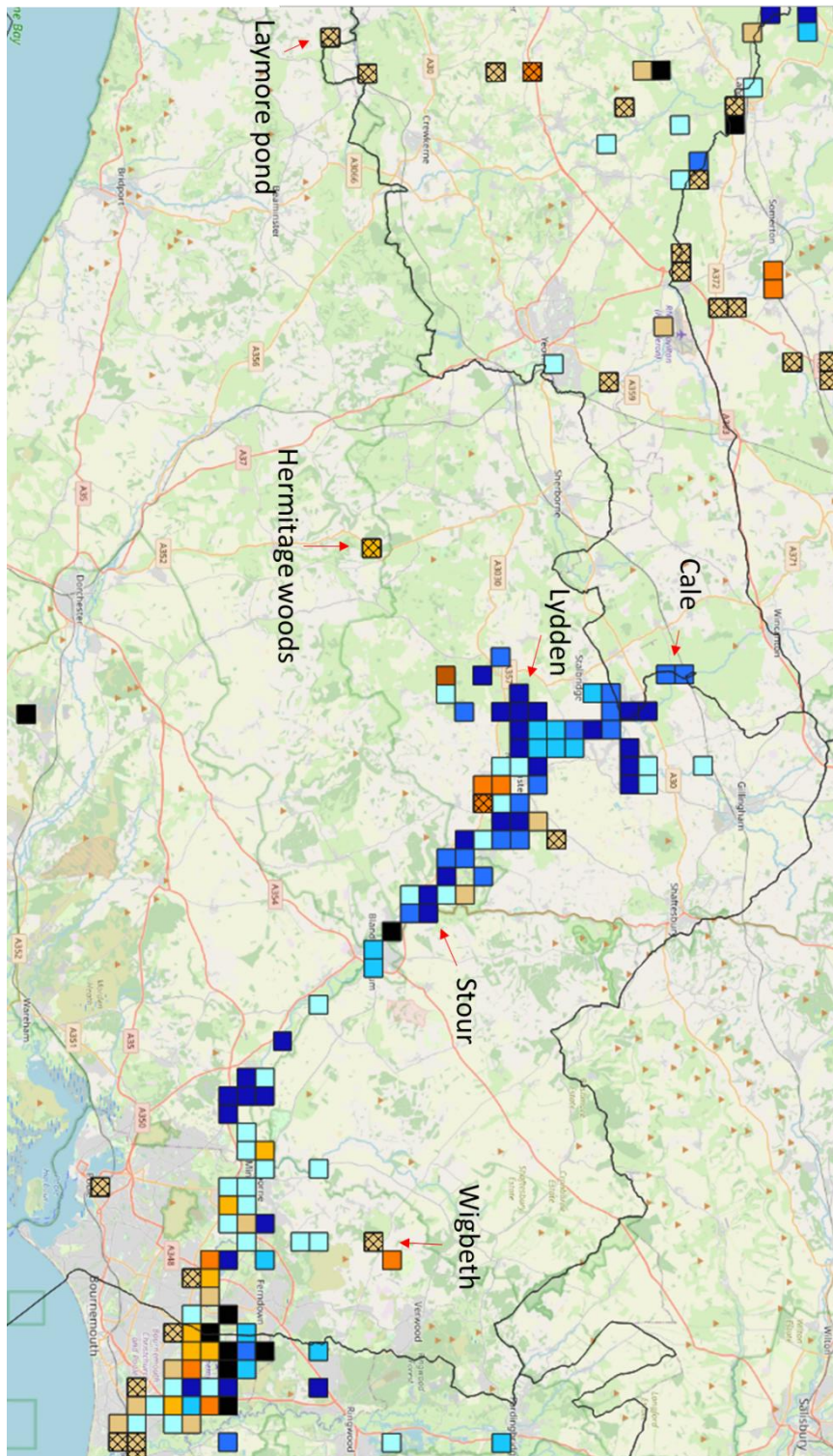
**Vice County summary of *Platycnemis pennipes* distribution:** distribution limited to waterways in the north west of the Vice County but possibly increasing.

**Kennet and Avon Canal:** found to be more widely distributed along this canal than previously recorded with sightings reported for the first time between Devizes and Wootton Rivers.

**River Frome:** still present on the river north of Woolverton ([Somerset Frome conf with Mells to conf B. Avo; moderate ecological status](#)).



## 9: Dorset



**Map 17:** *Platycnemis pennipes* records mapped at monad level for Dorset.

**Vice County summary of *Platycnemis pennipes* distribution:** *Platycnemis pennipes* was recorded for the first time in the west of Dorset; however, the species may have declined on the upper reaches of the Stour.

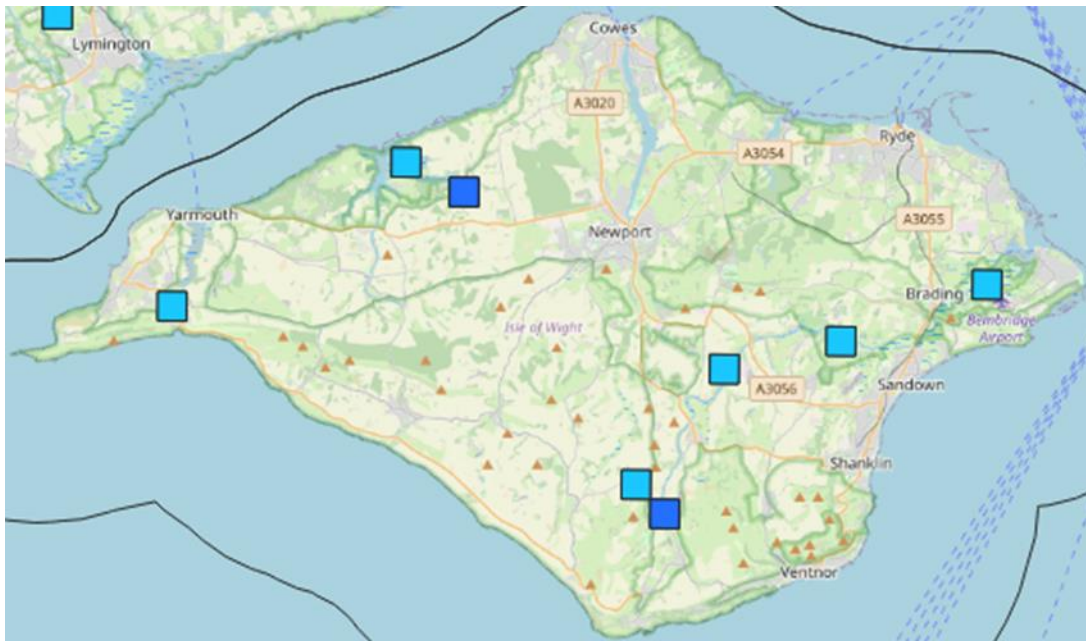
**River Cale:** historically recorded on the lower reaches of the river but there are no recent sightings (2008 onwards) ([Cale; moderate ecological status](#)).

**River Lydden:** hasn't produced records since 1998 ([Lydden \(Lower\) Water Body; poor ecological status](#)).

**River Stour:** scattered monads on its tributaries and associated wetlands from Bournemouth to Sturminster Newton produced records ([Stour \(Lower\); moderate ecological status](#), [Stour \(Middle d/s Pimperne Brook\); poor ecological status](#), [Stour \(Middle u/s Pimperne Brook\); moderate ecological status](#)).

**Additional sites:** newly identified sites include a pond near **Laymore**, and in the woods east of **Hermitage** while multiple records came from a site near Wigbeth.

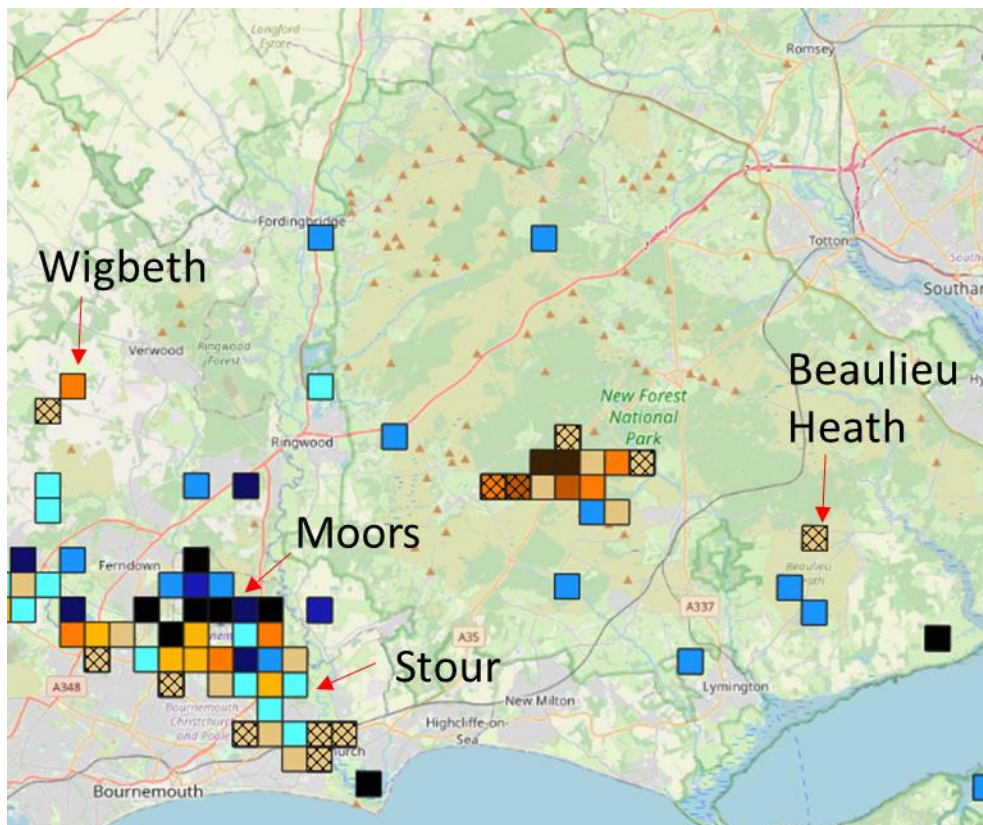
## 10: Isle of Wight



**Map 18:** *Platycnemis pennipes* records mapped at monad level for Isle of Wight.

**Vice County summary of *Platycnemis pennipes* distribution:** there have been no recorded sightings on the Isle of Wight since 2005.

## 11: South Hampshire



Map 19: *Platycnemis pennipes* records mapped at monad level for South Hampshire.

**Vice County summary of *Platycnemis pennipes* distribution:** there are no historic records of the species in South Hampshire east of the New Forest; to the west the species appears to have declined on the River Moors but appears to have colonised new sites.

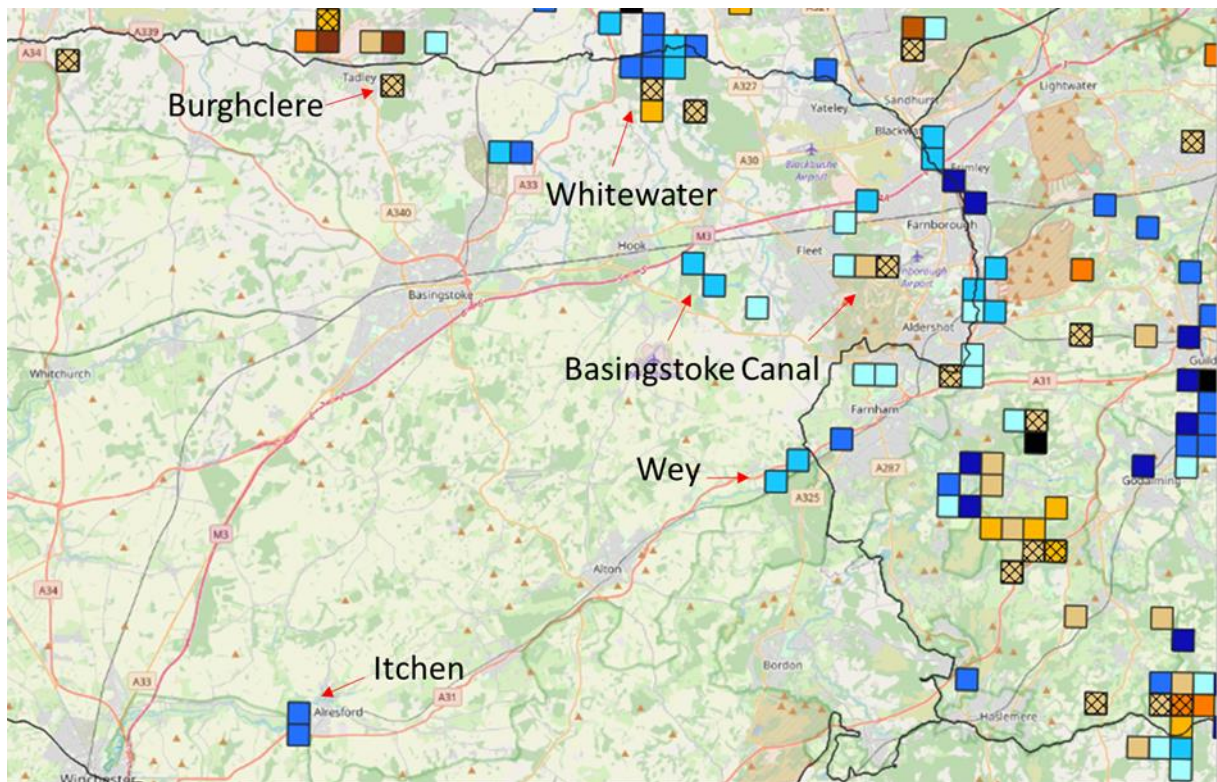
**River Moors:** the lower reaches of the river have significant historical sightings but limited sightings post 2008 ([Moors; good ecological status](#)).

**River Stour:** still present on the lower reaches of the river ([Stour \(Lower\) Water Body; moderate ecological status](#)).

**Additional sites:** in the **New Forest** records came from multiple monads between Burley and Brockenhurst; a single record also came from the west of the New Forest at **Beaulieu Heath**.



## 12: North Hampshire



**Map 20:** *Platycnemis pennipes* records mapped at monad level for North Hampshire.

**Vice County summary of *Platycnemis pennipes* distribution:** species is limited to short sections of waterways on the eastern edge of the county.

**Basingstoke Canal:** still present on a short section of the canal in west Farnborough.

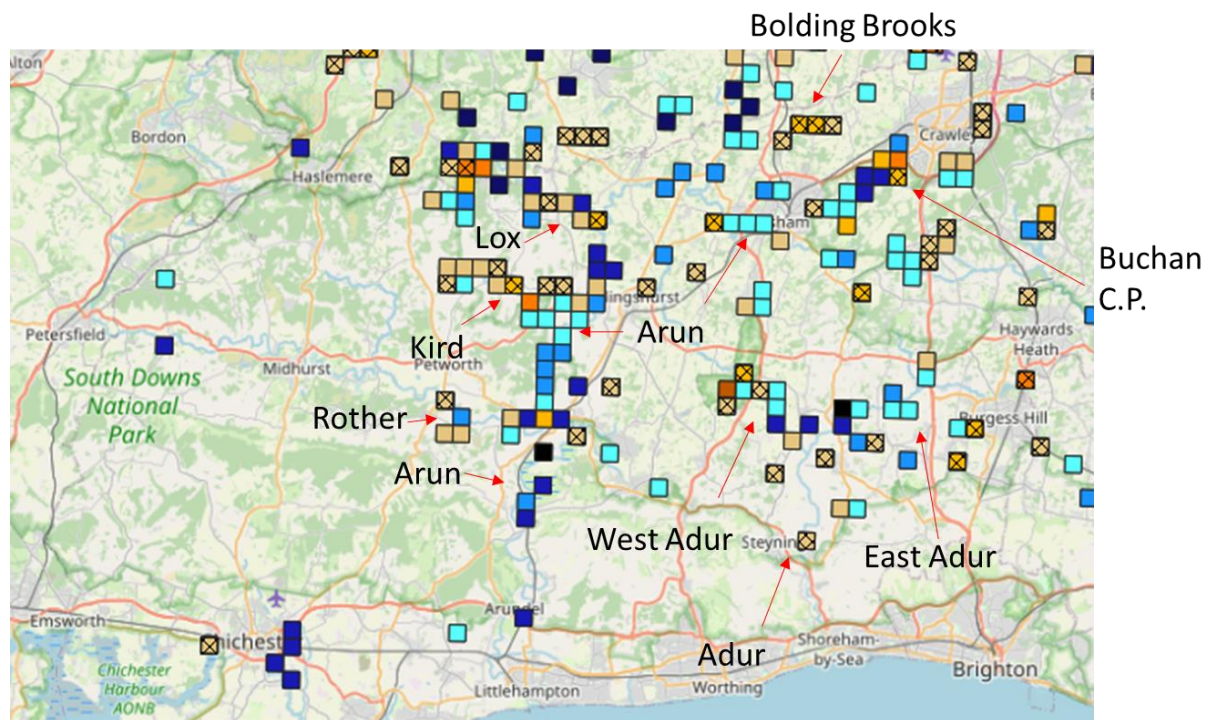
**River Itchen:** a couple of historic records from 1997 ([Itchen; good ecological status](#)).

**River Whitewater:** still present on the river near Hound Green ([Whitewater; poor ecological status](#))

**River Wye:** a couple of historic records, most recently dating from 2002 ([North Wey \(Alton to Tilford\); poor ecological status](#)).

**Additional sites:** found at a novel pond at **Burghclere**, Newbury.

### 13: West Sussex



**Map 21:** *Platycnemis pennipes* records mapped at monad level for West Sussex.

**Vice County summary of *Platycnemis pennipes* distribution:** widespread on the waterways and associated wetlands to the east of the Vice County.

**Boldings Brook:** recorded in multiple novel monads within the brook's catchment ([Boldings Brook](#); [poor ecological status](#)).

**River Adur:** scattered records received from along the river and its tributaries, including the **Western Adur** ([Adur \(Lockbridge\)](#); [bad ecological status](#)) and **Eastern Adur** ([Adur East \(Sakeham\)](#); [poor ecological status](#)).

**River Arun:** recent records (2008 onwards) are most abundant north of Coldwaltham despite historic records stretching downstream to Arundel ([Arun downstream Pallingham Weir Water Body](#); [moderate ecological status](#), [Arun \(U/S Pallingham\)](#); [moderate ecological status](#), [Arun Horsham](#); [poor ecological status](#), [Arun Source](#); [poor ecological status](#)).

**River Kird:** recorded along the river during the project period ([Kird](#); [poor ecological status](#)).

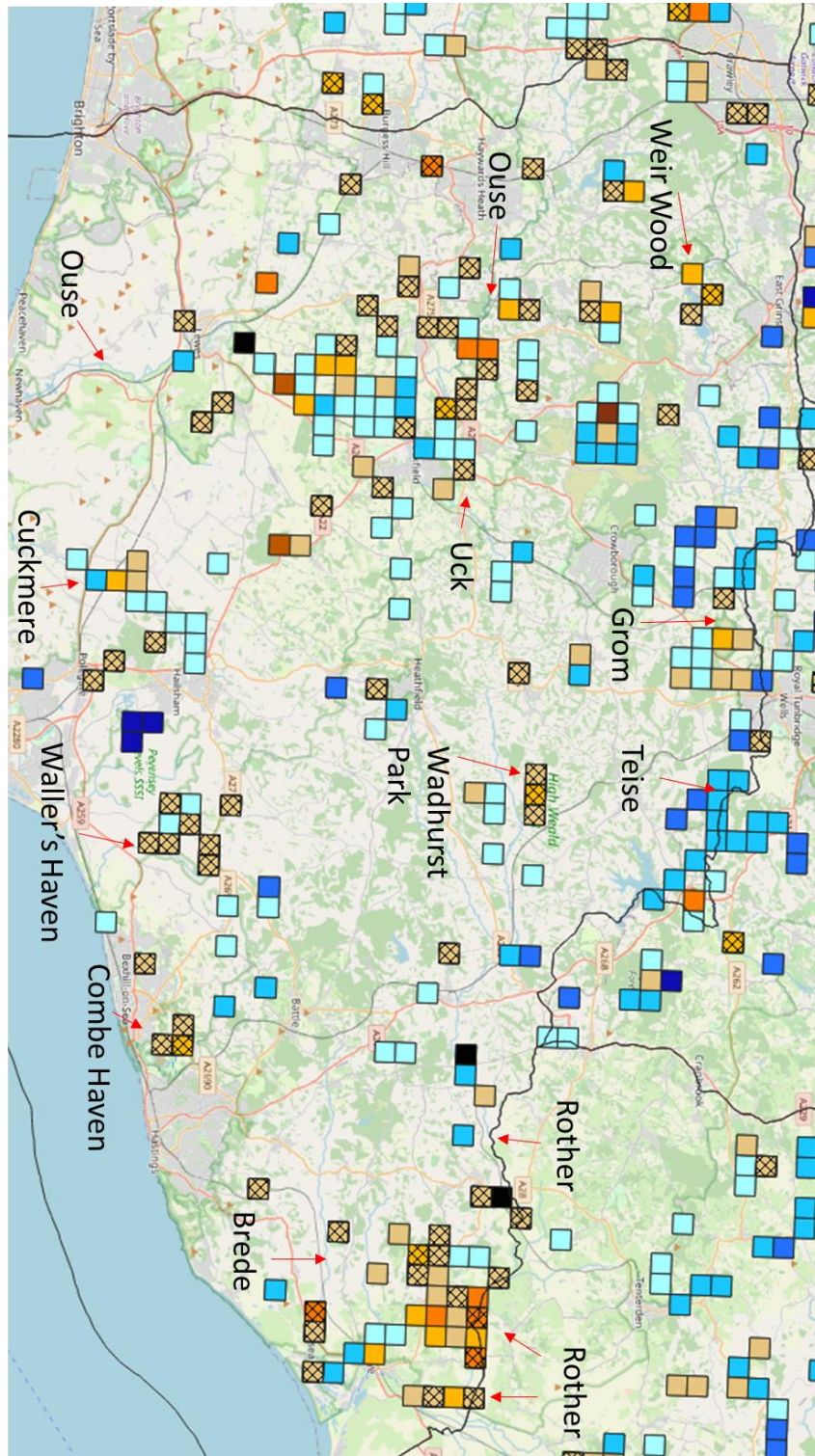
**River Lox/ Wey and Avon Canal:** recorded along the length that lies within the Vice County ([Loxwood Stream](#); [poor ecological status](#)).

**River Rother:** still present on the lower reaches ([Western Rother](#); [poor ecological status](#)).

**Additional sites:** not recorded in the wetlands east of **Chichester** since 1989; however, **Buchan Country Park** produced significant records.



## 14: East Sussex



**Map 22:** *Platycnemis pennipes* records mapped at monad level for East Sussex.

**Vice County summary of *Platycnemis pennipes* distribution:** widespread across the Vice County; during the project years the species was identified in many novel monads.

**Cuckmere:** recorded in recent years (2008 onwards) along the waterway north-west of Polegate ([Cuckmere from Alfriston to Arlington; moderate ecological status](#), [Cuckmere between Arlington and Lower Horsebridge; poor ecological status](#)).

**River Brede:** multiple novel monads within the river catchment produced records ([Brede; poor ecological status](#)).

**River Grom:** multiple monads in the upper tributaries south of Royal Tunbridge Wells produced records ([Grom; moderate ecological status](#)).

**River Ouse:** recorded in recent years (2008 onwards) along the middle Ouse ([Middle Ouse; moderate ecological status](#)).

**River Rother:** multiple novel monads produced records along the river downstream of Newenden ([Lower Rother from Etchingham to Scot's Float; moderate ecological status](#)).

**River Teise:** the short section of the river that falls within the Vice County boundary has produced limited sightings in recent years (2008 onwards) despite its historical records ([Upper Teise, moderate ecological status](#)).

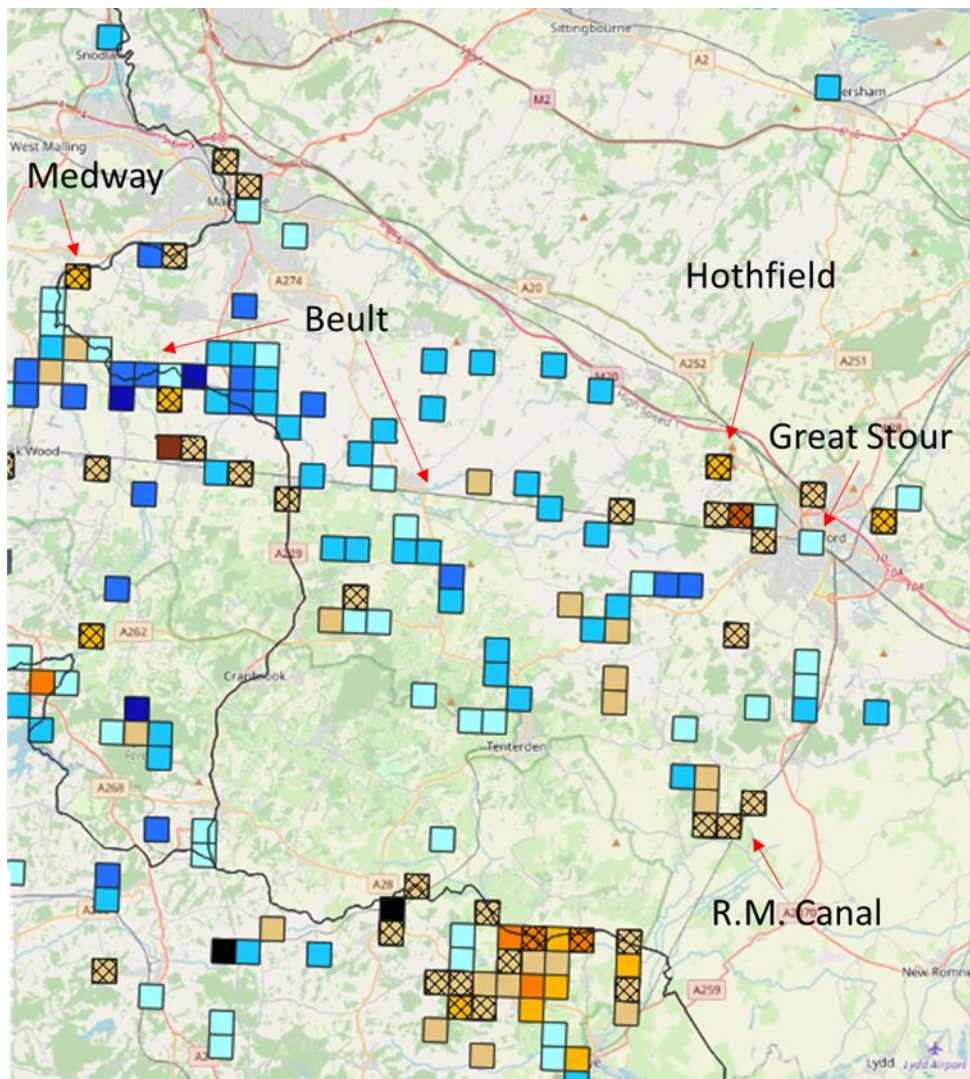
**River Uck:** recorded in recent years (2008 onwards) along the river near Uckfield ([Uck \(Ridgewood Stream to Isfield\); poor ecological status](#)).

**Waller's Haven:** found to be more widespread within the catchment than previously recorded ([Waller's Haven between Windmill Hill and Coast; moderate ecological status](#)).

**Additional sites:** newly identified sites include Wadhurst **Park** and **Weir Wood Reservoir**.



## 15: East Kent



**Map 23:** *Platycnemis pennipes* records mapped at monad level for East Kent.

**Vice County summary of *Platycnemis pennipes* distribution:** species limited to the west of the Vice County where it appears to still be present along its main historic waterways.

**Great Stour:** most abundant around Ashford; multiple novel monads produced records ([Upper Great Stour; bad ecological status](#)).

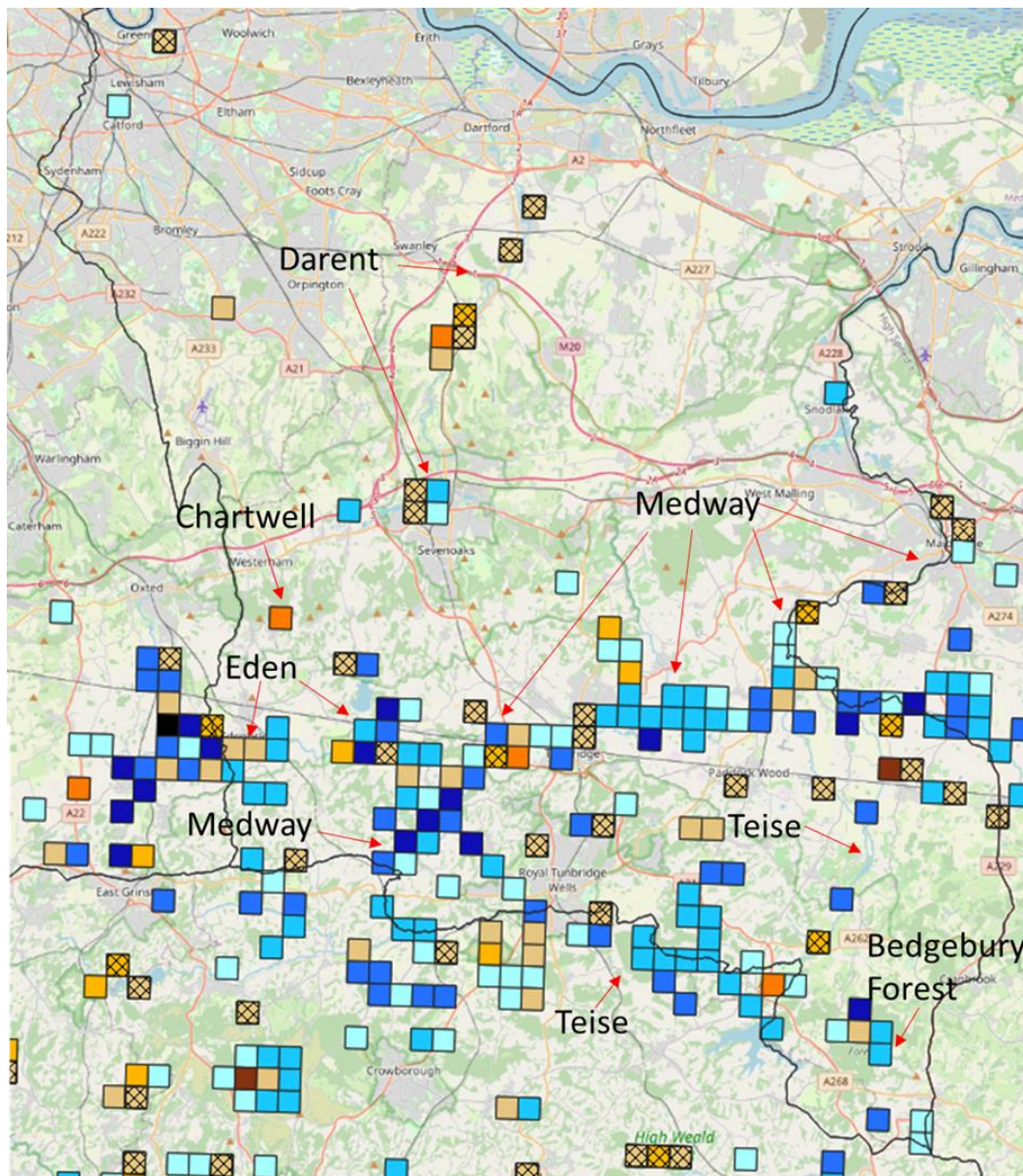
**River Beult:** scattered recent sightings (2008 onwards) along the river and its tributaries ([Beult; moderate ecological status](#), [Upper Beult - High Halden and Bethersden Streams; poor ecological status](#)).

**River Medway:** new monads along the county's western boundary between Maidstone and Yalding produced records during the project period ([Medway at Maidstone; moderate ecological status](#)).

**Royal Military Canal:** recorded for the first time along the canal.

**Additional sites:** newly identified sites include **Hothfield Common**.

## 16: West Kent



**Map 24:** *Platycnemis pennipes* records mapped at monad level for West Kent.

**Vice County summary of *Platycnemis pennipes* distribution:** widespread throughout central and southern West Kent; its range along some of the historic waterways may have become more restricted but there were monad gains elsewhere.

**River Beult:** no records were reported along the short section on the river that runs along the eastern Vice County boundary ([Beult; moderate ecological status](#)).

**River Darent:** recorded in multiple novel monads on the lower reaches of the river ([Middle and Lower Darent; good ecological status](#)).

**River Eden:** recorded in multiple monads within the catchment of the lower Eden ([Lower Eden; moderate ecological status](#)).

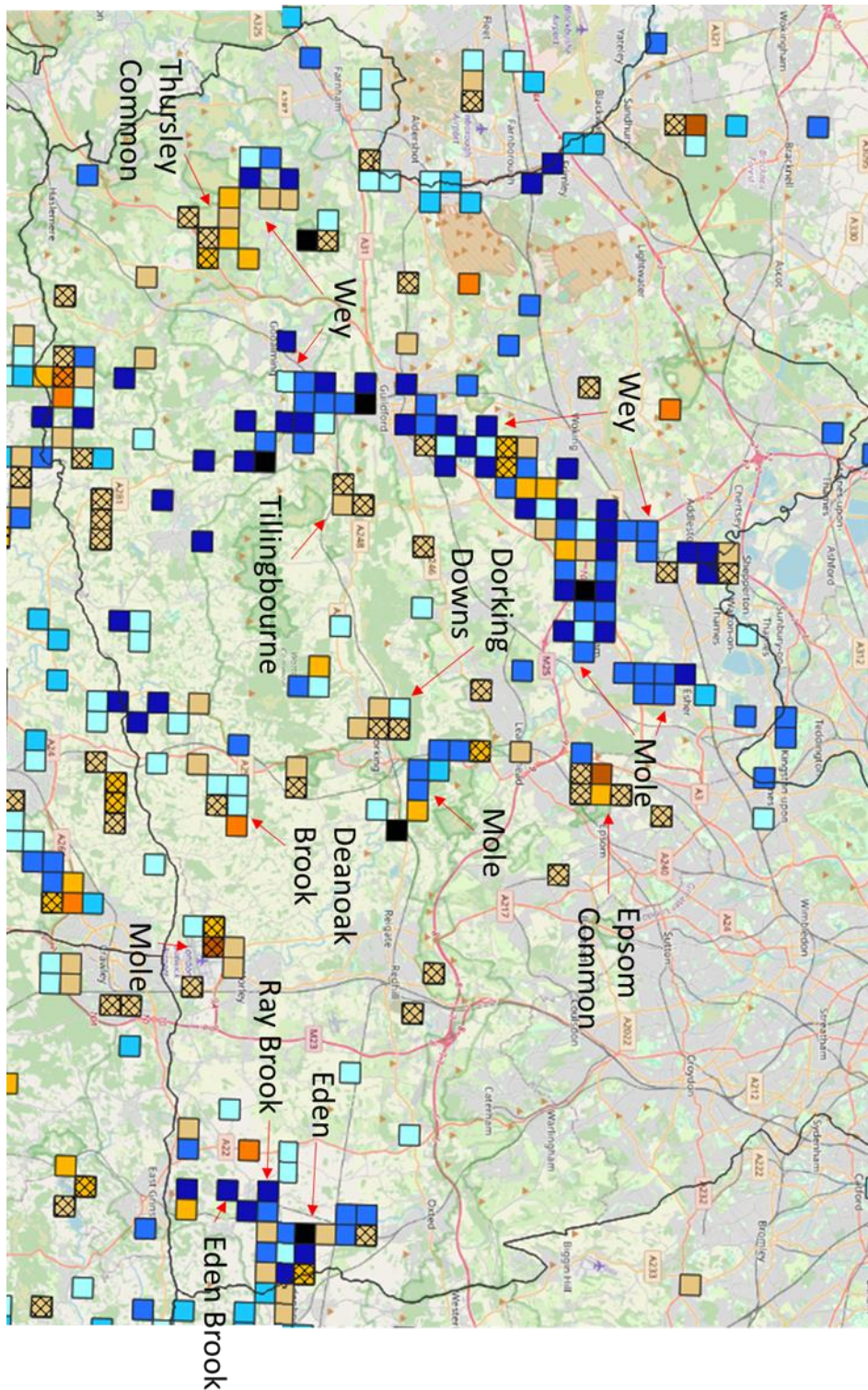


**River Medway:** scattered sightings were recorded along the river from Maidstone to Penhurst, but none between Penhurst and the western border ([Medway at Maidstone; moderate ecological status](#), [Mid Medway from Eden Confluence to Yalding; moderate ecological status](#), [Mid Medway from Hartfield to Eden Confluence; moderate ecological status](#)).

**River Teise:** there were only a couple of sightings from the catchment of the Teise, despite the species having historical records from multiple monads around Sandhurst ([Teise at Lamberhurst; poor ecological status](#), [Teise and Lesser Teise; moderate ecological status](#)).

**Additional sites:** confirmed as still present in the wetlands of **Bedgebury Forest** and **Chartwell**.

## 17: Surrey



**Map 25:** *Platycnemis pennipes* records mapped at monad level for Surrey.

**Vice County summary of *Platycnemis pennipes* distribution:** while the species is widespread throughout the Vice County there appears to have been a shift in its distribution with a lack of recent sightings on its core historic waterways but with numerous novel monads producing records within other catchments.

**Deanoak Brook:** catchment has produced significant records in recent years (2008 onwards) ([Deanoak Brook; poor ecological status](#)).

**Eden Brook:** none recorded despite its historical records ([Eden Brook; bad ecological status](#)).

**Ray Brook:** limited recent sightings (2008 onwards) ([Ray Brook; poor ecological status](#)).

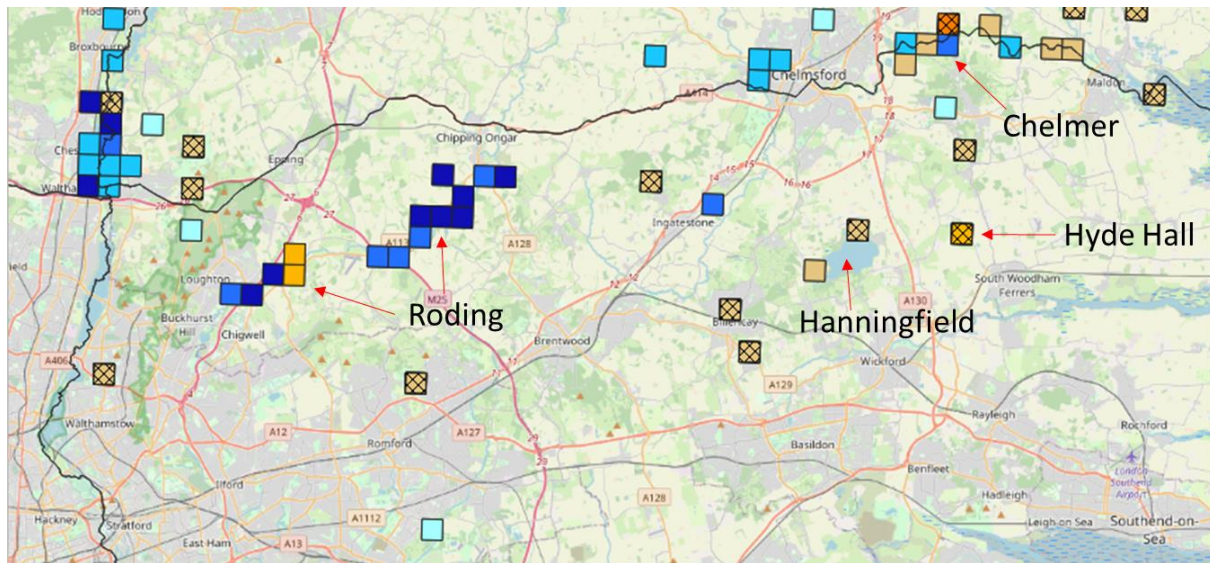
**River Mole:** still present on the river by the southern Vice County boundary ([Mole upstream of Horley; moderate ecological status](#)) and between Dorking and Leatherhead ([Mole - Dorking to Leatherhead; moderate ecological status](#)), but was not seen in historic monads between Leatherhead and Hersham ([Mole - Leatherhead to Hersham; moderate ecological status](#)).

**River Wey:** still present on the river and associated waterways between Addlestone and Guildford ([Wey \(Shalford to River Thames confluence at Weybridge; moderate ecological status\)](#)) but the river produced limited sightings between Guildford and Farnham ([Wey \(Tilford to Shalford\); poor ecological status](#)).

**Tillingbourne:** produced notable records near Albury ([Tillingbourne; moderate ecological status](#)).

**Additional sites:** sites that produced notable records include **Thursley Common Nature Reserve** and **Epsom Common**.

## 18: South Essex



**Map 26:** *Platycnemis pennipes* records mapped at monad level for South Essex.

**Vice County summary of *Platycnemis pennipes* distribution:** may have been lost along sections of its historic waterways, including the River Roding, but new lentic sites have also been discovered.

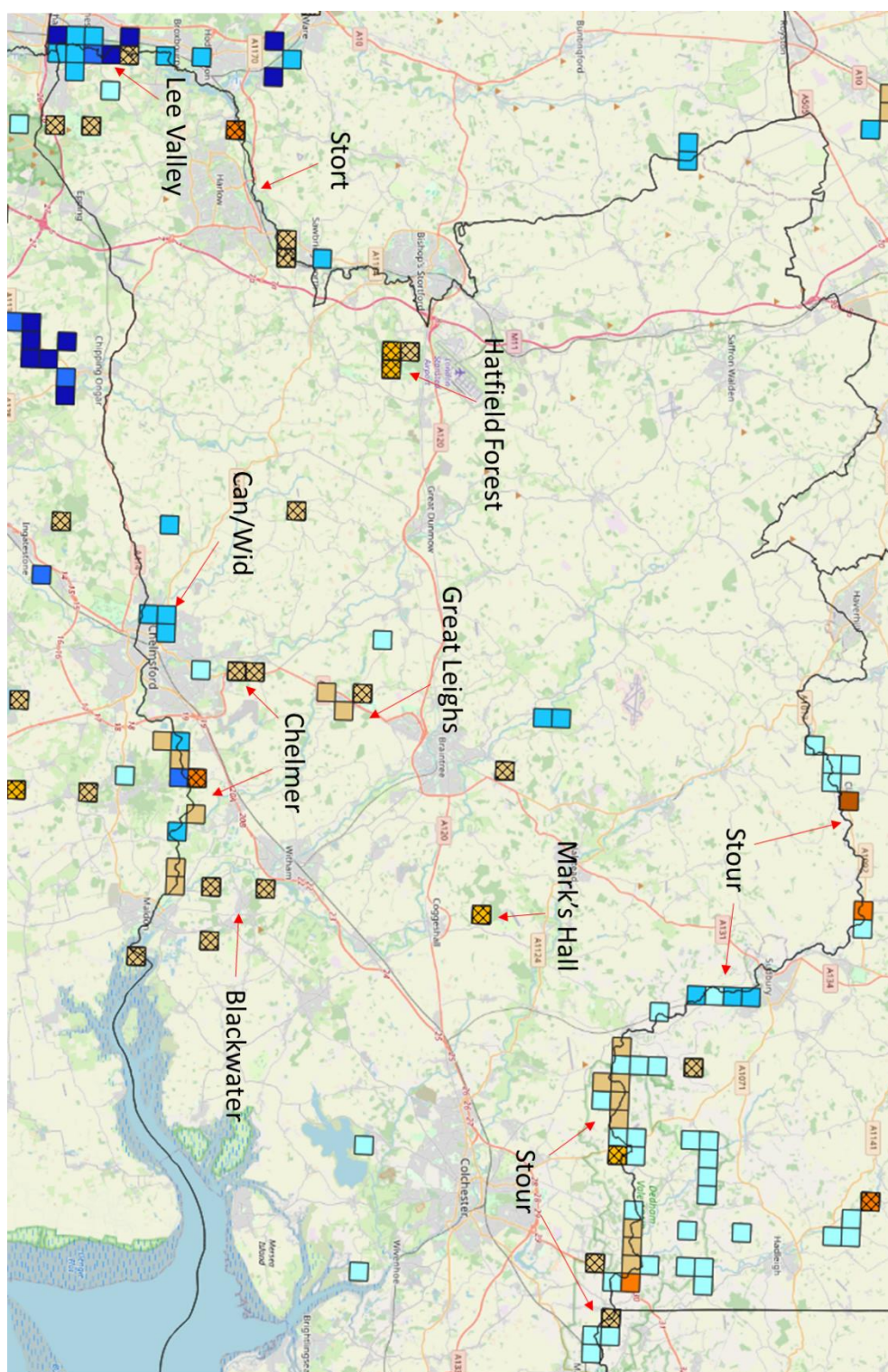
**River Chelmer:** the short section of the river that falls within the Vice County produced significant records between Chelmsford and its coastal tributary ([Chelmer \(d/s confluence with Can\); poor ecological status](#)).

**River Roding:** only recorded on a short section of the river near Abridge; all other monads with historic records have not produced sightings since the 1990s ([Lower Roding \(Cripsey Bk to Loughton\); moderate ecological status](#), [Lower Roding \(Cripsey Bk to Loughton\); Moderate ecological status](#)).

**Additional sites:** notable records came from novel monads at **RHS Hyde Hall** and **Hanningfield Reservoir**.



## 19. North Essex



**Map 27:** *Platycnemis pennipes* records mapped at monad level for North Essex.

**Vice County summary of *Platycnemis pennipes* distribution: well documented in recent years on the north-western waterways of the Vice County and multiple new sites were identified; however the species may have become more scarce around the Lee Valley.**

**River Blackwater:** produced its first associated records ([Blackwater \(Combined Essex\); moderate ecological status](#)).

**River Can/Wid:** the rivers' confluence has a cluster of historic records, the most recent dating from 2000 ([Can; poor ecological status](#)) ([Wid; poor ecological status](#)).

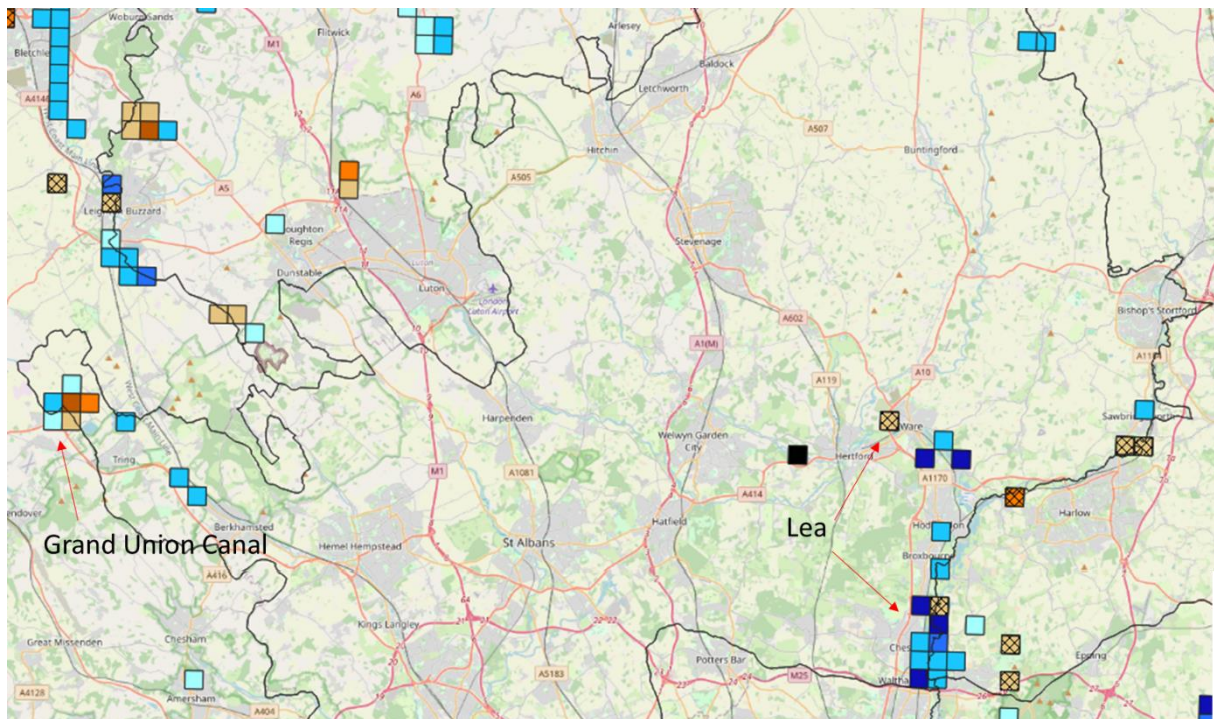
**River Chelmer:** the section of the river that falls within the Vice County produced significant records between Little Waltham and its coastal tributary ([Chelmer \(Gt. Easton - R. Can\); moderate ecological status](#), [Chelmer \(d/s confluence with Can\); poor ecological status](#)).

**River Stort and Navigation:** recorded between Roydon and Sawbridgeworth confirming the species continued presence ([Stort and Navigation, Harlow to Lee; moderate ecological status](#)).

**River Stour:** recorded along the river on the Vice County's northern boundary from its estuary up to Clare ([Stour \(d/s R. Brett\); moderate ecological status](#), [Stour \(Lamarsh - R. Brett\); moderate ecological status](#), [Stour \(Wixoe - Lamarsh\); moderate ecological status](#)).

**Additional sites:** the **Lee Valley** produced a single sighting despite the species being historically well documented within the site. However, the species was confirmed to still be present in the wetlands around **Great Leighs** and records came from novel monads at **Hatfield Forest** and **Mark's Hall Estate**.

## 20: Hertfordshire



**Map 28:** *Platycnemis pennipes* records mapped at monad level for Hertfordshire.

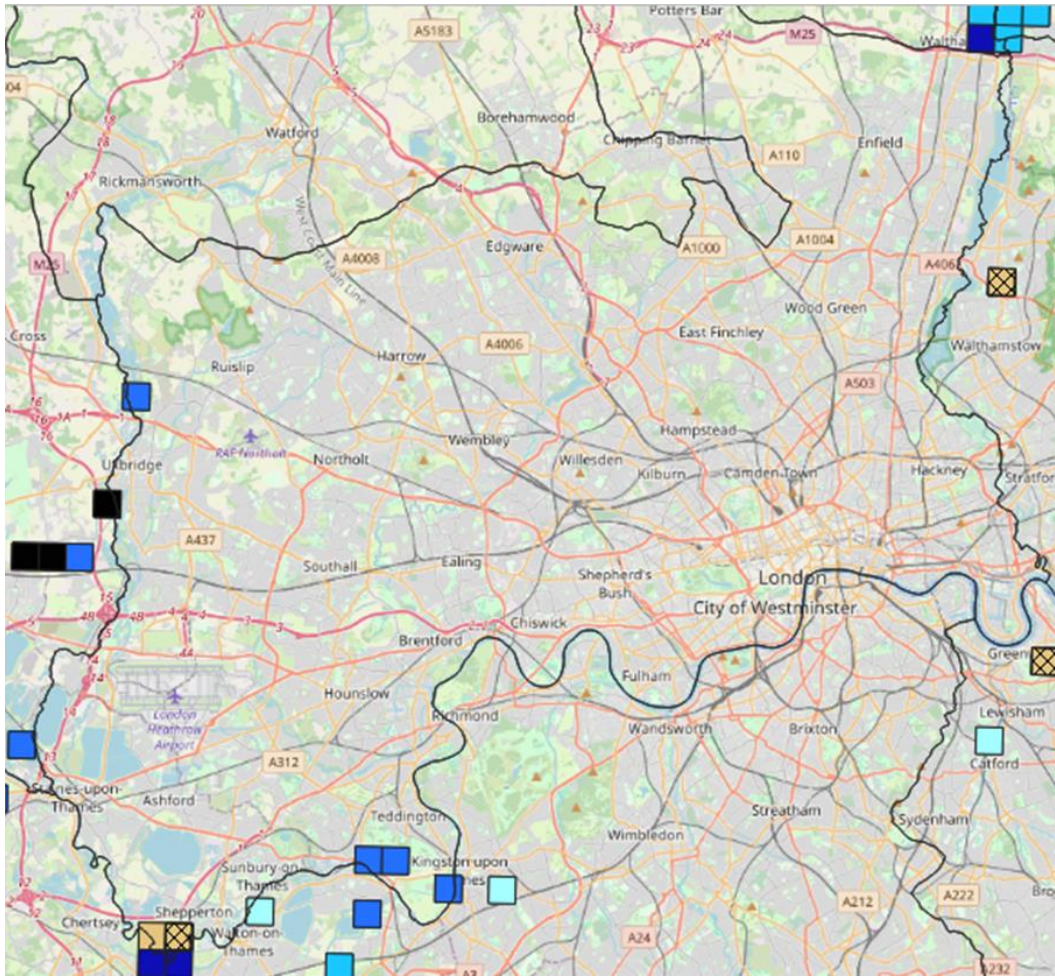
**Vice County summary of *Platycnemis pennipes* distribution:** the species has never been widespread within the Vice County but was confirmed to still be present on its two historic waterways.

**Grand Union Canal:** still present within the short section that has produced historical records.

**River Lea:** confirmed as still present on the river between Ware and Sawbridgeworth ([Stort and Navigation, Harlow to Lee; moderate ecological status](#)).



21: Middlesex



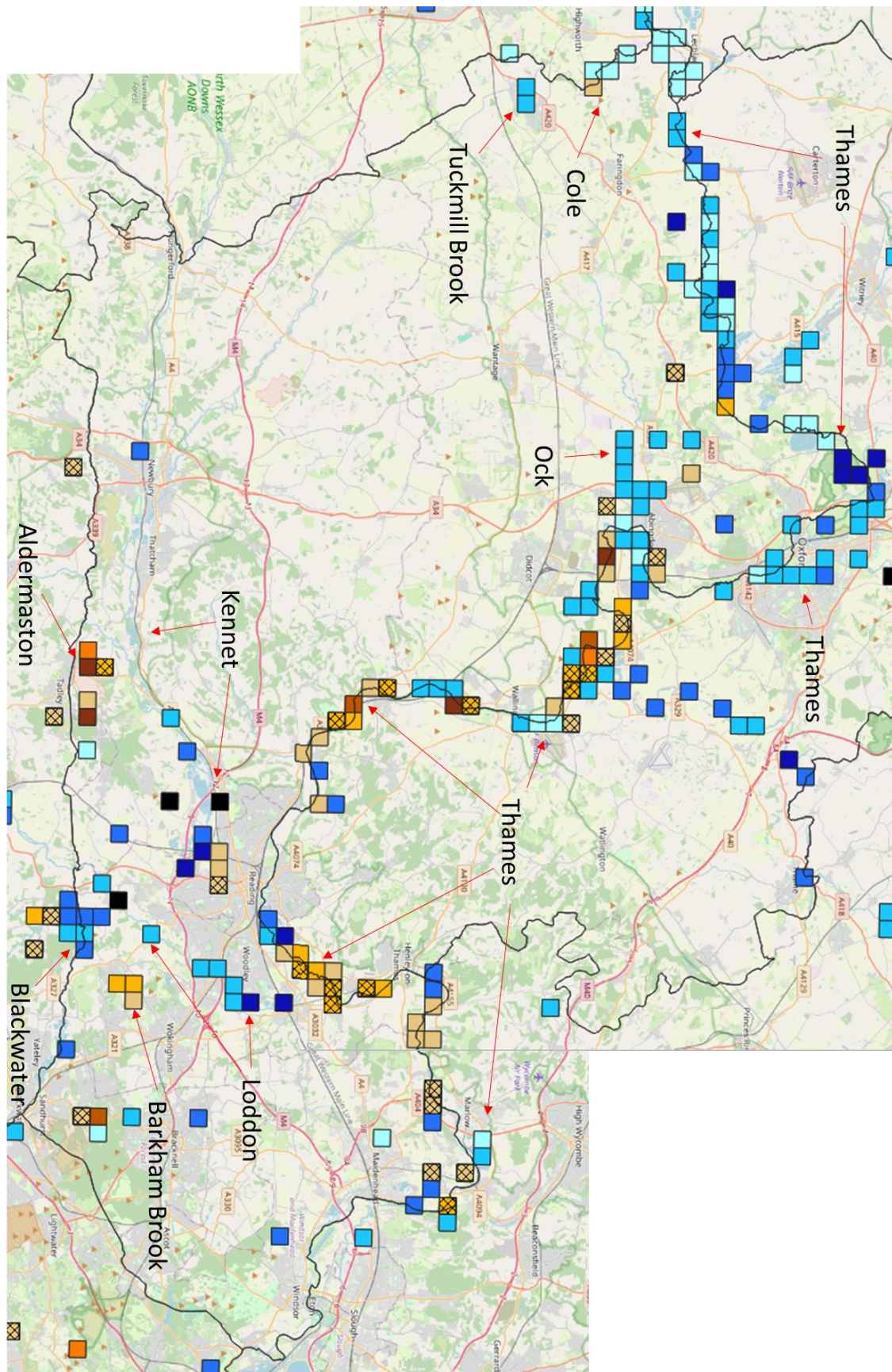
**Map 29:** *Platycnemis pennipes* records mapped at monad level for Middlesex.

**Vice County summary of *Platycnemis pennipes* distribution: species continues to be absent from this Vice County.**

**Grand Union Canal:** one monad, which is located north of Uxbridge, has historic records.



## 22: Berkshire



**Map 30:** *Platycnemis pennipes* records mapped at monad level for Berkshire.

**Vice County summary of *Platycnemis pennipes* distribution:** while the species may have been lost along some waterways such as Blackwater, substantial numbers of records came from many of its historic waterways as well as novel monads.

**Barkham Brook:** recorded on the brook near Arborfield Green ([Barkham Brook; moderate ecological status](#)).

**Blackwater River:** no recent (2008 onwards) records on the river within the Vice County ([Blackwater \(Bramshill to River Loddon confluence at Swallowfield\); moderate ecological status](#), [Blackwater \(Hawley to Whitewater confluence at Bramshill\); moderate ecological status](#)).

**River Cole:** notable recent records on the lower reaches of the river ([Cole \(Bower Bridge to Thames\); moderate ecological status](#)).

**River Kennet:** records came from Fobney Island Nature Reserve in Reading but no further west despite there being historic records along the Kennet from Reading to Newbury ([Lower Kennet \(Sheffield Bottom to Reading\); moderate ecological status](#)).

**River Loddon:** no recent sightings (2008 onwards) have been recorded on the river within the Vice County ([Loddon \(Swallowfield to River Thames confluence\); moderate ecological status](#), [Loddon \(Sherfield on Loddon to Swallowfield\); moderate ecological status](#)).

**River Ock:** no recent records (2008 onwards) ([Sandford Brook \(source to Ock\); poor ecological status](#)).

**River Thames:** recorded on the river from Maidenhead to Lechlade-on-Thames in recent years (2008 onwards) ([Thames \(Reading to Cookham\); moderate ecological status](#), [Thames Wallingford to Caversham; moderate ecological status](#), [Thames \(Evenlode to Thame\); poor ecological status](#), [Thames \(Leach to Evenlode\); poor ecological status](#)).

**Tuckmill Brook:** hasn't produced records since 2003 ([Tuckmill Brook; poor ecological status](#)).

**Additional sites:** notable population in the wetlands south of **Aldermaston**.



**Vice County summary of *Platycnemis pennipes* distribution: two of the species' main historic waterways, the River Cherwell and Evenlode have produced few sightings in recent years suggesting that its presence along these rivers and within the Vice County may be declining.**



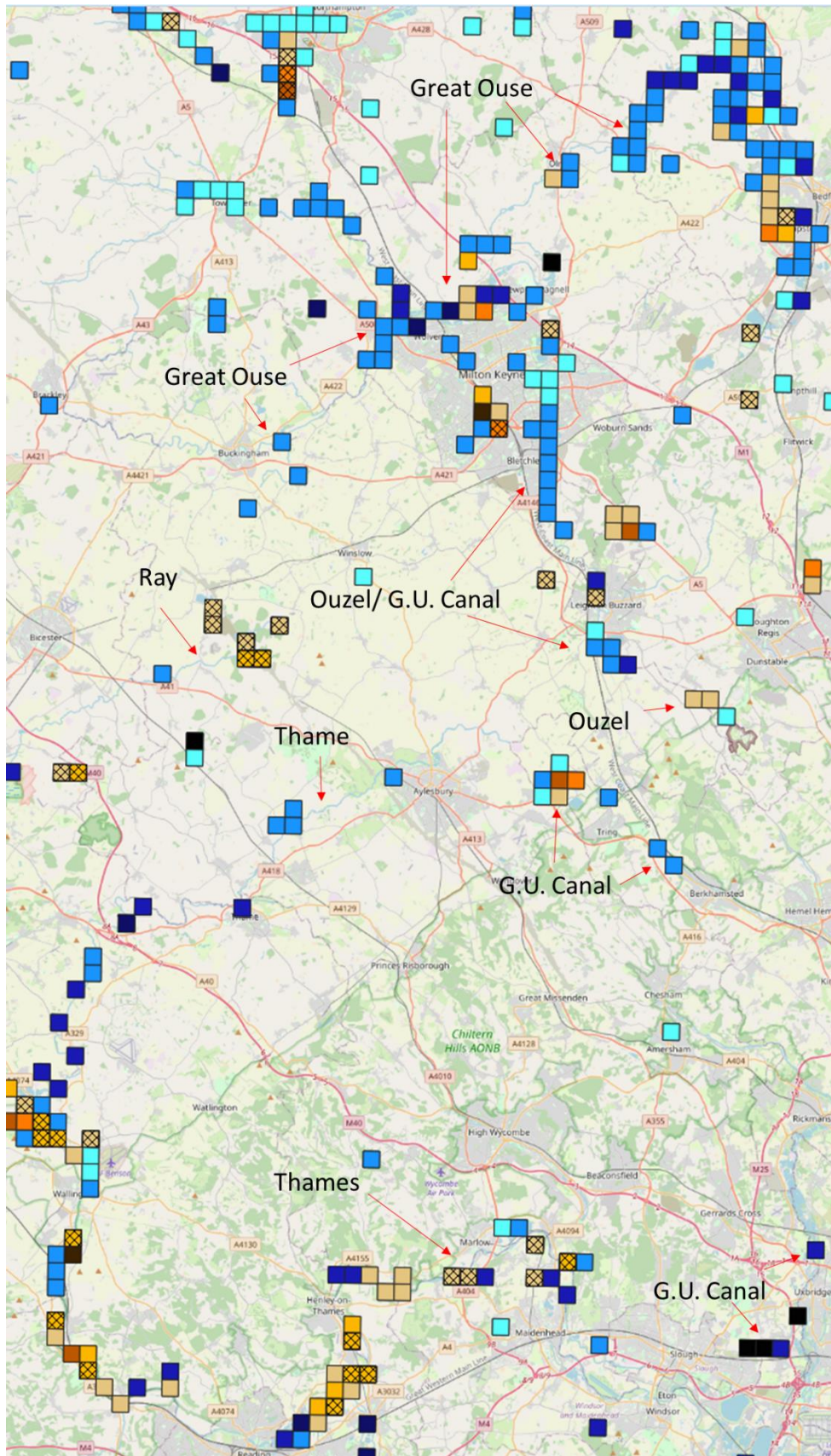
**River Cherwell:** only a few monads along the river from Oxford to the Vice County northern boundary near Claydon have produced records after the 1998-2007 data period ([Cherwell \(Ray to Thames\)](#) and [Woodeaton; poor ecological status](#), [Cherwell \(Bletchington to Ray\); moderate ecological status](#), [Cherwell \(Nell Bridge to Bletchington\); moderate ecological status](#), [Cherwell \(Cropredy to Nell Bridge\); moderate ecological status](#)).

**River Evenlode:** the section of the river that falls within the Vice County has not produced any records after the 1998-2007 data period ([Evenlode \(Glyme to Thames\); poor ecological status](#), [Evenlode \(Bledington to Glyme confluence\); moderate ecological status](#)).

**River Thames:** recorded on the river from Henley-on-Thames to Lechlade-on-Thames in recent years (2008 onwards) ([Thames \(Reading to Cookham\); moderate ecological status](#), [Thames Wallingford to Caversham; moderate ecological status](#), [Thames \(Evenlode to Thame\); poor ecological status](#), [Thames \(Leach to Evenlode\); poor ecological status](#)).

**Additional sites:** a new site was identified on the eastern boundary in **Whitecross Green Wood Nature Reserve**.

## 24. Buckinghamshire



**Map 32:** *Platycnemis pennipes* records mapped at monad level for Buckinghamshire.

**Vice County summary of *Platycnemis pennipes* distribution:** not widespread and the lack of recent records along a number of the species' historic waterways such as the River Great Ouse suggests its range is becoming more restricted.

**Grand Union Canal:** a few monads on the canal near Wilstone produced sightings; historic records are mapped on the canal near Uxbridge and Milton Keynes.

**River Great Ouse:** most records are from the 1998-2007 dataset or older stretching from Turvey to Buckingham ([Ouse \(Buckingham to Cosgrove\); moderate ecological status](#), [Ouse \(Wolverton to Newport Pagnell\); moderate ecological status](#), [Ouse \(Wolverton to Newport Pagnell\); moderate ecological status](#)).

**River Ouzel:** only produced records south of Leighton Buzzard; all records between Leighton Buzzard and Milton Keynes are from the 1998-2007 dataset or earlier ([Ouzel US Caldecote Mill; moderate ecological status](#)). However, a few monads with more recent records are located within the catchments south of Leighton Buzzard ([Ouzel \(US Clipstone Brook\); moderate ecological status](#)).

**River Ray:** six monads within the river's upstream catchment and its tributaries produced records ([Ray and tributaries NorthEast of Grendon; moderate ecological status](#)).

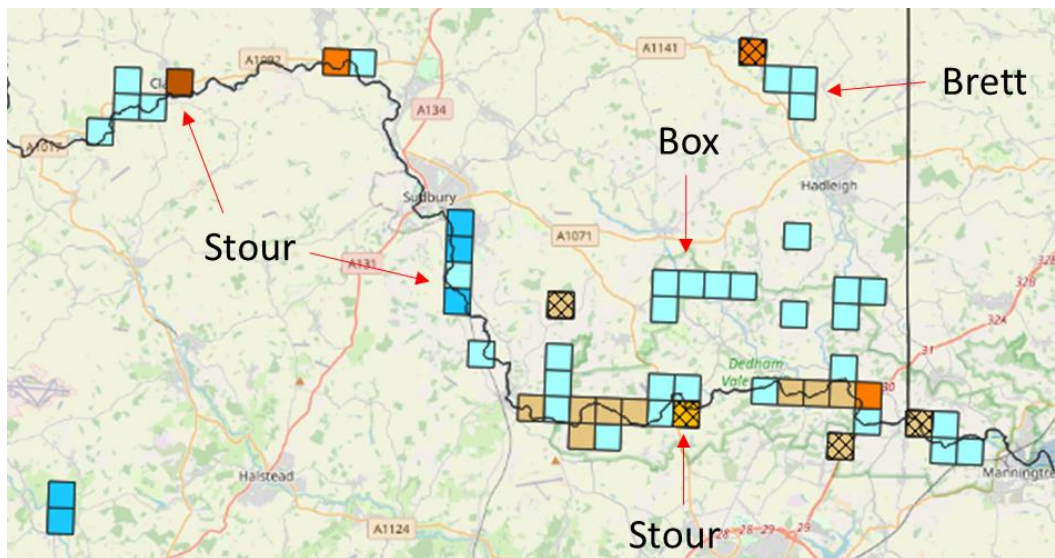
**River Thames:** recorded from Maidenhead to Henley-on-Thames ([Thames \(Reading to Cookham\); moderate ecological status](#)).

**River Thame:** the section of the river that runs through the Vice County has not produced any records since 2003 ([Thame \(Aylesbury to Scotsgrove Brook\); moderate ecological status](#)).

**Additional site:** records came from a number of lakes and wetlands in and around **Milton Keynes**.



## 25-26: East and West Suffolk



**Map 33:** *Platycnemis pennipes* records mapped at monad level for East and West Suffolk.

**Vice County summary of *Platycnemis pennipes* distribution: limited to the south of Suffolk.**

**River Box:** multiple monads with recent records (2008-2017) ([Box; moderate ecological status](#)).

**River Brett:** recent records (2008 onwards) north of Hadleigh ([Brett; moderate ecological status](#)).

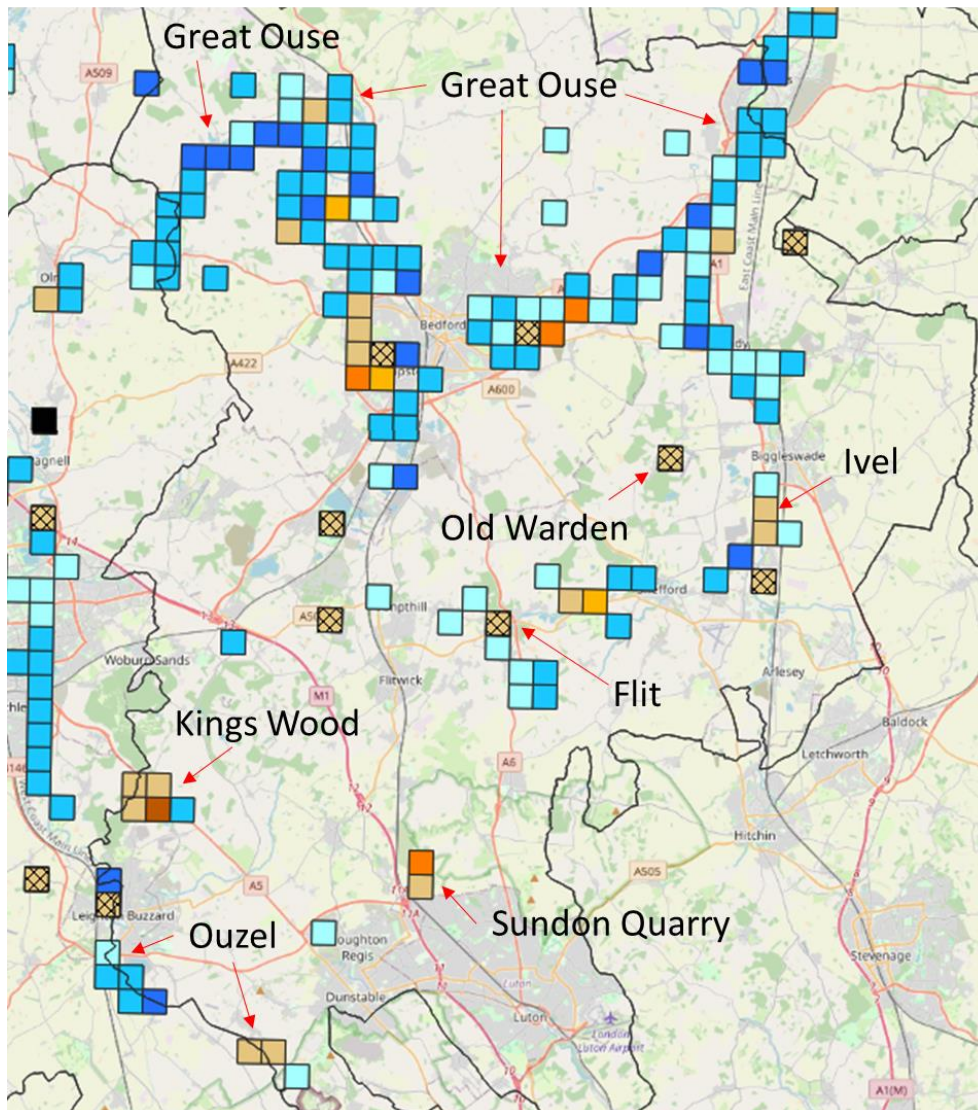
**River Stour:** records came from the river on the Vice County's southern boundary from its estuary up to Clare ([Stour \(d/s R. Brett\); moderate ecological status](#), [Stour \(Lamarsh - R. Brett\); moderate ecological status](#), [Stour \(Wixoe - Lamarsh\); moderate ecological status](#)).

**Vice County summary of *Platycnemis pennipes* distribution: distribution is restricted to a handful of sites.**

**Additional sites:** the project confirmed the species continued presence at **Shepreth L Moor Nature Reserve** and identified a new site at **Cambourne Lakes**.



## 30: Bedfordshire



**Map 35:** *Platycnemis pennipes* records mapped at monad level for Bedfordshire.

**Vice County summary of *Platycnemis pennipes* distribution:** species appears to have a stable presence within the county with many recent sightings along its historical waterways.

**River Flit:** recent sightings (2008 onwards) recorded from the rivers confluence with the River Ivel and Clophill ([Flit and Ivel Navigation d/s of Shefford; moderate ecological status](#)).

**River Great Ouse:** recent sightings (2008 onwards) recorded along the river from St Neots to Newton Blossomville ([Ouse \(Newport Pagnell to Roxton\); moderate ecological status](#)).

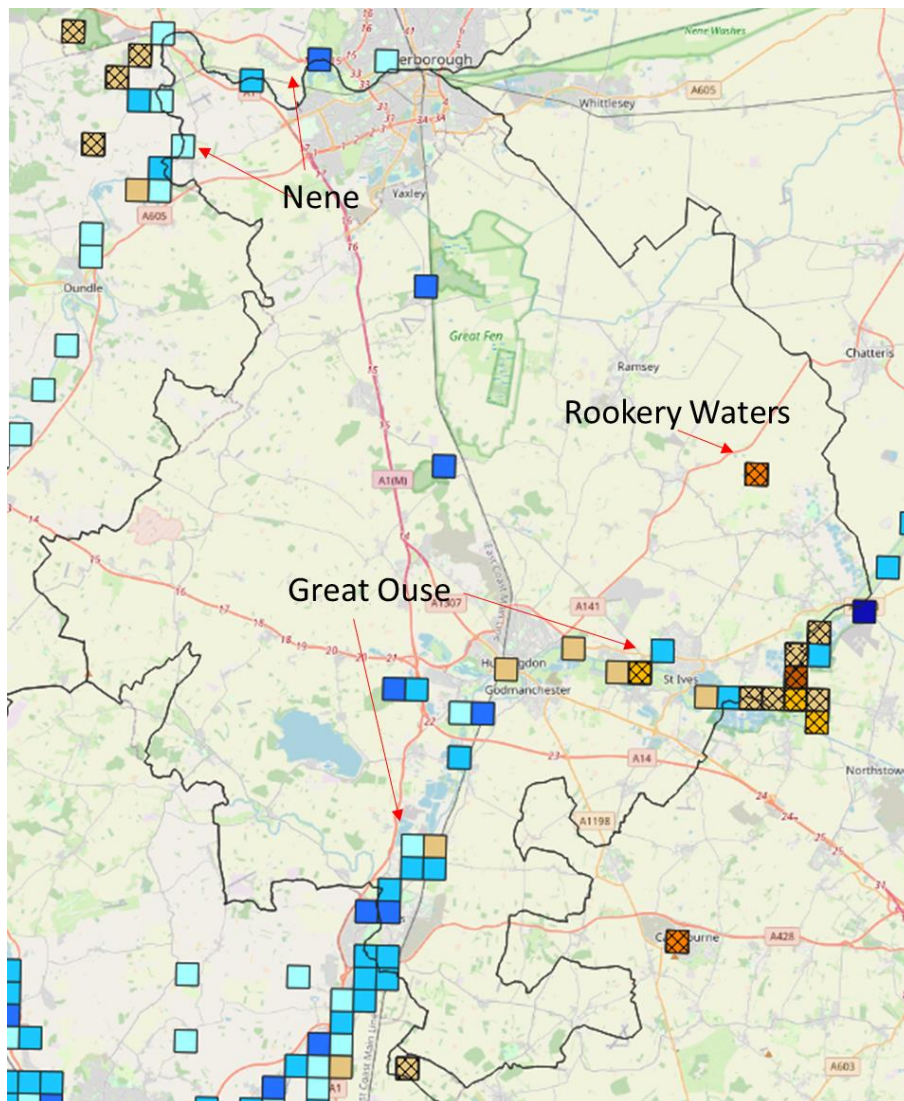
**River Ivel** recent sightings (2008 onwards) recorded along the river from Church End to its confluence with the River Great Ouse ([Ivel \(DS Langford to Roxton\); moderate ecological status](#)).

**River Ouzel:** records were taken within their historical range on the river between Whipsnade and Leighton Buzzard ([Ouzel \(US Clipstone Brook\); moderate ecological status](#)).



**Additional sites:** species confirmed to be still present at Sundon **Quarry** and **King's Wood**, and a novel wetland site near **Old Warden** was identified.

### 31: Huntingdonshire



**Map 36:** *Platycnemis pennipes* records mapped at monad level for Huntingdonshire.

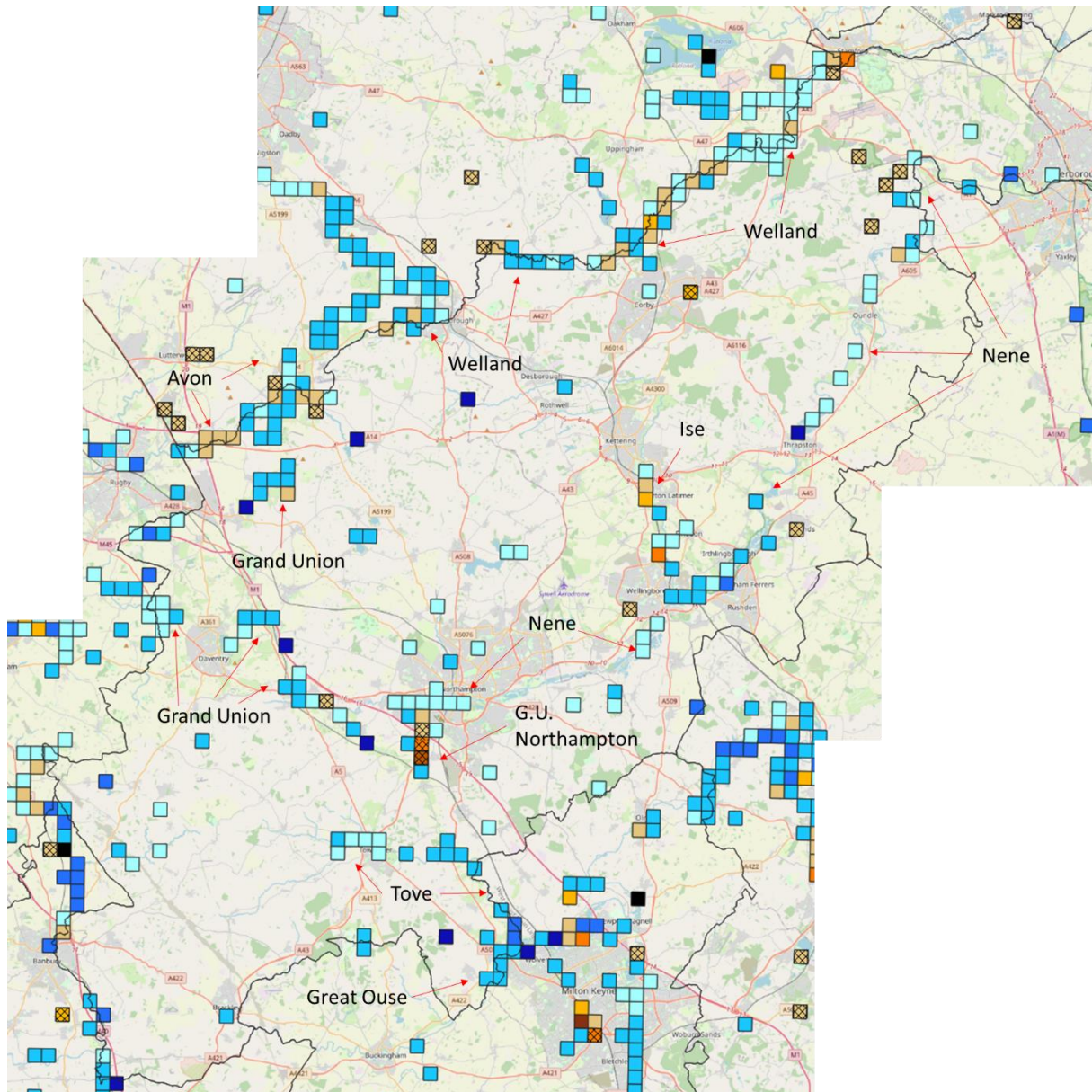
**Vice County summary of *Platycnemis pennipes* distribution:** distribution is limited; the species is most abundant along the Great Ouse.

**River Great Ouse:** the species was recorded on the river and its associated wetlands between Huntingdon and Earith (Great [Ouse \(Roxton to Earith\); moderate ecological status](#)).

**River Nene:** there are scattered monads with historic records located on the river between Peterborough and Fotheringhay ([Nene - Islip to tidal; moderate ecological status](#)).

**Additional sites:** a new site was discovered at **Rookery Waters Fishery, Pidley**.

## 32: Northamptonshire



**Map 37:** *Platychnemis pennipes* records mapped at monad level for Northamptonshire.

**Vice County summary of *Platychnemis pennipes* distribution:** the species is widespread across the Vice County.

**Grand Union Canal:** recent records (2008 onwards) along the eastern boundary of the Vice County; multiple monads on the Northampton Arm produced records during the project.

**River Avon:** recorded during the project period and in recent years (2008-2017) from Catthorpe to Welford ([Avon \(Warks\) - source to Clay Coton-Yelvertoft Bk; poor ecological status](#)).

**River Great Ouse:** recorded on the river and its associated wetlands on south-eastern edge of Milton Keynes ([Ouse \(Buckingham to Cosgrove\); moderate ecological status](#), [Ouse](#)



[\(Wolverton to Newport Pagnell\); moderate ecological status](#), [Ouse \(Newport Pagnell to Roxton\); moderate ecological status](#)).

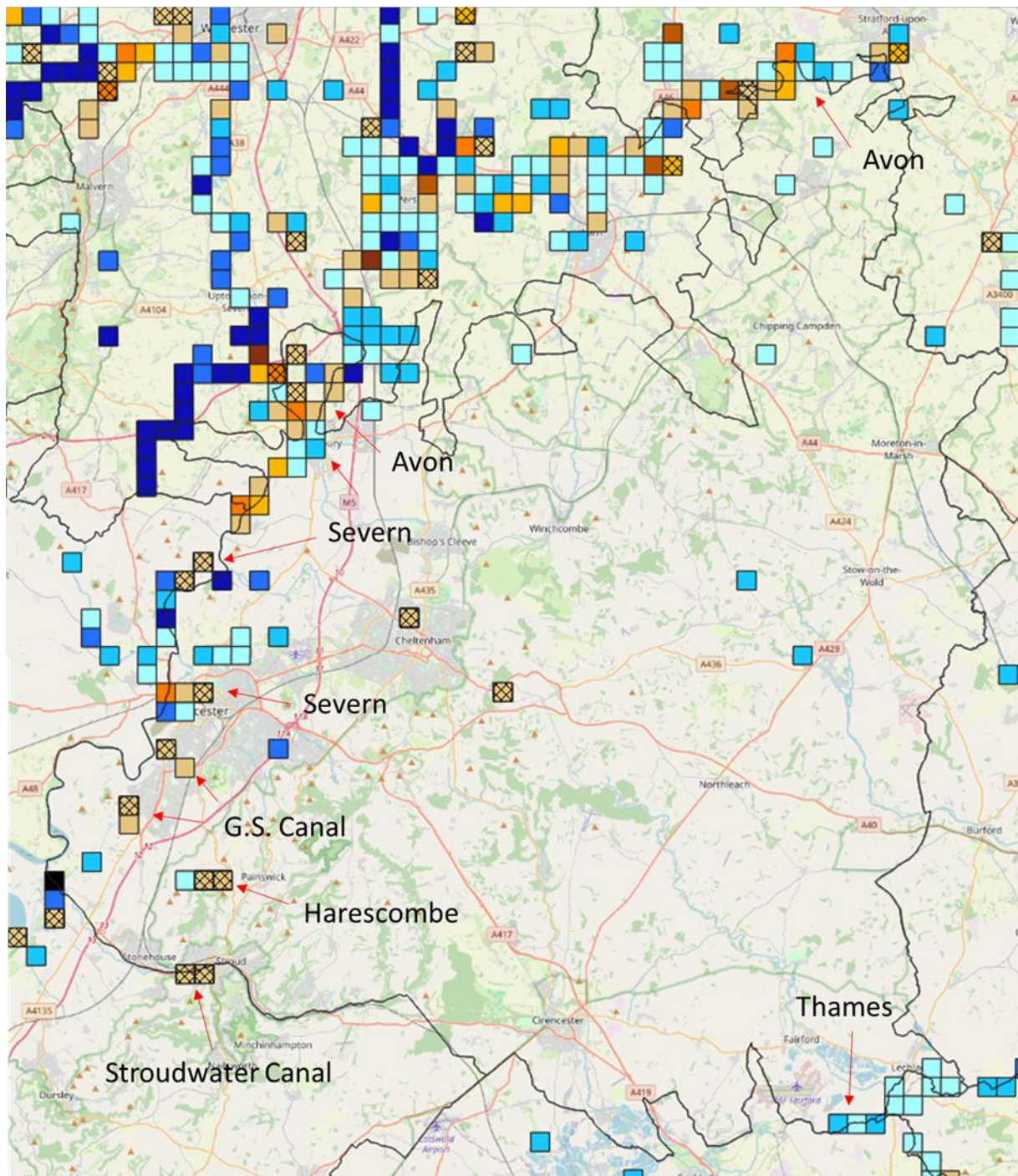
**River Ise:** recent records (2008 onwards) came from Kettering to the river's confluence with the River Nene ([Ise; poor ecological status](#)).

**River Nene:** recent records (2008 onwards) from Northampton to Peterborough ([Nene - conf Brampton Branch to conf Ise; moderate ecological status](#), [Nene - conf Ise to Islip; moderate ecological status](#), [Nene - Islip to tidal; moderate ecological status](#)).

**River Tove:** recent historic records (2008-2017) around Towcester but none taken during the project period ([Tove \(DS Greens Norton\); moderate ecological status](#)).

**River Welland:** recent sightings (2008 onwards) have been recorded from Stamford to Market Harborough. ([Welland - conf Langton Bk to conf Gwash; moderate ecological status](#), [Welland - conf Jordan to conf Langton; moderate ecological status](#)).

### 33: East Gloucestershire



**Map 38:** *Platycnemis pennipes* records mapped at monad level for East Gloucestershire.

**Vice County summary of *Platycnemis pennipes* distribution:** most widespread to the west of the Vice County.

**Gloucester and Sharpness Canal:** recorded on the canal south of Gloucester.

**River Avon:** recorded on the short section that falls within the Vice County east of Twynning ([Avon conf Workman Br, Evesham to conf R Severn; moderate ecological status](#)) and north

of Welford-on-Avon ([Avon- Tramway Br Stratford to Workman Br Evesham; moderate ecological status](#)).

**River Thames:** a short section has historic records within the Vice County south of Lechlade, the most recent dating from 2010 ([Thames \(Churn to Coln\); moderate ecological status](#)).

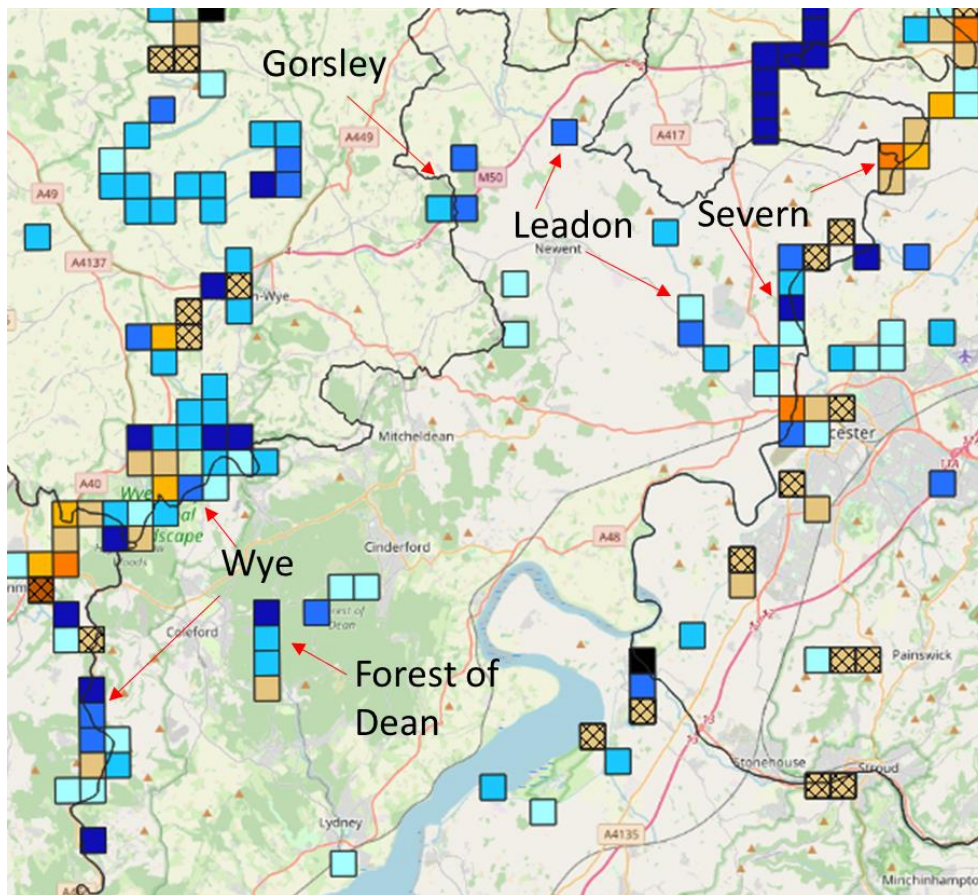
**River Severn:** well recorded from Gloucester to Shuthonger ([Severn \(E Channel\) - Horsebere Bk to Severn Est; moderate ecological status](#), [Severn - conf R Avon to conf Upper Parting; moderate ecological status](#), [Severn - conf R Teme to conf R Avon; Moderate ecological status](#)).

**Stroudwater Canal:** recorded for the first time on the canal south of Stroud.

**Additional sites:** confirmed to still be present on the wetlands south of Harescombe.



### 34: West Gloucestershire



**Map 39:** *Platycnemis pennipes* records mapped at monad level for West Gloucestershire.

**Vice County summary of *Platycnemis pennipes* distribution:** most common on the waterways around the Vice County boundaries.

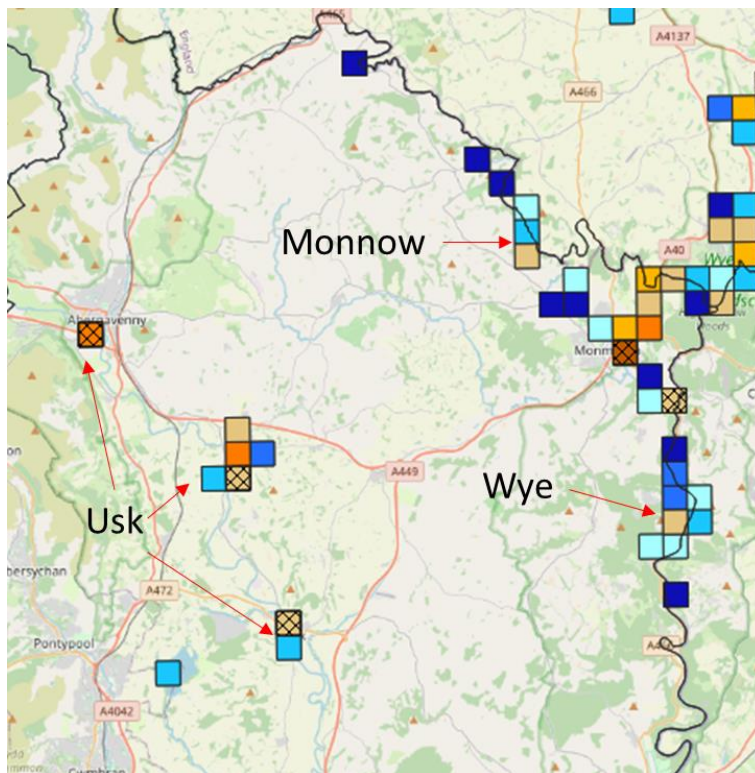
**River Leadon:** recent records (2008-2017) limited to lower reaches of the river near its confluence with the Severn ([Leadon - conf Preston Bk to conf R Severn \(W Channel\); moderate ecological status](#)).

**River Severn:** recorded from Gloucester to Shuthonger ([Severn \(E Channel\) - Horsebere Bk to Severn Est; moderate ecological status](#), [Severn - conf R Avon to conf Upper Parting; moderate ecological status](#), [Severn - conf R Teme to conf R Avon; Moderate ecological status](#)).

**River Wye:** recorded from Llandogo to where the river crosses the western Vice County border west of Ruardean ([Wye - conf Walford Bk to Bigsweir Br; moderate ecological status](#)).

**Additional sites:** limited recent sighting (2008 onwards) from the **Forest of Dean** wetlands; the woodlands near **Gorsley** haven't produced sightings since 1995.

### 35: Monmouthshire



**Map 40:** *Platycnemis pennipes* records mapped at monad level for Monmouthshire.

**Vice County summary of *Platycnemis pennipes* distribution:** mainly limited to three rivers.

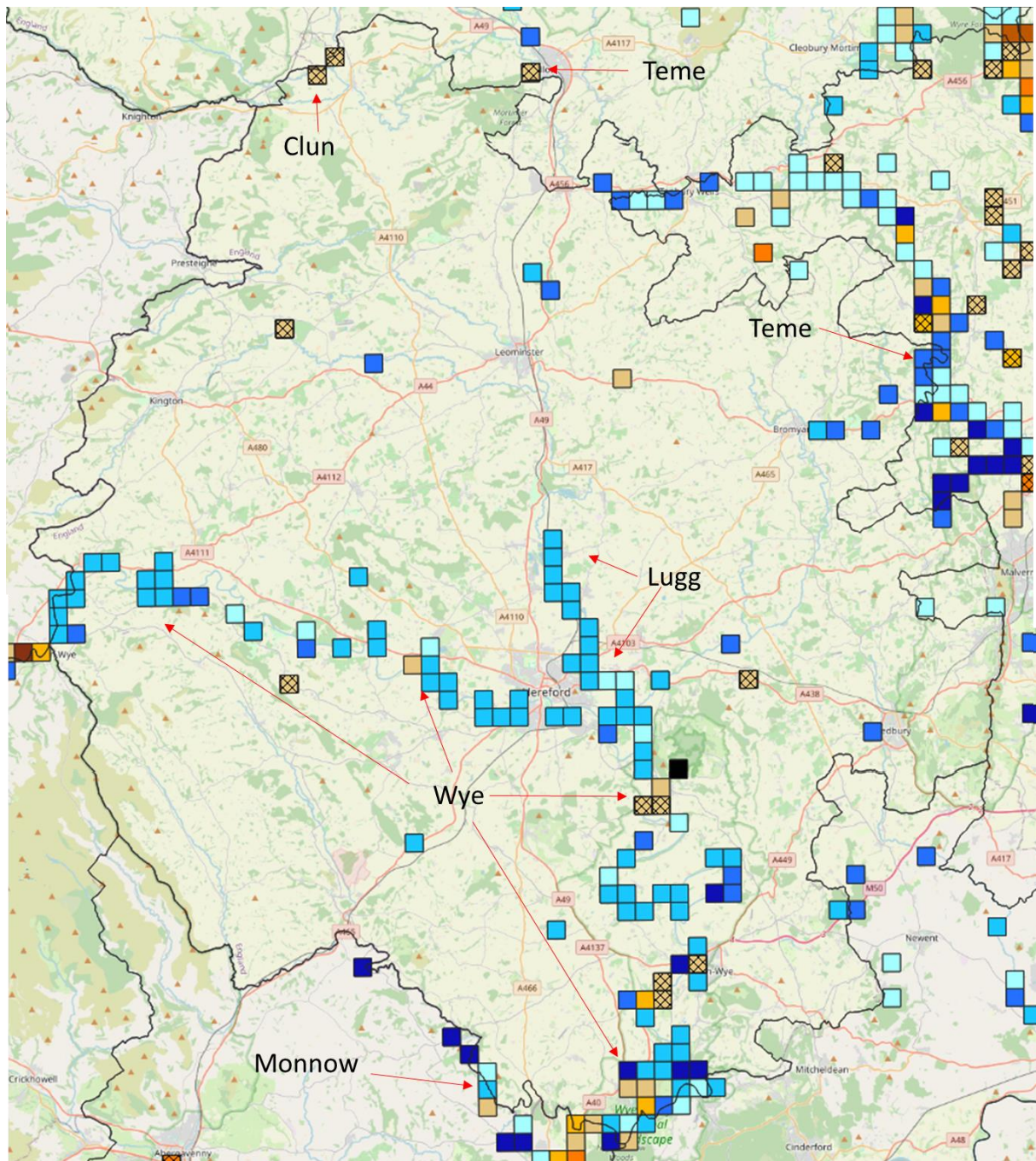
**River Monnow:** recent sightings (2008 onwards) are limited to the lower reaches below Llanrothal ([Monnow - conf Afon Honddu to conf R Wye; good ecological status](#)).

**River Usk:** scattered records came from Usk to Abergavenny ([Usk - conf R Gavenny to conf Olway Bk; moderate ecological status](#)).

**River Wye:** the short section that falls within the Vice County produced records from Llandogo to Monmouth ([Wye - conf Walford Bk to Bigsweir Br; moderate ecological status](#)).



### 36: Herefordshire



**Map 41:** *Platycnemis pennipes* records mapped at monad level for Herefordshire.

**Vice County summary of *Platycnemis pennipes* distribution:** the species is most prevalent in the Vice County within the catchment of the River Wye.

**River Clun:** a couple of sightings were made from the river around its confluence with the River Redlake; these are the first records from this river within the Vice County ([Clun - conf R Unk to conf R Teme; moderate ecological status](#), [Redlake - source to conf R Clun; moderate ecological status](#)).

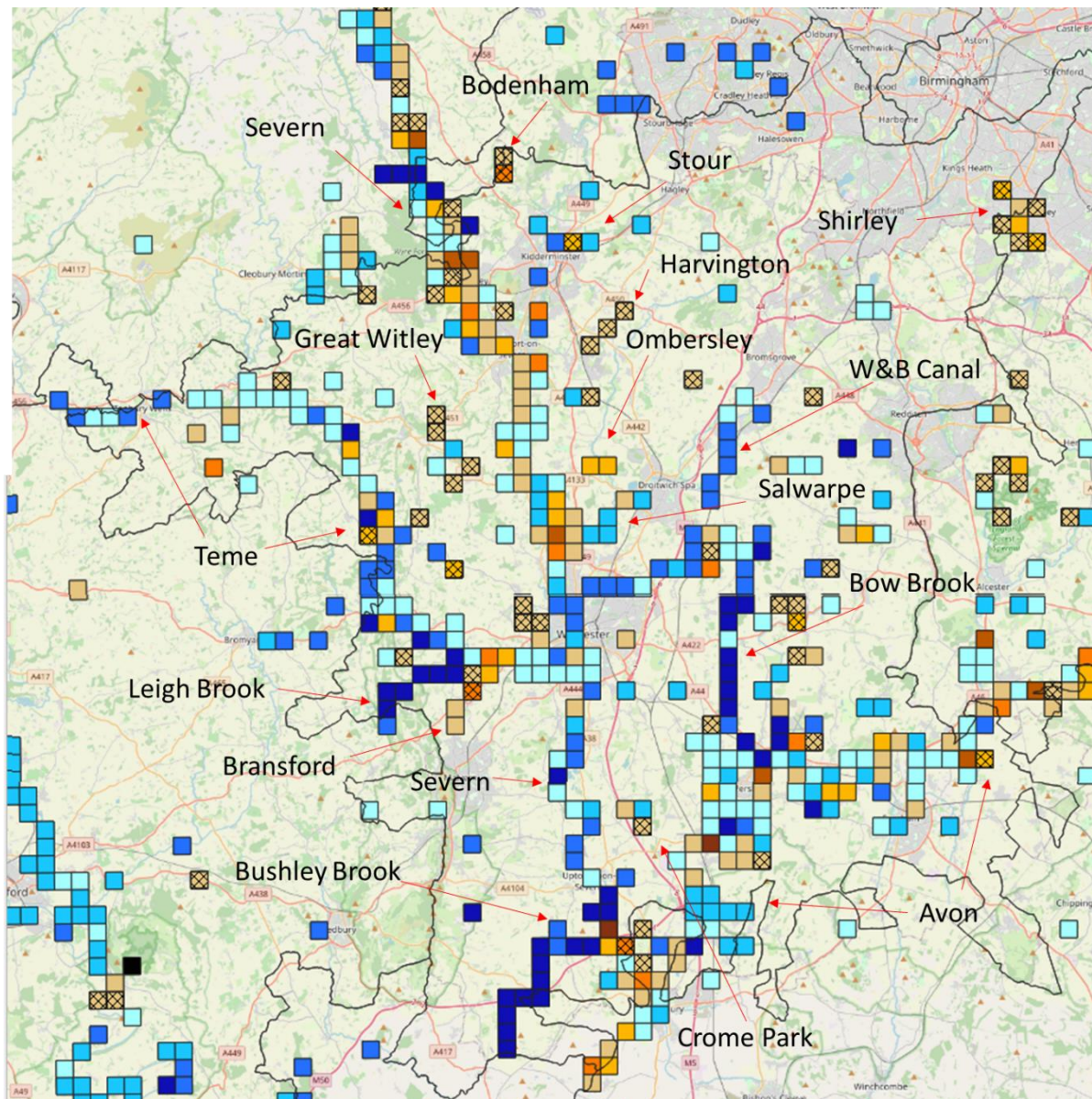


**River Lugg:** no records received during the project period; recent sightings (latest in 2014) limited to the lower reaches near its confluence with the Wye ([Lugg - conf R Arrow to conf R Wye; moderate ecological status](#)).

**River Teme:** a short section of the river which runs along the Vice County's eastern border east of Bromyard has historic records, the most recent record dating from 2012. Good numbers were recorded near Ludlow for the first time in a single monad ([Teme - conf R Onny to conf R Severn Water; good ecological status](#)).

**River Wye:** recorded between Monmouth and Hereford ([Wye - conf Walford Bk to Bigsweir Br; moderate ecological status](#), [Wye - conf Walford Bk to Bigsweir Br; moderate ecological status](#), [Wye - Hampton Bishop to conf Kerne Br; good ecological status](#)). However, there are a lack of recent records (2008 onwards) along its historic range from Hereford to Hay-on-Wye ([Wye - Bredwardine Br to Hampton Bishop; moderate ecological status](#), [Wye - Scithwen Bk to Bredwardine Br; good ecological status](#)).

### 37: Worcestershire



**Map 42:** *Platycnemis pennipes* records mapped at monad level for Worcestershire.

**Vice County summary of *Platycnemis pennipes* distribution:** appears to have been lost from some smaller waterways with the species becoming more reliant on lentic wetlands, especially fishing pools, for breeding habitat.

**Bushley Brook:** the brook and its tributaries appear to no longer support the species as they have not produced records since the 1990s (apart from near the confluence with the Severn) ([Bushley Longdon Bk - source to conf R Severn; poor ecological status](#)).

**Leigh Brook:** the brook and its tributaries appear to no longer support the species as none have been recorded on them since the 1990s ([Leigh-Cradley Bk - conf Suckley Bk to Teme; moderate ecological status](#)).

**River Avon:** sightings are consistently recorded from along the stretch of the river that lies within the Vice County between Tewkesbury and Marlcliff on the eastern Vice County border ([Avon conf Workman Br, Evesham to conf R Severn; moderate ecological status](#), [Avon- Tramway Br Stratford to Workman Br Evesham; moderate ecological status](#)).

**River Salwarpe:** historically the species has been recorded along the lower stretches near the confluence with the Severn; however there is a lack of records after the 2000s ([Salwarpe - conf Elmbridge Bk to conf R Severn; moderate ecological status](#)).

**River Severn:** recent records (2008 onwards) have been made along the stretch of the river that lies within the Vice County from Tewkesbury and Bewdley ([Severn - conf R Teme to conf R Avon; moderate ecological status](#), [Severn - conf R Stour to conf River Teme; moderate ecological status](#), [Severn - conf R Worfe to conf R Stour; moderate ecological status](#)).

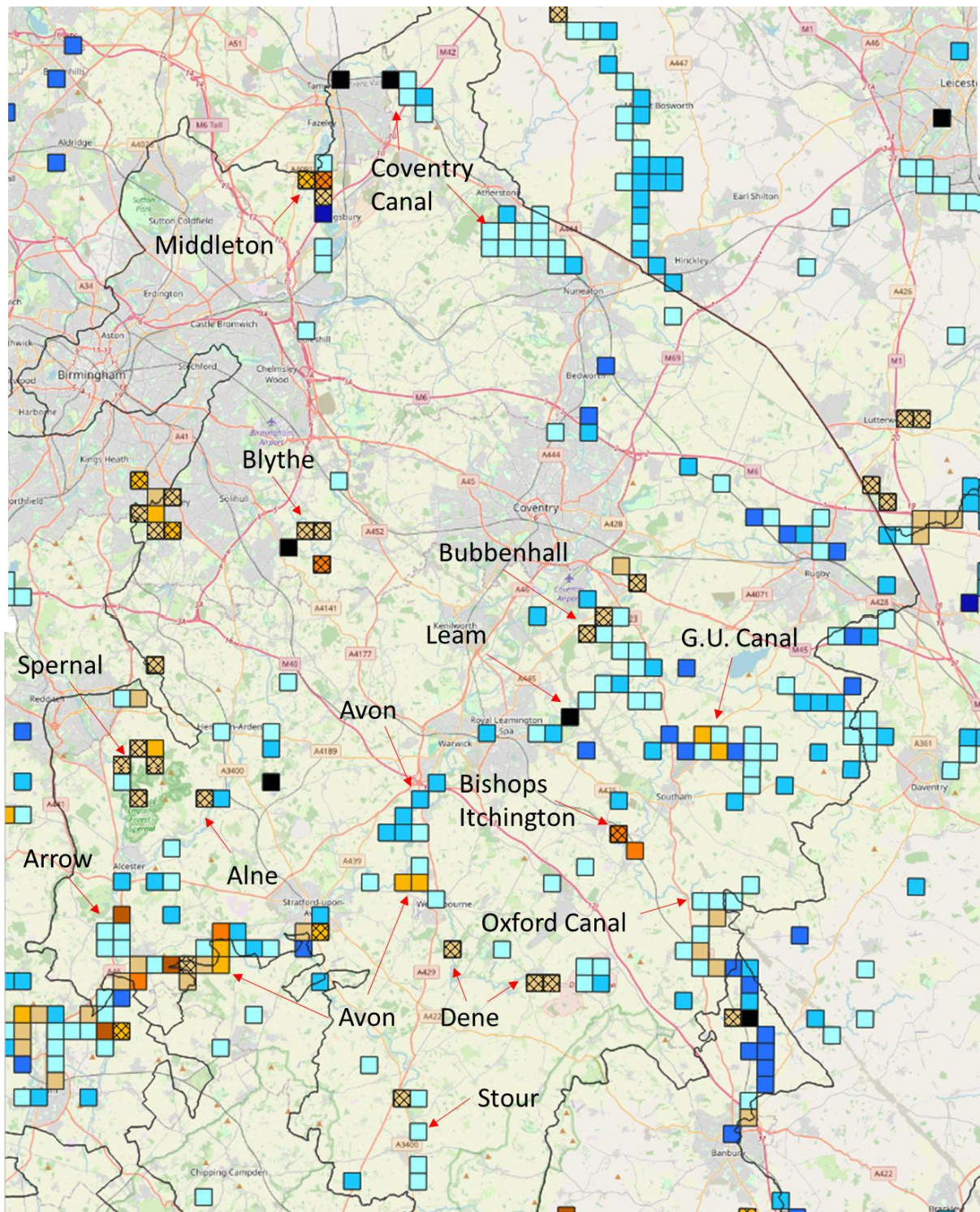
**River Teme:** records from the 2008-2017 dataset are mapped along the river from its confluence with the Severn to Tenbury Wells; scattered records were also collected along the river system during the project period ([Teme - conf R Onny to conf R Severn; good ecological status](#)).

**Worcester and Birmingham Canal:** most of its associated records are dated between 1988 and 1997.

**Additional sites:** multiple fishing pools in the **Harvington** area produced records for the first time, while other fishing pools south of **Bransford**, around **Great Witley** and **Ombersley** also produced good counts during the project period. The wetlands at **Croome Park** and around the River Cole in the **Shirley** area of Birmingham also produced records.



### 38: Warwickshire



**Map 43:** *Platycnemis pennipes* records mapped at monad level for Warwickshire.

**Vice County summary of *Platycnemis pennipes* distribution:** appears widespread within the Vice County; multiple new lentic wetlands were also identified.

**River Alne:** there have been a few recent records (2008 onwards) along the river up to Henley-in-Arden ([Alne - conf Claverdon Bk to conf R Arrow Water Body](#); moderate ecological

[status](#), [Alne conf Preston Bagot Bk to conf Claverdon Bk; poor ecological status](#), [Alne - source to conf Preston Bagot Bk; poor ecological status](#)).

**River Arrow:** still present on the river between Alcester and the confluence with the River Avon ([Arrow - conf R Alne to conf R Avon; moderate ecological status](#)).

**River Avon:** recorded from Cleeve Prior to Wellesbourne ([Avon conf Workman Br, Evesham to conf R Severn; moderate ecological status](#), [Avon- Tramway Br Stratford to Workman Br Evesham; moderate ecological status](#), [Avon \(Wark\) conf R Leam to Tramway Br, Stratford; moderate ecological status](#)).

**River Blythe:** recorded for the first time on the river near the confluence with Cuttle Brook ([Blythe from Source to Cuttle Brook; poor ecological status](#), [Blythe from Temple Balsall Brook to Patrick Bridge; moderate ecological status](#)).

**River Dene:** scattered recent records (2008 onwards) from its confluence with the Avon to Kineton ([Dene - Butlers Marston to conf R Avon; moderate ecological status](#)).

**River Leam:** recent records (2008 onwards) mapped between Royal Leamington Spa to Braunston on the Vice County's eastern boarder ([Leam - conf R Itchen to conf R Avon; poor ecological status](#), [Leam - conf Rains Bk to conf R Itchen; moderate ecological status](#), [Leam - source to conf Rains Bk; poor ecological status](#)).

**River Stour:** recent sightings (2008 onwards) recorded along a short stretch from Halford to Burmington ([Stour - conf Nethercote Bk to conf Back Bk; moderate ecological status](#)).

**Grand Union Canal:** recorded in recent years (2008 onwards) on a short stretch from Long Itchington to the confluence with the Oxford Canal.

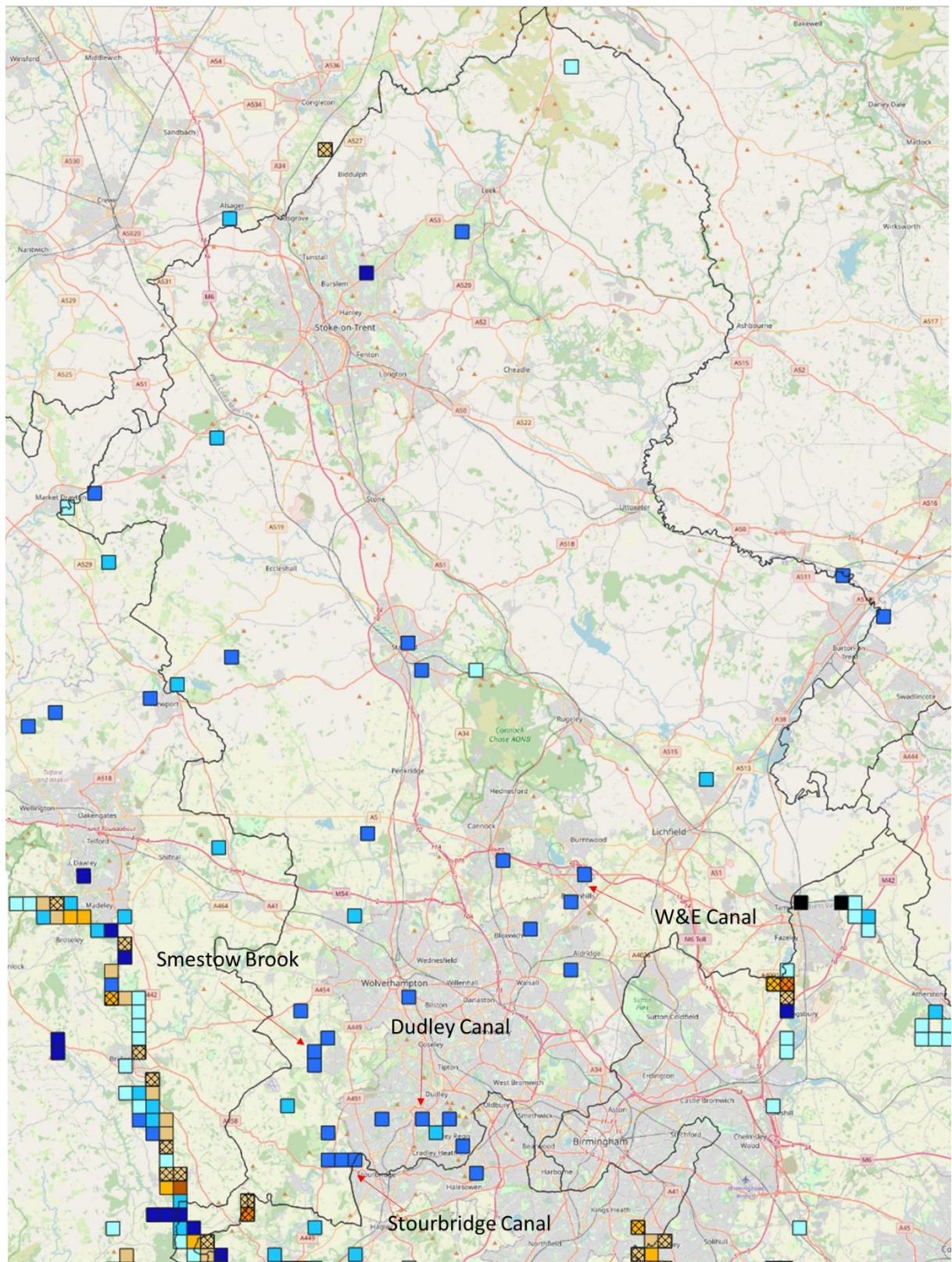
**Oxford Canal:** recorded in recent years (2008 onwards) on a short stretch of the river from the eastern Vice County border to Priors Hardwick.

**Coventry Canal:** recent records (2008-2017) have been reported from the canal south of Tamworth as well as between Atherstone and Nuneaton.

**Additional sites:** records came from the pools in **Spernal Forest**, the wetlands at **Bishop's Itchington**, **Bubbenhall** and **Middleton Lakes**.



### 39: Staffordshire



**Map 44:** *Platycnemis pennipes* records mapped at monad level for Staffordshire.



**Vice County summary of *Platycnemis pennipes* distribution:** species is at the edge of range; the Vice County has limited historical sightings and a lack of sightings since the 1990s.

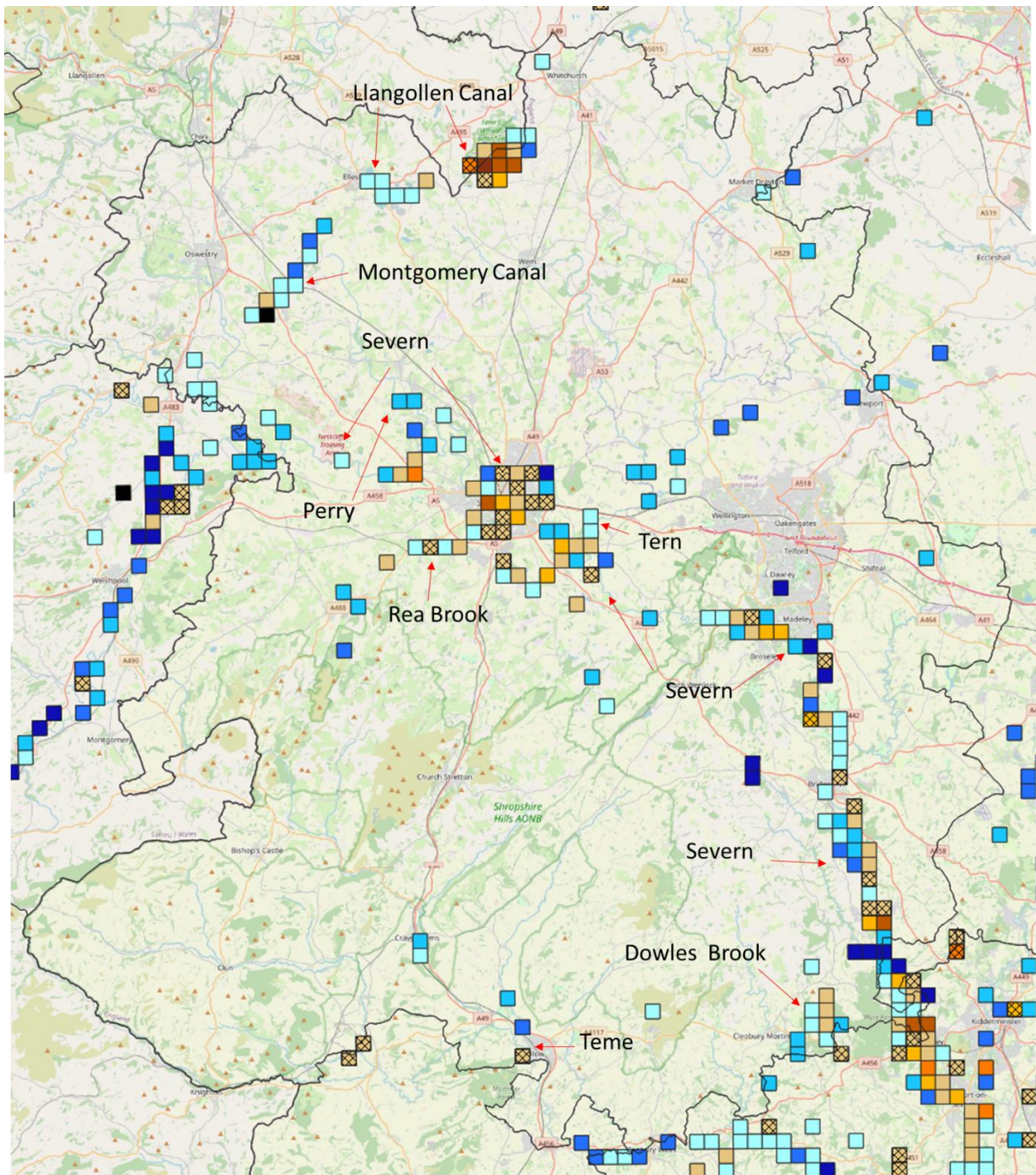
**Dudley Canal:** historical sightings (most recent dating from 2002) recorded on a short stretch north of Cradley Heath, Birmingham.

**Staffordshire and Worcestershire Canal:** historical sightings (1988-1997) recorded on the canal and nearby wetlands around Wombourne.

**Stourbridge Canal:** historical sightings (1988-1997) recorded on the canal near Stourton, Birmingham.

**Wyrley and Essington Canal:** historical sightings (most recent in 2002) recorded on a short stretch near Brownhills, Birmingham.

## 40: Shropshire



**Map 45:** *Platycnemis pennipes* records mapped at monad level for Shropshire.

**Vice County summary of *Platycnemis pennipes* distribution:** the River Sever and canals of north-west Shropshire make up the species' core distribution.

**Dowles Brook:** still present on the brook and its tributaries within the Wyre Forest ([Dowles Bk - source to conf R Severn; moderate ecological status](#)).

**Llangollen Canal:** still present on the canal between Ellesmere and Fenn's Bank.

**Montgomery Canal:** recent records (2008-2017) indicate the species is still present southeast of Owestry.

**Rea Brook:** still present along the brook downstream of Hinton ([Rea Bk - conf Pontesford Bk to conf R Severn; bad ecological status](#)).

**River Perry:** limited historical sightings and none since 2000 ([Perry - conf Tetchill Bk to conf R Severn; moderate ecological status](#)).

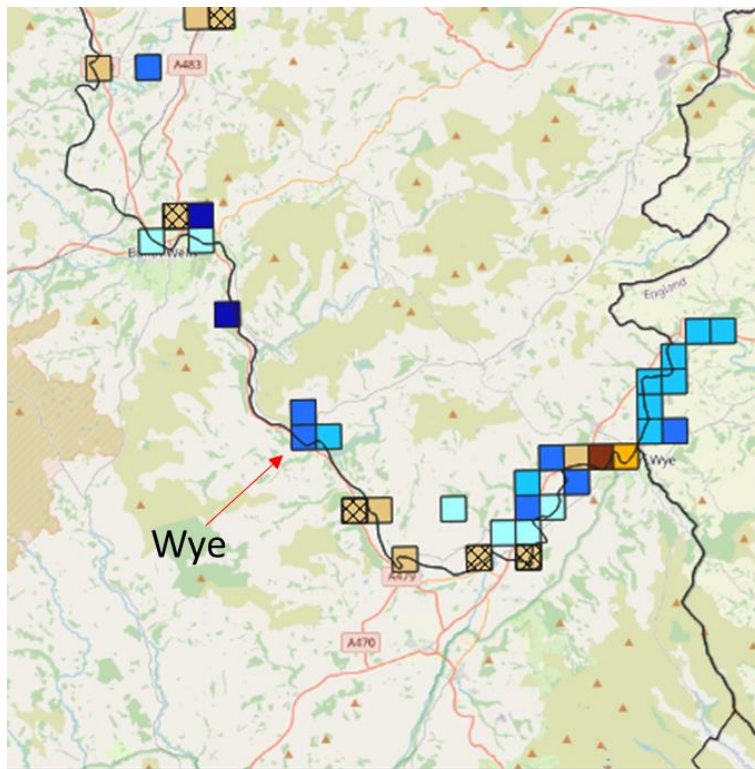
**River Severn:** recent records (2008 onwards) reported along the river within the Vice County ([Severn - conf R Worfe to conf R Stour; moderate ecological status](#), [Severn conf M Wenlock-Farley Bk to conf R Worfe; moderate ecological status](#), [Severn - Sundorne Bk to conf M Wenlock-Farley Bk; moderate ecological status](#), [Severn - conf Bele Bk to conf Sundorne Bk; moderate ecological status](#)).

**River Teme:** recorded for the first time at Ludlow, although historic records have come from close by on the Teme's tributary the River Corve ([Teme - conf R Onny to conf R Severn; good ecological status](#)).

**River Tern:** recent records (2008 onwards) reported from the river at Attingham Park ([Tern - conf R Roden to conf R Severn; moderate ecological status](#)).



## 42: Breconshire

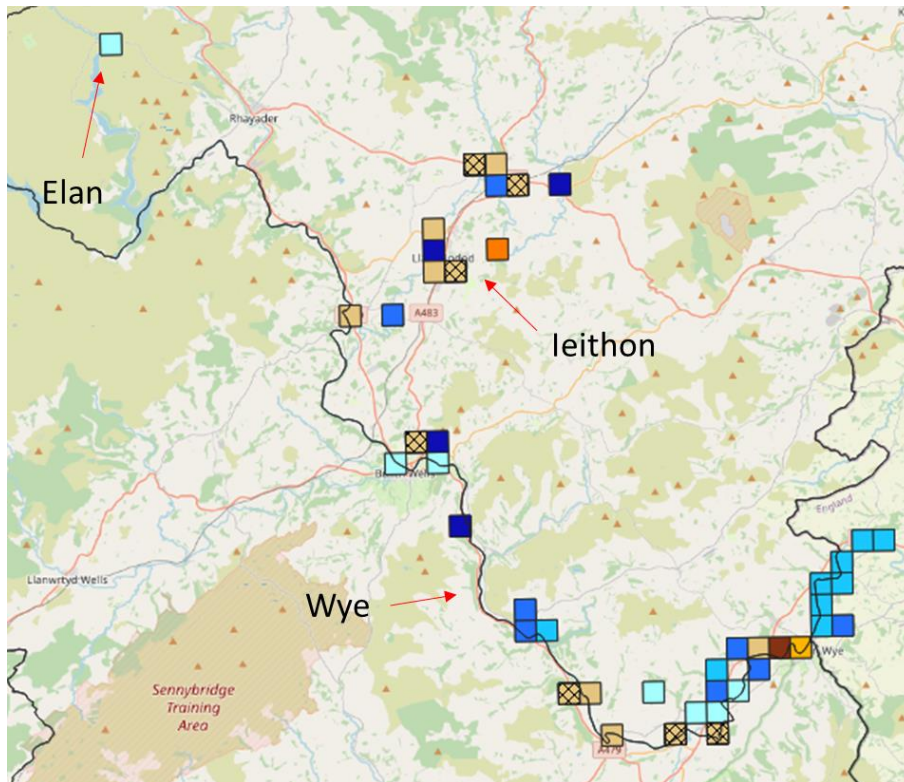


**Map 46:** *Platycnemis pennipes* records mapped at monad level for Breconshire.

**Vice County summary of *Platycnemis pennipes* distribution:** edge of the species range; distribution limited to the Wye on the northern Vice County border.

**River Wye:** species was confirmed as still present along the river from Newbridge-on-Wye to Hay-on-Wye ([Wye - Scithwen Bk to Brewardine Br; good ecological status, Wye - conf R Irfon to Scithwen Bk](#)).

## 43: Radnorshire



**Map 47:** *Platycnemis pennipes* records mapped at monad level for Radnorshire.

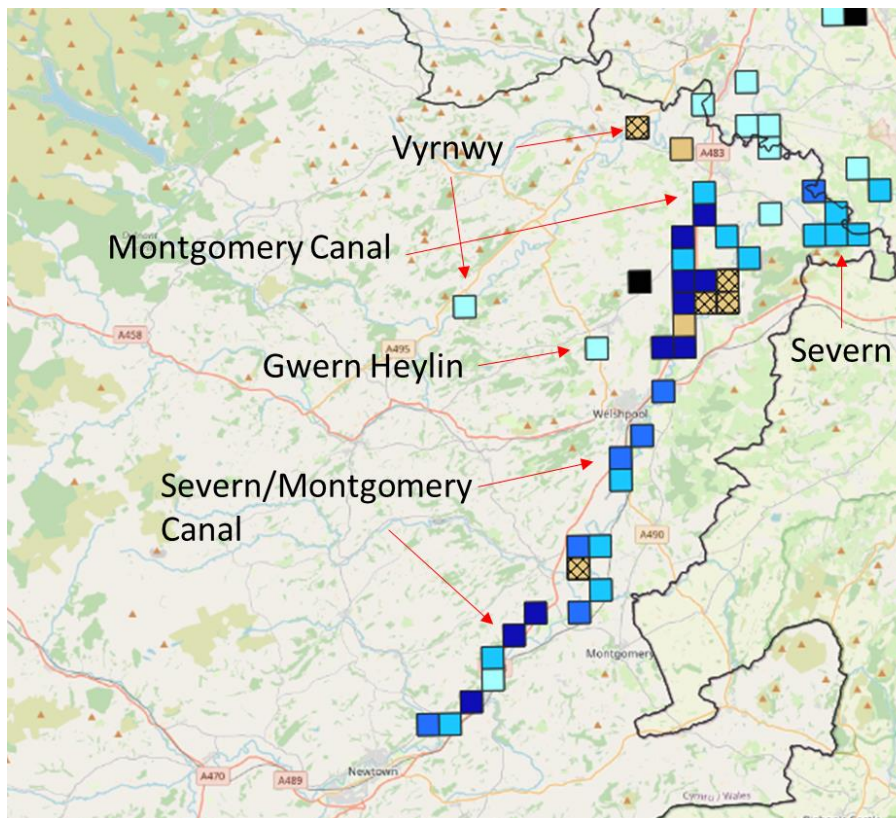
**Vice County summary of *Platycnemis pennipes* distribution:** edge of the species range; distribution limited to the Wye and leithon to the south-west of the Vice County.

**River Elan:** recently recorded (2009) for the first time on the river in a single monad ([Afon Elan - source to Pont ar Elan; poor ecological status](#)).

**River leithon:** still present on the river around Llandrindod and Crossgates ([lthon - conf Camddwr Bk to conf R Wye; moderate ecological status](#)).

**River Wye:** still present along the river from Newbridge-on-Wye to Hay-on-Wye ([Wye - Scithwen Bk to Brewardine Br; good ecological status, Wye - conf R Irfon to Scithwen Bk](#)).

## 47: Montgomeryshire



**Map 48:** *Platycnemis pennipes* records mapped at monad level for Montgomeryshire.

**Vice County summary of *Platycnemis pennipes* distribution:** edge of the species range; limited recent sightings along the River Severn and Montgomery Canal suggest a possible decline within the Vice County.

**Montgomery Canal:** historical records stretch from the northern Vice County border to Newtown; however there have been limited recent sightings (2008 onwards).

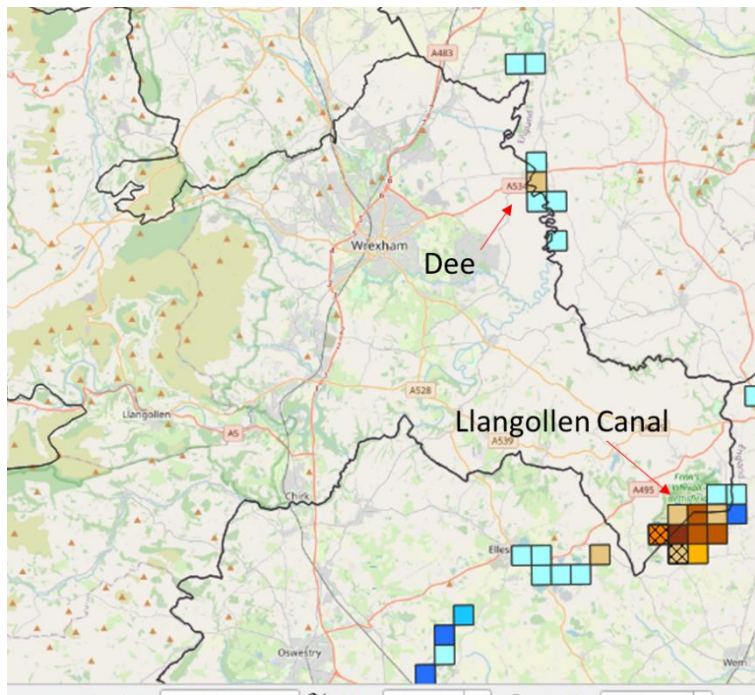
**River Severn:** historical records stretch from the northern Vice County border to Newtown; however, recent sightings (2008 onwards) were predominantly limited to a short stretch near Trewern ([Severn - conf Afon Dulas to conf R Camlad; moderate ecological status](#), [Severn - conf R Camlad to conf Bele Bk; moderate ecological status](#)).

**River Vyrnwy:** known from three monads within the Vice County ([Afon Vyrnwy DS of Banwy confluence; moderate ecological status](#)).

**Additional sites:** a population was identified in 2012 at **Gwern Heylin** fishing pools.



## 50: Denbighshire



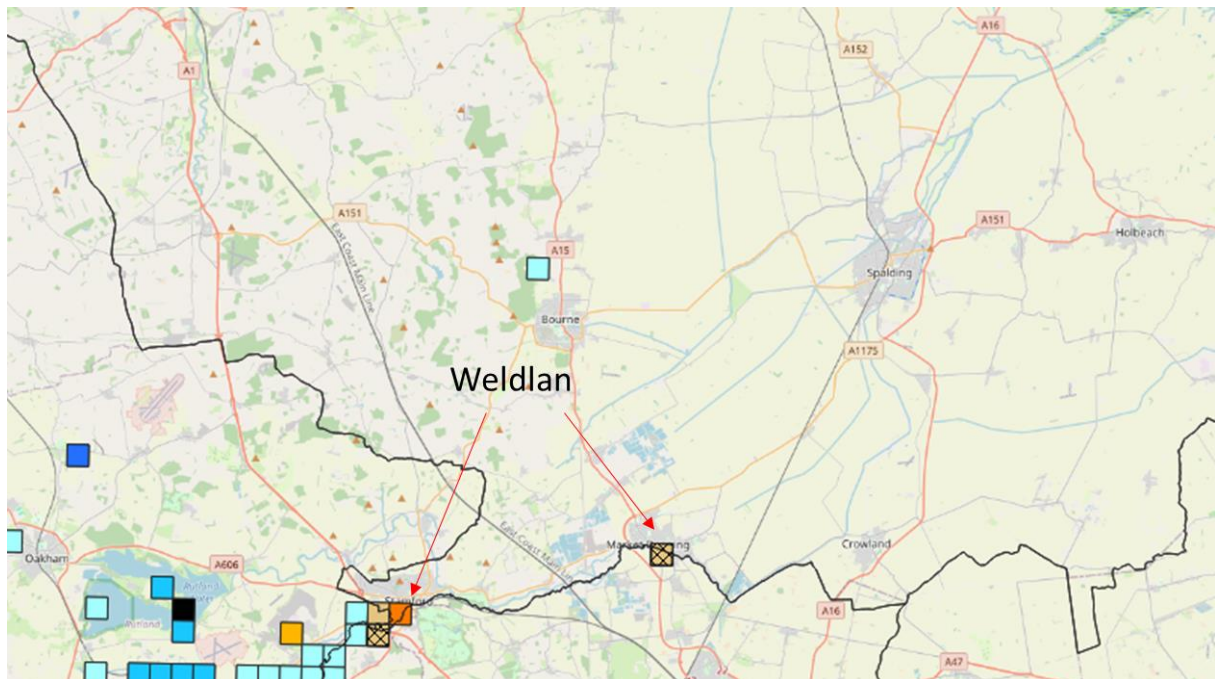
**Map 49:** *Platycnemis pennipes* records mapped at monad level for Denbighshire.

**Vice County summary of *Platycnemis pennipes* distribution:** limited to the south-eastern Vice County border.

**Llangollen Canal:** population still present between Ellesmere and Fenn's Bank.

**River Dee:** present on the river from Alford to Shocklach ([Dee - Chester Weir to Ceiriog; moderate ecological status](#)).

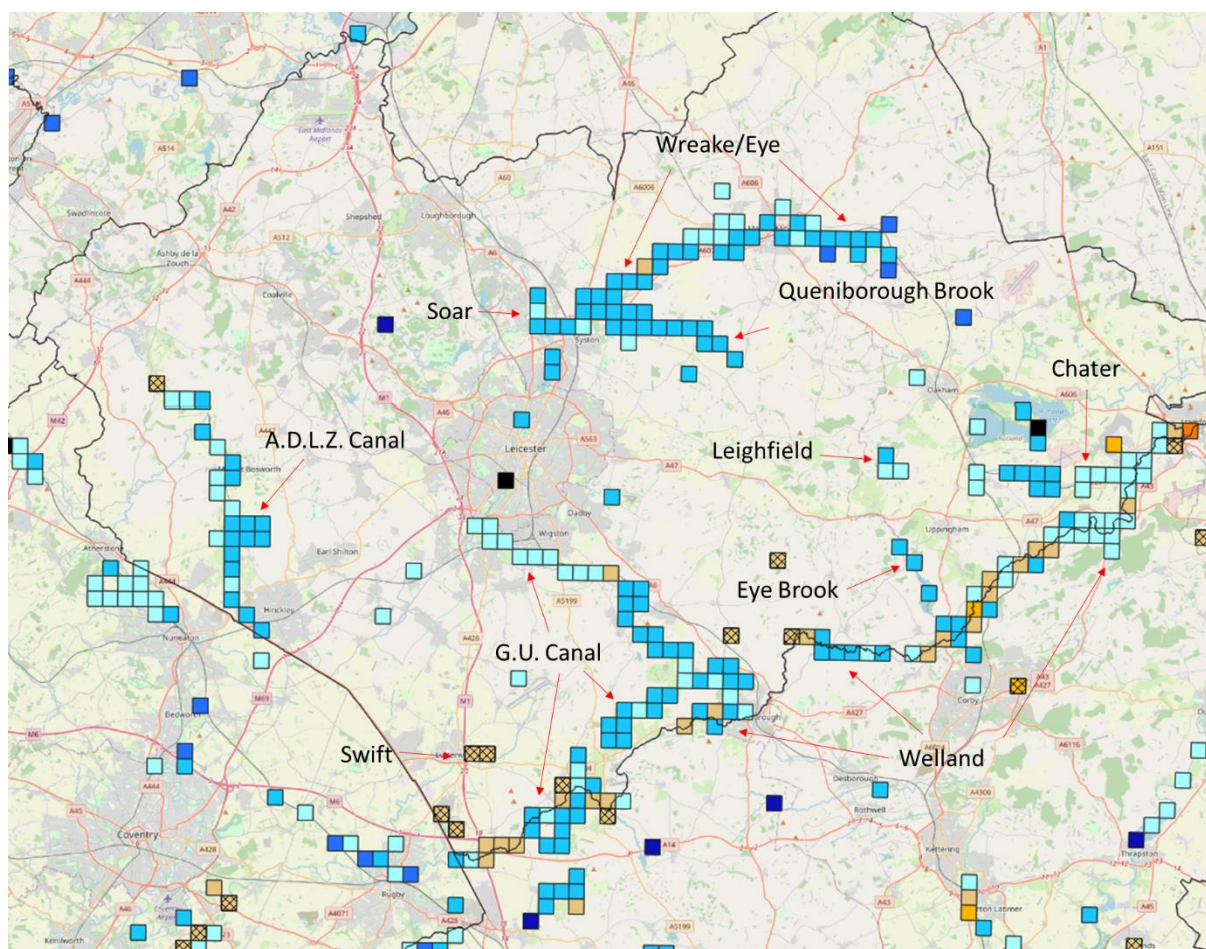
## 53: South Lincolnshire



**Vice County summary of *Platycnemis pennipes* distribution:** Current distribution limited to the south-western corner of the Vice County.

**River Welland:** sightings recorded on the Vice County border at Stamford ([Welland - conf Langton Bk to conf Gwash; moderate ecological status](#)), and further east at Market Deeping ([Welland - conf Greatford Cut to tidal Water Body; moderate ecological status](#)).

## 55: Leicestershire with Rutland



**Map 50:** *Platycnemis pennipes* records mapped at monad level for Leicestershire with Rutland.

**Vice County summary of *Platycnemis pennipes* distribution:** historically widespread but a lack of recent record on certain waterways, such as Queniborough Brook, raises concerns the species might have declined in some catchments.

**Ashby-de-la-Zouch Canal:** recent records (2008 onwards) span from Burton Hastings to Snarestone.

**Eye Brook:** historical records only, dating from 1998-2007, from around Eyebrook Reservoir ([Eye Brook; poor ecological status](#), [Eyebrook Reservoir; moderate ecological status](#)).

**Grand Union Canal:** recent records (2008 onwards) suggested the species is present along the canal from Fosse Park, Leicester, to the border at Catthorpe on the border.

**Queniborough Brook:** limited recent sightings (the most recent in 2009); historical distribution from its confluence with the River Wreake/Eye to Twyford ([Queniborough Brook Catchment \(trib of Wreake\); moderate ecological status](#)).



**River Chater:** recent sightings (2008 onwards) from Manton to its confluence with the River Welland ([Chater – Lower; moderate ecological status](#), [Chater – Upper; Bad ecological status](#)).

**River Soar:** limited historical records along the river near the confluence with the River Wreake/Eye ([Soar from Rothley Brook to Long Whatton Brook; moderate ecological status](#), [Soar from Sence to Rothley Brook; poor ecological status](#)).

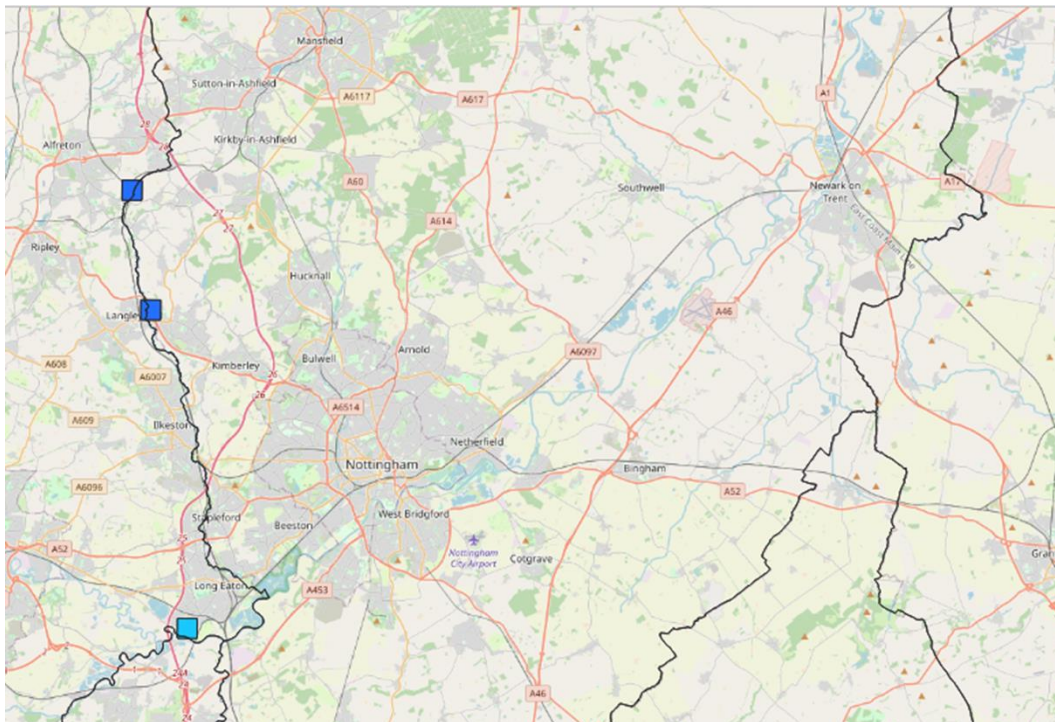
**River Swift:** recorded for the first time on the river near Lutterworth in 2020 ([Swift source to conf Avon; moderate ecological status](#)).

**River Welland:** recent sightings (2008 onwards) have been reported along the river from Stamford to Marston Trussell ([Welland - conf Langton Bk to conf Gwash; moderate ecological status](#), [Welland - conf Jordan to conf Langton Bk; moderate ecological status](#), [Welland - headwaters to conf Jordan Water; poor ecological status](#)).

**River Wreake/Eye:** historical records stretch from its confluence with the Soar to its source at Eye; the river's population appears to be centred around Melton Mowbray and the lakes at Asfordby ([Eye/Wreake from Langham Brook to Soar; poor ecological status](#)).

**Additional sites:** confirmed to still be present at **Leighfield fishing pool**.

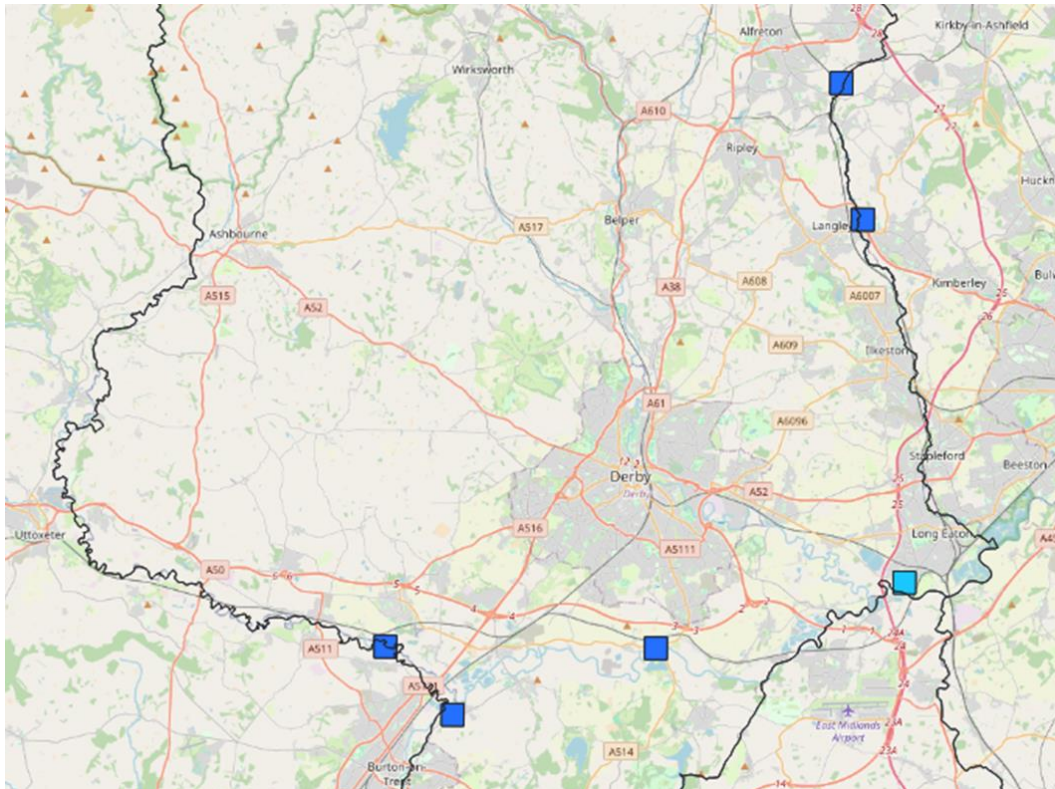
## 56: Nottinghamshire



**Map 51:** *Platycnemis pennipes* records mapped at monad level for Nottinghamshire.

**Vice County summary of *Platycnemis pennipes* distribution:** there are currently no known populations within the Vice County.

## 57: Derbyshire

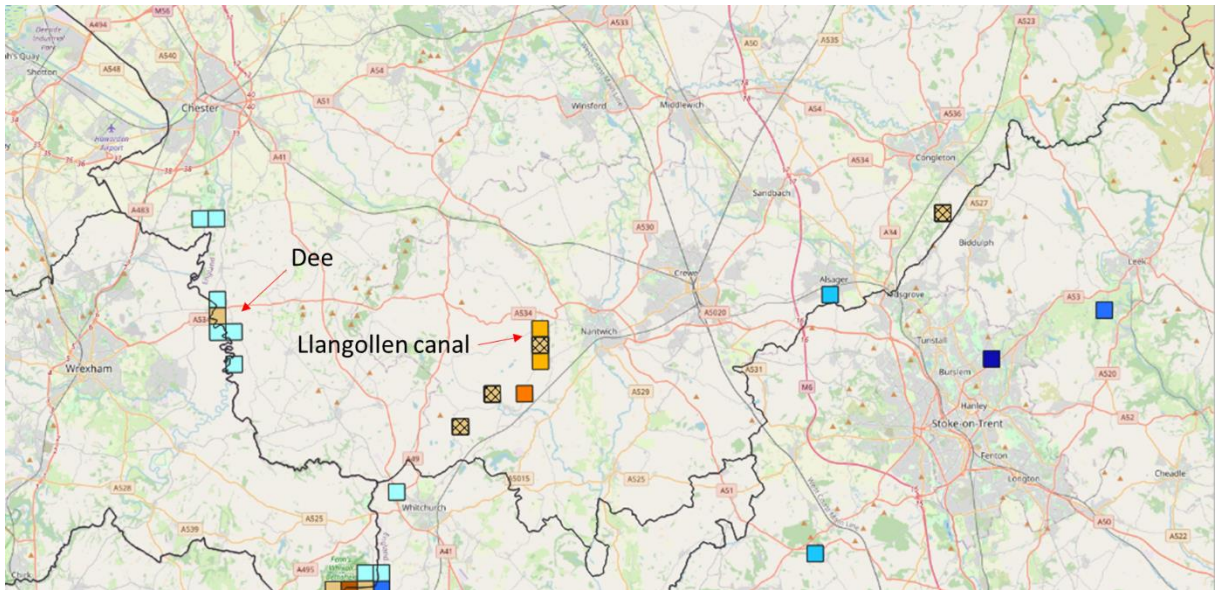


Map 52: *Platycnemis pennipes* records mapped at monad level for Derbyshire.

**Vice County summary of *Platycnemis pennipes* distribution: there are currently no known populations within the Vice County.**



## 58: Cheshire



**Map 53:** *Platycnemis pennipes* records mapped at monad level for Cheshire.

**Vice County summary of *Platycnemis pennipes* distribution:** species is at the edge of its range but appears stable on its two waterways: River Dee and Llangollen Canal.

**Llangollen Canal:** recorded from Marbury to Burland.

**River Dee:** present from Aldford to Shocklach ([Dee – Chester Weir to Ceiriog; moderate ecological status](#)).

## Discussion

### Species trends

The White-legged Damselfly Investigation citizen science project succeeded in producing a substantial dataset which has provided a valuable insight into the distribution of *Platycnemis pennipes* across Britain. The dataset contributed to the State of Dragonflies 2021 (Taylor *et al*, 2021) report analysis which confirmed the species has significantly increased in occupancy over the past 50 years (1970-2019), specifically in England. However, by mapping the BDS *Platycnemis pennipes* dataset at monad level, this report revealed that the species' patterns in changing distribution are more complex than it simply expanding out from historic waterways. In many Vice Counties the distribution of *Platycnemis pennipes* appears to be becoming restricted to certain catchments, while in others it has expanded out colonising new waterways and waterbodies. For example, in Surrey (map 25) a lack of recent records suggests the species' distribution may have become more restricted within the catchment of the River Mole north of Leatherhead and on the River Wey south of Guildford. However, the species was recorded in novel monads around Thursley Common Nature Reserve and on the River Mole near Gatwick airport. In South Essex (map 26) the species' distribution appears to have become restricted on the River Roding while it was recorded for the first time at RHS Hyde Hall and Hanningfield Reservoir.

### Drivers of change

The loss of *Platycnemis pennipes* from a wetland site, or a decline in sightings within a catchment, suggests that conditions have changed in a manner that makes them less suitable for the species to breed. However, when the species colonises a new site this suggests that suitable breeding habitat has become available. What makes a wetland site become more or less suitable for breeding could be a result of changes in a range of organic or inorganic environment variables, which are listed below along with influencing factors:

**Water quality:** Research into the vulnerability of *Platycnemis pennipes* larvae to different pollutants is limited and there is little evidence to suggest it is more sensitive than other resident species of Damselfly in Britain (Cham, 2003). However, chemicals such as poly-fluorinated alkyl substances (PFAS) have been shown to negatively impact Damselfly larvae survivorship (Van Gossum *et al*, 2009). Other major pollutants include nutrient run-off from agricultural land and sewage discharge from the water industry both of which can result in harmful algal blooms which deplete dissolved oxygen levels. The algae Cyanobacteria (*Microcystis*), common in algal blooms, also produces a toxin which is harmful to Damselfly prey, such as Water Fleas (*Ceriodaphnia* spp. and *Daphnia* spp.) (Shahmohamadloo *et al*, 2019).

**Aquatic vegetation structure:** The availability of floating aquatic vegetation and organic material determines the availability of suitable oviposition sites. Consequently, management activities which result in the removal of aquatic vegetation reduce habitat suitability. One of *Platycnemis pennipes*' preferred plant species for egg-laying is the Yellow

Water-lily (*Nuphar lutea*), which grows in still or slow-flowing, shallow areas of water. The dredging and canalisation of waterways, resulting in a faster water flow and deeper channel, inhibits the growth of *Nuphar lutea* and other floating plant species with similar requirements.

**Riparian vegetation structure:** Suitable *Platycnemis pennipes* breeding sites are generally characterised as being unshaded but with lush banksides of grasses and herbaceous vegetation which are utilised by larvae undergoing emergence, teneral adults in need of refuge, and foraging adults (Cham, 2003). Consequently, the removal of bankside vegetation, either mechanically or by over grazing, before or during the breeding season reduces habitat suitability. On the other hand, a lack of vegetation management, resulting in the development of tall scrub and tree growth can also reduce habitat suitability by increasing shade.

**Climate:** Climate plays an intrinsic role in determining the distribution of suitable *Platycnemis pennipes* habitat, with rainfall patterns interacting with the land's geography to determine the distribution of wetlands. In Britain, *Platycnemis pennipes* is at the northern edge of its range, and climate, in particular temperature, is theorised to be a main factor, along with suitable habitat availability, limiting the species' distribution. Summer air temperatures determine the activity of *Platycnemis pennipes* adults; in England and Wales, the average summer day increased in temperature by approximately 0.26°C per decade from 1960 to 2021 (Patterson, 2023). With more frequent warm days during the species' flight period, their adults' opportunities for dispersal and breeding increase, which has likely contributed to species expansion in occupancy over the same time period.

*Platycnemis pennipes* is at the northern edge of its range in Britain, while it is widespread across central and southern Europe. European Odonata guides describe the species as occurring in lentic wetlands especially in southern Europe (Smallshire, 2020). This has resulted in the theory that climate change, specifically the warmer temperatures Britain is experiencing throughout the year, is in some way responsible for the apparent shift in breeding habitat. Specifically that is the species' increasing utilisation of lentic habitats in Britain, particularly ponds that provide similar microhabitats to their more traditional lotic habitats for ovipositing and larval development. The mechanisms of how climate change could be directly or indirectly affecting species habitat use is a subject for future research.

## **Conclusions and future research aims**

The significant increase in occupancy exhibited by *Platycnemis pennipes* since 1970 quells any immediate concerns regarding the species conservation status within Britain. However, this report illustrates the dynamic shifts that have taken place in the species' distribution over recent decades with movement from some historic waterways to new wetland sites, as well as the species widespread utilisation of lentic wetland sites, as well as rivers, streams and canals. Dynamic changes in species distribution on a local level may be part of the species' innate behaviour, specifically its habit of dispersing from its natal breeding sites. This enables *Platycnemis pennipes* to respond more rapidly to the availability of new suitable



breeding sites within its surrounding landscape. It also allows the recolonization of historic breeding sites where the species has previously been lost due to inappropriate management or pollution events, consequently reducing its susceptibility to localised extinction.

The report identified a number of wetland areas with abundant historical records but a lack of recent sightings, which raises the concern that species occupancy has declined in these areas as a result of a loss of suitable habitat. While there is no immediate concern for the species' conservation status in Britain it is important that threats to the species and its habitat that are resulting in localised population loss are identified so that they can be mitigated and that populations across wider catchment can be protected.

Such threats are also likely to be negatively impacting the biodiversity of *Platycnemis pennipes*' freshwater ecosystem to the detriment of other species of a higher conservation concern. This may include the Near Threatened Common Clubtail, (*Gomphus vulgatissimus*), a species whose distribution is limited to a handful of river systems in England and Wales, many of which also support *Platycnemis pennipes* (BDS, 2019).

The lower section of the River Lugg, for example, has a scattering of *Gomphus vulgatissimus* historical records (adult and exuviae), the most recent from 2016. *Platycnemis pennipes*, has historical records along the same stretch, most dating from the 1998-2007 time period. Neither species produced records during their respective citizen science projects (*Gomphus vulgatissimus* was surveyed along the river during the Clubtail Count project that ran from 2017-2019 (BDS, 2019)). This stretch of the river is designated as both a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC). While the catchment is currently categorised as having a [moderate ecological status](#), its SSSI status is currently (2023) [Unfavourable – Declining](#), partly as a result of a decline in water quality, with nutrient and sediment pollution coming from a range of sources, including poultry units (Johnson, 2023). A decline in water quality may have resulted, in combination with other factors, in the lack of recent *Platycnemis pennipes* records and the limited evidence of breeding *Gomphus vulgatissimus*. This section of the river will also have suffered as a result of a pollution incident upstream in 2020 caused by illegal dredging and excavation work that destroyed 1.5km of the river Lugg at Kingsland (EA, 2023).

This example illustrates how a local decline in *Platycnemis pennipes* records may reflect underlying factors negatively impacting the health of a wetland. However, understanding the local loss of *Platycnemis pennipes* will require site-specific research including:

- Further examination of site records with the assistance of local recorders familiar with the wetlands.
- Detailed survey work of sites including the collection of data related to habitat characteristics, particularly riparian and aquatic vegetation structure.
- Further examination of water quality data and other environmental data available through the Environment Agency and other government bodies.

This report also highlights the lack of research into the environmental variables that determine *Platycnemis pennipes* habitat suitability. While research by BDS members has assisted in providing broad descriptions of wetland habitats where *Platycnemis pennipes* has

been recorded breeding, there is a lack of detailed quantitative data to accurately describe the variables that make a wetland suitable. Without this information, we cannot further our understanding of the factors that influence *Platycnemis pennipes* distribution and population loss across Britain, and our capacity to set wetland management targets to improve habitat suitability for *Platycnemis pennipes* is limited.

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