

# A survey of the aquatic invertebrates of Montgomery Canal SSSI in 2025

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## Crynodeb gweithredol

Mae SoDdGA Camlas Trefaldwyn yn ymestyn am 39 cilomedr o Lanymynech ar y ffin â Lloegr i'r Drenewydd yn Sir Drefaldwyn, gyda rhan ddwyreiniol o gangen Cegidfa hefyd wedi'i chynnwys yn ogystal â nifer o warchodfeydd natur camlas oddi ar y safle. Mae'r gamlas yn cynnal casgliad o infertebratau dyfrol o bwysigrwydd cenedlaethol sy'n cynnwys 43 o rywogaethau allweddol, a phoblogaeth o bwysigrwydd cenedlaethol y gwas neidr tindrwm *Gomphus vulgatissimus*. Yn ogystal, mae 57 o rywogaethau o chwilod dŵr wedi'u cofnodi hyd yn hyn, ac mae poblogaethau pwysig o'r fursen goeswen *Platycnemis pennipes* a'r fursen lygatgoch fawr *Erythromma najas*.

Mae'r adroddiad hwn yn rhoi manylion arolwg infertebratau dyfrol SoDdGA Camlas Trefaldwyn a gynhaliwyd rhwng mis Mehefin a mis Medi 2025 ac a oedd yn cynnwys rhwydo pyllau wedi'u hamseru mewn 20 o orsafoedd samplu. Cofnodwyd cyfanswm o 181 o dacsonau infertebratau gan gynnwys 153 o rywogaethau, ac o'r rhain roedd 36 yn chwilod dŵr a 20 yn folysgiaid dyfrol. Mae'r niferoedd hyn yn cymharu'n ffafriol â rhai o arolygon blaenorol. Cofnodwyd wyth rhywogaeth ddyfrol sy'n brin yn genedlaethol gan gynnwys *Aquarius najas*, *Dixella filicornis*, *Holocentropus stagnalis*, *Hydaticus seminiger*, *Hydraena rufipes*, *Odontomyia ornata*, *Odontomyia tigrina* a *Sphaerium rivicola*. Disgrifir eu hecoleg, eu statws a'u dosbarthiad.. Mae canfyddiad y pryf milwrol *Odontomyia ornata* yn nodi fod ei amrediad wedi ymestyn yn sylweddol ym Mhrydain Fawr, gyda phoblogaethau Cymru wedi'u cyfyngu i Wastadeddau Gwent. Os oes poblogaeth gref yn bresennol yng Nghamlas Trefaldwyn yna dylid ei hystyried fel nodwedd gymhwysol o'r SoDdGA. Cofnodwyd cyfanswm o 35 rhywogaeth o chwilod dŵr yn 2025, ac roedd 13 ohonynt yn newydd i Gamlas Trefaldwyn gan arwain at restr gronnu o 70 rhywogaeth.

O'r 43 rhywogaeth allweddol o'r casgliad o infertebratau dyfrol, cofnodwyd 11 (26%) yn ystod yr arolwg cyfredol gan gynnwys *Aquarius najas* a *Sphaerium rivicola*. Dylid ychwanegu deg rhywogaeth sy'n newydd i Gamlas Trefaldwyn at y casgliad - *Dixella filicornis*, *Helophorus griseus*, *Holocentropus stagnalis*, *Hydaticus seminiger*, *Hydraena rufipes*, *Odontomyia ornata*, *Odontomyia tigrina*, *Rhantus suturellus*, *Scirtes hemisphaericus* a *Tanysphyrus lemnae*. Os ystyrir y rhain, cofnodwyd 21 o 53 rhywogaeth y casgliad (40%) yn ystod yr arolwg cyfredol, sy'n awgrymu bod y casgliad mewn cyflwr ffafriol.

Mae dadansoddiad PANTHEON yn amlygu presenoldeb pum rhywogaeth sy'n gysylltiedig â'r math o gasgliad penodol mwyaf perthnasol – W211 (dŵr agored ar waddodion mwynau a amharwyd arnynt) – gan gynnwys *Haliplus immaculatus*, *Mesovelgia furcata*, *Notonecta maculata*, *Plea minutissima* a *Molanna angustata*. Gyda throthwy o chwe rhywogaeth, mae'n methu â bodloni amodau ffafriol. Fodd bynnag, gall samplu pellach, addasu methodoleg samplu i gofnodi rhywogaethau sy'n debygol o fod wedi'u hanwybyddu a/neu dargedu chwiliadau am weision neidr sy'n fwy prin ddarparu cofnodion o rywogaethau W211 ychwanegol.

Cadarnhawyd presenoldeb y cimwch afon America estron *Pacifastacus leniusculus* yn Aber-miwl ac Aberbechan trwy samplu eDNA. Ni chofnodwyd cimwch crafanc wen yr afon *Austropotamobius pallipes* na phla cimwch *Aphanomyces astaci*.

Dylid mabwysiadu rhaglen reolaidd o fonitro infertebratau dyfrol i ddarparu asesiad cyfredol o gyflwr y casgliad, drwy gynnal arolygon bob chwech i ddeng mlynedd. Dylid parhau i ddefnyddio'r ugain safle samplu a ddefnyddiwyd yn ystod yr arolwg presennol mewn arolygon dilynol, ac ystyried cynnwys safleoedd ychwanegol.

## Executive summary

Montgomery Canal SSSI extends for 39km from Llanymynech on the English border to Newtown in Montgomeryshire, with an eastern section of the Guilsfield Arm also included as are several off-site canal nature reserves. The canal supports a nationally important aquatic invertebrate assemblage which comprises 43 key species, and a nationally important population of the Common Club-tail *Gomphus vulgatissimus*. In addition, 57 water beetle species have been recorded to date, and there are important populations of White-legged Damselfly *Platycnemis pennipes* and Red-eyed Damselfly *Erythromma najas*.

This report provides details of an aquatic invertebrate survey of Montgomery Canal SSSI undertaken between June and September 2025 and involving timed pond-netting at 20 sampling stations. A total of 181 invertebrate taxa were recorded including 153 species, of which 36 were water beetles and 20 were aquatic molluscs. These numbers compare favourably with those from previous surveys. Eight Nationally Scarce aquatic species were recorded including *Aquarius najas*, *Dixella filicornis*, *Holocentropus stagnalis*, *Hydaticus seminiger*, *Hydraena rufipes*, *Odontomyia ornata*, *Odontomyia tigrina* and *Sphaerium rivicola*. Their ecology, status and distribution are described. The finding of Ornate Brigadier *Odontomyia ornata* marks a significant extension of its GB range, with Welsh populations restricted to the Gwent Levels. If a robust population is present in Montgomery Canal then it should be considered as a qualifying feature of the SSSI. A total of 35 water beetle species was recorded in 2025, of which 13 were new to the Montgomery Canal resulting in a cumulative list of 70 species.

Of the 43 key species of the aquatic invertebrate assemblage, 11 (26%) were recorded during the current survey including *Aquarius najas* and *Sphaerium rivicola*. Ten species new to Montgomery Canal should be added to the assemblage - *Dixella filicornis*, *Helophorus griseus*, *Holocentropus stagnalis*, *Hydaticus seminiger*, *Hydraena rufipes*, *Odontomyia ornata*, *Odontomyia tigrina*, *Rhantus suturellus*, *Scirtes hemisphaericus* and *Tanysphyrus lemnae*. If these are taken into consideration, 21 of 53 assemblage species (40%) were recorded during the current survey suggesting that the assemblage is in favourable condition.

PANTHEON analysis highlighted the presence of five species associated with the most relevant Specific Assemblage Type (SAT) – W211 (open water on disturbed mineral sediments) – including *Haliplus immaculatus*, *Mesovelgia furcata*, *Notonecta maculata*, *Plea minutissima* and *Molanna angustata*. With a threshold of six species, it just fails to meet favourable condition. However, further sampling, adjusting sampling methodology to record species likely to have been overlooked and/or targeting searches for scarcer dragonflies may provide records of additional W211 species.

The presence of the non-native Signal Crayfish *Pacifastacus leniusculus* was confirmed at Abermule and Aberbechan by eDNA sampling. Neither White-clawed Crayfish *Austropotamobius pallipes* nor crayfish plague *Aphanomyces astaci* was recorded.

A regular programme of aquatic invertebrate monitoring should be adopted to provide a contemporary assessment of the condition of the assemblage, with surveys undertaken every six to ten years. The twenty sampling sites used during the current survey should continue to be used in subsequent surveys, with consideration being given to include additional sites.

# 1. Introduction

Montgomery Canal SSSI is situated in east Montgomeryshire and extends for 39km from Llanymynech on the English border to Freestone Locks near Newtown. An eastern section of the Guilsfield Arm is also included within the site, as are several off-line canal nature reserves. The Canal is fed by two rivers - the River Severn enters at Pennarth near Newtown and the River Tanat enters via the Tanat feeder at Carreghoffa.

The canal is designated for its aquatic, emergent and marginal plant communities, including a large population of the internationally rare and threatened Floating Water-plantain *Luronium natans* and several other rare and scarce water plants. A nationally important aquatic invertebrate assemblage is also present. The present nature of the plant and animal communities depends upon a complex interaction between factors such as water chemistry, water flow and management regimes. The aquatic plant communities of the canal are unusually species-rich. The submerged vegetation is characterised by pondweeds *Potamogeton* spp., including Perfoliate Pondweed *P. perfoliatus*, Lesser Pondweed *P. pusillus* and Grass-wrack Pondweed *P. compressus*. Other notable aquatic plant species include Autumnal Water-starwort *Callitriche hermaphroditica*, Flat-stalked Pondweed *P. friesii* and Long-stalked Pondweed *P. praelongus*.

Floating plants are prominent locally, including Greater Duckweed *Spirodela polyrhiza*, Yellow Water-lily *Nuphar lutea* and various species of duckweed *Lemna* spp. The emergent and marginal vegetation is also diverse and well-developed. Dominant marginal species include Reed Sweet-grass *Glyceria maxima*, Bullrush *Typha latifolia* and Branched Bur-reed *Sparganium erectum*, with a wide range of associated species including Yellow Iris *Iris pseudacorus*, Flowering-rush *Butomus umbellatus*, Sweet Flag *Acorus calamus* and Tubular Water-dropwort *Oenanthe fistulosa*. Willow and alder carr have developed in association with former borrow pits alongside Wern embankment.

## 1.1 Aquatic invertebrates

Twigg (1959) published an article on the Shropshire Union Canal which included aquatic invertebrates. The Shropshire Union Canal is the north-eastward extension of the Montgomery Canal into England. Two of her sample sites are at Redwith and nearby Maesbury Marsh which lie several kilometres northeast of Llanymynech and this village is at the northeastern limit of the current survey. Twigg (1959) makes reference to mollusc records in Boycott & Oldham (1934).

The most extensive data on the invertebrates of the Montgomery Canal come from the 1980s Montgomery Canal Ecological Survey (Briggs, 1988) and the more recent, but less comprehensive studies, commissioned by British Waterways (1999). Neither of these surveys used standard methods for recording invertebrates which makes it difficult to use these as a baseline, but they do contain a large amount of valuable data.

Briggs (1988) recorded 143 species, including 43 species of water beetles, 22 molluscs and 19 caddisflies), with 158 taxa if Diptera and pea mussels are included. Six species - *Corixa dentipes*, *Cymatia coleoptrata*, *Haliphus heydeni*, *Noterus crassicornis*, *Ilybius guttiger* and *Sphaerium rivicola* – were regarded as Local or Nationally Scarce at that time. The relatively rich snail and caddis faunas are typical of permanent still, or slowly flowing, waters. Sampling stations were at 1km intervals over 42km of the canal, with two visits made to each in spring and summer. The 1997 survey focussed on molluscs and dragonflies, recording 17 species and eight breeding species respectively, with observations on another eleven on or close to the canal with no evidence of breeding (British Waterways, 1999).

In May 2003, a total of 88 macroinvertebrate species were recorded at ten sampling stations in Wales and England (Table 1) including 24 water beetle species, 19 molluscs and 16 caddisflies (Ponds Conservation Trust, 2003). Four Nationally Scarce species were recorded, namely *Gyrinus aeratus*, *G. urinator*, *Ilybius fenestratus* and *Noterus crassicornis*.

This survey used:

- A one-minute search for invertebrates which may be overlooked in hand net and dredge sampling (e.g. pond skaters, whirligig beetles);
- A two-minute semi-continuous hand-net sampling of the canal margin, shallows and any emergent plant habitats present. This sample typically covered a bank length of 5m to 15m.;
- Four net hauls from deeper bottom sediments along a canal length of approximately 10m, elutriated on site to wash out the bulk of muds and fine sands. These were taken at 3m intervals along the canal sampling length.

Samples were collected and assessed according to PSYM methodology (Ponds Conservation Trust, 2002). A wide range of environmental data were collected including information on substrate types, bank structure, vegetation abundance, shade, water and sediment depths, adjacent land use and basic water quality (pH, conductivity, dissolved oxygen concentration).

Table 1. Montgomery Canal sites sampled during the spring 2003 survey.

Site	Grid reference	Within SSSI
Lower Frankton	SJ370318	No
Rednal	SJ350275	No
Queen's Head	SJ341269	No
Aston Locks	SJ335263	No
Maesbury Marsh	SJ305248	No
Vyrnwy Aqueduct	SJ254197	Yes
Parson's Bridge	SJ264189	Yes
Bank Lock	SJ260130	Yes
Buttington Cross	SJ241089	Yes
Aberbechan	SO142934	Yes

Recent analysis by Natural Resources Wales (NRW) has identified 43 core species within the nationally important aquatic invertebrate assemblage (Table 2). In addition, 57 water beetle species have been recorded to date (Table 3). The Common Club-tail *Gomphus vulgatissimus* is an independently qualifying feature of the SSSI as well as being a core component of the assemblage, and there are important populations of White-legged Damselfly *Platycnemis pennipes* and Red-eyed Damselfly *Erythromma najas*. The Depressed River Mussel *Pseudanodonta complanata* has been recorded close to the Welsh border in the Shropshire Union Canal but has not yet been found in the Montgomery Canal (Willing, 2009).

Table 2. The 43 core component species of the nationally important aquatic invertebrate assemblage in Montgomery Canal SSSI, as identified by Natural Resources Wales.

Species	Order	Family	Status
<i>Aquarius najas</i>	Hemiptera	Gerridae	Nationally Scarce
<i>Argyroneta aquatica</i>	Araneae	Cybaeidae	Local
<i>Atherix ibis</i>	Diptera	Athericidae	Local
<i>Bdellocephala punctata</i>	Tricladida	Dendrocoelidae	-
<i>Beraeodes minutus</i>	Trichoptera	Beraeidae	Local
<i>Bithynia leachii</i>	Littorinimorpha	Bithyniidae	Local
<i>Caenis robusta</i>	Ephemeroptera	Caenidae	Nationally Rare
<i>Cercyon marinus</i>	Coleoptera	Hydrophilidae	Local
<i>Clambus nigriclavus</i>	Coleoptera	Clambidae	Local
<i>Corixa dentipes</i>	Hemiptera	Corixidae	-
<i>Cymatia coleoptrata</i>	Hemiptera	Corixidae	Local
<i>Dytiscus circumcinctus</i>	Coleoptera	Dytiscidae	Nationally Scarce
<i>Enochrus melanocephalus</i>	Coleoptera	Hydrophilidae	Nationally Scarce
<i>Erythromma najas</i>	Odonata	Coenagrionidae	Local
<i>Euglesa pulchella</i>	Veneroida	Sphaeriidae	Nationally Scarce
<i>Gomphus vulgatissimus</i>	Odonata	Gomphidae	Nationally Scarce
<i>Gyrinus aeratus</i>	Coleoptera	Gyrinidae	Nationally Scarce
<i>Gyrinus marinus</i>	Coleoptera	Gyrinidae	-
<i>Gyrinus urinator</i>	Coleoptera	Gyrinidae	Nationally Scarce
<i>Haliplus flavicollis</i>	Coleoptera	Haliplidae	Local
<i>Haliplus fluviatilis</i>	Coleoptera	Haliplidae	-
<i>Haliplus heydeni</i>	Coleoptera	Haliplidae	Nationally Scarce
<i>Haliplus immaculatus</i>	Coleoptera	Haliplidae	Local
<i>Haliplus lineolatus</i>	Coleoptera	Haliplidae	Local
<i>Hemiclepsis marginata</i>	Rhynchobdellida	Glossiphoniidae	Local
<i>Hygrotus versicolor</i>	Coleoptera	Dytiscidae	Local
<i>Ilybius fenestratus</i>	Coleoptera	Dytiscidae	Nationally Scarce
<i>Ilybius guttiger</i>	Coleoptera	Dytiscidae	Nationally Scarce
<i>Laccobius bipunctatus</i>	Coleoptera	Hydrophilidae	-
<i>Nebriporus depressus</i>	Coleoptera	Dytiscidae	Nationally Scarce
<i>Noterus crassicornis</i>	Coleoptera	Noteridae	Nationally Scarce

Species	Order	Family	Status
<i>Notidobia ciliaris</i>	Trichoptera	Sericostomatidae	Local
<i>Odhneripisidium moitessierianum</i>	Veneroida	Sphaeriidae	-
<i>Platycnemis pennipes</i>	Odonata	Platycnemididae	Nationally Scarce
<i>Pomatinus substriatus</i>	Coleoptera	Dryopidae	Nationally Scarce
<i>Ranatra linearis</i>	Hemiptera	Nepidae	Local
<i>Rhantus exsoletus</i>	Coleoptera	Dytiscidae	Local
<i>Sisyra dalii</i>	Neuroptera	Sisyridae	Nationally Scarce
<i>Sisyra fuscata</i>	Neuroptera	Sisyridae	Local
<i>Sphaerium rivicola</i>	Veneroida	Sphaeriidae	Nationally Scarce
<i>Suphrodytes dorsalis</i>	Coleoptera	Dytiscidae	Local
<i>Unio tumidus</i>	Unionoida	Unionidae	Local
<i>Viviparus viviparus</i>	Caenogastropoda	Viviparidae	Local

Table 3. Water beetles (57 species) recorded from Montgomery Canal SSSI.

Species	Family	Status
<i>Agabus bipustulatus</i>	Dytiscidae	Common
<i>Agabus sturmii</i>	Dytiscidae	Common
<i>Anacaena globulus</i>	Hydrophilidae	Common
<i>Anacaena limbata</i>	Hydrophilidae	Common
<i>Cercyon marinus</i>	Hydrophilidae	Local
<i>Coelostoma orbiculare</i>	Hydrophilidae	Common
<i>Dryops luridus</i>	Dryopidae	Common
<i>Dytiscus circumcinctus</i>	Dytiscidae	Nationally Scarce
<i>Dytiscus marginalis</i>	Dytiscidae	Common
<i>Elmis aenea</i>	Elmidae	Common
<i>Enochrus coarctatus</i>	Hydrophilidae	Local
<i>Enochrus melanocephalus</i>	Hydrophilidae	Nationally Scarce
<i>Enochrus testaceus</i>	Hydrophilidae	Local
<i>Gyrinus aeratus</i>	Gyrinidae	Nationally Scarce
<i>Gyrinus marinus</i>	Gyrinidae	Common
<i>Gyrinus substriatus</i>	Gyrinidae	Common
<i>Gyrinus urinator</i>	Gyrinidae	Nationally Scarce
<i>Haliplus confinis</i>	Hydrophilidae	Common
<i>Haliplus flavicollis</i>	Haliplidae	Local
<i>Haliplus fluviatilis</i>	Haliplidae	Common
<i>Haliplus fulvus</i>	Haliplidae	Local
<i>Haliplus heydeni</i>	Haliplidae	Nationally Scarce
<i>Haliplus immaculatus</i>	Haliplidae	Local
<i>Haliplus lineatocollis</i>	Haliplidae	Common
<i>Haliplus lineolatus</i>	Haliplidae	Local
<i>Haliplus ruficollis</i>	Haliplidae	Common
<i>Haliplus wehnckeii</i>	Haliplidae	Local

Species	Family	Status
<i>Helophorus aequalis</i>	Hydrophilidae	Common
<i>Helophorus brevipalpis</i>	Hydrophilidae	Common
<i>Helophorus grandis</i>	Hydrophilidae	Common
<i>Helophorus minutus</i>	Hydrophilidae	Common
<i>Hydraena gracilis</i>	Hydraenidae	Local
<i>Hydraena riparia</i>	Hydraenidae	Local
<i>Hydrobius fuscipes</i>	Hydrophilidae	Common
<i>Hydroporus angustatus</i>	Dytiscidae	Common
<i>Hydroporus palustris</i>	Dytiscidae	Common
<i>Hygrotus impressopunctatus</i>	Dytiscidae	Local
<i>Hygrotus inaequalis</i>	Dytiscidae	Common
<i>Hygrotus versicolor</i>	Dytiscidae	Local
<i>Hyphydrus ovatus</i>	Dytiscidae	Common
<i>Ilybius ater</i>	Dytiscidae	Common
<i>Ilybius fenestratus</i>	Dytiscidae	Nationally Scarce
<i>Ilybius fuliginosus</i>	Dytiscidae	Common
<i>Ilybius guttiger</i>	Dytiscidae	Nationally Scarce
<i>Ilybius quadriguttatus</i>	Dytiscidae	Common
<i>Laccobius bipunctatus</i>	Hydrophilidae	Common
<i>Laccophilus hyalinus</i>	Dytiscidae	Common
<i>Laccophilus minutus</i>	Dytiscidae	Local
<i>Limnius volckmari</i>	Elmidae	Common
<i>Nebrioporus depressus</i>	Dytiscidae	Nationally Scarce
<i>Nebrioporus elegans</i>	Dytiscidae	Common
<i>Noterus clavicornis</i>	Noteridae	Local
<i>Noterus crassicornis</i>	Noteridae	Nationally Scarce
<i>Oulimnius tuberculatus</i>	Elmidae	Common
<i>Pomatinus substriatus</i>	Dryopidae	Nationally Scarce
<i>Rhantus exsoletus</i>	Dytiscidae	Local
<i>Suphrodytes dorsalis</i>	Dytiscidae	Local

The current survey of the aquatic invertebrates of Montgomery Canal SSSI was undertaken in 2025 with sampling in June, July, and September. The primary purposes were to re-record core species and provide an assessment of the current condition of the assemblage. Wider identification enabled the recording of additional species.

## 2. Methods

### 2.1 Aquatic invertebrate survey

Sampling was by standardized pond netting using the methodologies described in Drake (2005), Drake *et al.* (2007) and the Ponds Conservation Trust (2003). NRW requested the following:

- A two-minute semi-continuous hand-net sampling of the canal margin, shallows, and any emergent plant habitats present. This sample will typically cover a bank length of 5-15m.
- A one-minute search for invertebrates which may be overlooked in the hand-net and dredge sampling (e.g., whirligig beetles, pond-skaters).
- Four net hauls from deeper bottom sediments along the canal length of approximately 10m. These will be elutriated on site to remove the bulk of the mud and sand. These will be taken at 3m intervals along the canal sampling length.

In practice, this methodology proved a little unwieldy and the surveyor adopted his routine 3-minute sampling with some samples targeting the canal bed and others targeting the emergent and marginal vegetation, as described below. The surveyor has used this method for over 30 years throughout the UK.

At each sampling site, the substrate type, bank structure, vegetation abundance & structure (underwater, floating & riparian vegetation), shade, water and sediment depth, adjacent land use and basic water quality (water clarity, pH, conductivity, dissolved oxygen concentration) were to be recorded, and digital photographs taken. The substrate type and submerged vegetation proved difficult to record due to the depth and poor water clarity. Bank structure was relatively uniform as might be expected for a canal although it should be pointed out that Guilsfield Arms was the only site where the canal sides had collapsed into the channel. Turbidity was measured with a turbidity tube. Conductivity, pH, water temperature and total dissolved solids (TDS) were measured with a Hanna HI98129 tester. Dissolved oxygen was measured in September only with a Lutron PDO-519 Dissolved Oxygen Meter. The data are provided in Appendix 4.

Care was taken to avoid damaging the protected Floating Water-plantain *Luronium natans*. At locations where this plant occurs, the surveyor first checked for its presence and if it was present, the surveyor moved to an area nearby where the plant was absent.

Three-minute samples were taken with a standard pond net (1mm mesh supplied by NHBS, Totnes, Devon). The samples were taken from the bank and from the shallow margins of the ditches. The samples were washed and sieved on the banks using a coarse 1cm riddle to remove twigs, stones and other coarse material and material was retained by a 500-micron sieve, so that fine sediment was washed through and not retained. The material retained 1cm riddle was also scanned for large aquatic invertebrates, such as large pond snails, large water beetles, water stick insect, etc. Where they could be

identified in the field, they were noted and returned to the channel. The material retained in the pots was preserved using 70% alcohol and processed later. Processing involved further washing to remove silt and other fine sediment and placement of the sample in small amounts in gridded petri dishes, then adding water. Each sample may require about 30-50 petri-dishes to accommodate one sample. Each dish was then examined under a binocular stereomicroscope, the invertebrates were extracted and placed into a vial of alcohol for later identification or identified and noted and all taxa were counted. Where particular species were abundant, subsampling was undertaken.

To sample the fauna on the canal bed, a series of hauls targeting these were undertaken. A hand dredge and a hand-operated grab were trialled but found to be impractical, so the pond net was utilised.

## 2.2 Survey locations

Twenty sites were sampled for aquatic invertebrates (Table 4). Maps are provided in Appendix 2 and site images in Appendix 3. Each site was sampled on three occasions, once in June (23<sup>rd</sup> to 25<sup>th</sup> June), July (28<sup>th</sup> to 30<sup>th</sup> July) and September (24<sup>th</sup> to 26<sup>th</sup> September) 2025.

Table 4. Montgomery Canal sites sampled in 2025.

Site	Grid reference	Comment
Vyrnwy Aqueduct/Llanymynech	SJ2535219900	-
Parson's Bridge/Lane	SJ2646018970	at Four Crosses
Guilfield Arm	SJ2499114577	west of the B4392
Wern Clay Pits Nature Reserve	SJ2515314154	-
Wern south of Clay Pits	SJ2523213785	Offline reserve
Bank Lock	SJ2601613073	just off the A483(T)
Tal-y-bont, Buttington Cross	SJ2414308933	-
White House Bridge Nature Reserve	SJ2232306156	-
White House Offline Reserve	SJ2215705999	west of the A483(T)
Llwynderw	SJ2068703682	south of Belan
Wernllwyd	SJ2030502943	south of Belan
Brithdir & Brithdir Locks	SJ2006802382	-
Berriew	SJ1930701154	-
Garthmyl House	SO1939498925	-
Trwst Llewelyn	SO1894198496	-
Glan Hafren North	SO1684596624	-
Glan Hafren South	SO1675196485	-
Abermule	SO1621995274	-
Abermule south of roadbridge	SO1617695172	-
Aberbechan	SO1421993480	-

## 2.3 Weather conditions

Weather conditions were measured using a Kestrel 3500 weather meter. The weather during the survey was generally good to excellent and was not considered to be a limiting factor. Weather conditions generally through late spring and summer 2025 were generally dry and hotter than average in the UK, but water levels were considered to be normal in the canal and flooding was definitely not an issue.

## 2.4 Invertebrate identification

The material identified concentrated on the usual aquatic macro-invertebrate taxa. Larval stages of many taxa and females of a few species could not be identified and consequently identifications have been left at the appropriate level. The contractor identified all material and vouchers of rare and uncommon taxa, as well as unidentified material, have been retained.

Some data is missing for Bank Lock and Guilsfield Arm on 28<sup>th</sup> July 2025 due to supposedly waterproof paper labels deteriorating and becoming illegible.

# 3. Results

## 3.1 Aquatic invertebrate survey

The aquatic invertebrates recorded are listed in Appendix 1. A total of 181 invertebrate taxa, including 153 species, were recorded between June and September 2025 (Appendix 1). The largest group were the water beetles with 36 species, whilst the aquatic Mollusca had 20 species, Trichoptera 13 species and Odonata eight definite species – these figures compare favourably with those from previous surveys. In addition, 29 pupal exuvia, semi-aquatic, wetland or wholly terrestrial species were also recorded including the terrestrial stages of taxa with aquatic larvae. Eight Nationally Scarce aquatic species were recorded (Table 5). Comments on the ecology, status and distribution of the significant species recorded are provided below.

Table 5. Nationally Scarce species recorded on Montgomery Canal in 2025.

Species	Taxon	Family	Comment
<i>Aquarius najas</i>	Hemiptera	Gerridae	Core Assemblage Species
<i>Dixella filicornis</i>	Diptera	Dixidae	New to Montgomery Canal
<i>Holocentropus stagnalis</i>	Trichoptera	Polycentropodidae	New to Montgomery Canal
<i>Hydaticus seminiger</i>	Coleoptera	Dytiscidae	New to Montgomery Canal
<i>Hydraena rufipes</i>	Coleoptera	Hydraenidae	New to Montgomery Canal
<i>Odontomyia ornata</i>	Diptera	Stratiomyidae	New to Montgomery Canal
<i>Odontomyia tigrina</i>	Diptera	Stratiomyidae	New to Montgomery Canal
<i>Sphaerium rivicola</i>	Mollusca	Sphaeriidae	Core Assemblage Species

## *Aquarius najas*

The River Skater *Aquarius najas* has a scattered distribution throughout England, Wales and Scotland (Huxley, 2003). It occurs in Kent, central southern England, the south-west peninsula, west Wales, South-west Scotland and there are outposts in the Midlands and Bristol area. This bug is unusual in that it seems to prefer some shade; there are many records of flotillas in the slow stretches of rivers and streams, often under the shade of trees. On the present survey, it was restricted to shaded sections of the Montgomery Canal at Glan Hafren North & South and Abermule south of roadbridge in July and September, and was in flotillas in the centre of the canal, with the Common Pond Skater *Gerris lacustris* occupying the water surface nearer the bank. *Aquarius najas* is listed as a core species of the Montgomery Canal SSSI aquatic invertebrate assemblage.

## *Dixella filicornis*

The meniscus midge *Dixella filicornis* has a sporadic distribution in England and Wales with one Scottish record, according to the NBN Atlas. There are no records for the Welsh Borders or east Wales but there are records for west Wales, Lancashire and the Midlands. Larval habitats include rushes bordering a eutrophic lake fringed with trees, the edge of a small loch, a woodland swamp, an unshaded roadside ditch, and similar small waterbodies or water courses (Disney, 1999). Three larvae were recorded at Wern south of Clay Pits on 23<sup>rd</sup> June 2025 and a single male at Glan Hafren North on 25<sup>th</sup> June 2025. The adult record helped to corroborate larval identifications. **NEW TO MONTGOMERY CANAL.**

## *Holocentropus stagnalis*

The Caseless Caddis *Holocentropus stagnalis* is widespread throughout England, Scotland and Wales according to the National Biodiversity Network (NBN) Atlas map. There are currently 386 records for this species in the NBN. It was considered a rarity, but there seem to be plenty of adult records which are likely to be more reliable than larval records. This species differs from the other two *Holocentropus* species in head markings, which can vary in the species, so records of adults are to be preferred. This species has been recorded from weedy ponds, pools, lakes and marshes (Wallace, 1991, 2016). A single larva was recorded at Brithdir on 25<sup>th</sup> September 2025. **NEW TO MONTGOMERY CANAL.**

## *Hydaticus seminiger*

The diving beetle *Hydaticus seminiger* has mainly been recorded from East Anglia, south east England, sites along the south coast of England, the Somerset Levels and the Cheshire meres, and large parts of southern Northern Ireland. A distribution map and other details are provided by Foster *et al.* (2016). It lives in lowland, permanent, weed-choked ponds and ditches. A single adult was recorded at Glan Hafren South on 25<sup>th</sup> September 2025. **NEW TO MONTGOMERY CANAL.**

## *Hydraena rufipes*

The small water beetle *Hydraena rufipes* has a mainly northern and western distribution in the UK (Foster *et al.*, 2020). These authors only give old (pre-1980) records for the northern Welsh Borders, with no records for North Wales, but it appears frequent in mid and South Wales. **NEW TO MONTGOMERY CANAL.**

## *Odontomyia ornata*

The Ornate Brigadier soldierfly *Odontomyia ornata* has two strongholds in Britain, in the Somerset Levels and the Gwent Levels where larvae are not uncommon. There is also a good population on the freshwater parts of the coastal levels of East Sussex. It has been recorded sparsely elsewhere including West Sussex, Kent, Essex, Suffolk and Norfolk. The adults may be found on umbellifers particularly Hemlock Water-dropwort *Oenanthe crocata* but it is generally much easier to locate the larvae in shallow ditches with a good variety of aquatic vegetation. As it is an independently qualifying feature on each of the eight SSSIs which comprise the Gwent Levels, the discovery of Ornate Brigadier on Montgomery Canal is very significant. A single larva was recorded at Wern south of roadbridge on 28<sup>th</sup> July 2025. **NEW TO MONTGOMERY CANAL.**

## *Odontomyia tigrina*

A close relative of the above, the Black Colonel soldierfly *Odontomyia tigrina* is a distinctively local species confined mainly to the southern half of England but also occurring near the coast in south Wales and extending northwards as a rarity into Scotland. The larvae are found in pond margins, ditches and (more rarely) in canals, usually those with a rich flora of emergent and aquatic vegetation. The adults are most easily found feeding at flowers such as umbellifers in wetlands. A single larva was recorded at Wern Clay Pits on 24<sup>th</sup> September 2025. **NEW TO MONTGOMERY CANAL.**

## *Sphaerium rivicola*

The Nut Orb Mussel *Sphaerium rivicola* is restricted in England and Wales to canals and large, slow-flowing rivers. It appears to require deeper water than other *Sphaerium* or *Pisidium* species and is rarely found in marginal habitats less than 0.5m deep (Killeen *et al.*, 2004). This may explain why it was only recorded in one sample on the present survey, which targeted relatively shallow water. It occurs throughout the canal basin of lowland, central England and the Welsh borders. It was found at Llwynderw on 24<sup>th</sup> September 2025, with 26 adults recorded. *Sphaerium rivicola* is listed as a core species of the Montgomery Canal SSSI aquatic invertebrate assemblage.

The Nationally Rare Alder Leaf Beetle *Agelastica alni* was also observed on young alders at White House Bridge on 24<sup>th</sup> June 2025. This species has undergone a recent range expansion in England and Wales and is no longer of conservation concern. The provisional Least Concern anthomyzid fly *Anagnota bicolor* was found in the pond sample from Abermule on 25<sup>th</sup> June 2025.

The number of water beetles, aquatic Mollusca, Trichoptera and breeding Odonata compare favourably with the surveys by Briggs (1988) and the Ponds Conservation Trust (2003). The number of Nationally Scarce species recorded is similar but surprisingly there is little overlap in Nationally Scarce species between the surveys.

## 3.2 Water beetles

A total of 22 of the 57 water beetles previously recorded in the Montgomery Canal was found during the current survey (Table 6). All are common or local in the UK. The survey added a further 13 species as well as the Duckweed Weevil *Tanysphyrus lemnae*, including the Nationally Scarce *Hydaticus seminiger* and *Hydraena rufipes* (Table 7; see 3.1 above). The cumulative list now stands at 70 species.

Table 6. Water beetles previously recorded in the Montgomery Canal and found in 2025.

Species	Family	Status	Comment
<i>Agabus bipustulatus</i>	Dytiscidae	Common	-
<i>Agabus sturmii</i>	Dytiscidae	Common	-
<i>Anacaena limbata</i>	Hydrophilidae	Common	-
<i>Dytiscus marginalis</i>	Dytiscidae	Common	-
<i>Elmis aenea</i>	Elmidae	Common	-
<i>Gyrinus marinus</i>	Gyrinidae	Common	Core Assemblage Species
<i>Gyrinus substriatus</i>	Gyrinidae	Common	-
<i>Haliphus flavicollis</i>	Haliplidae	Local	Core Assemblage Species
<i>Haliphus immaculatus</i>	Haliplidae	Local	Core Assemblage Species
<i>Haliphus lineolatus</i>	Haliplidae	Local	Core Assemblage Species
<i>Haliphus ruficollis</i>	Haliplidae	Common	-
<i>Helophorus brevipalpis</i>	Hydrophilidae	Common	-
<i>Helophorus grandis</i>	Hydrophilidae	Common	-
<i>Helophorus minutus</i>	Hydrophilidae	Common	-
<i>Hydrobius fuscipes</i>	Hydrophilidae	Common	-
<i>Hydroporus angustatus</i>	Dytiscidae	Common	-
<i>Hyphydrus ovatus</i>	Dytiscidae	Common	-
<i>Ilybius ater</i>	Dytiscidae	Common	-
<i>Ilybius fuliginosus</i>	Dytiscidae	Common	-
<i>Limnius volckmari</i>	Elmidae	Common	-
<i>Noterus clavicornis</i>	Noteridae	Local	-
<i>Oulimnius tuberculatus</i>	Elmidae	Common	-

Table 7. Water beetles, and a semi-aquatic weevil, found new to Montgomery Canal in 2025.

Species	Family	Status	Comment
<i>Anacaena lutescens</i>	Hydrophilidae	Common	-
<i>Colymbetes fuscus</i>	Dytiscidae	Common	-
<i>Haliplus sibiricus</i>	Haliplidae	Common	-
<i>Helophorus griseus</i>	Helophoridae	Local	Add to Assemblage
<i>Helophorus obscurus</i>	Helophoridae	Common	-
<i>Hydaticus seminiger</i>	Dytiscidae	Nationally Scarce	Add to Assemblage
<i>Hydraena rufipes</i>	Hydraenidae	Nationally Scarce	Add to Assemblage
<i>Hydroporus planus</i>	Dytiscidae	Common	-
<i>Hydroporus pubescens</i>	Dytiscidae	Common	-
<i>Limnebius truncatellus</i>	Hydraenidae	Common	-
<i>Ochthebius minimus</i>	Hydraenidae	Common	-
<i>Rhantus suturellus</i>	Dytiscidae	Local	Add to Assemblage
<i>Scirtes hemisphaericus</i>	Scirtidae	Local	Add to Assemblage
<i>Tanysphyrus lemnae</i>	Eirrhinidae	Local	Add to Assemblage

### 3.3 Aquatic invertebrate assemblage

Of the 43 core component species of the nationally important aquatic invertebrate assemblage in Montgomery Canal SSSI, 11 were recorded during the current survey (Table 8). These include *Aquarius najas* and *Sphaerium rivicola* (see accounts in 3.1).

Table 8. The 11 species recorded in 2025 which are part of the core Montgomery Canal SSSI aquatic invertebrate assemblage.

Species	Order	Family	Status
<i>Aquarius najas</i>	Hemiptera	Gerridae	Nationally Scarce
<i>Argyroneta aquatica</i>	Araneae	Cybaeidae	Local
<i>Bithynia leachii</i>	Littorinimorpha	Bithyniidae	Local
<i>Erythromma najas</i>	Odonata	Coenagrionidae	Local
<i>Gyrinus marinus</i>	Coleoptera	Gyrinidae	-
<i>Haliplus flavicollis</i>	Coleoptera	Haliplidae	Local
<i>Haliplus immaculatus</i>	Coleoptera	Haliplidae	Local
<i>Haliplus lineolatus</i>	Coleoptera	Haliplidae	Local
<i>Hemiclepsis marginata</i>	Rhynchobdellida	Glossiphoniidae	Local
<i>Sphaerium rivicola</i>	Veneroida	Sphaeriidae	Nationally Scarce
<i>Viviparus viviparus</i>	Caenogastropoda	Viviparidae	Local

### 3.4 PANTHEON analysis

PANTHEON recognised a sample size of 150, with 131 analysed and 19 not analysed, giving a return of 87%. The taxonomic output is summarised in Table 9. Water beetles are the largest group recorded, with 37 species. Freshwater molluscs came second (24 species), with, in decreasing order, the aquatic Hemiptera (19 species), Trichoptera (12 species), Diptera and Odonata (11 species each), followed by eight more less abundant groups.

Table 9. Taxonomic Output from PANTHEON showing taxonomic group, number analysed and percentage of analysed sample and whole sample.

Species group	Number analysed	% of analysed sample	% of whole sample
Coleoptera	37	28	24
Mollusca	24	18	16
Hemiptera	19	14	12
Trichoptera	12	9	8
Diptera	11	8	7
Odonata	11	8	7
Annelida	8	6	5
Ephemeroptera	2	1	1
Lepidoptera – Moths	2	1	1
Orthoptera	1	0	0
Lepidoptera - Rhopalocera	1	0	0
Megaloptera	1	0	0
Crustacea	1	0	0
Araneae	1	0	0

The results for the Specific Assemblage Types are discussed below and summarised in Table 10.

Table 10. Specific assemblage types from PANTHEON.

Code	Specific assemblage type	No. spp	% rep	Conservation status	Reported condition
W211	Open water on disturbed mineral sediments	5	12	0	Unfavourable (5 species, 6 required)
W314	Reed-fen & pools	3	3	<i>Odontomyia ornata</i> (NS)	Unfavourable (3 species, 11 required)
W125	Slow-flowing rivers	2	8	0	Unfavourable (2 species, 4 required)
W311	Open water in acid mire	1	5	0	Unfavourable (1 species, 5 required)
W313	Moss & tussock fen	1	2	<i>Hydaticus seminiger</i> (NS)	Unfavourable (1 species, 6 required)

Code	Specific assemblage type	No. spp	% rep	Conservation status	Reported condition
W212	Northern lakes & lochs	1	6	0	Unfavourable (1 species, 3 required)
W114	Stream & river margin	1	2	<i>Hydraena rufipes</i> (NS)	Unfavourable (1 species, 6 required)
F001	Scrub edge	1	<1	0	Unfavourable (1 species, 11 required)

The highest scoring Specific Assemblage Type (SAT) recorded, and the most relevant to Montgomery Canal, is W211 (open water on disturbed mineral sediments), with 12% of the recorded taxa for this SAT. The SAT does not achieve Favourable status, with five recorded species (*Haliphus immaculatus*, *Mesovelgia furcata*, *Notonecta maculata*, *Plea minutissima* & *Molanna angustata*) and six required to meet the threshold. Clearly, it narrowly misses being in Favourable status and only requires one more coded species. The second highest scoring SAT is W314 (reed-fen & pools), with 3% of the national pool. This SAT is in Unfavourable status, with three species recorded and eleven required to meet the threshold. Clearly, the gap between the reported status and the threshold is relatively large. One species of nature conservation value was recorded from this SAT however, namely the Nationally Scarce Ornate Brigadier *Odontomyia ornata*. The third highest scoring SAT is W125 (slow-flowing rivers), with 8% of the national pool. This SAT is in Unfavourable status, with two species recorded and four required to meet the threshold. With relatively little additional survey and/or identification, this threshold could be reached. Five more SATs were recorded, in decreasing significance and all assessed to be in Unfavourable condition. Two of these had species of nature conservation importance however, with the Nationally Scarce diving beetle *Hydaticus seminiger* in W313 and the Nationally Scarce minute moss beetle *Hydraena rufipes* in W114.

Overall, PANTHEON recorded eight SATs, none of which are in Favourable condition although the key SAT (W211) failed by a single species, and three had species of nature conservation value.

### 3.5 Crayfish eDNA

Juvenile crayfish (circa 1.5cm in length) were captured with the pond net from Abermule and Aberbechan, both on 30<sup>th</sup> July 2025 (Photograph 38). A local fisherman at Abermule had told the surveyor that there are large numbers of Signal Crayfish *Pacifastacus leniusculus* in the canal and these had come from water from the adjoining River Severn entering further south that is used to top up the canal. As there are also historical records of White-clawed Crayfish *Austropotamobius pallipes*, it was decided to undertake eDNA sampling for Signal Crayfish, White-clawed Crayfish and crayfish plague *Aphanomyces astaci* at the two sample sites and this was undertaken on 26<sup>th</sup> September 2025. The results proved positive for Signal Crayfish but negative for White-clawed Crayfish and crayfish plague at both sites. The eDNA reports for Abermule and Aberbechan are provided in Appendices 5 and 6 respectively.

## 3.6 Additional species records

Minnow, two unidentified fish (photos available), three amphibian species and one wetland mammal (mink) were also recorded.

## 4. Discussion

The number of water beetles, aquatic Mollusca, Trichoptera and breeding Odonata recorded in 2025 compare favourably with the surveys in the 1980s (Briggs, 1988) and 2003 (Ponds Conservation Trust, 2003). The number of Nationally Scarce species recorded in 2025 (7 species; Table 5) is similar but surprisingly there is little overlap in Nationally Scarce species between the surveys. A total of 35 water beetle species was recorded in 2025, of which 13 were new to the Montgomery Canal (Tables 6 & 7). This has resulted in a cumulative list of 70 species.

With just 11 of the 43 aquatic invertebrate assemblage core species recorded in 2025 (Table 8), it is difficult to determine the current condition of the fauna. However, it could be argued that recording  $\frac{1}{4}$  of the fauna in a single survey, with just three visits to each of the 20 sites in June, July and September, is a significant outcome. Several aquatic species were recorded new to Montgomery Canal, including ten species which should be added to the assemblage - *Dixella filicornis*, *Helophorus griseus*, *Holocentropus stagnalis*, *Hydaticus seminiger*, *Hydraena rufipes*, *Odontomyia ornata*, *Odontomyia tigrina*, *Rhantus suturellus*, *Scirtes hemisphaericus* and *Tanysphyrus lemnae*. If these are taken into consideration, 21 of 53 assemblage species (40%) were recorded during the current survey suggesting that the assemblage is in favourable condition.

The PANTHEON analysis indicates that the SATs are not in favourable condition, but some could achieve this with small alterations to habitat management and/or more survey. This is particularly pertinent for W211 (open water on disturbed mineral sediments) which required just one more species to meet the threshold for favourable status. Additional sampling and/or adjusting sampling methodology as well as recording adults of taxa including beetles (Coleoptera), bugs (Hemiptera), caddisflies (Trichoptera), dragonflies (Odonata), flies (Diptera) and sponge-flies (Neuroptera) from the towpath, may have recorded more W211 species. Targeting certain species such as the scarcer dragonflies (*Gomphus*, *Platycnemis*) might be another way of achieving the threshold. Alterations for habitat management that might improve the SATs might include control of invasive species (such as mink, signal crayfish, water soldier), ditch and sediment clearance, removal of or decrease in shade, etc.

The presence of Ornate Brigadier *Odontomyia ornata* on Montgomery Canal is significant, even if only a single larva was recorded. The only other reliable Welsh populations are restricted to the Gwent Levels which is one of the key areas for the species in the UK. It is a qualifying feature on all eight Gwent Levels SSSIs. If the soldierfly is resident on the canal, then it should also be considered a qualifying feature here.

The presence of Signal Crayfish with the Montgomery Canal is a cause for concern both for its impact upon the nationally important aquatic invertebrate assemblage and upon the canal ecosystem.

## 5. Recommendations

A regular programme of aquatic invertebrate monitoring should be adopted to provide a contemporary assessment of the condition of the assemblage, with surveys undertaken every six to ten years. The twenty sampling sites used during the current survey should continue to be used in subsequent surveys, with consideration being given to include additional sites.

A survey for Ornate Brigadier should be undertaken to determine its current status and distribution on Montgomery Canal.

Identifying aquatic insects from larvae such as Odonata, Trichoptera, Ephemeroptera and Diptera can be difficult. Identifications based on adult males are generally much more reliable. Consequently, surveys of the adult stages on the Montgomery Canal should be encouraged.

Use of other sampling methods might be considered. For example, no large mussels were observed in the present survey. One method of recording these is to search recent dredgings on the banks. A sign was in place at Parson's Bridge describing how dredging by the Canal and Rivers Trust was about to take place but this must have happened after the survey. Other methods such as light trapping would attract large numbers of adult Ephemeroptera and Trichoptera whilst use of a hand dredge or grab should help record other elements of the fauna but may require a two-man team, a boat or heavy equipment which were not possible on the current survey. Surveys of adult dragonflies can easily be undertaken from the towpaths with little more than binoculars, a camera and an identification manual.

Further analysis of the data using PSYM or other indices of use in slow-flowing waters might be helpful, particularly in assessing the biological water quality. Unfortunately, PSYM requires the use of full water plant data and measuring of several chemical variables at each site, which limits its use in the surveyor's opinion and for this reason, the method may not be possible using the current survey data. The Biological Monitoring Working party (BMWP) method and its extension, the Average Score per Taxon (ASPT), have been used for still water sites and could be used to analyse the data here; they have the advantage that they only rely on aquatic invertebrate data, but some still-water taxa are absent from the methodology. Other indices that could be used include the Community Conservation Index (CCI) which evaluates the nature conservation value of the aquatic invertebrates (Chadd & Extence, 2004) or the Lotic-Evaluation (LIFE) index which evaluates aquatic invertebrates in relation to water flow (Extence *et al.*, 1999). Interpretation of the physical and chemical data presented in the current report might also be useful in understanding canal water quality and the distribution of certain aquatic invertebrates.

Closer scrutiny and comparison of the existing data with the current data would be useful. The data from 1985-1988 includes a significant number of taxa associated with fast-flowing water courses and these taxa would be extremely unlikely in a canal. These include *Ancylus fluviatilis*, *Ecdyonurus dispar*, *Ephemera danica*, *Ephemerella ignita*, *Baetis* spp, *Hydraena riparia*, *Goera pilosa*, *Agapetus fuscipes*, *Hydropsyche* spp, Thaumaleidae, *Dicranota* spp, *Atherix* sp, Plecoptera and *Gammarus pulex*. In the surveyor's opinion, these are more likely to be associated with the nearby River Severn.

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## Appendix 1. Invertebrate species recorded from Montgomery Canal in 2025

Species	Vernacular name	Order	Family	Assemblage species
<i>Cristatella mucedo</i>	a bryozoan	Plumatellida	Cristatellidae	-
<i>Dendrocoelum lacteum</i>	a flatworm	Tricladida	Dendrocoelidae	-
<i>Polycelis tenuis</i>	a flatworm	Tricladida	Planariidae	-
<i>Erpobdella octoculata</i>	a leech	Arhynchobdellida	Erpobdellidae	-
<i>Erpobdella testacea</i>	a leech	Arhynchobdellida	Erpobdellidae	-
<i>Eiseniella tetraedra</i>	Square-tailed Worm	Crassiclitellata	Lumbricidae	-
<i>Alboglossiphonia heteroclita</i>	a leech	Rhynchobdellida	Glossiphoniidae	-
<i>Glossiphonia complanata</i>	a leech	Rhynchobdellida	Glossiphoniidae	-
<i>Helobdella stagnalis</i>	a leech	Rhynchobdellida	Glossiphoniidae	-
<i>Hemiclepsis marginata</i>	a leech	Rhynchobdellida	Glossiphoniidae	yes
<i>Theromyzon tessulatum</i>	Duck Leech	Rhynchobdellida	Glossiphoniidae	-
<i>Piscicola geometra</i>	Fish Leech	Rhynchobdellida	Piscicolidae	-
<i>Viviparus viviparus</i>	River Snail	Caenogastropoda	Viviparidae	yes
<i>Bithynia leachii</i>	Leach's Bithynia	Littorinimorpha	Bithyniidae	yes
<i>Bithynia tentaculata</i>	Common Bithynia	Littorinimorpha	Bithyniidae	-
<i>Potamopyrgus antipodarum</i>	Jenkins' Spire Snail	Littorinimorpha	Tateidae	-
<i>Trichia hispida</i>	Hairy Snail	Pulmonata	Hygromiidae	-
<i>Lauria cylindracea</i>	Common Chrysalis Snail	Pulmonata	Lauriidae	-
<i>Punctum pygmaeum</i>	Dwarf Snail	Pulmonata	Punctidae	-
<i>Oxyloma elegans</i>	Pfeiffer's Amber Snail	Pulmonata	Succineidae	-
<i>Columella edentula</i>	Toothless Chrysalis Snail	Pulmonata	Vertiginidae	-
<i>Musculium lacustre</i>	Lake Orb Mussel	Veneroida	Sphaeriidae	-
<i>Pisidium amnicum</i>	Giant Pea Shell	Veneroida	Sphaeriidae	-
<i>Sphaerium corneum</i>	Horny Orb Mussel	Veneroida	Sphaeriidae	-
<i>Sphaerium rivicola</i>	Nut Orb Mussel	Veneroida	Sphaeriidae	yes
<i>Acroloxus lacustris</i>	Lake Limpet	Hygrophila	Acroloxidae	-
<i>Lymnaea stagnalis</i>	Great Pond Snail	Hygrophila	Lymnaeidae	-
<i>Radix balthica</i>	Wandering Snail	Hygrophila	Lymnaeidae	-
<i>Physa fontinalis</i>	Common Bladder Snail	Hygrophila	Physidae	-
<i>Physella acuta</i>	Acute Bladder Snail	Hygrophila	Physidae	-
<i>Physella gyrina</i>	Tadpole Physa	Hygrophila	Physidae	-
<i>Gyraulus albus</i>	White Ramshorn	Hygrophila	Planorbidae	-
<i>Hippeutis complanatus</i>	Flat Ramshorn	Hygrophila	Planorbidae	-
<i>Planorbarius corneus</i>	Great Ramshorn	Hygrophila	Planorbidae	-
<i>Planorbis carinatus</i>	Keeled Ramshorn	Hygrophila	Planorbidae	-
<i>Planorbis planorbis</i>	Margined Ramshorn	Hygrophila	Planorbidae	-
<i>Anisus vortex</i>	Whorlpool Ramshorn	Hygrophila	Planorbidae	-
<i>Crangonyx pseudogracilis</i>	a shrimp	Amphipoda	Crangonyctidae	-
<i>Asellus aquaticus</i>	Water Hog Louse	Isopoda	Asellidae	-
<i>Eriophyes laevis</i>	a gall mite	Trombiformes	Eriophyidae	-
<i>Argyroneta aquatica</i>	Water Spider	Araneae	Cybaeidae	yes
<i>Simocephalus vetulus</i>	a water flea	Diplostraca	Daphniidae	-
<i>Eurycerus lamellatus</i>	a water flea	Diplostraca	Euryceridae	-
<i>Pacifastacus leniusculus</i>	Signal Crayfish	Decapoda	Astacidae	-
<i>Agelastica alni</i>	Alder Leaf Beetle	Coleoptera	Chrysomelidae	-
<i>Anisosticta novemdecimpunctata</i>	Water Ladybird	Coleoptera	Coccinellidae	-

Species	Vernacular name	Order	Family	Assemblage species
<i>Agabus bipustulatus</i>	a diving beetle	Coleoptera	Dytiscidae	-
<i>Agabus sturmii</i>	a diving beetle	Coleoptera	Dytiscidae	-
<i>Colymbetes fuscus</i>	a diving beetle	Coleoptera	Dytiscidae	-
<i>Dytiscus marginalis</i>	Great Diving Beetle	Coleoptera	Dytiscidae	-
<i>Hydaticus seminiger</i>	a diving beetle	Coleoptera	Dytiscidae	add
<i>Hydroporus angustatus</i>	a diving beetle	Coleoptera	Dytiscidae	-
<i>Hydroporus planus</i>	a diving beetle	Coleoptera	Dytiscidae	-
<i>Hydroporus pubescens</i>	a diving beetle	Coleoptera	Dytiscidae	-
<i>Hyphydrus ovatus</i>	a diving beetle	Coleoptera	Dytiscidae	-
<i>Ilybius ater</i>	a diving beetle	Coleoptera	Dytiscidae	-
<i>Ilybius fuliginosus</i>	a diving beetle	Coleoptera	Dytiscidae	-
<i>Rhantus suturellus</i>	a diving beetle	Coleoptera	Dytiscidae	add
<i>Elmis aenea</i>	a riffle beetle	Coleoptera	Elmidae	-
<i>Limnius volckmari</i>	a riffle beetle	Coleoptera	Elmidae	-
<i>Oulimnius tuberculatus</i>	a riffle beetle	Coleoptera	Elmidae	-
<i>Tanyosphyrus lemnae</i>	Duckweed Weevil	Coleoptera	Eirrhinidae	add
<i>Gyrinus marinus</i>	a whirligig beetle	Coleoptera	Gyrinidae	yes
<i>Gyrinus substriatus</i>	a whirligig beetle	Coleoptera	Gyrinidae	-
<i>Halipus flavicollis</i>	a water beetle	Coleoptera	Halipidae	yes
<i>Halipus immaculatus</i>	a water beetle	Coleoptera	Halipidae	yes
<i>Halipus lineolatus</i>	a water beetle	Coleoptera	Halipidae	yes
<i>Halipus ruficollis</i>	a water beetle	Coleoptera	Halipidae	-
<i>Halipus sibiricus</i>	a water beetle	Coleoptera	Halipidae	-
<i>Helophorus brevipalpis</i>	a water beetle	Coleoptera	Helophoridae	-
<i>Helophorus grandis</i>	a water beetle	Coleoptera	Helophoridae	-
<i>Helophorus griseus</i>	a water beetle	Coleoptera	Helophoridae	add
<i>Helophorus minutus</i>	a water beetle	Coleoptera	Helophoridae	-
<i>Helophorus obscurus</i>	a water beetle	Coleoptera	Helophoridae	-
<i>Hydraena rufipes</i>	a water beetle	Coleoptera	Hydraenidae	add
<i>Limnebius truncatellus</i>	a water beetle	Coleoptera	Hydraenidae	-
<i>Ochthebius minimus</i>	a water beetle	Coleoptera	Hydraenidae	-
<i>Anacaena limbata</i>	a water beetle	Coleoptera	Hydrophilidae	-
<i>Anacaena lutescens</i>	a water beetle	Coleoptera	Hydrophilidae	-
<i>Hydrobius fuscipes</i>	a water beetle	Coleoptera	Hydrophilidae	-
<i>Noterus clavicornis</i>	Larger Noterus	Coleoptera	Noteridae	-
<i>Scirtes hemisphaericus</i>	a scirtid beetle	Coleoptera	Scirtidae	add
<i>Phytoliriomyza melampyga</i>	a leaf-mining fly	Diptera	Agromyzidae	-
<i>Anagnota bicolor</i>	a fly	Diptera	Anthomyzidae	-
<i>Asteia amoena</i>	a fly	Diptera	Asteiidae	-
<i>Dasineura ulmaria</i>	a gall fly	Diptera	Cecidomyiidae	-
<i>Atrichopogon muelleri</i>	a biting midge	Diptera	Ceratopogonidae	-
<i>Chaoborus crystallinus</i>	a biting midge	Diptera	Chaoboridae	-
<i>Clinotanytus nervosus</i>	a non-biting midge	Diptera	Chironomidae	-
<i>Glyptotendipes pallens</i>	a non-biting midge	Diptera	Chironomidae	-
<i>Psectrotanytus varius</i>	a non-biting midge	Diptera	Chironomidae	-
<i>Anopheles atroparvus/messeae</i>	a mosquito	Diptera	Culicidae	-
<i>Anopheles claviger</i>	a mosquito	Diptera	Culicidae	-
<i>Culiseta annulata gp</i>	a mosquito	Diptera	Culicidae	-
<i>Dixella aestivalis</i>	a meniscus midge	Diptera	Dixidae	-
<i>Dixella amphibia</i>	a meniscus midge	Diptera	Dixidae	-
<i>Dixella attica</i>	a meniscus midge	Diptera	Dixidae	-

Species	Vernacular name	Order	Family	Assemblage species
<i>Dixella filicornis</i>	a meniscus midge	Diptera	Dixidae	add
<i>Odontomyia ornata</i>	Ornate Brigadier	Diptera	Stratiomyidae	add
<i>Odontomyia tigrina</i>	Black Colonel	Diptera	Stratiomyidae	add
<i>Oplodontha viridula</i>	Common Green Colonel	Diptera	Stratiomyidae	-
<i>Cloeon dipterum</i>	a mayfly	Ephemeroptera	Baetidae	-
<i>Caenis luctuosa</i>	Angler's Curse	Ephemeroptera	Caenidae	-
<i>Hesperocorixa linnaei</i>	a water boatman	Hemiptera	Corixidae	-
<i>Hesperocorixa sahlbergi</i>	a water boatman	Hemiptera	Corixidae	-
<i>Sigara distincta</i>	a water boatman	Hemiptera	Corixidae	-
<i>Sigara dorsalis</i>	a water boatman	Hemiptera	Corixidae	-
<i>Sigara falleni</i>	a water boatman	Hemiptera	Corixidae	-
<i>Sigara fossarum</i>	a water boatman	Hemiptera	Corixidae	-
<i>Aquarius najas</i>	River Skater	Hemiptera	Gerridae	yes
<i>Gerris lacustris</i>	Common Pondskaer	Hemiptera	Gerridae	-
<i>Gerris odontogaster</i>	Toothed Pondskaer	Hemiptera	Gerridae	-
<i>Hydrometra stagnorum</i>	Water Measurer	Hemiptera	Hydrometridae	-
<i>Ischnodemus sabuleti</i>	European Cinchbug	Hemiptera	Lygaeidae	-
<i>Mesovelia furcata</i>	Pondweed Bug	Hemiptera	Mesoveliidae	-
<i>Ilyocoris cimicoides</i>	Saucer Bug	Hemiptera	Naucoridae	-
<i>Nepa cinerea</i>	Water Scorpion	Hemiptera	Nepidae	-
<i>Notonecta glauca</i>	Common Backswimmer	Hemiptera	Notonectidae	-
<i>Notonecta maculata</i>	a backswimmer	Hemiptera	Notonectidae	-
<i>Plea leachi</i>	Pygmy Backswimmer	Hemiptera	Pleidae	-
<i>Microvelia reticulata</i>	a water cricket	Hemiptera	Veliidae	-
<i>Velia caprai</i>	Water Cricket	Hemiptera	Veliidae	-
<i>Cataclysta lemnata</i>	Small China-mark	Lepidoptera	Crambidae	-
<i>Elophila nymphaeata</i>	Brown China-mark	Lepidoptera	Crambidae	-
<i>Catocala nupta</i>	Red Underwing	Lepidoptera	Erebidae	-
<i>Polygonia c-album</i>	Comma	Lepidoptera	Nymphalidae	-
<i>Sialis lutaria</i>	an alderfly	Megaloptera	Sialidae	-
<i>Aeshna cyanea</i>	Southern Hawker	Odonata	Aeshnidae	-
<i>Aeshna mixta</i>	Migrant Hawker	Odonata	Aeshnidae	-
<i>Anax imperator</i>	Emperor Dragonfly	Odonata	Aeshnidae	-
<i>Brachytron pratense</i>	Hairy Dragonfly	Odonata	Aeshnidae	-
<i>Calopteryx splendens</i>	Banded Demoiselle	Odonata	Calopterygidae	-
<i>Calopteryx virgo</i>	Beautiful Demoiselle	Odonata	Calopterygidae	-
<i>Coenagrion puella</i>	Azure Damselfly	Odonata	Coenagrionidae	-
<i>Erythromma najas</i>	Red-eyed Damselfly	Odonata	Coenagrionidae	yes
<i>Ischnura elegans</i>	Blue-tailed Damselfly	Odonata	Coenagrionidae	-
<i>Pyrrhosoma nymphula</i>	Large Red Damselfly	Odonata	Coenagrionidae	-
<i>Sympetrum striolatum</i>	Common Darter	Odonata	Libellulidae	-
<i>Pholidoptera griseoptera</i>	Dark Bush-cricket	Orthoptera	Tettigoniidae	-
<i>Agraylea sexmaculata</i>	a caddisfly	Trichoptera	Hydroptilidae	-
<i>Athripsodes aterrimus</i>	a caddisfly	Trichoptera	Leptoceridae	-
<i>Mystacides azurea</i>	a caddisfly	Trichoptera	Leptoceridae	-
<i>Oecetis testacea</i>	a caddisfly	Trichoptera	Leptoceridae	-
<i>Triaenodes bicolor</i>	a caddisfly	Trichoptera	Leptoceridae	-
<i>Triaenodes bicolor</i>	a caddisfly	Trichoptera	Leptoceridae	-
<i>Limnephilus lunatus</i>	a caddisfly	Trichoptera	Limnephilidae	-
<i>Limnephilus marmoratus</i>	a caddisfly	Trichoptera	Limnephilidae	-
<i>Molanna angustata</i>	a caddisfly	Trichoptera	Molannidae	-

Species	Vernacular name	Order	Family	Assemblage species
<i>Phryganea bipunctata/grandis</i>	a caddisfly	Trichoptera	Phryganeidae	-
<i>Cyrnus flavidus</i>	a caddisfly	Trichoptera	Polycentropodidae	-
<i>Holocentropus dubius</i>	a caddisfly	Trichoptera	Polycentropodidae	-
<i>Holocentropus picicornis</i>	a caddisfly	Trichoptera	Polycentropodidae	-
<i>Holocentropus stagnalis</i>	a caddisfly	Trichoptera	Polycentropodidae	add

## Appendix 2. Location of survey sites on Montgomery Canal. Maps © Ordnance Survey



Figure 1A. Vyrnwy Aqueduct/Llanymynech and Parson's Bridge/Lane.

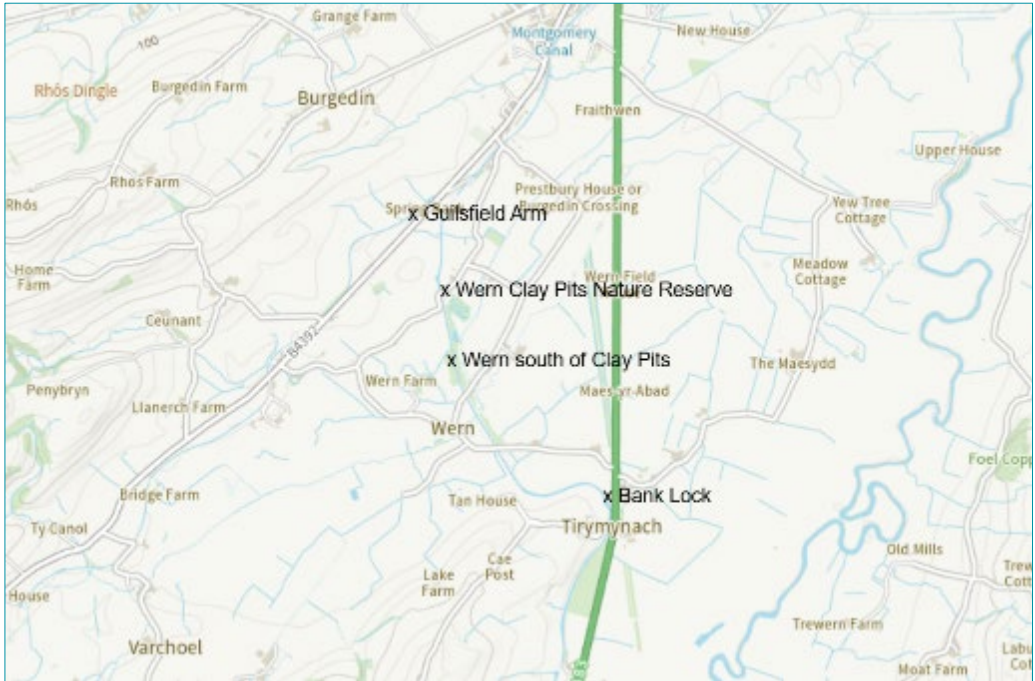


Figure 1B. Gullfield Arm, Wern Clays Pits/Nature Reserve, Wern south of Clays Pits and Bank Lock.

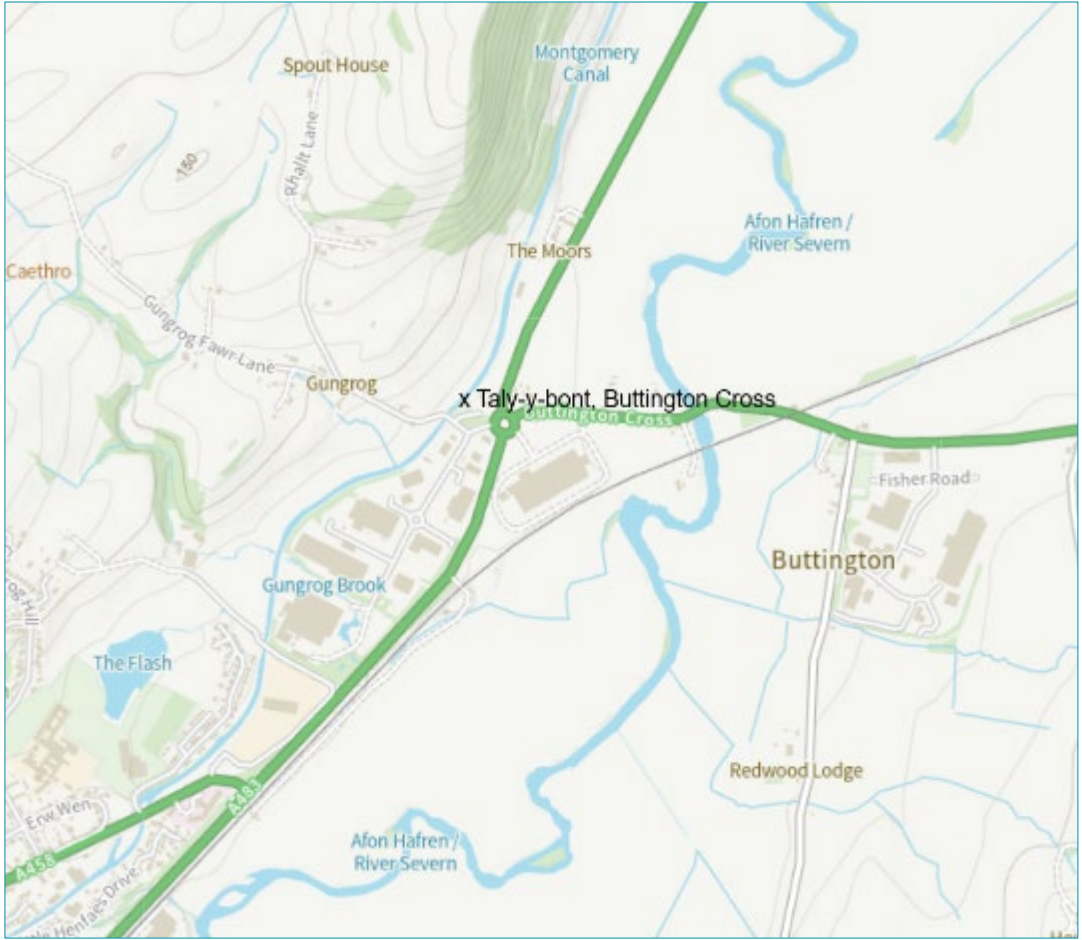


Figure 1C. Tal-y-bont, Buttington Cross.

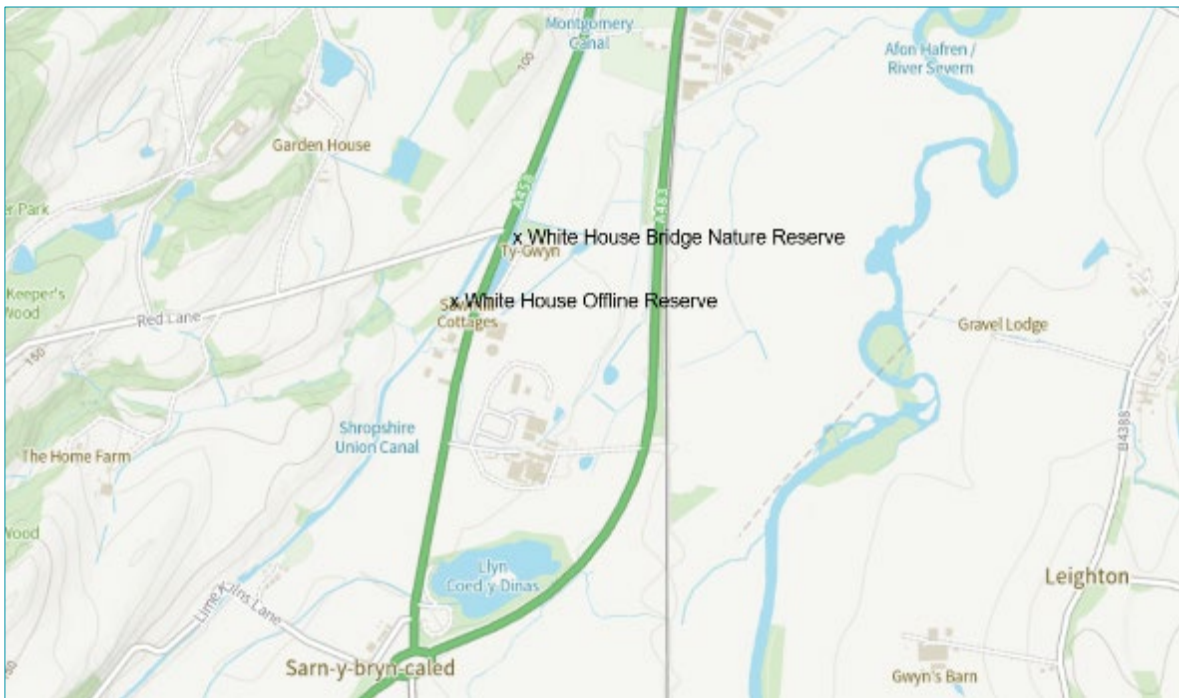


Figure 1D. White House Bridge Nature Reserve and White House Offline Reserve.

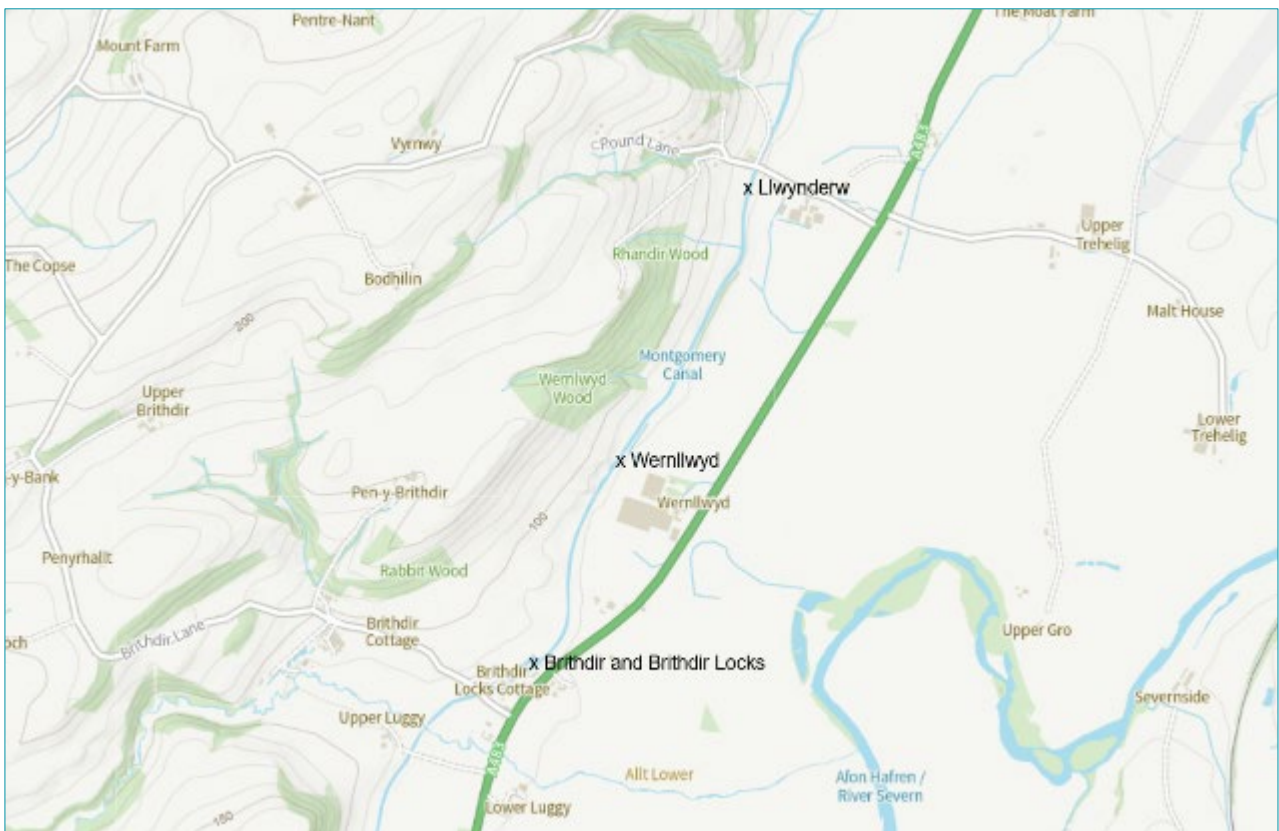


Figure 1E. Llwynderw, Wernllwyd and Brithdir & Brithdir Locks.

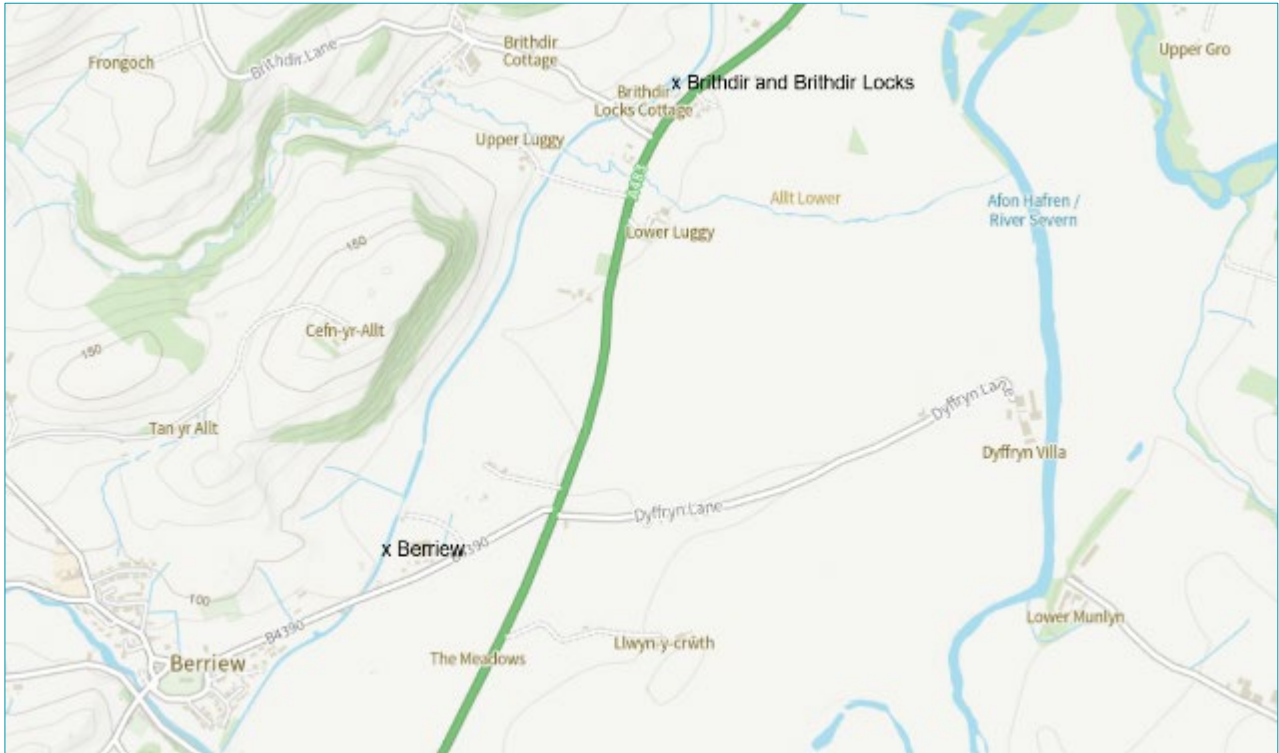


Figure 1F. Brithdir & Brithdir Locks and Berriew.

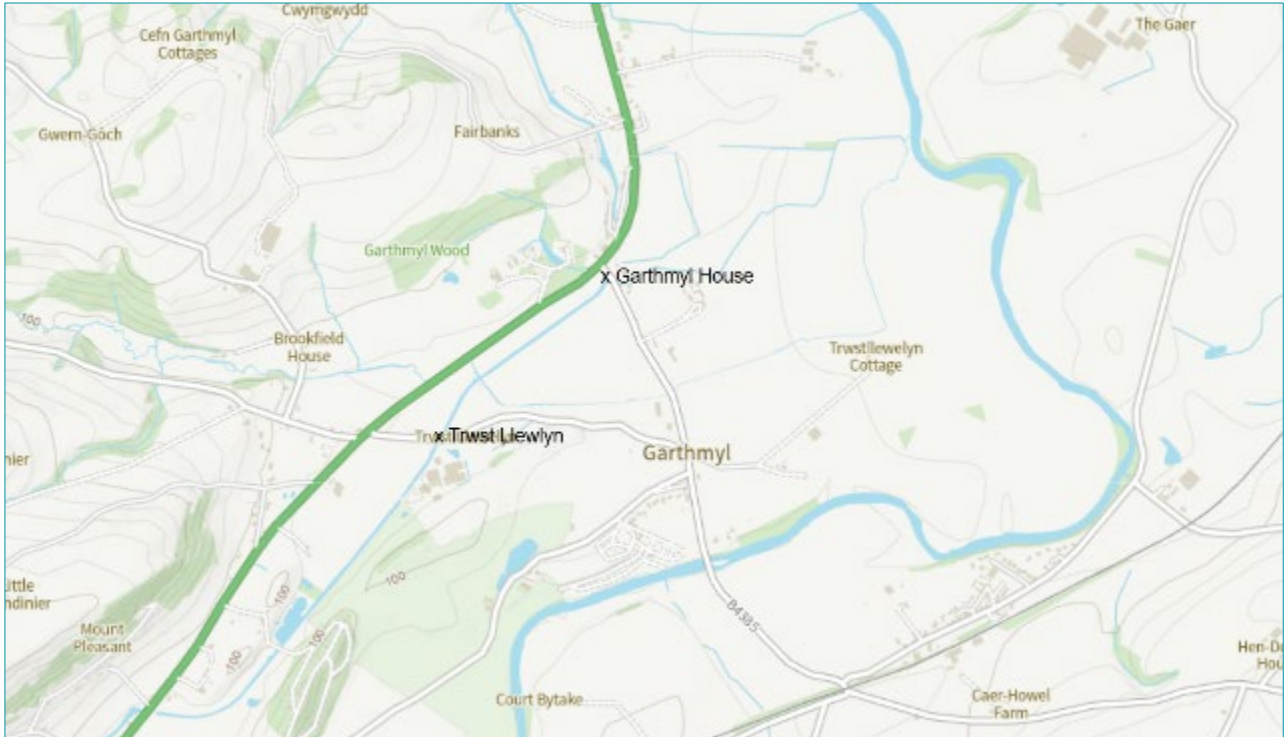


Figure 1G. Garthmyl House and Trwst Llewelyn.



Figure 1H. Glanhafren North and Glanhafren South.



Figure 1I. Abermule and Abermule south of roadbridge.

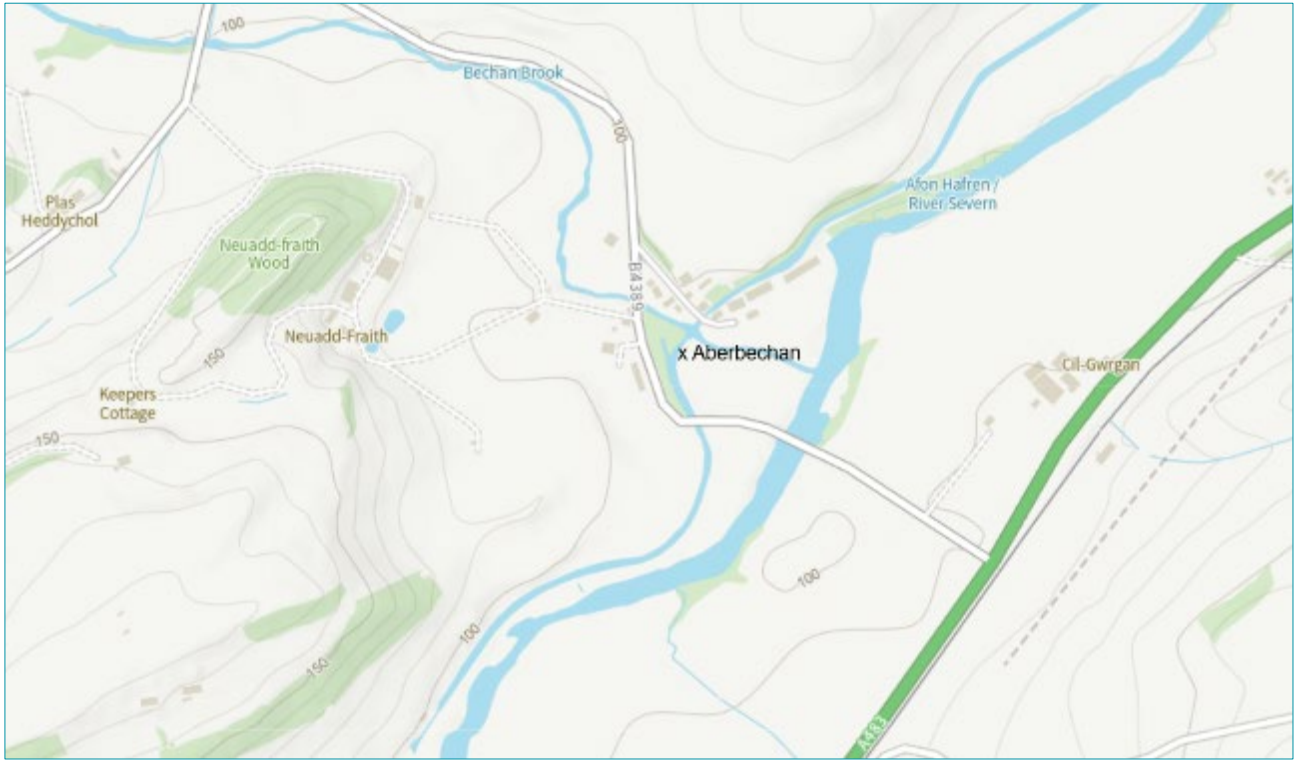


Figure 1J. Aberbechan.

## Appendix 3. Site photographs



Photograph 1. Vyrnwy Viaduct/Llanymynech. View is looking west. 25<sup>th</sup> June 2025.



Photograph 2. Vyrnwy Viaduct/Llanymynech. View is looking east towards the B4398. 25<sup>th</sup> June 2025.



Photograph 3. Parson's Bridge/Lane, Four Crosses. View is looking south. 23<sup>rd</sup> June 2025.



Photograph 4. Parson's Bridge/Lane, Four Crosses. View is looking northwest. 23<sup>rd</sup> June 2025.



Photograph 5. Guilsfield Arm. View is looking northeast. 23<sup>rd</sup> June 2025.



Photograph 6. Guilsfield Arm. View is looking southwest. 23<sup>rd</sup> June 2025.



Photograph 7. Wern Clay Pits Nature Reserve. View is looking north. 23<sup>rd</sup> June 2025.



Photograph 8. Wern Clay Pits Nature Reserve. View is looking south. 23<sup>rd</sup> June 2025.



Photograph 9. Wern south of Clay Pits. View is looking north. 23<sup>rd</sup> June 2025.



Photograph 10. Wern south of Clay Pits. View is looking south. 23<sup>rd</sup> June 2025.



Photograph 11. Bank Lock. View is looking north from the turning circle with the canal veering northeast in the distance. 23<sup>rd</sup> June 2025.



Photograph 12. Bank Lock. View is looking south (from the turning circle towards the lock). 23<sup>rd</sup> June 2025.



Photograph 13. Tal-y-bont, Buttington Cross. View is looking southwest. 23<sup>rd</sup> June 2025.



Photograph 14. Tal-y-bont, Buttington Cross. View is looking northeast. 23<sup>rd</sup> June 2025.



Photograph 15. White House Bridge Nature Reserve. View is looking southwest. 24<sup>th</sup> June 2025.



Photograph 16. White House Bridge Nature Reserve. View is looking northeast. 24<sup>th</sup> June 2025.



Photograph 17. Llwynderw. View is looking north. 24<sup>th</sup> June 2025. This section was dominated by Water Soldier *Stratiotes aliodes*.



Photograph 18. Llwynderw. View is looking south. 24<sup>th</sup> June 2025. This section was dominated by Water Soldier *Stratiotes aliodes*.



Photograph 19. Wernllwyd. View is looking northeast. 24<sup>th</sup> June 2025.



Photograph 20. Wernllwyd. View is looking south. 24<sup>th</sup> June 2025.



Photograph 21. Brithdir Lock. View is looking southwest. 24<sup>th</sup> June 2025.



Photograph 22. Brithdir Lock. View is looking northeast. 24<sup>th</sup> June 2025.



Photograph 23. Berriew. View is looking northeast. 24<sup>th</sup> June 2025.



Photograph 24. Berriew. View is looking southwest. 24<sup>th</sup> June 2025.



Photograph 25. Garthmyl House. View is looking southwest. 25<sup>th</sup> June 2025.



Photograph 26. Trwst Llewelyn. View is looking northeast from canal bridge. 25<sup>th</sup> June 2025.



Photograph 27. Trwst Llewelyn. View is looking southwest from canal bridge. 25<sup>th</sup> June 2025.



Photograph 28. Glan Hafren North. View is looking northeast. 25<sup>th</sup> June 2025.



Photograph 29. Glan Hafren North. View is looking southwest towards bridge. 25<sup>th</sup> June 2025.



Photograph 30. Glan Hafren South. View is looking north to bridge. 25<sup>th</sup> June 2025.



Photograph 31. Glan Hafren downstream of bridge. View is looking southwest. 25<sup>th</sup> June 2025.



Photograph 32. Abermule. View is looking southwest. 25<sup>th</sup> June 2025.



Photograph 33. Abermule south of bridge. View is looking southwest. 25<sup>th</sup> June 2025.



Photograph 34. Abermule south of bridge. View is looking northeast towards the bridge and link road between B4386 and A483(T). 25<sup>th</sup> June 2025.



Photograph 35. Abermule south of bridge (see above) showing Floating Water-plantain *Luronium natans*. 25<sup>th</sup> June 2025.



Photograph 36. Aberbechan. View is looking north to the village. 25<sup>th</sup> June 2025.



Photograph 37. Aberbechan. View is looking southwest. 25<sup>th</sup> June 2025.



Photograph 38. Juvenile Signal Crayfish *Pacifastacus leniusculus* caught by pond netting at Abermule and Aberbechan on 25<sup>th</sup> June 2025. The crayfish were about 1.5cm in size.

## Appendix 4. Physical and chemical data for Montgomery Canal Sample sites

Table 4.1. Sample sites 1 to 7 in June 2025.

Sample site	Llanymynech	Parson's Bridge	Guilsfield Arm	Wern Clay Pits	Wern s of Clay Pits	Bank Lock	Tal-y-bont
pH	7.1	7.3	6.6	6.5	6.7	7.7	7.4
Conductivity	115	117	144	185	193	182	153
Water Temp. (°C)	17.7	17.8	16	18.3	19.9	19.9	19.8
Total dissolved solids (ppm)	57	63	73	93	93	89	77
Turbidity	0	0	130	7	0	0	0
Water depth (cm)	72	72	17	80	29	42	54
Shade (%)	8	5	20	5	10	15	15
Floating veg. (%)	100	5	10	100	100	40	1
Submerged veg. (%)	Not visible	90	Not visible	Not visible	Not visible	Not visible	<5
Riparian veg. (%)	15	10	100	10	10	10	10
Adjacent land use (East)	River & wetland to N	Farm	House & garden	Nature reserve	Nature reserve	A483	Built-up
Adjacent land use (West)	Scrub to S	Pasture	Agri-cultural?	Wood-land	Wood-land	Pasture	Pasture

Table 4.2. Sample sites 8 to 14 in June 2025.

Sample site	White House Bridge	White House offline	Llwynderw	Wernllwyd	Brithdir	Berriew	Garthmyl House
pH	7.1	7.1	6.9	7.2	7	6.9	7
Conductivity (µS/cm)	151	145	129	113	112	120	148
Water Temp. (°C)	18.3	18.2	18.4	19.3	20.4	19.9	20.3
Total dissolved solids (ppm)	75	72	65	57	56	60	70

Sample site	White House Bridge	White House offline	Llwynderw	Wernllwyd	Brithdir	Berriew	Garthmyl House
Turbidity	0	45	0	0	0	0	0
Water depth (cm)	83	45	67	52	53	41	39
Shade (%)	8	5-10	15	8	5	8	1
Floating veg. (%)	95	10	5-100	80	<5	20	85
Submerged veg. (%)	Not visible	Not visible	Not visible	?	10	?	85
Riparian veg. (%)	5	10	0	5	10	15	80
Adjacent land use (East)	Built-up	House & garden	Agri-cultural	Farm	Pasture	Pasture	Farmland
Adjacent land use (West)	Nature reserve	Pasture	Pasture	Pasture	Pasture	Pasture	Arable

Table 4.3. Sample sites 15 to 20 in June 2025.

Sample site	Trwst Llewlyn	Glan Hafren North	Glan Hafren South	Abermule	Abermule s of roadbridge	Aberbechan
pH	7	7.1	7.1	7.1	7	7.1
Conductivity ( $\mu\text{S}/\text{cm}$ )	135	132	137	130	128	135
Water Temp. ( $^{\circ}\text{C}$ )	20.6	18.4	19.3	17.8	18.4	19.2
Total dissolved solids (ppm)	67	66	69	65	64	68
Turbidity	0	0	0	0	0	0
Water depth (cm)	47	52	40	31	37	43
Shade (%)	5	18	<3	15	8	<5
Floating veg. (%)	5	<1	<5	8	0	<1
Submerged veg. (%)	?	70	100?	?	Present	Present
Riparian veg. (%)	30	<1	10	20	15	18
Adjacent land use (East)	Pasture	Woodland & river	Farmland	River & woodland	Woodland & river	Pasture
Adjacent land use (West)	Farmland	Woodland & A483	A483	Scrub & grassland	Woodland & A483	Village

Table 4.4. Sample sites 1 to 7 in July 2025.

Sample site	Llanymynech	Parson's Bridge	Guilsfield Arm	Wern Clay Pits	Wern s of Clay Pits	Bank Lock	Tal-y-bont
pH	7.6	8.1	6.9	7.3	7.2	8.5	7.6
Conductivity (µS/cm)	170	232	296	178	165	175	159
Water Temp. (°C)	18.1	20.1	18.3	19.9	19.4	21.4	19.9
Total dissolved solids (ppm)	87	107	128	87	85	87	78
Adjacent land use (East)	River & wetland to N	Farm	House & garden	Nature reserve	Nature reserve	A483	Built-up
Adjacent land use (West)	Scrub to S	Pasture	Agri-cultural	Nature reserve	Nature reserve	Pasture	Pasture?

Table 4.5. Sample sites 8 to 14 in July 2025.

Sample site	White House Bridge	White House offline	Llwynderw	Wernllwyd	Brithdir	Berriew	Garthmyl House
pH	7.1	7.3	7.1	7.3	7.3	6.9	6.4
Conductivity (µS/cm)	132	117	108	94	100	94	97
Water Temp. (°C)	18.4	1.8	17	18.6	19.4	18.4	19.7
Total dissolved solids (ppm)	66	60	54	47	50	46	49
Adjacent land use (East)	Nature reserve	Agri-cultural	Agri-cultural	Farm	Pasture	Pasture	Farmland
Adjacent land use (West)	Nature reserve	Pasture	Pasture	Pasture	Pasture	Pasture	Farmland

Table 4.6. Sample sites 15 to 20 in July 2025.

Sample site	Trwst Llewelyn	Glan Hafren North	Glan Hafren South	Abermule	Abermule s of roadbridge	Aberbechan
pH	6.7	6.9	7.2	6.9	7	6.6
Conductivity (µS/cm)	89	88	98	98	93	74
Water Temp. (°C)	19.1	17.4	17.8	17.3	17.6	18.6
Total dissolved solids (ppm)	47	43	47	49	47	38
Adjacent land use (East)	Pasture	Woodland & river	Farmland	River & woodland	River & woodland	Pasture
Adjacent land use (West)	Farmland	Woodland & A483	A483	Scrub & grassland	Scrub & grassland	Village

Table 4.7. Sample sites 1 to 7 in September 2025.

Sample site	Llanymynech	Parson's Bridge	Guilsfield Arm	Wern Clay Pits	Wern s of Clay Pits	Bank Lock	Tal-y-bont
pH	6.9	7.3	6.6	7	7.2	7.2	7.3
Conductivity (µS/cm)	182	217	743	213	205	194	142
Water Temp. (°C)	9.9	10.6	10.1	11.6	11.5	12.2	13
Total dissolved solids (ppm)	93	105	365	107	104	106	71
Dissolved oxygen (%O <sub>2</sub> )	13	4	4.5	8.6	8.2	9.5	7
Water depth (cm)	54	53	8	50	45	72	40
Floating veg. (%)	95	30	5	<1	<1	10	<1
Submerged veg. (%)	?	90	100	?	?	?	?
Riparian veg. (%)	5	15	100	98	98	5	0
Adjacent land use (East)	Rivers and wetland to N	Farm	House & garden	Nature reserve	Nature reserve	A483	Built-up
Adjacent land use (West)	Scrub to south	Pasture	Agri-cultural	Nature reserve	Nature reserve	Pasture	Pasture?

Table 4.8. Sample sites 8 to 14 in September 2025.

Sample site	White House Bridge	White House offline	Llwynderw	Wernlwyd	Brithdir	Berriew	Garthmyl House
pH	6.8	7.3	7.4	7.7	7.2	6.9	7.2
Conductivity (µS/cm)	125	158	12.6	126	123	151	172
Water Temp. (°C)	11.8	11.2	13.8	11.7	11.7	11.7	10.3
Total dissolved solids (ppm)	62	78	12.6	63	60	76	85
Dissolved oxygen (%O <sub>2</sub> )	6.9	7.4	10.6	8.4	9.4	7.1	8
Water depth (cm)	74	38	45	84	50	57	38
Floating veg. (%)	1	3	80	80	35	80	1
Submerged veg. (%)	?	?	80	80	30	?	?
Riparian veg. (%)	10	30	80	30	5	0	80
Adjacent land use (East)	Nature reserve	House & garden	Agricultural	Farm	Pasture	Pasture	Farmland
Adjacent land use (West)	Nature reserve	Pasture	Pasture	Pasture	Pasture	Pasture	Arable

Table 4.9. Sample sites 15 to 20 in September 2025.

Sample site	Trwst Llewelyn	Glan Hafren North	Glan Hafren South	Abermule	Abermule s of roadbridge	Aberbechan
pH	7	7.3	6.3	6.2	6.8	6.6
Conductivity (µS/cm)	152	124	117	116	120	133
Water Temp. (°C)	9.5	12.5	13.3	11.5	10	10.3
Total dissolved solids (ppm)	75	62	58	59	61	65
Dissolved oxygen (%O <sub>2</sub> )	10.1	13.3	16.5	14	12	12.3
Water depth (cm)	38	50	47	53	38	47
Floating veg. (%)	5	0	15	20	15	5
Submerged veg. (%)	?	?	?	20?	?	?
Riparian veg. (%)	70	0	10	20	40	40
Adjacent land use (East)	Pasture	Woodland & river	Farmland	River & woodland	River & woodland	Pasture
Adjacent land use (West)	Farmland	Woodland & A483	A483	Scrub & grassland	Wood-land & A483	Wetland

# Appendix 5. Crayfish eDNA analysis for Montgomery Canal, Abermule - 26<sup>th</sup> September 2025

Folio No: 4199-2025  
 Purchase Order: Abermule North  
 Contact: Andy Godfrey Associates  
 Issue Date: 14.10.2025  
 Received Date: 30.09.2025



## eDNA Analysis

### Summary

When aquatic organisms inhabit a waterbody such as a pond, lake or river they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm the presence or absence of the target species within the waterbody.

### Results

Lab ID	Site Name	OS Reference	Target Species	Sample Integrity Check	Result	Positive Replicates
FK3711	Abermule North - Montgomery Canal	SO 163 954	Crayfish plague (Aphanomyces astaci)	Pass	Positive	12
			Signal crayfish (Pacifastacus leniusculus)	Pass	Positive	12
			White-clawed crayfish (Austropotamobius pallipes)	Pass	Negative	0

Matters affecting result: none

Reported by: Consuela Sopronyi

Approved by: Lauryn Jewkes

# Appendix 6. Crayfish eDNA analysis for Montgomery Canal, Aberbechan - 26<sup>th</sup> September 2025

Folio No: 4198-2025  
 Purchase Order: Aberbechan  
 Contact: Andy Godfrey Associates  
 Issue Date: 14.10.2025  
 Received Date: 30.09.2025



## eDNA Analysis

### Summary

When aquatic organisms inhabit a waterbody such as a pond, lake or river they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm the presence or absence of the target species within the waterbody.

### Results

Lab ID	Site Name	OS Reference	Target Species	Sample Integrity Check	Result	Positive Replicates
FK3710	Aberbechan - Montgomery Canal	SO 144 935	Crayfish plague (Aphanomyces astaci)	Pass	Positive	1
			Signal crayfish (Pacifastacus leniusculus)	Pass	Positive	10
			White-clawed crayfish (Austropotamobius pallipes)	Pass	Negative	0

Matters affecting result: none

Reported by: Consuela Sopronyi

Approved by: Lauryn Jewkes

# Data Archive Appendix

The data archive contains:

[A] The final report in Microsoft Word and Adobe PDF formats.

~~[B] A full set of maps produced in JPEG format.~~

~~[C] A series of GIS layers on which the maps in the report are based with a series of word documents detailing the data processing and structure of the GIS layers.~~

~~[D] A set of raster files in ESRI and ASCII grid formats.~~

~~[E] A database named [name] in Microsoft Access 2000 format with metadata described in a Microsoft Word document [name.doc].~~

~~[F] A full set of images produced in [jpg/tiff] format.~~

[G] Species records are held in the Welsh Invertebrate Database (WID).

Metadata for this project is publicly accessible through Natural Resources Wales' Library Catalogue <https://libcat.naturalresources.wales> (English Version) and <https://catllyfr.cyfoethnaturiol.cymru> (Welsh Version) by searching 'Dataset Titles'. The metadata is held as record no. **NRW\_DS161525**.

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