

**HATCHMERE SSSI
& BEAVER INTRODUCTION AREA,
DELAMERE FOREST, CHESHIRE
POST- INTRODUCTION INVERTEBRATE SURVEY &
EVALUATION FOR
THE TANYPTERA PROJECT**



Dave Bentley Entomology and Ecology Services V1.2

www.davebentleyecology.co.uk

EXECUTIVE SUMMARY

- 1 In September 2023 and May 2024 a resurvey of the wetland invertebrate interest of Hatchmere SSSI and the adjacent Beaver compound in the Delamere Forest of Cheshire was conducted by Dave Bentley Entomology and Ecology Services for the Tanyptera Project, in support of the Cheshire Wildlife Trust. This survey was carried out in the years following the Beaver introduction of 2020; after the Beavers had modified their new surroundings.
- 2 The pre-introduction survey was undertaken by Dave Bentley Entomology and Ecology Services in August and October 2019 and in March 2020. The original survey was designed to provide a baseline aquatic and wetland invertebrate survey against which the effects of a proposed Beaver introduction project could be measured over time.
- 3 The commission was guided by two questions:
 - Q 1 What will be the impact on aquatic and wetland invertebrates of the Beaver introduction on the downstream wetland SSSI of Hatchmere?
 - A1 There is no evidence in a reduction in water quality, or an improvement in water quality, using aquatic and wetland invertebrates.
 - Q 2 What will the impact on aquatic and wetland invertebrates of the Beaver introduction on the Beaver compound where the Beavers will modify the habitat?
 - A2 The Beavers area (at least that part surveyed) appears to support more invertebrate species, and more species of importance, due in varying parts to activity of Beavers, and activity of humans.
- 4 Invertebrates are a major component of any ecological system. Invertebrates include Butterflies, Moths, Bees, Wasps, Ants, Flies, Slugs, Snails, Beetles, Bugs, Dragonflies, Spiders, Grasshoppers, Woodlice, Millipedes and Centipedes and many more groups of animals. Invertebrates help pollinate flowers and break down dead plants and animals into soil. Some, like Butterflies and Dragonflies provide a visual treat for people, and others serve as food for wild birds and mammals. Invertebrates are vital to a healthy ecosystem.
- 5 488 invertebrate taxa have been identified in this 2023-24 survey at Hatchmere/Beavers (482 in 2019/20 and 707 both surveys combined). This is a good but not outstanding total for a late summer survey of basically three ponds, two streams and a ditch and adjacent marshland/mossland. In comparison, a survey at Sound Common heathland Site of Special Scientific

Interest in Cheshire East by Dave Bentley in 2017-18, taking in a much wider period from May to September, revealed 678 taxa. A late summer survey of wetlands and grasslands in Northwich in 2020 revealed 610 taxa.

- 6 In 2023-24, of the 488 taxa, 370 taxa (75.61 %) were recorded in the SSSI and 256 taxa (52.45%) were recorded in the Beaver area. 118 taxa (24.18%) were recorded in the Beaver area but not in the SSSI area. 232 taxa (47.54%) were recorded in the SSSI but not in the Beaver area. 138 taxa (28.27%) were common to both parts. It is likely that all the species found in the Beaver area will also be found in the SSSI with more work.
- 7 In 2019-20 of the 482 taxa, 410 taxa (85.06%) were recorded in the SSSI and 190 taxa (39.41%) were recorded in the Beaver area (moderated figures). 72 taxa (14.94%) were recorded in the Beaver area but not in the SSSI area. 292 taxa (60.58%) were recorded in the SSSI but not in the Beaver area. 118 taxa (24.48%) were common to both parts.
- 8 Combining both surveys this means 707 invertebrate taxa were recorded at Hatchmere/Beavers between 2019 and 2024. 579 taxa (81.75%) were recorded in the SSSI and 369 taxa (52.19 %) were recorded in the Beaver area. 128 taxa (18.10%) were recorded in the Beaver area but not in the SSSI area. 339 taxa (47.94%) were recorded in the SSSI but not in the Beaver area. 240 taxa (33.99%) were common to both parts. All moderated counts.
- 9 No legally protected invertebrates were recorded. There are no European or UK Protected Invertebrate Species and no Priority Species (Section 41) of Principal Importance.
- 10 21 species (2019-24) have official UK scarcity statuses as listed by the UK Joint Nature Conservation Committee, a part of government. Some of these statuses require updating. There were 16 recorded in 2023-24 and 11 recorded in 2019-20.
- 11 23 species (2019-24) had not (or at least not in recent decades) been recorded in Cheshire before. These are Notable in the County Records. There were 14 recorded in 2023-24 and 12 recorded in 2019-20.
- 12 83 species (2019-24) are Very Local in Cheshire have been recorded in between just 2 and 6 other Cheshire sites. There were 54 recorded in 2023-24 and 47 recorded in 2019-20.
- 13 The Local Wildlife Site Selection Criteria for the Cheshire region (Criterion S4) was used to consider the Dragonfly and Damselfly assemblage present. 15 species were recorded over the two sets of surveys combined including the

Variable Damselfly, Black-tailed Skimmer, Common Hawker and the Black Darter, each of these being a reason for site selection in Cheshire. The threshold for consideration as a Local Wildlife Site is 8 Points. The assemblage scores at least 60 points, enough to warrant consideration as a Local Wildlife Site for Dragonflies and Damselflies alone. All the 2019/20 taxa have been refound following the Beaver introduction as shown by iRecord contributors. iRecord adds Ruddy Darter adults to the Beavers site in 2023 and 2024.

- 14 Incidental records were made of Palmate Newts, Smooth Newts, Toads, Frogs, Common Lizard and Three-spined Sticklebacks. The alien invasive plant New Zealand Pigmyweed was also located in the NW part of the SSSI in 2020.
- 15 Despite a careful search at an appropriate time and with appropriate levels and extents of water pooling to support Caddis, no Nationally Rare and Vulnerable *Anabolia brevipennis* were located in either 2019-20 or 2023-24 by Dave Bentley. However it continues to be located by Ian Wallace the National Caddisfly expert who found it in the North West fen carr of Hatchmere on 02/03/2023, 18/05/2022, and also in 2018. It was not taken elsewhere in the survey, so this gives weight to the idea that it is restricted to the Carr Woodland in the NW of Hatchmere. Alas it was not found by Dave Bentley in the wet carr habitat around the stream in the adjacent eastern part of the Beavers compound on 05/05/2024.
- 16 *A. brevipennis* should be listed as a named feature of the SSSI, and should be monitored, at least once each decade.
- 17 The current waterflow regime in the *A. brevipennis* area is very important to maintain suitable conditions for the population. The waterflow regime should be regularly monitored for any changes, especially in light of the Beaver introduction. Significant change should trigger a new survey for *A. brevipennis* and any footpath mitigation work as a result of waterflow change should be carefully considered (in terms of materials used as well as hydrological impact) to avoid any negative impact on the *A. brevipennis* population.
- 18 The destruction by Beavers of the watercress beds in Beavers Brook has brought the Nationally Notable B Green Watercress Weevil *Drupenatus nasturtii* to the brink of local extinction.

1 INTRODUCTION

- 1.1 An area of land (SJ 547 723) upstream of Hatchmere SSSI in the Delamere Forest of Cheshire belonging to Cheshire Wildlife Trust was proposed, in 2019, for a Beaver introduction project. A series of ecological studies were undertaken to consider the biological value of the introduction area and of Hatchmere. These would constitute a benchmark against which any impact of the Beaver introduction could be established over time. Consent was obtained from Natural England for the survey.
- 1.2 One of the components of the ecological studies was an invertebrate survey. This was arranged by the Tanyptera Project for the Cheshire Wildlife Trust. Dave Bentley Ecological Services was selected for the work given Dave Bentley's vast experience in wetland invertebrate survey work, and additional heathland survey expertise.
- 1.3 The Beavers were introduced to a secure compound in 2020 and promptly set about modifying the habitat. In particular they dammed the stream which passed through their compound and diverted it into the existing pond (an old duck-decoy pond). Water eventually flooded a glade of rush pasture, waterlogging the area and creating winding channels and filling pools. The Beavers also coppiced willows and felled young oaks trees. Cheshire Wildlife Trust had also cleared, in the winter of 2019-20, a small plantation of conifer trees edging the glade, adding to the habitat change.
- 1.4 In September 2023 and May 2024 a resurvey of the wetland invertebrate interest of Hatchmere SSSI and the adjacent Beaver compound in the Delamere Forest of Cheshire West was conducted by Dave Bentley Entomology and Ecology Services for the Tanyptera Project, in support of the Cheshire Wildlife Trust. This survey was carried out in the years following the Beaver introduction of 2020 and after the Beavers had modified their new surroundings.
- 1.5 The invertebrate survey of 2019/2020 comprised three visits in August 2019, October 2019 and March 2020, timed to examine particularly the aquatic component. **The survey did not include early or mid-summer when, as long as there is sufficient rainfall, many more terrestrial species are encountered.**
- 1.6 Invertebrates are a major component of any ecological system. Invertebrates include Butterflies and Moths, Bees, Wasps, Ants, Flies, Slugs, Snails, Beetles, Bugs, Dragonflies, Spiders, Grasshoppers, Woodlice, Millipedes and Centipedes and many more groups of animals. Invertebrates help pollinate flowers and break down dead plants and animals into soil. Some, like

Butterflies and Dragonflies provide a visual treat for people, and others serve as food for wild birds and mammals. Invertebrates are vital to a healthy ecosystem.

- 1.7 Invertebrates that are specific to certain habitats are seen as an indicator of the naturalness of a site. Where such a species is rare or uncommon its presence can indicate the value of a habitat. The presence of certain invertebrates can suggest management practices for a site; the growth in the number of habitat-specific species over time can indicate a site has been improved as a habitat type; conversely the loss of habitat-specific species over time suggests a decline in quality of that habitat type. The specific needs of certain uncommon invertebrates might suggest certain types of future management. Looking at the habitat needs of the range of invertebrates present shows the range of habitats that need to be maintained.
- 1.8 The report sets out what was found in the periods in question. The report concentrates on aquatic/wetland/heathland invertebrates and not on wayside and woodland invertebrates. It is quite possible that many species were not seen/ found on the days visited, or can be found in other habitats. The 2019/2020 survey is presented in full in the report “Hatchmere SSSI & proposed Beaver introduction area, Delamere Forest, Cheshire: Invertebrate Survey for the Tanyptera Project. Dave Bentley Ecology Services V1.3” and its accompanying spreadsheet and is merely drawn on, as appropriate, in this report. Not all of the ditches in the Beaver compound could be resurveyed as parts now lie outside the Beaver fencing and are inaccessible, but in any case there was sufficient new wetland within the fence to provide alternative sampling points. A new pond found to have been dug behind the buildings at the Beaver compound was not sampled.
- 1.9 This report includes a text document and a spreadsheet.

2 METHODS

Timing and extent of the 2023/24 survey

- 2.1 Long day visits were conducted on fine, sunny days in September (25/09/2023 and 29/09/2023) and May (05/05/2024).
- 2.2 A map is appended showing location of sampling points 1 to 23. The surveys included the following habitats

1	Norley Moss Pools	SJ 5520 7198
2	Norley Moss Moor	SJ 5522 7203

3	Norley mere edge	SJ 5524 7207
4	West side mix Hatchmere	SJ 5520 7214
5	NW bay Hatchmere	SJ 5521 7214
6	West wet wood Hatchmere	SJ 5519 7215
7	West seepage Hatchmere	SJ 5509 7223
8	Crassula pool Hatchmere	SJ 5497 7235 2020 only
9	North inflow stream Hatchmere	SJ 5500 7234
10	North side swamp Hatchmere	SJ 5523 7228
11	Boardwalk (main) SE Hatchmere	SJ 5539 7207
12	Swim entry Hatchmere	SJ 5540 7216
13	East side Hatchmere	SJ 5536 7230
14	Sewage Outlet Hatchmere	SJ 5536 7224
15	NE Marsh Hatchmere	SJ 5531 7229
16	Beavers Brook	SJ 5472 7229
17	Beavers Pond	SJ 5478 7231
18	Beaver Glade/Swamp	SJ 5471 7224
19	Beaver West Ditch A (N)	SJ 5461 7236
20	Beaver West Ditch B	SJ 5463 7231
21	Beaver West Ditch C	SJ 5464 7227
22	Beavers West Ditch D (S)	SJ 5467 7220 2020 only
23	Ditch in Fen carr	SJ 5504 7233 2024 only

2.3 All field work and identification was done by Dave Bentley - who has been employed in wetland and general ecology since the early 1990s. Alan Stewart, Clive Washington and Garth Foster confirmed some specimens in the 2019/20 surveys. In the later surveys species of interest have been confirmed by iRecord verifiers.

2.4 A site meeting was held with Ian Wallace in October 2019 to discuss the records of the rare Caddis *Anabolia brevipennis*. Breeding locations, identification tips and survey methods were kindly shared. Later records were shared by email.

2.5 The methods employed were:

Direct observation of animals, mines and galls/ photography/ hand searching.

Use of pond net in water areas.

Searching of aquatic vegetation and water in a large white tray.

Butterfly net. Flying insects were targeted.

Canvas bag netting. A stout, short-handled bag was driven through ground vegetation, tall herbage, and amongst the lower branches of trees, with tree leaf clusters and bunches of reed-heads being shaken into the bag.

Vacuum sampling with a petrol sucker. The contents are shaken over a large white tray and picked through.

Samples were retained and preserved for microscopical examination.

Identification:

- 2.6 The latest up-to-date keys have been used. In addition help groups on Facebook have been consulted and online galleries and help pages viewed. Training courses with experts have been regularly attended. Almost every animal that is determined from a key can be viewed as a high definition photograph on specialist pages online. All samples have been retained, should they need to be re-examined.
- 2.7 Some species cannot be determined from female animals (e.g. some hoverflies), whilst many spider species cannot be determined without finding fully adult males or females. Species only become mature at certain times of year. *Some* of the Aleocharinae beetles have only basic keys which rely on having comparative samples and males, so could not be identified in 2019/20 - the publication of the final Beetles of Britain and Ireland Volume by Duff in late 2024 has allowed the 2023/24 Aleocharinae samples to be identified to species. A Moth survey would require night work to attract Moths to a moth trap.
- 2.8 Many Fly species have been identified. However, only a few selected distinctive Calypterate (blue-bottles or similarly shaped black flies) species have been so far identified. Some of the families of the smallest flies have not been attempted. Smaller Nematocera are the province of life-long experts so few species can be identified.
- 2.9 Micro wasps and Ichneumon wasps taken as bi-catch have been retained for a later attempt at identification by experts, though many species may not be known. They are the province of experts.
- 2.10 Thunderflies, tiny animals that live in flower heads, have not been attempted as the keys require very high magnification tools normally only found in Museums – and the species are not used in conservation evaluation.

3 RESULTS & DISCUSSION

- 3.1 All taxa, their conservation statuses in England and Wales, and in Cheshire, their habitat requirements, and the plot locations where found, are shown in the full spreadsheet. The Cheshire County is as created in 1974.

As well as total taxa counts, this report looks at three importance categories: Nationally Scarce etc taxa, Notable County records (only site in the county of Cheshire), and Very Local taxa (where there appear to be between 2 and 6 recorded sites in Cheshire County).

3.2 This table shows by species group over the 2019-24 surveys how many of which importance category. Some species can be in 2 columns. They comprise 2019-24:

	VL	NC	NS
Totals	83	23	21
Worms		1	
Bees/wasps	1	1	
Myriapoda	1		
Spiders	13		6
Water Mites		3	
Microcrustacea	8	3	1
Caddisflies			1
Dragonflies			1
Water Bugs	5		
Land bugs	22	4	2
Aphids		2	
Beetles	16	4	7
Flies	13	3	2
Thrips	1		
Springtails	3	2	1
	VL	NC	NS
Totals	83	23	21

Species numbers

3.3 At Hatchmere/Beavers the 2023-24 survey identified 488 invertebrate taxa. The 2019/20 survey identified a similar 482 taxa (moderated figure). These are good totals for a late summer survey of basically three ponds, two streams and a ditch and adjacent marshland. In comparison, a survey at Sound Common heathland Site of *Special* Scientific Interest in Cheshire East by Dave Bentley in 2017-18, taking in a much wider period from May to September, revealed 678 taxa. A late summer survey of wetlands and grasslands in Northwich in 2020 revealed 610 taxa. "Moderated" means ensuring taxa aggregates are not double counted.

- 3.4 In 2023-24, of the 488 taxa, 370 taxa (75.61 %) were recorded in the SSSI and 256 taxa (52.45%) were recorded in the Beaver area. 118 taxa (24.18%) were recorded in the Beaver area but not in the SSSI area. 232 taxa (47.54%) were recorded in the SSSI but not in the Beaver area. 138 taxa (28.27%) were common to both parts. It is likely that all the species found in the Beaver area will also be found in the SSSI with more work.
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- 3.6 Combining both surveys this means 707 invertebrate taxa were recorded at Hatchmere/Beavers between 2019 and 2024. 579 taxa (81.75%) were recorded in the SSSI and 369 taxa (52.19 %) were recorded in the Beaver area. 128 taxa (18.10%) were recorded in the Beaver area but not in the SSSI area. 339 taxa (47.94%) were recorded in the SSSI but not in the Beaver area. 240 taxa (33.99%) were common to both parts. All moderated counts.

Species rarity – officially Scarce Species

- 3.7 No legally protected invertebrates were recorded. There are no European or UK Protected Species and no Priority Species (Section 41) of Principal Importance. Note in case of transcribing errors in any of the following accounts the true record is the spreadsheet.
- 3.8 The survey located several officially scarce animals, and these have largely been confirmed with the relevant experts.
- 3.9 Between 2019 and 2024 twenty one species with an official scarcity status, as supplied in 2024 (taxon Designations download) by the UK Government's Joint Nature Conservation Committee (and other schemes where not covered by JNCC), were recorded: 15 in Hatchmere SSSI, 8 in Beavers. Two of these were found in both parts of the survey area, six were found in Beavers only and 13 were found at Hatchmere only. The species are as follows:

Bathyphantes setiger Cola-can-wielding Money Spider – Nationally Scarce, Very Local in Cheshire with fewer than 7 recorded sites. Amber listed, meaning the spider will become Red Listed if the conservation status of the spider gets worse. A bog species. Males were found along the west side of Hatchmere, where *Sphagnum* lawns are present, in 2019 and 2023.

Tmeticus affinis Orange & Grey Money Spider- Nationally Scarce. Very Local in Cheshire with fewer than 8 other records. A wetland species. Females were found at two marshy places on Hatchmere's east bank in October 2019.

Theridion hemerobium Therid Spider – Nationally Scarce. Finally confirmed at Hatchmere in September 2023 with an adult female found. Well-marked juveniles in several places (also in 2019) at Hatchmere only. Very Local in Cheshire with fewer than 7 recorded sites. A wetland species living by open water.

Theridiosoma gemmosum Fat-bodied Black and White Therid – Nationally Scarce. A very Local pond and stream edge spider known from less than 7 Cheshire. Taken at half the sample points in both parts of the site.

Erigonella ignobilis Brown Bog Money Spider – Nationally Scarce. A male taken in the new swamp at Beavers in September 2023. Very Local in Cheshire with fewer than 7 recorded sites.

Walckenaeria nodosa a Periscope Money Spider – Nationally Scarce. A male located at Norley Moss mere edge in October 2023. Very Local in Cheshire with fewer than 7 recorded sites.

Noterus crassicornis Smaller Boat-shaped Small Diving Beetle – Nationally Scarce. Local in Cheshire, not uncommon. A water beetle. One adult was taken along the main angling boardwalk in 2023, well away from the mossland. Two were taken, either side of Hatchmere, in 2023.

Hydroporus neglectus Toothed Small Brown Diving Beetle – Nationally Scarce. Common to Local in Cheshire. A water beetle. One male was found in the NE marsh of Hatchmere in October 2019 where leafy water and *Sphagnum* is found.

Stroggylocephalus livens Mottled Bog Leafhopper – Nationally Notable B. This is the first and only known Cheshire site. A wetland species. One male was found, in both 2019 and 2023, both on the west bank of Hatchmere where bog habitat is present. Confirmed by Alan Stewart.

Drupenatus nasturtii Green Watercress Weevil – Nationally Notable B. Very Local in Cheshire with fewer than 7 recorded sites. A wetland species. Taken in Beavers Brook amongst Water-cress in both surveys, but under threat locally due to the Beavers' destruction of the watercress bed.

Dioxyna bidentis Long-lipped Picture-winged Fly – Nationally Notable. Very Local in Cheshire with fewer than 8 other records. A wetland species. One adult

taken on Norley Moss mere edge in August 2019, presumably where *Bidens* grows in the saturated grass/surface mud.

Agelastica alni Alder Leaf Beetle – Red Data Book Data Deficient. Found on Alder trees east side of Hatchmere in 2019 and 2023. 20 years ago this was a rare beetle but the population exploded and now this beetle is found in almost any Alder tree (and others) in NW England. Also expanding in Yorkshire and Southern England.

Chydorus latus Square Water Flea – cited as “rare” in the British Freshwater Cladocera by Scourfield & Harding 1966. This sub 1mm Water Flea is known from deer wallow puddles in marshes at Tatton Park. A little recorded group. Found both parts of the site in both surveys.

Limnephilus binotatus Two-spotted Caddis – Nationally Scarce. Local in Cheshire. Found as a larva by the angling boardwalk in Hatchmere in September 2023.

Coenagrion pulchellum Variable Damselfly – Red Data Near Threatened. Local in Cheshire. Most likely now too widespread to be Near Threatened. Larvae with rounded tail tips found both sides of Hatchmere SSSI in 2023.

Ceratocombus coleoptratus Heath Litter Bug - Nationally Scarce. This is the only record on iRecord and Delamere Forest is one of two North West records on NBN Atlas (the other record is at Sefton Coast). The other Delamere record was made by Steve Judd of Liverpool World Museum in 1986. NBN Atlas states there are 124 records, scattered widely across Great Britain. Known from wet forested heaths and found in the fen carr north west of Hatchmere September 2023.

Gyrinus paykulli Larger Parallel-sided Whirligig Beetle – Nationally Scarce. Found in flooded lakeside vegetation in September 2023, both sides of Hatchmere. Very Local in Cheshire – there are records on NBN Atlas from Hatchmere in 1969 (H Cagier), Quoisley Little Mere in 1969 (K Allenby) and in 1889 in what is now Wirral Borough (J Ellis). Confirmed by Garth Foster.

Helochares punctatus Dark Bog Helochares Beetle – Nationally Scarce. Local in Cheshire, given it lives in more acid habitats. Delamere has a number of records. Found at Beavers Glade/Swamp May 2024.

Stenus fornicatus Little Black Camphor Beetle – Nationally Notable B. Delamere is the only site in Cheshire, with Clive Washington adding an iRecord record for Blakemere in 2022. These are the only two NW England records. Found at Beavers Pond May 2024. An Nb beetle that is still very much scarce, and its records are centred on iconic bog /heath areas.

Geomyza majuscula Fully-divided Geomyza Fly – Nationally Notable. Very Local in Cheshire. There is another Delamere Forest record made by L Hardwick in 2016. There is one other Cheshire record and a record each in both North and South Lancashire. It is a fly of Rich fens and marshes. The female part is divided into two hair-like points. Found at Beavers Glade/Swamp September 2023.

Isotoma riparia 1-striped Springtail – “apparently scarce, only at edge of rivers, probably under-reported” per the University of Roehampton Collembola webpages. Local in Cheshire at best. Found at Beavers Pond in March 2021.

Species Notable in County of Cheshire (only known site in Cheshire)

3.10 Species Notable in the County of Cheshire. The surveys of 2019-24 located several animals for which no other modern Cheshire County record/site appears to exist on published databases. The Cheshire County is as created in 1974. The “site” is taken to be Delamere Forest environs in this instance.

3.11 The twenty three Notable in Cheshire Records (NC) 2019-24 species are:

Dendrobaena octaedra Octagonal-tailed Worm found at Hatchmere. Under-recorded.

Acrodactyla quadrisculpta Tetragnatha spider parasite as larvae. Under-recorded.

*Hygrobates arenarius** Netted Water Mite – Previously confused with *Hygrobates fluviatilis* so this appears to be the first UK and first Cheshire record. *H fluviatilis* is recorded in one river in UK on NBN but was also listed in A Key to the Water Mites (Hydracarina) of the Flatford area by CL Hopkins 1961. It lives in fast streams and was found in the Beavers Brook. An under-recorded group.

*Unionicola crassipes** Square-plated Water Mite – First Cheshire record, no records on NBN but listed in A Key to the Water Mites (Hydracarina) of the Flatford area by CL Hopkins 1961. Found in the Beavers Pond. An under-recorded group, common in the Netherlands in many types of waterbody where freshwater sponges can be found.

Hygrobates fluviatilis Water Mite. Under-recorded.

*(De Nederlandse watermijten (Acari: Hydrachnidia) by Harry Smit 2018 was used to determine these samples.)

Alona costata? Lined Water Flea. Foot was missing from sample to confirm species, but under-recorded.

Ergasilus sp Parastic Copepod/ Gill Louse. Under-recorded.

Ceriodaphnia megalops Step-footed Small-headed Water Flea. Under-recorded. No records online, but listed in the key from several places.

Ceratocombus coleoptratus Heath Litter Bug. Nationally Scarce. See above.

Notus flavipennis Golden-winged Leafhopper. Somewhat under-recorded.

Stroggylocephalus livens Mottled Bog Leafhopper. Nationally Notable B – see above.

Eupteryx stachydearum Woundwort Small Leafhopper. Somewhat under-recorded.

Caricosipha paniculatae Greater Tussock Sedge Aphid. No records on NBN Atlas or rECOrd. Greater Tussock Sedge & other Carex. Under-recorded group but the main host plant is not common.

Hyalopteroides humilis? Elongate Cock's-foot Aphid. Under-recorded group.

Stenus fornicatus Little Black Camphor Beetle. Nationally Notable B – see above.

Volinus sticticus Striped Ruddy Dung Beetle. A few records exist around Delamere. Records are mainly south east, Wales, midlands and very few NW England records.

Ochlerotatus (Aedes) cf caspius? Mosquito. Under-recorded.

Ochlerotatus (Aedes) cf communis? Mosquito. Under-recorded.

Beckerina umbrimargo Scuttle Fly. Under-recorded species.

Chaetopleurophora erythronota Scuttle Fly. Under-recorded species.

Sepsis neocynipsea Ensign Fly with spine & bump. Somewhat under-recorded.

Sminthurinus aureus Squat Grey yellow Springtail. Under-recorded group.

Heterosminthurus insignis Yellow Least Squat Springtail. Under-recorded group.

Species with 1 to 6 recorded sites in Cheshire – Very Local Species

- 3.12 For Very Local species an arbitrary figure of 6 total known sites was chosen. Species with an official scarcity status but are not Notable or Very Local in Cheshire are not included here. There were 83 Very Local species recorded, **in addition** to the 21 Notable County records.
- 3.13 The full list 2019-24 of Very Local species in Cheshire (NC are shown above) (and with some duplication with officially Scarce species) showing broad habitat requirements and location found, is as follows:

<i>Colletes succinctus</i>	Heather Colletes Bee	Heaths SSSI
<i>Chordeuma cf proximum</i>	Big-cheeked Big-eyed Millipede	Wood edge SSSI
<i>Mangora acalypha</i>	Cricket-bat Orb-web Spider	Heaths Beavers
<i>Pirata (Piratula) uliginosus</i>	Coat Hooks Otter Spider	Heaths SSSI
<i>Enoplognatha latimana</i>	Scarce Candy-striped Spider	Roughs SSSI
<i>Theridion hemerobium</i>	Therid Spider	Wetland SSSI
<i>Theridiosoma gemmosum</i>	Fat-bodied Black and White Therid	Wetland Both
<i>Bathyphantes setiger</i>	Cola-can-wielding Money Spider	Wetland SSSI
<i>Ceratinella scabrosa</i>	Capped-abdomen Money Spider	Wood edge SSSI
<i>Erigonella ignobilis</i>	Brown Bog Money Spider	Wetland Beavers
<i>Oedothorax agrestis</i>	Brown Money Spider	Wetland SSSI
<i>Tmeticus affinis</i>	Orange & Grey Money Spider	Wetland SSSI
<i>Walckenaeria nodosa</i>	a Periscope Money Spider	Wetland SSSI
<i>Lophopilio palpinalis</i>	Many-spined Harvestman	Roughs Beavers
<i>Oligolophus hanseni</i>	Dark-eyed Harvestman	Wood edge SSSI
<i>Acroperus harpae</i>	Spanner Water Flea	Wetland Beavers
<i>Ceriodaphnia quadrangula</i>	Small-headed Water Flea	Wetland SSSI
<i>Ceriodaphnia reticulata</i>	Small-headed Water Flea	Wetland SSSI
<i>Chydorus latus</i>	Square Water Flea	Wetland Both
<i>Chydorus ovalis</i>	Oval Water Flea	Wetland Both
<i>Chydorus sphaericus</i>	Oval Water Flea	Wetland Beavers
<i>Daphnia curvirostris</i>	Many-toothed Water Flea	Wetland SSSI
<i>Pleuroxus truncatus</i>	Spiny-rear-end Water Flea	Wetland SSSI
<i>Hebrus ruficeps</i>	Ruddy Sphagnum Bug	Wetland SSSI
<i>Mesovelia furcata</i>	Pondweed Bug	Wetland SSSI
<i>Gerris argentatus</i>	Silver-edged Pond Skater	Wetland Both
<i>Cymatia coleoprata</i>	Brown Lesser Water Boatman	Wetland SSSI
<i>Sigara scotti</i>	Scott's Lesser Water Boatman	Wetland SSSI
<i>Rhacognathus punctatus</i>	Heather Shieldbug	Heaths SSSI
<i>Acalypta parvula</i>	Bulging-antennaed Moss Lacebug	Roughs SSSI
<i>Orius laticollis</i>	Wide-fronted Minute Flower Bug	Wood edge Beavers
<i>Orius vicinus</i>	Smaller un-haired Flower Bug	Roughs Both
<i>Compsidolon salicellum</i>	Grey Yellow Bramble Bug	Wood edge SSSI
<i>Cyrtorhinus caricis</i>	Green & Brown Plant Bug	Wetland SSSI
<i>Dicyphus errans</i>	Black-fronted Nettle Plant Bug	Wood edge SSSI
<i>Orthotylus marginalis</i>	Dark Green Apple Capsid	Wetland SSSI
<i>Kleidocerys ericae</i>	Heather Bug	Heaths SSSI

<i>Pachybrachius fracticollis</i>	Constricted-pronotum Ground Bug	Wetland SSSI
<i>Trapezonotus dispar</i>	Sandy Ground Bug	Heaths SSSI
<i>Conosanus obsoletus</i>	Part-winged Buff Leafhopper	Wetland SSSI
<i>Eupteryx cyclops</i>	C-marked pale-legged leafhopper	Wetland SSSI
<i>Notus flavipennis</i>	Yellow Arrow-head Leafhopper	Wetland SSSI
<i>Typhlocyba quercus</i>	Orange brown white Leafhopper	Wood edge SSSI
<i>Cixius distinguendus</i>	Forest Lacehopper	Wood edge SSSI
<i>Megamelodes quadrimaculatus</i>	Dark Brown Marsh Planthopper	Wetland Both
<i>Megamelus notula</i>	Banded Sedge Planthopper	Wetland SSSI
<i>Muellerianella fairmairei</i>	3-Banded Planthopper	Wetland Beavers
<i>Stenocranus minutus</i>	Long-winged Long-nosed P'hopper	Roughs Beavers
<i>Ulopa reticulata</i>	Heather Planthopper	Heaths SSSI
<i>Aphalara cf polygona</i>	Orange-blotched Jump'g Plant Louse	Wood edge Beavers
<i>Gyrinus paykulli</i>	Larger Parallel-sided Whirligig	Wetland SSSI
<i>Enochrus affinis</i>	Pale-eyed Scavenger Beetle	Wetland Both
<i>Donacia marginata</i>	Purple-patched Reed Beetle	Wetland Beavers
<i>Plagioderma versicolora</i>	Imported Willow Leaf Beetle	Wetland SSSI
<i>Psylliodes picina</i>	Smooth-headed Flea Beetle	Wetland Beavers
<i>Stenus picipennis</i>	Camphor Beetle	Wetland Beavers
<i>Stenus solutus</i>	Camphor Beetle	Wetland Beavers
<i>Alianta incana</i>	Granulated abdomen Rove Beetle	Wetland Beavers
<i>Hygronoma dimidiata</i>	Yellow+brown-winged Rove Beetle	Wetland SSSI
<i>Lathrobium terminatum</i>	Yellow-flash Rove Beetle	Wetland SSSI
<i>Myllaena intermedia</i>	Broad-fronted Brown Rove Beetle	Wetland Beavers
<i>Ocyusa picina</i>	Small Brown Rove Beetle	Wetland SSSI
<i>Philonthus nigrita</i>	Small Black Rove Beetle	Wetland SSSI
<i>Drupenatus nasturtii</i>	Green Watercress Weevil	Wetland Beavers
<i>Sitona hispidulus</i>	Flat-eyed Hairy Clover-root Weevil	Flower meadows SSSI
<i>Tachyerges stigma</i>	White-scutellumed Black Flea Weevil	Wood edge SSSI
<i>Achyrolimonia decemmaculata</i>	10-spot Crane fly	Wetland SSSI
<i>Ptychoptera minuta</i>	Fold-wing Crane fly	Wetland Beavers
<i>Dixella attica</i>	Meniscus Midge	Wetland Beavers
<i>Pericoma cf palustris/gracilis</i>	Moth Fly	Wetland Both
<i>Pherbellia schoenherri</i>	Spot-winged Little Snail-killing Fly	Wetland Both
<i>Chelipoda albiseta</i>	Long-legged Dance Fly	Wetland SSSI
<i>Leptozeza borealis</i>	Small dark Dance Fly	Wetland SSSI
<i>Geomyza majuscula</i>	Fully-divided Geomyza Fly	Wetland Beavers
<i>Dioxyna bidentis</i>	Long-lipped Picture-winged Fly	Wetland SSSI
<i>Tephritis leontodontis</i>	Hawkbit Gall Fly	Flower meadows SSSI
<i>Drosophila suzukii</i>	Spotted-winged Fruit Fly	Wood edge SSSI
<i>Limnolia surturi</i>	Shore Fly	Wetland SSSI
<i>Cordilura ciliata</i>	Reedbed Black Dung Fly	Wetland Both
<i>Liothrips setinodis</i>	Big Black Thrip	Wood edge SSSI
<i>Allacma fusca</i>	Large Dark Brown Squat Springtail	Roughs SSSI
<i>Deuterosternus pallipes</i>	Waltzing Squat Springtail	Roughs SSSI
<i>Isotomurus fucicolus</i>	Brown Springtail	Wetland Both

Totals in each category by area and year

3.14 Over the two surveys 2019-20 and 2023-24 these are the totals:

	2019-2024			2023-24			2019-20		
	Total	SSSI	Beaver	Total	SSSI	Beaver	Total	SSSI	Beaver
Total	707	579	369	488	370	256	482	410	190
NS	21	15	8	16	13	7	11	9	3
NC	23	16	9	14	11	5	12	7	5
VL	83	64	31	54	36	24	47	42	9

Note some taxa fell out of the NC and VL categories between 2020 and the end of 2024 and the total is updated from what might have appeared in the 2020 report.

3.15 On the face of these numbers one could say the number of taxa found in the SSSI fell, from 482 to 370 after the Beavers were introduced upstream. However it is felt that the decline in what are all chance captures is down to seasonality. The 2019–20 surveys of Hatchmere were on 8 August 2019, 2 October 2019 and 28 March 2020. The 2023-24 surveys were on 25 September 2024, 29 September 2024 and 5 May 2024 – in each case delayed by access permissions. There has been very little physical change at Hatchmere SSSI, and this seems limited to the reconstruction of the footpath which may have affected the water supply from the stream out of Beavers into the north-western marsh at Hatchmere.

3.16 Conversely one could say that the introduction of Beavers to the Beaver site has raised the number of taxa found from 190 to 256 taxa, and clearly here there has been an increase in wetland extent. The increase in wetland has changed from what was minor ditches, a flowing stream and a rather regular-sided pond with a reedmace swamp area, into a large wet willow carr and open swamp trickling through what had been Rush Pasture (which was itself rutted after the 2020 surveys by machines removing the Conifer plantation). It is not possible to fully ascertain whether the person-made manipulation or the Beaver manipulation had more results. Where a water level rises in a Rush Pasture the invertebrates become easier to find as they climb up the thatch layer to avoid drowning and are more easily caught. A vacuum sucker and a canvas bag net and a pond net were used in both surveys. The extensive flooding meant the original pond and its reedbed were inaccessible. Beavers was visited 8 August 2019 and 28 March 2020, and 29 September 2023 and 5 May 2024.

3.17 A more positive appraisal is that the counts of total species has gone up with more work as has the count of Nationally Scarce, Notable in Cheshire and Very Local species in Cheshire.

3.18 In general the more we survey a site the more we find.

3.19 These are the questions we asked:

Q 1 What will be the impact on aquatic and wetland invertebrates of the Beaver introduction on the downstream wetland SSSI of Hatchmere?

A1 There is no evidence in a reduction in water quality, or an improvement in water quality, using aquatic and wetland invertebrates.

Q 2 What will the impact on aquatic and wetland invertebrates of the Beaver introduction on the Beaver compound where the Beavers will modify the habitat?

A2 The Beavers area (at least that part surveyed) appears to support more invertebrate species, and more species of importance, due in varying parts to activity of Beavers, activity of humans

Local Wildlife Site selection Criteria

3.20 The Local Wildlife Site Selection Criteria for the Cheshire region (Criterion S9) considers terrestrial/freshwater invertebrates:

“Sites should be selected that regularly support either:

Significant populations of any UK BAP species, or red data book listed species, or national rare/scarce species (present in 1-100 hectads in the UK).

OR

Significant assemblages* of any terrestrial or freshwater invertebrates. (A locally significant bee assemblage is 8+ species of social bumble bee or 4+ species of cuckoo bee. A locally significant assemblage of macro-moths is 350 species which equates to 65% of the current list for VC5836)

*Refer to Lancashire and Cheshire Entomological Society”

- 3.21 For most scarce species (the probable exception being freshwater molluscs) when invertebrate surveying it is practically impossible to determine a population level and thus impossible to work out a significant population level, which no doubt would require an assessment of multiple sites’ populations.
- 3.22 This survey shows that there is, at the very least, a presence of 21 nationally rare/scarce species (included are 1 Near Threatened Damselfly*, 1 Nationally Rare Beetle*, 2 Nationally Notable Flies, 6 Nationally Scarce Spiders, 1 Nationally Scarce Caddes, 1 Nationally Scarce Bug, 4 Nationally Scarce Beetles, 1 Nationally Scarce Springtail, 1 “rare” Water Flea, 2 Nationally Notable B Beetles and 1 Nationally Notable Bug. * at least these two threatened or rare species are no longer so, having more than recovered from any pressing threats. The assemblage of invertebrates at Hatchmere/Beavers is a “significant assemblage” as suggested in this report. Thus invertebrates are an important component of the designated site and contribute towards its continued designation.

Dragonfly and Damselfly Assemblage

- 3.23 The Local Wildlife Site Selection Criteria for the Cheshire region (Criterion S4) was used to consider the Dragonfly and Damselfly assemblage present. 15 species were recorded over the two sets of surveys combined including the Variable Damselfly, Black-tailed Skimmer, Common Hawker and the Black Darter, each of these being a reason for site selection in Cheshire. The threshold for consideration as a Local Wildlife Site is 8 Points. The assemblage scores at least 60 points, enough to warrant consideration as a Local Wildlife Site for Dragonflies and Damselflies alone. All the 2019/20 taxa have been refound following the Beaver introduction as shown by iRecord contributors.
- 3.24 iRecord (Bob Wilkinson) adds Ruddy Darter adults to the Beavers site in 2023 and 2024. The 2020 report erroneously included reference to “Emerald Damselfly” but this did not figure in the spreadsheet or score calculation. Black-tailed Skimmer was accidentally omitted from the 2020 spreadsheet though was included in the text report.

Butterflies and Bees

- 3.25 Given the aquatic focus, the survey was not timed to coincide with peak species numbers of summer maturing species such as Butterflies and Bees. No conclusion should be drawn from the sparsity of these groups in this survey.

Caddis *Anabolia brevipennis*

- 3.26 Despite a careful search at an appropriate time and with appropriate levels and extents of water pooling to support Caddis, no Nationally Rare and Vulnerable *Anabolia brevipennis* were located in either 2019-20 or 2023-24 by Dave Bentley. However it continues to be located by Ian Wallace the National Caddisfly expert who found it in the North West fen carr of Hatchmere on 02/03/2023 and on 18/05/2022 and also in 2018. It was not taken elsewhere in the survey, so this gives weight to the idea that it is restricted to the Carr Woodland in the NW of Hatchmere. Alas it was not found by Dave Bentley in the wet carr habitat around the stream in the adjacent eastern part of the Beavers compound on 05/05/2024.
- 3.27 Ian Wallace requests *A. brevipennis* should be listed as a named feature of the SSSI, and should be monitored, at least once each decade.
- 3.28 The current waterflow regime in the *A. brevipennis* area is very important to maintain suitable conditions for the population. The waterflow regime should be regularly monitored for any changes, especially in light of the Beaver introduction. Significant change should trigger a new survey for *A. brevipennis* and any footpath mitigation work as a result of waterflow change should be carefully considered (in terms of materials used as well as hydrological impact) to avoid any negative impact on the *A. brevipennis* population.

Sewerage installation

- 3.29 A sewerage installation from the east side of the main road issues via a ditch under the road and through the willow area before emptying into the Mere. No signs of pollution were found in the ditch west of the road. The ditch contained numerous *Gammarus pulex* Freshwater Shrimp in both 2019 and 2023. It is a tree-shaded muddy course with little marginal vegetation.

Water-cress beds in Beavers Brook

- 3.30 The 2020 report drew attention to the potential loss of the Water-cress beds and the Nationally Notable B Weevil dependent upon that plant: "Particularly the Watercress beds in the Beaver Stream need to be conserved to protect the Green Watercress Weevil *Drupenatus nasturtii*." The 2020 report stressed in its concluding comments that "Steps to ensure the survival of Watercress beds

within the Beaver Stream may need to be taken.” Recommendations have been made in the intervening period to conserve the Water-cress beds and/or the Watercress at Hatchmere. However, the Water-cress is massively diminished at the Beavers site. The Nationally Scarce Water-cress Weevil *Drupenatus nasturtii* was found in 2024 on the only fragment of Water-cress seen in a stream once filled with the water plant. If the Beavers destroy all the Water-cress, the Nationally Scarce weevil will be lost from the site.

Habitats for invertebrates considered

- 3.31 The area studied includes deep open water, vegetated open water, including with lily pads, marginal vegetation including reedbed, fen, inundation grassland and carr, flowing streams, sluggish streams and seepages, wooded damp grassland, marshy grassland, acid heath, sphagnum lawn and acidic heathland pools.

4 INCIDENTAL WILDLIFE RECORDS

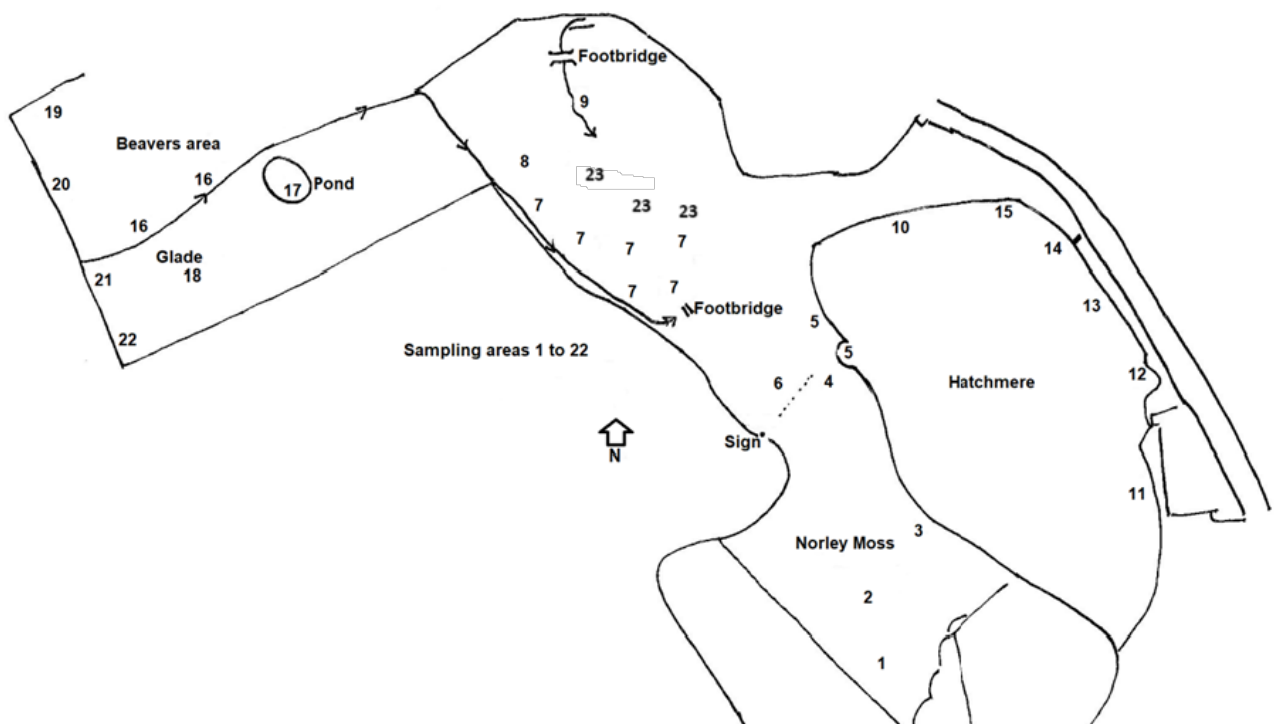
- 4.1 In 2020 Common Frog spawn was found in Beavers Pond and the western ditch south of the stream in Beavers. Common Toad spawn was found in Beavers Pond. Hatchmere was not searched during the amphibian breeding season. Common Lizard found on Norley Moss in 2019. In 2024 Beavers Pond had Frog tadpoles and a Toad on the bank, whilst in the Glade/Swamp Frog tadpoles, a male Palmate Newt and three Smooth Newts (one male) were netted and a Toadlet was seen there.
- 4.2 In 2019/20 Three-spined Stickleback fish were located as follows: The Western seepage into Hatchmere, the North East Marsh, Beavers Brook and Beavers Pond. Hatchmere’s east bank is let to an angling club. In 2024 they were located in Beavers Brook and the immediately adjacent Ditch C, Beavers Pond and in the Glade/Swamp.
- 4.3 A pool containing the alien invasive New Zealand Pigmyweed *Crassula helmsii* was located in the NW of the SSSI on 28/03/2020 (location is just visible from the SE corner of the Beaver enclosure fence). The contamination of the pond effectively ended the survey in 2020. This plant needs to be eliminated. The ditch was avoided in 2023/24 but the invasive plant was not located elsewhere.

5 CONCLUDING COMMENT

5.1 This is a report of an invertebrate survey of aquatic/wetland invertebrates at Hatchmere SSSI and the proposed Beavers area to the North West of the SSSI.

Significant invertebrate interest exists on site contributing to the designation. Steps to ensure the survival of Watercress beds within the Beaver Stream or elsewhere need to be taken. In order to evaluate the impact of the Beaver introduction and human involvement the methodology will need to be repeated at the appropriate intervals.

Dave Bentley 01/01/2025



Plan showing location of sample points 1 to 23