

# **SOUTHERN DAMSELFLY *COENAGRION MERCURIALE* ON THE ANGLESEY FENS**

## **SURVEY AND MONITORING 2013**

### **C.15: Actions for Annex II species**

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## BACKGROUND

An isolated population of *Coenagrion mercuriale* is present on the Anglesey and Llyn Fens SAC, on and adjacent to the Nant Isaf spring fields within Cors Erddreiniog SSSI. Following an EU LIFE funded programme of recovery management across the SSSI, Matt Sutton Ecology was contracted to undertake surveillance of all suitable habitat for the southern damselfly *Coenagrion mercuriale* on this site, and at nearby Waun Eurad SSSI. Baseline monitoring transects were established in locations supporting *Coenagrion mercuriale*, and counts of adult males made. An assessment was made of the potential for habitat re-creation work on Cae Gwyn to support the species in future.

## MAIN FINDINGS

The core population on the Nant Isaf spring fields appears reasonably strong, with counts on transects through the best areas producing counts of males totalling at least 166. This would suggest an overall total population of perhaps 1000-2000.

The ditch running west to link the Nant Isaf spring fields to Cors Nant Isaf also holds a small population, with a count of 13 males. This would suggest a small overall population here of perhaps 100 males. This ditch provides a crucial dispersal route for *Coenagrion mercuriale*, potentially allowing it to become established in other areas of the site should they hold suitable habitat.

Flushes and other watercourses on Cors Nant Isaf and elsewhere on the site were carefully examined, but no *C. mercuriale* seen. Most flushes appeared too dry to host permanent populations. Similarly, the flushes on Waun Eurad comprised dry mud, and held no Odonata.

The recent work on Cae Gwyn has created shallow water-bodies, but at the time of survey, there were no soligenous flows across the freshly exposed marl surface. The pools were proving attractive to *Ischnura pumilio*, but the potential for this part of the site to support *C. mercuriale* would be dependent on the creation and maintenance of permanent or near permanent soligenous flows.

Our key recommendation is to give consideration to enhanced management of ditches on Cors Erddreiniog. The potential for expanding the *C. mercuriale* population in this context seems potentially more viable than expanding it through management of soligenous flows.

One waterbody examined on Cors Erddreiniog, re-profiled with an excavator in March 2013, was found to contain a small population of Floating Water Plantain, *Luronium natans*, not previously recorded from the SAC and considered to be extinct on Anglesey. This plant is listed in the Habitats Directive as an Annex II species.

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## 1. INTRODUCTION

The population of *Coenagrion mercuriale* on Cors Erddreiniog has only been known since the 1980s. As a small, isolated population it is particularly vulnerable to changes in hydrology or management at its core location. A programme of recovery management has been implemented during the last three years, substantially funded by the EU through the 'Anglesey and Llyn Fens LIFE project'. This has included the funding of enhanced grazing regimes across Cors Erddreiniog, a substantial amount of vegetation cutting, and some re-profiling and creation of water courses. The latter has included excavator work and hand work, ranging from the extensive soil stripping project on Cae Gwyn, to ditch-side scraping with a tracked excavator, and small-scale works with hand tools on and around the known *Coenagrion mercuriale* flushes.

Following this, Natural Resources Wales wished to obtain updated information on the status of *Coenagrion mercuriale* on the Anglesey Fens. Matt Sutton Ecology was contracted to carry out surveillance and monitoring of the species on and around its known populations. Fieldwork was undertaken during hot (20 – 25°C), sunny weather on July 8<sup>th</sup> – 10<sup>th</sup> 2013.

## 2. CONSERVATION OBJECTIVES

The conservation objective for *Coenagrion mercuriale* on the Anglesey Fens SAC (CCW, 2008) is for it to be in favourable conservation status, where all of the following conditions are satisfied:

- Population size is stable or increasing
- The population occupies at least 3 distinct management units
- The total area of good breeding habitat does not fall below 1000m<sup>2</sup>
- Seepages and shallow runnels at Nant Isaf will be clear, pollution free and will support good numbers of native aquatic plants.
- The population of southern damselflies on the site (allowing for normal annual fluctuations) is maintained or increases.
- Species indicative of drainage or agricultural modification, such as Yorkshire fog *Holcus lanatus*, bramble *Rubus* spp., nettle *Urtica dioica* are largely absent
- Alkaline Fen habitat exhibits a diverse age and height structure across the site (tussocks are undamaged and 20% short grazed, 50% mature – 30% in between including bare ground)
- Scrub species such as willow *Salix* spp and birch *Betula pubescens* are largely absent from the alkaline fen habitat
- Rhododendron spp. is absent from the feature.
- Appropriate grazing is managed across 100% of the site
- Standing or running surface water is present between tussocks throughout the year, and visible over 30% of the tussock covered area.
- All hydrological (diffuse, surface and sub-surface) pathways (inputs and outputs) should be restored and/or intact (includes ditch infilling, blocking, diversion and re-engineering)
- Water quality is appropriate to the needs of the vegetation and species.
- All factors affecting the achievement of the foregoing conditions are under control.

The second part of the conservation objective specifies the indicators for feature condition as follows:

<i>Attribute</i>	<i>Attribute rationale and other comments</i>	<i>Specified limits</i>
A1. Size of population	Breeding populations are recorded by reference to the number of adult males per square metre of good breeding habitat, in at least one year out of six	<i>Upper limit:</i> None set <i>Lower limit:</i> at least 1 male per 10 square metres of breeding habitat across the site
A2. Distribution of population	Southern damselfly presently occurs in 2 management units: Nant Isaf Spring Flushes and at Cors Nant Isaf, but is susceptible to changes in management or stochastic events. Suitable habitat exists at Cors Goch and other locations in Cors Erddreiniog.	<i>Upper limit :</i> none set <i>Lower limit:</i> breeding occurs regularly in 3 management units.
A3. Extent of good breeding habitat	Good breeding habitat comprises shallow running water in alkaline fen. Distinct patches of oviposition plants ( <i>Menyanthes trifoliata</i> , <i>Hypericum elodes</i> , <i>Potamogeton coloratus</i> and <i>Apium nodiflorum</i> ) are present as more than 20% cover over areas greater than 0.5 square metres and no more than 20% of the total cover is taller than 15cm above water level. Patches must occur where there is evidence of flow (ie. streams, seepages and flushes) and are regarded as sub-optimal or insignificant when present in standing water or basin mire habitats.	Upper limit: Lower limit: At least 500 square metres of breeding habitat present at Nant Isaf Spring and Cors Nant Isaf Target: At least 500m (combined) of suitable habitat at other locations within the SAC

### 3. SURVEY

Locations known or thought to contain potentially suitable flush systems for *Coenagrion mercuriale* were indicated by NRW. Although neither vegetation maps nor aerial photos were available during the survey, in practice it was straightforward to locate potentially suitable flush systems. All work was carried out by Matt Sutton.

The locations indicated by CCW comprised the following:

- All springs/seepages East side of Cors Erddreiniog SSSI, between Bodgynda entrance and Cae Gwyn
- Cae Gwyn Excavation site including constructed wetlands and pools
- Seepage and spring flow above Cae Gwyn
- Nant Isaf Spring Fields
- Ditch between Spring Fields and Cors Nant Isaf
- Cors nant Isaf East Side springs and flushes, including "stepping stone" area between Spring fields and Cors Nant Isaf
- Ty'n Cae and small area opposite Cors nant Isaf
- Waun Eurad

Searches were additionally made along the main ditch, and the lateral ditch feeding this from the Cae Gwyn excavation site.

Surveillance initially took place outside of the peak hours for *Coenagrion mercuriale* activity (11-2pm), but particularly suitable habitat was searched again between these times. Searches were made simultaneously for other scarce odonata, particularly the damselfly species *Coenagrion pulchellum*, *Ischnura pumilio* and *Ceriagrion tenellum*.

Appendix 4 provides photos of and notes on the more suitable areas searched.

### 4. MONITORING TRANSECTS

#### **Timing of Monitoring and Weather Conditions**

The flight period of *C. mercuriale* is relatively short in this northern population – given as 8<sup>th</sup> June to 24<sup>th</sup> July in 1998 (Colley and Howe, 1999). Thompson, Purse and Rouquette (2003) indicate 20<sup>th</sup> June to 18<sup>th</sup> July as the four week period in which peak counts are likely to be obtained on UK sites.

The monitoring dates of July 8<sup>th</sup> and 9<sup>th</sup> fell within this peak emergence period. It would be advisable to undertake future monitoring at a similar date, weather conditions allowing, and certainly within the four week period specified in the generic guidance.

Thompson, Purse and Rouquette (2003) specify the time period and weather conditions in which monitoring of transects should be carried out:

- Counts should take place between 11:00 and 14:00 BST
- The air temperature in the shade should be above 17°C.
- There should be at least 50% sunshine.

- Wind should not exceed force 4 on the Beaufort scale (no more than leaves and branches moving).

Days were chosen to monitor when the weather was hot (around 24°C), sunny (virtually full sun) and fairly still (winds no more than 3 on the Beaufort scale). Transects were recorded during the optimum period, and where possible between 12:00 and 13.00.

### **Location of Transects**

Baseline monitoring transects were established to assess the population sizes at the two locations where *C. mercuriale* was found.

At these locations, an initial reconnaissance transect was walked to establish start and end points, and to check that the transect route concentrated on the highest concentration of adults. Following this, the transect was walked once in accordance with the guidance set out in Thompson, Purse and Rouquette (2003). This suggests a walking pace of approximately 5m per minute, and a recording distance of 5m to either side of the transect line.

An outstretched net was used to help delimit this distance on one side (and was also useful for gently encouraging resting, hidden damselflies into the air). Although not specified in the guidance, transects were walked in an uphill direction where applicable, as the topography, combined with the direction of breeze, tended to encourage damselflies to drift behind rather than in front the observer. Males only were counted, but the number of tandem pairs was also recorded separately on this occasion.

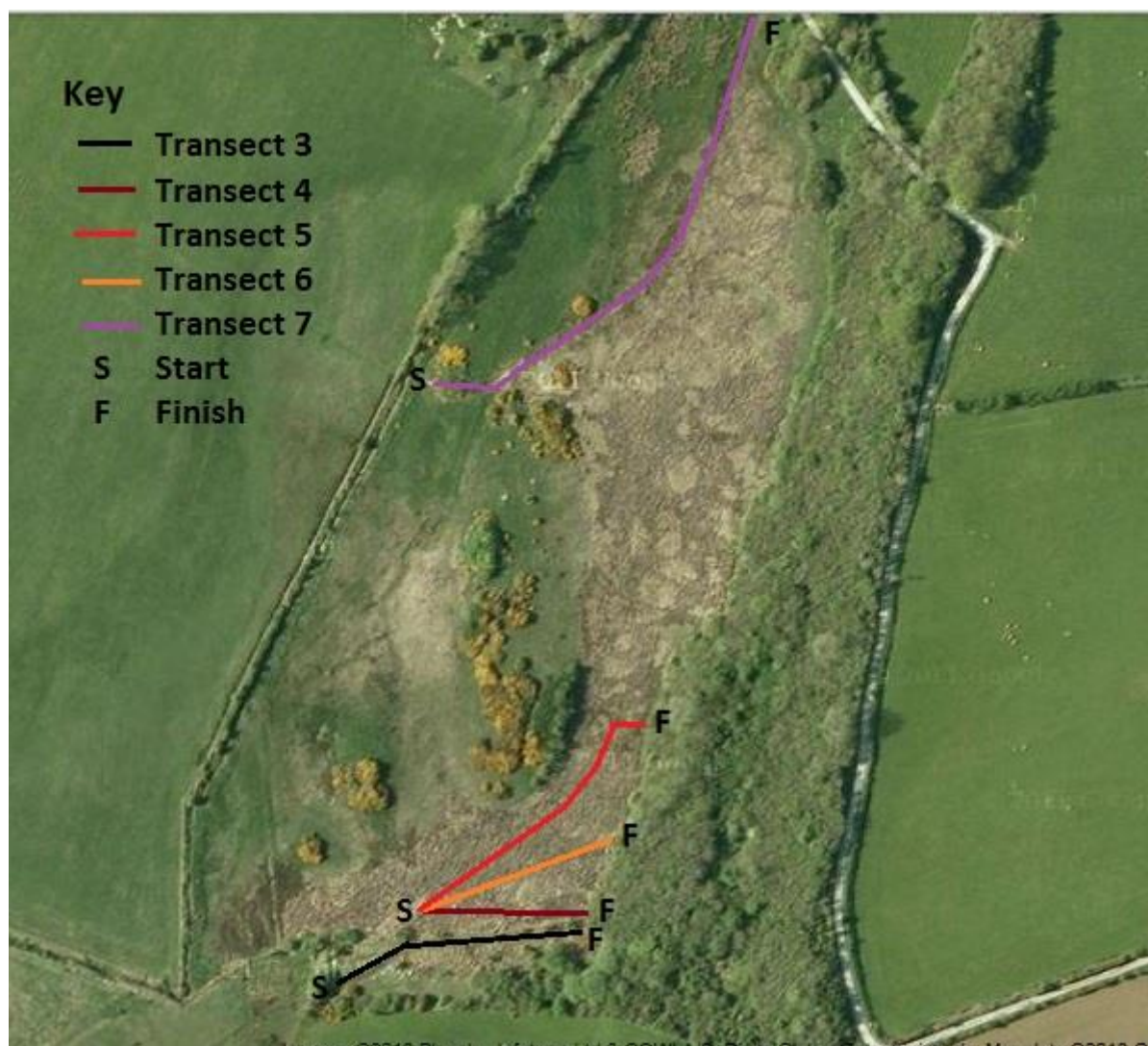
Four transects were recorded on Nant Isaf spring field, one just outside the southern boundary of this field, and two on the ditch joining this site to Cors Nant Isaf. These are mapped below, and fully described in Appendix 1.

Two of the four transects on Nant Isaf recorded particularly good numbers of male *C. mercuriale* (Transects 4 and 7), and these should be the primary transects for repeat monitoring at this site. The two ditch transects (Transects 1 and 2) should both be considered primary transects for repeat monitoring, as they provide key evidence of dispersal to other potentially suitable parts of the site.

If any further locations are subsequently discovered, primary transects should be established there too in accordance with the guidelines given above.







## Transect Results

Details of numbers for each transect are given in Appendix 3. Two counts are given for the primary transects on Nant Isaf spring field, as the transect reconnaissance recorded slightly higher counts than the actual transect monitoring. Two counts are also given for Transect 1, as an additional male was present when the transect was repeated the following day.

## 5. ASSESSMENT OF CONSERVATION STATUS

Counts on transects established by Colley and Howe (cited in Thompson, Purse and Rouquette, 2003) apparently fluctuated from 31 in 1997 to 11 the following year, but recovered to 80 in 2002. No other data on the population was available to inform this survey, and no information on spatial distribution within the site. The NRW management plan for the Anglesey Fens (CCW, 2008) states that the conservation status of *Coenagrion mercuriale* is 'unfavourable declining', saying that 'population surveillance has occurred for a number of years and confirms that dereliction, hydrology, water quality and undergrazing are reducing habitats and populations'.

The present survey suggests a more optimistic assessment, with counts of adult males at least twice those in 2002, and the factors affecting the species, particularly under-grazing, not so evident. However, an assessment made against the conservation objective shows that the status must still be judged unfavourable, as the species is still confined to two management units. With continued favourable management and an evident ability to disperse, a third management unit could feasibly become colonised in the near future. Were this to be the case, the specified limit for population size (at least 1 male per 10 square metres of breeding habitat across the site) would currently be met, providing the target extent of good breeding habitat (500m<sup>2</sup>) was available<sup>1</sup>.

<sup>1</sup>it may prove sensible to reassess this attribute as, hypothetically, a situation could arise where management resulted in a large increase in the extent of good breeding habitat, thus 'diluting' the population to a figure below 1 male per 10m<sup>2</sup>.

## 6. CONCLUSIONS AND RECOMMENDATIONS

Survey work found no new management units supporting *C. mercuriale*. Flushes and other watercourses on Cors Nant Isaf and elsewhere on the site were carefully examined, but no *C. mercuriale* seen. Most flushes appeared too dry to host permanent populations. The Cae Gwyn re-creation site held standing water in shallow pools, but the runnels linking these were dry following the recent drought conditions. A more stable hydrological regime would perhaps be required if this part of the site is to attract *C. mercuriale*. Similarly, the flushes on Waun Eurad comprised dry mud, and held no Odonata.

Monitoring work established that the core population on Nant Isaf spring fields appears to be responding well to current management, with transects demonstrating the presence of a moderate number of males. The site could potentially become more suitable with increased levels of grazing. The *Menyanthes* dominated ditch sampled by Transect 7 appears to be a favoured part of the site, but several lengths of this transect held a rather dense growth of the plant, with few or no damselflies. The area of high quality alkaline fen sampled by Transects 4,5 and 6 appear to have a less dense, but more widespread population. The short, open vegetation with extensive areas of shallow water or wet mud is particularly favoured here. However, it may prove difficult to achieve a high enough stocking rate to avoid the need for other interventions (mechanical disturbance or cutting of vegetation) without adversely impacting other components of the alkaline fen or indeed compromising livestock growth rates. Sensitive vegetation cutting may have benefitted the fen here, not only by allowing greater sunlight penetration to the wet ground between the tussocks, but also by reducing the suitability of the vegetation for damselfly predators such as orb web spiders.

The second known population, on the outflow ditch from the Nant Isaf spring field, persists despite water quality appearing moderate at best. The shallow flows here should be maintained, and care taken not to divert all available water on to the Cae Gwyn restoration project. Some judicious opening up of the taller vegetation, such as that around the footbridge, could help this population. Ditch side re-profiling here might extend the areas of shallow water and create some additional habitat. Removal of bushy growth on the section of ditch alongside Cae Gwyn would reduce shading and potentially also improve habitat suitability. It should be noted that the emergent plants used for ovipositing by the ditch population are different from those listed in the conservation objective, presumably written specifically for the flush populations. *Caltha palustris*, *Iris pseudacorus*, *Veronica anagallis-aquatica* and *Rorripa nasturtium-aquaticum* are among the most prominent plants in the



ditch, and it is perhaps the latter species which would be most attractive to ovipositing females. Both this, and '*Veronica* sp.' are recorded as having been used for oviposition (Purse, 2002).

Attention could also be focussed on other ditches, particularly the main ditch running south / north through the site. Providing water quality is at least moderate here too, ditch side mechanical interventions coupled to the increased trampling of livestock may allow the damselfly to occupy a similar niche here, and spread further across the site. In contrast to many of the spring-fed areas on Cors Nant Isaf, the ditch here does at least appear to have a reliable water supply.

Our key recommendation, therefore, is to give consideration to enhanced management of ditches on Cors Erddreiniog. The potential for expanding the *Coenagrion mercuriale* population in this context seems potentially more viable than expanding it through management of soligenous flows.



*C. mercuriale* location on Transect 2 – ditch enhancement work could produce more such habitat

## 7. REFERENCES

CCW (2008) Site Management Plan, Anglesey Fens. Unpublished.

Purse, B. (2002). The Ecology and Conservation of the Southern Damselfly (*Coenagrion mercuriale* – Charpentier) in Britain. Environment Agency R&D Technical Report W1-021/TR.

Thompson DJ, Purse BV & Rouquette JR (2003). *Monitoring the Southern Damselfly, Coenagrion mercuriale*. Conserving Natura 2000 Rivers Monitoring Series No. 8, English Nature, Peterborough.

## APPENDIX 1: TRANSECT DETAILS

Transect Number	Transect Name	Start-Point GR	Start-Point Description	End-Point GR	End-Point Description	Route
1	Ditch Transect 1	SH 47638 82278	Wooden post and rail stock fence across ditch	SH 47440 82353	Wooden foot-bridge	Within ditch, then alongside on right
2	Ditch Transect 2	SH 47440 82353	Wooden foot-bridge	Not recorded	Junction with main ditch	Alongside ditch on right
3	Spring-Field south of boundary	SH 47707 82279	Bottom of runnel just east of Cae Gwyn settlement pond	SH 47796 82292	Top of runnel before bushes	Following main runnel near to fence
4	Spring-Field Transect 1a	SH 47725 82296	Largest willow just in from boundary	SH 47794 82303	Top corner of enclosure	Following boundary bank c.3m in, diversion round 2 willows
5	Spring-Field Transect 1b	SH 47725 82296	Largest willow just in from boundary	SH 47814 82419	Dog-leg in top fence	Aiming to the right of dry ridge then following channel / axis
6	Spring-Field Transect 1c	SH 47725 82296	Largest willow just in from boundary	SH 47802 82322	Top of main channel by strainer post 144' from corner	Bisecting transects 1a and 1b
7	Spring-Field Transect 2	SH 47752 82490	Culvert to boundary stream	SH 47878 82650	Entrance gateway	Following main runnel, with abundant Menyanthes



APPENDIX 2: TRANSECT PHOTOS



Transect 1 start-point viewed from transect line





Transect 1 first section, with the only *C. mercuriale* location around fence-posts 4 and 5



This footbridge locates the end of Transect 1 and the start of Transect 2





Transect 3 starts at the bottom of this runnel before the bushes



Transect 3 follows the sometimes ill-defined main flush channel inside the hedge to the top corner





Transects 4, 5 and 6 all start from the tall willow in the centre of this picture



Transect 4 follows the right hand edge of this photo, Transect 5 to the left, and Transect 6 through the centre





Transect 7 follows the main channel flow, dominated in part by *Menyanthes trifoliata*

## APPENDIX 3: TRANSECT COUNTS

Transect Number	Date	Time	Weather	Number of male <i>C. mercuriale</i>	Notes
1	8.7.2013	13.00 – 13.30	Hot, full sun, wind 2-3	1	Tandem pair. Also 8 <i>Ischnura pumilio</i>
1 repeated	9.7.2013	13.45 – 14.15	Hot, full sun, wind 1-2	2	2 tandems in the same location
2	9.7.2013	13.13 – 13.30	Hot, full sun, wind 1-2	11	Including 1 tandem
3	9.7.2013	10.20 - 10.32	Hot, full sun, wind 1-2 from east	9	Incl. 3 tandems
4	9.7.2013	10.55 – 11.08	Hot, full sun, wind 1-2 from east	11	Incl. 2 tandems
4 reconnaissance	8.7.2013	Not recorded	Hot, full sun, wind 2-3	30	
5	9.7.2013	11.16 – 11.40	Hot, full sun, wind 1-2 from east	17	
6	9.7.2013	12.30 – 12.45	Hot, full sun, wind 1-2 from east	28	
7	9.7.2013	11.46 – 12.15	Hot, 7/8 sun, wind 1-2 from east	69	7 before start of <i>Menyanthes</i> , incl. 3 at start-point by culvert. Peak in mid/upper section but still 3 in poached <i>Juncus articulatus</i> dominated runnel c.20m from gate
7 reconnaissance	8.7.2013	Not recorded	Hot, full sun, wind 2-3	88	A further 20 males on subsidiary channels alongside mid/upper section of transect

#### APPENDIX 4: AREAS OF POTENTIAL HABITAT SEARCHED



Cors Erddreiniog east side (left) and northern section (right)

Numbered locations are as follows:

1. All springs/seepages East side of Cors Erddreiniog SSSI, between Bodgynda entrance and Cae Gwyn
2. Cae Gwyn Excavation site including constructed wetlands and pools
3. Seepage and spring flow above Cae Gwyn
4. Nant Isaf Spring Fields
5. Ditch between Spring Fields and Cors Nant Isaf
6. Cors nant Isaf East Side springs and flushes, including "stepping stone" area between Spring fields and Cors Nant Isaf
7. Ty'n Cae and small area opposite Cors nant Isaf

Yellow Stars indicate areas of promising habitat, particularly worthy of continued surveillance





Seepage zones in location 1, although wet, are generally small and shaded by tall growth



Promising *C. mercuriale* habitat at the southern yellow starred area in location 1, where slow-flowing shallow water instead held one male *Coenagrion pulchellum*





A flush system at the northern starred area in location 1 held *Ischnura pumilio*, and would be a good location for continued surveillance



Pools on the Cae Gwyn re-creation site had *Ischnura pumilio*, but with no through-flow seem unsuitable for *mercuriale*.





Location 6: Grazed, open flush system, but rather too dry at time of survey



Location 6: Hand-dug channels provide the only surface water – heavier (cattle) grazing would perhaps provide a better management tool for creating and maintaining suitable *C. mercuriale* habitat.





Location 6 'Stepping Stone' area between Transect 1 and Cors Nant Isaf, with recently hand-opened channel providing a small amount of potentially suitable habitat.



*Menyanthes* dominates the ditch and northern fringe of the site at location 7 – if more open it could resemble the *Menyanthes* ditch on Nant Isaf spring field.