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INVERTEBRATE MONITORING & ENHANCEMENT PLAN

At

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Date:	22nd July 2024
UES reference:	UES03448/46

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1 INTRODUCTION

1.1 Author and qualifications

This report is compiled and written by Harry Fox BSc MRes, United Environmental Services (UES) Graduate Ecologist.

It has been verified by Tom Kenwright BSc MSc ACIEEM, UES Senior Ecologist.

1.2 Proposed development

Planning permission (reference P/2023/0280) was granted by Wrexham Borough Council on the 5th July 2024. The granted permission is a hybrid planning permission for:

a) Outline permission (all matters reserved except for means of access) for erection of up to 3 warehouse and distribution units (use class b8); and

b) Full planning permission for demolition, means of access, earthworks, drainage, landscaping, ecology zone and relative ecological mitigation measures, and ancillary works.

A separate planning application (reference P/2023/0640) and European Protected Species (EPS) mitigation licence (reference S093997-1) have already been secured to enable the pond creation works within the ecological compensation area to commence ahead of the main development. These works are currently being undertaken under the approved permission and licence.

The ecological compensation area will be subject to enhancement measures and managed as a community nature reserve, with access granted to the public or special interest groups by permit or only. It is within this compensation area that the invertebrate monitoring and habitat management will take place.

1.3 Objectives and scope

UES has been commissioned to produce an Invertebrate Monitoring and Enhancement Plan (IMEP) – detailing how the proposed and retained habitats on site will be managed to enhance the local invertebrate populations, while also targeting protected & notable species (e.g. dingy & grizzled skipper & small heath). This document also details the monitoring programme that will be implemented to determine the effectiveness of the proposed measures on key species & the sites invertebrate community in general.

This document has been prepared in order to discharge Condition 37 of the approved planning permission P/2023/0280. Condition 37 read as follows:

"No development shall take place until an Invertebrate Monitoring and Habitat Enhancement Plan has been submitted to and approved in writing by the Local Planning Authority. Development shall be carried out in strict accordance with the approved details."

A Landscape and Ecology Management Plan (LEMP) addressing detailed the proposed habitat creation and enhancement measures, including a 30-year management plan and ongoing monitoring surveys has already been submitted to and accepted by Wrexham

Borough Council (see report reference UES03448/25). As such this should be read in conjunction with the LEMP.

2 BASELINE ECOLOGICAL INFORMATION

The land parcel has an area of approximately 20.9ha and was formerly used for industrial and agricultural purposes, prior to being left unmanaged for several years. The site contains large semi-improved species-rich grassland fields interspersed with ponds, small stands of woodland, hedgerows and scattered trees. Large areas of the site have succeeded into dense scrub and areas of bare ground and ephemeral / short perennial are present on previously developed land within the south-eastern section of the site. The south-western section of the site contains an area of amenity grassland and a large hardstanding compound used to store vehicles. A shallow stream runs along the northern site boundary and wet ditches are present along the western and part of the eastern site boundaries.

An additional 4.5ha of adjacent land has been included within the development boundary which will be used as an ecological compensation area, to provide enhancements for biodiversity in order to offset the biodiversity loss elsewhere onsite: This land comprises two agricultural grassland fields that are divided and bordered by hedgerows and trees. A dry and unvegetated ditch runs along part of the eastern boundary, and a pond, surrounded by willow *Salix sp.* scrub, is present within the northernmost field.

A suite of ecological survey work has been undertaken on the site by UES across 2021, 2022 and 2023. Specifically, a suite of invertebrate surveys were undertaken of the proposed development site in 2022. These surveys included butterfly transect surveys (targeting dingy skipper, grizzled skipper and small heath) and PSYM surveys of the attached ponds undertaken by UES. A general terrestrial invertebrate assessment comprising five survey visits was also undertaken by Conops Ecology.

A summary of the findings of the invertebrate surveys are provided below. Full details of the survey methodologies and findings are available within the individual survey reports and the Ecological Impact Assessment (EcIA) (reference UES03448/22) submitted as part of the planning application.

<u>Butterfly transect survey</u>

The majority of the site was assessed as being broadly unsuitable to support dingy and grizzled skipper due to a lack of sufficient quantities of their larval foodplants.

However, the southernmost section of the site contains an area of open mosaic habitat that supports an abundance of common bird's-foot trefoil *Lotus corniculatus*, creeping cinquefoil *Potentilla reptans* and wild strawberry *Fragaria vesca*. In addition, this area contains exposed areas and banks of bare ground and rubble which will provide basking habitat and supports an array of wildflowers for adults to feed. The adjacent area of lowland meadow also contains bird's-foot trefoil and an abundance of wildflowers to support adults.

Butterfly surveys particularly targeting dingy skipper that were undertaken of the southern section of the site observed peak counts of two dingy skipper, four small heath and seven grizzled skipper. All three butterflies were observed using both the unimproved grassland and the open mosaic area; however, all three species showed a greater affinity for the open mosaic habitat. As such, the southern section of the site is considered to support small-moderate size populations of all three species.

General invertebrate assessment

A total of 261 species were recorded on site during the general terrestrial invertebrate survey undertaken by Conops Ecology, of which only 8 species (3.01%) are regarded as species of importance based on national or local status and rarity. Of these eight species, it is recognized by many of the national recording schemes that a number of these no longer warrant their current status and that they may need revising. Table 1 below shows a summary of important species observed on site:

Table 1 – Protected or otherwise notable species observed

SCIENTIFIC NAME	COMMON NAME	STATUS	HABITAT PREFERENCES AND SPECEIS NOTES
Agelastica alni	Alder leaf beetle	Data Deficient; Nationally Rare*	Foliage feeder on alders (*Alnus* spp.). Owing to a significant range expansion, it now no longer warrants a nationally significant status.
Coenonympha pamphilus	Small heath butterfly	Section 42; Vulnerable	Prefers structurally varied grass swards with fine-leaved grasses such as bents (*Agrostis* spp.) and fescues (*Festuca* spp.).
Crossocerus distinguendus	A solitary wasp	Notable a	Associated with structurally complex mosaics including brownfield sites.
Erynnis tages	Dingy skipper	Section 42	Larvae feed on prostrate bird's-foot trefoil when small and potentially taller stands when older. The species appears to require a mosaic of features and habitats from patchy bare ground through to tall swards.
Hippodamia variegata	Adonis ladybird	Notable b*	Open mosaics, parched grasslands.
Libellula fulva	Scarce chaser dragonfly	Near Threatened	Slow meandering rivers and large dykes and rhynes. Requires good-quality water and abundant submerged and floating vegetation. Although still a scarcity, the species is spreading and may not be as

			scarce as its current status suggests. Not thought to be breeding on the site.
Merzomyia westermanni	A fruit fly	Notable*	Associated exclusively with ragwort species.
Pyrgus malvae	Grizzled skipper	Section 42; Vulnerable	Larvae feed on the prostrate-growing forms of a range of Rosaceae plants including creeping cinquefoil, agrimony, and wild strawberry.

*Accepted as being more common than this status suggests; likely to be downgraded.

The overall number of species recorded was not particularly high, but the results do reflect well the habitats and species present on the site. The scarce species percentage is also not high but does include three key species to the local area; small heath, dingy skipper and grizzled skipper butterflies.

Although there is no single species or species group of greatest value to the site, the populations of scarce and declining butterflies are of particular note, as they are demanding species requiring significant compensation to allow them to persist on the site. Coupled with these, there are other specialized and demanding groups such as the bees and wasps, both the ground-nesting and also aerial (deadwood)-nesting assemblages that will require optimal and complex habitat mosaics in order to survive on the site alongside a proposed development.

The site comprises, or is thought to comprise a moderately rich invertebrate fauna that includes a number of localized and specialized species.

The site is considered to be of local / county importance and not one of a higher status, owing to the site not holding significant populations of NERC Act Section 42 species or other species with a nationally significant status. The site also does not hold, or is not thought to hold, a high diversity of species.

However, it should be noted that this site's invertebrate resources are likely to support other populations across a wider resource of small sites on and around the Industrial Estate that includes scarce and increasingly threatened invertebrates such as the 'brownfield' butterflies and solitary bees and wasps.

<u>PSYM surveys of ponds</u>

Ponds 3, 4, 5 and 6 on site are considered to qualify as the pond Habitat of Principal Importance as they support GCNs, a species protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). The three ponds (Ponds 1, 2 and 4) which are due to be removed to facilitate the development proposals were assessed for their ecological importance via the PSYM method: none of these ponds returned a PYSM score of greater than 75%, and therefore none of the ponds qualify as Priority Ponds for the general assemblage of aquatic plants or invertebrates that they support.

3 LANDSCAPING AND HABITAT MANAGEMENT

Through consultation with NRW and Wrexham County Borough Council, and in conjunction with UES (as ecological consultant) the project design team have designed a site layout and landscaping scheme that prioritises the retention of the most ecologically valuable habitats present, in addition to their enhancement and the creation of compensatory habitat that targets key species and habitats. This is detailed within a Planting Plan and Schedule, produced by PGLA Landscape Architects, reference WRE2205_PP001.00.

Each habitat on site will require a certain level of establishment, maintenance and monitoring to ensure that they are providing opportunities for a wide range of invertebrates. Section 3.1 details the habitats and features being retained or created that will specifically benefit invertebrates, and specific management measures for each habitat in relation to invertebrates. The management responsibilities and mechanisms to ensure compliance are explained in Section 3.2.

The LEMP that has already been prepared for the site details the proposed habitat establishment and management procedures that will be implemented, including a 30-year management plan. As such, measures will be implemented as per the LEMP, in addition to any further limited measures detailed within this document.

3.1 Habitat management

3.1.1 Woodland and scrub

Three existing areas of woodland are to be retained (or partly retained) as per the development proposals. These areas will require significant management as woodland is already established and natural processes will be permitted to develop and continue.

The scattered trees, newly created and retained areas of woodland on site present the opportunity to provide further ecological enhancement for invertebrates. Within the woodland, care should be taken to retain any fallen or standing deadwood where possible (and where safe), as these provide an ideal habitat for a diverse range of species including many IUCN red-listed saprophytic beetle species. Additionally, any veteran features present or that develop within trees (of any age) are to be retained e.g. tear outs, hollow limbs, rot-holes & cavities etc. as these also create ecological niches for invertebrates.

3.1.2 Wildflower, Marsh & Tall tussocky grassland

The lowland meadow on site will be retained and protected as part of the development and additional areas of grassland will be created, including:

- 24480m^2 of wildflower grassland will be sown in the ecological compensation area.
- 5228m^2 of tall ‘tussocky’ grassland will be created in the ecological compensation area.
- 2,432m^2 of marshy grassland seed mix will be sown around newly created ponds in the ecological compensation area.

The retained and newly created areas of grasslands will attract an array of invertebrate species. While also providing specific benefits to the listed/endangered butterfly species e.g.

dingy skipper, grizzled skipper and small heath which have associations with various grass species and low growing forbs.

The areas of tussocky grass will be sown with a seed mix containing 20% wildflowers and 80% grasses, all of which are species tolerant of tall swards. This grassland with its dense tussocky sward will provide different opportunities and floral communities compared to the more intensively managed wildflower grassland or marshy grassland habitats. A specific target species for this habitat is the nationally scarce picture-winged fly *Merzomyia westermanni*, which is known to have previously been within the wider Wrexham Industrial estate and has an association with ragworts. Additionally, the grassland will provide abundant larval foodplants for small heath butterflies, which have an association with several grass species.

3.1.3 Ponds

New pond creation

The development proposals include the creation of 22 new ponds, which will provide new ecological niches and will provide a significant ecological enhancement to the site.

The primary purpose of the ponds is to provide breeding opportunities for GCNs; however, some have been designed to have variable depth and profile to create different conditions and ecological niches, targeting a range of species. The retained and newly created ponds will likely create ideal habitat for varied aquatic and semi aquatic invertebrate species.

The proposed ponds are all currently being created under a separate planning application (reference P/2023/0640) and full details of the ponds initial creation and specification is detailed within the Great Crested Newt Method Statement & Pond Specification document that has been submitted to inform the application (see report reference UES03348/31).

In order to regulate the oxygen levels in the pond, submerged oxygenating plant species will be planted within 10 of the ponds in the second year following establishment, once water levels have settled and it can be determined which ponds hold sufficient water. Suitable species include hornwort *Ceratophyllum demersum*, common water crowfoot *Ranunculus aquatilis* and spiked water milfoil *Myriophyllum spicatum*. This aquatic/marginal vegetation will help improve invertebrate diversity by providing shelter, foraging and egg laying opportunities.

Where available from material generated on site, a small amount of deadwood will be left in the five deepest ponds, which will further enhance the biodiversity of the ponds by providing organic features for invertebrates and offering shelter for amphibians using the ponds.

Long term pond management

Once fully established, the newly created ponds (and retained ponds) will not require a great amount of management. However, ponds are always susceptible to leaks and invasion of non-native species which can change habitats, supress native species and dry out ponds. Over time, ponds may become encroached by scrub.

No fish or any other animals should ever be introduced to the ponds. Fish are often detrimental to the overall pond ecosystem as they predate on the larval stages of many invertebrate species.

3.1.4 Wet ditches

Two wet ditches will be created in the eastern section of the site, connected to newly created ponds, to provide linear wet features. The ditches will feature a depth of approximately 1m, and a width of 6m; resulting in a bank profile of approximately 30% gradient.

The water levels of the ditches will be allowed to fluctuate naturally and seasonally, and vegetation on the banks of the ditches will need to be resistant to regular inundation; as such, they will be allowed to colonise naturally with species tolerable of the varying conditions.

The spoil from the created ditches will be retained and profiled on the northern bank of each ditch, so that they are shallower in gradient on the southern aspect and steeper on the northern aspect, in order to ensure that the maximum area of each bank is afforded the maximum level of sunlight, creating optimal opportunities for invertebrates. This will then be sown with wildflower meadow mix (as detailed in Section 3.1.4 of the LEMP).

3.1.5 Open mosaic habitat

This habitat is of significant importance for the invertebrate assemblages on site. Not only does it support a high diversity of invertebrates, it is also an essential habitat for several protected / notable species, examples of which that have previously been recorded on site include dingy skipper, grizzled skipper, adonis ladybird *Hippodamia variegate* and a species of solitary wasp *Crossocerus distinguendus.*

<u>Open mosaic creation</u>

The southern section of the site currently features a large area of concrete hardstanding which has become partially colonised by scrub and tall ruderal plant species within cracks in the concrete. This area is currently of limited value to wildlife as the majority of the concrete is intact, preventing plants from colonising. Due to its low ecological value, this area will be used as the site compound during the construction works, however, following completion, it will be enhanced, to create a greater structural and ecological diversity, creating more opportunities for plants, invertebrates and other wildlife.

The open mosaic creation will follow the following principals:

- The existing concrete is to be broken up using an excavator and hydraulic breaker, into pieces up to $3m^2$. In some areas concrete slabs may remain in situ once broken, however in other areas these may be removed and piled up to create rubble piles. These piles may be combined with spoil from elsewhere on site to offer a more-densely structured pile.

- Where concrete is removed, the substrate beneath is to be disturbed, to create opportunities for pioneer plant species to colonise.

- Mounds of earth are to be created at various points around the habitat, using spoil from elsewhere on site (for example from pond creation); these will create topological diversity, offering opportunities for species with differing requirements. The southern aspects of these slopes may be steep-graded; offering some steep ‘cliffs’ and some flatter areas.

- The area is to be allowed to colonise naturally; pioneer plant species colonising initially and later successional species gradually colonising over time.

- A pond / scrape is to be created in the southern section of this habitat; the dimensions and topography of the pond is to adhere to those detailed within the LEMP report; however, the pond will be allowed to colonise naturally.

- Two large sand banks will be included within this area. The banks will be profiled so that they feature a shallower gradient on the southern aspect and steeper northern aspect; thus increasing the area subjected to sunlight. Part of the sand banks may be steep-graded on the southern aspects to offer 'cliffs' and flatter areas. These will be suitable for an array of burrowing invertebrates (e.g mining bees, digger wasps, burying beetles etc.).

Existing open mosaic habitat

There is an area of existing disturbed ground / open mosaic habitat in the south-western section of the site, which will be retained by the development proposals. This area currently supports populations of dingy and grizzled skipper butterfly and requires little remedial management.

In order to enhance the diversity of habitats present in this section of the site, two sand banks (as described above) are to be created within this area, as well as a pond / scrape (also as described above and in greater detail within the LEMP).

Additionally, patches of bare ground (approximately 3m^2) will be created by scraping back the top 10cm of substrate with an excavator bucket; this will offer opportunities for pioneer plant species and may offer burrowing opportunities for invertebrates. The scraped back material will be left in a loose pile adjacent to the scrape. This will be overseen by the onsite ecologist, who will determine the exact location and quantity of scrapes.

Ongoing open mosaic management

Open mosaic habitats require little intervention on the whole, as natural processes should be allowed to occur. However, care should be taken to maintain a dynamic and heterogenous landscape by disturbing the substrate and cutting back scrub should it become too dominant.

With regards to invertebrates, the following measures should be undertaken to retain enhancement features that may otherwise disappear:

The maintenance of bare ground patches and scrapes (on the sandbanks) will be beneficial as these will provide opportunities for various burrowing invertebrates as well as sunning and lekking site for dragonflies, damselflies and butterflies. Initially, the sand banks and scrapes will offer bare ground, however these will become vegetated over time. New scrapes may be created, and sand banks may be subjected to minor excavation works or re-profiling of step-graded cliffs.

3.1.6 Additional habitats

Butterfly and beetle mounds

Three south-facing mounds will be created within the eastern section of the site, totalling 240m^2. These mounds will be sown with Naturescape N4F Butterfly and Bee Mix. This mix contains native grass and wildflower species, flowering between June and September, offering

nectar resource to invertebrates at their most active time of year. The mix is to be sown at a sowing rate of 5g per m^2.

The mounds will be created using spoil from the adjacent ponds; if the spoil comprises predominantly heavy soils with a high clay content, mixing with 50% imported, clean, sand may be required to facilitate better establishment of wildflower mix and offer improved opportunities for burrowing invertebrates.

The mounds will be profiled so that they are shallower in gradient on the southern aspect and steeper on the northern aspect, in order to ensure that the maximum area of each bank is afforded the maximum level of sunlight; creating optimal opportunities for invertebrates.

Hibernacula and log piles

Various amphibian hibernacula and log / brash piles will be created across the site. At least 9 hibernacula and 4 log piles will be created. In addition to other faunal groups, these will provide sheltering, foraging and breeding opportunities for a variety invertebrate taxa.

The hibernacula will be created by excavating a pit in the ground (0.5-1m deep, 0.5-1m wide, and 1-2m long). Ideally, the pits will then be filled using materials already present on site, including hay, brash, cut timber / logs and brick / rock hard-core, or the materials can be sourced from elsewhere if necessary. The pits will be piled up to a height of approximately 1m above ground level. Hibernacula will then be loosely capped with topsoil or turf, ensuring that access is still available through to the lower layers at the margins. The following diagram provides a visual representation of the hibernaculum, with the only additional requirement to the diagram being that a pit is first excavated.

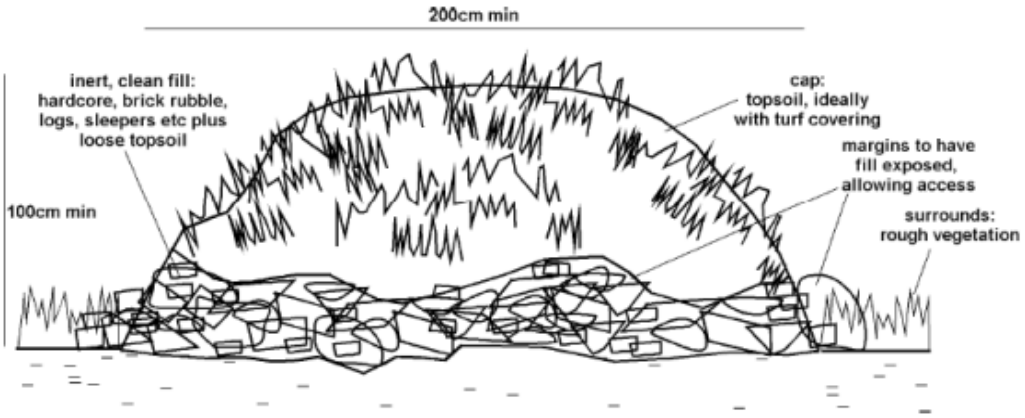


Figure 1 – Hibernacula design

The log / brash piles will be created using arisings from the scrub removal works. Other arisings from the scrub removal will be stacked close to the areas of retained woodland and dense scrub.

4 RESPONSIBILITIES, MONITORING AND REMEDIAL MEASURES

4.1 Management responsibilities

The responsibility for the invertebrate habitat creation works lies with the developer / land owner (FI-REM) and the contractors appointed to carry out those works. They will be responsible for ensuring that the habitat creation works are carried out to in accordance with this IEMP (and broader habitat guidance detailed within the LEMP).

Subsequent management of the habitats on site will be the responsibility of the developer / land owner (FI-REM) and the appointed management company. An ecology cooperative is being established that will involve FI-REM (developer / landowner), United Environmental Services (ecological consultant), North Wales Wildlife Trust and Enfys Ecology Ltd. Butterfly Conservation and Amphibian and Reptile Conservation will also be invited to be members of the cooperative as advisors. Furthermore, Whilst Wrexham Borough Council's Ecologist and Natural Resources Wales won't be members of the cooperative, their expertise and advice will be regularly sought from the cooperative.

Through the cooperative, Enfys Ecology and the North Wales Wildlife Trust will be appointed as the management company responsible for undertaking the ongoing habitat management works as detailed within this document. They must ensure that the ongoing measures detailed within this IMEP and the LEMP are implemented. They will also be responsible for monitoring the establishment of habitats as well as monitoring them for any changes affecting their quality or function.

4.2 Monitoring surveys

As part of the 30-year management plan, annual site inspections will be undertaken of the created and retained ecology areas by Enfys Ecology, North Wales Wildlife Trust and / or the project ecologist. Following this, annual meetings will be held and will include all members of the ecology cooperative. The purpose of the meeting will be to discuss any issues, particularly in relation to failed habitat establishment and management, and to determine whether any remedial works are necessary to restore the habitats to a satisfactory standard, or to implement further enhancement measures. This meeting will be held from late summer to winter, so that the habitats can be assessed when in flower (e.g. wildflower meadows) and to allow for the required remedial works to be arranged.

Following completion of the construction works and establishment of the habitats, further butterfly monitoring surveys will be undertaken of the site by an appropriately skilled ecologist, with particular focus on dingy skipper, grizzled skipper and small heath butterflies (species of principle importance). These monitoring surveys will be undertaken annually for the first 5 years, after which they will be undertaken every other year from years 6-10. It is considered that specific surveys are not required after the 10-year period as it is highly unlikely that changes to management plan will be implemented at this point and hence the butterfly populations on site will have stabilised. Any significant reductions in the populations of these species will be picked up during detailed invertebrate monitoring surveys, covering all taxa, which will be undertaken of the ecology areas every five years.

Survey results from all monitoring surveys will be provided to the ecology cooperative to inform the need for changes to the management plan. Results will also be submitted to NRW,

Wrexham County Council Ecologist and Cofnod, the North Wales Environmental Information Service.

4.3 Site access restrictions

The eastern section of the site has designed as a designated ecological mitigation and compensation area. Paths will be mown through the area, to facilitate monitoring, access for maintenance and access for pre-arranged interest groups, however the site will not have open public access. This is to protect the habitats and species present. All access gates will be fitted with secure padlocks, with keys / access codes kept securely by assigned persons.

A strict policy of no access to dogs will be imposed.

Nocturnal access to the site will be restricted to access only for ecological monitoring (for example surveying of ponds by licenced ecologists).

5 MANAGEMENT SCHEDULE

The LEMP report includes a detailed 30-year management plan for all habitat works detailed above within the document.

All initial habitat creation and enhancement works are to be undertaken at the appropriate time of year as detailed within the 30-year management plan and are to be completed within 2 years of the commencement of construction works, unless specified otherwise.

The 30-year ongoing management will commence immediately following the start of construction works or initial habitat creation works, whichever occurs first, unless specified otherwise.

6 CONCLUSION

Once implemented, the suggested landscaping and ecological measures will promote a more abundant and diverse invertebrate species assemblage. In addition to the creation / enhancement of habitats which support invertebrate populations, several habitat creation and management measures will be implemented to target specific groups or key species of conservation concern.

Furthermore, a long-term monitoring and management scheme will be implemented to ensure that local invertebrate populations and their associated habitats are maintained and monitored in the long-term.