

12.3 INVERTEBRATES

Application (all invertebrate guidelines)

The determination of the boundaries for a site designated under invertebrate guidelines should take account of the requirements of invertebrate species for habitat and structural diversity both at the macro and micro scales. The requirement of invertebrates for different habitats reflects their complex lifecycles that often involve one or more larval and adult phases. Invertebrates generally have annual life cycles, and their survival on a site depends on the continued availability of the right mixture of habitats at the right time of year – every year. In addition many invertebrates tend to have very narrow habitat or ecological niches.

Invertebrate habitats can include small scale features such as a patch of bare ground or length of deadwood and these habitats can be transient in space and time shifting around within a larger habitat e.g. wetland or woodland, on which the invertebrates also depend. In addition some invertebrates may be dependent on both small-scale habitats such as ditches and a larger habitat such as a river or stream. In these instances the associate habitats, although possibly isolated, should be considered within the context of a larger designation.

At the present time supplements to the invertebrate section of the Derbyshire Red Data Book are being prepared and it is anticipated that lists of species relating to different selection criteria will be available for use soon. For the time being therefore no species lists are included.

Justification

In Derbyshire, as elsewhere, there are more species of invertebrate animals than of all the plants and other animals combined. Many invertebrate groups and species have declined dramatically in recent decades and their conservation is a matter of widespread concern in Europe. Invertebrates' tendency to have narrow ecological niches coupled with poor powers of dispersal, means that they can be the most vulnerable taxa in the context of habitat fragmentation and increasing isolation, and are prone to local extinction. Until recently it was thought that if sites were selected (and managed) on the basis of the botanical interest, the invertebrates would automatically be catered for too. This is not so: it is important that due regard is paid to the contribution that invertebrates make to biodiversity, and of their habitat needs as far as available information allows.

With such a large number of invertebrate groups and the relative lack of information about many of these, it is impossible to develop individual sets of guidelines for every species-group at the present time. However, the process of selecting sites for individual groups of invertebrates will be kept under review and as a more comprehensive database of sites and invertebrate species is collated it is hoped that more specific guidelines may be added to complement the guidelines described here.

Invertebrate Selection Guidelines

Sites that meet one or more of the following guidelines will be eligible for designation as a Local Wildlife Site.

Inv 1 Any site that regularly supports a population of an invertebrate species, which is listed in any of the following:

- a) Schedule 5 of the Wildlife and Countryside Act 1981 as revised and amended**
 - b) British Red Data Books: 2. Insects or British Red Data Books: 3 Invertebrates other than insects or appropriate updates.**
 - c) a nationally rare or scarce species list**
- or**
- d) occurs at 3 or fewer localities in Derbyshire**
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Application

Any site identified in one of the above categories may be considered for selection. The potential population size of the species should be considered and extra weight should be placed upon sites where evidence for a persistent population is present. This could be presence over a number of years or a large number of individuals captured in one year or even during one site visit. Experienced invertebrate field surveyors should be consulted prior to designation.

A full list of species falling into all of these categories has not yet been compiled specifically for Derbyshire, so for the moment the assessment must consider national and local publications on distributions and abundance of different invertebrate groups.

This guideline can be applied to any type of site.

Justification

Species included in the above categories are identified as being rare or threatened at a national or European scale, or rare within the County.

Inv 2 Any site that regularly supports a significant proportion of the Derbyshire population, or contributes significantly to the range in Derbyshire, of an invertebrate species which is recorded from more than three localities in the County, but which could be at risk because of very small populations, recent rapid decline or habitat loss or change, and which is not included under any other guideline.

Application

This guideline can be applied for any species belonging to any invertebrate group. In particular this guideline should be applied where UK BAP priority species are present, but other species can also be included. Ideally sufficient information should be available on the abundance and distribution of species within Derbyshire or it should be demonstrated that the species or the habitat it occurs in is regionally rare or uncommon.

Justification

Small populations, nationally or locally declining species or species dependent on threatened habitat types are in greater need of protection through the LWS system. Recent reports on butterflies and larger moths highlight the continued declines in species that were once very common e.g. the small heath or garden tiger. It is likely that the same is true of some other invertebrate taxa. The designation of a site under this guideline should be made in consultation with local and regional experts and take into account any ongoing changes in the extent of habitat types or the status of a particular species.

Inv 3 Any site supporting a characteristic or significant assemblage of invertebrates including those associated with the following microhabitats: -

- ❖ Deadwood
- ❖ Veteran trees
- ❖ Scrub
- ❖ Woodland edge habitat
- ❖ Rough grassland displaying structural heterogeneity e.g. tussocks, light and shaded areas, damp hollows
- ❖ Bare soil and or rock including both natural geological strata and imported material
- ❖ Open vegetation
- ❖ Brownfield sites
- ❖ Wetlands including microhabitats associated with running and still water and seasonal and temporary pools
- ❖ Hill slope and rock-face seepages and flushes

Application

An assemblage can be composed of a diversity of species within one or more families or orders. The guideline can be used for any assemblage of invertebrates associated with any of the habitat types covered elsewhere in the guidelines or for any microhabitats as listed above. For the majority of families or orders of invertebrates we have insufficient information to allow meaningful threshold values for site selection to be agreed upon. For the present a flexible approach is to be adopted in determining how characteristic or significant an invertebrate assemblage is based on consultation with both national and local invertebrate specialists.

This guideline will be subject to re-assessment as additional information on invertebrate species, populations and assemblages within Derbyshire is collated. Thresholds may be added in due course for selected groups.

Sites being looked at under this guideline should include the following information to assist in the selection process: -

- ❖ A list of invertebrate species present on the site where possible linked to habitats and microhabitats
- ❖ A list of survey events and recorders (to provide an indication of search effort)
- ❖ Invertebrate species considered to be associated with or significant within the Natural Area that the site lies in should be highlighted (according to Drake et al, 1998).
- ❖ A score derived from the invertebrate site index below (provisional adaptation from English Nature)

Category	Points
RDB1, 2	100
RDB 3, Notable A (Na)	50
Notable B (Nb)	40
Notable (Region) (Nr)	20
Derbyshire Red Data Book	10

The boundaries of the site should reflect, as far as possible all the key physical and biological features required for the invertebrate species present.

Justification

Invertebrates are the most diverse and abundant animal group and play an essential role in maintaining functional ecosystems. Their diversity often reflects the variety of ecological niches available within different habitats and microhabitats. Identifying and protecting these habitats is essential if we are to protect the full range of invertebrate biodiversity present in Derbyshire and surrounding areas.

Inv4 Any site regularly supporting 22 or more butterfly species.

Application

The guideline can be applied to any site of whatever size that has records of 22 butterfly species over at least a three year period.

Justification

Derbyshire supports just over 30 species of butterfly and only a handful of sites are likely to support 22 or more species over this period. There are 16 widespread and common species so a site with 22 will also include at least a few species of more localised or restricted distribution.

Inv5 Any site regularly supporting 45 or more hoverfly species.

Application

The guideline can be applied to any site of whatever size that has records of 45 hoverfly species over at least a two year period.

Justification

Derbyshire supports just over 130 species of hoverfly and a notable assemblage for this group would be between 45 and 70 with anything over that being exceptional.

Inv6 Any site that supports a water beetle assemblage that scores 25 or above or scores between 20 and 24 and has at least 6 Local A and/or Local B species in any combination.

Application

The guideline can be applied to any of the ponds listed as notable ponds in Appendix 4 of the Atlas of the water beetles (Coleoptera) and water bugs (Hemiptera) of Derbyshire, Nottinghamshire and South Yorkshire, 1993 – 2005 (Merritt, R, 2006) or any other pond that has been subject to a detailed water beetle survey. Any pond to be designated should be subject to a visit to check on the current physical condition of the pond.

Assemblage scores are calculated by the following formula:-

(Species richness - the number of notable species) + (the number of Nationally Rare species x 8) + (the number of Nationally Scarce species x 6) + (the number of Local A species x 4) + (the number of Local B species x 2).

For example for the site known as the River Rother cut-offs, Killamarsh the calculation would be as follows:-

Species richness	= 26 (including 9 'notable' species)
Nationally Rare	= 0
Nationally Scarce	= 0
Local A	= 5
Local B	= 3

$$(26 - 9) + (0 \times 8) + (0 \times 6) + (5 \times 4) + (3 \times 2) = 15 + 0 + 0 + 20 + 6$$

$$\underline{\underline{= 41}}$$

Justification

Noteworthy beetle ponds as identified in Appendix 4 of the Atlas account for just 22% of those visited and this guideline would allow designation of an estimated 70% of those. These ponds are therefore considered the very best sites for water beetles in the County reflecting both overall species richness and national and local status and are therefore of high nature conservation interest and value. In Derbyshire it is estimated this could be in the region of 150 ponds.

The designation of Local Wildlife Sites for water beetles and water bugs is based on the extensive field work of Bob Merritt, both before and after the publication of his *Atlas* by the Sorby Natural History Society (Merritt, 2006). At that time, the JNCC national statuses for both these groups were very out of date and the author devised an unofficial system to identify "noteworthy" sites based on counts of hectad occupancy in Britain as shown on the NBN Gateway.

Since the publication of the *Atlas*, JNCC has published a set of revised national statuses for water beetles (Foster, 2010). Where applicable, these will be used in the designation of Local Wildlife Sites along with the unofficial criteria referred to above. A justification for continuing to use these unofficial criteria may be found in JNCC's latest review in which Foster states, referring to certain species which fell outside the scope of the Review: "Nevertheless many of these species have a conservation value as indicators of good quality sites. Development of a new system of scoring sites, or upgrading of existing systems.....is desirable to take advantage of the extensive recording of such species."

The official statuses applicable to Derbyshire's rarer water beetles, taken from the latest national Review, are:

1) Near Threatened. This category is used to identify species that need to be kept under review to ensure that they have not become vulnerable to extinction, and applies to species for which a potential threat, natural habitat dependency or range change demand frequent review of status.

2) Nationally Scarce. This category is used for species recorded from 16 to 100 hectads of the Ordnance Survey national grid in Great Britain since 1980, and which qualify for neither a Threatened status or a Near Threatened status.

The unofficial statuses to be used in SINC designation of water beetles and water bugs are:

Rare	= 30 hectads or fewer (water bugs only)
Scarce	= 31-100 hectads (water bugs only)
Local A	= 101-200 hectads
Local B	= 201-400 hectads
Common	= 401+ hectads.

To ensure that the distributions shown on the Gateway are accurate and reliable, only a few of the datasets available for selection were selected when compiling the lists in Annex 1 and Annex 2, namely that of the Balfour-Browne-Club (which ran the water beetle national recording scheme for BRC, and now renamed the Aquatic Coleoptera Conservation Trust), the Aquatic Heteroptera Recording Scheme's Aquatic Heteroptera Dataset, and the Biological Records Centre's Water Bug Data for Britain. Records were chosen for the 25-year period immediate preceding the year of the most recent national update of data for that dataset. (NB. The species' statuses published in the *Atlas* have been updated in this document).

Inv7 Any site that supports a water bug assemblage that scores 16 or above.

Application

The guideline can be applied to any of the ponds listed as notable ponds in Appendix 7 of the Atlas of the water beetles (Coleoptera) and water bugs (Hemiptera) of Derbyshire, Nottinghamshire and South Yorkshire, 1993 – 2005 (Merritt, R, 2006) or any other pond that has been subject to a detailed water bug survey. Any pond to be designated should be subject to a visit to check on the current physical condition of the pond.

Assemblage scores are calculated by the following formula:-

(Species richness - the number of notable species) + (the number of Nationally Rare species x 8) + (the number of Nationally Scarce species x 6) + (the number of Local A species x 4) + (the number of Local B species x 2).

Justification

Noteworthy bug ponds as identified in Appendix 7 of the Atlas account for just 13% of those visited and this guideline would allow designation of an estimated 66% of those. These ponds are therefore considered the very best sites for water bugs in the County reflecting both overall species richness and national and local status and are therefore of high nature conservation interest and value. In Derbyshire it is estimated there could be in the region of 50 - 75 ponds that might meet the guideline.

Inv8 Any site that supports a dragonfly assemblage of 10 or more breeding species.

Application

All 10 species should have been recorded as breeding (based on the definitions below) within 10 years of the proposed designation date.

Successful Breeding

Confirmed - exuvia present (presence of an exuvia constitutes absolute proof that at least one specimen has completed a cycle from egg to adult at the site).

Probable Breeding - larva present or female ovipositing or teneral (newly emerged adult) or regular presence of both sexes (normally annual presence in reasonable numbers or a repeated period consistent with the species' life-cycle length). All records to be at, or adjacent to, a suitable water body.

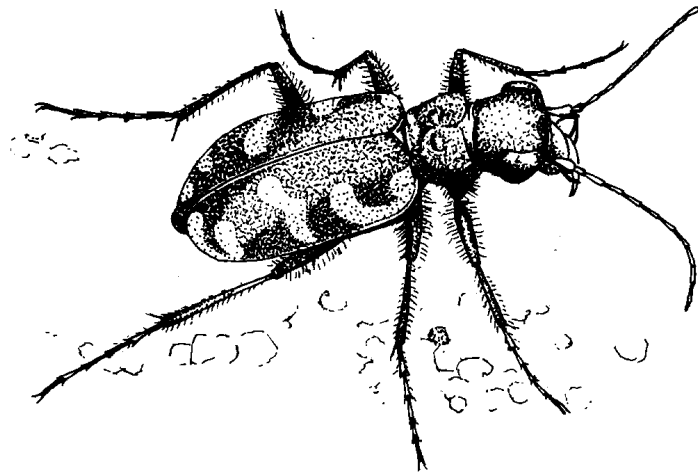
Possible Breeding – pair copulating or female seen at a water body suitable for the species where at least one male has been observed to be engaged in some form of reproductive behaviour, such as territoriality or pursuing females.

Adult(s) Present, but none of the above breeding evidence or behaviour observed.

For a Site Assemblage LWS designation everything in Confirmed and Probable Breeding should be included.

Justification

Successful breeding ponds for dragonflies have declined in recent decades and designation as a LWS should help to raise awareness and provide a degree of protection. A threshold value of 11 is recommended for Nottinghamshire by David Goddard who is the Dragonfly Recorder for Derbyshire and Nottinghamshire Entomological Society. A slightly lower threshold level has been set for Derbyshire.



Tiger Beetle