

Nottinghamshire LWS Handbook

Guidelines for the selection of Local Wildlife Sites in Nottinghamshire

Part 2A – Local Wildlife Sites selection criteria: species



Produced by the Nottinghamshire Local Sites Panel

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LOCAL WILDLIFE SITES SELECTION CRITERIA: SPECIES

1. INTRODUCTION

This document sets out the criteria used in Nottinghamshire for the selection of Local Wildlife Sites, based on their importance for individual species or species groups. It should be read in conjunction with Part 1 – An overview of Local Wildlife Sites in Nottinghamshire.

2. SPECIES SELECTION CRITERIA

The following criteria will be used for the selection of Local Wildlife Sites, based on their importance for individual species or species groups.

2.1 Amphibians and Reptiles

These criteria were accepted by the NEGDP on 18/03/2014

Originators: Dr Sheila Wright (Nottingham Museums Service and joint county recorder for herpetofauna) & John Osborne (joint county recorder for herpetofauna)

Introduction

Amphibians and reptiles are struggling to survive in an increasingly hostile environment in Britain today. Ponds have been lost, isolated or polluted, whilst suitable terrestrial habitat (heathland in particular) has been lost or fragmented. Increasing urbanisation, disruption of migration routes and reductions in the numbers of their invertebrate prey has caused serious declines amongst even the more common herpetofauna. Nottinghamshire is no exception - several of our amphibians and reptiles (our herpetofauna) are already very localised within the county, and one species, the Adder, seems to be on the verge of extinction. Garden ponds have been a lifeline for the Frog *Rana temporaria* and Smooth Newt *Lissotriton vulgaris*, but even these familiar species have declined greatly in the wider countryside - and good breeding ponds are now few and far between. Declines in our herpetofauna populations impact upon other species, too, as they are important prey items in diet of many mammals and birds, some aquatic invertebrates, and even of each other. There is therefore an urgent need to conserve all nine of our native Nottinghamshire herpetofauna species, and for this reason the LWS criteria detailed below have been produced to help protect their habitats.

Because of the difficulty of proving breeding for reptiles (due to their shy and elusive nature), sites where they are "*present and considered likely to be breeding*", rather than "*known to be breeding*", will be considered for recognition as sites of importance for herpetofauna. Ideally, however, there should be an attempt to prove breeding at such sites. For amphibians, the presence of spawn or larvae at a breeding site will usually be obvious throughout the spring and summer months, and so proof of breeding should be obtained at potential sites of importance for amphibians in the county. Ponds in private gardens will be excluded from LWS designation, but ornamental ponds can be included where they occur in areas that would not ordinarily be considered a private garden. Sites where the animals are likely or known introductions will also be excluded from consideration, except where these have been sanctioned as part of an official translocation.

Criteria

Sites in Nottinghamshire holding amphibians and/or reptiles will be designated as LWSs where they meet one or more of the following criteria;

Criterion 1: Any site where Adder *Vipera berus* or Slow-worm *Anguis fragilis* is present and considered likely to be breeding. The area of importance will include all known or likely breeding, foraging and hibernating habitat

Justification: The Adder is currently (2013) known from a single verified site in the county, and it is a Species of Principal Importance. Slow-worms are Nottinghamshire rarities that are recorded from fewer than 50 1km squares in the county, and are also a Species of Principal Importance.

Criterion 2: Any site where Great Crested Newt *Triturus cristatus* or Palmate Newt *Lissotriton helveticus* is present and breeding. The area of importance will include all contiguous semi-natural habitat (suitable for terrestrial foraging and hibernating) within a 250m radius of the water body

Justification: Great Crested Newts are rare at a European level, and the UK is a stronghold in Europe for these threatened amphibians. Even though they have been recorded in more than 30 1km grid squares in Nottinghamshire, and are legally protected in the UK, this criterion has been developed because of their European rarity and their status as a Species of Principal Importance. Palmate Newts are very rare in Nottinghamshire, and although they may have been native to Nottinghamshire in the past, in modern times those at all but one site are known to have been introduced – the latter site has recently been under investigation and is now thought to be native. Should any breeding Palmate Newt population be discovered in the future and confirmed to be native, the site concerned will be recognised as of importance for herpetofauna. For both species, all contiguous semi-natural habitat within 250 metres of the breeding pond will be included within the LWS. This figure has been adopted as an appropriate distance within which foraging and hibernating habitat for these species can be protected, although it is recognised that Great Crested Newts can move greater distances.

Criterion 3: Any site where a significant population size for Nottinghamshire of Grass Snake *Natrix natrix* or Common Lizard *Zootoca vivipara* (as determined by reference to Annex 1) is present and considered likely to be breeding. The area of importance will include all known or likely breeding, foraging and hibernating habitat

Justification: Although not rare, these species have suffered a considerable decline in numbers in the Nottinghamshire countryside over the last century due to habitat degradation and loss. Both are Species of Principal Importance.

Criterion 4: Any site where a significant population size for Nottinghamshire of Common Frog *Rana temporaria*, Common Toad *Bufo bufo*, or Smooth Newt *Lissotriton vulgaris* (as determined by reference to Annex 1) is present and breeding. The area of importance will include all contiguous semi-natural habitat (suitable for terrestrial foraging and hibernating) within a 250m radius of the water body

Justification: Although not rare, these species have suffered a considerable decline in numbers in the Nottinghamshire countryside over the last century due to habitat degradation and loss. Common Toad is a Species of Principal Importance.

Criterion 5: Any site where an assemblage of four or more species of amphibian or reptile native to Nottinghamshire are present and considered likely to be breeding (reptiles), or are known to be breeding (amphibians). The area of importance will include all known or likely breeding, foraging and hibernating habitat for any reptiles present, and all semi-natural habitat (suitable for terrestrial foraging and hibernating) within a 250m radius of a water body where amphibians are present and breeding

Justification: Such sites account for fewer than 4% of the 300+ known herpetofauna sites in the county (excluding gardens and ornamental ponds), making them exceptional.

Site mapping

- Sites will be mapped in line with the mapping rules for habitats set out section 7(d) of Part 1.
- When mapping sites within a 250m radius of a waterbody, traditional management unit boundaries will still be used to set the boundary of the LWS. Therefore, where part of a traditional management unit is within the 250m radius, and part is outside it, the land outside will be mapped as part of the LWS, up to the traditional management unit boundary.

Site survey and resurvey

- Sites will initially be designated on the basis of survey results not more than 10 years old.
- Designated sites will be resurveyed every 10 years. When a site cannot be surveyed within the specified survey programme, it will be assumed that the site still qualifies and will remain designated until it can be ascertained that it does not.

Annex 1 - population thresholds

Species	Threshold number of adults noted on a single visit to a site taken to indicate a significant population size for Nottinghamshire
Common Lizard	4
Grass Snake	3
Smooth Newt	25
Common Frog	50 (or 25 clumps of spawn)
Common Toad	100

In the absence of any detailed long-term monitoring of populations, existing data held by the county herpetofauna recorders was examined for all sites at which observations have so far been made (other than private gardens and ornamental ponds). From these, the top 10% of sites for each species were identified (in terms of those supporting the largest populations); these population sizes were then used to set the threshold at or above which such populations are deemed to be 'significant'.

2.2 Bats

These criteria were accepted by the NEGDP on 18/03/2014

Originators: Janice Bradley (Nottinghamshire Wildlife Trust), Nick Crouch (Nottinghamshire County Council) and Michael Walker (Nottinghamshire Bat Group and Nottinghamshire Wildlife Trust)

Introduction

The decline in bat numbers in the UK has been well documented; for example, pipistrelle numbers were estimated to have dropped by over 70% in the 15 year period between 1978 and 1993 (Entwistle et al. 2001). Consequently, a number of species are identified as national conservation priorities by virtue of listing as Species of Principal Importance, four of which occur in Nottinghamshire (see Annex 1).

The loss of roost sites, persecution and the destruction and fragmentation of habitat are all major factors contributing to this decline. Roost sites have been protected by law since 1981 but continue to be lost. Bats require good quality habitat close to their roosts for foraging or to commute to good feeding areas nearby, and loss of this local habitat can have a significant impact on a roost and ultimately lead to its abandonment.

Female bats in summer nursery colonies will forage over much shorter distances during this period making good local habitat as important as the roost site itself. For pipistrelle species this could be as little as 1km from the roost and even less for brown long-eared bats who generally forage within 0.5km. These LWS criteria allow for the designation of sites close to significant roosts to reflect their importance for successful breeding.

There are a few areas in the county that provide roosting and foraging opportunities for a number of species and are therefore considered to be extremely important. The criteria below will identify these multi-species areas and ensure their protection. Criteria to identify important hibernation sites, which are extremely rare in Nottinghamshire, are also included.

Criteria

Sites in Nottinghamshire holding bats will be designated as LWSs where they meet one or more of the following criteria;

Criterion 1: All semi-natural habitat (including linear linking habitat) used by bats where (with reference to Annex 1) it occurs within 500 metres of:

- a) any maternity roost of a bat species in Nottinghamshire where the roost size exceeds the 'significance' threshold for the species in question and it can be shown by appropriate survey that bats of the same species are using the habitat for foraging or commuting
- b) any maternity roost comprising 2 or more species where there are at least 5 individuals of each species and it can be shown by appropriate survey that bats of the same species are using the habitat for foraging or commuting

Justification: To reflect local scarcity and vulnerability and national conservation status, and to protect the integrity of important maternity roost sites; however, given that bats can forage over considerable distances, the distances used above are considered likely to protect 'core' foraging areas and as such are considered a minimum area of importance. The rarity categories and maternity roost 'significance' thresholds given in Annex 1 are based on current knowledge and might be subject to change in the future as our knowledge of these species improves.

Criterion 2: Any contiguous area of a semi-natural habitat used by foraging bats that scores a combined total of 7 points, where (with reference to Annex 1) appropriate survey has demonstrated the presence of:

- any rare* species, which scores 5 points
- any scarce species, which scores 3 points
- any less scarce species, which scores 2 points
- any common species, which scores 1 point
- any *Nyctalus* bat (where it has not been possible to assign to species)**, which scores 1 point
- any *Myotis* bat (where it has not been possible to assign to species)**, which scores 1 point

* for Nathusius Pipistrelle *Pipistrellus nathusii* (a migratory species not known to be permanently resident in the county at this time), this only applies where either a) the species has been recorded on at least two surveys during a six week period between mid-June and the end of July in the same year, or b) the species has been recorded on at least two surveys at least 14 days apart in 2 years out of 5.

** this only applies where it has not been possible to assign any of the *Nyctalus/Myotis* bats encountered during a survey to a particular species; where at least some of the *Nyctalus/Myotis* bats encountered have been assigned to a particular species, then any additional unassigned *Nyctalus/Myotis* bats do not score an additional point.

Justification: To reflect local scarcity and vulnerability and national conservation status, and to protect the integrity of important foraging sites. The rarity categories and maternity roost 'significance' thresholds given in Annex 1 are

based on current knowledge and might be subject to change in the future as our knowledge of these species improves.

Criterion 3: All semi-natural habitat (including linear linking habitat) within 250 metres of:

- a) any hibernation roost hosting 3 or more species**
- b) any hibernation roost containing 10 or more bats of 1 or more species**

Justification: To reflect local scarcity and vulnerability and national conservation status, and to protect the integrity of important hibernating sites.

Site mapping

- Sites will be mapped in line with the mapping rules for habitats set out section 7(d) of Part 1.
- When mapping sites within 250m of a hibernation roost or within 500m of maternity roost, traditional management unit boundaries will be used to set the boundary of the LWS. Therefore, where part of a traditional management unit is within 250m/500m, and part is outside it, the land outside will be mapped as part of the LWS, up to the traditional management unit boundary.
- Mapping of sites will include semi-natural habitat (such as a hedgerows or watercourse) which is known to (or is likely to) provide linkages between the roost site and the foraging habitat.
- Private gardens will not be included within the mapped LWS boundary, so where a roost is within an urban/suburban area the LWS may not lie immediately adjacent to the roost site.
- Habitats of importance for foraging which cannot be linked to a known roost site (criterion 2) will only include that habitat from which the 'scoring' species have been recorded, and no inferences will be made about linkages to other sites or habitats, unless these can be proven.

Site survey and resurvey

- Sites will initially be mapped on the basis of survey results not more than 10 years old.
- Designated sites will be resurveyed every 10 years, to account for the generally low level of amateur surveying and the difficulties involved in surveying for bats. When a site cannot be surveyed within the specified survey programme, it will be assumed that the site still qualifies and will remain designated until it can be ascertained that it does not.

References

Entwhistle, A.C., Harris, S., Hutson, A.M., Racey, P.A., Walsh, A., Gibson, S.D., Hepburn, I. & Johnston, J. (2001) Habitat management for bats - A guide for land managers, land owners and their advisors. Joint Nature Conservation Committee, Peterborough.

Annex 1 – bat species in Nottinghamshire

Species	Species of Principal Importance	Status in Nottinghamshire	Maternity roost 'significance' threshold*
Serotine (<i>Eptesicus serotinus</i>)		Rare	1
Nathusius's Pipistrelle (<i>Pipistrellus nathusii</i>)		Rare	1
Barbastelle (<i>Barbastella barbastellus</i>)	Yes	Rare	1
Brandt's Bat (<i>Brandt's bat</i>)		Scarce	20
Leisler's Bat (<i>Nyctalus leisleri</i>)		Scarce	15
Natterer's Bat (<i>Myotis nattereri</i>)		Less scarce	20
Whiskered Bat (<i>Myotis mystacinus</i>)		Less scarce	20
Common Pipistrelle (<i>Pipistrellus pipistrellus</i>)		More common	150
Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>)	Yes	More common	200
Brown Long-eared Bat (<i>Plecotus auritus</i>)	Yes	More common	30
Daubenton's Bat (<i>Myotis daubentonii</i>)		More common	20
Noctule (<i>Nyctalus noctule</i>)	Yes	More common	15

* The number of individual adult bats using the roost

Rarity categories and maternity roost 'significance thresholds' were assigned based on input from specialist bat workers operating within the county, using local data sources.

2.3 Birds

These criteria were accepted by the NEGDP on 18/03/2014

Originators: Carl Cornish (RSPB), David Parkin (Nottinghamshire Birdwatchers) and Craig Howat (Nottinghamshire Wildlife Trust)

Introduction

The bird species used for the selection of LWSs are based upon the list of Nottinghamshire Birds of Conservation Concern (Notts BoCC) (Cornish, Parkin & Crouch (2010), which updates an earlier list (Parkin & Cornish 2004) and is shown in Annex 1. This includes species on the UK Red and Amber Birds of Conservation Concern lists (Eaton et al. 2009) that regularly occur in the county for breeding, wintering or on passage, along with a small number of Green listed species that are of local significance.

Species are regarded as having a 'regular' presence on a site if they use it to nest, roost, feed or over-winter and have been recorded at least once in the previous five years. Sites can be selected on the basis of their importance for breeding or wintering species. The minimum evidence for a 'breeding record' follows the standard for national breeding bird surveys as:

1. The presence of a male bird displaying territorial behaviour in appropriate habitat in the breeding season, and/or;
2. Repeated sightings of the species displaying behaviour that is acknowledged as likely to be associated with breeding for this species, in suitable habitat during the breeding season.

A 'site' should include all areas that are critical for nesting, foraging, roosting or territorial use. Sites are selected on the basis of eleven key habitats. These are;

- Broad-leaved woodland in Sherwood Forest
- Broad-leaved woodland elsewhere in Nottinghamshire
- Coniferous woodland
- Scrub
- Parkland
- Heathland
- Dry grassland
- Riverine grassland
- Lakes & gravel pits
- Reedbed
- Post-industrial (sites such as disused quarries, former colliery pit tips, etc.)

Some sites, such as arable farmland where the bird interest changes from field to field over time, are not suitable to be LWSs. Consequently, arable farmland has

not been included in the selection criteria for habitat-based LWSs for breeding or wintering birds.

Six methods have been used for the selection criteria of LWSs:

- If the site has a rare UK breeding bird;
- If the site has a colony of a colonial breeding species on Notts BoCC;
- If the site has two or more species of breeding waders;
- If the site has an important breeding bird assemblage;
- If the site has an important wintering bird assemblage;
- If the site supports a significant proportion of the UK wintering population of a species.

Broad-leaved woodland in the Sherwood Forest (taken to be the Sherwood Natural Area) is dealt with separately since it includes some species that are rarely encountered elsewhere in the county.

Criteria

Sites in Nottinghamshire holding birds will be designated as LWSs where they meet one or more of the following criteria;

Criterion 1: Any site that regularly supports a species monitored by the Rare Breeding Birds Panel

Justification: Species monitored by the Rare Breeding Birds Panel (Rare Breeding Birds Panel, 2013) are nationally rare as a breeding species (Category A) or less scarce as a breeding species (Category B) within the United Kingdom. Their rarity is because:

1. Specific habitat requirements limit their range and numbers;
2. They are on the edge of their range;
3. They are a recent colonist;
4. A combination of the above three.

Nottinghamshire has populations of several rare breeding birds that comprise a significant proportion of the United Kingdom population. In addition, breeding populations of rare species warrant designation since their small size or isolation means that they are vulnerable to extinction, at least locally. They are also often sensitive to changes in habitat. Only species that breed regularly in the county are considered, so sporadic breeders such as Common Quail, Garganey and Black Redstart, have been omitted from consideration. Irregular breeders such as European Honey-buzzard and Common Crossbill are retained since their breeding sites are predictable. Hobby has been omitted because it usually moves nest site each year and is dependent on crow nests, and will often nest up to 3km from feeding areas.

The species to which this criterion should be applied are; Black-necked Grebe; Eurasian Wigeon; Gadwall; Shoveler; Common Pochard; European Honey-Buzzard; Northern Goshawk; Marsh Harrier; Water Rail; Avocet; Little Ringed Plover; Kingfisher; Woodlark; Cetti's Warbler; Hawfinch; Common Crossbill.

Criterion 2: Any site that regularly supports a colony of a colonial species on the Notts BoCC list

Justification: Colonial species are those that form a discernable cluster of breeding individuals, making them especially vulnerable to disturbance and destruction of their breeding habitat. Two colonial species, Swift and House Martin, are excluded from this criterion because they normally nest in or on private residential properties and the conservation of these species is therefore best achieved by other means, whilst for Sand Martin, sites only apply where they are not located in active sand quarries subject to ongoing excavation works. For the purposes of this criterion, a colony is regarded as three or more pairs of a colonial species within a patch of habitat, or two if the habitat is effectively 'full'.

The species to which this guideline should be applied are; Grey Heron; Black-headed Gull; Common Tern; Sand Martin; Reed Warbler.

Criterion 3: Any site that regularly has two or more breeding species of waders

Justification: The decline of breeding waders in the county has been well-documented. Loss of habitat (especially flood plain meadows, marshes and grasslands), changes in farming practices and hydrological changes have all contributed to the declines. Assemblages of breeding waders are now reliant on fragmented habitats and temporary sites at working aggregate quarries and disused brown-field sites, so are very vulnerable to further losses. Woodcock has been excluded from the list because it breeds in woodland, a habitat which is not used by other breeding wader species in Nottinghamshire.

The species to which this guideline should be applied are: Oystercatcher; Avocet; Little Ringed Plover; Great Ringed Plover; Northern Lapwing; Common Snipe; Eurasian Curlew; Common Redshank; Common Sandpiper.

In addition, two species are potential colonisers of the county, and if they start to breed in the county will immediately be added to the above list. These two species are: Ruff and Black-tailed Godwit.

Criterion 4: Any site that has a regular breeding bird assemblage with a score that is equal to or exceeds the threshold value for the site's habitat

Justification: This criterion highlights sites that are important for their breeding bird assemblages in the county. A conservation weighting score is attributed to each species on the Notts BoCC list, taking into account national population size and conservation status. The methodology for this is shown in Annex 2, and the resultant score for each species is listed in Annex 3 (Summer LWS Score column). For each habitat, these scores of species which use the habitat are summed, and a theoretical 'high' score obtained. A threshold value is then set at one third of this theoretical high score, and any site exceeding this threshold for the habitat in question qualifies as an LWS. This level was set at a level to reflect county significance, after review of Natural England's national SSSI guidelines and after consultation with the Nottinghamshire Birdwatchers and Nottinghamshire Wildlife Trust. These thresholds are shown in Annex 4, and below. The score of the bird assemblage present should exceed the threshold value at least once every five years.

Habitat	Assemblage score	Threshold value
Broad-leaved woodland (Sherwood)	117	39
Broad-leaved woodland	73	24
Coniferous woodland	46	15
Scrub	67	22
Parkland	76	25
Heathland	51	14
Grassland	75	25
Riverine grassland	92	31
Lakes & gravel pits	147	49
Reedbed	42	14
Post-industrial	77	29

Criterion 5: Any site that has a regular wintering bird assemblage with a score that is equal to or exceeds the threshold value for the site's habitat

Justification: This criterion highlights sites that are important for their wintering bird assemblages. A conservation weighting score is attributed to each species on the Notts BoCC list, taking into account national population size (Baker et al. 2006) and conservation status. The methodology for this is shown in Annex 2, and the resultant score for each species is listed in Annex 3 (Winter LWS Score column). For each habitat, these scores of species which use the habitat are summed, and a theoretical 'high' score obtained. A threshold value is then set at one third of this theoretical high score, and any site exceeding this threshold for the habitat in question qualifies as an LWS. These thresholds are shown in Annex 5, and below. The score of the bird assemblage present should exceed the threshold value at least once every five years. For the purposes of LWS criteria, winter is defined as the period from November through to March.

Habitat	Assemblage score	Threshold value
Broad-leaved woodland (Sherwood)	89	30
Broad-leaved woodland	58	19
Coniferous woodland	30	10
Scrub	50	19
Riverine grassland	81	27
Heathland	42	13
Parkland	72	24
Wet riverine grassland	95	32
Lakes & gravel pits	159	53
Reedbed	50	17
Post-industrial	36	12

Criterion 6: Any site* that regularly supports 0.5% or more of the UK wintering population of a water bird or wading bird species

Justification: This criterion highlights important sites for wintering water birds and waders in the county, and is set below the 1% threshold used for identifying important wintering sites for waders and wildfowl at a national level. For the purposes of LWS criteria, winter is defined as the period from November through to March. The species to which this criterion applies, and the relevant wintering population size, are shown below. The population figures are taken from Kershaw & Cranswick (2002). *Excludes arable farmland, on the basis that cropping patterns, and hence utilisation by birds, changes on an annual basis.

Species	0.5% threshold
Little Grebe	39
Great Crested Grebe	80
Black-necked Grebe	1
Great Cormorant	115
Great Bittern	1
Bewick's Swan	40
Whooper Swan	29
Eurasian Wigeon	2030
Gadwall	86
Common Teal	960
Northern Shoveler	74
Common Pochard	298
Coot	625
European Golden Plover	1550

Site mapping

- Sites will be mapped in line with the mapping rules for habitats set out section 7(d) of Part 1.

Site survey and resurvey

- Sites will initially be designated on the basis of survey results not more than 5 years old.
- Designated sites will be resurveyed every 5 years. When a site cannot be surveyed within the specified survey programme, it will be assumed that the site still qualifies and will remain designated until it can be ascertained that it does not.

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Annex 1 - List of Birds of Conservation Concern for Nottinghamshire

This list was produced for the Biodiversity Action Group by the Nottinghamshire Birdwatchers, Nottinghamshire Wildlife Trust and RSPB. The derivation of the list is provided elsewhere (Parkin & Cornish 2004) and the list itself was revised in 2010 (Cornish, Parkin & Crouch 2010) following changes to the national Red and

Amber lists. Essentially, it includes those species on the national Red or Amber lists (Eaton et al. 2009) which occur regularly within Nottinghamshire. Additionally, species are included if they are not so designated, but are rare or scarce in the county or the wintering population in the county is 1% of the national total. These include: Grey Heron, Little Egret, Northern Goshawk, Hobby, Coot, Avocet, Little Ringed Plover, Black-tailed Godwit, Tawny Owl, Long-eared Owl, Raven, Cetti's Warbler, Reed Warbler and Common Crossbill.

	Species	UK BAP Species	National Red or Amber	Breeding	Winter	>1% national	Scarce or rare
				Target species	Scarce, rare, restricted or declining		
1	Bewick's Swan	Yes	Amber				Yes
2	Whooper Swan		Amber				Yes
3	Shelduck		Amber		Scarce		
4	Wigeon		Amber			Yes	
5	Gadwall		Amber			Yes	
6	Teal		Amber			Yes	
7	Mallard		Amber		Declining		
8	Garganey		Amber		Rare		
9	Shoveler		Amber		Scarce	Yes	
10	Pochard		Amber			Yes	
11	Tufted Duck		Amber		Declining		
12	Goldeneye		Amber				Yes
13	Smew		Amber				Yes
14	Grey Partridge	Yes	Red		Declining		
15	Quail		Amber		Restricted		
16	Cormorant		Amber			Yes	
17	Great Bittern	Yes	Red	Yes			
18	Grey Heron		Green		Restricted		
19	Little Egret		Amber	Yes			
20	Little Grebe		Amber			Yes	
21	Great Crested Grebe		Green			Yes	
22	Black-necked Grebe		Amber		Rare		
23	Honey Buzzard		Amber		Rare		
24	Red Kite		Amber		Rare		
25	Marsh Harrier		Amber		Rare		
26	Hen Harrier		Red				Yes
27	Goshawk		Green		Rare		
28	Osprey		Amber	Yes			
29	Kestrel		Amber		Declining		
30	Hobby		Green		Scarce		
31	Peregrine		Amber		Rare		Yes
32	Water Rail		Amber		Rare		
33	Coot		Green			Yes	
34	Oystercatcher		Amber		Scarce		
35	Avocet		Amber		Rare		

36	Little Ringed Plover		Green		Scarce		
37	Ringed Plover		Amber		Scarce		
38	Golden Plover		Amber			Yes	
39	Northern Lapwing	Yes	Red		Declining		
40	Ruff		Red	Yes			
41	Jack Snipe		Amber				Yes
42	Snipe		Amber		Rare		
43	Woodcock		Amber		Declining		
44	Black-tailed Godwit	Yes	Red	Yes			
45	Eurasian Curlew	Yes	Amber		Rare		
46	Redshank		Amber		Rare		
47	Black-headed Gull		Amber		Restricted		
48	Herring Gull	Yes	Red				Yes
49	Common Tern		Amber		Restricted		
50	Stock Dove		Amber		Declining		
51	European Turtle Dove	Yes	Red		Declining		
52	Common Cuckoo	Yes	Red		Declining		
53	Barn Owl		Amber		Scarce		
54	Tawny Owl		Green		Declining		
55	Long-eared Owl		Green		Scarce		Yes
56	Short-eared Owl		Amber				Yes
57	European Nightjar	Yes	Red		Scarce		
58	Swift		Amber		Declining		
59	Kingfisher		Amber		Scarce		
60	Green Woodpecker		Amber				
61	Lesser Spotted Woodpecker	Yes	Red		Declining		
62	Raven		Green		Rare		
63	Bearded Tit		Amber	Yes			
64	Marsh Tit	Yes	Red		Declining		
65	Willow Tit	Yes	Red		Declining		
66	Woodlark	Yes	Amber		Scarce		
67	Skylark	Yes	Red		Declining		
68	Sand Martin		Amber		Declining		
69	Swallow		Amber		Declining		
70	House Martin		Amber		Declining		
71	Cetti's Warbler		Green		Rare		
72	Willow Warbler		Amber		Declining		
73	Lesser Whitethroat		Green		Declining		
74	Common Whitethroat		Amber		Declining		
75	Grasshopper Warbler	Yes	Red		Declining		
77	Reed Warbler		Green		Restricted		
78	Common Starling	Yes	Red		Declining		
79	Song Thrush	Yes	Red		Declining		
80	Mistle Thrush		Amber		Declining		
81	Nightingale		Amber		Rare		
82	Black Redstart		Amber		Rare		
83	Redstart		Amber		Scarce		

84	Whinchat		Amber		Rare		
85	Stonechat		Green		Rare		
86	Northern Wheatear		Amber	Yes			
87	Spotted Flycatcher	Yes	Red		Declining		
88	Pied Flycatcher		Amber	Yes			
89	Dunnock	Yes	Amber		Declining		
90	House Sparrow	Yes	Red		Declining		
91	Tree Sparrow	Yes	Red		Declining		
92	Yellow Wagtail	Yes	Red		Declining		
93	Grey Wagtail		Amber		Scarce		
94	Tree Pipit		Red		Declining		
95	Meadow Pipit		Amber		Declining		
96	Common Linnet	Yes	Red		Declining		
97	Lesser Redpoll	Yes	Red		Declining		
98	Common Crossbill		Green		Scarce		
99	Common Bullfinch	Yes	Amber		Declining		
100	Hawfinch	Yes	Red		Scarce		
101	Yellowhammer	Yes	Red		Declining		
102	Reed Bunting	Yes	Amber		Declining		
103	Corn Bunting	Yes	Red		Declining		

Annex 2 - Derivation of conservation weighting scores

To determine the conservation weighting score for each Nottinghamshire BoCC, the following system is used:

- Breeding bird score = UK population score (breeding) + weighting for conservation status
- Wintering bird score = UK population score (winter) + weighting for conservation status

The UK population scores are as follows:

UK population estimate	Score
> 1 million	0
100,000 – 1,000,000	1
10,000 – 100,000	2
1,000 – 10,000	3
100 – 1,000	4
10 – 100	5
1 – 10	6

N.B. Population estimates come from Baker et al. (2006). The breeding population is taken as the number of pairs. Where winter population estimates are available, these are used (number of individuals), but in the absence of this

data, the breeding population estimate is used as a proxy. In both cases, where a range is given by Baker et al., the mid-point is used.

The weightings for conservation status are as follows:

Green list BoCC on Notts list of BoCC	+ 1
Amber list BoCC on Notts list of BoCC	+ 2
Red list BoCC on Notts list of BoCC	+ 3

Annex 3 - Conservation weighting scores for all species (summer and winter)

	Species	Conservation weighting score	Breeding score	Summer LWS score	Wintering score	Winter LWS Score
1	Bewick's Swan	2			3	5
2	Whooper Swan	2			3	5
3	Shelduck	2	2	4	2	4
4	Wigeon	2	4	6	1	3
5	Gadwall	2	4	6	2	4
6	Teal	2	3	5	1	3
7	Mallard	2	2	4	1	3
8	Garganey	2	5	7		
9	Shoveler	2	3	5	2	4
10	Pochard	2	4	6	2	4
11	Tufted Duck	2	3	5	2	4
12	Goldeneye	2			2	4
13	Smew	2			4	6
14	Grey Partridge	3	2	5	2	5
15	Quail	2	4	6		
16	Cormorant	2	3	5	2	4
17	Bittern	3	5	8	4	7
18	Grey Heron	1	2	3	2	3
19	Little Egret	2	4	6	4	6
20	Little Grebe	2	3	5	3	5
21	Great Crested Grebe	1	3	4	2	3
22	Black-necked Grebe	2	5	7	4	6
23	Honey Buzzard	2	5	7		
24	Red Kite	2	4	6	4	6
25	Marsh Harrier	2	4	6	4	6
26	Hen Harrier	3			4	7
27	Goshawk	1	4	5	4	5
28	Osprey	2	4	6		

29	Kestrel	2	2	4	2	4
30	Hobby	1	3	4		
31	Peregrine	2	3	5	3	5
32	Water Rail	2	4	6	4	6
33	Coot	1	2	3	1	2
34	Oystercatcher	2	1	3	1	3
35	Avocet	2	4	5		
36	Little Ringed Plover	1	4	5		
37	Ringed Plover	2	3	5	2	4
38	Golden Plover	2			1	3
39	Lapwing	3	1	4	0	3
40	Ruff	3	5	8		
41	Jack Snipe	2			2	4
42	Snipe	2	2	4	1	3
43	Woodcock	2	3	5	3	5
44	Black-tailed Godwit	3	5	8	2	5
45	Curlew	2	1	3	1	3
46	Redshank	2	2	4	1	3
47	Black-headed Gull	2	1	3	0	2
48	Herring Gull	3			1	4
49	Common Tern	2	2	4		
50	Stock Dove	2	1	3	1	3
51	Turtle Dove	3	2	5		
52	Cuckoo	3	2	5		
53	Barn Owl	2	3	5	3	5
54	Tawny Owl	1	2	3	2	3
55	Long-eared Owl	1	3	4	3	4
56	Short-eared Owl	2	3	5	3	5
57	Nightjar	3	3	6		
58	Swift	2	2	4		
59	Kingfisher	2	3	5	3	5
60	Green Woodpecker	2	2	4	2	4
61	Lesser Spotted Woodpecker	3	3	6	3	6
62	Raven	1	2	3	2	3
63	Bearded Tit	2	4	6	4	6
64	Marsh Tit	3	2	5	2	5
65	Willow Tit	3	3	6	3	6
67	Woodlark	2	3	5	3	5
68	Skylark	3	0	3	0	3
69	Sand Martin	2	1	3		
70	Swallow	2	1	3		
71	House Martin	2	1	3		
72	Cetti's Warbler	1	4	5	4	5
73	Willow Warbler	2	0	2		
74	Lesser Whitethroat	1	2	3		
75	Common Whitethroat	2	1	3		
77	Grasshopper Warbler	3	2	5		
78	Reed Warbler	1	2	3		
79	Starling	3	1	4	1	4
80	Song Thrush	3	0	3	0	3
81	Mistle Thrush	2	1	3	1	3
82	Nightingale	2	3	5		
83	Black Redstart	2	5	7		

84	Redstart	2	1	3		
85	Whinchat	2	2	4		
86	Stonechat	1	3	4	3	4
87	Northern Wheatear	2	2	4		
88	Spotted Flycatcher	3	2	5		
89	Pied Flycatcher	2	2	4		
90	Dunnock	2	0	2	0	2
91	House Sparrow	3	0	3	0	3
92	Tree Sparrow	3	2	5	2	5
93	Yellow Wagtail	3	2	5		
94	Grey Wagtail	2	2	4	2	4
95	Tree Pipit	3	2	5		
96	Meadow Pipit	2	0	2	0	2
97	Linnet	3	1	4	1	4
98	Lesser Redpoll	3	2	5	2	5
99	Common Crossbill	1	3	4	3	4
100	Bullfinch	2	1	3	1	3
101	Hawfinch	3	3	6	3	6
102	Yellowhammer	3	1	4	1	4
103	Reed Bunting	2	1	3	1	3
104	Corn Bunting	3	2	5	2	5

Annex 4 - Calculation of scores for summer species assemblages in the major habitat types in Nottinghamshire

Species	Conservation weighting score	Sherwood	Broadleaf	Conifers	Scrub	Heathland	Parkland	Grassland	Riverine Grassland	Lakes & Gravel Pits	Reedbed	Post-industrial site
Shelduck	4								4	4		
Wigeon	6									6		
Gadwall	6								6	6		
Teal	5									5		
Mallard	4								4	4		
Shoveler	5									5		
Pochard	6									6		
Tufted Duck	5									5		
Grey Partridge	5							5	5			5
Quail	6							5	5			
Cormorant	5									5		
Bittern	8										8	
Grey Heron	3	3	3							5		
Little Egret	6									5		
Little Grebe	5									5		
Great Crested Grebe	4									4		
Black-necked Grebe	7									7		
Honey Buzzard	7	7										
Red Kite	6											
Marsh Harrier	6										6	

Goshawk	5	5	5	5								
Osprey	6			5								
Kestrel	4					4		4				4
Hobby	4	4				4						
Peregrine	5											
Water Rail	6									6	6	
Coot	3									3		3
Oystercatcher	3									3		3
Avocet	5									5		5
Little Ringed Plover	5									5		5
Ringed Plover	5									5		5
Lapwing	4					4		4		4		4
Ruff	8											
Snipe	4							4	4			
Woodcock	5	5	5	5								
Black-tailed Godwit	8											
Curlew	3							3	3	3		
Redshank	4							4	4	4		
Black-headed Gull	3									4		
Common Tern	4									4		
Stock Dove	3	3	3			3	3					3
Turtle Dove	5	5			5							3
Cuckoo	5	5			5	5	5	5	5			5
Barn Owl	5						5	5				
Tawny Owl	3	3	3	3								
Long-eared Owl	4	4	4	4	4							
Short-eared Owl	5								5	5		
Nightjar	6	6		6		6						
Swift	4											
Kingfisher	5									5		
Green Woodpecker	4	4	4	4		4	4					
Lesser Spotted Woodpecker	6	6	6				6					
Raven	3											
Bearded Tit	6											6
Marsh Tit	5	5	5									
Willow Tit	6	6	6		6					6		6
Woodlark	5	5		5		5						
Skylark	3					3		3	3			3
Sand Martin	3									3		
Swallow	3									3		3
House Martin	3											
Cetti's Warbler	5											5
Willow Warbler	2	2	2		2	2	2		2			2
Common Whitethroat	3				3	3						
Lesser Whitethroat	3				3							
Grasshopper Warbler	5					5		5	5			5
Reed Warbler	3									3	3	
Starling	4						4			4		
Song Thrush	3	3	3	3	3		3					
Mistle Thrush	3	3										
Nightingale	5		5		5							
Black Redstart	7											7
Redstart	3	3	3				3					
Whinchat	4					4						

Stonechat	5					5						
Northern Wheatear	4					4						
Spotted Flycatcher	5	5	5				5					
Duncock	2	2	2	2	2							2
House Sparrow	3											3
Tree Sparrow	5				5		5					
Yellow Wagtail	5							5	5	5		
Grey Wagtail	4								5	4		
Tree Pipit	5	5		5	5	5						
Meadow Pipit	2					2		2	2	2		2
Linnet	4				4	4		4	4			4
Lesser Redpoll	5	5			5							
Common Crossbill	4	4		4								
Bullfinch	3	3	3		3							
Hawfinch	6	6	6				6					
Yellowhammer	4				4	4		4	4			
Reed Bunting	3				3			3	3	3	3	
Corn Bunting	5							5	5			
Possible high score		117	73	46	67	76	51	75	92	147	42	77
Threshold value		39	24	15	22	25	14	25	31	49	14	29

Annex 5 - Calculation of scores for winter species assemblages in the major habitat types in Nottinghamshire

Species	Conservation weighting score	Sherwood	Broadleaf	Conifers	Scrub	Heathland	Parkland	Grassland	Riverine Grassland	Lakes & Gravel Pits	Reedbed	Post-industrial site
Bewick's Swan	5								5	5		
Whooper Swan	5								5	5		
Shelduck	4									4		
Wigeon	3								3	3		
Gadwall	4									4		
Teal	3								3	3		
Mallard	3								3	3		
Shoveler	4									4		
Pochard	4									4		
Tufted Duck	4									4		
Goldeneye	4									4		
Smew	6									6		
Grey Partridge	5							5				5
Cormorant	4									3		
Bittern	7									7	7	
Grey Heron	3								3	3	3	
Little Egret	6								6	6		
Little Grebe	5									5		
Great Crested Grebe	3									3		
Black-necked Grebe	6									6		
Red Kite	6					6						

Marsh Harrier	6								6		6	
Hen Harrier	7							7		7	7	
Goshawk	5	5	5	5		5			5	5		
Kestrel	4				4	4	4	4				4
Peregrine	5	5				5			5		5	
Water Rail	6								6	6	6	
Coot	2									2	2	
Oystercatcher	3									3		
Ringed Plover	4									4		
Golden Plover	3							3	3			
Lapwing	3							3	3	3		3
Jack Snipe	4								4	4		
Snipe	3								3	3		
Woodcock	5			5								
Curlew	3								3	3		
Redshank	3								3	3		
Black-headed Gull	2							2	2	2		
Herring Gull	4									4		
Stock Dove	3	3	3			3						
Barn Owl	5	5			5	5	5	5	5			
Tawny Owl	3	3	3	3		3						
Long-eared Owl	4	4	4	4	4					4		
Short-eared Owl	5	5						5	5	5		
Kingfisher	5									5		
Green Woodpecker	4	4	4	4	4	4						
Lesser Spotted Woodpecker	6	6	6			6						
Raven	3	3						3				
Bearded Tit	6										6	
Marsh Tit	5	5	5			5						
Willow Tit	6	6	6		6					6		6
Woodlark	5	5			5	5	5	5				5
Skylark	3	3				3	3	3				3
Cetti's Warbler	5								5	5	5	
Starling	4					4		4				4
Song Thrush	3	3	3	3	3	3						3
Mistle Thrush	3	3	3			3						
Stonechat	4							4		4		
Dunnock	2	2	2	2	2							
House Sparrow	3											3
Tree Sparrow	5	5			5							
Grey Wagtail	4								4	4		
Meadow Pipit	2				2		2	2	2			
Linnet	4					4	4	4				
Lesser Redpoll	5	5	5						5			
Common Crossbill	4			4		4	4					
Bullfinch	3	3	3		3	3						
Hawfinch	6	6	6			6	6					
Yellowhammer	4				4			4				
Reed Bunting	3				3			3	3		3	
Corn Bunting	5							5				
Possible high score		89	58	30	50	81	42	72	95	159	50	36
Threshold value		30	19	10	19	27	13	24	32	53	17	12

2.4 Butterflies

These criteria were accepted by the NEGDP on 18/03/2014

Originators: Barry Prater (Butterfly Conservation East Midlands); updated by Richard Penson (County Butterfly Recorder)

Introduction

There are 59 species of butterfly which breed in the UK, of which 56 are resident and three are regular migrants, although in varying annual numbers. Nottinghamshire currently has 32 species, ranging from widespread and numerous ones to some which are only known to occur at single sites in the county. Going back to the nineteenth century there would have been around a dozen more species present in the county, all of which have become locally extinct as a result of changes in agricultural and forestry practices and other environmental factors. The county thus has a relatively impoverished butterfly fauna.

However, this region of the country is also witnessing the northerly spread of some species, perhaps associated with climate change, and this is enhancing the biodiversity of some sites, although it is not known whether these range expansions will be sustained in the long term. The distribution of many of those species requiring more specialised habitats appears to be changing quite rapidly, either contracting or spreading and this dynamic situation poses problems for the conservation of individual colonies as these may be short-lived. Habitat conservation on a larger scale is likely to be more effective, with corridors allowing the free movement of species between sites with suitable habitat. However, the site-based approach embodied in the LWS process is valuable because it allows close focus on known sites of importance for butterflies and can therefore contribute significantly to their conservation in the medium term.

Ideally, a site should be accepted as holding a species if that butterfly is known to breed there. However, proof of breeding will often not be evident from records received and all of the species which are of particular concern in the county tend to be relatively sedentary and so their presence will normally imply breeding. All of the species in Nottinghamshire which are more wide-ranging in their activities are also widespread and numerous and hence are less important in terms of their conservation needs. For these reasons, the criteria have been developed on the assumption that if a butterfly is present at a site then that site holds the species concerned. The number of individual butterflies of a particular species at a site, or the size of a colony, will also not be used for identifying important sites. This is because for many species the number of individuals in a population varies considerably from year to year as a normal to weather and other environmental and ecological factors. Records of butterflies known to stem from introductions

will not be used to select LWSs, unless that introduction has been carried out through official channels.

The following factors have been taken account of in drawing up the criteria in this document:

1. Whether a site holds a Species of Principal Importance
2. Whether a site holds a species of conservation priority in Nottinghamshire
3. The total number of species held by a site (site assemblage)
4. The number of species held by a site which are considered to be characteristic of a particular habitat in Nottinghamshire (site assemblage - characteristic species)

Conservation priority in Nottinghamshire is based on Butterfly Conservation's Regional Action Plan (RAP) for the East Midlands (Ellis & Bourn 2000), following a detailed analysis of its application at the county level (Prater 2004), with minor amendments made in 2011 based upon the county recorder's knowledge.

Criteria

Sites in Nottinghamshire holding butterflies will be designated as LWSs where they meet one or more of the following criteria;

Criterion 1: Any site that supports a Species of Principal Importance, as shown in Annex 1, excluding the two species listed only as priorities for research and monitoring

Justification: To reflect national conservation priorities. Most Species of Principal Importance occurring in Nottinghamshire have very limited distributions and are restricted to particular habitats at a small number of sites. White-letter hairstreak, although more widespread, often occurs in very small, isolated colonies.

Criterion 2: Any site that supports a species of high conservation priority in Nottinghamshire or two species of medium conservation priority in Nottinghamshire as shown in Annex 1

Justification: To reflect local conservation priorities. With one exception, all 'high' species are Species of Principal Importance. The exception, Green Hairstreak, remains widespread in southern Britain but has a patchy distribution across the Midlands, and is very rare in Nottinghamshire.

Criterion 3: Any site with a total species assemblage exceeding 20 from the species shown in Annex 1

Justification: To reflect a diverse assemblage of butterflies in the county. The threshold represents two-thirds of the total number of species occurring in the

county, and any site holding this number of species would be exceptional and would also be likely to support high and/or medium priority species.

Criterion 4: Any deciduous woodland site with at least two species characteristic of that habitat as shown in Annex 2

Justification: To reflect an important assemblage of butterflies associated with woodland. Two out of three characteristic species is considered to represent a notable site.

Criterion 5: Any lowland heathland site with at least three species characteristic of that habitat as shown in Annex 2

Justification: To reflect an important assemblage of butterflies associated with heathland. Three out of four characteristic species is considered to represent a notable site.

Criterion 6: Any brownfield site with at least three species characteristic of that habitat as shown in Annex 2

Justification: To reflect an important assemblage of butterflies associated with brownfield habitats. Three out of five characteristic species is considered to represent a notable site. In this context, a 'brownfield' site is an area of previously developed land, which is normally attributable to the LBAP habitat Open Mosaic Habitat on Previously Developed Land.

Site mapping

- Sites will be mapped in line with the mapping rules for habitats set out section 7(d) of Part 1.
- For species occurring in linear features such as hedgerows, road verges, or disused railway lines, areas that are 50 metres either side of a record from a single location will be mapped as part of the LWS. Where multiple records come from a length of linear habitat, the site will be mapped as a single LWS where records occur within 50 metres of each other, and the LWS will be mapped to extend for 50 metres beyond the outermost records.

Site survey and resurvey

- Sites will initially be designated on the basis of survey results not more than 10 years old.
- Designated sites will be resurveyed every 10 years, to account for generally low levels of surveying and vagaries in population sizes and distributions due to annual weather patterns. When a site cannot be surveyed within the specified survey programme, it will be assumed that the site still qualifies and will remain designated until it can be ascertained that it does not.

References

Ellis, S. & Bourn, N. (2000) Butterfly Conservation Regional Action Plan East Midlands of England. East Midlands Branch BC and Lincolnshire Branch BC. (http://butterfly-conservation.org/files/ap-east_midlands.pdf)

Prater, B. (2004) Nottinghamshire Local Biodiversity Action Plan - Revised Criteria for Selecting Butterfly Species of Conservation Concern (Unpublished).

Annex 1 - Conservation status of Butterflies in Nottinghamshire

Species	Species of Principal Importance?	LBAP species?	BC Regional Priority	BC Priority for Nottinghamshire
Small Skipper <i>Thymelicus sylvestris</i>				
Essex Skipper <i>Thymelicus lineola</i>				
Large Skipper <i>Ochlodes sylvanus</i>				
Dingy Skipper <i>Erynnis tages</i>	Yes	Yes	Medium	High
Grizzled Skipper <i>Pyrgus malvae</i>	Yes	Yes	High	High
Clouded Yellow <i>Colias croceus</i>				
Brimstone <i>Gonopteryx rhamni</i>				
Large White <i>Pieris brassicae</i>				
Small White <i>Pieris rapae</i>				
Green-veined White <i>Pieris napi</i>				
Orange-tip <i>Anthocharis cardamines</i>				
Green Hairstreak <i>Callophrys rubi</i>		Yes	Medium	High
Purple Hairstreak <i>Neozephyrus quercus</i>		Yes		Medium
White-letter Hairstreak <i>Satyrium w-album</i>	Yes	Yes	Medium	Medium
Small Copper <i>Lycaena phlaeas</i>				
Brown Argus <i>Aricia agestis</i>		Yes		Medium
Common Blue <i>Polyommatus icarus</i>				
Holly Blue <i>Celastrina argiolus</i>				
White Admiral <i>Limenitis camilla</i>	Yes	Yes	Medium	High
Red Admiral <i>Vanessa atalanta</i>				
Painted Lady <i>Cynthia cardui</i>				
Small Tortoiseshell <i>Aglais uticae</i>				
Peacock <i>Inachis io</i>				
Comma <i>Polytonia c-album</i>				

Speckled Wood <i>Pararge aegeria</i>				
Wall <i>Lasiommata megera</i>	(Yes)	Yes		Medium
Gatekeeper <i>Pyronia tithonus</i>				
Meadow Brown <i>Maniola jurtina</i>				
Small Heath <i>Coenonympha pamphilus</i>	(Yes)	Yes		
Ringlet <i>Aphantopus hyperantus</i>				

Notes:

- Brown Hairstreak *Thecla betulae* is not included in the list as its recent presence in the county was due to an unauthorised release which only persisted for between one and three years before dying out (there have been no records since 2007). It was, however, present in the county during Victorian times.
- Marbled White *Melanargia galathea* is not included in the list as it has been widely introduced across many sites in the county since 2006, none of which appear to have persisted beyond the first year; the only exception is an established population at a site near Mansfield where it has been recorded for a number of years. Nevertheless, this population is thought also to have stemmed from an unauthorised introduction.
- The Species of Principal Importance listed “(Yes)” are priorities for research and monitoring only.
- Green Hairstreak *Callophrys rubi* has been upgraded from ‘Medium’ to ‘High’ BC Priority for Nottinghamshire, due to the small number of colonies in the county and lack of recent records from several of these.
- The presence of Silver-washed Fritillary *Argynnis paphia* in the county will be kept under review, as the origins and breeding status of individuals recorded since 2007 is as yet unknown.
- The status of Wall *Lasiommata megera* will be kept under review due to recent declines, but its ‘Medium’ BC Priority for Nottinghamshire is retained for the time being.

Annex 2 - Characteristic Species Assemblage

Species	Deciduous Woodland*	Lowland Heathland**	Brownfield Sites***
Dingy Skipper <i>Erynnis tages</i>			✓
Grizzled Skipper <i>Pyrgus malvae</i>			✓
Purple Hairstreak <i>Neozephyrus quercus</i>	✓		
White-letter Hairstreak <i>Satyrrium w-album</i>	✓		
Small Copper <i>Lycaena phlaeas</i>		✓	✓
Brown Argus <i>Aricia agestis</i>		✓	✓

Common Blue <i>Polyommatus Icarus</i>		✓	
White Admiral <i>Limenitis camilla</i>	✓		
Wall <i>Lasiommata megera</i>			✓
Small Heath <i>Coenonympha pamphilus</i>		✓	

Notes:

- * Any deciduous woodland, including the LBAP habitats Mixed Ash-dominated Woodland and Oak-birch Woodland
- ** Lowland heathland includes the LBAP habitats Lowland Heathland and Lowland Dry Acid Grassland
- *** Previously developed land, which is normally attributable to the LBAP habitat Open Mosaic Habitat on Previously Developed Land

2.5 Dragonflies and damselflies

These criteria were accepted by the NEGDP on 18/03/2014

Originator: David Goddard (Nottinghamshire county recorder for odonata)

Introduction

Odonata - dragonflies and damselflies - are conspicuous invertebrates recognised as being good biological indicators of habitat quality, especially the aquatic habitats that they breed in. The conservation of all odonata is very closely tied to the management and water quality of water bodies such as ponds, pools, lakes, canals and rivers. The larval stages of odonata remain within the water body for a long period, typically ranging in time from one to three years depending upon species. The presence of a good assemblage of odonata or the presence of a notable species is therefore a good indication that the water bodies concerned are in good condition.

The threats that are faced by odonata are primarily associated with the loss of their breeding sites due to changes in farming practises where water bodies are no longer required and are either filled in or left unmanaged, and from development which also results in the loss of water bodies. Other important issues relate to the pollution of water bodies (especially from nutrient run-off from farmland), along with the lack of management or mismanagement of the water body and its immediate surrounding habitats.

Recently, there have been a number changes in the odonata fauna of the British Isles, with a number of species recently colonising to form breeding colonies, along with an increase in the number and range of migrant species from continental Europe. Within Nottinghamshire, this has been reflected by the Small Red-eyed Damselfly *Erythromma viridulum* being recorded breeding at a number of sites. There has also been an increase in the number of records of species such as the Ruddy Darter *Sympetrum sanguineum* over the last ten years or so, along with the number of migrant species being recorded such as the red-veined darter and lesser emperor. These changes appear to be due to changes in climate.

For the selection of LWS sites based on their assemblage, only species showing evidence of confirmed or probable breeding are included (Taylor 2003);

- Confirmed breeding - 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.

Evidence of possible breeding is not sufficient (e.g. pair copulating or a 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) or the presence of adult(s), but with none of the above breeding evidence or behaviour observed).

The five most outstanding Nottinghamshire sites have, in addition, been designated as Key Sites for Odonata by the British Dragonfly Society. They are all sites which contain established populations of Grade 1 or Grade 2 Nottinghamshire species (as listed in Annexes 1 and 2), or where an outstanding assemblage of odonata has been recorded. An outstanding assemblage for Nottinghamshire has been defined as 11 or more species recorded since 2000.

Criteria

Sites in Nottinghamshire holding dragonflies and damselflies will be designated as LWSs where they meet one or more of the following criteria;

Criterion 1: Any site that supports a Grade 1 species (as shown in Annex 1) or Grade 2 species (as shown in Annex 2)

Justification: To reflect national conservation status. This is based upon the criteria for determining key Odonata sites in Great Britain (French & Smallshire, 2008).

Criterion 2: Any site with a total assemblage of 11 or more species, even if the assemblage does not include any Grade 1 or Grade 2 species

Justification: To reflect a diverse assemblage of characteristic species.

Site mapping

- All contiguous lengths of watercourse with multiple records of qualifying species will be mapped as LWSs with the site boundary set 100 metres either side of the first up-stream and last down-stream record (or a lesser distance, where suitable habitat ceases to exist).
- Where a single record of a qualifying species comes from a watercourse, all habitat 100 metres up- and down-stream of that record will be mapped as an LWS.
- Any single or linked waterbodies with a record(s) of qualifying species will be mapped as an LWS.

Site survey and resurvey

- Sites will initially be designated on the basis of survey results not more than 10 years old.
- Designated sites will be resurveyed every 10 years, to account for generally low levels of surveying. When a site cannot be surveyed within the specified survey programme, it will be assumed that the site still qualifies and will remain designated until it can be ascertained that it does not.

References

Daguet, C.A., French, G.C. and Taylor, P. (2007). The Odonata Red Data List for Great Britain. *Species Status* **11**; 1-34. Joint Nature Conservation Committee, Peterborough. (http://jncc.defra.gov.uk/pdf/pub08_speciesstatus11.pdf)

French, G. & Smallshire, D. (2008) Criteria for determining key odonata sites in Great Britain. *Journal of the British Dragonfly Society* **24(2)**:54-60. British Dragonfly Society.

Taylor, P. 2003. DCG Special Report - criteria for Proof of Breeding in dragonflies. *Dragonfly News*, **43**: 26-27

Annex 1 - Grade 1 species

These are species occurring in Nottinghamshire which have an IUCN conservation status of Near Threatened (NT) (Daguet et al. 2007). There is one Odonata species of IUCN NT status in Nottinghamshire:

- Variable Damselfly *Coenagrion pulchellum*

This species has been also been recorded from three or fewer 10Km squares in Nottinghamshire since 2000. However, the Grade 1 Nottinghamshire status has been assigned on the basis of its high national conservation status, and not on the number of 10Km squares in Nottinghamshire in which it has been recorded. Consequently, even if it was to be recorded from more than three 10Km squares in Nottinghamshire, it would remain a Grade 1 Nottinghamshire species for as long as its IUCN conservation status remained Near Threatened or greater.

Annex 2 - Grade 2 species

These are species occurring in Nottinghamshire which are classified as IUCN Least Concern (LC) status, but which have been recorded from three or fewer 10Km squares in Nottinghamshire since 2000. There are four Odonata species of Grade 2 status in Nottinghamshire:

- Beautiful Demoiselle *Calopteryx virgo*

- Golden-ringed Dragonfly *Cordulegaster boltonii*
- Hairy Dragonfly *Brachytron pratensis*
- Black Darter *Sympetrum danae*

Annex 3 - Other Odonata species recorded within Nottinghamshire

These are species occurring in Nottinghamshire which are classified either as IUCN Least Concern (LC) or Not Evaluated (NE), and which have been recorded from more than three 10Km squares in Nottinghamshire since 2000 or are migrants to Nottinghamshire. At present 21 such species are known to occur in Nottinghamshire, these are:

LEAST CONCERN (LC)

- Banded Demoiselle *Calopteryx splendens*
- Emerald Damselfly *Lestes sponsa*
- Azure Damselfly *Coenagrion puella*
- Red-eyed Damselfly *Erythromma najas*
- Large Red Damselfly *Pyrrhosoma nymphula*
- Common Blue Damselfly *Enallagma cyathigerum*
- Blue-tailed Damselfly *Ischnura elegans*
- Southern Hawker *Aeshna cyanea*
- Brown Hawker *Aeshna grandis*
- Common Hawker *Aeshna juncea*
- Migrant Hawker *Aeshna mixta*
- Emperor Dragonfly *Anax imperator*
- Broad-bodied Chaser *Libellula depressa*
- Four-spotted Chaser *Libellula quadrimaculata*
- Black-tailed Skimmer *Orthetrum cancellatum*
- Yellow-winged Darter *Sympetrum flaveolum* *
- Red-veined Darter *Sympetrum fonscolombii* *
- Ruddy Darter *Sympetrum sanguineum*
- Common Darter *Sympetrum striolatum*

NOT EVALUATED (NE)

- Small Red-eyed Damselfly *Erythromma viridulum* **
- Lesser Emperor *Anax parthenope*

Note:

* - Migrant species which occasionally breed but have not formed permanent populations.

** - A recent colonist which now breeds.

2.6 Fish

These criteria were accepted by the NEGDP on 18/03/2014

Originators: Steve Lawrie, Joel Rawlinson, Kathy Hughes and Anja Randeria
(Environment Agency)

Introduction

Fish are fundamental biological components of aquatic environments and play a vital role in sustaining healthy ecosystems. Their presence or absence, species composition, population density and relative biomass are commonly used as a key indication tool to accurately assess and infer the biological health status of a given aquatic ecosystem.

The county boasts a broad array of aquatic ecosystems that support a diverse composition of native salmonid and coarse fish species. Historically the county's watercourses would have supported substantial populations of migratory Atlantic Salmon *Salmo salar* and Sea Trout *Salmo trutta* whilst also providing excellent habitat for European Eels *Anguilla anguilla*, lamprey and coarse fish. Increased anthropogenic perturbations over past centuries saw Burbot *Lota lota* become extinct, whilst other fish species underwent significant declines; Atlantic Salmon and Sea Trout are not currently known to spawn within Nottinghamshire and European Eel populations have reduced.

Conservation efforts are now seeking to reverse these declines, and have seen the removal of artificial barriers to fish migration, improvements to water quality, and habitat creation undertaken. As a result the status of some aquatic ecosystems is beginning to improve. Brown Trout are now commonly found in the upper reaches of many watercourses and through reintroductions, Grayling *Thymallus thymallus* have also successfully re-established in sections of the River Erewash. However, it is vital that appropriate sections of watercourse within the county are protected so that very specific and limited aquatic habitat types and their fish communities can be conserved.

In order to be considered and selected as an LWS for fish, a site must contain optimum habitat requirements (including foraging and spawning areas) for the fish species covered by the criteria below. Potentially suitable habitat will initially be identified through an assessment of the habitat. If suitable habitat is identified, presence/absence of the species will then be determined by carrying out electric-fishing surveys or fyke netting (for eels). These surveys are not expected to create a population density estimate, and a species is not required to reach a specific population level in order for the designation to take place; for non-salmonid species of fish there are no published population density targets used by the Environment Agency (for salmonids there is 'habscore').

Criteria

Sites in Nottinghamshire holding fish will be designated as LWSs where they meet one or more of the following criteria;

Criterion 1: Any site where any of the species listed in Annex 1-3 is present and considered likely to be breeding

Justification: To reflect national conservation status; all the species in Annex 1 are Species of Principal Importance; species in Annex 2 are Annex II species under the EU Habitats Directive; and species in Annex 3 are uncommon and/or localised in Nottinghamshire.

Criterion 2: Any site where European Eel *Anguilla anguilla* is regularly present

Justification: To reflect national conservation status and local rarity. European Eel is Species of Principal Importance.

Site mapping

- All contiguous lengths of qualifying watercourse will be mapped as LWSs, with the site boundary set 250 metres either side of the first up-stream and last down-stream record (or a lesser distance, where suitable habitat ceases to exist).
- The area of importance will include all areas of known or likely breeding and foraging habitat.
- Any qualifying single or linked waterbodies will be mapped as an LWS in their entirety.
- Ornamental ponds can be included within LWSs where they are outside what would ordinarily be considered a private garden.

Site survey and resurvey

- Sites will initially be mapped on the basis of survey results not more than 10 years old.
- Designated sites will be resurveyed every 10 years, to account for the specialised nature of fish surveying. Where a site cannot be surveyed within the specified survey programme, it will be assumed that the site still qualifies and will remain designated until it can be ascertained that it does not.
- In the case of European Eel (Criterion 2), regular presence must be confirmed by at least two records from the same site in any one year, or at least three records from the same site in a 10 year period.

Annex 1 - Species of Principal Importance

Atlantic Salmon *Salmo salar*
Brown Trout *Salmo trutta*
Spined Loach *Cobitis taenia*
Sea Lamprey *Petromyzon marinus*
River Lamprey *Lampetra fluviatilis*

Annex 2 – Species listed in Annex II species of the EU Habitats Directive

Bullhead *Cottus gobio*
Brook Lamprey *Lampetra planeri*

Annex 3 - Uncommon/localised species in Nottinghamshire

Grayling *Thymallus thymallus*
Nine-spined Stickleback *Pungitius pungitius*

2.7 Mammals (excluding bats)

These criteria were accepted by the NEGDP on 18/03/2014

Originators: John Ellis (County Mammal Recorder) and Janice Bradley (Head of Conservation Policy and Planning for Nottinghamshire Wildlife Trust)

Introduction

Nottinghamshire hosts a diverse range of mammals, including some of our nationally most threatened species, such as Water Voles *Arvicola amphibius*. Many mammals rely on a complex range of habitat features to be able to breed and feed successfully, and so can be a good indicator of the health of a habitat. Several of our mammals that are indigenous to the County are protected by law and/or are UK BAP priority species, reflecting their vulnerability to habitat loss, deliberate killing and also a variety of indirect impacts, which have resulted in significant decreases in their populations over the last century. Conversely, some species, such as Otters *Lutra lutra*, are gradually increasing in the County and slowly re-colonising their former natural range, due to a combination of habitat conservation measures and legal protection. Others species, such as polecats are also doing so, largely in the absence of specific conservation measures, but aided by protection from persecution.

These patterns of population change have been taken into account when formulating these criteria, including the role that habitat loss has played for those species that are in decline. A distinction has also been made between those species protected by law because they are rare or declining, and Badgers *Meles meles*, which are protected by law because they are vulnerable to persecution, rather than because they are rare, and so LWS status is not required to protect their habitats. In addition, it should be noted that two mammal species listed as Species of Principal Importance, Hedgehog *Erinaceus europaeus* and Brown Hare *Lepus europaeus*, have not been included in these criteria as although they have suffered declines, they remain widespread in the county and protection of sites through the LWS system is not considered likely to have any meaningful impact on their conservation status.

A record of a species is based on evidence of either a sighting of the animal itself, or a field sign associated with territorial/breeding activity by that animal (such as latrines and grazing lawns for Water Voles, spraints for Otters and nests for Harvest Mice *Micromys minutus*). Species are generally regarded as having a 'regular' presence on a site if they used it to nest/breed or feed and have been recorded at least once in the previous ten years on the last time they were surveyed in that location, as most areas will have been surveyed only once in that period. This is a precautionary approach based on the evidence that many mammals use the same sites each year, in the absence of any significant habitat

change and/or increase in predation, thus it is likely that they will occur in the same locations and would be recorded again, were surveys to be undertaken. It is intended that the LWS system will complement the legislation for those species protected by law, by providing some degree of protection for the habitat that supports them. It should be noted that for some species it has been decided that an alert map would be more helpful to indicate to planners, developers and landowners that the species has been recorded at that point and therefore that an up-to-date survey is required.

Criteria

Sites in Nottinghamshire holding mammals will be designated as LWSs where they meet one or more of the following criteria;

Criterion 1: Any site with breeding Water Vole *Arvicola amphibius* or Otter *Lutra lutra*

Justification: To reflect national conservation status (both are Species of Principal Importance). Water Voles have declined dramatically across the UK and are now extinct in at least two counties. The Nottinghamshire population is thought to be important in the East Midlands, although there have still been dramatic reductions in both range and numbers over recent decades as a result of habitat loss and degradation. Otters are slowly expanding both range and population size in the County, however they remain vulnerable to habitat loss and degradation, and are vulnerable to collisions with cars, a number of substantial gaps in distribution remain in the county, and breeding sites are rare.

Criterion 2: Any site with breeding Red Deer *Cervus elaphus* (excluding parkland populations)

Justification: To reflect local scarcity and vulnerability. Although not a national conservation priority, wild red deer in Nottinghamshire are believed to be of a unique genotype, displaying an unusual antler formation, and have a restricted distribution.

Criterion 3: Any site where Harvest Mouse *Micromys minutus*, Dormouse *Muscardinus avellanarius* or Polecat *Mustela putorius* are present and considered likely to be breeding

Justification: To reflect national conservation status (all are Species of Principal Importance). Harvest Mice are scarcely distributed in the county and believed to have undergone significant decline, persisting in a few strongholds (mainly on nature reserves). Whilst historically native to the county, Dormice are currently found in only one woodland in Nottinghamshire, where they were reintroduced (but have now persisted for over 15 years and may colonise other areas over

time). Polecats have returned to the County in recent years but still have very limited distribution and remain a rare mammal.

Criterion 4: Any site where Yellow-necked Mouse *Apodemus flavicollis* is present and considered likely to be breeding

Justification: To reflect local rarity. This species is very rare in the Midlands and the North, and records from Nottinghamshire are currently unproven; however this species is included as there is a likelihood that it will be recorded in the future, particularly in response to the effects of climate change, as it is likely to spread northwards.

Criterion 5: Any site where three or more of the species listed in criteria 1-5 above are recorded but have not been proven to be breeding

Justification: To reflect sites with important assemblages of mammals.

Site mapping

- Sites will be mapped in line with the mapping rules for habitats set out section 7(d) of Part 1.
- For Water Vole, all contiguous lengths of watercourse holding evidence of breeding will be mapped as LWSs with the site boundary set 50 metres either side of the first up-stream and last down-stream record (or a lesser distance, where suitable habitat ceases to exist). The LWS will extend to 5m from the top of the bank and will cover both banks, and the intervening water.
- Where Water Voles are using standing waterbodies, those that are less than 2ha in size (ponds) will be included within the LWS boundary in their entirety, whilst in the case of those larger than 2ha in size (lakes), only those parts of the periphery used by Water Voles, to a distance of 50m either side of the outermost records, will be included within the LWS boundary (although where records occur all the way around a lake, then all peripheral areas will be included). In both cases, the LWS will extend to 5m from the water's edge.
- For Otter, all contiguous of lengths of watercourse either side of natural or artificial holts which are in use will be mapped as LWSs with the site boundary set 200 metres either side of the first up-stream and last down-stream record (or a lesser distance, where suitable habitat ceases to exist), or from a holt. The LWS will extend to 5m from the top of the bank and will cover both banks. Where holts are located within areas of woodland or scrub, these areas will be included within the LWS boundary.

Site survey and resurvey

- Sites will initially be mapped on the basis of survey results not more than 10 years old.

- Designated sites will be resurveyed every 10 years, to account for the generally low level of amateur surveying. Where a site cannot be surveyed within the specified survey programme, it will be assumed that the site still qualifies and will remain designated until it can be ascertained that it does not.

2.8 Moths

These criteria were accepted by the NEGDP on 18/03/2014

Originator: Dr Sheila Wright (Nottingham Museums Service)

Introduction

A wide-ranging study conducted by the Rothamstead Experimental Research Station over the 35 years between 1968 and 2003 (Fox et al 2006) revealed that two-thirds of British moth species had undergone a significant decline in population levels over that period, with half of these found to be in steep decline. The total number of moths was found to have declined by a third over the period of the study. Furthermore, there is anecdotal evidence to suggest that moths had already seriously declined prior to 1968 when the study began - due to the agricultural intensification that took place in much of the UK between the 1940's and early 1960's.

Together with other insects, moths are an important part of the ecosystem as food for insectivorous birds and mammals, as well as being important in their own right. Many species of moth are also excellent indicators of good habitat - the rarer ones often occurring only in areas that are valuable for other wildlife, too. Moths are also very vulnerable to the effects of isolation - those populations that remain only in isolated pockets of habitat surrounded by inhospitable land are prone to local extinction - and because of this isolation and the rarity of the species involved, they are unlikely to recolonise an area once lost. For these reasons, sites where rare moth species occur, and sites where a good assemblage of moth species occur, are covered by the designation criteria given below.

A total of 633 resident species of moth have been recorded from Nottinghamshire; of these, there are no post-1990 records for 68 species. All species of macro moth for which there are post-1990 records for Nottinghamshire (excluding migrants and vagrants) have been assigned a Nottinghamshire conservation status, in accordance with an assessment based upon a combination of their national conservation status and their recorded distribution within Nottinghamshire (Wright 2011). An extract from this publication, showing the grading system which has been devised, is given in Annex 1, and the moths to which the gradings apply are shown in Annexes 2 to 4.

Criteria

Sites in Nottinghamshire holding moths will be designated as LWSs where they meet one or more of the following criteria;

Criterion 1: Any site where at least one Grade 1 species has been recorded since 1990, and the site is considered likely to be supporting a resident breeding population of the species concerned

Justification: To reflect national and/or local rarity.

Criterion 2: Any site where at least two Grade 2 species have been recorded since 1990, and the site is considered likely to be supporting resident breeding populations of the species concerned

Justification: To reflect national and/or local rarity.

Criterion 3: Any site where at least ten Grade 3 (or one Grade 2 and at least nine Grade 3) species have been recorded since 1990, and the site is considered likely to be supporting resident breeding populations of the species concerned

Justification: To reflect national and/or local rarity.

Criterion 4: Any site where at least 275 resident UK species (including Nottinghamshire "Ungraded" species) have been recorded since 1990, and the site is considered likely to be supporting breeding populations of the species concerned

Justification: To reflect a diverse assemblage of moths.

Site mapping

- Sites will be mapped in line with the mapping rules for habitats set out section 7(d) of Part 1.

Site survey and resurvey

- Sites will initially be designated on the basis of survey results not more than 30 years old.
- Designated sites will be resurveyed at least once every 30 years, to account for the generally low level of amateur surveying and the fact that some species have short flight periods. When a site cannot be surveyed within the specified survey programme, it will be assumed that the site still qualifies and will remain designated until it can be ascertained that it does not.

References

Bradley, J.D. (2000). *Checklist of Lepidoptera Recorded from the British Isles*. Second Edition (Revised).

Fox, R., Conrad, K.F., Parsons, M.S., Warren, M.S. & Woiwod, I.P. (2006) The state of Britain's larger moths. Butterfly Conservation and Rothamsted Research, Wareham, Dorset. (<http://butterfly-conservation.org/files/sobm-final-version.pdf>)

Wright, S. (2011) The Conservation Status of Larger Moths in Nottinghamshire (3rd edition). Nottingham Natural History Museum, Wollaton Hall, Nottingham.

Annex 1 - The conservation grading system for the larger moths of Nottinghamshire

The assessment of the conservation status of each of the species of larger moth resident in Nottinghamshire takes into account both their national conservation status and their local rarity. This is because it is probably at least as important for us to protect nationally rare/local species which happen to be common in Nottinghamshire as it is to protect nationally common species which are nevertheless scarce in this county (many of our Nottinghamshire moths are both nationally and locally rare, of course).

Resident species have thus been assigned a Grade 1, 2, 3 conservation status in the county, or left ungraded, according to a combination of their national status and the frequency of their known occurrence within Nottinghamshire, as detailed below. Frequency is determined by the number of 10km squares in the county from which they have been recorded since 1990. Migrants have been excluded from consideration for conservation status, since it is probably safe to assume that their occurrence at a particular site will be casual and have no real bearing on the conservation value of that site. Further information relating to national conservation statuses can be found on the Joint Nature Conservation Committee website (<http://jncc.defra.gov.uk/page-3425>).

Grade 1: Includes all Red Data Book and Nationally Notable Group A species recorded in Nottinghamshire since 1990, together with all Nationally Notable Group B species recorded from five or fewer 10km squares in Nottinghamshire since 1990.

Grade 2: Includes all Nationally Notable Group B species recorded from more than five 10km squares in Nottinghamshire since 1990, together with all Nationally Local species recorded from five or fewer 10km squares in Nottinghamshire since 1990.

Grade 3: Includes all Nationally Local species recorded from more than five 10km squares in Nottinghamshire since 1990, together with all Nationally Common species recorded from five or fewer 10km squares in Nottinghamshire since 1990.

Ungraded: Includes all nationally common species recorded from more than five 10km squares in Nottinghamshire since 1990. (Although moths in this category

have no conservation status as individual species, they may still be important in conservation terms as part of the overall assemblage of moths at a site).

It should be noted that the current list of Grade 1, 2 and 3 moths is taken from Wright (2011), updated with small number of species recorded since 2011 (namely Goat, Poplar Lutestring, Small Seraphim, White-marked, Haworth's Minor, Silver Hook and Minor Shoulder-knot). A fully revised list of Grade 1, 2 and 3 moths will be produced in mid-2014.

Annex 2 - Grade 1 species

Ref.*	Common name	Scientific name	National Status
0374	Yellow-legged Clearwing	<i>Synanthedon vespiformis</i>	Nb
0376	Welsh Clearwing	<i>Synanthedon scoliaeformis</i>	RDB 3
0379	Red-belted Clearwing	<i>Synanthedon myopaeformis</i>	Nb
0380	Red-tipped Clearwing	<i>Synanthedon formicaeformis</i>	Nb
0381	Large Red-belted Clearwing	<i>Synanthedon culiciformis</i>	Nb
0162	Goat	<i>Cossus cossus</i>	Nb
1633	Small Eggar	<i>Eriogaster lanestris</i>	Nb
1679	False Mocha	<i>Cyclophora porata</i>	Nb
1721	Balsam Carpet	<i>Xanthorhoe biriviata</i>	Na
1822	Marsh Carpet	<i>Perizoma sagittata</i>	Na
1820	Pinion-spotted Pug	<i>Eupithecia insigniata</i>	Nb
1821	Valerian Pug	<i>Eupithecia valerianata</i>	Nb
1822	Marsh Pug	<i>Eupithecia pygmaeata</i>	Nb
1824	Pauper(Fletcher's)Pug	<i>Eupithecia egenaria</i>	RDB 3
1836	Campanula Pug	<i>Eupithecia denotata</i>	Na
1863	Dentated Pug	<i>Anticollix sparsata</i>	Na
1943	Great Oak Beauty	<i>Boarmia roboraria</i>	Nb
1983	Broad- bordered Bee Hawk-moth	<i>Hemaris fuciformis</i>	Nb
2017	Small Chocolate-tip	<i>Clostera pigra</i>	Nb
2025	Scarce Vapourer	<i>Orgyia recens</i>	RDB 2
2131	Square-spotted Clay	<i>Xestia rhomboidea</i>	Nb
2152	White Colon	<i>Sideridis albicolon</i>	Nb
2211	The Wormwood	<i>Cucullia absinthii</i>	Nb
2465	The Four-spotted	<i>Tyta luctuosa</i>	Na
2475	Waved Black	<i>Parascotia fuliginaria</i>	Nb

Annex 3 - Grade 2 species

Ref.*	Common name	Scientific name	National Status
0163	The Forester	<i>Adscita statices</i>	Local
0373	Currant Clearwing	<i>Synanthedon tipuliformis</i>	Nb
0382	Six-belted Clearwing	<i>Bembecia ichneumoniformis</i>	Nb
1647	Barred Hook-tip	<i>Drepana cultraria</i>	Local
1655	Poplar Lutestring	<i>Tethea or</i>	Local

1660	Frosted Green	<i>Polyphoca ridens</i>	Local
1661	Orange Underwing	<i>Archiearis parthenias</i>	Local
1667	Blotched Emerald	<i>Comibaena bajularia</i>	Local
1673	Small Emerald	<i>Hemistola chrysoprasaria</i>	Local
1677	Birch Mocha	<i>Cyclophora albipunctata</i>	Local
1692	Lesser Cream Wave	<i>Scopula immutata</i>	Local
1739	Wood Carpet	<i>Epirrhoe rivata</i>	Local
1740	Galium Carpet	<i>Epirrhoe galiata</i>	Local
1761	Autumn Green Carpet	<i>Chloroclysta miata</i>	Local
1779	Ruddy Highflyer	<i>Hydriomena ruberata</i>	Local
1788	Scarce Tissue	<i>Rheumaptera cervinalis</i>	Local
1790	The Tissue	<i>Triphosa dubitata</i>	Local
1791	Brown Scallop	<i>Philereme vetulata</i>	Local
1807	Grass Rivulet	<i>Perizoma albulata</i>	Local
1813	Haworth's Pug	<i>Eupithecia haworthiata</i>	Local
1823	Netted Pug	<i>Eupithecia venosata</i>	Local
1826	Triple-spotted Pug	<i>Eupithecia trisignaria</i>	Local
1828	Satyr Pug	<i>Eupithecia satyrata</i>	Local
1831	Ling Pug	<i>Eupithecia f.goossensiata</i>	Local
1840	Shaded Pug	<i>Eupithecia subumbrata</i>	Local
1842	Plain Pug	<i>Eupithecia simpliciata</i>	Local
1874	Dingy Shell	<i>Euchoeca nebulata</i>	Local
1882	Small Seraphim	<i>Pterapherapteryx sexalata</i>	Local
1889	Peacock Moth	<i>Semiothisa notata</i>	Local
1897	The V-moth	<i>Semiothisa wauaria</i>	Local
1918	Lunar Thorn	<i>Selenia lunularia</i>	Local
1925	Small Brindled Beauty	<i>Apocheima hispidaria</i>	Local
1964	The Annulet	<i>Gnophos obscurata</i>	Local
1970	Grass Wave	<i>Perconia strigillaria</i>	Local
1996	Alder Kitten	<i>Furcula bicuspis</i>	Local
2010	Scarce Prominent	<i>Odontosia carmelita</i>	Local
2014	Marbled Brown	<i>Drymonia dodonaea</i>	Local
2033	Black Arches	<i>Lymantria monacha</i>	Local
2035	Round-winged Muslin	<i>Thumatha senex</i>	Local
2037	Rosy Footman	<i>Miltochrista miniata</i>	Local
2038	Muslin Footman	<i>Nudaria mundana</i>	Local
2039	Red-necked Footman	<i>Atolmis rubricollis</i>	Local
2059	Clouded Buff	<i>Diacrisia sannio</i>	Local
2085	Archer's Dart	<i>Agrotis vestigialis</i>	Local
2104	Northern Rustic	<i>Standfussiana lucernea</i>	Local
2105	Dotted Rustic	<i>Rhyacia simulans</i>	Local
2113	Stout Dart	<i>Spaelotis ravidata</i>	Local
2121	Barred Chestnut	<i>Diarsia dahlii</i>	Local
2140	White-marked	<i>Cerastis leucographa</i>	Local
2156	Beautiful Brocade	<i>Lacanobia contigua</i>	Local
2159	Dog's Tooth	<i>Lacanobia suasa</i>	Local
2162	Glaucous Shears	<i>Papestra biren</i>	Local
2171	Marbled Coronet	<i>Hadena confusa</i>	Local

2185	Lead-coloured Drab	<i>Orthosia populeti</i>	Local
2196	Striped Wainscot	<i>Mythimna pudorina</i>	Local
2204	Obscure Wainscot	<i>Mythimna obsoleta</i>	Local
2214	Chamomile Shark	<i>Cucullia chamomillae</i>	Local
2229	Brindled Ochre	<i>Dasypolia templi</i>	Local
2235	Tawny Pinion	<i>Lithophane semibrunnea</i>	Local
2241	Red Swordgrass	<i>Xylena vetusta</i>	Local
2252	Large Ranunculus	<i>Polymixis flavicincta</i>	Local
2275	Dusky-lemon Sallow	<i>Xanthia gilvago</i>	Local
2291	Coronet	<i>Craniophora ligustri</i>	Local
2313	Angle-striped Sallow	<i>Enargia paleacea</i>	Nb
2316	Lesser-spotted Pinion	<i>Cosmia affinis</i>	Local
2319	Lunar-spotted Pinion	<i>Cosmia pyralina</i>	Local
2357	Large Ear	<i>Amphipoea lucens</i>	Local
2358	Saltern Ear	<i>Amphipoea fucosa</i>	Local
2362	Butterbur	<i>Hydraecia petasitis</i>	Local
2367	Haworth's Minor	<i>Celaena haworthii</i>	Local
2371	Brown-veined Wainscot	<i>Archanara dissoluta</i>	Local
2379	Small Rufous	<i>Coenobia rufa</i>	Local
2391	Silky Wainscot	<i>Chilodes maritimus</i>	Local
2394	The Anomalous	<i>Stilbia anomala</i>	Local
2399	Bordered Sallow	<i>Pyrrhia umbra</i>	Local
2412	Silver Hook	<i>Deltote uncula</i>	Local
2418	Cream-bordered Green Pea	<i>Earias clorana</i>	Nb
2476	Beautiful Snout	<i>Hypena crassalis</i>	Local
2484	Pinion-streaked Snout	<i>Schrankia costaestrigalis</i>	Local

Annex 4 - Grade 3 species

Ref.*	Common name	Scientific name	National Status
0016	Gold Swift	<i>Hepialus hecta</i>	Local
0018	Map-winged Swift	<i>Hepialus fusconebulosa</i>	Local
0371	Lunar Hornet Moth	<i>Sesia bembeciformis</i>	Common
1665	Grass Emerald	<i>Pseudoterpna pruinata</i>	Common
1680	Maiden's Blush	<i>Cyclophora punctaria</i>	Local
1681	Clay Triple-lines	<i>Cyclophora linearia</i>	Local
1693	Cream Wave	<i>Scopula floslactata</i>	Local
1705	Dwarf Cream Wave	<i>Idaea fuscovenosa</i>	Local
1712	Small Scallop	<i>Idaea emarginata</i>	Local
1715	Plain Wave	<i>Idaea straminata</i>	Local
1726	Large Twin-spot Carpet	<i>Xanthorhoe quadrifasciata</i>	Local
1754	The Phoenix	<i>Eulithis prunata</i>	Common
1756	Northern Spinach	<i>Eulithis populata</i>	Common
1766	Blue-bordered Carpet	<i>Plemyria rubiginata</i>	Common
1775	Mottled Grey	<i>Colostigia multistrigaria</i>	Common
1781	Small Waved Umber	<i>Horisma vitalbata</i>	Common
1782	The Fern	<i>Horisme tersata</i>	Common

1789	Scallop Shell	<i>Rheumaptera undulata</i>	Local
1792	Dark Umber	<i>Philereme transversata</i>	Local
1804	Barred Rivulet	<i>Perizoma bifaciata</i>	Local
1812	Maple Pug	<i>Eupithecia inturbata</i>	Local
1835	White-spotted Pug	<i>Eupithecia tripunctaria</i>	Local
1851	Golden-rod Pug	<i>Eupithecia virgaureata</i>	Local
1875	Small White Wave	<i>Asthena abulata</i>	Common
1879	The Seraphim	<i>Lobophora halterata</i>	Local
1883	Yellow-barred Brindle	<i>Acasis viretata</i>	Local
1885	Clouded Magpie	<i>Abraxas sylvata</i>	Local
1888	Scorched Carpet	<i>Ligdia adustata</i>	Local
1904	Scorched Wing	<i>Plagodis dolabraria</i>	Local
1910	Lilac Beauty	<i>Apeira syringaria</i>	Local
1912	August Thorn	<i>Ennomos quercinaria</i>	Local
1944	Pale Oak Beauty	<i>Serraca punctinalis</i>	Common
1978	Pine Hawk-moth	<i>Hyloicus pinastri</i>	Local
1992	Small Elephant Hawk-moth	<i>Deilephila porcellus</i>	Local
1998	Poplar Kitten	<i>Furcula bifida</i>	Local
2019	Chocolate-tip	<i>Clostera curtula</i>	Local
2020	Figure of Eight	<i>Diloba caerulecephala</i>	Common
2031	White Satin	<i>Leucoma salicis</i>	Local
2043	Orange Footman	<i>Eilema sororcula</i>	Local
2047	Scarce Footman	<i>Eilema complana</i>	Local
2049	Buff Footman	<i>Eilema deplana</i>	Local
2078	Least Black Arches	<i>Nola confusalis</i>	Local
2114	Double Dart	<i>Graphiophora augur</i>	Common
2135	Heath Rustic	<i>Xestia agathina agathina</i>	Local
2136	The Gothic	<i>Naenia typica</i>	Local
2142	Beautiful Yellow Underwing	<i>Anarta myrtilli</i>	Common
2167	Tawny Shears	<i>Hadena perplexa perplexa</i>	Common
2197	Southern Wainscot	<i>Mythimna straminea</i>	Local
2225	Minor Shoulder-knot	<i>Brachylomia viminalis</i>	Common
2227	The Sprawler	<i>Asteroscopus sphinx</i>	Common
2236	Pale Pinion	<i>Lithophane socia</i>	Local
2250	Dark Brocade	<i>Mniotype adusta</i>	Common
2279	Sycamore	<i>Acronicta aceris</i>	Local
2281	Alder Moth	<i>Acronicta alni</i>	Local
2300	Old Lady	<i>Mormo maura</i>	Local
2301	Bird's Wing	<i>Dypterygia scabriuscula</i>	Local
2312	The Olive	<i>Ipimorpha subtusa</i>	Local
2268	The Suspected	<i>Parastichtis suspecta</i>	Local
2314	Dingy Shears	<i>Parastichtis ypsilon</i>	Local
2333	Large Nutmeg	<i>Apamea anceps</i>	Local
2338	Rufous Minor	<i>Oligia versicolor</i>	Local
2368	The Crescent	<i>Celaena leucostigma</i>	Local
2370	Twin-spotted Wainscot	<i>Archanara geminipuncta</i>	Local
2377	Fen Wainscot	<i>Arenostola phragmitidis</i>	Local
2384	Vine's Rustic	<i>Hoplodrina ambigua</i>	Local

2397	Small Yellow Underwing	<i>Panemeria tenebrata</i>	Local
2421	Scarce Silver-lines	<i>Bena bicolorana</i>	Local
2444	Gold Spangle	<i>Autographa bractea</i>	Common
2423	Oak Nycteoline	<i>Nycteola revayana</i>	Local
2449	Dark Spectacle	<i>Abrostola trigenina</i>	Common
2466	The Blackneck	<i>Lygephila pastinum</i>	Local
2473	Beautiful Hook-tip	<i>Laspeyria flexula</i>	Local

*Reference numbers are those used in Bradley, J.D. (2000).

2.9 Water beetles and water bugs

These criteria were accepted by the NEGDP on 18/03/2014

Originator: Robert Merritt (county recorder for water beetles and water bugs)

Introduction

Water beetles (Coleoptera), as a group, possess a range of attributes that make them well-suited for the evaluation of the conservation status of wetlands: they occupy an almost complete range of wetland habitats, and distinct ecological communities can be identified; they are a relatively large group of insects but with not so many species as to hamper investigation; adult beetles of most species can be found throughout the year; a modern key to identification is available (Foster & Friday 2011); the biology and distribution of most species is well-understood, and they include many predators - a fact considered by some authors to be an important indicator of environmental quality. The presence of certain species of water beetle can reveal conservation interest in places where there is little floristic diversity and from which more conspicuous insects such as dragonflies are rare or absent.

Whilst water bugs (Hemiptera) lack many of the attributes outlined above for water beetles, they are nevertheless an important component of the invertebrate fauna of many wetland sites. Some species of water bug can be extremely abundant at individual sites, particularly in shallow open water, and must play a significant role in the food chain. Other species are ecologically important for being keystone predators, especially when they occupy small, enclosed waterbodies.

The designation of LWSs 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. It is emphasised here that the published lists of noteworthy sites also included sites which had been mentioned in the text of the publication. The lists should not be interpreted as being candidate LWSs. It should be noted that there are two species of water beetle that have been found in Nottinghamshire by the author since the publication of the Atlas, namely *Acilius canaliculatus* and *Agabus labiatus*, both at a Nottinghamshire Wildlife Trust reserve on former MOD land in the north of the county.

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 LWSs 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 Nottinghamshire'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 nor a Near Threatened status.

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

- Rare = a species recorded in 30 hectads or fewer (water bugs only)
- Scarce = a species recorded in 31-100 hectads (water bugs only)
- Local A = a species recorded in 101-200 hectads
- Local B = a species recorded in 201-400 hectads
- Common = a species recorded in 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 immediately 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). It is the author's opinion that many of the datasets posted on the NBN Gateway contain data that have been insufficiently validated, including those from some national institutions, e.g. Natural England's Invertebrate Site Register.

Criteria

Sites in Nottinghamshire holding water beetles and water bugs will be designated as LWSs where they meet one or more of the following criteria:

Criterion 1: Any site at which a Near Threatened or Nationally Scarce species of water beetle, or a Rare or Scarce species of water bug, has been recorded (with reference to Annex 1 and Annex 2)

Justification: To reflect national rarity and/or threat.

Criterion 2: Any site at which at least 3 Local A and 5 Local B species of water beetle or 2 Local A and 4 Local B species of water bug have been recorded (with reference to Annex 1 and Annex 2)

Justification: To reflect an assemblage of nationally local species, some of which have a high local conservation interest.

Criterion 3: Any site possessing a Local A or Local B species which has been found at 4 or fewer sites in Nottinghamshire (with reference to Annex 1 and Annex 2)

Justification: To reflect county rarity.

Criterion 4: Any site at which at least 32 species of water beetle or 15 species of water bug have been recorded (with reference to Annexes 1 to 4)

Justification: To reflect a diverse water beetle/bug assemblage.

Site mapping

- Sites will be mapped in line with the mapping rules for habitats set out section 7(d) of Part 1.
- For species occurring in watercourses, all contiguous lengths of watercourse with multiple records will be mapped as LWSs, with the site boundary set 100 metres either side of the first up-stream and last down-stream record (or a lesser distance, where suitable habitat ceases to exist).
- Where a single record comes from a watercourse, all habitat 100 metres up- and down-stream of that record will be mapped as an LWS.

Site survey and resurvey

- Sites will initially be designated on the basis of survey results not more than twenty years old.
- Designated sites will be resurveyed every ten years, to account for the specialised nature of water beetle and water bug surveying. The resurvey should entail a minimum of two visits in one year, at least three months apart (preferably four). When a site cannot be surveyed within the specified survey

programme, it will be assumed that the site still qualifies and will remain designated until it can be ascertained that it does not.

- Resurveyed sites where a single individual of a Near Threatened or Nationally Scarce water beetle or of a Rare or Scarce water bug (see criterion 1), or of a county rarity of either water beetle or water bug (see criterion 3), was recorded on a single date only, and for the first time, should be revisited prior to redesignation in order to confirm a regular presence. For such species recorded as singletons during the initial survey prior to the original designation, the presence of a single individual during the resurvey will be taken as confirmation of a regular presence.
- Sites that are clearly of a temporary nature will not be considered for designation (e.g. puddles, some pools) even though they may be host to certain pioneer species listed in Annex 1 or Annex 2.

References

Foster, G.N. (2010). A review of the scarce and threatened Coleoptera of Great Britain Part (3): Water beetles of Great Britain. Species status 1. Joint Nature Conservation Committee, Peterborough.
http://jncc.defra.gov.uk/PDF/JNCC_WEB_Waterbeetle%20Review%20No1%20Part3%20Aug%202010_2.pdf

Foster, G.N. & Friday L.E. (2011) RES Handbook Volume 4, Part 5: Keys to adults of the water beetles of Britain and Ireland (Part 1). Royal Entomological Society, St Albans.

Merritt, R. (2006). Atlas of the Water Beetles (Coleoptera) and Water Bugs (Hemiptera) of Derbyshire, Nottinghamshire, and South Yorkshire, 1993 – 2005. Sorby Record Special Series 14. Sorby Natural History Society, Sheffield.

Annex 1 - Water beetles (Coleoptera) relevant to criteria 1-4

Species	National status
<i>Acilius canaliculatus</i>	Nationally Scarce
<i>Acilius sulcatus</i>	Local B
<i>Agabus affinis</i>	Local B
<i>Agabus biguttatus</i>	Nationally Scarce
<i>Agabus conspersus</i>	Nationally Scarce
<i>Agabus didymus</i>	Local B
<i>Agabus labiatus</i>	Near Threatened
<i>Agabus uliginosus</i>	Near Threatened
<i>Agabus unguicularis</i>	Local A
<i>Anacaena bipustulata</i>	Local B
<i>Berosus signaticollis</i>	Local A
<i>Brychius elevatus</i>	Local A

<i>Cercyon bifenestratus</i>	Nationally Scarce
<i>Cercyon convexiusculus</i>	Local B
<i>Cercyon marinus</i>	Local A
<i>Cercyon sternalis</i>	Local A
<i>Cercyon tristis</i>	Local B
<i>Cercyon ustulatus</i>	Local B
<i>Chaetarthria seminulum</i>	Nationally Scarce
<i>Coelostoma orbiculare</i>	Local B
<i>Cymbiodyta marginellus</i>	Local B
<i>Dryops ernesti</i>	Local A
<i>Dytiscus circumcinctus</i>	Nationally Scarce
<i>Dytiscus circumflexus</i>	Local A
<i>Dytiscus semisulcatus</i>	Local B
<i>Enicocerus exsculptus</i>	Nationally Scarce
<i>Enochrus halophilus</i>	Nationally Scarce
<i>Enochrus melanocephalus</i>	Local A
<i>Enochrus quadripunctatus</i>	Nationally Scarce
<i>Enochrus testaceus</i>	Local B
<i>Graptodytes granularis</i>	Local A
<i>Graptodytes pictus</i>	Local B
<i>Gyrinus distinctus</i>	Nationally Scarce
<i>Gyrinus marinus</i>	Local B
<i>Gyrinus paykulli</i>	Nationally Scarce
<i>Gyrinus urinator</i>	Local A
<i>Haliphus confinis</i>	Local B
<i>Haliphus flavicollis</i>	Local B
<i>Haliphus fulvus</i>	Local B
<i>Haliphus heydeni</i>	Local A
<i>Haliphus laminatus</i>	Local A
<i>Haliphus lineolatus</i>	Local B
<i>Haliphus mucronatus</i>	Nationally Scarce
<i>Haliphus obliquus</i>	Local B
<i>Helochares lividus</i>	Local B
<i>Helochares punctatus</i>	Nationally Scarce
<i>Helophorus arvernicus</i>	Local A
<i>Helophorus dorsalis</i>	Nationally Scarce
<i>Helophorus griseus</i>	Local B
<i>Helophorus longitarsis</i>	Nationally Scarce
<i>Helophorus nanus</i>	Nationally Scarce
<i>Helophorus strigifrons</i>	Nationally Scarce
<i>Hydraena britteni</i>	Local A
<i>Hydraena nigrita</i>	Local A
<i>Hydraena testacea</i>	Local B
<i>Hydrochus elongatus</i>	Near Threatened

<i>Hydroglyphus geminus</i>	Local B
<i>Hydroporus melanarius</i>	Local B
<i>Hydroporus neglectus</i>	Nationally Scarce
<i>Hydroporus obsoletus</i>	Nationally Scarce
<i>Hydroporus striola</i>	Local B
<i>Hygrobia hermanni</i>	Local B
<i>Hygrotus confluens</i>	Local B
<i>Hygrotus nigrolineatus</i>	Nationally Scarce
<i>Hygrotus quinquelineatus</i>	Nationally Scarce
<i>Hygrotus versicolor</i>	Local B
<i>Ilybius chalconatus</i>	Local A
<i>Ilybius fenestratus</i>	Local A
<i>Ilybius montanus</i>	Local B
<i>Ilybius quadriguttatus</i>	Local B
<i>Ilybius subaeneus</i>	Nationally Scarce
<i>Laccobius colon</i>	Local B
<i>Laccobius sinuatus</i>	Local B
<i>Laccobius striatulus</i>	Local B
<i>Laccophilus hyalinus</i>	Local B
<i>Limnebius nitidus</i>	Local A
<i>Limnebius papposus</i>	Near Threatened
<i>Liopterus haemorrhoidalis</i>	Local B
<i>Nebrioporus assimilis</i>	Local B
<i>Noterus crassicornis</i>	Nationally Scarce
<i>Ochthebius bicolon</i>	Local A
<i>Ochthebius dilatatus</i>	Local B
<i>Orectochilus villosus</i>	Local A
<i>Oulimnius major</i>	Nationally Scarce
<i>Oulimnius rivularis</i>	Nationally Scarce
<i>Porhydrus lineatus</i>	Local A
<i>Rhantus exsoletus</i>	Local B
<i>Rhantus grapii</i>	Local A
<i>Rhantus suturalis</i>	Local B
<i>Riolus subviolaceus</i>	Nationally Scarce
<i>Scarodytes halensis</i>	Nationally Scarce
<i>Strictionectes lepidus</i>	Near Threatened
<i>Suphrodytes dorsalis</i>	Local B

Annex 2 - Water bugs (Hemiptera) relevant to criteria 1-4

Species	National status
<i>Aphelocheirus aestivalis</i>	Local B
<i>Arctocorisa germari</i>	Local A
<i>Corixa dentipes</i>	Local A
<i>Corixa panzeri</i>	Local B

<i>Cymatia bonzdorffii</i>	Local B
<i>Cymatia coleoptrata</i>	Local B
<i>Gerris lateralis</i>	Local A
<i>Mesovelia furcata</i>	Scarce
<i>Micronecta poweri</i>	Local A
<i>Micronecta scholtzi</i>	Local A
<i>Notonecta maculata</i>	Local B
<i>Notonecta obliqua</i>	Local B
<i>Notonecta viridis</i>	Local B
<i>Paracorixa concinna</i>	Local B
<i>Ranatra linearis</i>	Local B
<i>Sigara limitata</i>	Local A
<i>Sigara scotti</i>	Local B
<i>Sigara semistriata</i>	Local A
<i>Sigara venusta</i>	Local A

Annex 3 - Water beetles (Coleoptera) relevant only to criterion 4

Species	National status
<i>Agabus bipustulatus</i>	Common
<i>Agabus guttatus</i>	Common
<i>Agabus nebulosus</i>	Common
<i>Agabus paludosus</i>	Common
<i>Agabus sturmii</i>	Common
<i>Anacaena globulus</i>	Common
<i>Anacaena limbata</i>	Common
<i>Anacaena lutescens</i>	Common
<i>Colymbetes fuscus</i>	Common
<i>Dryops luridus</i>	Common
<i>Dytiscus marginalis</i>	Common
<i>Elmis aenea</i>	Common
<i>Gyrinus substriatus</i>	Common
<i>Haliphus fluviatilis</i>	Common
<i>Haliphus immaculatus</i>	Common
<i>Haliphus lineatocollis</i>	Common
<i>Haliphus ruficollis</i>	Common
<i>Haliphus sibiricus</i>	Common
<i>Helophorus aequalis</i>	Common
<i>Helophorus brevipalpis</i>	Common
<i>Helophorus flavipes</i>	Common
<i>Helophorus grandis</i>	Common
<i>Helophorus minutus</i>	Common
<i>Helophorus obscurus</i>	Common
<i>Hydraena gracilis</i>	Common
<i>Hydraena riparia</i>	Common

<i>Hydrobius fuscipes</i>	Common
<i>Hydroporus angustatus</i>	Common
<i>Hydroporus discretus</i>	Common
<i>Hydroporus erythrocephalus</i>	Common
<i>Hydroporus gyllenhalii</i>	Common
<i>Hydroporus incognitus</i>	Common
<i>Hydroporus memnonius</i>	Common
<i>Hydroporus nigrita</i>	Common
<i>Hydroporus palustris</i>	Common
<i>Hydroporus planus</i>	Common
<i>Hydroporus pubescens</i>	Common
<i>Hydroporus tessellatus</i>	Common
<i>Hydroporus tristis</i>	Common
<i>Hygrotus impressopunctatus</i>	Common
<i>Hygrotus inaequalis</i>	Common
<i>Hyphydrus ovatus</i>	Common
<i>Ilybius ater</i>	Common
<i>Ilybius fuliginosus</i>	Common
<i>Laccobius bipunctatus</i>	Common
<i>Laccobius minutus</i>	Common
<i>Laccophilus minutus</i>	Common
<i>Limnebius truncatellus</i>	Common
<i>Limnius volckmari</i>	Common
<i>Nebrioporus elegans</i>	Common
<i>Noterus clavicornis</i>	Common
<i>Ochthebius minimus</i>	Common
<i>Oreodytes sanmarkii</i>	Common
<i>Oulimnius tuberculatus</i>	Common
<i>Platambus maculatus</i>	Common
<i>Stictotarsus duodecimpustulatus</i>	Common

Annex 4 - Water bugs (Hemiptera) relevant only to criterion 4

Species	National status
<i>Callicorixa praeusta</i>	Common
<i>Corixa punctata</i>	Common
<i>Gerris lacustris</i>	Common
<i>Gerris odontogaster</i>	Common
<i>Gerris thoracicus</i>	Common
<i>Hesperocorixa linnaei</i>	Common
<i>Hesperocorixa sahlbergi</i>	Common
<i>Hydrometra stagnorum</i>	Common
<i>Ilyocoris cimicoides</i>	Common
<i>Limnoporus rufoscutellatus</i>	Migrant
<i>Microvelia reticulata</i>	Common

<i>Nepa cinerea</i>	Common
<i>Notonecta glauca</i>	Common
<i>Plea minutissima</i>	Common
<i>Sigara distincta</i>	Common
<i>Sigara dorsalis</i>	Common
<i>Sigara falleni</i>	Common
<i>Sigara fossarum</i>	Common
<i>Sigara lateralis</i>	Common
<i>Sigara nigrolineata</i>	Common
<i>Velia caprai</i>	Common

N.B. These annexes (1-4) comprise all species which have been reliably recorded in Nottinghamshire since 1950.

2.10 White-clawed Crayfish

These criteria were accepted by the NEGDP on 18/03/2014

Originator: Dr David Holdich (Crayfish Survey & Research, Peak Ecology Ltd., Bakewell)

Introduction

The White-clawed Crayfish *Austropotamobius pallipes* is considered endangered at both national and European level due to the impact of alien crayfish of North American origin (especially the Signal Crayfish *Pacifastacus leniusculus*). Not only do these out-compete the White-clawed Crayfish but they harbour a fungal disease, crayfish plague, which is lethal to all European crayfish. For this reason the White-clawed Crayfish is protected through the European Habitats Directive, and the UK Wildlife & Countryside Act, and it is a Species of Principal Importance.

Populations in the UK have been declining in England since the 1980s and they now occupy fewer 10 km² squares than the alien crayfish. The strongholds for the remaining populations are central and northern England but many of these are under threat. It is therefore important to protect all remaining sites.

In Nottinghamshire, the White-clawed Crayfish is common in a number of sites north of the River Trent, particularly in the catchment of the River Leen, e.g. Newstead Abbey (including the Garden Lake) and Papplewick, and it is common in Bestwood Ponds (Holdich & Jackson 2011). It has also been recorded in the outflowing stream (Nethergreen Brook) of Moorgreen Reservoir; in Beauvale Brook, Eastwood; and in some streams in and around Hucknall. A berried female was found in the upper River Erewash in 2009. In the River Maun catchment it is found in Cauldwell Brook and some associated ponds. It has also been found in the River Ryton catchment but records have not been confirmed in recent years. It does not occur south of the River Trent in Nottinghamshire but is common in parts of Leicestershire.

White-clawed Crayfish habitat is very variable. Crayfish are usually associated with small to medium sized streams and rivers with plenty of refuges in the form of rocks and boulders, tree roots and organic debris, and moderately-sized lakes with plenty of refuges in the form of tree roots, rocks, logs, piers etc., and in small, medium and large reservoirs with similar habitat. They can also occur in deep, flooded quarries. They usually do not occur in water bodies that could be considered as ponds. They are also found associated with muddy habitats in some canals, and occasionally they are found burrowing into clayey riverbanks. Recently, White-clawed Crayfish have been found capable of occupying very muddy streams/rivers as long as there is plenty of cover in the form of tree roots.

As far as alien crayfish are concerned only two are known from Nottinghamshire, the Signal Crayfish and the Spiny-cheek Crayfish *Orconectes limosus*, both from North America. Both of these can carry crayfish plague and are serious competitors for resources with the White-clawed Crayfish. Spiny-cheek Crayfish are so far only known from Clifton Pond at the Attenborough Nature Reserve. The Spiny-cheek Crayfish are likely to spread into other ponds at Attenborough and into the R. Trent, either naturally or human-mediated means. Signal Crayfish are present in the east of the county, where they have been known since the mid-1980s. Populations mainly occur in the River Greet (Southwell), but are also found around Lowdham, Halam, Kelham, Syerston and Newark. Dead individuals have been found in the R. Trent at Farndon. One of unknown origin was found near Papplewick in 2009.

Criteria

Sites in Nottinghamshire holding White-clawed Crayfish will be designated as LWSs where they meet the following criteria:

Criterion 1: Any site where White-clawed Crayfish *Austropotamobius pallipes* are present and considered likely to be breeding

Justification: to reflect national and local rarity and threatened status. White-clawed Crayfish is also a Species of Principal Importance.

Site mapping

- All contiguous lengths of watercourse with multiple White-clawed Crayfish records will be mapped as LWSs, with the site boundary set 250 metres either side of the first up-stream and last down-stream record (or a lesser distance, where suitable habitat ceases to exist)
- Where a single White-clawed Crayfish record comes from a watercourse, all habitat 250 metres up- and down-stream of that record will be mapped as an LWS
- Any single or linked waterbodies with White-clawed Crayfish records will be mapped as an LWS

Site survey and resurvey

- Sites will initially be designated on the basis of survey results not more than 10 years old.
- Designated sites will be resurveyed every 10 years to account for the specialised nature of crayfish surveys. When a site cannot be surveyed within the specified survey programme, it will be assumed that the site still qualifies and will remain designated until it can be ascertained that it does not.

References

Holdich, D.M. & Jackson, C. (2011) The Crayfish of Nottinghamshire, in Rees, M., Nightingale J. & Holdich D.M. (eds) Species Survival: Securing white-clawed crayfish in a changing environment. Proceedings of a conference held on 16th and 17th November 2010 in Bristol, UK.
(http://www.nottsbag.org.uk/pdfs/CrayfishofNottinghamshire_HoldichandJackson_2011website.pdf)

2.11 Grassland fungi

These criteria were accepted by the NEGDP on 18/03/2014

Originators: Steve Clifton (Natural England) & the Nottinghamshire Fungi Group

Introduction

Fungi form a rich and varied part of our natural history but many species of grassland fungi are rare or endangered and require conservation action to ensure their survival. Many traditionally-managed grasslands have a rich fungal flora, but changes to land management practices means that grasslands that are important for their fungi have become very scarce on a European scale and it is increasingly being recognised that the UK is of exceptional importance for grassland fungi.

Some of the most distinctive and characteristic fungi found in these habitats are the waxcaps (*Hygrocybe*), which are usually brightly coloured including species that are pink, green, violet and every shade from yellow through to deep crimson. They have thick waxy gills, moist brittle flesh and a waxy, sticky or slimy cap. For this reason these sites are commonly known as 'waxcap-grasslands'. Some other species that often occur alongside the waxcaps in these habitats include the fairy clubs (*Clavariaceae*), the earth tongues (*Geoglossaceae*) and the pink-gills (*Entolomataceae*).

Almost without exception the best grassland sites for fungi are well drained, have a short turf, a well-defined bryophyte layer and a low availability of nitrogen. Old agriculturally unimproved pastures, traditionally managed old lawns and sympathetically managed churchyards can all be potentially good sites. Fungi-rich pastures are typically well-grazed whilst the turf of old lawns, churchyards and parks may be kept short by regular mowing. Neutral, acid and calcareous grasslands, as well as grass-heaths, may all have a rich waxcap-grassland flora.

Often fungi-rich grasslands are botanically poor and sometimes appear to be of low conservation value when looking at their associated plants and animals. Unless the importance of the fungi is known at these sites there is a danger that they may be lost or irreversibly damaged as a result of changes in management, such as the application of fertilisers, lawn treatments and moss killers, and insufficient grazing or mowing. These sites may also be inadvertently damaged in an attempt to improve their value for other biodiversity. Once damaged, it is extremely difficult, if not impossible, to restore these habitats. Very few county-wide surveys have been undertaken for this type of grassland and as a result, important sites for grassland fungi are often overlooked and rarely recognised in the Local Wildlife Site series. The development of LWS selection criteria for this group seeks to address this.

Several different systems have been developed to date to help determine the relative mycological value of fungi-rich grassland. It is generally accepted that the number of waxcap species recorded can be used as an indication of site value. Additionally, the value of a site can be measured by the presence of rare or endangered species, belonging to the groups mentioned above, and by a diverse range of rare and/or characteristic species that are likely to be good habitat quality indicators. The criteria presented below use a combination of these attributes.

Criteria

Sites in Nottinghamshire holding grassland fungi will be designated as LWSs where they meet one or more of the following criteria;

- Criterion 1: Any site supporting any grassland-associated fungus that is:**
- a) listed in the Provisional and Preliminary Red Data Lists of British Fungi**
 - b) listed in Schedule 8 of the Wildlife and Countryside Act 1981 (as amended); or**
 - c) listed as a Species of Principal Importance**

Justification: To reflect national rarity. The relevant Red Lists are contained in Ing (1992) and Evans et al (2006), whilst Schedule 8 of the Wildlife and Countryside Act is available on the Joint Nature Conservation Committee website (http://jncc.defra.gov.uk/PDF/waca1981_schedule8.pdf).

- Criterion 2: Any site supporting at least 5 species of *Hygrocybe* listed in Annex 1, or a total of at least 8 species from the four key groups listed in Annex 1**

Justification: To reflect a diverse assemblage of characteristic species.

- Criterion 3: Any site supporting a grassland-associated fungus known from 3 or fewer localities in the county according to the Nottinghamshire Fungi Group database**

Justification: To reflect local rarity.

Site mapping

- Sites will be mapped in line with the mapping rules for habitats set out section 7(d) of Part 1.

Site survey and resurvey

- Sites will initially be designated on the basis of survey results not more than 10 years old.
- Designated sites will be resurveyed every 10 years, to account for the unpredictability of fungal fruiting and for the specialised nature of fungi surveying. When a site cannot be surveyed within the specified survey programme, it will be assumed that the site still qualifies and will remain designated until it can be ascertained that it does not.

References

Evans, S., Henrici, A. & Ing, B. (2006) Preliminary Assessment: The Red Data List of Threatened British Fungi. British Mycological Society, Manchester.
(<http://www.britmycolsoc.org.uk/index.php?cid=472>)

Ing, B. (1992) A Provisional Red Data List of British Fungi. Mycologist 6: 124-128.

Annex 1 - key groups and species strongly indicative of a rich grassland fungi assemblage

The Fairy clubs (*Clavariaceae*)

Clavaria rosea

C. fumosa

C. zollingeri

Clavulinopsis umbrinella

H. nitrata

H. ovina

H. phaeococcinea

H. punicea

H. pratensis var. *pallida*

H. quieta

H. radiata

H. spadicea

H. splendidissima

H. vitellina

H. xanthochroa

The Waxcaps (*Hygrocybe*)

Hygrocybe aurantiosplendens

H. calciphila

H. calyptriformis

H. citrinopallida

H. citrovirens

H. colemanniana

H. constrictospora

H. flavipes

H. fornicata

H. glutinipes

H. helobia

H. intermedia

H. irrigata

H. ingrata

H. lacmus

The Pink Gills (*Entolomataceae*)

Entoloma bloxamii

E. incanum

E. porphyrophaeum

E. pratulense

E. prunuloides

E. roseum

The Earth Tongues (*Geoglossaceae*)

All species

2.12 Rare plants

These criteria were accepted by the NEGDP on 18/03/2014

Originator: Dave Wood (Nottinghamshire BSBI recorder & NBGRC)

Introduction

Vascular plants include flowering plants, grasses and ferns. Assemblages of vascular plants have been used to describe and assess the quality of habitats in Section B of Part 2 of this Handbook. These criteria only consider the presence of individual rare species, and their application is based on the criteria used for the identification of species to include in the Nottinghamshire Rare Plant Register (RPR) (Wood & Woods 2012), which follows those recommended by the Botanical Society for the British Isles (BSBI) (Ellis & Pearman 2005) and are based on national and local categories.

Any site that supports a Nottinghamshire RPR species can be considered for selection for LWS status. All of the species included in the RPR are classified as either 'native species' or 'archaeophytes' (plants which were introduced to the British Isles prior to 1492 AD). Plants arriving after that date are known as 'neophytes', and are excluded from use in these criteria. 'Microspecies' are also excluded, as their recording is incomplete and often their distribution may reflect the activity of specialist recorders rather than a true distribution. The same is true of hybrids, although some hybrids may be included under a national criteria or if they are of conservation importance (e.g. *Potamogeton*, *Ranunculus* etc.).

LWS selection will be based on records of plant species that occur naturally in Nottinghamshire. Records will not be used for site selection in instances where:

- A species native to the UK has been introduced to the county
- A species previously occurring in the county has become extinct, and has subsequently been reintroduced

In addition:

- Species (such as Columbine *Aquilegia vulgaris*, Galingale *Cyperus longus*) are commonly grown as garden plants and occur frequently as casuals, and a population of such species will only be considered for LWS selection if it is considered to be native.

A species will be regarded as extinct if it has not been recorded at a site in the last 40 years. A recent survey should be undertaken before any site de-notification at an appropriate time of year or under suitable conditions in order to confirm the status of the species since, in some cases a species may not have been seen for a long period of time.

It should be noted that the lists used in the RPR may be incomplete, e.g. for rarities not yet discovered in Nottinghamshire or in instances where plants thought to be extinct are re-found. Consequently, new additions should be considered accordingly.

Criteria

Sites in Nottinghamshire holding rare plants will be designated as LWSs where they meet one or more of the following criteria;

Criterion 1 Any site that supports a plant that is identified as being Endemic to Britain or Internationally Rare

Justification: To reflect international rarity and threat.

Criterion 2 Any site that supports a plant having full protection under Schedule 8 of the Wildlife and Countryside Act 1981 (as amended), or that is identified as being Nationally threatened by virtue of inclusion in the vascular Plant Red Data List

Justification: To reflect national rarity and threat. Schedule 8 of the Wildlife and Countryside Act is available on the Joint Nature Conservation Committee website (http://jncc.defra.gov.uk/PDF/waca1981_schedule8.pdf), and the Vascular Plant Red Data List is provided in Cheffings et al (2005).

Criterion 3 Any site that supports a plant that is identified as being Nationally Rare (found in 1-15 hectads in Britain) or Nationally Scarce (found in 16-100 hectads in Britain)

Justification: To reflect national rarity and threat. A number of 'rare' plants are actually widespread in Nottinghamshire and will only be considered if their populations are especially significant, (occurring across an area of greater than 2ha). These species are listed in Annex 1.

Criterion 4 Any site that supports a plant that is identified as a Species of Principal Importance

Justification: To reflect national rarity and threat. Species of Principal Importance which occur in Nottinghamshire are listed in Annex 2. A number of these Species of Principal Importance are actually widespread in Nottinghamshire, and are excluded from this criterion. These species are highlighted in Annex 2.

Criterion 5 Any site that supports a population of a plant that is identified as being County Rare (present in 1-3 sites) or County Scarce (present at 4-10 sites)

Justification: To reflect local rarity and threat. A list of species qualifying under this criterion will be updated annually and made available on the NBGRC website.

Criterion 6 Any site that supports an ‘Archeophyte’ which is of particular cultural, historical or ecological interest, excluding plants recorded as ‘casuals’.

Justification: Archeophytes are considered to be ‘honorary natives’, and in many cases have cultural or historical interest, as well as ecological value. Such species are listed in Annex 3.

Site mapping

- Sites will be mapped in line with the mapping rules for habitats set out section 7(d) of Part 1.

Site survey and resurvey

- Sites will initially be designated on the basis of survey results not more than 5 years old.
- Designated sites will be resurveyed every 5 years. When a site cannot be surveyed within the specified survey programme, it will be assumed that the site still qualifies and will remain designated until it can be ascertained that it does not.

References

Cheffings, C.M. & Farrell, L. (Eds.), Dines T.D., Jones, R.A., Leach, S.J., McKean, D.R., Pearman, D.A., Preston, C.D., Rumsey, F.J. & Taylor, I. (2005) The vascular plant red data list for Great Britain. Species Status 7: 1-116. Joint Nature Conservation Committee, Peterborough.
(http://jncc.defra.gov.uk/pdf/pub05_speciesstatusvpredlist3_web.pdf)

Ellis, B. & Pearman, D. (2005) County rare plant registers. Botanical Society of the British Isles, Bristol. (http://www.bsbi.org.uk/CRPR_Guidelines.pdf)

Preston, C.D., Pearman, D.A. & Dines, T.D. (Eds.) (2002) New atlas of the British and Irish flora. Oxford University Press, Oxford.

Wood, D. & Woods, M. (2013) Nottinghamshire Vice County 56 Rare Plant Register. Nottingham City Council, Nottingham.
(http://www.bsbi.org.uk/Nottinghamshire_Rare_Plant_Register_2013.pdf)

Annex 1 – Widespread ‘rare plants’ species occurring in Nottinghamshire

Common name	Scientific name
Common Cudweed	<i>Filago vulgaris</i>
Field Garlic	<i>Allium oleraceum</i>
Loose Silky-bent	<i>Apera spica-venti</i>
Water-starwort	<i>Callitriche truncata</i>
Hound's-tongue	<i>Cynoglossum officinale</i>
Dwarf Spurge	<i>Euphorbia exigua</i>
Round-fruited Rush	<i>Juncus compressus</i>
Wild Pansy	<i>Viola tricolor</i>
Corn Marigold	<i>Glebionis segetum</i>
Prickly Poppy	<i>Papaver argemone</i>
Corn Spurrey	<i>Spergula arvensis</i>

Annex 2 – Species of Principal Importance occurring in Nottinghamshire

Common name	Scientific name
Flat-sedge	<i>Blysmus compressus</i>
Basil Thyme	<i>Clinopodium acinos</i>
Frog Orchid	<i>Coeloglossum viride</i>
Deptford Pink	<i>Dianthus armeria</i>
English Sticky Eyebright	<i>Euphrasia anglica</i>
Chalk Eyebright	<i>Euphrasia pseudokernerii</i>
Red Hemp-nettle	<i>Galeopsis angustifolia</i>
Fine-leaved Sandwort	<i>Minuartia hybrida</i>
Yellow Bird's-nest	<i>Monotropa hypopitys</i>
Tubular Water-dropwort *	<i>Oenanthe fistulosa</i>
Fly Orchid	<i>Ophrys insectifera</i>
Shepherd's Needle	<i>Scandix pecten-veneris</i>
Annual Knawel *	<i>Scleranthus annuus</i>
Marsh Stitchwort	<i>Stellaria palustris</i>
Spreading Hedge-parsley	<i>Torilis arvensis</i>

* Widespread species in Nottinghamshire which are excluded from Criterion 4.

Annex 3 – Archeophytes relevant to Criterion 6

Common name	Scientific name
Autumn Crocus	<i>Crocus nudiflorus</i>
Spring Crocus	<i>Crocus vernus</i>