Appendix 34: Fens Biodiversity Audit

Fens Biodiversity Audit










Cover photos:
Wodwalton Fen, Steven Falk
Ouse Washes, Wildlife Trust BCN
A rare reed beetle, *Plateumaris braccata*, Brian Eversham
A wetland soldier beetle, *Silis ruficollis*, Brian Eversham
Orb-web Spider, *Araneus marmoreus*, Brian Eversham
Fen Violet, Brian Eversham
Fen Ragwort, Brian Eversham
A wetland ground beetle, *Chlaenius vestitus*, Brian Eversham
Hoverfly, *Tropida scita*, Brian Eversham
Dactylorhiza incarnata ssp. ochroleucon, Peter Walker

Fens Biodiversity Audit

Part 1 & 2 - Methodology and Results

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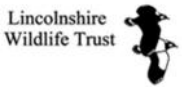
We also acknowledge the invaluable contributions of many hundreds of additional recorders and members of the public who over many years have submitted information to the Local Records Centres, county and national taxonomic recording schemes, or NBN.



Contents

Part 1 - Methodology

Study area

The Fens Biodiversity Audit study area largely comprised the Fens National Character Area (NCA); this boundary is clearly delineated by the peat soils. However, an important fen complex, Chippenham, is not included in the NCA. Chippenham is an isolated patch of peat fen, underlain by chalky marl that rises to the surface in places (2011) The surrounding landscape comprises a mix of lime rich chalk/limestone and slight acid, base rich soils. The Suffolk Landscape Character assessment (www.suffolklandscape.org.uk), based on soil type, landscape history and land use, placed Chippenham in the 'Rolling estate chalklands' rather than in the fenlands.

The soil and landscape character maps indicate that Chippenham should not be included in the Fens Biodiversity Audit area. However, the character of much of the biodiversity is similar to that of important fen sites within the NCA, such as Wicken Fen. Plantlife suggest that 'Chippenham Fen is a remnant of the once massive Cambridgeshire Fens and is one of only four extant 'wild' Fens still surviving in the enormous Great Fen Basin' (Plantlife 2010). An informal survey of taxonomic experts at the Fens Species Workshop (Peterborough, 27/01/2012) indicated that the biodiversity character of Chippenham was sufficiently similar, and important, for it to be included in the Fens Biodiversity Audit.

The Fens Biodiversity Audit study area therefore comprised the 1-km grid squares that included part of the Fens National Character Area (NCA), plus those including part of the small extension that included Chippenham (Fig. 1).

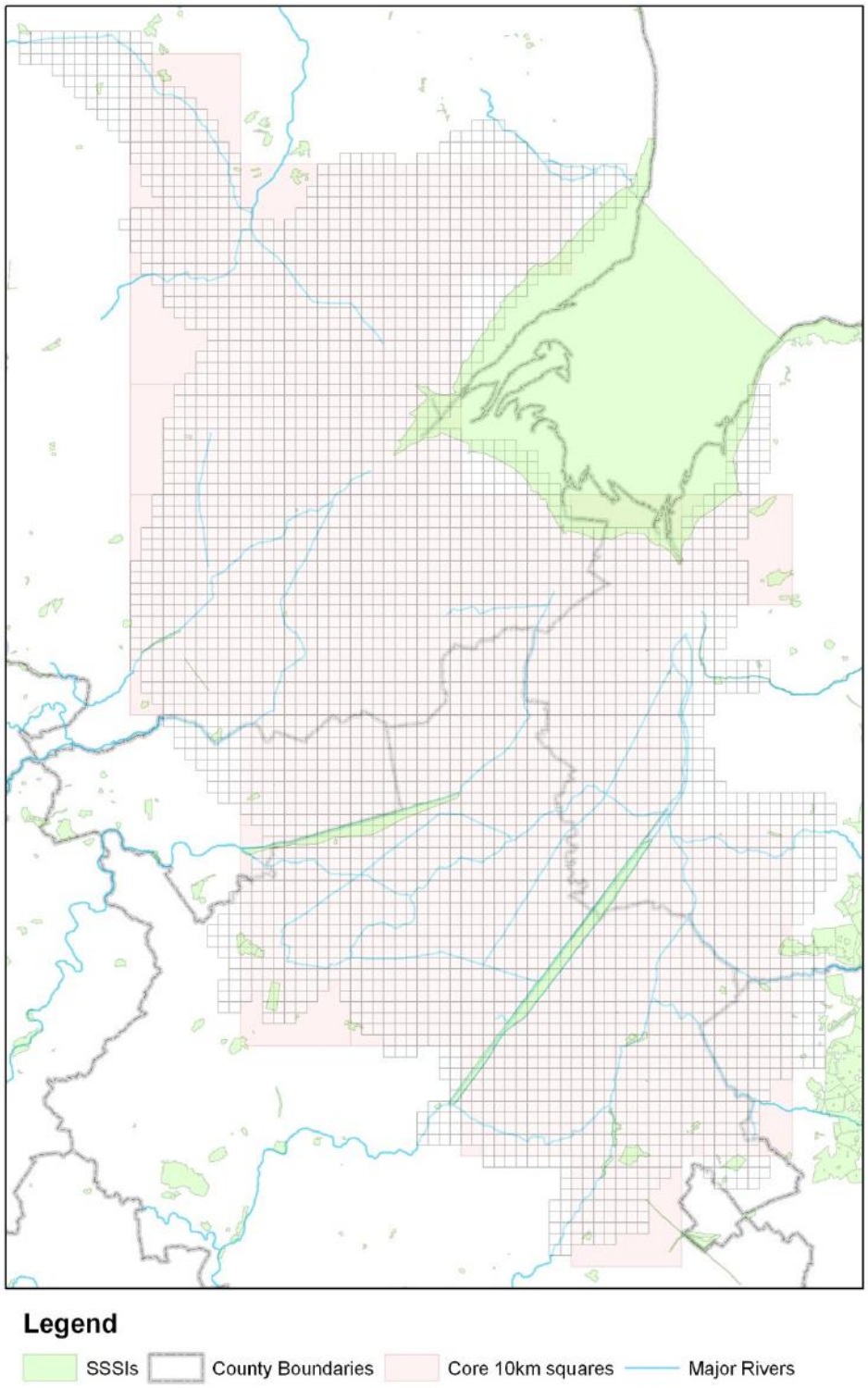


Fig. 1. Map of the Fens National Character Area (NCA) with an extension to include Chippenham Fens. The Fens Biodiversity Audit area comprised the 1-km grid squares that included part of this area. Records at a 10-km resolution were included if the were defined as 'core squares', the area of which was ≥50% within the NCA.

Data collation

All available records were obtained from within the study area. Whilst the study area was restricted to those species occurring in the Fens NCA plus Chippenham, a number of datasets were only available as aggregated units of 10-km grid squares (despite resolution greater than this) and a small number of species records were only available at 10 km resolution. For some datasets it was therefore necessary to collate biological records from a wider area, comprising the 40 'core' 10-km grid, the area of which was ≥50% within the NCA (Fig. 1). Species records at a 10-km resolution within these core squares were included in the collation of species lists.

The data collation resulted in a database of 1,098,057 records. Species records were imported and managed using the software Recorder 6 (www.jncc.gov.uk/page-4592).

Database refinement

The database of 1,098,057 records included occurrences of 16,341 taxa. This database was subject to refinement, which comprised the following:

Refinement to records:

- Removal of 28,421 records that were outside the study area.
- Removal of 26,178 records of a 10-km resolution that did not occur within the core 10-km squares (Fig. 1).
- "Ungrouping" of tetrad records. A single tetrad record was converted into four 1-km records, thereby assuming that the species occurred in the four 1-km squares comprising the tetrad. This increased the number of records at this stage from 1,043,458 to 1,337,619).
- Removing 352,280 records of a 1-km resolution that did not include part of the Fens NCA (whilst still retaining records at a 10-km resolution which fall within the core 10-km).
- Inclusion of 12 records for species that could not be entered into Recorder 6 due to omissions in it's taxon dictionary.

Refinement to species list:

- Removal of taxa not recorded to species level or finer (e.g. records to genus). (601 genus/families recorded – all records also removed)
- Aggregates of micro-species were treated as a single species. Sub-species and taxon variants (e.g. seg./form./subsp./var.) were usually aggregated with the parent species, with exceptions where a conservation designation applied solely to the sub-specific taxon – these were maintained as separate taxa.
- Removal of taxa identified as garden-escapes, erroneous, misidentifications and invalid taxon names (e.g. species that have been reclassified but both old and new names existed in the database). Errors were identified by taxonomic experts or through distribution maps (157 species recorded were identified and all records were removed).

This refinement resulted in a database of 969,136 records for 13,422 taxa, including designated sub-species and aggregates. Taxa are hereafter referred to as 'species' for simplicity.

Cut-off date

In order to ensure that biodiversity mapping was broadly representative of current species distributions, a cut-off date of 1987 (≥1987) was selected and records from before this date were not used in the mapping of contemporary priority species. This cut-off date excluded the earliest 20% of records (Fig. 2). Less than 1% of records were made prior to 1900. A number of records (3848) had no or unusable (e.g. 'June', 'winter') dates. This resulted in c.750,000 records that were suitable for mapping.

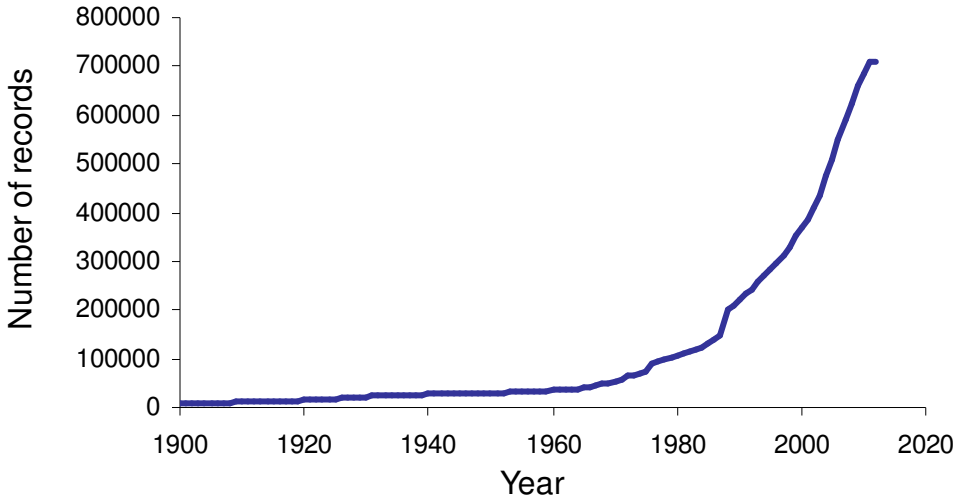


Fig. 2. Cumulative number of records per year collated during the Fens Biodiversity Audit.

Data mapping and analysis

The numbers of records, species, priority species and guild members per 1-km square were calucated using records at 1 km resolution or better and mapped. Colour bands were defined using geometric intervals.

Due to the small size of a number of the management guilds and the patchy distribution of records, the distribution of only a small number of guilds were mapped.

Definition of conservation priority species

Following the refinement of the database, the resulting list of species was assessed against conservation designations using the JNCC's Conservation Designations for UK Taxa[1]. Other

[1] http://www.jncc.gov.uk/page-3408; latest update accessed on February 2012

designations were obtained from the provisional UK RDBs for fungi (Evans, Henrici & Ing 2006) and lists of Nationally Notable species for Arachnida (Harvey, Nellist & Telfer 2002) and Orthoptera and allies (Haes & Harding 1997).

The Fens Biodiversity Audit considered species to be conservation priorities if they had at least one of the following designations:

- BAP – all Biodiversity Action Plan priority species as in the revised 2007 list;
- Red Lists (Global and UK lists), including species listed as Extinct, Extinct in the wild, Critically Endangered, Vulnerable, Rare, Near threatened and Data deficient, but not those listed as Least Concern;
- Nationally Rare and Nationally Scarce, Notable A and B species;
- Red and Amber List birds;
- 'Fens Specialists' – species restricted to the Fens region within the UK (see below for methodology and definition).

It is important to note that many taxa have more than one designation.

It is important to note that BAP lists for many invertebrate groups are incomplete. Whilst relatively recent, they are relatively biased towards a small number of taxonomic groups, and include both very rare and specialist species and very abundant, widespread, albeit declining, species.

Many red data books and formal statuses, particularly for a number of invertebrate groups, were set some time ago and are likely to be significantly revised in new editions. For example, a relatively thorough examination of the Hemiptera in The Fens indicated that the designation of at least 11 priority species are likely to be reduced or removed (P. Kirby, *pers. comm.*); a number of these species have considerably increased in abundance and/or range in recent years.

This audit includes all species meeting at least one of these conservation designations, because there is uncertainty and incompleteness within a designation. It is hoped that using all lists will therefore provide a precautionary approach.

Definition of Fens Specialist species

Following methodologies developed by Dolman et al. (2010), candidate Fens Specialists were first identified using a combination of searches of published and electronic information and consultation with expert stakeholders. Their status as Fens Specialist species was then confirmed by examining known UK distributions or abundance, (e.g. NBN maps, atlases) recognising the following categories:

Species that within the UK:	**Quantified information required for classification**
Are **Entirely Restricted** to the Fens	100% of 10 km squares in which a species have been recorded are, or ≥50% of breeding numbers (when known), within the Fens 10km squares

Are **Largely Restricted** to the Fens	≥80% of 10 km squares in which a species have been recorded are, or ≥50% of breeding numbers (when known), occur within the Fens 10km squares
Have a **Primary Stronghold** in the Fens	≥50% of 10 km squares in which a species have been recorded are, or ≥50% of breeding numbers (when known) occur, within the Fens 10km squares
Have a **Secondary Stronghold** in the Fens	≥25% of 10 km squares in which a species have been recorded are, or ≥25% of breeding numbers (when known) occur, within the Fens 10km squares

Locally extirpated and nationally extinct species for which historic records have been in the Fens were considered as candidate Fens Specialist if their historic UK distribution met the relevant criteria.

Expert stakeholder validation of collated priority taxa

The current status of priority species and their occurrence in the area was validated using all sources of species information that informed habitat and tolerance assessments.

The provisional lists of conservation priority species were shown to attendees of the Species Workshop (January 2012) for validation in order to identify erroneous records, likely misidentifications, species now considered historic to the region (i.e. locally extirpated or nationally extinct) and candidate Fens Specialist species. These experts covered a wide range of taxonomic groups including flowering plants, beetles, true flies, true bugs, butterflies and spiders. A number of taxonomic groups could not be validated in this way, including fungi and lichens.

Following assessment of the provisional list of Hemiptera, Peter Kirby identified a further 28 species that he believed to occur in the Fens but for which the Audit had not received records (Table 1). Whilst no subsequent records were obtained, the species were added to the list of species recorded in the Fens.

Table 1. Species identified as occurring in the Fens by Peter Kirby data but for which the Fens Audit have not received records. Asterisk indicates designated species.

*Amblytylus delicatus**
*Anthocoris sarothamni**
*Aradus depressus**
Arboridia parvula
Arthaldeus arenarius
Atractotomus mirificus
Brachyarthrum limitatum
Brachycarenus tigrinus
Cixius simplex
Closterotomus fulvomaculatus
Compsidolon salicellum
Corizus hyoscyami
Edwardsiana geometra
Edwardsiana prunicola
Eupterycyba jucunda
Javesella discolor
Kybos strigilifer
Kybos smaragdula
Liorrhyssus hyalinus
Lamprotettix splendidulus
Macropsis fuscinervis
Ophiola decumana
Orthotylus adenocarpi
Orthotylus flavinervis
Psallus confusus
Psammotettix cephalotes
Rhytidodus decimusquartus
Thamnotettix dilutior

The provisional list of vascular plants was compared to a previous assessment of the flora of the Fens NCA by Natural England using BSBI data (Simon Leach, Natural England, *pers. comm.*). Comparison of these lists identified 23 plant species for which the Fens Audit had not obtained records, but were known from the Fens area through BSBI data (Table 2). Of these 16 were considered to be extirpated from the region. A subsequent search for records by CPERC obtained a small number of records for 5 of the 23 species, but these were obtained too late to be included into the audit analysis and are unlikely to represent the full knowledge of the occurrence of these species. It is recommended that the BSBI be contacted for further available records of these species. All 23 species were added to the species list for the Fens. In addition the Fens specialist plume moth *Emmelia argoteles* included in the list of additional species. The species has been recorded solely from Wicken and Chippenham (Ringwood et al. 2009), however the species is not recognised by Recorder.

Table 2. Vascular plant species identified as occurring in the Fens by BSBI data but for which the Fens Audit did not initially obtain records. Asterisk denotes species for which a small number of records were subsequently obtained. The current status of the species, based on expert opinion, is given.

Species	Status
Atriplex pedunculata	Extirpated
Centaurea calcitrapa	Extirpated
Chenopodium chenopodioides	Extirpated
*Chenopodium murale**	
Chenopodium vulvaria	Extirpated
Cicuta virosa	Extirpated
Cynodon dactylon	Extirpated
Damasonium alisma	Extirpated
Galium tricornutum	Extirpated
Gastridium ventricosum	Extirpated
Mentha pulegium	Extirpated
Orobanche rapum-genistae	Extirpated
*Persicaria minor**	
*Polemonium caeruleum**	Extirpated
Potamogeton acutifolius	Extirpated
Potamogeton coloratus x gramineus = P. x billupsii	Extirpated
Potamogeton pectinatus x vaginatus = P. x bottnicus	
Primula elatior	
*Radiola linoides**	Extirpated
*Salicornia fragilis**	
Salicornia obscura	
Viola lactea	Extirpated
Zostera noltei	

Extinct and extirpated taxa

Mapping of priority species was conducted only for those species for which recent records (i.e. ≥1987) had been collated. The numbers and identity of priority species were compared between the entire data set and recorded recently, in order to identify those priority species for which historic but no recent record existed. These will include both species that are extinct/locally extirpated and those that may still occur, but have not been recorded. No

attempt was made to carry out a similar collation and quantification of all priority species for which no recent (post-1988) record is known.

Taxa that were considered to now be either regionally extirpated or nationally extinct, but which were previously recorded in the Fens, were identified as:

- those listed as Red Data Book Extinct,
- those listed in Natural England's Lost Life publication (Brown *et al.* 2010),
- those indicated as regionally extirpated by taxonomic experts and distribution maps.

For each of the taxa identified as regionally or nationally extirpated, the date of the last record collated by the Biodiversity Audit was identified. A number of species showed discrepancy between the last recorded dates stated in the Lost Life report and those in the Audit database.

Collating and synthesising species habitat associations and ecological requirements

Conservation priority species were assessed for their associations with broad and micro habitats, and their requirements for ecological conditions and processes. A full list of the 112 criteria are provided in Appendix Table A1 and included:

- 41 broad habitats, e.g. salt marsh, lowland heath, deciduous woodland, fen. These were derived from the broad habitats listed by the LandCoverMap2000 (Fuller *et al.* 2002), modified from previous experience (Dolman, Panter & Mossman 2010; Panter, Mossman & Dolman 2011) to be appropriate for assessing species requirements;
- 52 micro-habitats and structures, each of which can occur across a number of broad habitats, e.g. dead wood, short grass, broken turf, bare ground;
- 19 ecological processes – dynamic actions that create or modify micro-habitat structure and suitability, e.g. positive or negative responses to intensive grazing, physical disturbance, nutrient enrichment, poaching.

For phytophagous and parasitic invertebrates or other species with obligate or host species, the information for the ecology of host species was also collated.

Habitat associations

All conservation priority species were assigned to every broad habitat in which they were known to occur and were not constrained to a single habitat. Primary habitat association(s) were identified where evidence stated that the taxon is primarily or most frequently recorded in, or associated with, that habitat. Other, secondary habitat(s), were identified where evidence indicated that species is occasionally recorded in, or associated, with this habitat, e.g. a statement that species are "also known from" the habitat. The classification of primary versus secondary therefore has a degree of subjectivity, but was consistently applied, with just one person (Chris Panter) classifying all species.

Ecological structures and processes

Species were assessed for their association with or requirement for microhabitats or structures and ecological processes on a scale where:

- +3 – an essential condition or process, or a primary habitat
- +2 – an important condition, process or habitat
- +1 – of minor benefit or importance
- 0 – known to have no effect
- -1 – minor detrimental effect
- -2 – major detrimental effect
- -3 – having a destructive or damaging effect

Sources of ecological information

Habitat associations and species requirements were identified using a wide range of sources of ecological information. The largest of these was the species accounts stored within Recorder 6, which includes species accounts developed from the Invertebrate Site Register, various Red Data Book accounts and checklists, and reviews of taxonomic groups. This information was supplemented by other literature and expert opinion. A full list of sources is given in Appendix Table A2.

Part 2 - Results

Biodiversity in the Fens

The Fens region is very important for biodiversity, with records (pooling pre- and post-1987) comprising (Table 3):

- 13, 474 species
- 1,932 priority species (Global RDB, RDB, Nationally Notable, Birds of Conservation Concern, BAP, Fen Specialists).
- 27% (305 species) of the UK BAP species.
- 82 Fen Specialist species (20 species entirely and 7 largely restricted to the Fens in the UK and 24 that have a primary stronghold, and 35 that have a secondary stronghold, in the region).

True flies were the most species rich group in the fens, with 2,630 species being recorded; this constitutes approximately 37% of the UK Diptera fauna (total c. 7,000 species (Barnard 2011)). Large numbers of beetles (2,159 species), moths (1,521) and vascular plants (1,531) were also recorded (Table 3). Thirty-three percent of the 1,932 priority species were beetles.

Sixteen Global Red Data Book species have been recorded in the Fens. These species were: three bird species (Eurasian Curlew, Black-tailed Godwit, Red Kite); two species of mammal (Otter, Western Barbastelle); the Medicinal Leech; *Pseudotriphyllus suturalis* (a beetle of decaying heartwood); Large Copper; White-clawed Crayfish; three species of fish (European Eel, Common Sturgeon – extinct, Thornback Ray); and four species of mollusc (Glutinous Snail *Myxas glutinosa*, Desmoulin's Whorl Snail *Vertigo moulinsiana*, Narrow-mouthed Whorl Snail *Vertigo angustior*, Compressed River Mussel *Pseudanodonta complanata*.

A full list of priority species recorded in the Fens is given in Table A4.

Recording coverage

There was considerable discrepancy in the level of recording between taxonomic groups (Table 4). Twenty-three percent of records were of bird species, 21% of flowering plants, 14% moths, 8% beetles and 7% butterflies. Butterflies were particularly well recorded with >900 records per species. Hymenoptera were rather poorly recorded, with only 9 records per species.

There was also considerable variation in the geographic coverage of recent (post-1987 incl.) species recording (Fig. 3). Recording density was higher overall in Norfolk and Suffolk, particularly compared to Lincolnshire, but these records were confined to relatively small numbers of taxonomic groups. The density and diversity of recording was very high at a small number of SSSIs, e.g. Wicken and Woodwalton Fens. Recording coverage in Lincolnshire was significantly higher *prior* to the selected cut-off year of 1987 (Fig. 4).

Distribution of biodiversity in the Fens

The total number of species recorded per 1-km square was, unsurprisingly, highly related to the density of records (Fig. 5). As such, all species maps should be considered in conjuction with the map of recording density. It is clear that key relict fen sites, such as Wicken, are extreme hotspots of both species richness and recording. However, the biodiversity status of the wider landscape is unclear, since these areas are rather poorly recorded.

Distribution of priority species

Unsurprisingly, the relict fen sites were hotspots of priority species (Figs. 6 & 7). These are dominated by Chippenham Fen, Woodwalton Fen and Wicken Fen, which is enhanced by the complex of nearby SSSIs, including the Cam Washes and Upware South Pit.

Other important areas include the coastal sites of Gibraltar Point SSSI and RSPB Freiston Shore. Inland, there were a number of hotspots of priority biodiversity along the River Welland and its floodplain, including the seasonally wet grassland sites of Surfleet Lows, Baston and Thurlby Fens, and Deeping Gravel Pit. The Nene Washes SSSI and associated sites, such as Bassenhally Pit SSSI and King's Dyke Nature Reserve, were located at the edge of the Fens NCA, but formed one of the largest areas of priority species in region.

On the eastern edge of the Fens NCA the main hotspot was formed by Stallode Wash Lakenheath SSSI and RSPB Lakenheath Fen, which were located along the Little Ouse on the Norfolk/Suffolk border. The other prominent hotspot in the Ouse basin is the linear Ouse Washes SSSI, visible by the two river channels of the Hundred Foot Drain.

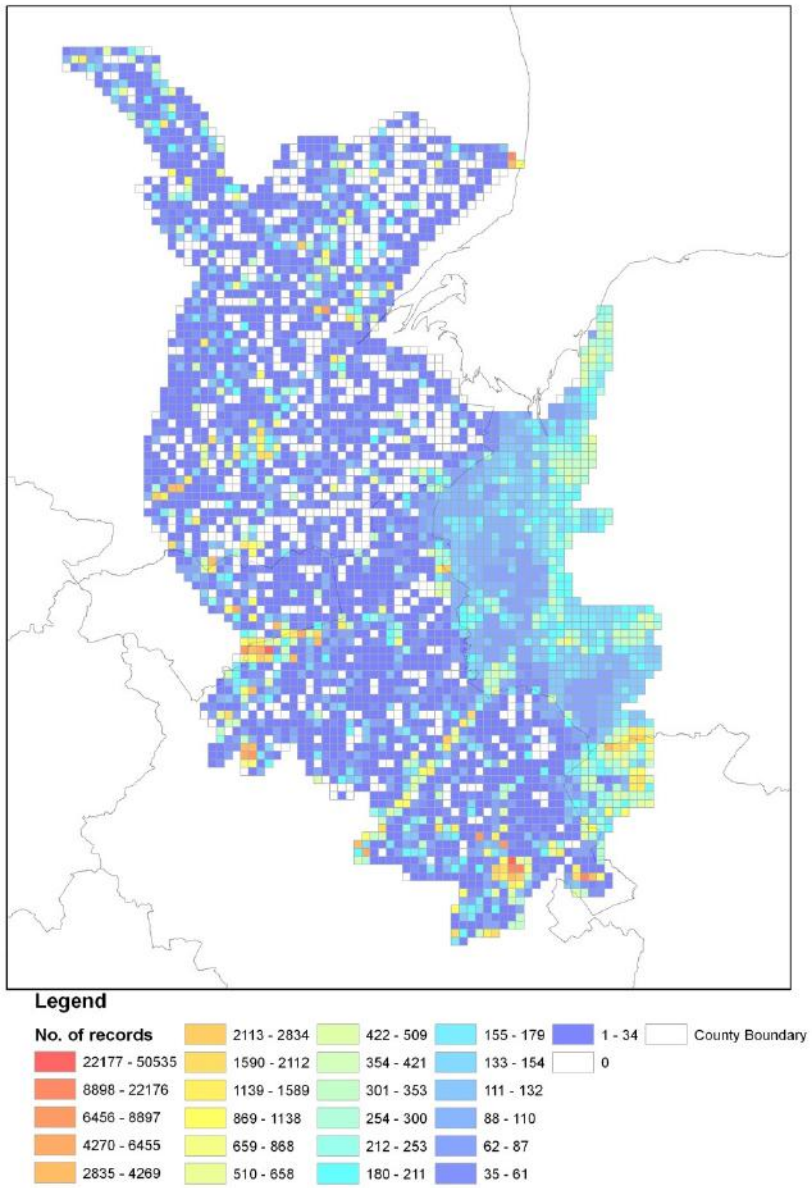
Table 3. The number of species recorded within the Fens Biodiversity Audit area. Designated species include RDB (global and UK, excluding Least Concern), Bird Red and Amber, Notable (including nationally rare, scare, Notable A and B), BAP and Fen Specialists. Lost species include those considered to be nationally extinct (RDB Extinct or listed in Brown *et al.* (2010) and those identified by experts as locally extirpated (Lost species exclude those for which no records were obtained).

	Total number of species	Designated species	Red Data Book species	Global Red Data Book	Bird: Amber	Bird: Red	Notable	BAP	Entirely Restricted	Largely Restricted	Primary Stronghold	Secondary Stronghold	Lost species
Bacteria	21	0	0	0	0	0	0	0	0	0	0	0	0
Fungi[1]	1646	18	15	0	0	0	2	1	0	0	0	0	3
Lichen	305	42	12	0	0	0	39	2	0	0	0	0	1
Algae and diatoms	426	0	0	0	0	0	0	0	0	0	0	0	0
Stonewort	16	10	5	0	0	0	5	4	0	1	1	0	0
Bryophyte	363	48	11	0	0	0	47	6	0	0	0	0	1
Vascular plant	1530	183	139	0	0	0	126	58	3	0	6	2	12
Mollusc	180	15	12	4	0	0	0	11	1	0	1	1	5
Other invertebrate[2]	114	1	1	1	0	0	0	0	0	0	0	0	0
Spider	368	95	35	0	0	0	60	8	2	1	2	6	7
Dragonfly	31	5	5	0	0	0	0	1	0	0	0	0	1
Riverflies[3]	117	7	4	0	0	0	3	0	1	0	1	1	1
True bug	562	60	13	0	0	0	47	0	1	0	1	3	2
Orthoptera	20	1	1	0	0	0	0	1	0	0	0	0	1
Moth	1521	164	46	0	0	0	32	95	2	1	8	4	17
Butterfly	53	20	20	1	0	0	0	13	0	0	0	2	7
True fly	2630	345	108	0	0	0	235	5	4	3	1	3	5
Beetle	2159	630	145	1	0	0	492	24	5	1	3	9	10
Hymenoptera	569	91	29	0	0	0	59	13	0	0	0	0	2
Other arthropod[4]	428	4	3	1	0	0	0	2	1	0	0	0	0
Fish	50	9	3	3	0	0	0	8	0	0	0	0	1
Herptile	12	6	0	0	0	0	0	6	0	0	0	0	0
Bird	312	168	3	3	114	51	0	37	0	0	0	0	6
Terrestrial mammal	38	8	2	2	0	0	0	8	0	0	0	0	0
Marine mammal	3	2	0	0	0	0	0	2	0	0	0	0	0
Total	**13474**	**1932**	**612**	**16**	**114**	**51**	**1147**	**305**	**20**	**7**	**24**	**31**	**82**

[1] Fungi, including fungoid and slime mould; [2] including bryozoa, tardigrade; [3]caddisfly, stonefly, mayfly, alderfly; [4] including bristletail, harvestman.

Table 4. The number of records, and the number of records per species, obtained for each taxonomic group from within the Fens Biodiversity Audit area.

	No. of records	No. of records per species		No. of records	No. of records per species
Bacterium	52	2	Two-tailed bristletail (Diplura)	5	3
Diatom	509	3	Mayfly (Ephemeroptera)	1252	89
Slime mould	161	3	Dragonfly (Odonata)	19633	633
Fungoid	49	3	Bristletail (Archaeognatha)	1	1
Fungus	5863	4	Stonefly (Plecoptera)	1	1
Lichen	6477	21	Orthopteran	2436	122
Alga	517	3	Stick insect (Phasmida)	1	1
Stonewort	282	18	Earwig (Dermaptera)	219	73
Liverwort	1859	27	Cockroach (Dictyoptera)	2	2
Hornwort	1	1	True bug (Hemiptera)	16170	29
Moss	23940	81	Thrips (Thysanoptera)	34	1
Clubmoss	5	5	Snakefly (Raphidioptera)	6	6
Horsetail	1594	266	Alderfly (Megaloptera)	407	204
Fern	2025	78	Booklouse (Psocoptera)	50	2
Conifer	867	33	Lacewing (Neuroptera)	299	9
Flowering plant	260662	177	Beetle (Coleoptera)	61042	28
Sponge (Porifera)	2	2	Scorpion fly (Mecoptera)	35	12
Rotifer	48	2	Flea (Siphonaptera)	216	7
Coelenterate (cnidarian)	4	2	Caddis fly (Trichoptera)	2088	30
Flatworm (Turbellaria)	574	52	Butterfly	51973	981
Roundworm (Nematoda)	112	5	Moth	106111	70
Waterbear (Tardigrada)	1	1	True fly (Diptera)	34326	13
Mollusc	18066	100	Hymenopteran	6605	12
Annelid	3916	89	Bryozoan	6	3
Acari	83	2	Jawless fish (Agnatha)	12	6
Spider (Araneae)	16675	45	Cartilagenous fish	1	1
Harvestman (Opiliones)	318	19	Bony fish (Actinopterygii)	28342	603
False scorpion (Pseudoscorpiones)	43	5	Amphibian	1998	333
Crustacean	4577	28	Reptile	913	152
Millipede	669	26	Bird	258942	830
Centipede	115	7	Marine mammal	80	27
Springtail (Collembola)	270	4	Terrestrial mammal	25592	673



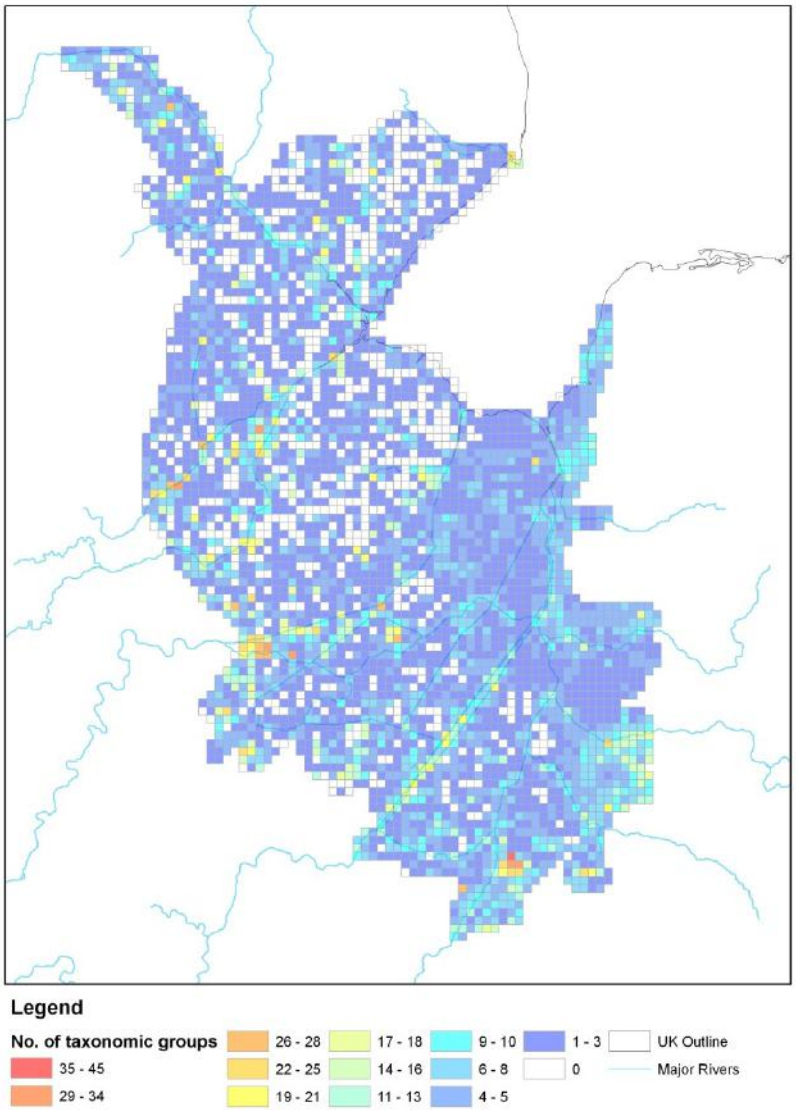


Fig. 3. The number of post-1987 (inclusive) records collated and, Right) the number of taxonomic groups recorded, per 1-km square in the Fens Biodiversity Audit area. Bands for categories are determined by natural breaks (jenks).

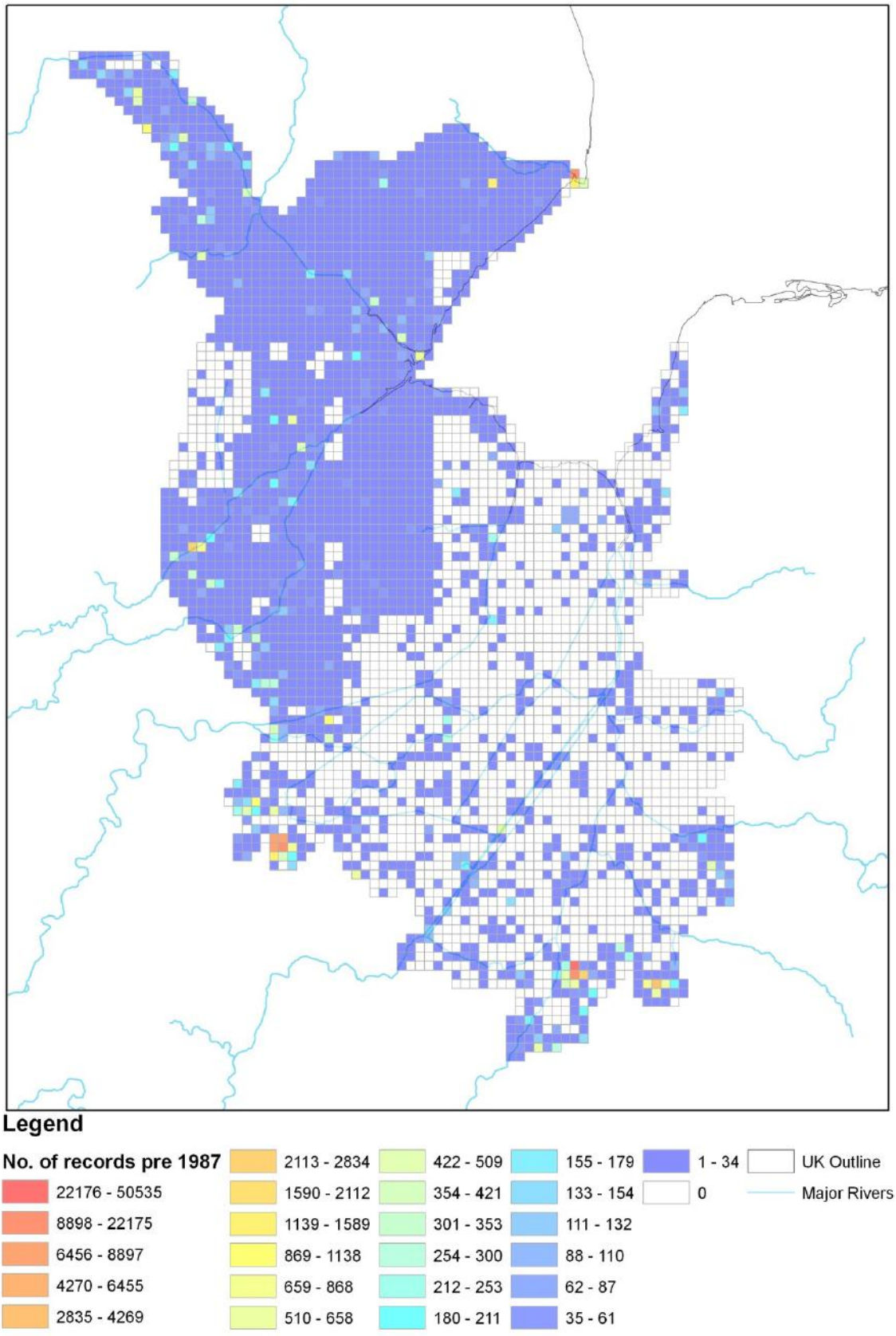


Fig. 4. The number of pre-1987 records collated per 1-km square in the Fens Biodiversity Audit. Bands for categories are determined by natural breaks (jenks).

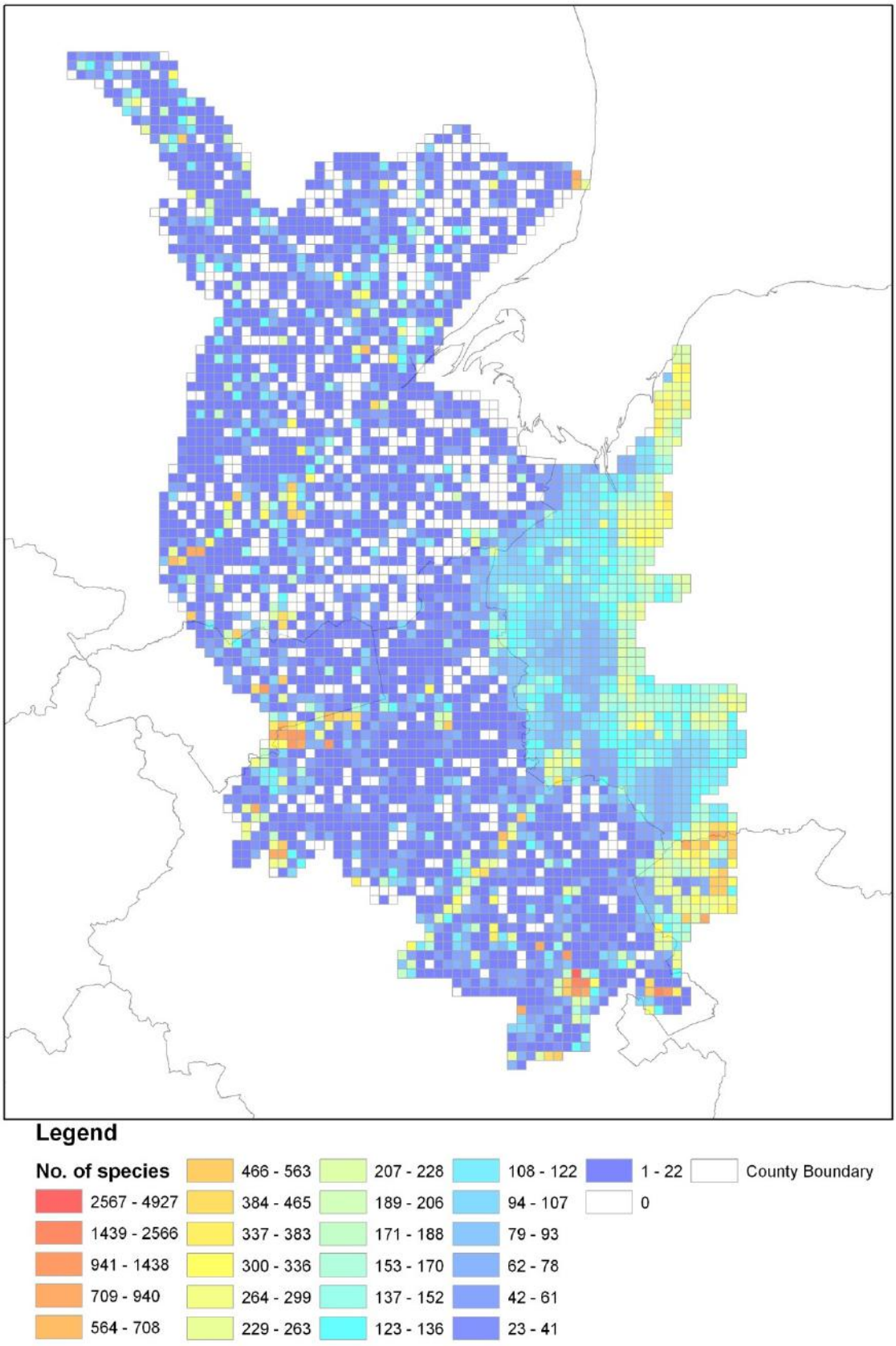


Fig. 5. The number of species recorded since 1987 (inclusive) per 1-km square in the Fens Biodiversity Audit area. Bands for categories are determined by natural breaks (jenks).

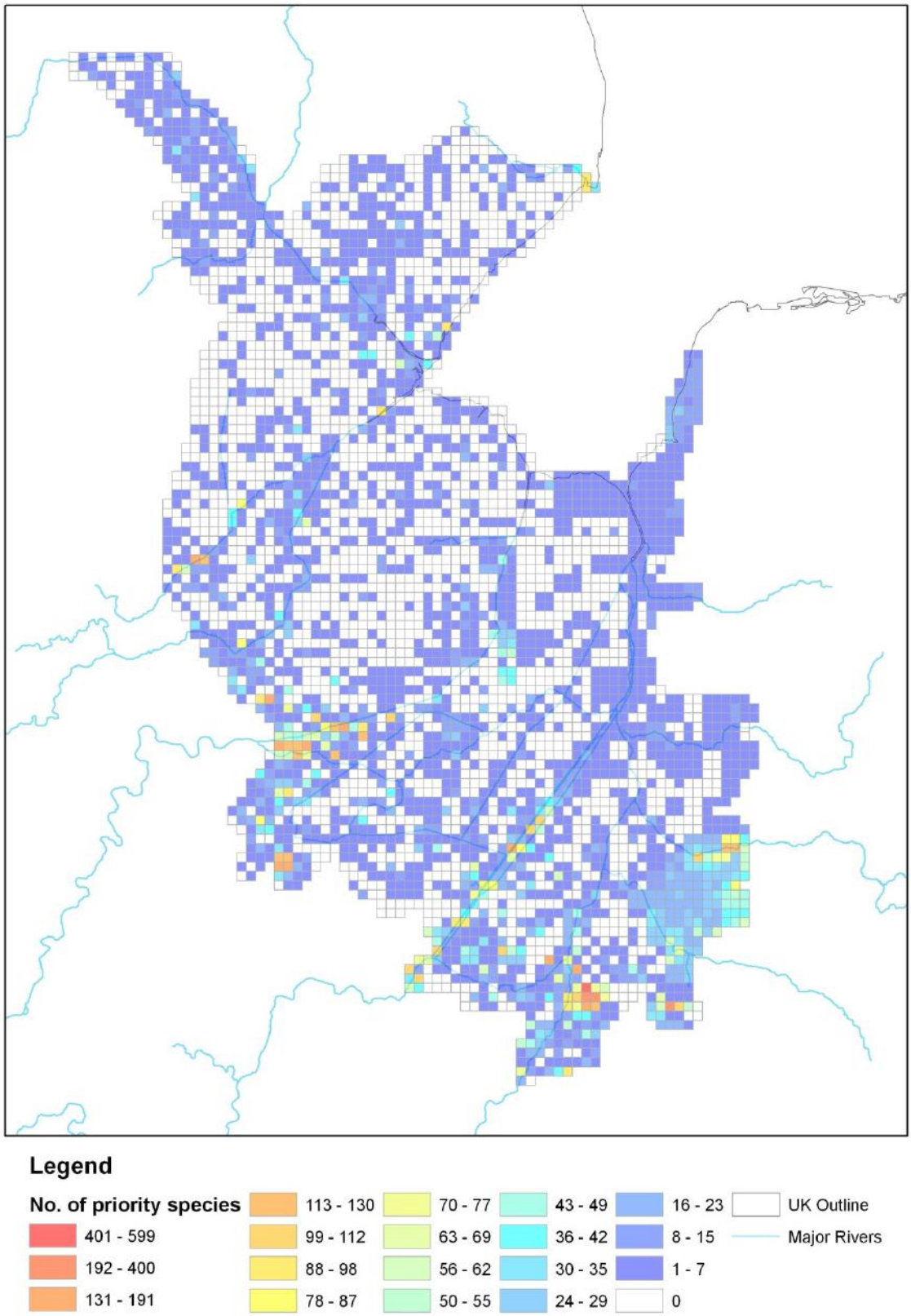


Fig. 6. The number of priority species (RDB, BAP, Notable, Bird: Red and Amber, and Fen Specialist) recorded since 1987 (inclusive) in the Fens Biodiversity Audit area. Bands for categories are determined by natural breaks (jenks).

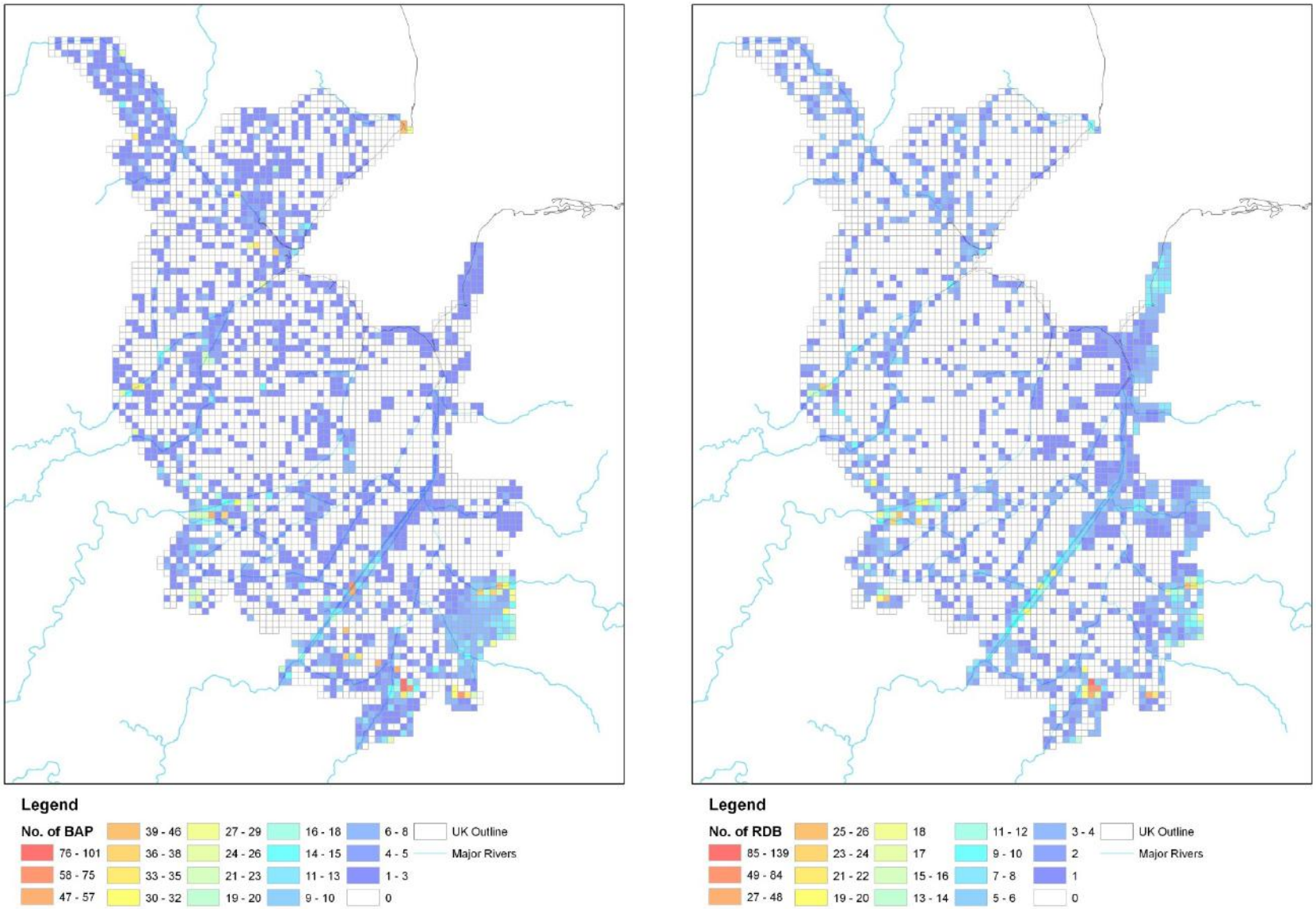


Fig. 7. The number of (left) UK BAP species and (right) Red Data Book (RDB) species recorded since 1987 (inclusive) in the Fens Biodiversity Audit area. Bands for categories are determined by natural breaks (jenks).

Fen Regional Specialists

Eighty-two species were identified as being Fen Specialists: species for which the region is key to their UK population (Table 5). Twenty species were found to be entirely restricted to the Fens in the UK, including five beetles and four True flies. Seven species were identified as largely restricted to the Fens in the UK, including three True flies. The remaining 55 species were considered to have a primary or secondary stronghold in the UK (Table 5).

Fen specialists were from a range of taxonomic groups including stoneworts, a crustacean and caddis flies. Twenty-two percent of Fen Specialist species were beetles, 18% were moths and 13% were True flies (Table 5).

Seven Fen Specialists had no conservation designation: *Cyturella albosetosa* (True fly), *Daphnia rosea* (crustacean), Scarce Gold Conch *Phtheochroa schreibersiana* (moth), *Emmelina argoteles* (moth), *Galeruca laticollis* (leaf beetle), *Hydrobia acuta subsp. neglecta* (mollusc) and *Lotobia pallidiventris* (True fly).

Cyturella albosetosa, *Daphnia rosea,* Scarce Gold Conch and *Hydrobia acuta subsp. neglecta* belonged to large guilds (10+ members) that included at least one BAP member. *Lotobia pallidiventris* was assigned to a guild with only one other member that was not a BAP species; this guild was dung in open, seasonally wet conditions. *Emmelina argoteles* and *Galeruca laticollis* were not assigned to a guild.

The recorded distribution of Fen Specialist species was very patchy across the Fens NCA (Fig. 8). A high proportion of all Fen Specialist species have been recorded at Wicken Fen and, to a lesser extent, at Chippenham Fen. Other important areas include the complex of sites on the Little Ouse at Lakenheath, a number of sites around the Nene and Woodwalton Fen.

Table 5. List of species identified as being regionally restricted to the Fens – Fens Specialists. Accepted species English common names are shown in bold. Lost species include those considered to be nationally extinct (RDB Extinct or listed in Brown *et al.* (2010) and those identified by experts as locally extirpated.

Taxon group		Species	Lost species
		Entirely Restricted	
Flowering plant	Fen Wood-rush	*Luzula pallidula*	
Flowering plant	Fen Ragwort	*Senecio paludosus*	
Flowering plant	Heath Dog-violet	*Viola canina subsp. montana*	
Mollusc	Solid Orb Mussel	*Sphaerium solidum*	
Spider	Rosser's sac spider	*Clubiona rosserae*	
Spider		*Hypsosinga heri*	Extinct
Crustacean	A waterflea	*Daphnia rosea*	
True bug	A planthopper	*Eurysula lurida*	
Beetle	A rove beetle	*Gyrophaena pseudonana*	
Beetle	A feather-winged beetle	*Microptilium palustre*	
Beetle	Eyed Longhorn Beetle	*Oberea oculata*	
Beetle	A feather-winged beetle	*Ptilium affine*	
Beetle	A feather-winged beetle	*Ptilium caesum*	Extinct
Caddisfly		*Grammotaulius nitidus*	
Moth	A plume moth	*Emmelina argoteles*	
Moth	Cambridge Groundling	*Scrobipalpa pauperella*	
True fly	A snail-killing fly	*Anticheta obliviosa*	
True fly	A long-legged fly	*Cyturella albosetosa*	
True fly	A long-legged fly	*Dolichopus plumitarsis*	
True fly	A dance-fly	*Platypalpus pallidiseta*	
		Largely Restricted	
Stonewort	Bearded Stonewort	*Chara canescens*	
Spider	A wolf spider	*Pardosa paludicola*	
Beetle	A rove beetle	*Quedius balticus*	
Moth	Marsh Moth	*Athetis pallustris*	
True fly	Cigarillo Gall-fly	*Lipara similis*	
True fly	A thick-headed fly	*Myopa polystigma*	
True fly	A long-legged fly	*Thinophilus ruficornis*	
		Primary Stronghold	
Stonewort	Dwarf Stonewort	*Nitella tenuissima*	
Flowering plant	Ribbon-leaved Water-plantain	*Alisma gramineum*	
Flowering plant	Early marsh-orchid	*Dactylorhiza incarnata subsp. ochroleuca*	Extirpated
Flowering plant	Fringed Water-lily	*Nymphoides peltata*	
Flowering plant	Cambridge Milk-parsley	*Selinum carvifolia*	
Flowering plant	Water Germander	*Teucrium scordium*	
Flowering plant	Fen violet	*Viola persicifolia*	
Mollusc	Large-mouthed Valve Snail	*Valvata macrostoma*	
Spider	A wolf spider	*Hygrolycosa rubrofasciata*	
Spider		*Zora armillata*	Extirpated
True bug	A leafhopper	*Sagatus punctifrons*	

Beetle	A diving beetle	*Agabus undulatus*	
Beetle	A silken fungus beetle	*Cryptophagus schmidtii*	
Beetle	A rove beetle	*Thinobius brevipennis*	Extirpated
Caddisfly	A long-horned caddisfly	*Erotesis baltica*	
Moth	Brown Fen Neb	*Aristotelia subdecurtella*	Extirpated
Moth	Eastern Piercer	*Cydia leguminana*	Extinct
Moth	Silver Barred	*Deltote bankiana*	
Moth	Scarce Pug	*Eupithecia extensaria subsp. occidua*	
Moth	Reed Tussock	*Laelia coenosa*	Extinct
Moth	Marsh Carpet	*Perizoma sagittata*	
Moth	Reed Leopard	*Phragmataecia castaneae*	
Moth	Scarce Gold Conch	*Phtheochroa schreibersiana*	Extinct
True fly		*Geomyza hendeli*	
	Secondary Stronghold		
Flowering plant	Marsh pea	*Lathyrus palustris*	
Flowering plant	Fen Pondweed	*Potamogeton coloratus*	
Mollusc	A mud snail	*Hydrobia acuta subsp. neglecta*	
Spider	A money spider	*Entelecara omissa*	
Spider	A money spider	*Gongylidiellum murcidum*	
Spider	A money spider	*Maro sublestus*	
Spider	A money spider	*Maso gallicus*	
Spider	A jumping spider	*Neon valentulus*	
Spider	A money spider	*Taranucnus setosus*	
True bug	A leafhopper	*Agallia brachyptera*	
True bug	A leaf-bug	*Agnocoris reclairei*	
True bug	A smaller water strider	*Microvelia buenoi*	
Beetle	A soft-wing flower beetle	*Cerapheles terminatus*	
Beetle	Black Night-runner	*Chlaenius tristis*	Extinct
Beetle	A leaf beetle	*Galeruca laticollis*	Extirpated
Beetle	A water scavenging beetle	*Hydrochus crenatus*	
Beetle	Weaver Beetle	*Lamia textor*	
Beetle	A weevil	*Lixus paraplecticus*	Extinct
Beetle	A riffle beetle	*Oulimnius major*	
Beetle	A ground beetle	*Paradromius longiceps*	
Beetle	A rove beetle	*Schistoglossa viduata*	
Caddisfly		*Limnephilus pati*	
Butterfly	Large Copper	*Lycaena dispar*	Extinct
Butterfly	Black Hairstreak	*Satyrium pruni*	
Moth	Marsh Dagger	*Acronicta strigosa*	Extinct
Moth	Northern Groundling	*Athrips tetrapunctella*	
Moth	Concolorous	*Chortodes extrema*	
Moth	White-spotted Pinion	*Cosmia diffinis*	
True fly	A fruit fly	*Acinia corniculata*	
True fly	A small dung fly	*Lotobia pallidiventris*	
True fly	A fungus gnat	*Sciophila antiqua*	

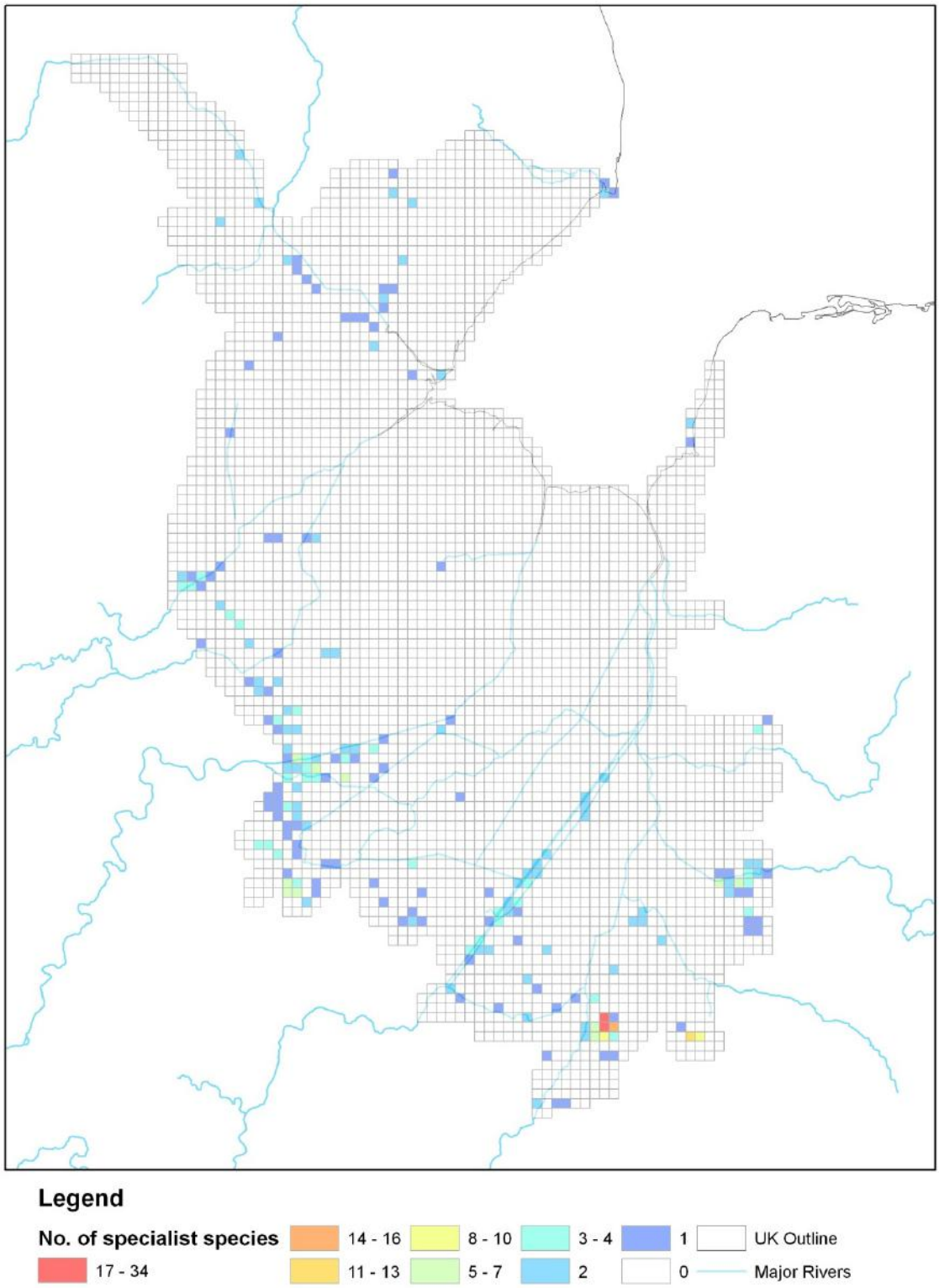


Fig. 8. The recorded distribution of Fen Specialist recorded since 1987 (inclusive) in the Fens Biodiversity Audit area. Bands for categories are determined by natural breaks (jenks).

Extinctions in the Fens

No modern records (≥1987) were obtained for 3,160 species, including 38% (504 species, Appendix Table A3) of the total number of priority species (1,931 species) recorded in the Fens.

One hundred species were acknowledged as extinct or locally extirpated (Table 6), including 13 Fens Specialist species. The 100 'lost' species included 30 flowering plants, ten beetles and seven spiders. Twenty-three percent of the species thought to be extirpated in the Fens were associated with dry grasslands, 21% with fen, 20% with small bodies of permanent standing water and 20% with heathlands (Note: species can be associated with more than one habitat).

Recent records were received for a number of species considered to be nationally extinct (e.g. by the NE 'Lost Life Report') (Table 6). This can occur because species listed as extinct in RDBs and the Lost Life publication refer to native breeding populations, whereas modern records in the Audit database may refer to infrequent vagrant or migrant individuals (e.g. Black Tern). Recent records may also refer to introduced individuals of species with extinct *native* populations, e.g. garden escapes such as Corncockle. Other recent records may be as a result of mis-identifications. However, it is likely that some recent records of apparently extinct species are genuine, demonstrating that proving extinction is always more difficult than showing that a species still persists.

The status of the remaining species for which the Audit has no records since 1987 is largely unknown. These species may now be extirpated or may remain in the region but have not been recorded or records were not received by the Biodiversity Audit. It is recommended that in order to establish the status of these species, further biological recording is required. This can be targeted through discussion of individual species with local recorders and national societies and recording at the last known sites. Before this is conducted, there is a need to assess the list to prioritise the important wetland species and remove those not considered regionally important.

Table 6. Priority species known to have occurred in the Fens Audit area but are now considered to be extinct in the UK or locally extirpated in the Fens. Extinctions and extirpations were identified in the Natural England Lost Life publication (Brown et al. 2010), those designated as Red Data Book: Extinct and those identified as extirpated by experts. The date of the last record in the Fens obtained by the audit is given; 'No date' indicates the records collated by the Fens Audit had not date specified, blank cells indicate that no records were obtained for the species. Fens Specialist status is shown; Entirely Restricted (ER), Largely Restricted (LR), Primary Stronghold in the region (PS), Secondary Stronghold in the region (SS). Asterisk indicates species once thought to be extinct, but have since re-colonised (P. Kirby, *pers. comm*.)

Taxon group	Common name	Species	Fen Specialists	Date of last record in the Fens	Lost species
Fungus		*Perenniporia medulla-panis*		1909	Extinct [1, 2]
Fungus		*Puccinia cladii*		2001	Extinct [1]
Fungus	Matt Knight	*Tricholoma imbricatum*		1909	Extinct [1]
Lichen		*Caloplaca haematites*		1896	Extinct [3]
Moss	Shaw's Bristle-moss	*Orthotrichum striatum*		2010	Extinct [3]
Clubmoss	Marsh Clubmoss	*Lycopodiella inundata*		1992	Extirpated
Fern	Crested Buckler-fern	*Dryopteris cristata*		1851	Extirpated
Flowering plant	Pheasant's Eye	*Adonis annua*		1960	Extinct
Flowering plant	Corncockle	*Agrostemma githago*		2011	Extinct [2]
Flowering plant	Tower Mustard	*Arabis glabra*		2003	Extirpated
Flowering plant	Pedunculate Sea-purslane	*Atriplex pedunculata*			Extirpated
Flowering plant	Caraway	*Carum carvi*		1961	Extirpated
Flowering plant	Small Bur-Parsley	*Caucalis platycarpos*		1982	Extinct [2,3]
Flowering plant	Red Star-thistle	*Centaurea calcitrapa*			Extirpated
Flowering plant	Saltmarsh Goosefoot	*Chenopodium chenopodioides*			Extirpated
Flowering plant	Upright Goosefoot	*Chenopodium urbicum*		1982	Extinct [2]
Flowering plant	Stinking Goosefoot	*Chenopodium vulvaria*			Extirpated
Flowering plant	Cowbane	*Cicuta virosa*			Extirpated
Flowering plant	Bermuda-grass	*Cynodon dactylon*			Extirpated
Flowering plant	Starfruit	*Damasonium alisma*			Extirpated
Flowering plant	Corn Cleavers	*Galium tricornutum*			Extirpated
Flowering plant	Nit-grass	*Gastridium ventricosum*			Extirpated
Flowering plant	Petty Whin	*Genista anglica*		1975	Extirpated
Flowering plant	Heath Cudweed	*Gnaphalium sylvaticum*		1988	Extirpated
Flowering plant	Hydrilla	*Hydrilla verticillata*		2002	Extinct [2]
Flowering plant	Matted Sea-lavender	*Limonium bellidifolium*		2007	Extirpated
Flowering plant	Lax-flowered Sea-lavender	*Limonium humile*		1973	Extirpated
Flowering plant	Fen Orchid	*Liparis loeselii*		2005	Extirpated
Flowering plant	Pennyroyal	*Mentha pulegium*			Extirpated
Flowering plant	Greater Broomrape	*Orobanche rapum-genistae*			Extirpated
Flowering plant	Jacob's Ladder	*Polemonium caeruleum*		2009	Extirpated
Flowering plant	Sharp-leaved Pondweed	*Potamogeton acutifolius*			Extirpated
Flowering plant		*Potamogeton coloratus x gramineus P. x billupsii*			Extirpated
Flowering plant	Small Fleabane	*Pulicaria vulgaris*		1963	Extinct
Flowering plant	Allseed	*Radiola linoides*		1981	Extirpated

Flowering plant	Sulphur Clover	*Trifolium ochroleucon*		1982	Extirpated
Flowering plant	Pale Heath Violet	*Viola lactea*			Extirpated
Mollusc		*Mercuria cf. similis*		No date	Extirpated
Mollusc		*Myxas glutinosa*		1862	Extirpated
Mollusc		*Omphiscola glabra*		1890	Extirpated
Mollusc		*Oxyloma sarsii*		2010	Extirpated
Mollusc		*Segmentina nitida*		1970	Extirpated
Spider		*Agyneta cauta*		1999	Extirpated
Spider		*Araeoncus crassiceps*		1999	Extirpated
Spider		*Araneus alsine*		1892	Extirpated
Spider		*Dipoena inornata*		1999	Extirpated
Spider		*Hypsosinga heri*	ER	1928	Extinct [2]
Spider		*Walckenaeria corniculans*		1950	Extirpated
Spider		*Zora armillata*	PS	1997	Extirpated
Orthoptera	Large Marsh Grasshopper	*Stethophyma grossum*		1968	Extirpated
True bug		*Stictopleurus abutilon*		2006	Extinct [3]*
True bug		*Stictopleurus punctatonervosus*		2011	Extinct [3]*
Beetle		*Bembidion octomaculatum*		1992	Extinct [3]*
Beetle		*Chlaenius tristis*	SS	No date	Extinct
Beetle		*Galeruca laticollis*	SS	1878	Extirpated
Beetle		*Lixus paraplecticus*	SS	1919	Extinct
Beetle	Crucifix Ground Beetle	*Panagaeus cruxmajor*		1957	Extirpated
Beetle		*Ptilium caesum*	ER	1873	Extinct
Beetle		*Rhantus bistriatus*		1829	Extinct
Beetle		*Spercheus emarginatus*		1820	Extinct [2]
Beetle		*Tachinus bipustulatus*		No date	Extinct
Beetle		*Thinobius brevipennis*	PS	1925	Extirpated
Caddisfly		*Oxyethira distinctella*		1999	Extinct [2]
Butterfly		*Aglais polychloros*		2006	Extinct
Butterfly	Black-veined White	*Aporia crataegi*		1828	Extinct [2]
Butterfly	Marsh Fritillary	*Euphydryas aurinia*		1927	Extirpated
Butterfly	Duke of Burgundy	*Hamearis lucina*		1951	Extirpated
Butterfly	Large Copper	*Lycaena dispar*	SS	1993	Extinct [2]
Butterfly	Bath White	*Pontia daplidice*		1926	Extinct [2]
Moth	Marsh Dagger	*Acronicta strigosa*	SS	1907	Extinct
Moth	Brown Fen Neb	*Aristotelia subdecurtella*	PS	1905	Extinct
Moth	Clifden Nonpareil	*Catocala fraxini*		2001	Extinct [2]
Moth	Scarce Fen Marble	*Celypha doubledayana*		No date	Extinct [2]
Moth	Pistol Case-bearer	*Coleophora anatipennella*		2005	Extinct [2]
Moth	Many-Lined	*Costaconvexa polygrammata*		1851	Extinct [2, 3]
Moth	Aspen-shoot Piercer	*Cydia corollana*		1878	Extinct [2]
Moth	Eastern Piercer	*Cydia leguminana*	PS	1976	Extinct [2]
Moth	Spotted Sulphur	*Emmelia trabealis*		1960	Extinct [2]
Moth	Least Shoot	*Gibberifera simplana*		1878	Extinct [2]
Moth	Viper's Bugloss	*Hadena irregularis*		1925	Extinct [2]
Moth	Small Ranunculus	*Hecatera dysodea*		1902	Extinct [2, 3]
Moth	Reed Tussock	*Laelia coenosa*	PS	1911	Extinct [2, 3]
Moth	Diamond-spot Sable	*Loxostege sticticalis*		2001	Extinct

Moth	Gypsy Moth	*Lymantria dispar*		1993	Extinct
Moth	Scarce Gold Conch	*Phtheochroa schreibersiana*	PS	1920	Extinct [2]
Moth	Orache Moth	*Trachea atriplicis*		1915	Extinct [2, 3]
True fly	Hornet robberfly	*Asilus crabroniformis*		1979	Extirpated
True fly		*Belida angelicae*		1986	Extinct [2]
True fly		*Eudorylas ruralis*		2007	Extinct [2]
True fly		*Phaonia scutellata*		2011	Extinct [2, 3]
True fly		*Tachydromia halterata*		1921	Extinct [2]
Hymenoptera	Great Yellow Bumble Bee	*Bombus distinguendus*		1980	Extirpated
Hymenoptera	Short-haired Bumble Bee	*Bombus subterraneus*		1999	Extinct [2]
Fish	Burbot	*Lota lota*		1972	Extinct [2]
Bird	Kentish Plover	*Charadrius alexandrinus*		2004	Extinct [2]
Bird	Black Tern	*Chlidonias niger*		2011	Extinct [2]
Bird	Corn Crake	*Crex crex*		2010	Extinct [2]
Bird	White-Tailed Eagle	*Haliaeetus albicilla*		1927	Extinct [2]
Bird	Eurasian Wryneck	*Jynx torquilla*		2010	Extinct [2]
Bird	Red-Backed Shrike	*Lanius collurio*		1973	Extinct [2]

[1] Listed as extinct in the provisional Red Data Book of Fungi (Evans, Henrici & Ing 2006); [2] Listed as extinct in the Lost Life report (Brown *et al.* 2010); [3] Listed as extinct in Red Data Books.

Habitat Associations

Only 12% of the priority taxa were primarily associated with a single broad habitat type, with most associated with more than two (mean ± SD 3.4 ± 1.7 habitats). In interpreting these results, it is important to bear in mind that:

- The analysis considers associations from the literature, so may include associations with habitats not present or prevalent the Fens
- Since species were classified with more than one primary habitat association, the total number of habitat associations is greater than the number of priority species.

Key habitats for Priority Biodiversity

The relative importance of different habitats to the priority biodiversity was quantified, by assessing the numbers of species that have a primary association with each habitat. Results are shown in Fig. 9 and can be summarised as:

Fen >> Wet Grassland ≈ Dry Grassland ≈ Broadleaved Woodland > Dune, shingle > Heath > Small Standing Waterbodies > Reedbed > Large standing water ≈ Running water ≈ Brownfield (waste-land)

>> many more species associated with; > more species associated with; ≈ approximately equal numbers of species associated with

Unsurprisingly, this confirms the high importance of fen habitats, which support the primary habitat association of 517 priority species (Fig. 9).

Key habitats for Fens Specialists

The relative importance of different habitats to the Fens Specialists was also quantified, by assessing the numbers of species that have a primary association with each habitat. Results are shown in Fig. 10 and can be summarised as:

Fen >> Wet Grassland > Small Standing Waterbodies > Reedbed > Large standing water > Fen Carr ≈ Running water

>> many more species associated with; > more species associated with; ≈ approximately equal numbers of species associated with

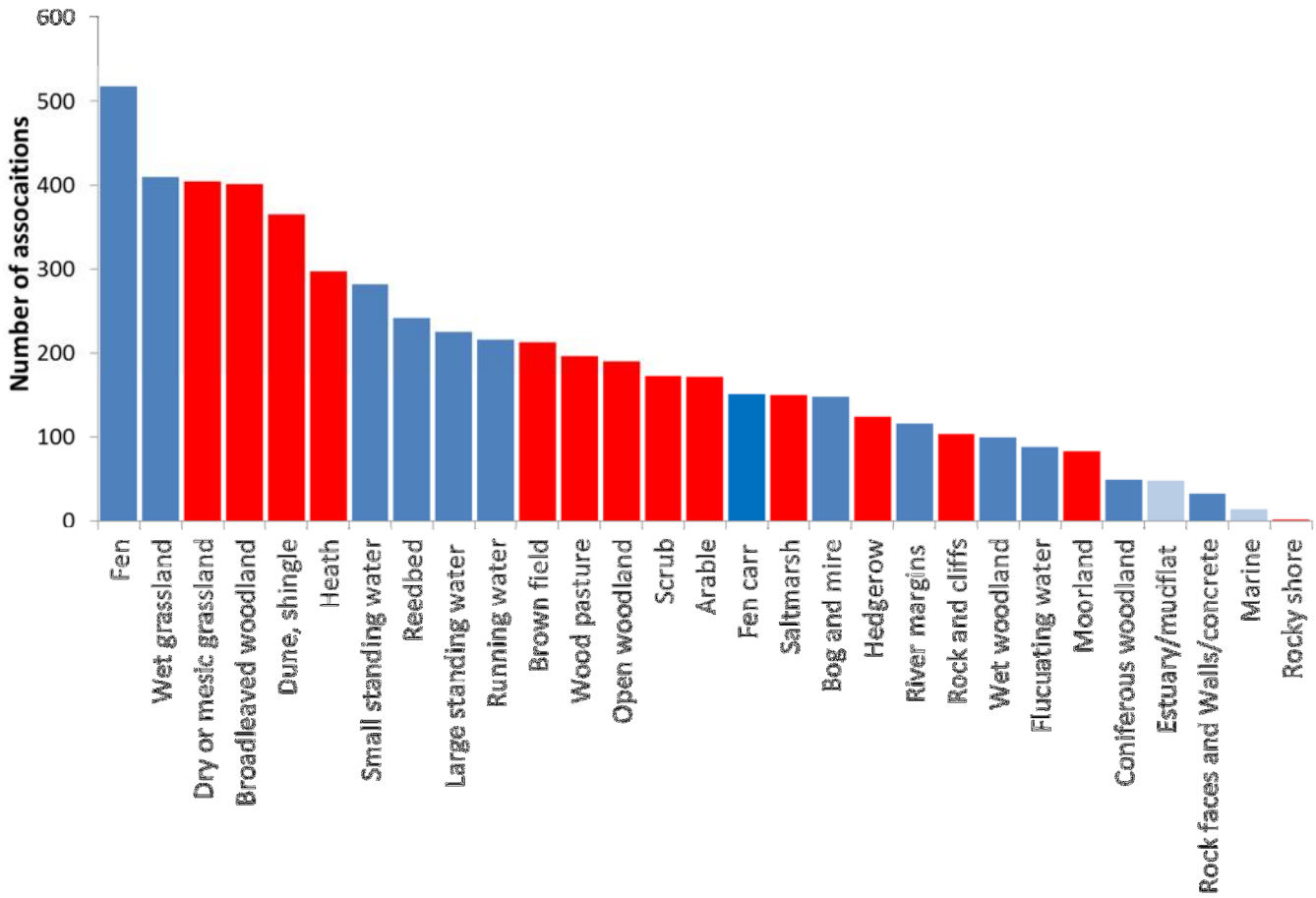


Fig. 9. The relative importance of habitats defined by the number of associations with priority species in the Fens, i.e. the number of species classified from the literature as having a primary association with the habitat. Note: note all these habitats are well represented within the Fens landscape. Individual species may be associated with more than one habitat, so that the total number of primary habitat associations is much greater than the number of species. Blue bars represent wetland habitats, red bars terrestrial habitats and light blue bars costal / marine habitats.

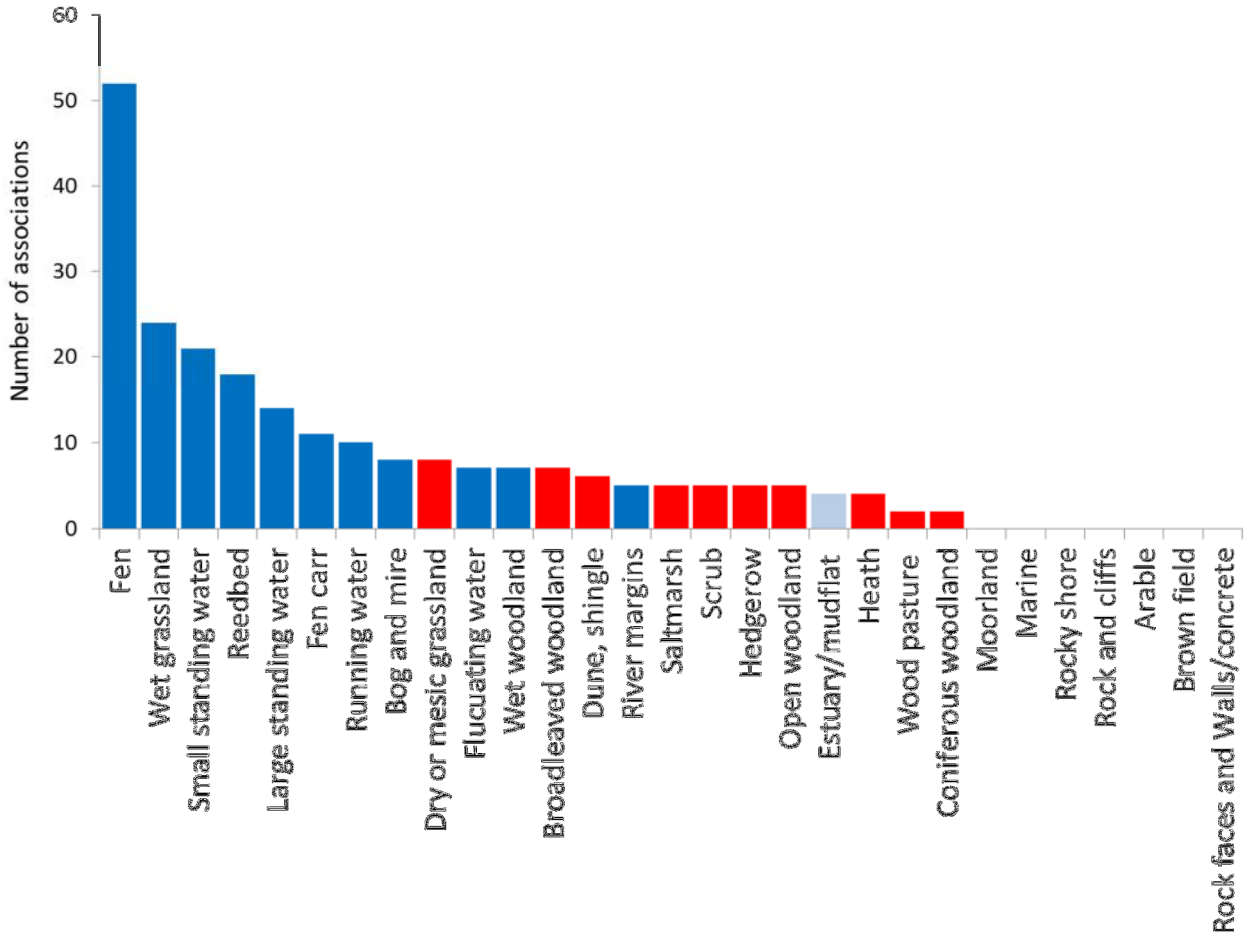


Fig. 10. The relative importance of habitats defined by the number of associations with Fen Specialist species, i.e. the number of species classified from the literature as having a primary association with the habitat.
Note: note all these habitats are well represented within the Fens landscape. Individual species may be associated with more than one habitat, so that the total number of primary habitat associations is much greater than the number of species.

Guild Analysis

The matrix of habitat and ecological information was used to define 'management guilds' – taxonomically diverse groups of species with common requirements in terms of ecological processes and physical conditions, with a focus on potential management actions. Constituent species may not necessarily occur together as a coherent assemblage, for example where more detailed requirements such as soil pH differ, but will benefit from the same management prescriptions applied across site and landscape scales.

Management guilds comprised fungi, lichens, lower and higher plants and invertebrates, but excluded vertebrates, for which habitat and ecological requirements must generally be considered at greater spatial scales.

We recognise that, although this methodology was applied consistently and objectively after systematic collation of available data, it is nevertheless subjective and if repeated independently different guilds may result.

Successional and hydrological conditions

The conceptual framework for the determination of guilds of species comprises a matrix with three dimensions, as shown in Figure 11a. Management guilds were established by first classifying priority species into just two primary axes; 1) canopy structure in a succession gradient from open areas with no trees to closed woodland, and 2) a hydrological gradient from fast flowing water to droughted, xeric environments. Species were classified into this matrix in lieu of 'habitat' type e.g. fen, damp woodland.

1) Canopy Conditions – Table 7, Figure 11b

Coarse and fine categories were defined along a successional gradient from open habitats to closed canopy woodland, largely based on canopy cover and tree/scrub patch arrangement.

Species were assigned into both a single coarse successional category and, where possible, a fine successional category. However, some species occupied more than one successional categories; this occurred under two situations:

1) species require complexity in the landscape, occupying different successional conditions during different parts of their life cycle(e.g. both open and woodland elements) – these species were categorised under Landscape Complexity;

2) species have particular or varied requirements that can be found within a number of successional conditions (e.g. 'generalist' detritivore species) – these species are categorised under Variety.

2) Hydrological Conditions– Table 8, Figure 11c

Coarse and fine categories were defined along a hydrological gradient from fully aquatic to droughted xeric conditions. In determining categories exisiting hydrological classifications were considered (Mitsch & Gosselink 1993, Wheeler *et al*. 2004).Species were also assigned to

a coarse and, where possible, a fine hydrological category. Species were more frequently assigned to a range of fine hydrological categories compared to fine successional conditions. Species occupying distinct hydrological conditions during different parts of their life cycle, e.g. dragonflies, were assessed according to the most hydrologically sensitive stage, i.e. the aquatic larval stage of dragonflies. The exception to this were a number of species, largely Hymenoptera, that required two distinct hydrological conditions during the same life stage, e.g. dry sandy places for nesting and wetlands for hunting. These species were placed in a Landscape Complexity guild.

Note: Hydrological categories may be mediated by altitude and latitude and thus species classification into these are Fens specific.

In deciding upon the framework, categories were compared to those of the National Vegetation Classification (NVC) and Invertebrate Speices–habitat information System (ISIS) (Webb & Lott 2006) (Table 8). All NVC communities were assigned to one or more of these categories, however only select examples are provided. ISIS assemablages are also assigned to a small number of corresponding conditions, though many are not equivalent as ISIS refers to an assemblage of species requiring certain processes e.g. bare sand and chalk; montane and upland, riparian sand.

Classification of management guilds

The classification of management guilds was based on a combination of the successional and hydrological categories and then within these a range of ecological structures and processes, e.g. deadwood, detritus, dung, bare ground and sward mosaics. Detailed explanations of these ecological conditions are given in Table 9.

For some guilds, a sub-set of species had additional specific requirements, which were not included in the classification of guilds, since this would result in a large increase in the number of guilds, but are presented in Table 10 in order to highlight other potential considerations for management.

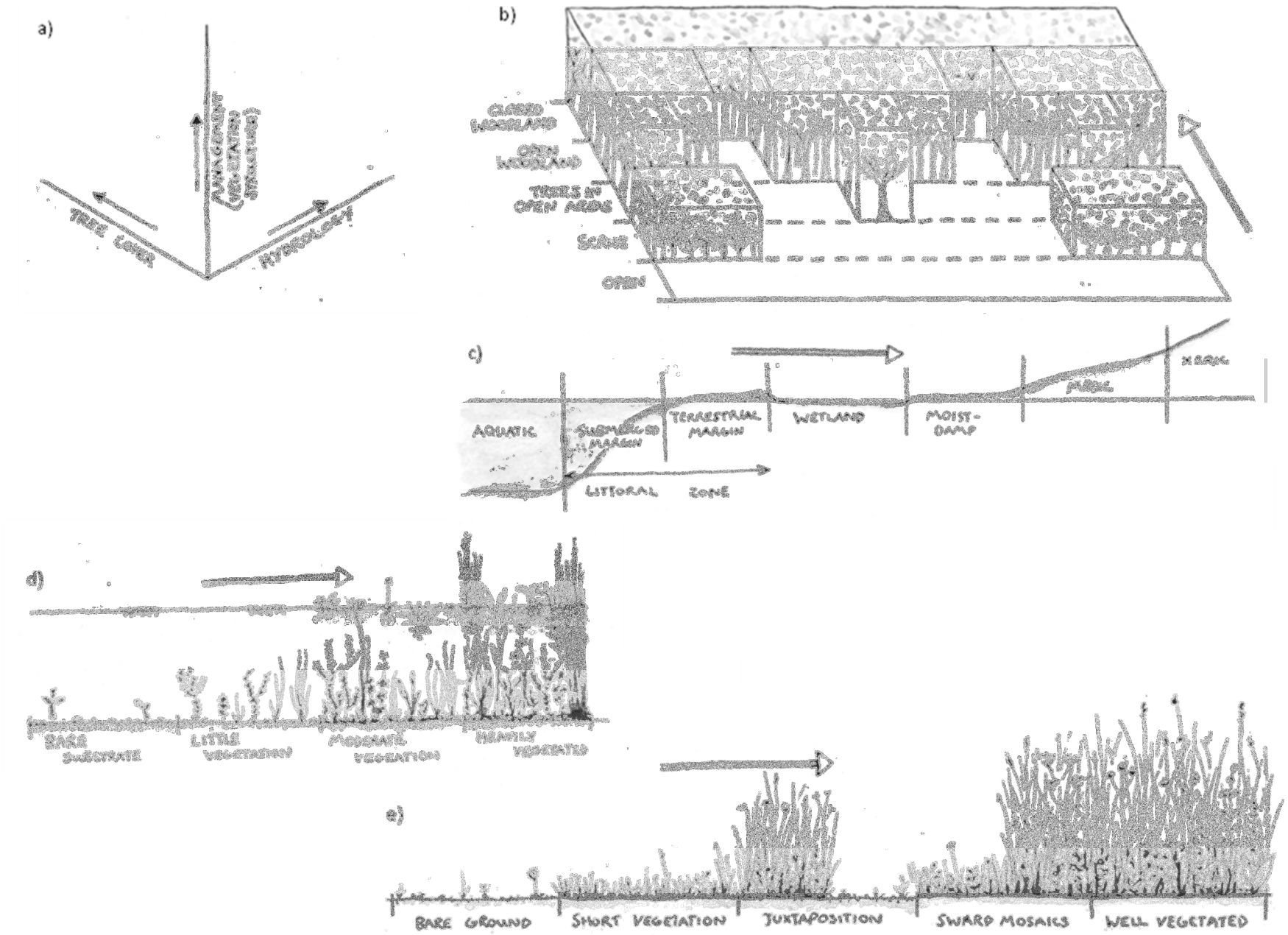


Figure 11: The conceptual framework used in creating guilds of species. a) This considered three dimensions; a gradient of b) tree cover; c) hydrology; management

usually as the resulting vegetation structure in both terrestrial and aquatic environments.

Table 7. Coarse and fine categories along a successional gradient from open habitats to closed canopy woodland, used in the definition of management guilds.

Coarse Successional categories			Fine Successional categories	Description of categories	Typical habitats
OPEN			Open unshaded **O**	Areas are **open**, encompassing numerous predominately **treeless** habitat types. Species do not specifically require trees, but may rarely exploit open conditions in wooded areas.	All treeless habitats; arable fields, grassland, fen, reedbed, open ditches, unshaded rivers
			Open shaded **OS**	Habitats are **open but shaded**. **Shade is primarily not from tree cover**, although species may occasionally occur in closed-canopy, shaded areas.	Under-cliff, rock crevices, north-facing slopes/walls.
LANDSCAPE COMPLEXITY (species have requirements in more than category)			Open **and** Scrub **POS**	Species require **both** open unshaded and scrub habitats during their lifecycle. Scrub elements are required for nesting, overwintering or for resources e.g. pollen, prey, deadwood. Some species may be found in woodland edge, hedgerows and rides.	Isolated patches of scrub within an open habitat (e.g. grassland-scrub mosaics). Size of scrub patches can vary greatly.
			Open **and** Wood **LC OW**	Species require a complex landscape comprising **open habitats, juxtaposed with wooded** areas. Species have a distinct requirement in each habitat and need to be managed in both.	Complex landscape comprising areas of both wooded and open habitats
SHADED	**Partial shade**		Scattered Scrub **PSS**	Open areas with patches of scrub or scattered scrub elements, in a variety of wet and dry habitats.	Scattered scrub or scrub edge in open dry grassland or isolated scrub or carr in fens.
	Tree or srub cover T/SC	**Open wooded**	Wood-pasture/ Parkland **PWP**	This category is subdivided by tree density: wood-pasture/parkland, including isolated trees in open areas (e.g. isolated trees in arable context or riverside situations); open woodland (e.g. rides, glades, wood-edge).	A wide range of tree covered land-cover types.
			Open woodland **POW**		
		Closed Canopy	Closed Scrub	Species of habitats with a predominately **closed-canopy**. This category is subdivided by type of canopy cover; woodland or scrub.	Mature hawthorn scrub, closed canopy ancient woodland
			Closed Woodland **CW**		
VARIETY (Open to closed-canopy) V			Open to closed-canopy	Species occurring in a **variety of habitat types;** both **open and closed-canopy**. This category includes both True generalist species occurring in a range of habitats and specialist species that exploit the same niche in a variety of habitats (e.g. detritivores), which may include highly specialised host-specific species.	A variety of open and closed habitats. (e.g. species occurs in litter in open reedbed and closed-canopy oak woodland)

Table 8. Coarse and fine categories along a hydrological gradient from fully aquatic to droughted xeric conditions, used in the definition of management guilds. Example NVC and ISIS categories are given.

Coarse Hydrological categories	Fine Hydrological categories	Description	Typical habitats (NVC)	Typical species (ISIS categories)
1. Fast-flowing water	Fast-flowing water	Species found **within,** or at the **margins of, fast flowing streams and waterfalls** (e.g. boulders/splash zones). *Aquatic, semi-aquatic and terrestrial life stages*	Fast-flowing water and waterfalls	Rare in the Fens (W113)
13. Aquatic	Flowing water	*Aquatic (semi-aquatic) species* found within the main body of moving water. Water has **definite movement**; ditches are not included. Species may have non-aquatic separate stage of lifecycle. Species mostly intolerant of desiccation.	Rivers (A2, A8, A19, A17)	Floating leaved and submerged aquatic plants, crustaceans (W125)
	Standing water	*Aquatic (semi-aquatic) species* found within the main body of **still or very slow flowing water**. Species may have non-aquatic separate stage of lifecycle. Species mostly intolerant of desiccation.	Pools, lakes, still parts of rivers (A1, A5, A12, A24)	Floating-leaved and submerged plants, strong-swimming aquatic beetles (W125, W212)
14 Littoral (sp occur in both 4 + 6 for separate stages, or are indifferent and occur in both) **4. Submerged margins**	Submerged margins	*Aquatic and semi-aquatic species* of **submerged** margins of a water body. Substrate is typically below water, though rare fluctuations can occur.	Ditches or small shallow pools, or littoral swamp. (A20, M1, S19)	Emergent macrophytes, aquatic beetles, flies, aquatic molluscs
6. Terrestrial margins	Terrestrial margins	*Semi-aquatic and terrestrial species* usually occurring at the emergent **margins of a water body**. Similar conditions may occur more widely in wetland habitats where subject to fluctuations in water table. Species usually occur on or in the damp or saturated substrate (e.g. margin, bank)	Margins of ditches, pools, lakes and rivers (OV29, M5, M36)	Ground beetles, rove beetles craneflies, snailkilling flies (W121,W122)

15 Wet to dry		Permanently wet	Typically **permanently wet** habitats. Water table above or near substrate. Occasional seasonal fluctuations in water table can occur both above and below the substrate, but substrate always water-logged or wet. Communities are frequently adaptable to changes in level, e.g. floating vegetation mats	Fen, reedbed, carr, mire (M3, M10, W1)	Wide range of wetland species, particualrly beetles, diptera, moths, hemiptera (W313)
	7. Seasonally wet	Seasonally wet	Areas that are seasonally **wet**, becoming no drier than moist. *Water table at or above the substrate surface in winter and usually falling below the surface in summer. However, the substrate remains moist at all times (usually assisted by a flat topography close to the water table). Species that specifically require fluctuations in water table occur within this category, but are noted separately.*	Wet grassland, margins of fens or marshes, wet areas of heath, wet woodland. (M20, MG13)	Many species of diptera, beetles, moths
	8. Moist or seasonally moist	Moist or seasonally moist	**Moist or seasonally moist to wet** (any fluctuations are at or below the substrate).	Dry reedbed, moorland, wet woodland (MG12, CG12, W6)	Predominently beetles and diptera, also plants, moths
	10. Mesic	Damp	Damp habitats that are often of stable hydrology and are never inundated or saturated with water. In open habitats, damp areas may be associated with shading (e.g. tall grass).	Wide range of habitat types, e.g. damp areas of woodland, grassland MG6, CG10, W11	Plants, mosses, spiders, Hemiptera, diptera
		Mesic	Mesic soils. Species for which no information on hydrological requirements is available are also included in this category.	Woodland, grassland, heath, dune, arable	An extremely wide range of species
		Dry	Dry soils	Dry grassland, heath, dune (OV16, U1)	Plants, spiders, hymenoptera, hemiptera
	12. Xeric	Xeric	Extremely dry areas with exceptionally free draining soils (e.g. sandy, bare, parched soil) or no soil (e.g. bare rock, scree).	Dry parched grassland, scree (CG7, OV17)	Drought adapted plants, hemiptera, spiders, many bees and wasps

NVC communities: A1 - Lemna gibba community, A2 - Lemna minor community, A5 - Ceratophyllum demersum community, A8 - Nuphar lutea community, A12 - Potamogeton pectinatus community, A17 - Ranunculus penicillatus ssp. pseudofluitans community, A19 - Ranunculus aquatilis community, A20 - Ranunculus peltatus community, A24 - Juncus bulbosus community, M1 - Sphagnum auriculatum bog pool community, M3 - Eriophorum angustifolium bog pool community, M5 - Carex rostrata-Sphagnum squarrosum mire, M10 - Carex dioica-Pinguicula vulgaris mire, M12 - Carex saxatilis mire, M20 - Eriophorum vaginatum blanket and raised mire, M36 - Lowland springs and streambanks of shaded situations, S19 - Eleocharis palustris swamp, CG7 - Festuca ovina-Hieracium pilosella-Thymus praecox/pulegioides grassland, CG10 - Festuca ovina-Agrostis capillaris-Thymus praecox grassland, MG13 - Agrostis stolonifera-Alopecurus geniculatus grassland, OV16 - Papaver rhoeas-Silene noctiflora community, OV17 - Reseda lutea-Polygonum aviculare community, OV28 - Agrostis stolonifera-Ranunculus repens community, U1 - Festuca ovina-Agrostis capillaris-Rumex acetosella grassland, W1 - Salix cinerea-Galium palustre woodland, W11 - Quercus petraea-Betula pubescens-Oxalis acetosella woodland.
ISIS assemblages: W113 – fast flowing streams & waterfalls, W125 – slow flowing rivers, W212 – northern lakes & lochs, W121 – sandy river margin,W122 – riparian sand, W313 – Mesotropic fen ISIS assemblages: W113 – fast flowing streams & waterfalls, W125 – slow flowing rivers, W212 – northern lakes & lochs, W121 – sandy river margin,W122 – riparian sand, W313 – Mesotropic fen

Table 9. Key ecological processes and micro-habitats used in conjunction with the successional and hydrological categories in order to define guilds.

Arboreal species	Species found on trees or shrubs in wooded and/or scrubby conditions. Species are arboreal for much of their lifecycle, but may occur elsewhere as adults (e.g. moths) or may be arboreal as adults but have larval stages elsewhere. These groups may include epiphytic algae, mosses, lichens, slime moulds and fungi, and their associated invertebrates. This definition encompasses a range of feeding behaviours, including phytophages, xylophages, nectarivores and palynivores, as well as many associated predators and parasites. General best management practice for these species is to ensure heterogeneity in tree canopy structure and age. This would benefit both species that require younger trees, including many foliage feeders, and species that require mature trees and associated sap runs, rot holes and hollow trees. It is important to maintain standing and fallen deadwood. Ground vegetation structure is often not essential for these species. However, a variety of vegetation structures, including the presence of herbaceous flowers and flowering shrubs, may be useful.
Short vegetation	This applies to both aquatic and terrestrial conditions, with little biomass. In grassland this is short vegetation, from grazing or cutting, however it should be noted some species may be grazing intolerant or intolerant of any cutting or grazing during specific times (e.g. for seeding plant or gall forming species).
Well vegetated	This category can apply in both aquatic and terrestrial conditions. Species are associated with areas of dense and/or tall vegetation. Some species may also have a requirement for dead herbaceous stems, detritus or litter**,** which are frequently associated with well vegetated areas. Management by occasional cutting, biomass harvest or low intensity/rotational grazing would be suitable; few species can tolerate intense grazing and may require undisturbed conditions. Nutrient limitation and fluctuating water levels are also important for a number of species. In aquatic systems, areas contain rich, lush submerged vegetation.
Heavily vegetated	This category can apply in both aquatic and terrestrial conditions. In terrestrial conditions, species require areas that are heavily vegetated, in late (herbaceous) successional stages, e.g. in grassland or fen habitats, areas are dominated by coarse, rank vegetation with occasional bramble thickets, giving way to occasional saplings/shrubs. Some species require flower rich areas, or occur in flowers, seed heads or stems, which may be naturally provided in heavily vegetated areas. In aquatic systems, areas are choked with rich vegetation that impedes the flow of water.
Sward mosaics	Species require both areas of short and tall vegetation, such as tussocks. Many species can be managed for with a rotation of grazing or cutting that would create complex swards. However, the species require the differing sward heights in very close proximity. Species are reliant on areas of tall vegetation for shelter or overwintering, or plants in ungrazed, tall areas. Short vegetation is required for basking or is a requirement for host species or plants. This category includes a small number of species for which sward mosaics are stated in species accounts as the best management, rather than there currently being evidence of a distinct requirement.
Juxtaposition	Species require bare substrates or sparse vegetation, usually created by some form of disturbance. Such conditions should be juxtaposed with areas of taller vegetation. This includes many species requiring flower-rich areas, either for pollen or nectar resources, and species occurring within unopened flowers, developing seed heads or stems. Some species may also require detritus, which can be provided by well vegetated areas.
Rock	Species associated with bare or sparsely vegetated rock, including on rocky crevices, boulders, stones, churchyards. Substrate pH and nutrient limited conditions are particularly important for these species. Some species are also associated with rock and an accumulation of detritus, usually in areas that are rarely disturbed.
Fungi	Species associated with fungi, usually with fungal fruiting bodies (e.g. bracket fungi *Fomes*, *Piptoporus* and puffball fungi *Lycoperdon, Bovista*). Many species may also require detritus, litter and deadwood.
Detritus	This category can occur in both terrestrial and aquatic conditions. Species are associated with rich layers of organic matter, including detritus or herbaceous litter (leaf/reed/sedge litter). Species also include some mosses and species that require mosses or liverworts. Some species have been found in thatched roofs and bird nests.
Deadwood	Terrestrial species that require **deadwood**; can include standing or fallen deadwood. Most hymenoptera and many beetles have a preference for standing deadwood and many diptera seem to prefer fallen deadwood. However, the literature for many species does not distinguish between the two types. The requirement for fallen deadwood often overlaps with the need for detritus and coarse debris. A subset of these species requires flower-rich areas.

Management guilds

1,561 (82%) priority species were assigned to a management guild. Vertebrates were not assigned to a management guild, because their habitat and ecological requirements must generally be considered at greater spatial scale. Excluding vertebrates, 91% of priority species were assigned to a management guild.

A number of species were only classified into a broad guild, either because their requirements are met by the conditions of the broad guild, or because there was insufficient information available in order to understand their detailed requirements.

Guilds contained 16 (± 16, SD) priority species on average. The largest guild containing 91 species was light disturance and light grazing in open, mesic conditions. Three 'guilds' contained only one species; species associated with fungi in open wetlands, bare ground and detritus in open, mesic conditions, and dung in closed-canopy woodlands. Whilst single species do not constitute a guild, it was felt that the conditions required by these species were sufficient different and relevant to management.

Fifty-eight (58%) of guilds contained at least one BAP species. Guilds without a BAP member were smaller than those containing a BAP (mean (± SD) guild size without a BAP 8±8 species, with a BAP 21±18 species). Of the 42 guilds without a BAP member, six contained a Fens Specialist species. The remaining 36 guilds potentially have no 'flagship' species. Many of these are small guilds (72% contain fewer than 10 species). Others are Broad Guilds (e.g. O.4 – open submerged margins) and frequently more information was available regarding BAP species and so they could be placed into Sub-Guilds. Deadwood in closed-canopy woodland was a large guild (31 species) for which no BAP species has been recorded in the area.

Table 10. List of management guilds, showing the number of species classified into each guild. The numbers of BAP and Fens Specialist species are shown.

Guild No.	Guild Code	Guild Name	No. of priority species	No. BAP species	No. Fen Specialist species
1	O.1	open fast flowing water	3	0	0
2	O.13	open – aquatic	10	1	2
3	O.13brsub	open – aquatic – bare substrate	5	1	1
4	O.13mdveg	open - aquatic – moderate vegetated	18	5	1
5	O.13wlveg	open - aquatic – well vegetated	13	3	1
6	O.4	open – submerged margins	11	0	0
7	O.4brsub	open – submerged margins – bare substrate	4	3	2
8	O.4shveg	open – submerged margins – short vegetation	8	1	1
9	O.4wlveg	open – submerged margins – well vegetated	34	3	4
10	O.4heveg	open – submerged margins – heavily vegetated	14	2	3
11	POW.4	open wood – aquatic	4	0	0
12	O.14	open – littoral	4	0	0
13	O.14bgrnd, shveg	open – littoral – bare ground, short vegetation	6	1	0
14	O.14mdveg	open – littoral – moderate vegetation	5	0	0
15	O.14wlveg	open – littoral – well vegetated	20	4	0
16	O.14swrdm	open - littoral – sward mosaics	15	0	0
17	O.14detri	open – littoral – detritus	10	0	1
18	PSS.14swrdm	scattered scrub – littoral – sward mosaics	8	0	0
19	O.6	open – terrestrial littoral	20	0	0
20	O.6bgrnd	open – terrestrial littoral – bare ground	23	2	1
21	O.6wlveg	open – terrestrial littoral – well vegetated	11	2	1
22	O.6juxt	open – terrestrial littoral – juxtaposition	3	0	0
23	O.6detri	open – terrestrial littoral – detritus	12	0	0
24	CW.6	closed-canopy wood/scrub – littoral	6	0	0
25	V.6/14	open to closed-canopy – littoral	8	0	0
26	O.5	open – wet	7	0	0
27	O.5bgrnd	open – wet – bare ground	8	0	0
28	O.5bgrnd, dist	open – wet – bare ground, disturbance	2	1	1
29	O.5mdveg	open – wet – moderate vegetation	34	4	6
30	O.5wlveg	open – wet – well vegetated	61	5	13
31	O.5swrdm	open – wet – sward mosaics	8	2	0
32	O.5fungi	open – wet – fungi	1	0	0
33	O.5carri/dung	open – wet – carrion/excrement	2	0	0
34	PSS.5swrdm	scattered/open scrub – wet – swrdm	7	0	1
35	PSS.5wlveg	scattered/open scrub – wet – well vegetated	8	2	1
36	T/SC.5	carr – wet	19	4	2
37	T/SC.5swrdm	carr – wet – swrdm	6	1	0
38	T/SC.5dead/detri	carr – wet – deadwood/detritus	11	1	1
39	V.5	open to closed-canopy – wet	15	1	0
40	V.5detri/fungi	open to closed-canopy – wet – detritus/fungi	10	0	0
41	O.7	open – seasonally wet	14	0	2
42	O.7bgrnd	open – seasonally wet – bare ground	17	7	3
43	O.7shveg	open – seasonally wet – short vegetation	5	2	1
44	O.7mdveg	open – seasonally wet – moderate vegetation	24	8	2

45	O.7wlveg	open – seasonally wet – well vegetated	21	3	5
46	O.7dung	open – seasonally wet – dung	2	0	1
47	O.5/8detri	open – wet or damp – detritus	49	1	6
48	POW.7	open wood – seasonally wet	8	0	0
49	CW.8	closed-canopy woodland – damp	14	0	0
50	OS.8	open – shaded	6	1	0
51	O.10	open – mesic	28	8	0
52	O.10bgrnd, detri	open – mesic – bare ground, detritus	1	0	0
53	O.10bgrnd, shveg	open – mesic – disturbance, grazing	42	7	0
54	O.10Ldist	open – mesic – lightly disturbed, light grazing	91	10	0
55	O.10Hdist	open – mesic – heavily disturbed	83	20	0
56	O.10shveg	open – mesic – short vegetation	28	4	0
57	O.10wlveg	open – mesic – well vegetated	31	10	1
58	O.10swrdm	open – mesic – sward mosaics	22	11	0
59	O.10juxt	open – mesic – juxtaposition	55	14	1
60	O.10rock	open – mesic – rock	12	0	0
61	O.10detri	open – mesic – detritus	22	0	0
62	O.10dung	open – mesic – dung	6	1	0
63	O.10fungi	open – mesic – fungi	2	0	0
64	PSS.10	scattered scrub – mesic	14	5	0
65	POS.10	open and scrub – mesic	18	3	0
66	PWP.10	trees in open conditions – mesic	15	7	0
67	POW.10	open wood – mesic	27	1	1
68	POW.10 Ldist	open wood – mesic – light disturbance	6	0	0
69	POW.10shveg	open wood – mesic – short vegetation	7	2	0
70	POW.10wlveg	open wood – mesic – well vegetated	17	5	1
71	POW.10heveg	open wood – mesic - heavily vegetated	4	2	0
72	POW.10dead	open wood – mesic – deadwood	9	0	0
73	POW.10fungi	open wood – mesic – fungi	2	0	0
74	CW.10	closed-canopy woodland – mesic	32	5	2
75	CW.10dead	closed-canopy woodland – mesic – deadwood	31	0	0
76	CW.10detri	closed-canopy woodland – mesic – detritus	31	3	0
77	CW.10dung	closed-canopy woodland – mesic – dung	1	0	0
78	CW.10fungi	closed-canopy woodland – mesic – fungi	20	0	1
79	T/SC.10	tree/shrub cover – mesic	44	12	1
80	T/SC.10dead	tree/shrub cover – mesic – deadwood	38	1	0
81	T/SC.10detri	tree/shrub cover – mesic – detritus	5	0	0
82	T/SC.10fungi	tree/shrub cover – mesic – fungi	7	0	0
83	T/SC.10vet	tree/shrub cover – mesic – vet	15	2	0
84	V.10	open to closed-canopy – mesic	9	1	0
85	O.12dist, graz	open – xeric – disturbance, grazing	14	2	0
86	O.12dist	open – xeric – disturbance, no grazing	11	7	0
87	O.12juxt	open – xeric – juxtaposition	7	1	0
88	O.15	open – wet to dry	9	1	0
89	O.15graz	open – wet to dry – grazed	13	4	1
90	T/SC.15	tree/shrub cover – wet to dry	13	2	2
91	CW.15detri,fungi	closed-canopy woodland – wet to dry – detritus/fungi	4	0	0

92	V.carri	open to closed-canopy – carrion	4	0	0
93	V.detri/fungi	open to closed-canopy – detritus/fungi	43	0	0
94	sub.10	Subterranean	7	0	0
95	sub.5	subterranean – springs	2	0	0
96	saltm	Saltmarsh	22	0	0
97	saltm,upper	saltmarsh – upper	8	1	0
98	saltm,detri	saltmarsh – detri	4	0	2
99	LC.OW	open and wood	14	1	0
100	LC.5-10	open – wet and dry	3	0	0

Guild Descriptions

1. Broad guild: Open – Fast-flowing Water

Code: O.1
Description: Species occur in areas of fast-flowing, well-oxygenated water, with no shading from canopy cover. This guild is poorly represented in The Fens.
Typical priority species: aquatic beetles; riffle beetles (Elmidae) and minute moss beetles (Hydraenidae).
Number of priority species: 3

2. Broad guild: Open – Aquatic

Code: O.13
Description: These are aquatic or semi-aquatic species of standing, flowing or both standing and flowing water, in open, predominantly treeless situations. The majority of species are aquatic; though semi-aquatic species are included when it is considered that the aquatic stage forms the most sensitive stage of their lifecycle and as such management which would impact on this stage is most important (e.g. some dragonflies). Species can exist away from the submerged margins and into areas of relatively open water. Species include plants that are free-floating or deeply-rooted submerged aquatics, and water beetles that are effective swimmers and forage in open water. Emergent littoral margins may be necessary for some species at certain stages of the life cycle (e.g. pupation).
Typical priority species: minute moss beetles (Hydraenidae), molluscs and stonewort.
Number of priority species: 10 (2)

3. Open –Aquatic – Bare substrate
Code: O.13brsub
Description: These are aquatic or semi-aquatic species of standing, flowing or both standing and flowing water, in open, predominantly treeless situations. Species require the waterbodies to be in early successional stages, with bare substrates for the establishment of plants and little aquatic vegetation. Species can occur in areas disturbed by animals or birds, or with seasonal fluctuations in water level which help reduce dense competition vegetation. Frequent removal of aquatic vegetation will benefit species that require little competition, and disturbance may be beneficial for establishment of species.
Typical priority species: flowering plants, stoneworts, liverwort.

Number of priority species: 5 (1)

4. Open –Aquatic – Moderate vegetation
Code: O.13mdveg
Description: These are aquatic or semi-aquatic species of standing, flowing or both standing and flowing water, in open, predominantly treeless situations. Species occur in waterbodies with plenty of aquatic vegetation, including some specific foodplant species. Clearance management should operate on an intermediate rotation to provide suitable conditions, but prevent waterbodies becoming choked with vegetation.
Typical priority species: riffle beetles (Elmidae), weevils (Curculionidae) flowering plants, stoneworts and a crustacean, caddisfly.
Number of priority species: 18 (1)

5. Open –Aquatic – Well vegetated
Code: O.13wlveg
Description: These are aquatic or semi-aquatic species of standing, flowing or both standing and flowing water, in open, predominantly treeless situations. Species occur in areas with plentiful aquatic vegetation and include molluscs, odonata and aquatic beetles that require rich, dense aquatic vegetation. A number of these species are sensitive to disturbance and some species are poor colonisers. Areas should be managed on a long rotation, with only small area cleared at a time.
Typical priority species: aquatic beetles including weevils (Curculionidae) and leaf beetles (Chrysomelidae) stoneworts, flowering plants, molluscs, odonata.
Number of priority species: 13 (1)

Forty-six species, including five Fen Specialists, were fully aquatic, occurring in standing or flowing water. This group of species was widely distributed across the Fens landscape, particularly considering the patchy recording effort (Fig. 12). It is important to note that these management guilds do not include vertebrate species; the inclusion of fish into these guilds would increase the distribution of this group. It is not clear if the lower reaches of the rivers are less suitable for priority plant and invertebrate species or if the recording effort for these groups is much reduced.

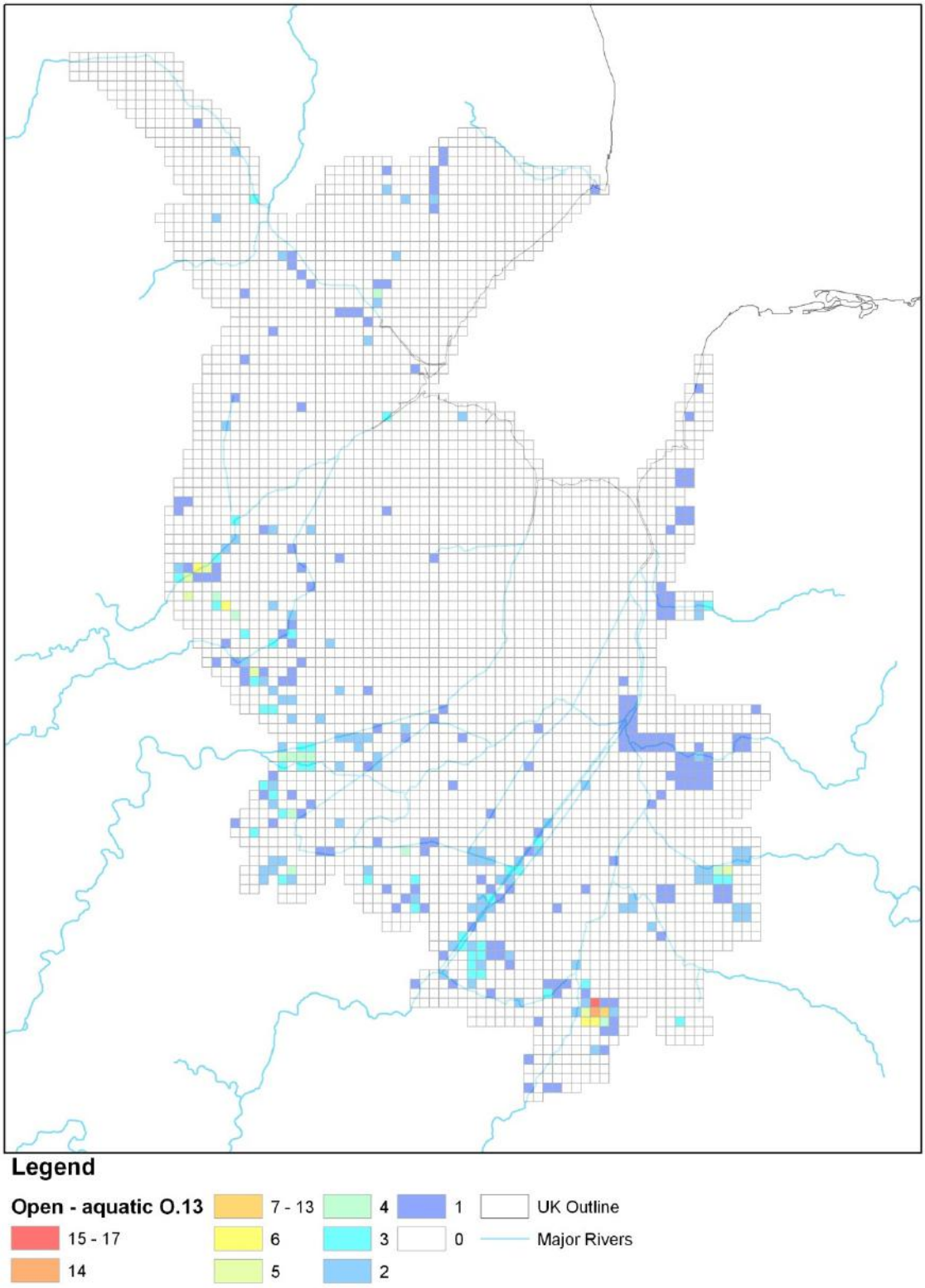


Fig. 12. The distribution (number of species per 1-km square) of fully aquatic priority species, recorded since 1987 (inclusive), in the Fens Biodiversity Audit area. The mapped distribution includes 46 species from four guilds.

6. Broad guild: Open – Submerged margins

Code: O.4
Description: Species occur in submerged littoral margins in open, predominantly treeless situations. Areas are permanently wet, with water almost always above the substrate, although occasional small fluctuations in water levels may occur. Species may tolerant infrequent droughts, but are reliant upon the presence of waterbodies. Species are aquatic or semi-aquatic, or occasional entirely terrestrial species that require the emergent vegetation (e.g. moth species).
Typical priority species: aquatic beetles
Number of priority species: 11

7. Open – Submerged margins – Bare substrate
Code: O.4bgrnd
Description: Species occur on bare or sparsely vegetated substrates in submerged littoral margins, in open, predominantly treeless situations. Substrates may be peat or silt, although a number of species have a specific requirement for a particular substrate type or pH. Trampling and poaching is beneficial in creating bare ground and maintaining early successional stages; however should not be extensive as natural fluctuations in water level may be the usual mechanism of creating such conditions.
Typical priority species: fern, flowering plant, stonewort.
Number of priority species: 4(2)

8. Open – Submerged margins – Short vegetation
Code: O.4shveg
Description: These aquatic species occur in well vegetated, submerged margins of waterbodies in open, predominantly treeless situations. Species require short aquatic vegetation including; grassy or mossy areas, often in shallow permanent water which are accessible to grazing livestock or cut frequently. Rarely areas may have small patches of bare ground from poaching by livestock, which may benefit some species. Ditches on short clearance rotation could provide suitable conditions.
Typical priority species: flowering plants, diving beetles (Dytiscidae).
Number of priority species: 8 (1)

9. Open – Submerged margins – Well vegetated
Code: O.4wlveg
Description: Species occur in well vegetated, submerged margins of waterbodies in open, predominantly treeless situations. Species require plentiful aquatic and/or tall emergent vegetation, occasionally with some accumulating detritus. Ditches on an intermediate to long clearance rotation could provide suitable conditions.
Typical priority species: aquatic beetles; including diving beetles (Dytiscidae) and weevils (Curculionidae), caddisflies.
Number of priority species: 34 (4)

10. Open – Submerged margins – Heavily vegetated
Code: O.4heveg
Description: Species occur in heavily vegetated, submerged margins of waterbodies in open, predominantly treeless situations. The margins are choked with dense aquatic

and tall dense emergent vegetation, which usually results in dense shading and provides an accumulation of detritus and dead stems. One species requires dense aquatic vegetation but little shading emergent vegetation. Clearance management should be on a very long rotation.
Typical priority species: diving beetles (Dytiscidae), Hemiptera, molluscs.
Number of priority species: 14 (3)

11. Broad guild: Open woodland – Aquatic

Code: POW.4
Description: Aquatic species occurring in partially shaded waterbodies. Species may rarely tolerate completely shaded areas. Typical partially shaded waterbodies have limited aquatic vegetation and are often rich with detritus or leaf litter. Species are can also be found in partially shaded, shallow mossy pools.
Typical priority species: all species are diving beetles (Dytiscidae).
Number of priority species: 4

12. Broad guild: Open – Littoral

Code: O.14
Description: Species occur in both the submerged and emergent (terrestrial) littoral zones in open areas with no tree or shrub canopy. Some species with this broad and sub guilds utilise different littoral zones during different parts of their lifecycle, e.g. diptera, leaf beetles (Chrysomelidae) and some "water beetles" families, such as long-toed water beetles (Dryopidae). Other species are semi-aquatic species and do not distinguish between the aquatic and terrestrial zones of littoral margins; some species of diving beetles (Dytiscidae).
Typical priority species: a range of semi-aquatic littoral beetle families.
Number of priority species: 4

13. Open – Littoral – Short vegetation and bare ground
Code: O.14bgrnd, shveg
Description: Species occur across the submerged and emergent (terrestrial) littoral zones with little vegetation and exposed wet to moist substrates, in open areas with no tree or shrub canopy cover. Species require sparse aquatic and emergent vegetation and little vegetation along the terrestrial margin. Fluctuating water levels may be beneficial in creating the suitable areas of wet to moist bare ground for a number of the species. Typical areas include grassy pools and areas may sometimes be grazed, providing bare ground and preventing dense vegetation.
Typical priority species: littoral semi-aquatic beetles; including Georissidae and Helophoridae and a species of mollusc.
Number of priority species: 6

14. Open – Littoral – Moderate vegetation
Code: O.14mdveg
Description: Species occur in both the submerged and emergent (terrestrial) littoral zones in open areas with no tree or shrub canopy. Species require short to moderate aquatic and emergent vegetation, often with early successional species-rich communities. Areas should be cut on a short to moderate rotation or grazed, but should not be allowed to become completely choked by aquatic/ emergent vegetation.

Typical priority species: beetles and diptera
Number of priority species: 5

15. Open – Littoral – Well vegetated
Code: O.14wlveg
Description: Species occur in both the submerged and emergent (terrestrial) littoral zones in open areas with no tree or shrub canopy. Species require plentiful aquatic and emergent vegetation, often with tall species-rich communities. A number of species occur in dead herbaceous and reed stems, and any complete cutting should account for the long larval stages of some species (up to 4 years). Areas should be cut on a moderate to long rotation, but should not be allowed to become completely choked by aquatic/ emergent vegetation.
Typical priority species: leaf beetles (Chrysomelidae), moths, and a range of diptera and water beetles.
Number of priority species: 20

16. Open – Littoral – Sward mosaics
Code: O.14swrdm
Description: Species occur in both the submerged and emergent (terrestrial) littoral zones, in open areas with no tree or shrub canopy. Species require structurally complex vegetation across the littoral margins; including aquatic and emergent plants, and a range of vegetation heights in the terrestrial zone, such as tussocks, flowers and short vegetation, including mosses.
Typical priority species: several species of snail killing flies (Sciomyzidae) and soliderflies (Stratiomyidae), long-toed water beetles (Dryopidae).
Number of priority species: 15

17. Open – Littoral – Detritus
Code: O.14detri
Description: Species occur in both the submerged and emergent (terrestrial) littoral zones, in open areas with no tree or shrub canopy, with a plentiful layer of organic matter, including detritus and mosses. Typical sites for these guilds include mossy *Sphagnum* pools, ponds with plentiful decaying vegetation and seepages. Some taller vegetation may be important to provide structure (e.g. spiders) and to create detritus, but areas should not have dense tall vegetation.
Typical priority species: beetles, spiders and a single species of moss and diptera.
Number of priority species: 10 (1)

18. Broad guild: Scattered scrub – Littoral – Sward mosaics

Code: PSS.14swardm
Description: Species occur in submerged and/or emergent margins of water that is adjacent, or very close, to some scattered or open scrub. Species utilise the aquatic and terrestrial littoral zones during different parts of the life-cycle. Partial shading of the waterbodies by some scrub will be beneficial. Species require vegetation in the littoral zone that can include both emergent and terrestrial littoral communities and a range of vegetation types should be managed for. Fluctuations in the water level of water bodies may be important for many species within this guild.

Typical priority species: Snail-killing flies (Sciomyzidae)
Number of priority species: 8

19. Broad guild: Open – Terrestrial littoral

Code: O.6
Description: Species of emergent (terrestrial) margins of waterbodies of a range of sizes, including ponds, gravel pits and ditches, in open conditions. More rarely, species may occur in areas of fluctuating water in marshes and fens. Most species are terrestrial, through both stages of the lifecycle, though some within the subguilds have semi-aquatic larvae. Though species are stated as those of littoral margins, many species require adjacent rank vegetation or scrub to escape the important seasonal flooding of sites.
Typical priority species: a range of diptera and beetles, particularly ground beetles (Carabidae).
Number of priority species: 20

20. Open – Terrestrial littoral – Bare ground
Code: O.6brgnd
Description: Species of emergent margins at early successional stages, particularly with bare, exposed substrates. Typical habitats include bare substrates at the margins of rivers, e.g. beaches. Bare ground is naturally created and maintained by fluctuations in water level. At least four species can occur in areas created by physical disturbance (e.g. wheel ruts, poaching). It is not known how the remaining species respond to physical disturbance, however for the maintenance or creation of such conditions in the absence of fluctuating water, small-scale, infrequent disturbance is recommended. Several species also require detritus, such as strandline refuse.
Typical priority species: a range of diptera, particularly craneflies (Limoniidae) and beetles, particularly ground beetles (Carabidae) and a liverwort.
Number of priority species: 23 (1)

21. Open – Terrestrial littoral – Well vegetated
Code: O.6wlveg
Description: Species occur in emergent littoral margins, with dense vegetation, e.g. reed and sedge beds. Extensive grazing or cutting on a long rotation would be required to prevent scrub invasion. Usually species are found on the tall littoral vegetation or within the flowers or stems.
Typical priority species: beetles, including ground beetles (Carabidae) moths and hemiptera.
Number of priority species: 11 (1)

22. Open – Terrestrial littoral – Juxtaposition
Code: O.6juxt
Description: Species occur in emergent littoral margins in open conditions. Species require bare, exposed substrates juxtaposed with tall vegetation, e.g. tall, but sparse shading reeds. Frequently, larvae require bare, exposed substrates and adults require tall vegetation for perching, shelter or a source of flowers.
Typical priority species: shore bug (Saldidae) and diptera.
Number of priority species: 3

23. Open – Terrestrial littoral – Detritus
Code: O.6detri
Description: Species occur in emergent littoral margins, in open conditions, and with plentiful detritus and litter. Litter can include decaying vegetation and cut reeds. General detritivores feature heavily within this guild, but other feeding behaviours are included.
Typical priority species: water scavenging beetles (Hydrophilidae), and rove beetles (Staphylinidae), diptera and spiders.
Number of priority species: 12

Two hundred priority species (including 13 Fen Specialists), from 16 guilds, were associated with open, littoral habitats, including both submerged and terrestrial margins. Both the relict fens and relatively new, waterfilled extraction sites were important for this group of species (Fig. 13).

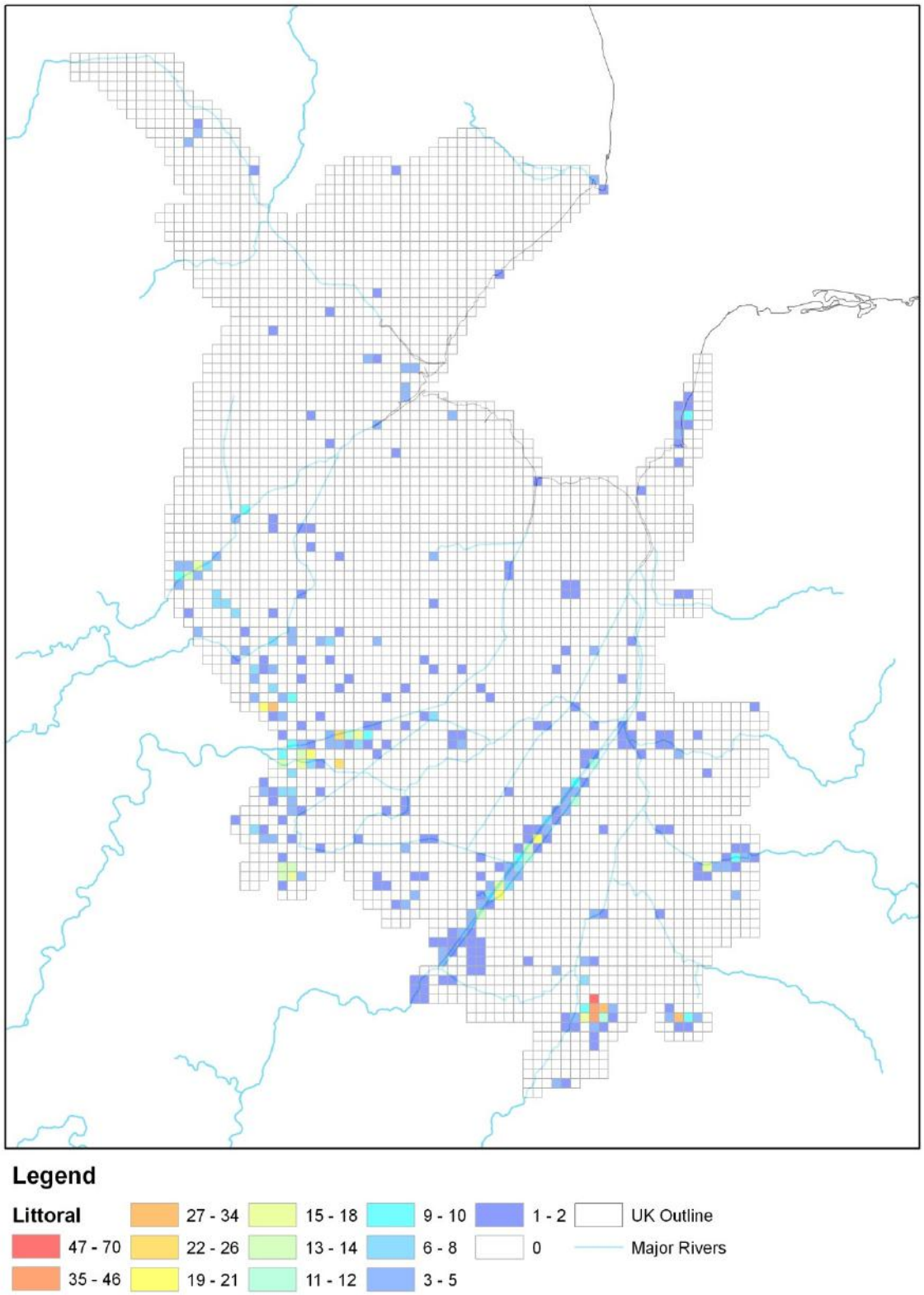


Fig. 13. The distribution (number of species per 1-km square) of species associated with open, littoral habitats of waterbodies (including both submerged and terrestrial margins), recorded since 1987 (inclusive), in the Fens Biodiversity Audit area. The mapped distribution includes 200 species from 16 guilds.

24. Broad guild: Closed-canopywood/scrub – Littoral

Code: CW.6
Description: Species occur at edges of streams, seepages or at the margins of rivers (rarely standing water) that are shaded by closed woodland or, less frequently, scrub. Larvae occur in bare patches of damp or wet soil, or in mosses at the water margins. Bare ground can be provided by natural fluctuations in water level, though adjacent vegetated areas are also important. Undisturbed detritus and mosses are important, with one species feeding on moss.
Typical priority species: This guild is composed entirely of diptera, particularly craneflies (Limoniidae).
Number of priority species: 6

25. Broad guild: Open to closed-canopy – Littoral

Code: V.6/14
Description: Species occur at littoral margins, both submerged and emergent, in a variety of conditions, including both open and closed-canopy situations. The majority of these species are terrestrial, with a small number being semi-aquatic. Seasonally fluctuating water levels are important to the majority of species, with such fluctuations needed to create areas of bare substrate. For many species, maintaining a diversity of vegetation structures is important to accommodate different requirements over the lifecycle or uncertainty in the species requirements.
Typical priority species: diptera; including snail killing flies (Sciomyzidae) and soliderflies (Stratiomyidae), and also ground beetles (Carabidae).
Number of priority species: 8

26. Broad guild: Open – Wet

Code: O.5
Description: Species occur in a range of permanently wet habitats. In such conditions the water level is usually permanently at or above the substrate surface. Typical habitats include fens, bogs, reedbed and marshes.
Typical priority species: beetles, spiders.
Number of priority species: 7

27. Open – Wet – Bare ground

Code: O.5bgrnd
Description: Species occur in a range of permanently wet habitats (water is permanently at or above the substrate surface), such as fens, bogs and marshes. Species require small patches of bare, exposed and saturated substrates that are created through natural disturbance processes, such as slight fluctuations in water level. Physical disturbance of the substrate is usually detrimental. A number of species also require detritus and litter.
Typical priority species: a range of diptera, flowering plant, fern, moss.
Number of priority species: 8

28. Open – Wet – Bare ground, disturbance

Code: O.5dist
Description: Species occur in a range of permanently wet habitats (water is permanently at or above the substrate surface), such as fens, bogs and marshes.

Species require patches of bare, exposed and saturated substrates created through physical disturbance, such as regular trampling or infrequent peat cutting.
Typical priority species: flowering plant, diptera
Number of priority species: 2 (1)

29. Open – Wet – Moderate vegetation
Code: O.5mdveg
Description: Species occur in a range of permanently wet habitats (water is permanently at or above the substrate surface), such as fens, bogs and marshes. Vegetation is rich and diverse, with moderate vegetation such as grazed herb rich fen, or short vegetation such as *Sphagnum* bog. Seasonal grazing or cutting will maintain vegetation communities and accommodate species which occur in stems, flowers or seeds of plants.
Typical priority species: beetles, lepidoptera, hemiptera, diptera and spiders.
Number of priority species: 34 (6)

30. Open – Wet – Well vegetated
Code: O.5wlveg
Description: Species require permanently wet habitats (water levels remain at, or above, the substrate), with lush or dense, tall vegetation. Many species also require some litter created from the lush or dense vegetation. Typical habitats include reed beds and tall, rarely grazed fen. Water levels should remain high and prevent succession to scrub. Where this is not the case, grazing or cutting would be required to prevent succession to scrub, but grazing should be extensive and cutting on a long rotation to allow for species developing in stems with a long larval stage (up to 4 years).
Typical priority species: flowering plants, moths, range of beetles and diptera, spiders
Number of priority species: 61 (13)

31. Open – Wet – Sward mosaics
Code: O.5swrdm
Description: Species require permanently wet habitats (water levels remain at, or above, the substrate), with complex vegetation structures that includes short vegetation and taller tussocks or flower rich resources.
Typical priority species: leaf and plant hoppers (Auchenorrhyncha), moths, diptera
Number of priority species: 8

32. Open – Wet – Fungi
Code: O.5fungi
Description: Only one species occurring in the Fens. This species requires fungi in open, wetland habitats. The type of fungi is unknown.
Typical priority species: a fungus gnat (Mycetophilidae)
Number of priority species: 1

33. Open – Wet – Carrion/excrement
Code: O.5carri/dung

Description: Species occurring in open, wetland habitats with requirements for excrement and/or carrion, including human excrement, pig slurry and occasionally carcasses. As such herbivore dung from grazing livestock is probably not suitable for these species.
Typical priority species: black scavenger flies (Sepsidae)
Number of priority species: 2

Large numbers of Fens priority species, 123 species including 20 Fen Specialists, were associated with open, permanently wet conditions. However, the group were rather restricted in their distribution in the Fens landscape and were mostly recorded from the high quality relict fen sites along the margins of the Fens basin (Fig. 14). This contrasts starkly with the more widely distributed fully aquatic species (O.13 Fig 11).

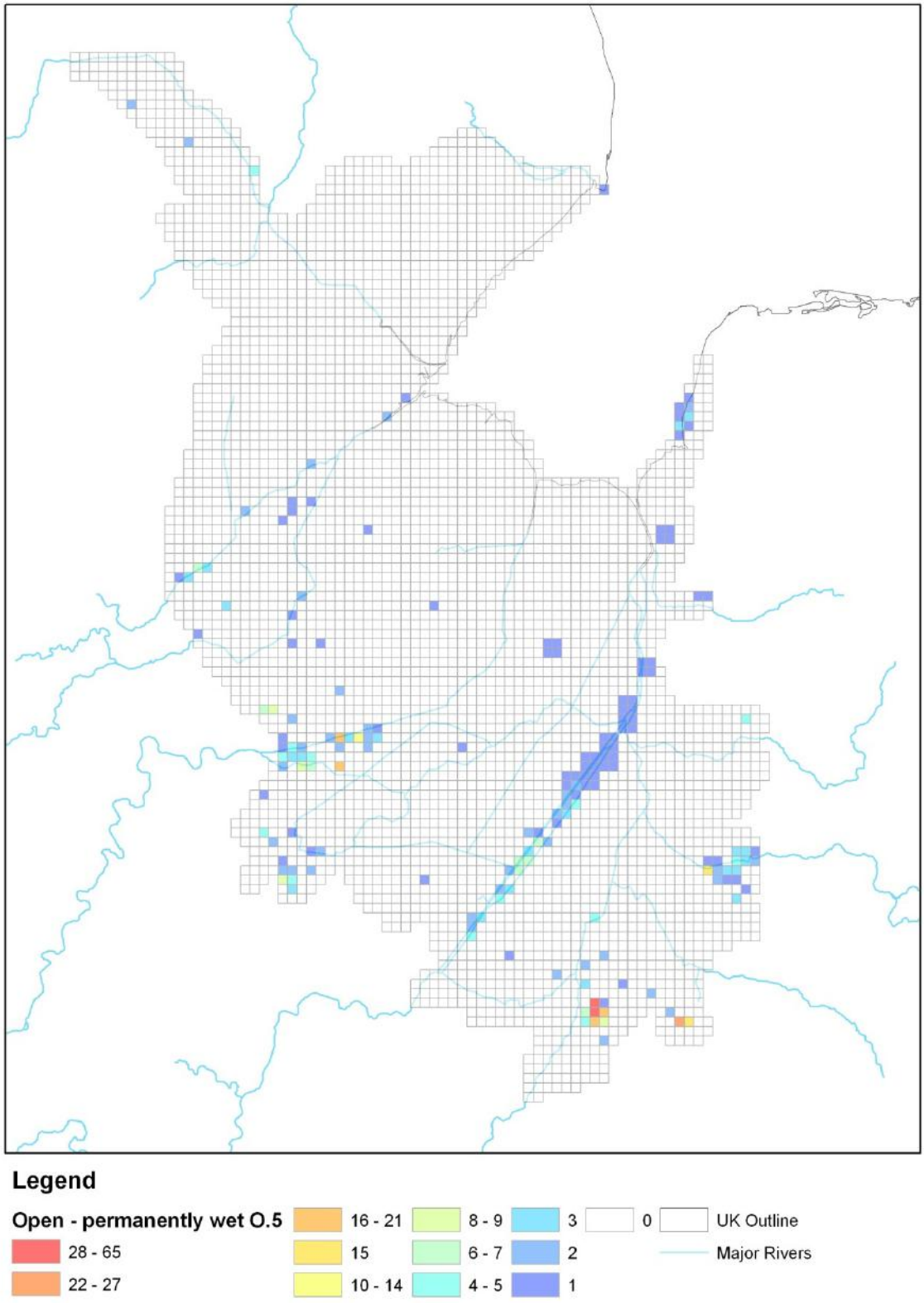


Fig. 14. The distribution (number of species per 1-km square) of priority species associated with open, permanently wet conditions, recorded since 1987 (inclusive), in the Fens Biodiversity Audit area. The mapped distribution includes 123 species from eight guilds.

Broad guild: Scattered scrub – Wet

34. Scattered scrub – Wet – Sward mosaics
Code: PSS.5swrdm
Description: Species of wetlands, for which areas of scattered scrub or isolated bushes are beneficial. Areas of closed carr or scrub are generally not suitable. For these species, maintaining a diversity of vegetation structures is important to accommodate different requirements over the lifecycle or uncertainty in the species requirements.
Typical priority species: a range of diptera.
Number of priority species: 7 (1)

35. Scattered scrub – Wet – Well vegetated
Code: PSS.5wlveg
Description: Species of wetlands, for which areas of scattered scrub or isolated bushes are beneficial. This guild of species is associated with young bushes or scrubby trees, particularly willows *Salix* and bog myrtle *Myrica gale*, in open wetlands. Areas are often also well vegetated and rarely grazed to allow limited invasion of important scrub elements. Typical habitats are a transitional state between late successional mature fen or reed and invading young carr/scrub.
Typical priority species: Hemiptera, moths, solitary wasps.
Number of priority species: 8 (1)

36. Broad guild: Carr – Wet

Name: Carr – Wet
Code: T/SC.5
Description: Species of this guild occur in areas of closed or light canopy cover within wet habitats; fen carr is a typical habitat. Some guild members are closely associated with a host tree/shrub species and, as such, may occur in other habitats, such as along river margins. Important host tree and shrub species include willows *Salix* spp. (occasionally sallow/osier) and poplar or aspen *Populus*. No species within this group are aquatic or semi-aquatic. All species are arboreal during at least one stage of the lifecycle; some species drop to the ground to pupuate. Species are usually phytophagous on the foliage or catkins, though a number of species develop within twigs/branches of associated tree species.
Typical priority species: moths, weevils (Curculionidae), longhorn beetles (Cerambycidae), leafhoppers (Cicadellidae).
Number of priority species: 19 (2)

37. Carr – Wet – Sward mosaics
Code: T/SC.5swrdm
Description: Species are associated with the herbaceous understory, often in addition to the canopy, in carr or wet woodland, or the open herb layer with lightly wooded wetland settings. Management should aim to maintain a range of vegetation heights and structures and would usually include cutting or grazing. Grazing is essential for one species, the horsefly *Tabanus bovinus*, a blood feeder.
Typical priority species: a noctuid moth and a variety of diptera.
Number of priority species: 6

38. Carr – Wet – Deadwood/detritus

Code: T/SC.5dead/detri
Description: Species are associated with deadwood or detritus occur in areas of closed or light canopy cover within wet habitats; fen carr is a typical habitat. Those that utilise deadwood are associated either with wet, fallen deadwood or standing deadwood. Species requiring detritus occur amongst a range of detritus, including fallen rotten deadwood, coarse debris and leaf or herbaceous litter. There is overlap between this guild and damp, closed-canopy woodland with detritus (CW.8) .
Typical priority species: money spiders (Linyphiidae), a number of beetles and True flies.
Number of priority species: 11 (1)

Fifty-one species, including five Fen Specialists, from five guilds, were associated with wet woodland, carr and scrub in permanently wet conditions. The relict fen sites are important for the distribution of these species, particularly Wicken Fen, where more than one third of the species in this group have been recorded (Fig. 15). The distribution of these species outside of the relict fens was patchy, with species only having been recorded in 2% of 1-km squares comprising the Fens NCA. It is not clear the extent to which this reflects the paucity of trees in the Fens landscape, or the influence of recording effort.

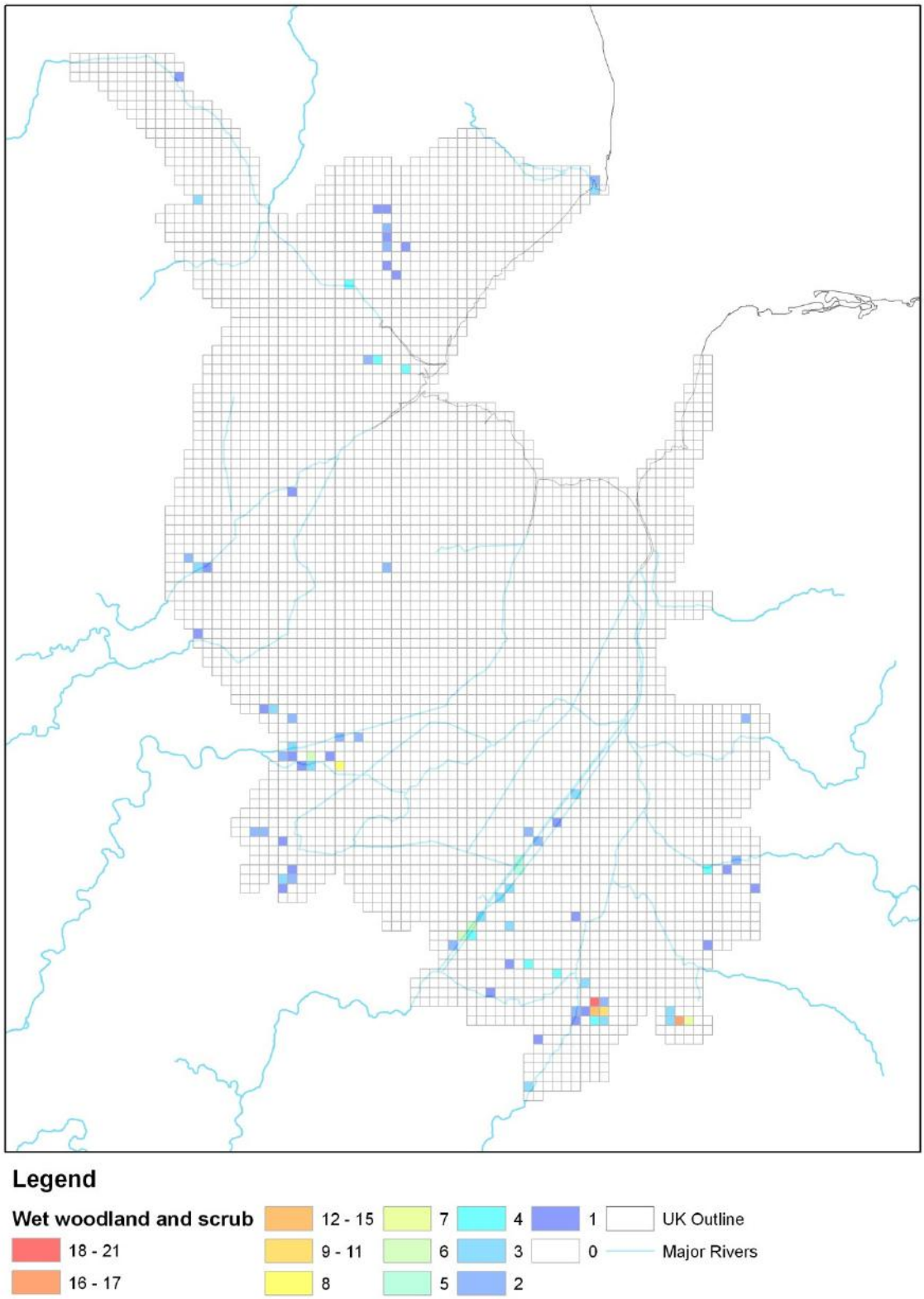


Fig. 15. The distribution (number of species per 1-km square) of priority species associated with wet woodland, carr and scrub in permanently wet conditions, recorded since 1987 (inclusive), in the Fens Biodiversity Audit area. The mapped distribution includes 51 species from five guilds.

39. Broad guild: Open to closed-canopy – Wet

Code: V.5
Description: A poorly defined guild. Species occur in a variety of wet habitats and can be found in a range of open to closed-canopy conditions. Species are often predatory, although some parasitic and phytophagous species are also included. . Many species are poorly known and further work is needed to understand their requirements. Other species have specific requirements, which can occur in a variety of habitats, and individual targeting is needed for their conservation. A generic management prescription for many of the poorly understood species would be to maintain the full successional range of vegetation types.
Typical priority species: A variety of beetles and diptera.
Number of priority species: 15

40. Open to closed-canopy – Wet – Detritus/fungi
Code: V.5detri/fungi
Description: Species are associated with fungi and/or detritus in a variety of wet habitats, in a range of open to closed-canopy conditions. There is a requirement for fungi or a variety of detritus such as; litter, coarse debris and a layer of organic matter, including mossy areas.
Typical priority species: ground beetles (Carabidae), a cranefly (Tipulidae), fungus gnats (Mycetophilidae), soliderfly (Stratiomyidae) and a moss.
Number of priority species: 10

41. Broad guild: Open – Seasonally wet

Code: O.7
Description: A poorly defined guild. Species occur in open habitats with substrates that are permanently moist at their driest and are seasonally wet. Typical habitats include marshy places, wet grasslands and meadows, bogs and the drier parts of fen.
Typical priority species: longlegged flies (Dolichopodidae), beetles and spiders.
Number of priority species: 14 (2)

42. Open – Seasonally wet – Bare ground
Code: O.7bgrnd
Description: Species that occur in open areas with bare, predominantly wet substrates that occasionally dry out, but remain moist (e.g. winter flooded hollows, seasonal vernal pools). Bare ground is created and maintained largely by fluctuating water levels. However, occasional disturbance, such as poaching by grazing animals or wheel ruts, can provide suitable conditions for some of the species.
Typical priority species: flowering plants, beetles, moths, liverworts.
Number of priority species: 17 (3)

43. Open – Seasonally wet – Short vegetation
Code: O.7shveg
Description: Species occur in open habitats with short vegetation and substrates that are permanently moist at their driest and are seasonally wet. Fluctuations in water are important in maintaining short vegetation. Grazing is also important in maintaining short vegetation, but poaching and nutrient deposition should be avoided; biomass removal may be a suitable alternative.

Typical priority species: mollusc, beetles
Number of priority species: 5 (1)

44. Open – Seasonally wet – Moderate vegetation
Code: O.7mdveg
Description: Species occur in open habitats with moderate vegetation and substrates that are permanently moist at their driest and are seasonally wet. Seasonal moderate grazing or cutting will be important in maintaining open conditions.
Typical priority species: flowering plants, moths, flies, spiders
Number of priority species: 24 (2)

45. Open – Seasonally wet – Well vegetated
Code: O.7wlveg
Description: Species occur in open habitats with tall, dense lush vegetation and substrates that are permanently moist at their driest and are seasonally wet. Tall, dense vegetation can include dense reeds, tall grass and lush herbs. A rich litter layer is important for a number species.
Typical priority species: flowering plants, moths, beetles, spiders
Number of priority species: 21 (5)

46. Open – Seasonally wet – Dung
Code: O.7dung
Description: Species associated with herbivore dung in open, wet habitats, such as fens, bogs and wet grasslands. Management should aim to maintain a continuous, plentiful supply of herbivore dung.
Typical priority species: diptera only; black scavenger flies (Sepsidae) and lesser dung flies (Sphaeroceridae).
Number of priority species: 2 (1)

Eighty-three priority species, including 14 Fen Specialists, from six guilds, were associated with open, seasonally wet conditions. In contrast to the distribution of species associated permanently wet conditions, this group was not confined to the relict fen sites (Fig. 16). Species were often closely associated with floodplains and seasonally wet grasslands.

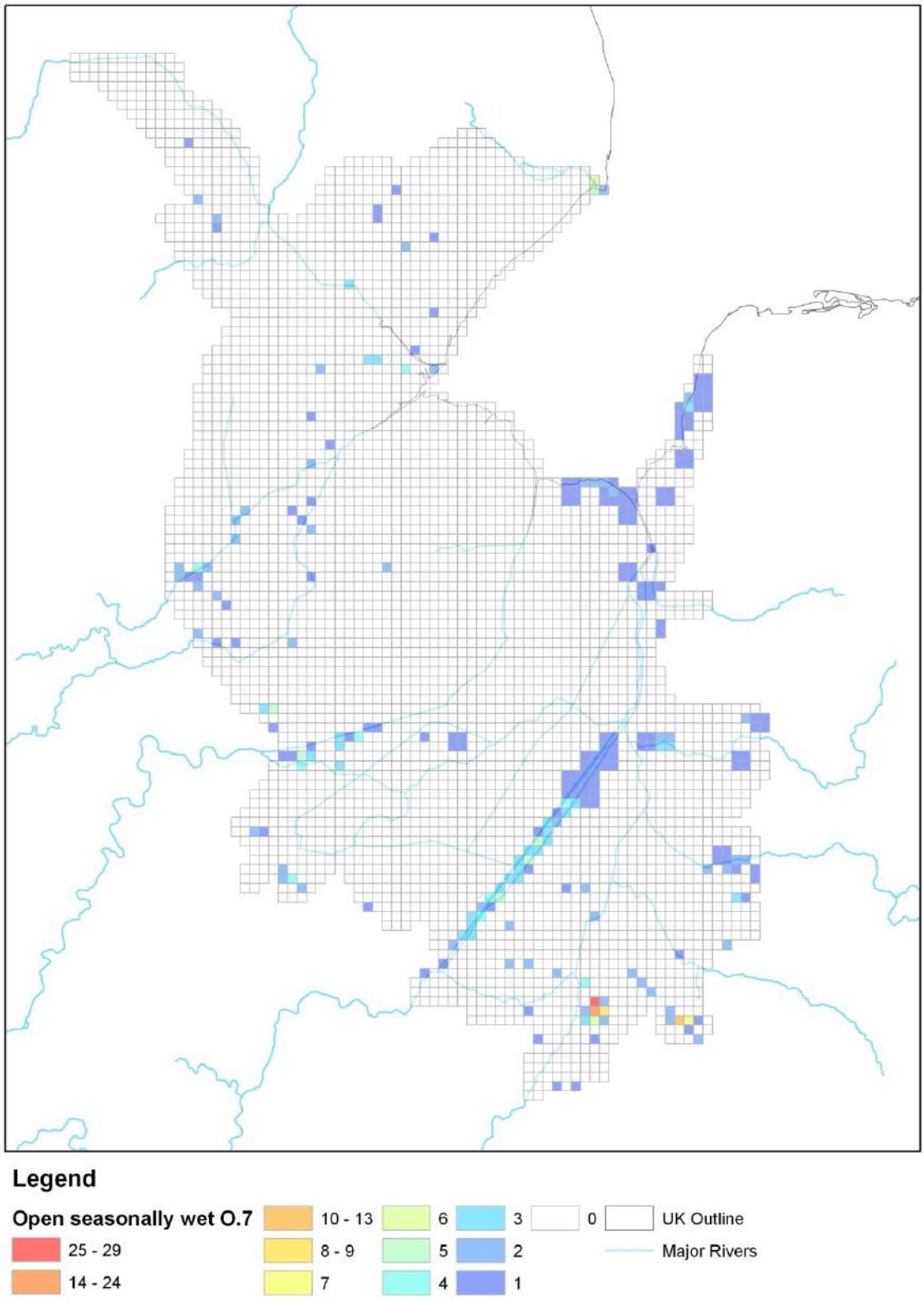


Fig. 16. The distribution (number of species per 1-km square) of priority species associated with open, seasonally wet conditions, recorded since 1987 (inclusive), in the Fens Biodiversity Audit area. The mapped distribution includes 83 species from six guilds.

47. Broad guild: Open – Wet to damp – detritus

Code: O.5/8detri
Description: Species occur in wet, seasonally wet or damp open habitats, all species associated with detritus, litter piles, or a layer of organic material; including mosses.
Typical priority species: a wide range of beetles; including many rove beetles (Staphylinidae), bryophytes, spiders and diptera.
Number of priority species: 49 (6)

48. Broad guild: Open woodland – Seasonally wet

Code: POW.7
Description: Species occur in open areas within woodland; this includes woodland rides, edges and glades. These areas are typically seasonally wet or permanently moist at their driest. Species are very infrequently associated with closed areas of wet woodland. Typical habitats include open areas within; damp or wet woodland, wooded fens and occasionally trees along river margins. In the predominately wooded areas, the open areas are important, occasionally the presence of nectar sources is important, from herbaceous and shrub flowers. This broad guild includes a range of requirements, such as pollen or nectar feeders, but also many species requiring a diversity of vegetation structures to accommodate different requirements over the lifecycle or uncertainty in the species requirements. A single species of water beetle is found in ephemeral pools.
Typical priority species: a range of beetles and diptera.
Number of priority species: 8

49. Broad guild: Closed-canopy woodland – Damp

Code: CW.8
Description: Species are associated with predominately closed-canopy woodland, in damp, occasionally wet, conditions. Typical habitats include wet woodland, woodland in damp valleys, wooded moorland or marshy to damp areas within woodland; species rarely occur in carr. Species within this guild are varied in their specific requirements and include arboreal foliage feeder, fungivores of soft bodied fungi growing on deadwood, species with larvae stages developing in deadwood or moss and species found in detritus and litter. This guild is small and has therefore not been split further by species requirements. However, best practise management of damp, closed-canopy woodland, including minimising disturbance and retaining standing and fallen deadwood, would provide suitable conditions for these species.
Typical priority species: money spiders (Linyphiidae), a range of diptera and beetles
Number of priority species: 14

50. Broad guild: Open – Shaded

Code: OS.8
Description: Species of highly shaded areas of open habitats, such as under-cliff, rock crevices and north-facing walls. Whilst the shade is not primarily from tree cover, species may rarely also occur in closed-canopy woodland.
Typical priority species: spiders and mosses.
Number of priority species: 6

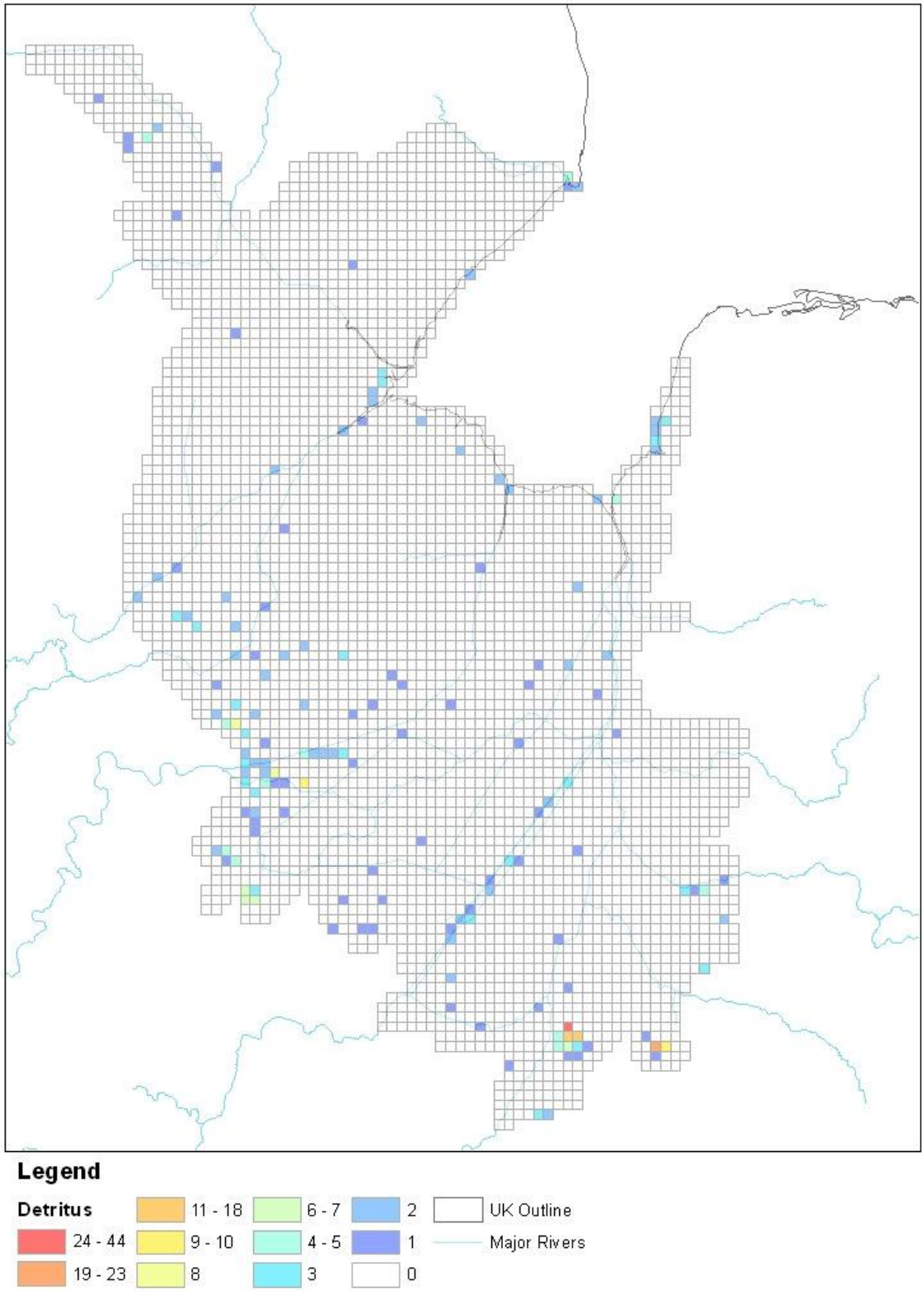


Fig. 17. The distribution (number of species per 1-km square) of priority species associated with detritus, recorded since 1987 (inclusive), in the Fens Biodiversity Audit area. The mapped distribution includes 190 species from eleven guilds.

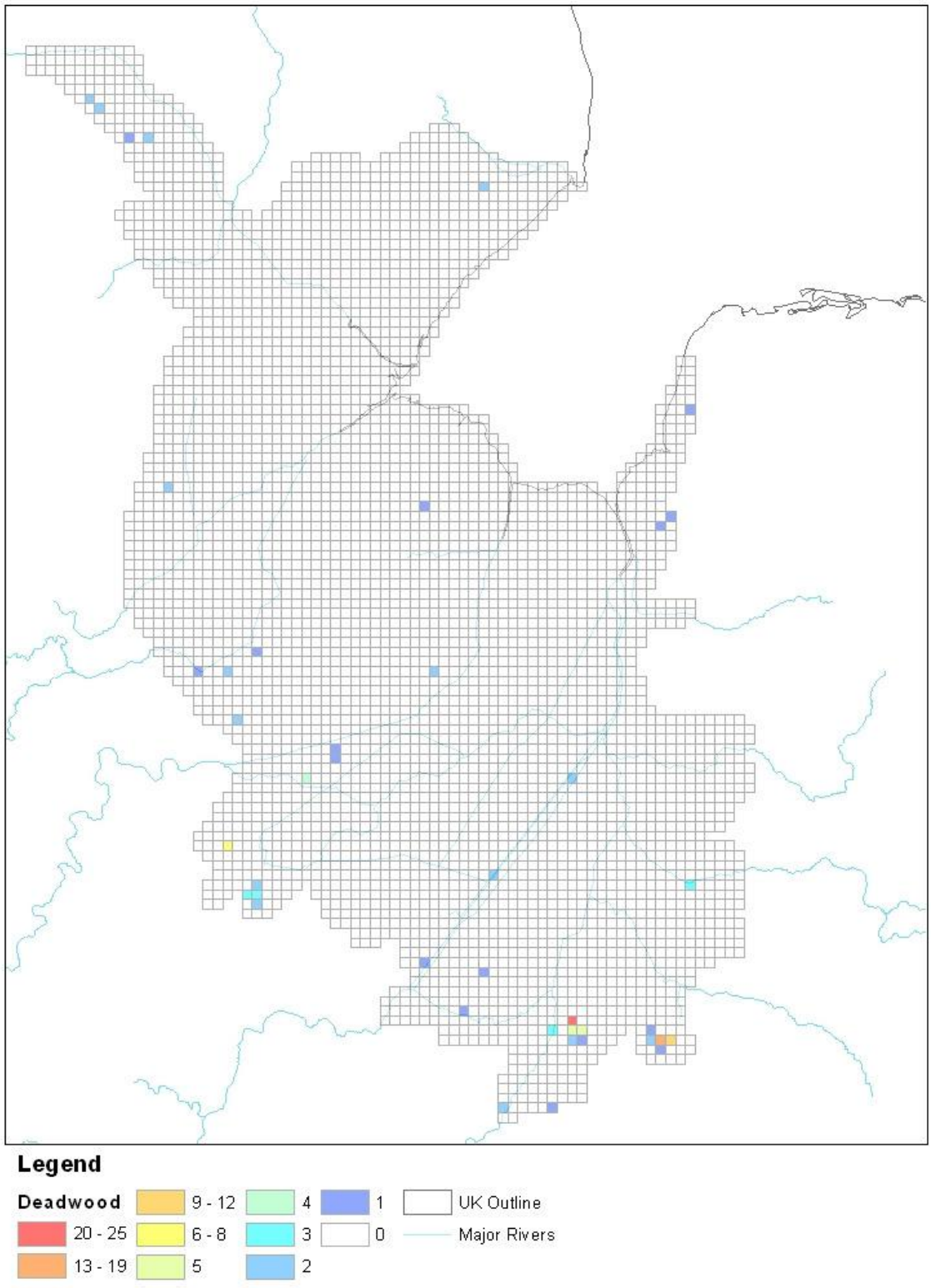


Fig. 18. The distribution (number of species per 1-km square) of priority species associated with deadwood, recorded since 1987 (inclusive), in the Fens Biodiversity Audit area. The mapped distribution includes 78 species from four guilds.

51. Broad guild: Open – Mesic

Code: O.10
Description: A poorly defined guild found in a range of open, mesic habitats, such as arable fields, grasslands and brownfields. Species are either poorly known and little information is available, or have specific requirements that can be found in a wide range of environments.
Typical priority species: fungi, beetles, spiders, moths, diptera.
Number of priority species: 28

52. Open – Mesic – Bare ground, detritus
Code: O.10bgrnd, detri
Description: Guild comprises only one species. Species is found in open, disturbed habitats, primarily arable. It requires bare substrates and a cover of litter and detritus.
Typical priority species: a single species of Hemiptera (*Aphanus rolandri*).
Number of priority species: 1

53. Open – Mesic – Disturbance, grazing
Code: O.10bgrnd, shveg
Description: Areas with bare ground or sparse vegetation amongst a grazed, short sward. Areas for this guild require some form of disturbance for invertebrates or establishment of plants. Typically sites are disturbed, trampled or compacted; usually regularly e.g. track ways, rabbit grazed areas (with short vegetation and scrapes/aprons). Though some species occur primarily in exposed areas with nutrient limited, stressed conditions from thin or free draining soils, where areas of bare ground may be small. Moderate grazing is necessary, however it be seasonal to allow for seeding of plants or species which species feed on seed heads or within stems of low growing plants (e.g. *Galium verum/saxatile*). Whilst, widespread, intensive disturbance is not suitable, small areas may be rotovated or ploughed.
Typical priority species: flowering plants, hemiptera, mosses, moths.
Number of priority species: 42

54. Open – Mesic – Lightly disturbed, light grazing
Code: O.10Ldist
Description:
Species of this guild occur in open, mesic environments that are subject to light physical disturbance. Species are associated with early successional stages. Flowering plants require disturbance to provide small patches of bare ground for the establishment of seedlings. Invertebrate members of this guild are either associated with these plant species (i.e. are often phytophagous) or have a requirement for bare, exposed substrates. Suitable physical disturbance would include occasional rabbit scrapes and very infrequent and small-scale rotovation. Some species may benefit from light-moderate seasonal grazing to hold back later successional stages, but this should not be the main management activity. Intensive or continuous grazing will certainly be detrimental for most species. Two species are associated with the conditions resulting from infrequent, controlled burning of heathland.
Typical priority species: flowering plants, beetles, moths, mosses.
Number of priority species: 91

55. Open – Mesic – Heavily disturbed
Code: O.10Hdist
Description: Species require early successional stages, usually created by heavy or frequent physical disturbance. Typical habitats include arable fields, waste grounds and brownfield. Physical disturbance should be either infrequent major disturbance (e.g. turf removal) or regular moderate disturbance (ploughing or rotovation every 3 years). Light disturbance is beneficial, particularly in order to lengthen the effects of major disturbance, but is unlikely to be sufficient alone in the long-term. Any disturbance rotations should allow for a number of years flowering and seeding of colonising ruderal plants; this will ensure the establishment of a seed bank and will allow sufficient time for colonisation and establishment of invertebrate populations feeding in flowerheads or on the seeds. Managing a larger area on rotation will ensure that conditions are always provided. Although some species may benefit from grazing, the vast majority do not and therefore this guild should not be managed by grazing.
Typical priority species: flowering plants, beetles, moths, bryophytes.
Number of priority species: 83

56. Open – Mesic – Short vegetation
Code: O.10shveg
Description: Species occur in open, mesic habitats with short vegetation. Most species will benefit from seasonal moderate or intensive grazing. However, intensive, continuous grazing may be detrimental for some species, particularly those invertebrate species that develop in seed or flower heads.
Typical priority species: flowering plants, beetles lichen, moss and spider.
Number of priority species: 28

57. Open – Mesic – Well vegetated
Code: O.10wlveg
Description: Species require open, mesic areas that are well vegetated, e.g. tall herbs and grasses in grasslands and in heathlands areas of mature heather. However, over-mature heather or the dominance of rank vegetation would be detrimental. Seasonal, low intensity grazing or cutting is beneficial in preventing scrub invasion.
Typical priority species: noctuid moths, range of flies and spiders.
Number of priority species: 31 (1)

58. Open – Mesic – Sward mosaics
Code: O.10swardm
Description: Species within this guild occur in open, mesic areas, with sward mosaics. This includes species that require short and tall vegetation with a patch, such as tussocky areas, and those that require short and tall vegetation across a site, i.e. adjacent patches. Some species also require flower-rich areas, detritus and dead herbaceous stems. Within-patch sward mosaics can be achieved with light grazing, as many species are sensitive to overgrazing. Between-patch sward mosaics may be achieved by moderate to intensive grazing on one patch to create short turfs, adjacent to areas that are infrequently cut.
Typical priority species: beetles, hymenoptera, lepidoptera, flies, spiders
Number of priority species: 22

59. Open – Mesic – Juxtaposition
Code: O.10juxt
Description: Species have a requirement for two contrasting vegetation structures, which may require differing management regimes. All species require sparsely vegetated areas with bare exposed substrates. This must be juxtaposed with areas of taller vegetation, which can include tussocks, flower-rich resource, rank/well-vegetated areas and mature heather. Species are occasionally associated with detritus and dead herbaceous stems. Some form of physical disturbance is required to ensure the presence of bare ground and this should be adjacent to areas a range of ground vegetation heights.
Typical priority species: hymenoptera, Lepidoptera, Hemiptera, diptera, spiders
Number of priority species: 55 (1)

60. Open – Mesic – Rock
Code: O.10rock
Description: Species occur predominately on bare rocks and hard substrates in open, mesic situations. Due to the lack of naturally occurring rocky areas within the Fens, most of the species are associated with gravestones, churches and other old walls or buildings.
Typical priority species: lichens, spider and moss.
Number of priority species: 12

61. Open – Mesic – Detritus
Code: O.10detri
Description: Species require a significant amount of natural organic matter in open, mesic habitats. Suitable conditions include mosses on detritus, coarse woody debris and plant debris such as litter piles. Occasionally species may also be associated with fungi or grassy tussocks. A number of species are associated with a wide range of detritus, dung, carrion and deadwood.
Typical priority species: several beetles, primarily rove beetles (Staphylinidae), spiders, lichens.
Number of priority species: 22

62. Open – Mesic – Dung
Code: O.10dung
Description: Species are associated with open, mesic environments. Areas should be managed in order to provide a plentiful and continuous source of dung. However, many species also require adjacent flower-rich areas or taller vegetation for prey resource. Most species are probably associated with herbivore dung, but for many, this level of detail is not available. A small number of species are more general detrivitores and can rarely be found associated with other conditions, such as carrion, fungi or deadwood.
Typical priority species: rove beetles (Staphylinidae), several species of diptera and a Tiphiid wasp.
Number of priority species: 6

63. Open – Mesic – Fungi
Code: O.10fungi
Description: All species are usually found within fungal fruiting bodies in open, mesic conditions. Fungi used are often puff balls (*Lycoperdon, Bovista* etc.), though other types are probably also used.
Typical priority species: a range of beetles.
Number of priority species: 2

64. Broad guild: Scattered scrub – Mesic

Code: PSS.10
Description: Species occur in mesic environments in areas with scattered or open scrub. Such conditions can occur in hedgerows, the edges of closed scrub or woodland and scattered host bushes/shrubs. Dense, closed scrub or woodland is rarely utilised. Species are often associated with a number of shrub species, such as hawthorn *Prunus* and blackthorn *Crataegus,* and occasionally currants *Ribes, Clematis vitalba* and gorse *Cytisus scoparius*.
Typical priority species: moths, spiders
Number of priority species: 14

65. Broad guild: Open and Scrub – Mesic

Code: POS.10
Name: Landscape complexity - open and scrub - mesic
Description: Species require open conditions with scattered scrub or adjacent closed scrub, rarely woodland. All species utilise both the open, mesic areas and the areas of scrub. For most species within this guild there is a requirement for the juxtaposition of flower rich areas and bare ground and sparsely vegetated areas or flower rich areas.
Typical priority species: hymenoptera, Hemiptera and diptera
Number of priority species: 18

66. Broad guild: Trees in open conditions – Mesic

Code: PWP.10
Description: Species are associated with trees in open, mesic conditions, most typically in wood-pasture or parkland. Isolated trees may provide suitable conditions, but many species are thought to be poor dispersers and continuity of trees may be very important. Associations of the species with closed canopy are very rare or not preferred. All species are predominately arboreal and many are also associated with mature or veteran trees. Arboreal species may be indifferent of grazing around isolated trees such as in parkland, though some species may require undisturbed or well vegetated areas around the bases of mature trees.
Typical priority species: moths, diptera.
Number of priority species: 15

67. Broad guild: Open woodland – Mesic

Code: POW.10
Description: Species associated with woodland, but specifically open, sunny areas within woodland. These areas are frequently small and include woodland edges, rides and glades. Species may occasionally occur in parkland or, less frequently, in open areas. Within the subguilds the importance of flower resources including flowering shrubs should be noted.
Typical priority species: flowering plants, diptera, moths, heteroptera.

Number of priority species: 27 (1)

68. Open woodland – Mesic – Light disturbance
Code: POW.10Ldist
Description: Species within this guild occur in open areas within woodlands, and are associated with bare ground or light infrequent disturbance, for host plants.
Typical priority species: diptera, beetle, moth.
Number of priority species: 6

69. Open woodland – Mesic – Short vegetation
Code: POW.10shveg
Description: The species are associated with open, sunny areas within woodland, with short, species rich flora. Typical species required include; clovers *Trifolium*, violets *Viola*, oxslip/primrose *Primula*. Some species additionally require deadwood, usually standing deadwood or detritus often in warm, sunny areas.
Typical priority species: butterflies, diptera, hymenoptera.
Number of priority species: 7

70. Open woodland – Mesic – Well vegetated
Code: POW.10wlveg
Description: Species associated with open, sunny areas within woodland. Species require flower-rich, lush ground flora (e.g. thistles hogweed, ragwort). Some areas which are becoming tall and thick with vegetation and occasional brambles are also beneficial.
Some species additionally require deadwood, usually standing. usually standing wooden posts for larvae development or nesting, often in warm, sunny areas
Typical priority species: butterflies, diptera, hymenoptera.
Number of priority species: 17 (1)

71. Open woodland – Mesic – Heavily vegetated
Code: POW.10heveg
Description: Species are associated with heavily vegetated, late successional areas in open, sunny areas within woodland. These areas are require the presence of young scrub, bushes and thickets in the open areas of woodland, with dense areas of important host plants such as brambles or currants *Ribes*.
Typical priority species: moths, spiders.
Number of priority species: 4

72. Open woodland – Mesic – Deadwood
Code: POW.10dead
Description: Species associated with deadwood in open, sunny areas within woodland. Deadwood may be standing or fallen, but is more frequently standing. Within open areas, flowering shrubs are important for some species.
Typical priority species: hymenoptera, diptera, beetles, moss.
Number of priority species: 9

73. Open woodland – Mesic – Fungi
Code: POW.10fungi
Description: Species associated with fungi in open, sunny areas within woodland.
Typical priority species: beetle, diptera.
Number of priority species: 2

74. Broad guild: Closed-canopy woodland – Mesic

Code: CW.10
Description: This guild includes species of both broadleaved and coniferous woodland. Some species may have been recorded rarely in open habitats or scrub. Species include arboreal foliage feeders, some of which have specific host tree species. This broad guild also includes species with poorly understood specific requirements.
Typical priority species: beetles, fungi, lepidoptera, flies, spiders, mosses.
Number of priority species: 32 (2)

75. Closed-canopy woodland – Mesic – Deadwood
Code: CW.10deadwood
Description: Species are associated with fallen, standing or both types of deadwood in broadleaved and coniferous woodland in mesic conditions. The majority of species are associated with both fallen and standing deadwood; many of the remaining species were associated with fallen deadwood. However, it should be noted that distinguishing between requirements for fallen and standing deadwood is infrequently made in the literature. A number of the species also require the presence of flowers and/or flowering shrubs.
Typical priority species: fungi, range of beetles and flies.
Number of priority species: 31

76. Closed-canopy woodland – Mesic – Detritus
Code: CW.10detri
Description: Species require detritus-rich broadleaved and coniferous woodland, in a range of mesic conditions. A range of detritus is required, including coarse woody debris such as sawn logs, leaf/grass litter, animal nests and mossy areas with a rich organic layer. Some species are general detritivores with few specific requirements. Several species are associated with ants.
Typical priority species: beetles and flies from a range of families, spiders, flowering plants, mosses.
Number of priority species: 31

77. Closed-canopy woodland – Mesic – Dung
Code: CW.10dung
Description: Species require dung in broadleaved and coniferous woodland in a range of mesic conditions. Species have an essential requirement for a continuous supply of dung. For some species the exact type of dung required is uncertain, but some grazing by deer or livestock is likely to be beneficial in providing sufficient continuity of dung.
Typical priority species: a single species of fly.
Number of priority species: 1

78. Closed-canopy woodland – Mesic – Fungi
Code: CW.10fungi
Description: Species require fungi in broadleaved and coniferous woodland, in a range of mesic conditions. This includes the fungal fruiting bodies of arboreal epiphytes (e.g. bracket fungi), terrestrial species and fungal hyphae within deadwood.
Typical priority species: beetles and flies, particularly mycetophagous families; hairy fungus beetles (Mycetophagidae), fungus gnats (Mycetophilidae)
Number of priority species: 20 (1)

79. Broad guild: Tree/Shrub cover – Mesic

Code: T/SC.10
Description: Species have an essential requirement for trees or shrubs. These can occur in largely open through to closed-canopy wood/scrub habitats. Within the broad guild almost all species are arboreal, though many will utilise flower-rich, ground flora. The most common association for species is with both closed woodland and pasture-woodland. Other associated habitats include; closed woodland or scrub, wood-pasture, isolated trees, hedgerows, and structural timbers.
Typical priority species: a range of beetles, flies, lichens, moths.
Number of priority species: 44 (1)

80. Tree/Shrub cover – Mesic – Deadwood
Code: T/SC.10dead
Description: Species require deadwood in mesic conditions; tree density and configuration is not thought to be important. Species can occur on dead boughs, stumps, logs and, occasionally worked timbers.
Typical priority species: a range of beetles and flies.
Number of priority species: 38

81. Tree/Shrub cover – Mesic – Detritus
Code: T/SC.10detri
Description: Species are associated with rotting coarse debris, litter, mouldy wood or vegetation, occasionally fungi.
Typical priority species: two families of beetles and flies (Staphylinidae, Hybotidae).
Number of priority species: 5

82. Tree/Shrub cover – Mesic – Fungi
Code: T/SC.10fungi
Description: associated with fungi
Typical priority species: all beetles from a range of families.
Number of priority species: 7

83.Tree/Shrub cover – Mesic – Veteran
Code: T/SC.10vet
Description: Species within the guild are associated with over-mature or veteran trees in a variety of mesic conditions. Trees can occur in a range of habitats ranging from closed woodland to isolated trees. Individual species have requirements for heartwood

decay, deep crevices, dead branches, rot holes and sap runs (including trees damaged by the larvae of the goat moth, *Cossus cossus*).
Typical priority species: lichens, hymenoptera, beetle.
Number of priority species: 15

84. Broad guild: Open to closed-canopy – Mesic

Code: V.10
Description: A poorly defined group of species. Species within this guild occur in a range of mesic habitats and can be found in both open and closed canopy conditions. Many species are poorly known and further work is needed to understand their requirements. Other species have specific requirements, which can occur in a variety of habitats, and individual targeting is needed for their conservation.
Typical priority species: beetle, moth, tachinid flies (Tachinidae) moss, lichen.
Number of priority species: 9

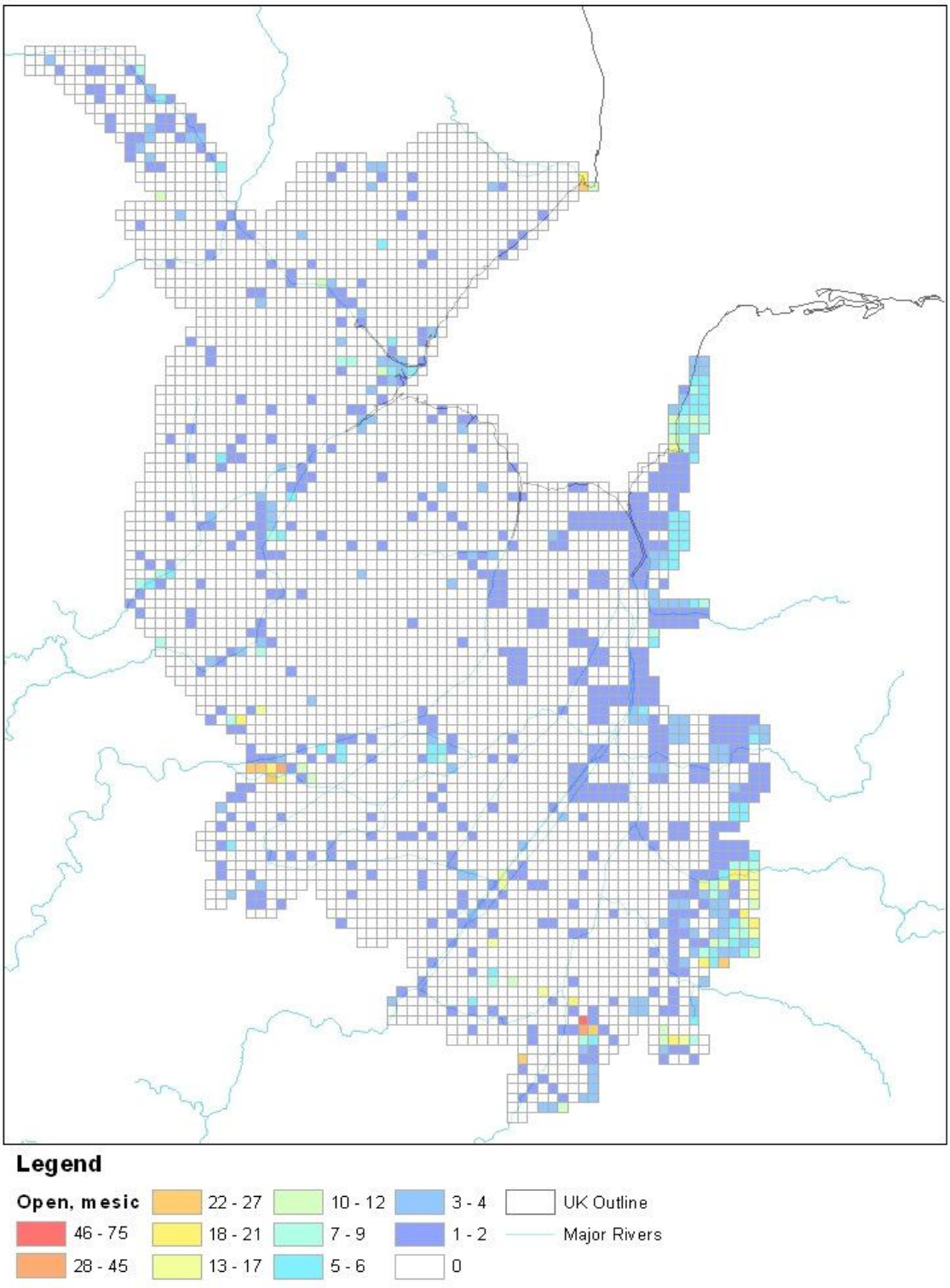


Fig. 19. The distribution (number of species per 1-km square) of priority species associated with mesic conditions, recorded since 1987 (inclusive), in the Fens Biodiversity Audit area. The mapped distribution includes 428 species from thirty-four guilds.

<u>Broad guild</u>: Open – Xeric

85. Open – Xeric – Disturbance, grazing
Code: O.12dist, graz
Description: Species require open areas that are extremely dry, droughted and nutrient limited; such areas have exceptionally free draining soils (e.g. sandy bare parched soil) or areas that have little or no soil (e.g. bare rock, scree or stone walls). Species are associated with bare, sparsely vegetated ground and short vegetation in open, xeric conditions. Grazing and disturbance is important to maintain bare ground and short turf; rabbit scrapes and grazing provide suitable conditions.
Typical priority species: flowering plants, beetles, spiders.
Number of priority species: 14

86. Open – Xeric – Disturbance, no grazing
Code: O.12Dist
Description: Species require open areas that are extremely dry, droughted and nutrient limited; such areas have exceptionally free draining soils (e.g. sandy bare parched soil) or areas that have little or no soil (e.g. bare rock, scree or stone walls). Species are associated with bare, sparsely vegetated ground in open, xeric conditions. Disturbance is important to maintain bare ground, although intense, frequent disturbance is not needed since the areas are so droughted and nutrient poor. Typical habitats include waste ground and brownfield. Whilst some species can tolerate some light grazing, the majority cannot.
Typical priority species: flowering plants, beetles, spiders, moss, moths.
Number of priority species: 11

87. Open – Xeric – Juxtaposition
Code: O.12juxt
Description: Species require open areas that are extremely dry, droughted and nutrient limited; such areas have exceptionally free draining soils (e.g. sandy bare parched soil) or areas that have little or no soil (e.g. bare rock, scree or stone walls). Species require the juxtaposition of short or sparsely vegetated area and areas of tussocky or dense, tall flowering grasses or herbs. The short, sparse vegetation can be maintained through a combination of disturbance and grazing. In contrast, the tussocky or tall vegetation is susceptible to overgrazing.
Typical priority species: hymenoptera, Hemiptera.
Number of priority species: 7

Thirty-two priority species (of three guilds) were associated with extremely dry (xeric) conditions. This may be suprising in the context of the Fens NCA. However, the xeric priority species were largely confined to the east of the Fens NCA, along the border with the Brecks (Fig. 20). The boundary between the Fens and Brecks NCAs can be quite stark, with rapid changes in soil conditions. This, coupled with the extension of the audit boundary to include Chippenham Fen, results in a number of 'Breckland' species occurring within the Fens boundary. Other occurrences of this group elsewhere in the Fens NCA were scattered and infrequent. Many of these records were casual, or possibly garden-escape, plants, or occur in dry disturbed conditions along roadside verges or extraction sites.

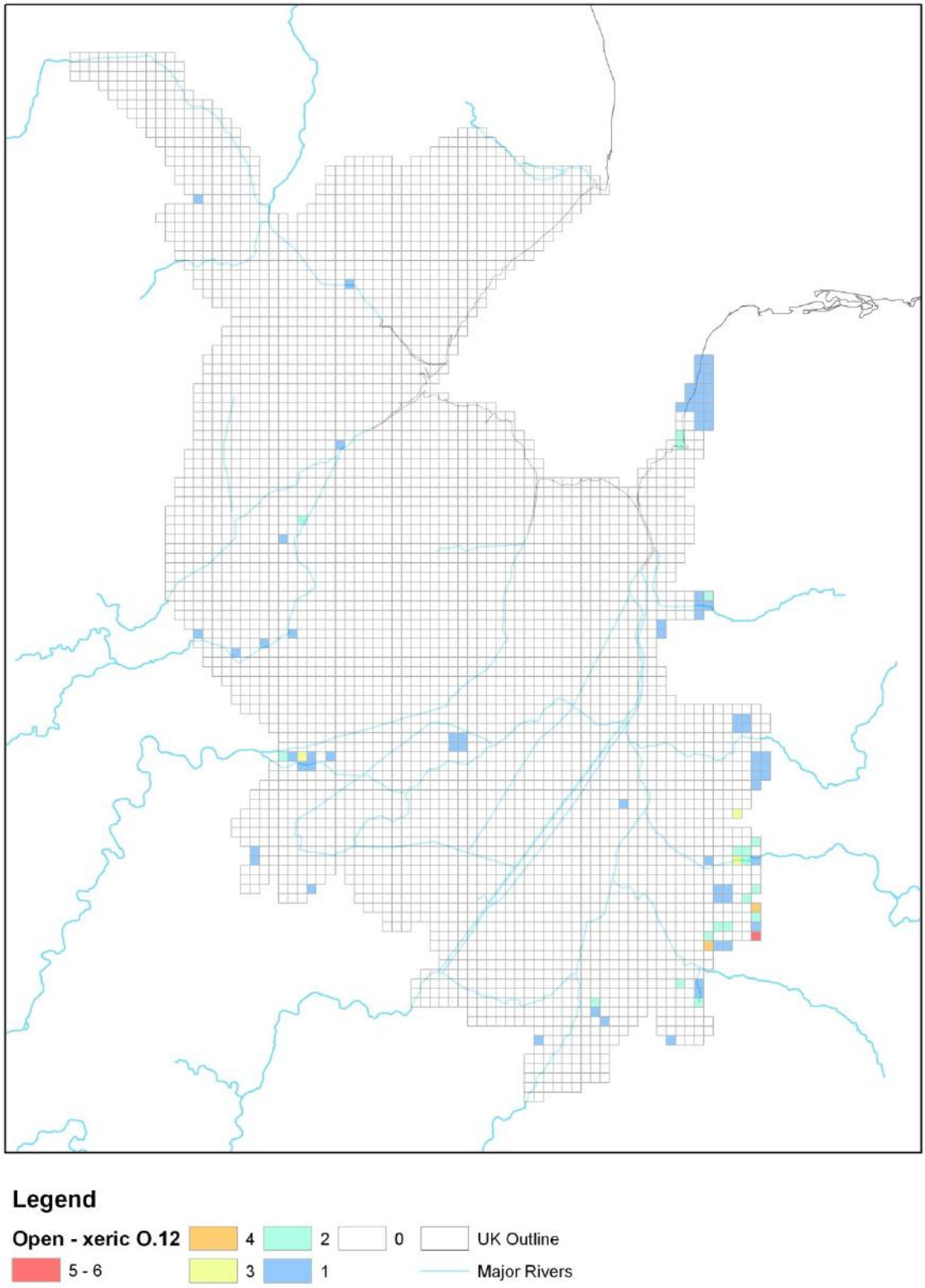


Fig. 20. The distribution (number of species per 1-km square) of priority species associated with xeric (droughted) conditions, recorded since 1987 (inclusive), in the Fens Biodiversity Audit area. The mapped distribution includes 32 species from three guilds.

88. Broad guild: Open – Wet to dry

Code: O.15
Description: A poorly defined group of species. Species are associated with a range of open habitats, ranging from wet to dry conditions. Many species are poorly known and further work is needed to understand their requirements. Other species have specific requirements, which can occur in a variety of habitats, and individual targeting is needed for their conservation.
Typical priority species: flowering plants, beetles, spiders, diptera.
Number of priority species: 9

89. Open – Wet to dry – Grazed
Code: O.15graz
Description: Species occur in a range of open habitats in a range of wet to dry conditions. Species occur in areas with short to moderate vegetation and therefore require light to moderate grazing. Intensive, continuous grazing would not be suitable since many species require herbaceous stems and flowers.
Typical priority species: flowering plants, beetles, moths, Hemiptera.
Number of priority species: 13 (1)

90. Broad guild: Tree/Shrub cover – Wet or dry

Code: T/SC.15
Description: This guild of species requires trees or shrubs in a variety of wet to dry conditions. Typical habitats of species range from closed woodland, wood-pasture, hedges, wooded fens, isolated riverine trees. Many species are arboreal, often with specific host plants and occasionally associated with over-mature trees. Some species are general detritivores and associated with a variety of conditions (e.g. fungi, litter, debris, detritus), the remaining species are associated with deadwood (both fallen and standing).
Typical priority species: moths, diptera, beetles.
Number of priority species: 13 (2)

91. Broad guild: Closed-canopy woodland – Wet to dry – Detritus/fungi

Code: CW.15detri, fungi
Description: Species are recorded from a range of wet to dry, predominately closed-canopy woodlands, from dry woodland to wooded fen carr. Species require plentiful litter, detritus or fungi.
Typical priority species: beetles and diptera.
Number of priority species: 4

92. Broad guild: Open to closed-canopy – Carrion

Code: V.carri
Description: Species are associated with carrion, and occasionally excrement, and are probably not habitat specific having been recorded in range of habitats from wet to dry and open to closed-canopy habitats.
Typical priority species: two species of burying or sexton beetles (Silphidae) and diptera.
Number of priority species: 4

93. Broad guild: Open to closed-canopy – Detritus/fungi

Code: V.detri/fungi
Description: Species within this guild occur in a range of habitats and can be found in both open and closed canopy conditions. Many species are generalist detritivores and are associated with an exceptionally wide range of conditions, including animal nests (e.g. mole, squirrel, bird. social wasps), bracken/grass litter, leaf litter (both coniferous and broadleaved), manure/compost heaps, bryophytes, old heather, old faggots, driftwood, piles of litter, roots of plants, carcasses and bones.
Typical priority species: beetles, including many rove beetles (Staphylinidae), spiders, diptera,
Number of priority species: 43

94. Broad guild: Subterranean

Code: SUB
Description: Species are thought to be subterranean, and often are most frequently recorded from mammal burrows. Species often have associations with detritus, litter, dung and decaying vegetation.
Typical priority species: beetles, spiders.
Number of priority species: 7

95. Subterranean – Springs

Code: SUB.5
Description: These water beetles are associated with springs or trickles, rather than open running water. Both are thought to be subterranean and have been recorded from spring systems, culverts, upwellings, seepages in crevices in cliffs and drains.
Typical priority species: beetles (Dytiscidae)
Number of priority species: 2

96. Broad guild: Saltmarsh

Code: Saltm
Description: Species occurring almost exclusively on coastal saltmarsh. Species can occur at a range of inter-tidal elevations, but are primarily found on the mid marsh. Many invertebrate species are associated with halophytic species, such as glassworts *Salicornia*, sea plantain *Plantago maritima* and sea lavender *Limonium vulgare.*
Typical priority species: flowering plants, beetles, Hemiptera, diptera.
Number of priority species: 22

97. Saltmarsh – Upper saltmarsh

Code: Saltm,upper
Description: Species occurring on the upper levels of saltmarsh. Many of the invertebrate species are associated with upper saltmarsh plant species, such as sea wormwood *Seriphidium maritimum*, shrubby seablite *Suaeda vera*, and matted sea lavender *Limonium bellidifolium.*
Typical priority species: flowering plants, beetles, diptera.
Number of priority species: 8

98. Saltmarsh – Detritus
Code: Saltm,detri
Description: Species that require or live amongst detritus on saltmarshes. Suitable detritus most frequently occurs the strandline and may include seaweed and driftwood.
Typical priority species: beetles, spiders
Number of priority species: 4 (2)

99. Broad guild: Open and Wood

Code: LC.OW
Description: Species of this guild require complex landscapes, with the juxtaposition of open and wooded habitats. Species have a range of specific requirements within each landscape unit. In opens areas requirements include flower rich areas, bare or sparse vegetated ground and well vegetated areas that support suitable prey. In closed areas, requirements include deadwood, detritus and well vegetated areas with tall understory, often with brambles or dead herbaceous stems. Typically habitats and conditions may occasionally overlap with those of open woodland and species may occur in such areas. Suitable conditions for these species can be achieved on a single site, providing there are sufficient areas of both habitat types.
Typical priority species: a range of solitary bees and wasps, and a single species of hoverfly
Number of priority species: 14

100. Broad guild: Open – Wet and dry

Code: LC.5-10
Description: Species of this guild require a compelx open landscape with a juxtaposition of wet and dry habitats. For these species wet areas are important to provide areas for specific prey items (diptera/hemiptera) and/or flower resources. Suitable areas of wetland must be juxtaposed with dry habitat that provide nesting areas, i.e. with bare ground and sparse vegetation or tussocks of vegetation. Suitable conditions for these species can be achieved on a single site where there is complex hydrology or topography.
Typical priority species: solitary bees and wasps.
Number of priority species: 3

Part 3 - Management to Sustain Wetland Assemblages

This section was compiled by Martin Baker of the Wildlife Trust for Bedfordshire, Cambridgeshire & Northamptonshire following a workshop organised for conservation site managers from across the Fens in August 2012. It draws on the information presented by Mossman, Panter & Dolman in parts 1 and 2 of this report and seeks to identify the management issues affecting the guilds that support the key Fen specialist priority species. We seek to provide guidelines for land managers to support and enhance the various assemblages of priority species for conservation in the Fens. We also identify areas of uncertainty, recommendations for research and emphasise the need for monitoring outcomes.

An important priority must be to provide appropriate conditions for specialist assemblages of Fens conservation priority species across the existing resource of both statutory (SSSIs) and non-statutory (CWS) designated sites, but also the wider network of drainage ditches and rivers across the Fens basin.

Many of the relic Fen sites are dominated by later successional stage habitats whether fen, carr woodland and scrub, or drainage ditches managed on intermediate to long rotations. These provide mature and often stable habitat conditions for a wide range of wetland priority species, including Fens specialists.

By contrast the washlands with floodplain grazing marsh are managed primarily as wet grassland for their breeding and wintering water bird populations. However, associated habitats such as drainage ditches and their margins; scrapes; occasional trees and blocks of scrub; do provide the potential to cater for a wider range of biodiversity.

By contrast, the guilds associated with early successional habitats are more likely to be found in habitat creation areas, former sand, gravel and clay pits and in the regularly managed drainage ditch network.

Key Guild Assemblages for Fens priority species

The following section summarises the information from part 2 of this report specifically for those key guilds that support the majority of the priority species in the Fens and which can be influenced through management interventions.

Open aquatic

46 priority species (including 5 Fens specialists), from 4 guilds, were associated with open aquatic conditions, most usually with standing or slow flowing water. Of these 15 species were associated with early successional conditions and 31 with later successional stages.

This group is widely distributed across the Fens, except possibly the lower reaches of rivers, where agricultural runoff, increased turbidity, decreased water quality or salinity may have reduced their occurrence. They are typically found in drainage ditches, small standing water bodies and submerged margins of larger water-bodies.

Active management may be necessary to maintain suitable conditions for these guilds. For example vegetation clearance on intermediate to long rotations may be necessary for those associated with moderate to well vegetated conditions. Annual clearance may be required to maintain conditions for those species associated with early successional open water and bare substrates. However, active management is only needed when naturally occurring processes, such as water movement or fluctuations, are unable to create and maintain suitable conditions.

Many species would ideally have stable early or late successional conditions. For early successional species, this implies the annual cutting and clearance of vegetation from ditches rich in these species (i.e. little and often), rather than relying on the regular creation of early successional conditions within longer rotational management cycles. For late successional species, stable conditions can be created through only partially clearing a small proportion of each ditch / pond annually as part of the rotational management cycle, rather than major clearance of longer lengths.

Open littoral

200 priority species (including 13 Fens specialists), from 16 guilds, were associated with open littoral environments either in submerged or terrestrial margins.

65% of priority species were associated with well, heavily or moderately vegetated conditions compared with only 35% associated with short vegetation and bare ground. About 10% were associated with detritus.

Both relic fen sites and new water-filled extraction sites are important for this group. They are typically found in drainage ditches, ponds or small pools within wetland complexes and the margins of larger water bodies.

Vegetation clearance on intermediate to long rotations is required for those species associated with moderate to well vegetated conditions. Annual clearance maintains conditions for those species associated with early successional open water and bare substrates. Grazing at some sites is likely to be appropriate and the poaching of margins may be beneficial for many species. However, for species intolerant of trampling or grazing, fluctuating water levels may be particularly important in creating the presence of bare substrate on littoral margins and within wetland complexes. Rarely these fluctuations may be sufficient to mean active intervention is not necessary. Novel mechanical methods of creating bare ground on littoral margins should be investigated, trialled and thoroughly monitored.

As with open aquatic species, many species would ideally have stable early or late successional conditions and continuity of conditions. For ditch management, this implies annual cutting and clearance of vegetation from ditches rich in these species, little and often, over shorter sections rather than relying on the regular creation of early successional conditions within longer rotational management cycles. For late successional species, stable conditions can be created through only partially clearing a small proportion of each ditch / pond annually as part of the rotational management cycle, rather than major clearance of longer lengths. This ensures continuity of dead herbaceous stems, detritus and litter which is important for many species associated with late successional stages.

Open, permanently wet

123 priority species (including 20 Fens specialists), from 8 guilds, were associated with open, permanently wet conditions. Of these 95 species were associated with well and moderately vegetated conditions compared with only 17 species associated with short vegetation or bare ground.

Species from these guilds were mainly associated with the high quality relic fen sites around the margins of the Fens basin.

Maintenance of moderately to well vegetated conditions is best delivered through seasonal grazing and / or cutting, including at least some areas rarely grazed or cut on long rotations (>4 years), to accommodate for species associated with a build up of detritus or dead herbaceous stems, or with long life cycles. Grazing is important in providing more specialist niches including bare ground and disturbed conditions, sward mosaics and dung.

Open, seasonally wet

83 priority species (including 14 Fens specialists), from 6 guilds, were associated with open, seasonally wet conditions.

Unlike the aquatic, littoral and permanently wet fen guilds described above, where generally the majority of species were associated with moderately to well vegetated conditions, the majority (45 species) of the priority species of open, seasonally wet guilds were associated with bare ground or short vegetation, compared with 36 species associated with moderate to well vegetated conditions.

Species were particularly associated with floodplains and seasonally wet grasslands and the washes, though did also occur at the margins of fens on the high quality relic Fen sites.

Fluctuating water levels are critical to maintain conditions that are seasonally wet and never less than moist. Seasonal moderate grazing is ideal, though with some areas being rarely grazed to allow the development of tall vegetation and build-up of litter. Cutting can help maintain moderate to well-vegetated conditions but will be less beneficial to species such as those associated with bare ground, disturbance or dung. Bare ground can be created by fluctuating water levels, poaching by livestock or from wheel ruts.

Permanently wet, carr & wet woodland

102 priority species (including 5 Fens specialists), from 11 guilds were associated with permanently wet carr, woodland or scrub.

Priority species were associated with the full range of conditions from open areas with scattered trees or shrubs to closed canopy. Detritus and deadwood guilds form an important component of these habitats.

Species were particularly associated with the high quality relic Fen sites around the margins of the Fens basin, though can also occur on older mineral extraction sites where carr and wet woodland has had a chance to develop.

Limited intervention to allow a build-up of deadwood, detritus and litter is important. Occasional extensive, light grazing or cutting of glades to create small patches can be valuable to create suitable conditions for those species requiring open areas. While in open wetlands allowing occasional isolated trees or bushes may be beneficial.

Detritus species (particularly, open wet to damp species)

198 priority species (including 9 Fens specialists), from 11 guilds, were associated with detritus and litter. The single largest group was the 49 priority species (including 6 Fens specialists), in the open, wet to damp, detritus guild.

These species occur across the Fens basin, though there is a bias towards the high quality relic Fen sites for the open, wet to damp detritus guild, but the scattering thoughout the landscape, particularly along river margins, suggests they may be more widely distributed. Two Fens specialist species were also associated with saltmarshes.

Cutting of vegetation on moderate to long rotations is important to allow a build-up of deadwood, detritus and litter. Extensive, light to moderate grazing can also allow for the build-up of detritus. Retention of seaweed and driftwood along the strandline is important for the saltmarsh species. Retention of litter piles from rotational cutting can also provide suitable conditions, but is not as important as retention of in-situ litter in tall lightly or irregularly managed vegetation.

Deadwood species

89 species (including 1 Fens specialist), from 4 guilds were associated with deadwood.

These species occur across the Fens basin, with a bias towards key wetland conservation sites, possibly indicating a lack of deadwood in the wider landscape. However, as there are almost as many records as species, this does suggest that these species are under-recorded.

Limited intervention within woodland and carr habitats allows for the accumulation of deadwood. Light to moderate grazing on the high quality, relic Fen sites can allow for the accumulation of deadwood in individual trees / woodland.

Other important guilds

42 priority species (including 3 Fens specialists), from 5 guilds, were associated with mosaics of wet and dry conditions. These conditions are usually provided by complex hydrology or topography rather than management.

66 priority species (including 1 Fens specialist), from 6 guilds, were associated with various sward mosaics, in a variety of wet to dry and open to closed conditions. Suitable conditions can be created by extensive grazing or varied cutting regimes leaving tall and short vegetation in close proximity.

65 priority species (including 1 Fens specialist), from 3 guilds, were associated with the juxtaposition of habitats. Suitable conditions are only likely to arise from some kind of physical disturbance to create bare ground within and in close proximity to taller, often flower-rich vegetation.

99 priority species (including 5 Fens specialists) were associated with bare ground in a variety of open to closed and wet to dry conditions. Bare ground can arise through fluctuations in water levels, poaching by livestock or from vehicle movements.

Habitat management assessment

Short-herb Fen

Current management techniques
Current management at the three main relic Fen sites, Woodwalton Fen, Wicken Fen and Chippenham Fen, includes a mixture of extensive grazing or mowing techniques. The vegetation structure of these short-herb fen areas is generally moderately to well vegetated, but bare ground, isolated bushes and patches of dense scrub can be rare or occasional.

At Woodwalton Fen, the summer cattle and pony grazing is supplemented by occasional turf cutting to create small pools for the Nationally Rare and Fen specialist, Fen Violet.

At Chippenham Fen, the extensive grazing is by buffalo all year round. This is supplemented by forage harvesting on a 4 year rotation of half of the short-herb fen.

At Wicken Fen, the short-herb fen vegetation occurs in compartments by itself and as an intimate mosaic with tall-herb fen vegetation. It is managed by either forage harvesting (pure short-herb fen compartment), or through extensive all year round grazing by Konik ponies (mixed short-herb / tall-herb fen compartments).

Which guilds are catered for by the current management approaches?
The above management has the potential to provide for the full range of open, permanently wet guilds, from bare ground to well vegetated.

The mixture of grazing and cutting with small patches of bare ground, isolated bushes and denser scrub, is also likely to provide suitable conditions for a variety of guilds associated with the terrestrial littoral zone of ditches and pools, or those species requiring a mosaic or juxtaposition of habitats from wet to dry or open to wooded.

Variations in hydrology across compartments will provide suitable conditions for species of open, seasonally wet guilds, as well as those requiring a mosaic of wet to damp condtions.

Are any guilds not well catered for?
Species associated with detritus and deadwood may or may not be catered for, depending on the precise circumstances in individual management compartments. However, the presence of nearby tall-herb fen and carr vegetation is likely to cater well for species of these guilds.

Recommendations
The current approaches to management appear to provide for the range of conditions required by the key guilds of priority species. However, a more detailed analysis of the species present at each site and of whether each site provides the conditions for the key guilds would be a worthwhile exercise for site managers.

At present it is difficult to assess the impacts of the different approaches to management (type of grazing animal, season of grazing, supplementary cutting) across the 3 main relic Fen sites. A co-ordinated approach to monitoring, as well as detailed research into the species / guilds catered for under each of the different management regimes would help to inform future approaches to management as well as facilitate sharing of best practice across the sites.

Two areas where particular studies could be undertaken are: (1) Assessment of the differences in vegetation structure between the different management approaches adopted at the 3 sites, and development of a standard monitoring technique for vegetation structure? (2) Assessment of any major differences in the priority species present in compartments under the different management regimes?

Tall-herb Fen

Current management techniques
Current management at the three main relic Fen sites is dominated by annual cutting on 3 or 4 year rotations, with removal of the vegetation, either off-site as a crop or leaving it in litter piles. At Wicken Fen, there are also areas of tall-herb fen in a mosaic with short-herb fen in compartments extensively grazed all year by Konik ponies. These management compartments generally have occasional scrub, though bare ground is inevitably less in the mown compartments than the grazed.

Which guilds are catered for by the current management approaches?
The current management approaches provide for those species associated with open, permanently wet, moderately to well vegetated guilds, as well as those associated with detritus and litter. The grazing of tall-herb vegetation at Wicken Fen may better provide for those species associated with bare ground, sward mosaics, and the juxtaposition of habitats (tall vegetation and bare ground).

Variations in hydrology across compartments will provide suitable conditions for species of open, seasonally wet guilds, as well as those requiring a mosaic of wet to damp condtions.

Are any guilds not well catered for?
In the mown, tall-herb fen compartments, species requiring either a mosaic or juxtaposition of short and tall vegetation or bare ground may not be well catered, unless these are adjacent to other compartments that provide short vegetation and bare ground.

Recommendations
One area where particular studies could be undertaken would be to investigate whether there are any differences in priority species between the cut and grazed tall-herb fen vegetation at Wicken Fen?

Floodplain grazing Marsh

Current management techniques
Current management techniques at the Ouse Washes, Nene Washes and Baston Fen are similar based around a summer grazing programme from April to October or November using

mainly cattle and fewer numbers of sheep and / or horses. Parts of Baston Fen are also cut for hay with aftermath grazing from September to November. The floodplain grazing marsh at Wicken Fen is grazed all year round by a mixture of Konik ponies and cattle at lower densities than for the seasonal grazing at the washland sites.

The aim at all sites is for winter flooding, with a steady drawdown in the water table through the spring and early summer. Sward heights are generally in the range of 0-10 cm or 10-50 cm though with small areas of taller vegetation. Most sites have occasional bare ground, though isolated bushes and scrub are usually rare, as most sites are managed for breeding waders, so potential perches for predators are undesirable.

Which guilds are catered for by the current management approaches?
Management of these sites generally provides the full-range of conditions for species associated with the open, seasonally wet guilds. The seasonal flooding and cattle grazing also provides plenty of bare ground for the species associated with the bare ground guilds.

Variations in hydrology and topography on large sites will provide a range of conditions for those species associated with mosaics of open, wet to dry conditions, while the variations in sward height will cater for those requiring mosaics of different sward heights.

The major conservation sites will also cater well for species associated with the terrestrial littoral zone of ditches and pools.

Are any guilds not well catered for?
On these sites, winter flooding and grazing management will generally limit the build up of detritus and the species associated with these guilds. There are also very limited areas of scrub for wet woodland or deadwood guilds to feature strongly.

Recommendations
Retention of some areas of seasonally wet woodland, managed to allow the build up of deadwood and detritus would be valuable on many sites, where this doesn't conflict with the conservation of breeding and wintering bird populations.

Drainage ditches

Current management techniques
Across the Fens landscape as a whole a variety of ditch management practices are employed from short rotations (1 to 3 years), to medium rotations (4 to 10 years), and long rotations (over 10 years).

The majority of the IDB managed ditches (around 80%) are managed annually, another 18-19% managed on short to medium rotations (2 to 4 years), and only 1-2% managed on a long rotation.

On the major conservation sites, a mixture of short (3 to 4 years), medium (7 years) and long rotations (10 to 12 years) are generally adopted. Often whole ditches will be cleared at once though on some sites, some ditches may be managed by clearing sections of the same ditch on rotation. Very few sites now use annual management (known as "roding" at Woodwalton

Fen), where the ditch vegetation was cut and removed thereby helping to reduce the need for slubbing. A couple of sites appear to have a single rotation length across the whole site.

Which guilds are catered for by the current management approaches?
Across the Fens as a whole, the full range of conditions for open, aquatic and open, littoral guilds are provided. There is however, a bias toward the later successional, moderate to well vegetated conditions on the major conservation sites, and a bias towards early successional, bare substrate and sparsely vegetated conditions in the managed ditches of the arable farmland.

Are any guilds not well catered for?
Stable, open, early successional aquatic conditions are now often rare at the historic Fen sites, as management has moved towards longer rotations. Although such conditions may be provided within the IDB drainage ditch network, too manay of these drains suffer from eutrophication, and may not be suitable for many of the priority fen species.

Recommendations
Maintaining continuity of ditch management and stable conditions is important for many invertebrate species. Therefore the aim should be to manage some ditches little and often to provide stable early successional habitats. Similarly for later successional species, managing small lengths of ditches on long rotations, with different short lengths of ditch cut every year will be better than managing the whole ditches on a long rotation.

On the relic Fen sites recent management over 20 years or more has encouraged a dominance of later successional ditches. On these sites, which provide well for those late successional species of moderate to well vegetated conditions, it may therefore be better to seek to provide the early successional stages in new habitat creation areas adjacent to the historic Fen sites. This will avoid losing the later successional species still present on the main Fen sites, while increasing provision for species benefitting from stable early successional conditions. New, annual ditch management regimes can be introduced from the start of the habitat creation process in selected locations and become part of routine management.

On those conservation sites where there are currently simple rotations, it would be worth exploring the introduction of a variety of ditch management approaches from short, to medium to long rotations.

Throughout the wider arable fenland landscape the IDBs should ensure that a variety of ditch rotations from short to medium to long continue to be implemented, even though the majority of ditches will continue to be managed on short rotations. Less intensive management of ditch banks would also help provide for species associated with well vegetated terrestrial margins to ditches, some open wetland species, or those requiring a mosaic of sward heights adjacent to the ditches.

Identifying species-rich ditches and ditch systems in the wider arable fens landscape should be a priority, particularly as these are likely to support a different species assemblage to the main conservation sites and could be important for the early successional species of the open aquatic and open littoral guilds. IDBs need to know where the most valuable ditches and ditch

systems area so that they can base their ditch management decisions on up-to-date and accurate biodiversity information, while conservation organisations need to target monitoring and management advice and help develop a coherent wetland ecological network.

Carr / wet woodland

Current management techniques
Management of most carr and wet woodland areas is through limited or non-intervention, whether on the historic Fen sites or on newer gravel pit complexes. There are exceptions with parts of Chippenham Fen being grazed all year round with buffalo. At Wicken Fen there are compartments grazed all year round with Konik ponies that have some willows, though the majority of wet woodland at Wicken is in non-intervention areas. Osier beds are coppiced occasionally at the Ouse Washes and Baston Fen.

The only management undertaken at most sites will be the mowing of paths, which are often relatively narrow (up to 3 metres wide).

Which guilds are catered for by the current management approaches?
The dominance of limited or non-intervention management ensures there are suitable conditions for the key deadwood and detritus guilds.

Are any guilds not well catered for?
While detritus and deadwood species are well catered for, the lack of open flower-rich areas within the wet woodlands may limit the occurrence of species requiring a mosaic of open to closed habitats, though on many sites carr woodland and tall or short-herb fen will be present in close proximity.

Recommendations
It would be interesting to research whether the extensive, all year round grazing of areas of carr woodland at Chippenham Fen and the all year round grazing compartments at Wicken Fen provide for a different range of species to those found in un-grazed limited intervention, wet woodland?

Small standing water-bodies / large standing water-bodies

Current management techniques
At Woodwalton Fen, small turf pools are created mainly to conserve the population of Fen Violet.

On many of the floodplain grazing marsh sites, scrapes and pools are specifically created to attract water birds.

At all sites fluctuations in topography allow the formation of shallow and temporary water bodies, whether they be permanent or seasonally flooded.

More recent gravel and clay pit complexes are often designed with shallow margins and a variety of profiles, while older pits are often steep sided. Specific habitat management rarely occurs, with management often being related to recreational uses. A few sites such as King's Dyke are managed as nature reserves, but most former minerals sites are used for fishing,

boatig or abandoned. Where there isn't a recreational use, the pit margins will often quickly become dominated by willows and become shaded.

Which guilds are catered for by the current approaches?
The small and temporary open pools will provide suitable conditions for species associated with a variety of guilds including bare ground species, open littoral species, mosaics of wet and dry conditions, and those species requiring a juxtaposition of habitats.

The larger gravel pits will generally support open aquatic species covering the full range of successional conditions from bare substrates to moderately and well vegetated conditions. Some of the flooded clay and gravel pits are extremely important for early successional open, aquatic species associated with bare substrates. Most will also support many open, littoral species, particularly the more recently created ones, which are designed with varied profiles including shallow margins.

Larger gravel pit sites where the margins have become dominated by willows can provide for species associated with deadwood, detritus and shaded littoral or aquatic conditions.

Are any guilds not well catered for?
While minerals extraction continues and new sites keep being created there are no obvious gaps. In the long-term there could be a reduction in early successional conditions without specific management, but there should be no danger of that for several decades.

Recommendations
The creation of small pools on the historic Fen sites should be continued and the effects of such management monitored, both for target species such as the Fen Violet and for other priority species including the Fens Regional specialists.

Evidence should be gathered as to which priority and Fens Regional specialist species are associated with scrapes and pools created for water birds.

Gravel and clay pits should continue to be designed with varied profiles and an abundance of shallow sloping margins to maximise the opportunities for species associated with the aquatic and terrestrial littoral zones.

Research is needed to understand how it might be possible to maintain the early successional, open, aquatic, bare substrates where these support priority species and particularly Fens Regional specialists. If this isn't possible, plans will need to be made to create new ponds and lakes in suitable locations.

Strategic Management Challenges

On the main conservation sites, whether relic Fens or washlands, the biggest challenges are associated with water resources, whether that is availability of sufficient water under climate change scenarios or flooding at the wrong time of year. Securing adequate water supplies for the landscape-scale habitat creation schemes is also a major challenge.

On these sites and on those former minerals sites managed for nature conservation, maintenance of populations of priority species associated with early successional stages presents an on-going challenge, though future habitat creation could help.

The isolation and fragmentation of semi-naturtal habitats across the Fens may limit the potential for some priority species and Fenland reigional specialists to adapt to future changes. Lack of understanding of what constitutes a viable ecological network across the Fens presents a major challenge in formulating conservation strategies, planning habitat creation and seeking to influence management of the wider farmed landscape.

Summary

Much of the existing management practice on conservation sites in the Fens appears to provide suitable conditions for a majority of the guilds that have been identified as most important for the conservation of priority species, including Fenland Regional specialists.

A detailed analysis of each major conservation site within the Fens would be worthwhile to identify which priority species are present, their guilds and to review whether current management is providing suitable conditions for these guilds. This assessment would also indicate whether there are particular guilds (and associated species) missing.

This analysis could also be extended to assess whether species have been lost from the site, which guilds theses belong to and whether changes to management could be introduced to encourage re-colonisation (without detriment to the biodiversity still present), or whether the species were never present or losses were too long ago to attempt the creation of suitable conditions.

There are some changes that could be made on some sites, particularly linked to ditch management rotations and the creation of more stable early or late successional conditions through smaller scale ditch management rotations. The creation of stable early successional conditions through annual management of selected ditches on the habitat creation sites adjacent to the major Fenland conservation sites would be beneficial, to complement the generally longer roations and late successional stages now dominant on the historic conservation sites.

In recent years new approaches to management have been introduced, such as extensive, all year round grazing regimes at Wicken Fen and Chippenham Fen. However there is a lack of published information on the effects of these new approaches compared to the traditional cutting or seasonal grazing.

Research is urgently required to investigate the wider biodiversity benefits of experimental management either underway or new approaches identified through this report. It is vital that records are made of the management actions applied to each compartment in each year. Furthermore, vegetation structure and species monitoring should be explicitly linked to the compartment of recording and the management actions applied to that compartment. Without this information, it will not be possible to demonstrate the effects of a given management regime, particularly since it may take a number of years to see any benefits. The outcomes of any novel or unsual management should be monitored, catalogued and information shared between conservation managers. Further investigation is also needed to understand the distribution of priority species outside of the relic fen sites and in the wider landscape; it is recommended that field margins and ditches and associated banks are particularly targeted. Additional engagement with local and national recording groups may provide opportunities for species monitoring.

The information from such research could be used to fine tune management practices to the benefit of the Fenland priority species and wider biodiversity.

Specific areas for research include:

- Promote recording in the wider Fens landscape – even enhancing our knowledge of the distribution of common species would be helpful.
- Are there differences in the assemblages of priority species at the relic Fen sites in compartments managed by traditional cutting and seasonal grazing management regimes compared with those managed by extensive, all year round grazing?
- What are the differences in the vegetation communities and structures resulting from long term extensive grazing regimes compared to cutting and/or more intensive seasonal grazing?
- To what extent do the extensive grazing regimes on Fen sites provide for the full range of guilds (or at least a majority of them)? What level of supplementary cutting of herbaceous vegetation and scrub is still required?
- What are the responses of priority species to different grazing regimes on relic fen sites? What is the best approach to investigate this question? For example, could more common indicator species with similar requirements be used?;
- What are the responses of priority species to different management cycles for Drainage Ditches on both conservation sites (washlands and relic Fens) and within the wider farmed environment? Both the ability of species to survive such disturbance and their ability to re-colonise disturbed areas will vary. Any monitoring of managed ditches should include pre-disturbance monitoring (particularly in ditches on long rotation);
- Development of a methodology / tool to identify biodiversity-rich ditches in the wider farmed environment;
- Assessment and monitoring of experimental methods to create stable, early successional stages within ditches on both current conservation sites (relic Fens and washlands), and on the new habitat creation sites;
- Development of novel mechanical methods of creating bare ground on littoral margins should be investigated, trialled and thoroughly monitored.
- Assessment of effects & benefits to key priority species of creating small standing water-bodies on both relic Fen sites and new habitat creation areas;
- Assessment of the non-avian priority species using scrapes created for breeding and wintering birds on the main washland sites;
- Investigation of the relative longevity and benefits of different methods to create bare, exposed sediments in wetland habitats. For example, do the experimental rotovated ditch bank plots, created by the WWT for waders, provide valuable habitat for any priority plant and invertebrate species?

A co-ordinated approach to research and monitoring needs to be developed if there is to be a move towards evidence-based conservation within the Fens. It would be beneficial to adopt some standard approaches to monitoring across the Fens conservation sites, particularly related to whether suitable habitat conditions are present for some of the key guilds and their priority species. This would probably be best be related to standard measures of habitat structure and micro-habitats.

Finally, regular meetings of Fens conservation site managers would help facilitate sharing of knowledge, new experiemental approaches and the results of monitoring efforts.

References

Barnard, P.C. (ed.), 2011. The Royal Entomological Society book of British insects. John Wiley & Sons, Chichester, UK.

Brown, A., Brotherton, P., Pearce, P., Perry, S., Pearson, H., Radley, D., Measures, G. & Townsend T. (ed.) (2010) Lost Life: England's lost and threatened species. Natural England, Peterborough.

Dolman, P.M., Panter, C.J. & Mossman, H.L. (2010) Securing Biodiversity in Breckland. Guidance for Conservation and Research. First Report of the Breckland Biodiversity Audit. University of East Anglia, Norwich.

England, N. (2011) Chippenham Fen NNR. [redacted] Date accessed: 14/10/2011.

Evans, S., Henrici, A. & Ing, B. (2006) The Red Data List of Threatened British Fungi: Preliminary Assessment. . Unpublished report. British Mycological Society, Manchester.

Fuller, R., Smith, G., Sanderson, J., Hill, R., Thomson, A., Cox, R., Brown, N., Clarke, R., Rothery, P. & Gerard, F. (2002) Countryside Survey 2000 Module 7: Land Cover Map 2000 Final Report. Centre for Ecology and Hydrology, Monks Wood.

Haes, E.C.M. & Harding, P.T. (1997) Atlas of Grasshoppers Crickets and Allied Insects in Britain and Ireland. Institute of Terrestrial Ecology, Huntingdon.

Harvey, P.R., Nellist, D.R. & Telfer, M.G. (2002) Provisional Atlas of British Spiders (Arachnida, Araneae), Volumes 1 & 2. Biological Records Centre, Centre for Ecology and Hydrology, Monks Wood.

Mitsch, W.J. and J.G. Gosselink. 1993.Wetlands, 2nd Ed. John Wiley & Sons, New York. 722 pp.

Panter, C., Mossman, H.L. & Dolman, P.M. (2011) Biodiversity Audit and Tolerance Sensitivity Mapping for the Broads. . Broads Authority Report. The Broads, UK.

Plantlife (2010) Important Plant Areas: Chippenham Fen. [redacted] Date accessed: 14/10/2011.

Ringwood, Z., Roscoe, A. & Higgott, J. (2009) 'The habitat and conservation requirements of the newly recognised British plume moth Emmelina argoteles (Lepidoptera: Pterophoridae)', British Journal of Entomology and Natural History, 22, 195-204.

Webb, J. & Lott, D. (2006) The development of ISIS: a habitat-based invertebrate assemblage classification system for assessing conservation interest in England. *Journal of Insect Conservation,* **10,** 179-188.

Wheeler, B.D., Gowing, D.J.G., Shaw, S.C., Mountford, J.O., and Money, R.P., 2004. Ecohydrological Guidelines for Lowland Wetland Plant Communities (Eds. A.W. Brooks, P.V. Jose, and M.I. Whiteman,). Environment Agency.

Appendices

Table A1. List of broad habitats, micro-habitats, ecological structures and processes used when to characterise species requirements and form management guilds.

Broad habitats
Very fast flowing water - including waterfalls
Running water - water has definite flow
Standing water - small permanent e.g. Pools, ponds, ditches (not ephermal pools such as hoofprints/puddles)
Standing water – large
Brackish tolerant
Fluctuating water (in waterbodies, littoral margins, reedbed, fen)
River margins (all terrestrial species)
Fen (including fen meadow)
Litter fen
Fen carr (well shaded)
Bog
Mire
Reedbed (less species rich than fen)
Moorland
Montane/alpine
Coastal (sand dune, shingle, saltmarsh)
Marine
Shingle (coastal and inland)
Rocky shore
Sea cliffs/ coastal cliff tops
Rock/cliff
Estuary/mudflat
Saltmarsh
Sand dune
Wet grassland (seasonally wet-damp (indeterminate acid/calc) inc. Rush pasture
Mesic/indeterminate grassland (e.g. "grassland", "semi-improved grassland", "verges")
Dry grassland (indeterminate acid/calc)
Acid grassland
Calcareous grassland
Heath (lowland dwarf scrub)
Arable
Brown field (waste-land)
Scrub (wet or dry habitats)
Hedgerow
Wet woodland
Wood pasture (including parkland and orchards)
Open-woodland (e.g. glades, rides, edges, open-coppiced woodland)
Broadleaved woodland (inc. "woodland" - assumed broad/mixed)
Coniferous woodland
Rock faces/rocks

Walls/concrete features

Ecological structures, processes and micro-habitats

Wet
Mesic
Xeric/dry
Moisture gradients
Aquatic vegetation
Clear water (not opaque, low sediment load)
Muddy water
High water quality (specific need, not generic statement)
Substrate typically below water (e.g. *Sphagnum* bog pools, *Carex elata* swamp)
Emergent/marginal vegetation
Rich/choked aquatic vegetation
Littoral/Lake margins
Mossy/ moss – including liverworts (terrestrial or aquatic)
Seepage/flushes
Acid substrate
Basic Substrate
Mineral - sandy (terrestrial or aquatic)
Mineral - silt (terrestrial or aquatic)
Organic - peat (terrestrial or aquatic)
Bedrock/boulders ((terrestrial or aquatic)
Gravel/pebbles (terrestrial or aquatic)
Scree
Caves, underground
Limestone pavement
Soft cliffs
Bare ground (terrestrial or aquatic)
Early successional stages (terrestrial or aquatic)
Warm sunny areas
Banks (terrestrial species only)
Slopes
Short vegetation
Tall vegetation
Isolated trees
Veteran trees (and associated processes e.g. Heartwood decay, rotholes)
Arboreal/ Ground vegetation structure not relevant
Detritus/Litter
General detritivore
Chalk/sand/gravel pits
Field margins
Flower rich areas
Ruderal herbs (flora nad fauna)
Dead herbaceous stems (stems)
Tussocks

Juxtapostion - needs complexity of structures e.g. bare ground and tussocks/nectar
Open with scrub (needs juxtaposition of two)
Sward mosaics (both short and tall required, needs complexity of sward)
Mammal burrows
Dung
Fungi/Lichen/smuts
Carrion
Standing deadwood (if indeterminate both ticked)
Fallen deadwood (if indeterminate both ticked)
Eutrophication
Nutrient limitation
Low intensity grazing (very low stocking rate/extensive OR grazing outside growing season)
Moderate density
Intensive grazing
Trampling
Cutting (biomass harvest)
No grazing
No cutting
No disturbance
Low intensity disturbance
High intensity disturbance
Burning
Sward closure; tall, occasionally short (ISIS - states poorly expressed in ISIS. (also Coarse/rank veg)
Scrub invasion
Poaching
Species in seed heads/dead flower heads/stems (mainly herbaceous)
Obligate species required - primary species (secondary species)
Other unmentioned requirements (hoofprints, ivy on walls, sap runs)

Table A2. Sources of species information used to characterise requirements and form management guilds.

Auto-ecological Information:

Available via Recorder:

Anderson, R. (2005) on-marine Mollusca of Britain and Ireland – source reference included within recorder species accounts

Biological Monitoring Working Party (BMWP value) - water quality measure

Bratton, J.H. (1990) A Review of the Scarcer Ephemeroptera and Plecoptera of Great Britain. Research and Survey in Nature Conservation Series 29. Joint Nature Conservation Committee, Peterborough

Bratton, J.H. (ed.) (1991) British Red Data Books: 3. Invertebrates other than insects. Joint Nature Conservation Committee, Peterborough. (Included within Recorder Species Accounts)

British Lichen Society Note (undated reference within Recorder 6 species accounts)

CCI value (Community Conservation Index -rarity score)

Church, J.M., Coppins, B.J., Gilbert, O.L., James, P.W. & Stewart, X.F. (1996) Red Data Books of Britain and Ireland: Lichens, Volume 1: Britain. Joint Nature Conservation Committee, Peterborough

Church, J.M., Hodgetts, N.G., Preston, C.D., & Stewart, N.F. (2001) British Red Data Books mosses and liverworts. Joint Nature Conservation Committee, Peterborough

Diptera Checklist (undated reference source included within Recorder Species Accounts).

Falk, S. (1991) A Review of the Scarce and Threatened Bees, Wasps and Ants of Great Britain. Research and Survey in Nature Conservation, No. 35. Joint Nature Conservation Committee, Peterborough

Falk, S. (1991) A Review of the Scarce and Threatened Flies of Great Britain. Research and Survey in Nature Conservation, No. 39. Joint Nature Conservation Committee, Peterborough

Hyman, P.S. (revised and updated by Parsons, M.S) (1992) Review of the Scarce and Threatened Coleoptera of Great Britain, Part 1. UK Nature Conservation Series No.3. Joint Nature Conservation Committee, Peterborough

Hyman, P.S. (revised and updated by Parsons, M.S) (1994) Review of the Scarce and Threatened Coleoptera of Great Britain, Part 2. UK Nature Conservation Series No. 12. Joint Nature Conservation Committee, Peterborough

Kirby, P. (1991) A review of the scarcer Neuroptera of Great Britain. Research and Survey in Nature Conservation, No. 34. Joint Nature Conservation Committee, Peterborough. (Included within Recorder Species Accounts)

Kirby, P. (1992) A Review of the Scarce and Threatened Hemiptera of Great Britain. UK Nature Conservation Series 2. Joint Nature Conservation Committee, Peterborough

LIFE value (Lotic invertebrate Index for Flow Evaluation)

MTR (Mean trophic rank) value

Parsons, M.S. (1993) Review of the Scarce and Threatened Pyralid Moths of Great Britain. UK Nature Conservation Series 11. Joint Nature Conservation Committee, Peterborough

Parsons, M.S. (1996) A Review of the Scarce and Threatened Ethmiine Stathmopodine and Gelechiid Moths of Great Britain. UK Nature Conservation Series 11. Joint Nature Conservation Committee, Peterborough

Pollution tolerant score (Unreferenced Recorder statement)

Recorder 6 species accounts. These include statements from the Invertebrate Site Registers and Red Data Book accounts

RivPacs River Invertebrate Prediction and Classification System (RivPacs) code

Shirt, D.B. (ed.) (1987) British Red Data Books: 2 Insects. Joint Nature Conservation Committee, Peterborough

Stewart, N.F. & Church, J.M. (1993) Red Data Books of Britain and Ireland: Stoneworts. Joint Nature Conservation Committee, Peterborough

Wallace, I.D. (1991) A Review of the Trichoptera of Great Britain. Research and Survey in Nature Conservation Series 32. Joint Nature Conservation Committee, Peterborough.

Wigginton, M.J. (ed.) (1999) British Red Data Books: 1 Vascular plants (3rd edition). Joint Nature Conservation Committee, Peterborough

Websites:

British dragonfly society website (www.dragonflysoc.org.uk)

UK moths website (ukmoths.org.uk)

Coleoptera of Poland (coleoptera.ksib.pl)

General database of plant ecology (www.ecoflora.co.uk)

Online Atlas of the British and Irish flora (www.brc.ac.uk/plantatlas/)
(www.bbsfieldguide.org.uk)
General ecological information for UK butterflies (www.ukbutterflies.co.uk www.britishbutterflies.co.uk)
Essex Field Club, for ecological accounts of species often lacking in information from usual sources (www.essexfieldclub.org.uk)
Specific ecological information for tachinids (Diptera) from Tachinid Recording Scheme (tachinidae.org.uk)
Ecological information and current distributions for spiders and harvestman (srs.britishspiders.org.uk/portal.php)
Biological Records Centre - Database of Insects and their Food Plants (www.brc.ac.uk/dbif/homepage.aspx)
UK BAP Tranches 1 and 2 (1995-1999) Biodiversity Action Plans (Note these are the original action plans and are no longer current. However ecological information is still relevant) (www.ukbap.org.uk/species.aspx)
The IUCN website (www.iucnredlist.org)

Databases:

Invertebrate Species-habitat Information System (ISIS) - c .6000 invertebrate species have been categorised.
Hill, M.O., Preston, C.D., Bosanquet, S.D.S & Roy D.B. (2007) BRYOATT: Attributes of British and Irish Mosses, Liverworts and Hornworts With Information on Native Status, Size, Life Form, Life History, Geography and Habitat. NERC Centre for Ecology and Hydrology and Countryside Council for Wales.
Hill, M.O., Preston, C.D. & Roy D.B. (2004) PLANTATT Attributes of British and Irish Plants: Status, Size, Life History, Geography and Habitats for use in connection with the New atlas of the British and Irish flora Biological Records Centre NERC Centre for Ecology and Hydrology.

Publications:

Balfour-Browne, F. (1940, 1950, 1958) British Water Beetles, Volumes I-III. Ray Society, London
Emmet, A.M., (ed.) 1988. A Field Guide to the Smaller British Lepidoptera. Second edition. The British Entological & Natural History Society, London
Foster, G.N. (1994) Biodiversity Inventory of Scotland: Aquatic Coleoptera. Scottish Natural Heritage Review. No. 26
Foster, G.N. (2001) Atlas of Scottish Water Beetles. Scottish Natural Heritage
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
Goddey, B. (2004) The Moths of Essex. Loping Book, Wimbish
Haes, E.C.M. & Harding, P.T. (1997) Atlas of Grasshoppers, Crickets and Allied Insects in Britain and Ireland. Institute of Terrestrial Ecology, Huntingdon
Jermy, A. C.; Arnold, H. R.; Farrell, Lynne; Perring, F. H., eds. 1978. Atlas of Ferns of the British Isles. Botanical Society of the British Isles and British Pteridological Society, London
Kerney, M. (1999) Atlas of Land and Freshwater Molluscs of Britain and Ireland. Harley Books, Colchester.
Kirby, P. (1992) Habitat Management for Invertebrates: A Practical Handbook. Royal Society for the Protection of Birds, Sandy
Luff, M.L. (1998) Provisional Atlas of the Ground Beetles (Coleoptera, Carabidae) of Britain. Centre for Ecology and Hydrology, Huntingdon
Newbold, C. 1997. Water Level Requirements of Wetland Plants and Animals. English Nature Freshwater Series, Peterborough
Purvis, O.W., Coppins, B.J., Hawksworth, D.L., James, P.W., & Moore, D. M. (1994) The Lichen Flora of Great Britain and Ireland. Natural History Museum, London.
Smith, A.J.E. (2004) The Moss Flora of Britain and Ireland. Second Edition. Cambridge University Press, Cambridge
Stewart, A., Pearman, D.A. & Preston, C.D. 1994. Scarce plants in Britain. JNCC, Peterborough.
Twinn, P.F.G. & Harding, P.T. (1999) Provisional Atlas of the Longhorn Beetles (Coleoptera, Cerambycidae) of Britain. Abbots Ripton, Huntingdon, Biological Records Centre Institute of Terrestrial Ecology, 96pp
Waring, P. & Townsend, M. (2003) Field Guide to the Moths of Great Britain and Ireland. British Wildlife Publishing, Hook
Woods, R.G, Coppins, B.J. 2003. A Conservation Evaluation of British Lichens. Intype London, Wimbledon

Table A3. Priority species for which no records of later than 1987 (incl.) were obtained during the Fens Biodiversity Audit. Fens Specialist status is shown; Entirely Restricted (ER) to the Fens, Largely Restricted (LR), Primary Stronghold in the region (PS), Secondary Stronghold in the region (SS). Asterisk denotes species for which post-1987 records came to light since the completion of record collation.

Taxon group	Family	Species	Fen Specialist	Extinct
Fungus	Bankeraceae	*Hydnellum concrescens*		
Fungus	Cladoniaceae	*Cladonia conista*		
Fungus	Clavicipitaceae	*Cordyceps tuberculata*		
Fungus	Cortinariaceae	*Cortinarius violaceus*		
Fungus	Entolomataceae	*Entoloma indutoides*		
Fungus	Helotiaceae	*Mitrula sclerotipus*		
Fungus	Pleurotaceae	*Hohenbuehelia mastrucata*		
Fungus	Polyporaceae	*Perenniporia medulla-panis*		Extinct
Fungus	Tricholomataceae	*Hygrophorus arbustivus*		
Fungus	Tricholomataceae	*Hygrophorus penarius*		
Fungus	Tricholomataceae	*Tricholoma inamoenum*		Extinct
Fungus	Tricholomataceae	*Tricholoma stans*		
Fungus	Ustilaginaceae	*Ustilago hordei*		
Lichen	Bacidiaceae	*Bacidia chloroticula*		
Lichen	Bacidiaceae	*Bacidia incompta*		
Lichen	Cladoniaceae	*Cladonia cariosa*		
Lichen	Cladoniaceae	*Cladonia phyllophora*		
Lichen	Collemataceae	*Collema bachmanianum*		
Lichen	Incertae sedis	*Lepraria nivalis*		
Lichen	Parmeliaceae	*Melanelia disjuncta*		
Lichen	Physciaceae	*Rinodina exigua*		
Lichen	Teloschistaceae	*Caloplaca haematites*		Extinct
Lichen	Teloschistaceae	*Caloplaca luteoalba*		
Lichen	Teloschistaceae	*Xanthoria ulophyllodes*		
Lichen	Tricholomataceae	*Arrhenia chlorocyanea*		
Stonewort	Characeae	*Chara rudis*		
Liverwort	Aneuraceae	*Cryptothallus mirabilis*		
Liverwort	Pallaviciniaceae	*Moerckia hibernica*		
Liverwort	Ricciaceae	*Riccia rhenana*		
Moss	Amblystegiaceae	*Drepanocladus lycopodioides*		
Moss	Amblystegiaceae	*Tomentypnum nitens*		
Moss	Bryaceae	*Bryum creberrimum*		
Moss	Bryaceae	*Bryum torquescens*		
Moss	Dicranaceae	*Ditrichum flexicaule*		
Moss	Mniaceae	*Plagiomnium ellipticum*		
Moss	Pottiaceae	*Didymodon acutus*		
Moss	Pottiaceae	*Tortella inclinata*		
Moss	Pottiaceae	*Tortella inflexa*		
Moss	Pottiaceae	*Tortula vahliana*		
Moss	Pottiaceae	*Weissia sterilis*		
Fern	Dryopteridaceae	*Dryopteris cristata*		Extinct
Fern	Marsileaceae	*Pilularia globulifera*		

Dragonfly (Odonata)	Lestidae	*Lestes dryas*		
Flowering plant	Apiaceae	*Caucalis platycarpos*		Extinct
Flowering plant	Apiaceae	*Selinum carvifolia*	PS	
Flowering plant	Asteraceae	*Filago pyramidata*		
Flowering plant	Asteraceae	*Pulicaria vulgaris*		Extinct
Flowering plant	Brassicaceae	*Camelina sativa*		
Flowering plant	Caryophyllaceae	*Dianthus armeria*		
Flowering plant	Caryophyllaceae	*Scleranthus annuus subsp.*		
Flowering plant	Chenopodiaceae	*Chenopodium urbicum*		Extinct
Flowering plant	Cuscutaceae	*Cuscuta epithymum*		
Flowering plant	Cyperaceae	*Blysmus compressus*		
Flowering plant	Droseraceae	*Drosera anglica*		
Flowering plant	Fabaceae	*Genista anglica*		
Flowering plant	Fabaceae	*Lathyrus aphaca*		
Flowering plant	Fabaceae	*Trifolium ochroleucon*		
Flowering plant	Fabaceae	*Vicia parviflora*		
Flowering plant	Orchidaceae	*Aceras anthropophorum*		
Flowering plant	Orchidaceae	*Himantoglossum hircinum*		
Flowering plant	Orchidaceae	*Platanthera chlorantha*		
Flowering plant	Plumbaginaceae	*Limonium humile*		Extirpated
Flowering plant	Poaceae	*Calamagrostis stricta*		
Flowering plant	Poaceae	*Corynephorus canescens*		
Flowering plant	Poaceae	*Festuca longifolia*		
Flowering plant	Poaceae	*Hordelymus europaeus*		
Flowering plant	Potamogetonaceae	*Potamogeton natans x lucens =*		
Flowering plant	Ranunculaceae	*Adonis annua*		Extinct
Flowering plant	Ranunculaceae	*Ranunculus arvensis*		
Flowering plant	Violaceae	*Viola canina subsp. canina*		
Flowering plant	Violaceae	*Viola canina subsp. montana*	ER	
Mollusc	Hydrobiidae	*Hydrobia acuta subsp. neglecta*	SS	
Mollusc	Hydrobiidae	*Marstoniopsis insubrica*		
Mollusc	Hydrobiidae	*Mercuria cf. similis*		Extirpated
Mollusc	Lymnaeidae	*Myxas glutinosa*		Extirpated
Mollusc	Lymnaeidae	*Omphiscola glabra*		Extirpated
Mollusc	Ostreidae	*Ostrea edulis*		
Mollusc	Planorbidae	*Anisus vorticulus*		
Mollusc	Planorbidae	*Segmentina nitida*		Extirpated
Mollusc	Vertiginidae	*Vertigo angustior*		
Annelid	Hirudinidae	*Hirudo medicinalis*		
False scorpion	Chernetidae	*Dendrochernes cyrneus*		
Spider (Araneae)	Araneidae	*Araneus alsine*		Extirpated
Spider (Araneae)	Araneidae	*Cercidia prominens*		
Spider (Araneae)	Araneidae	*Hypsosinga heri*	ER	Extinct
Spider (Araneae)	Araneidae	*Larinioides patagiatus*		
Spider (Araneae)	Linyphiidae	*Baryphyma maritimum*		
Spider (Araneae)	Linyphiidae	*Centromerus capucinus*		
Spider (Araneae)	Linyphiidae	*Centromerus semiater*		
Spider (Araneae)	Linyphiidae	*Erigonella ignobilis*		
Spider (Araneae)	Linyphiidae	*Pelecopsis nemoralioides*		

Spider (Araneae)	Linyphiidae	*Walckenaeria capito*		
Spider (Araneae)	Linyphiidae	*Walckenaeria corniculans*		Extinct
Spider (Araneae)	Lycosidae	*Pardosa hortensis*		
Spider (Araneae)	Lycosidae	*Trochosa robusta*		
Spider (Araneae)	Philodromidae	*Philodromus fallax*		
Spider (Araneae)	Salticidae	*Marpissa nivoyi*		
Spider (Araneae)	Theridiosomatidae	*Theridiosoma gemmosum*		
Spider (Araneae)	Thomisidae	*Ozyptila scabricula*		
Spider (Araneae)	Thomisidae	*Xysticus lanio*		
Orthopteran	Acrididae	*Stethophyma grossum*		Extinct
True bug (Hemiptera)	Cicadellidae	*Idiocerus fulgidus*		
True bug (Hemiptera)	Cicadellidae	*Stroggylocephalus livens*		
True bug (Hemiptera)	Delphacidae	*Paraliburnia clypealis**		
True bug (Hemiptera)	Hebridae	*Hebrus pusillus*		
True bug (Hemiptera)	Lygaeidae	*Drymus pilicornis*		
True bug (Hemiptera)	Lygaeidae	*Eremocoris plebejus*		
True bug (Hemiptera)	Microphysidae	*Myrmedobia coleoptrata*		
True bug (Hemiptera)	Miridae	*Adelphocoris seticornis*		
True bug (Hemiptera)	Miridae	*Halticus saltator*		
True bug (Hemiptera)	Rhopalidae	*Rhopalus rufus*		
True bug (Hemiptera)	Scutelleridae	*Eurygaster maura*		
Beetle (Coleoptera)	Anobiidae	*Caenocara bovistae**		
Beetle (Coleoptera)	Anobiidae	*Dorcatoma dresdensis**		
Beetle (Coleoptera)	Apionidae	*Melanapion minimum*		
Beetle (Coleoptera)	Apionidae	*Perapion lemoroi*		
Beetle (Coleoptera)	Apionidae	*Protapion varipes*		
Beetle (Coleoptera)	Apionidae	*Squamapion vicinum*		
Beetle (Coleoptera)	Bothrideridae	*Anommatus duodecimstriatus*		
Beetle (Coleoptera)	Buprestidae	*Aphanisticus pusillus*		
Beetle (Coleoptera)	Cantharidae	*Malthodes guttifer*		
Beetle (Coleoptera)	Cantharidae	*Malthodes maurus*		
Beetle (Coleoptera)	Carabidae	*Acupalpus exiguus*		
Beetle (Coleoptera)	Carabidae	*Agonum nigrum**		
Beetle (Coleoptera)	Carabidae	*Agonum scitulum*		
Beetle (Coleoptera)	Carabidae	*Agonum versutum*		
Beetle (Coleoptera)	Carabidae	*Amara consularis*		
Beetle (Coleoptera)	Carabidae	*Amara curta*		
Beetle (Coleoptera)	Carabidae	*Amara fulva*		
Beetle (Coleoptera)	Carabidae	*Amara praetermissa**		
Beetle (Coleoptera)	Carabidae	*Amara strenua*		
Beetle (Coleoptera)	Carabidae	*Bembidion fluviatile*		
Beetle (Coleoptera)	Carabidae	*Bembidion nigricorne*		
Beetle (Coleoptera)	Carabidae	*Bembidion semipunctatum*		
Beetle (Coleoptera)	Carabidae	*Bracteon litorale*		
Beetle (Coleoptera)	Carabidae	*Chlaenius tristis*	SS	Extinct
Beetle (Coleoptera)	Carabidae	*Cymindis axillaris*		
Beetle (Coleoptera)	Carabidae	*Dicheirotrichus obsoletus*		
Beetle (Coleoptera)	Carabidae	*Elaphrus uliginosus*		
Beetle (Coleoptera)	Carabidae	*Harpalus melancholicus*		

Beetle (Coleoptera)	Carabidae	*Harpalus serripes*		
Beetle (Coleoptera)	Carabidae	*Lebia chlorocephala*		
Beetle (Coleoptera)	Carabidae	*Notiophilus aesthuans*		
Beetle (Coleoptera)	Carabidae	*Ophonus laticollis*		
Beetle (Coleoptera)	Carabidae	*Ophonus melletii**		
Beetle (Coleoptera)	Carabidae	*Ophonus puncticollis*		
Beetle (Coleoptera)	Carabidae	*Ophonus sabulicola*		
Beetle (Coleoptera)	Carabidae	*Ophonus stictus*		
Beetle (Coleoptera)	Carabidae	*Panagaeus cruxmajor*		Extripated
Beetle (Coleoptera)	Carabidae	*Philorhizus sigma*		
Beetle (Coleoptera)	Carabidae	*Pterostichus aterrimus*		
Beetle (Coleoptera)	Carabidae	*Pterostichus longicollis*		
Beetle (Coleoptera)	Carabidae	*Pterostichus quadrifoveolatus*		
Beetle (Coleoptera)	Carabidae	*Stenolophus teutonus*		
Beetle (Coleoptera)	Carabidae	*Trechus rivularis*		
Beetle (Coleoptera)	Carabidae	*Trechus rubens*		
Beetle (Coleoptera)	Carabidae	*Zabrus tenebrioides*		
Beetle (Coleoptera)	Cerambycidae	*Glaphyra umbellatarum**		
Beetle (Coleoptera)	Cerambycidae	*Stenostola dubia*		
Beetle (Coleoptera)	Chrysomelidae	*Bruchus atomarius*		
Beetle (Coleoptera)	Chrysomelidae	*Cassida hemisphaerica*		
Beetle (Coleoptera)	Chrysomelidae	*Chaetocnema aerosa*		
Beetle (Coleoptera)	Chrysomelidae	*Chaetocnema sahlbergii*		
Beetle (Coleoptera)	Chrysomelidae	*Chrysolina haemoptera*		
Beetle (Coleoptera)	Chrysomelidae	*Cryptocephalus aureolus*		
Beetle (Coleoptera)	Chrysomelidae	*Cryptocephalus bilineatus*		
Beetle (Coleoptera)	Chrysomelidae	*Cryptocephalus exiguus*		
Beetle (Coleoptera)	Chrysomelidae	*Cryptocephalus frontalis*		
Beetle (Coleoptera)	Chrysomelidae	*Cryptocephalus parvulus*		
Beetle (Coleoptera)	Chrysomelidae	*Dibolia cynoglossi*		
Beetle (Coleoptera)	Chrysomelidae	*Donacia aquatica*		
Beetle (Coleoptera)	Chrysomelidae	*Donacia bicolora*		
Beetle (Coleoptera)	Chrysomelidae	*Galeruca laticollis*	SS	Extirpated
Beetle (Coleoptera)	Chrysomelidae	*Longitarsus agilis*		
Beetle (Coleoptera)	Chrysomelidae	*Longitarsus anchusae*		
Beetle (Coleoptera)	Chrysomelidae	*Longitarsus ballotae*		
Beetle (Coleoptera)	Chrysomelidae	*Longitarsus nasturtii*		
Beetle (Coleoptera)	Chrysomelidae	*Longitarsus nigrofasciatus*		
Beetle (Coleoptera)	Chrysomelidae	*Longitarsus plantagomaritimus*		
Beetle (Coleoptera)	Chrysomelidae	*Longitarsus tabidus**		
Beetle (Coleoptera)	Chrysomelidae	*Mantura obtusata*		
Beetle (Coleoptera)	Chrysomelidae	*Mantura rustica*		
Beetle (Coleoptera)	Chrysomelidae	*Ochrosis ventralis*		
Beetle (Coleoptera)	Chrysomelidae	*Plateumaris affinis*		
Beetle (Coleoptera)	Chrysomelidae	*Psylliodes luteola*		
Beetle (Coleoptera)	Coccinellidae	*Scymnus limbatus*		
Beetle (Coleoptera)	Coccinellidae	*Scymnus schmidti*		
Beetle (Coleoptera)	Cryptophagidae	*Atomaria barani*		
Beetle (Coleoptera)	Cryptophagidae	*Atomaria pseudatra*		

Beetle (Coleoptera)	Cryptophagidae	*Atomaria rhenana*		
Beetle (Coleoptera)	Cryptophagidae	*Atomaria rubricollis*		
Beetle (Coleoptera)	Cryptophagidae	*Atomaria umbrina*		
Beetle (Coleoptera)	Cryptophagidae	*Cryptophagus populi*		
Beetle (Coleoptera)	Cryptophagidae	*Cryptophagus schmidtii*	PS	
Beetle (Coleoptera)	Cucujidae	*Pediacus depressus**		
Beetle (Coleoptera)	Curculionidae	*Anthonomus ulmi*		
Beetle (Coleoptera)	Curculionidae	*Aulacobaris lepidii*		
Beetle (Coleoptera)	Curculionidae	*Bagous puncticollis*		
Beetle (Coleoptera)	Curculionidae	*Bagous subcarinatus*		
Beetle (Coleoptera)	Curculionidae	*Bagous tempestivus*		
Beetle (Coleoptera)	Curculionidae	*Brachysomus echinatus*		
Beetle (Coleoptera)	Curculionidae	*Ceutorhynchus pectoralis*		
Beetle (Coleoptera)	Curculionidae	*Ceutorhynchus thomsoni*		
Beetle (Coleoptera)	Curculionidae	*Coeliodinus nigritarsis*		
Beetle (Coleoptera)	Curculionidae	*Curculio rubidus*		
Beetle (Coleoptera)	Curculionidae	*Datonychus angulosus*		
Beetle (Coleoptera)	Curculionidae	*Dorytomus filirostris**		
Beetle (Coleoptera)	Curculionidae	*Dorytomus hirtipennis*		
Beetle (Coleoptera)	Curculionidae	*Drupenatus nasturtii*		
Beetle (Coleoptera)	Curculionidae	*Gymnetron veronicae**		
Beetle (Coleoptera)	Curculionidae	*Hypera fuscocinerea*		
Beetle (Coleoptera)	Curculionidae	*Kyklioacalles roboris*		
Beetle (Coleoptera)	Curculionidae	*Lixus paraplecticus*	SS	Extinct
Beetle (Coleoptera)	Curculionidae	*Melanobaris laticollis*		
Beetle (Coleoptera)	Curculionidae	*Pseudostyphlus pillumus*		
Beetle (Coleoptera)	Curculionidae	*Sirocalodes mixtus*		
Beetle (Coleoptera)	Curculionidae	*Sitona macularius*		
Beetle (Coleoptera)	Curculionidae	*Stenocarus ruficornis**		
Beetle (Coleoptera)	Curculionidae	*Stereocorynes truncorum*		
Beetle (Coleoptera)	Curculionidae	*Tapeinotus sellatus*		
Beetle (Coleoptera)	Curculionidae	*Trachyphloeus asperatus*		
Beetle (Coleoptera)	Curculionidae	*Trypophloeus binodulus*		
Beetle (Coleoptera)	Dytiscidae	*Acilius canaliculatus*		
Beetle (Coleoptera)	Dytiscidae	*Agabus labiatus*		
Beetle (Coleoptera)	Dytiscidae	*Bidessus unistriatus*		
Beetle (Coleoptera)	Dytiscidae	*Dytiscus circumcinctus*		
Beetle (Coleoptera)	Dytiscidae	*Graphoderus cinereus*		
Beetle (Coleoptera)	Dytiscidae	*Hydroporus ferrugineus*		
Beetle (Coleoptera)	Dytiscidae	*Hydroporus rufifrons*		
Beetle (Coleoptera)	Dytiscidae	*Rhantus bistriatus*		Extinct
Beetle (Coleoptera)	Elateridae	*Ampedus cinnabarinus*		
Beetle (Coleoptera)	Elateridae	*Ampedus pomorum*		
Beetle (Coleoptera)	Elateridae	*Oedostethus quadripustulatus**		
Beetle (Coleoptera)	Elmidae	*Oulimnius troglodytes*		
Beetle (Coleoptera)	Elmidae	*Riolus cupreus*		
Beetle (Coleoptera)	Eucnemidae	*Melasis buprestoides**		
Beetle (Coleoptera)	Gyrinidae	*Gyrinus suffriani*		
Beetle (Coleoptera)	Helophoridae	*Helophorus alternans*		

Beetle (Coleoptera)	Helophoridae	*Helophorus fulgidicollis*		
Beetle (Coleoptera)	Helophoridae	*Helophorus granularis*		
Beetle (Coleoptera)	Heteroceridae	*Augyles maritimus*		
Beetle (Coleoptera)	Hydraenidae	*Hydraena pygmaea*		
Beetle (Coleoptera)	Hydraenidae	*Ochthebius punctatus*		
Beetle (Coleoptera)	Hydraenidae	*Ochthebius viridis*		
Beetle (Coleoptera)	Hydrochidae	*Hydrochus brevis*		
Beetle (Coleoptera)	Hydrophilidae	*Hydrochara caraboides*		
Beetle (Coleoptera)	Hydrophilidae	*Hydrophilus piceus*		
Beetle (Coleoptera)	Hydrophilidae	*Laccobius atrocephalus*		
Beetle (Coleoptera)	Latridiidae	*Corticaria inconspicua*		
Beetle (Coleoptera)	Leiodidae	*Agathidium marginatum*		
Beetle (Coleoptera)	Leiodidae	*Choleva glauca*		
Beetle (Coleoptera)	Leiodidae	*Leiodes gyllenhalii*		
Beetle (Coleoptera)	Lucanidae	*Lucanus cervus*		
Beetle (Coleoptera)	Lycidae	*Platycis minutus*		
Beetle (Coleoptera)	Melandryidae	*Anisoxya fuscula**		
Beetle (Coleoptera)	Melandryidae	*Conopalpus testaceus**		
Beetle (Coleoptera)	Melyridae	*Clanoptilus marginellus*		
Beetle (Coleoptera)	Mordellidae	*Mordellistena neuwaldeggiana*		
Beetle (Coleoptera)	Mycetophagidae	*Mycetophagus piceus*		
Beetle (Coleoptera)	Mycetophagidae	*Mycetophagus quadriguttatus*		
Beetle (Coleoptera)	Nitidulidae	*Cryptarcha strigata*		
Beetle (Coleoptera)	Nitidulidae	*Meligethes gagathinus*		
Beetle (Coleoptera)	Phalacridae	*Stilbus atomarius*		
Beetle (Coleoptera)	Ptiliidae	*Acrotrichis brevipennis*		
Beetle (Coleoptera)	Ptiliidae	*Acrotrichis pumila*		
Beetle (Coleoptera)	Ptiliidae	*Ptilium caesum*	ER	Extinct
Beetle (Coleoptera)	Ptiliidae	*Ptinella britannica*		
Beetle (Coleoptera)	Rhynchitidae	*Byctiscus betulae*		
Beetle (Coleoptera)	Salpingidae	*Lissodema cursor*		
Beetle (Coleoptera)	Scirtidae	*Elodes minuta*		
Beetle (Coleoptera)	Scirtidae	*Elodes pseudominuta*		
Beetle (Coleoptera)	Scirtidae	*Hydrocyphon deflexicollis*		
Beetle (Coleoptera)	Scraptiidae	*Anaspis thoracica**		
Beetle (Coleoptera)	Scydmaenidae	*Eutheia schaumii*		
Beetle (Coleoptera)	Scydmaenidae	*Eutheia scydmaenoides*		
Beetle (Coleoptera)	Scydmaenidae	*Scydmoraphes sparshalli*		
Beetle (Coleoptera)	Silphidae	*Aclypea undata*		
Beetle (Coleoptera)	Silphidae	*Nicrophorus vestigator*		
Beetle (Coleoptera)	Silphidae	*Silpha obscura*		
Beetle (Coleoptera)	Silphidae	*Silpha tyrolensis*		
Beetle (Coleoptera)	Spercheidae	*Spercheus emarginatus*		Extinct
Beetle (Coleoptera)	Sphaeriusidae	*Sphaerius acaroides*		
Beetle (Coleoptera)	Staphylinidae	*Acrolocha minuta*		
Beetle (Coleoptera)	Staphylinidae	*Aleochara discipennis*		
Beetle (Coleoptera)	Staphylinidae	*Aleochara inconspicua*		
Beetle (Coleoptera)	Staphylinidae	*Aleochara kamila*		
Beetle (Coleoptera)	Staphylinidae	*Aleochara moerens*		

Beetle (Coleoptera)	Staphylinidae	*Alevonota rufotestacea*		
Beetle (Coleoptera)	Staphylinidae	*Aloconota coulsoni*		
Beetle (Coleoptera)	Staphylinidae	*Aloconota languida*		
Beetle (Coleoptera)	Staphylinidae	*Astenus immaculatus*		
Beetle (Coleoptera)	Staphylinidae	*Atheta diversa*		
Beetle (Coleoptera)	Staphylinidae	*Bisnius pseudoparcus*		
Beetle (Coleoptera)	Staphylinidae	*Calodera riparia*		
Beetle (Coleoptera)	Staphylinidae	*Carpelimus fuliginosus*		
Beetle (Coleoptera)	Staphylinidae	*Carpelimus lindrothi*		
Beetle (Coleoptera)	Staphylinidae	*Cypha discoidea*		
Beetle (Coleoptera)	Staphylinidae	*Cypha pulicaria*		
Beetle (Coleoptera)	Staphylinidae	*Cypha seminulum*		
Beetle (Coleoptera)	Staphylinidae	*Datomicra zosterae*		
Beetle (Coleoptera)	Staphylinidae	*Dexiogyia corticina*		
Beetle (Coleoptera)	Staphylinidae	*Emus hirtus*		
Beetle (Coleoptera)	Staphylinidae	*Gyrophaena congrua*		
Beetle (Coleoptera)	Staphylinidae	*Gyrophaena munsteri*		
Beetle (Coleoptera)	Staphylinidae	*Gyrophaena pseudonana*	ER	
Beetle (Coleoptera)	Staphylinidae	*Gyrophaena pulchella*		
Beetle (Coleoptera)	Staphylinidae	*Gyrophaena strictula*		
Beetle (Coleoptera)	Staphylinidae	*Ilyobates bennetti*		
Beetle (Coleoptera)	Staphylinidae	*Lathrobium pallidipenne*		
Beetle (Coleoptera)	Staphylinidae	*Lathrobium rufonitidum*		
Beetle (Coleoptera)	Staphylinidae	*Microdota benickiella*		
Beetle (Coleoptera)	Staphylinidae	*Microdota excelsa*		
Beetle (Coleoptera)	Staphylinidae	*Mocyta orphana*		
Beetle (Coleoptera)	Staphylinidae	*Mycetoporus longicornis*		
Beetle (Coleoptera)	Staphylinidae	*Mycetoporus punctus*		
Beetle (Coleoptera)	Staphylinidae	*Ocypus fuscatus*		
Beetle (Coleoptera)	Staphylinidae	*Omalium allardi*		
Beetle (Coleoptera)	Staphylinidae	*Omalium rugatum*		
Beetle (Coleoptera)	Staphylinidae	*Pachyatheta mortuorum*		
Beetle (Coleoptera)	Staphylinidae	*Philhygra deformis*		
Beetle (Coleoptera)	Staphylinidae	*Philhygra hygrobia*		
Beetle (Coleoptera)	Staphylinidae	*Philhygra parca*		
Beetle (Coleoptera)	Staphylinidae	*Philonthus mannerheimi*		
Beetle (Coleoptera)	Staphylinidae	*Phyllodrepa salicis*		
Beetle (Coleoptera)	Staphylinidae	*Proteinus crenulatus*		
Beetle (Coleoptera)	Staphylinidae	*Pselaphaulax dresdensis*		
Beetle (Coleoptera)	Staphylinidae	*Quedius fulgidus*		
Beetle (Coleoptera)	Staphylinidae	*Quedius nigrocaeruleus*		
Beetle (Coleoptera)	Staphylinidae	*Quedius puncticollis*		
Beetle (Coleoptera)	Staphylinidae	*Quedius truncicola*		
Beetle (Coleoptera)	Staphylinidae	*Rugilus similis*		
Beetle (Coleoptera)	Staphylinidae	*Schistoglossa viduata*	SS	
Beetle (Coleoptera)	Staphylinidae	*Sepedophilus constans*		
Beetle (Coleoptera)	Staphylinidae	*Staphylinus caesareus*		
Beetle (Coleoptera)	Staphylinidae	*Stenus argus*		
Beetle (Coleoptera)	Staphylinidae	*Stenus ater*		

Beetle (Coleoptera)	Staphylinidae	*Stenus atratulus*		
Beetle (Coleoptera)	Staphylinidae	*Stenus carbonarius*		
Beetle (Coleoptera)	Staphylinidae	*Stenus circularis*		
Beetle (Coleoptera)	Staphylinidae	*Stenus nigritulus*		
Beetle (Coleoptera)	Staphylinidae	*Stenus opticus*		
Beetle (Coleoptera)	Staphylinidae	*Stenus proditor*		
Beetle (Coleoptera)	Staphylinidae	*Stenus subdepressus*		
Beetle (Coleoptera)	Staphylinidae	*Tachinus bipustulatus*		Extinct
Beetle (Coleoptera)	Staphylinidae	*Tachyporus formosus*		
Beetle (Coleoptera)	Staphylinidae	*Tasgius pedator*		
Beetle (Coleoptera)	Staphylinidae	*Thinobius brevipennis*	PS	Extirpated
Beetle (Coleoptera)	Staphylinidae	*Trichophya pilicornis*		
Beetle (Coleoptera)	Tenebrionidae	*Mycetochara humeralis**		
Beetle (Coleoptera)	Tetratomidae	*Hallomenus binotatus*		
Caddis fly (Trichoptera)	Limnephilidae	*Limnephilus pati*	SS	
Caddis fly (Trichoptera)	Limnephilidae	*Limnephilus tauricus*		
Butterfly	Lycaenidae	*Hamearis lucina*		Extirpated
Butterfly	Nymphalidae	*Apatura iris*		
Butterfly	Nymphalidae	*Boloria euphrosyne*		
Butterfly	Nymphalidae	*Euphydryas aurinia*		Extirpated
Butterfly	Pieridae	*Aporia crataegi*		Extinct
Butterfly	Pieridae	*Leptidea sinapis*		
Moth	Adelidae	*Nemophora fasciella*		
Moth	Drepanidae	*Cymatophorima diluta*		
Moth	Gelechiidae	*Aristotelia subdecurtella*	PS	Extirpated
Moth	Gelechiidae	*Athrips tetrapunctella*	SS	
Moth	Gelechiidae	*Bryotropha basaltinella*		
Moth	Gelechiidae	*Chionodes distinctella*		
Moth	Gelechiidae	*Gelechia turpella*		
Moth	Gelechiidae	*Monochroa arundinetella*		
Moth	Gelechiidae	*Monochroa divisella*		
Moth	Gelechiidae	*Pexicopia malvella*		
Moth	Gelechiidae	*Scrobipalpa pauperella*	ER	
Moth	Geometridae	*Costaconvexa polygrammata*		Extinct
Moth	Geometridae	*Cyclophora pendularia*		
Moth	Geometridae	*Cyclophora porata*		
Moth	Geometridae	*Idaea dilutaria*		
Moth	Geometridae	*Rheumaptera hastata*		
Moth	Geometridae	*Scopula marginepunctata*		
Moth	Geometridae	*Xanthorhoe biriviata*		
Moth	Lymantriidae	*Laelia coenosa*	PS	Extinct
Moth	Lymantriidae	*Lymantria dispar*		Extirpated
Moth	Lymantriidae	*Orgyia recens*		
Moth	Noctuidae	*Acronicta strigosa*	SS	Extirpated
Moth	Noctuidae	*Agrochola helvola*		
Moth	Noctuidae	*Archanara algae*		
Moth	Noctuidae	*Archanara neurica*		
Moth	Noctuidae	*Celaena haworthii*		
Moth	Noctuidae	*Coenophila subrosea*		

Moth	Noctuidae	*Dicycla oo*		
Moth	Noctuidae	*Emmelia trabealis*		Extinct
Moth	Noctuidae	*Hadena irregularis*		Extinct
Moth	Noctuidae	*Hecatera dysodea*		Extinct
Moth	Noctuidae	*Heliophobus reticulata*		
Moth	Noctuidae	*Heliothis maritima*		
Moth	Noctuidae	*Oria musculosa*		
Moth	Noctuidae	*Pechipogo strigilata*		
Moth	Noctuidae	*Shargacucullia lychnitis*		
Moth	Noctuidae	*Trachea atriplicis*		Extinct
Moth	Noctuidae	*Xestia agathina*		
Moth	Noctuidae	*Xylena exsoleta*		
Moth	Pyralidae	*Anania verbascalis*		
Moth	Pyralidae	*Crambus pratella*		
Moth	Pyralidae	*Crambus silvella*		
Moth	Pyralidae	*Eudonia lineola*		
Moth	Pyralidae	*Synaphe punctalis*		
Moth	Sphingidae	*Hemaris tityus*		
Moth	Tortricidae	*Cydia leguminana*	PS	Extinct
Moth	Tortricidae	*Phtheochroa schreibersiana*	PS	Extinct
True fly (Diptera)	Acroceridae	*Ogcodes pallipes*		
True fly (Diptera)	Anthomyiidae	*Eustalomyia vittipes*		
True fly (Diptera)	Asilidae	*Asilus crabroniformis*		Extinct
True fly (Diptera)	Asilidae	*Laphria marginata**		
True fly (Diptera)	Asilidae	*Lasiopogon cinctus*		
True fly (Diptera)	Calliphoridae	*Angioneura cyrtoneurina*		
True fly (Diptera)	Carniidae	*Meoneura triangularis*		
True fly (Diptera)	Chamaemyiidae	*Parochthiphila spectabilis*		
True fly (Diptera)	Chloropidae	*Chlorops planifrons*		
True fly (Diptera)	Chloropidae	*Lasiambia brevibucca*		
True fly (Diptera)	Conopidae	*Leopoldius brevirostris*		
True fly (Diptera)	Conopidae	*Leopoldius signatus*		
True fly (Diptera)	Conopidae	*Myopa polystigma*	LR	
True fly (Diptera)	Conopidae	*Zodion cinereum*		
True fly (Diptera)	Dolichopodidae	*Cyturella albosetosa*	ER	
True fly (Diptera)	Dolichopodidae	*Hercostomus nigrilamellatus*		
True fly (Diptera)	Dolichopodidae	*Hercostomus nigrocoerulea*		
True fly (Diptera)	Dolichopodidae	*Medetera inspissata*		
True fly (Diptera)	Dolichopodidae	*Ortochile nigrocoerulea*		
True fly (Diptera)	Dolichopodidae	*Syntormon mikii*		
True fly (Diptera)	Dolichopodidae	*Systenus leucurus*		
True fly (Diptera)	Dolichopodidae	*Thrypticus cuneatus**		
True fly (Diptera)	Drosophilidae	*Chymomyza costata*		
True fly (Diptera)	Drosophilidae	*Stegana coleoptrata*		
True fly (Diptera)	Fanniidae	*Fannia gotlandica*		
True fly (Diptera)	Fanniidae	*Fannia metallipennis*		
True fly (Diptera)	Heleomyzidae	*Suillia oxyphora*		
True fly (Diptera)	Hybotidae	*Platypalpus niveiseta*		
True fly (Diptera)	Hybotidae	*Platypalpus stigma*		

True fly (Diptera)	Hybotidae	*Tachydromia connexa*		
True fly (Diptera)	Hybotidae	*Tachydromia halterata*		Extinct
True fly (Diptera)	Keroplatidae	*Macrocera pusilla*		
True fly (Diptera)	Keroplatidae	*Orfelia bicolor*		
True fly (Diptera)	Limoniidae	*Limnophila pulchella*		
True fly (Diptera)	Limoniidae	*Tasiocera collini*		
True fly (Diptera)	Lonchaeidae	*Earomyia schistopyga*		
True fly (Diptera)	Lonchaeidae	*Lonchaea peregrina*		
True fly (Diptera)	Megamerinidae	*Megamerina dolium*		
True fly (Diptera)	Muscidae	*Caricea falculata*		
True fly (Diptera)	Muscidae	*Helina arctata*		
True fly (Diptera)	Muscidae	*Pyrellia rapax*		
True fly (Diptera)	Mycetophilidae	*Manota unifurcata*		
True fly (Diptera)	Mycetophilidae	*Palaeodocosia flava*		
True fly (Diptera)	Mycetophilidae	*Sciophila interrupta*		
True fly (Diptera)	Odiniidae	*Odinia meijerei*		
True fly (Diptera)	Periscelididae	*Periscelis annulata*		
True fly (Diptera)	Phoridae	*Phora bullata*		
True fly (Diptera)	Pipunculidae	*Dorylomorpha clavifemora*		
True fly (Diptera)	Pipunculidae	*Eudorylas kowarzi*		
True fly (Diptera)	Platypezidae	*Agathomyia collini*		
True fly (Diptera)	Scathophagidae	*Gimnomera tarsea*		
True fly (Diptera)	Sciomyzidae	*Pelidnoptera nigripennis*		
True fly (Diptera)	Sciomyzidae	*Pherbellia brunnipes*		
True fly (Diptera)	Sepsidae	*Meroplius minutus*		
True fly (Diptera)	Spaniidae	*Ptiolina obscura**		
True fly (Diptera)	Sphaeroceridae	*Lotobia pallidiventris*	SS	
True fly (Diptera)	Stratiomyidae	*Eupachygaster tarsalis**		
True fly (Diptera)	Stratiomyidae	*Stratiomys chamaeleon*		Exirpated
True fly (Diptera)	Stratiomyidae	*Stratiomys longicornis*		
True fly (Diptera)	Syrphidae	*Callicera spinolae*		
True fly (Diptera)	Syrphidae	*Cheilosia nebulosa*		
True fly (Diptera)	Syrphidae	*Mallota cimbiciformis*		
True fly (Diptera)	Syrphidae	*Melangyna barbifrons*		
True fly (Diptera)	Tachinidae	*Belida angelicae*		Extinct
True fly (Diptera)	Tachinidae	*Peribaea setinervis*		
True fly (Diptera)	Tephritidae	*Euphranta toxoneura*		
True fly (Diptera)	Tipulidae	*Nephrotoma crocata**		
True fly (Diptera)	Tipulidae	*Tipula pseudovariipennis*		
True fly (Diptera)	Ulidiidae	*Ulidia erythrophthalma*		
Hymenopteran	Apidae	*Andrena alfkenella*		
Hymenopteran	Apidae	*Andrena marginata*		
Hymenopteran	Apidae	*Andrena minutuloides*		
Hymenopteran	Apidae	*Andrena niveata*		
Hymenopteran	Apidae	*Andrena tarsata*		
Hymenopteran	Apidae	*Andrena varians*		
Hymenopteran	Apidae	*Bombus distinguendus*		Extirpated
Hymenopteran	Apidae	*Bombus humilis*		
Hymenopteran	Apidae	*Bombus sylvarum*		

Hymenopteran	Apidae	*Nomada fulvicornis*		
Hymenopteran	Apidae	*Nomada roberjeotiana*		
Hymenopteran	Apidae	*Osmia bicolor*		
Hymenopteran	Apidae	*Osmia pilicornis*		
Hymenopteran	Chrysididae	*Chrysis fulgida*		
Hymenopteran	Chrysididae	*Chrysura radians*		
Hymenopteran	Chrysididae	*Cleptes semiauratus**		
Hymenopteran	Crabronidae	*Crossocerus palmipes*		
Hymenopteran	Crabronidae	*Crossocerus vagabundus*		
Hymenopteran	Crabronidae	*Mimumesa littoralis*		
Hymenopteran	Pompilidae	*Dipogon bifasciatus*		
Hymenopteran	Pompilidae	*Priocnemis agilis**		
Hymenopteran	Pompilidae	*Priocnemis hyalinata*		
Hymenopteran	Vespidae	*Odynerus melanocephalus**		
Bony fish (Actinopterygii)	Acipenseridae	*Acipenser sturio*		
Bony fish (Actinopterygii)	Lotidae	*Lota lota*		Extinct
Bird	Emberizidae	*Emberiza cirlus*		
Bird	Accipitridae	*Haliaeetus albicilla*		Extinct
Bird	Anatidae	*Melanitta fusca*		
Bird	Fringillidae	*Serinus serinus*		

Table A4. Priority species recorded in the Fens Audit area. Fens Specialist status is shown; Entirely Restricted (ER) to the Fens, Largely Restricted (LR), Primary Stronghold in the region (PS), Secondary Stronghold in the region (SS). Species thought to be extinct (1) and extirpated (2) in the region are shown. Species designations: S:NS = nationally scarce; S:NR = nationally rare; DD = RDB data deficient; NT = RDB near threatened; VU = RDB vulnerable; EN = RDB endangered: EX = RDB extinct. Asterisk denotes provisional fungi list.

Taxon Group	Family	Species	Specialist	Lost species	Designation	Guild
Fungus	Bankeraceae	*Hydnellum concrescens*			BAP	CW.10detri
Fungus	Cladoniaceae	*Cladonia conista*			S:NR	X
Fungus	Clavariaceae	*Clavaria incarnata*			NT*	X
Fungus	Clavicipitaceae	*Cordyceps tuberculata*			VU*	X
Fungus	Cortinariaceae	*Cortinarius violaceus*			NT*	CW.10
Fungus	Entolomataceae	*Entoloma indutoides*			NT*	X
Fungus	Helotiaceae	*Mitrula sclerotipus*			VU*	X
Fungus	Incertae sedis	*Cyrtidula hippocastani*			S:NS	T/SC.10
Fungus	Pleurotaceae	*Hohenbuehelia mastrucata*			EN*	CW.10dead
Fungus	Polyporaceae	*Perenniporia medulla-panis*		1	EX*	CW.10dead
Fungus	Psathyrellaceae	*Coprinopsis ammophilae*			VU*	O.10
Fungus	Pucciniaceae	*Puccinia cladii*		1	EX*	O.5wlveg
Fungus	Pucciniaceae	*Puccinia scirpi*			CE*	O.5wlveg
fungus	Tricholomataceae	*Arrhenia chlorocyanea*			VU*	O.10shveg
Fungus	Tricholomataceae	*Hygrophorus arbustivus*			NT*	CW.10
Fungus	Tricholomataceae	*Hygrophorus penarius*			VU*	CW.10
Fungus	Tricholomataceae	*Tricholoma inamoenum*			EX*	CW.10
Fungus	Tricholomataceae	*Tricholoma stans*			VU*	CW.10
Fungus	Ustilaginaceae	*Ustilago hordei*			VU*	O.10Hdist
Lichen	Agyriaceae	*Placynthiella dasaea*			S:NS	X
Lichen	Arthoniaceae	*Arthonia muscigena*			S:NS	T/SC.10
Lichen	Bacidiaceae	*Bacidia chloroticula*			S:NS	T/SC.10
Lichen	Bacidiaceae	*Bacidia delicata*			S:NS	T/SC.10
Lichen	Bacidiaceae	*Bacidia incompta*			VU, BAP	T/SC.10vet
Lichen	Bacidiaceae	*Bacidia saxenii*			S:NS	X
Lichen	Bacidiaceae	*Lecania cyrtella*			DD, S:NR	T/SC.10
Lichen	Bacidiaceae	*Lecania hutchinsiae*			S:NS	OS.8
Lichen	Bacidiaceae	*Lecania inundata*			S:NS	O.10rock
Lichen	Bacidiaceae	*Lecania rabenhorstii*			S:NS	O.10rock
Lichen	Candelariaceae	*Candelariella aurella*			S:NS	X
Lichen	Catillariaceae	*Catillaria atomarioides*			S:NS	O.10rock
Lichen	Cladoniaceae	*Cladonia cariosa*			S:NS	O.10Ldist
Lichen	Cladoniaceae	*Cladonia chlorophaea*			S:NS	O.10detri
Lichen	Cladoniaceae	*Cladonia coccifera*			DD, S:NS	O.10detri

Lichen	Cladoniaceae	*Cladonia phyllophora*			NT, S:NS	O.10rock
Lichen	Collemataceae	*Collema bachmanianum*			NT, S:NS	O.10Ldist
Lichen	Coniocybaceae	*Chaenotheca brachypoda*			S:NS	T/SC.10vet
Lichen	Gyalectaceae	*Ramonia interjecta*			S:NS	T/SC.10
Lichen	Hymeneliaceae	*Aspicilia contorta subsp. hoffmanniana*			DD, S:NR	O.10rock
Lichen	Incertae sedis	*Lepraria nivalis*			S:NS	X
Lichen	Lecanoraceae	*Lecanora campestris subsp. dolomitica*			S:NS	O.10rock
Lichen	Lecanoraceae	*Lecanora pruinosa*			S:NS	X
Lichen	Lichinaceae	*Lempholemma chalazanum*			DD, S:NS	O.10rock
Lichen	Lichinaceae	*Psorotichia schaereri*			S:NS	X
Lichen	Micareaceae	*Micarea prasina*			S:NS	V.10
Lichen	Parmeliaceae	*Melanelia disjuncta*			S:NS	X
Lichen	Parmeliaceae	*Punctelia ulophylla*			S:NS	X
Lichen	Physciaceae	*Amandinea lecideina*			S:NS	X
Lichen	Physciaceae	*Rinodina calcarea*			S:NR	O.10rock
Lichen	Physciaceae	*Rinodina exigua*			DD, S:NR	T/SC.10
Lichen	Stereocaulaceae	*Stereocaulon nanodes*			S:NS	X
Lichen	Teloschistaceae	*Caloplaca crenulatella*			S:NS	O.10rock
Lichen	Teloschistaceae	*Caloplaca haematites*		1	EX	T/SC.10
Lichen	Teloschistaceae	*Caloplaca luteoalba*			VU, S:NS, BAP	T/SC.10vet
Lichen	Teloschistaceae	*Caloplaca polycarpa*			S:NR	X
Lichen	Teloschistaceae	*Xanthoria ucrainica*			S:NS	X
Lichen	Teloschistaceae	*Xanthoria ulophyllodes*			S:NR	T/SC.10
Lichen	Verrucariaceae	*Verrucaria bulgarica*			S:NR	OS.8
Lichen	Verrucariaceae	*Verrucaria fuscella*			DD, S:NR	X
Lichen	Vezdaeaceae	*Vezdaea leprosa*			S:NS	O.10detri
stonewort	Characeae	*Chara aculeolata*			S:NS	O.13
stonewort	Characeae	*Chara canescens*	LR		EN, BAP	O.13brsub
stonewort	Characeae	*Chara curta*			S:NS	O.13mdveg
stonewort	Characeae	*Chara rudis*			NT	O.13mdveg
stonewort	Characeae	*Nitella flexilis*			S:NS	O.13
stonewort	Characeae	*Nitella mucronata*			S:NS	O.13brsub
stonewort	Characeae	*Nitella tenuissima*	PS		EN, BAP	O.4brsub
stonewort	Characeae	*Nitellopsis obtusa*			VU, BAP	O.13mdveg
stonewort	Characeae	*Tolypella glomerata*			S:NS	O.13
stonewort	Characeae	*Tolypella prolifera*			EN, BAP	O.13mdveg
Liverwort	Aneuraceae	*Cryptothallus mirabilis*			S:NS	CW.10detri
Liverwort	Cephaloziaceae	*Cephalozia macrostachya*			S:NS	O.5/8detri
Liverwort	Jungermanniaceae	*Nardia geoscyphus*			S:NS	O.10Ldist
Liverwort	Lophoziaceae	*Lophozia capitata*			EN, S:NS, BAP	O.7bgrnd

Liverwort	Pallaviciniaceae	*Moerckia hibernica*		S:NS	O.6bgrnd
Liverwort	Ricciaceae	*Riccia cavernosa*		S:NS	O.7bgrnd
Liverwort	Ricciaceae	*Riccia rhenana*		S:NR	O.4
Liverwort	Ricciaceae	*Ricciocarpos natans*		S:NS	O.13brsub
Liverwort	Sphaerocarpaceae	*Sphaerocarpos texanus*		VU, S:NS, BAP	O.10Hdist
Moss	Amblystegiaceae	*Amblystegium humile*		S:NS	O.5/8detri
Moss	Amblystegiaceae	*Campyliadelphus elodes*		S:NS	O.7mdveg
Moss	Amblystegiaceae	*Drepanocladus lycopodioides*		S:NS	O.5bgrnd
Moss	Amblystegiaceae	*Tomentypnum nitens*		S:NS	O.5/8detri
Moss	Brachytheciaceae	*Brachythecium salebrosum*		S:NS	CW.10detri
Moss	Bryaceae	*Bryum creberrimum*		S:NS	O.10
Moss	Bryaceae	*Bryum intermedium*		DD, S:NS	O.10Ldist
Moss	Bryaceae	*Bryum pallescens*		S:NS	O.10rock
Moss	Bryaceae	*Bryum tenuisetum*		S:NS	O.10Ldist
Moss	Bryaceae	*Bryum torquescens*		S:NS	O.10shveg
Moss	Dicranaceae	*Dicranum polysetum*		S:NS	CW.10detri
Moss	Dicranaceae	*Dicranum spurium*		VU, S:NS, BAP	O.10swrdm
Moss	Dicranaceae	*Ditrichum flexicaule*		S:NS	O.10Ldist
Moss	Ephemeraceae	*Ephemerum recurvifolium*		S:NS	O.10Ldist
Moss	Grimmiaceae	*Racomitrium canescens*		S:NS	O.10shveg
Moss	Grimmiaceae	*Schistidium confertum*		S:NS	O.10rock
Moss	Hedwigiaceae	*Hedwigia ciliata*		NT, S:NR	CW.10
Moss	Hypnaceae	*Platygyrium repens*		S:NS	CW.10
moss	Hypnaceae	*Pylaisia polyantha*		S:NS	POW.10
Moss	Mniaceae	*Plagiomnium ellipticum*		S:NR	V.5detri/fungi
Moss	Orthotrichaceae	*Orthotrichum obtusifolium*		VU, S:NR, BAP	PWP.10
Moss	Orthotrichaceae	*Orthotrichum speciosum*		NT, S:NR	CW.10
Moss	Orthotrichaceae	*Orthotrichum striatum*	1	EX	CW.10
Moss	Plagiotheciaceae	*Herzogiella seligeri*		S:NS	POW.10dead
Moss	Pottiaceae	*Aloina ambigua*		S:NS	O.10Hdist
Moss	Pottiaceae	*Aloina rigida*		S:NS	O.10Hdist
Moss	Pottiaceae	*Didymodon acutus*		S:NS	O.10bgrnd, shveg
Moss	Pottiaceae	*Didymodon umbrosus*		S:NS	X
Moss	Pottiaceae	*Leptobarbula berica*		S:NS	OS.8
Moss	Pottiaceae	*Microbryum starckeanum*		S:NS	O.10Hdist
Moss	Pottiaceae	*Pterygoneurum ovatum*		DD, S:NS	O.10Hdist
Moss	Pottiaceae	*Syntrichia virescens*		S:NS	T/SC.10
Moss	Pottiaceae	*Tortella inclinata*		S:NS	O.10Ldist
Moss	Pottiaceae	*Tortella inflexa*		S:NS	V.10

Moss	Pottiaceae	*Tortula vahliana*			VU, S:NR, BAP	OS.8
Moss	Pottiaceae	*Weissia sterilis*			VU, S:NS, BAP	O.12dist
Moss	Rhytidiaceae	*Rhytidium rugosum*			S:NS	O.10bgrnd, shveg
Moss	Sphagnaceae	*Sphagnum subsecundum*			S:NS	O.14detri
Moss	Thuidiaceae	*Thuidium abietinum subsp. abietinum*			S:NS	O.10Ldist
Clubmoss	Lycopodiaceae	*Lycopodiella inundata*		2	EN, S:NS, BAP	O.7bgrnd
Fern	Dryopteridaceae	*Dryopteris cristata*		2	CR, S:NR, BAP	T/SC.5dead/detri
Fern	Marsileaceae	*Pilularia globulifera*			NT, S:NS, BAP	O.4brsub
Fern	Thelypteridaceae	*Thelypteris palustris*			S:NS	O.5bgrnd
flowering plant	Alismataceae	*Alisma gramineum*	PS		CR, S:NR, BAP	O.4brsub
flowering plant	Alismataceae	*Baldellia ranunculoides*			NT	O.4shveg
Flowering plant	Apiaceae	*Bupleurum tenuissimum*			VU, S:NS, BAP	O.10bgrnd, shveg
Flowering plant	Apiaceae	*Caucalis platycarpos*		1	EX	O.10Hdist
Flowering plant	Apiaceae	*Oenanthe fistulosa*			VU, BAP	O.7mdveg
Flowering plant	Apiaceae	*Oenanthe silaifolia*			NT, S:NS	O.7wlveg
Flowering plant	Apiaceae	*Peucedanum palustre*			VU, S:NS	O.5wlveg
Flowering plant	Apiaceae	*Scandix pecten-veneris*			CR, BAP	O.10Hdist
Flowering plant	Apiaceae	*Selinum carvifolia*	PS		VU, S:NR	O.7wlveg
Flowering plant	Apiaceae	*Sium latifolium*			EN, S:NS, BAP	O.4wlveg
Flowering plant	Apiaceae	*Torilis arvensis*			EN, S:NS, BAP	O.10Hdist
Flowering plant	Asteraceae	*Anthemis arvensis*			EN	O.10Hdist
Flowering plant	Asteraceae	*Anthemis cotula*			VU	O.10Hdist
Flowering plant	Asteraceae	*Artemisia campestris*			VU, S:NR, BAP	O.10Hdist
Flowering plant	Asteraceae	*Centaurea cyanus*			BAP	O.10Hdist
Flowering plant	Asteraceae	*Filago lutescens*			EN, S:NS, BAP	O.10bgrnd, shveg
Flowering plant	Asteraceae	*Filago pyramidata*			EN, S:NS, BAP	O.10Hdist

Flowering plant	Asteraceae	*Filago vulgaris*			NT	O.10Hdist
Flowering plant	Asteraceae	*Glebionis segetum*			VU	O.10Ldist
Flowering plant	Asteraceae	*Gnaphalium sylvaticum*			EN	O.10bgrnd, shveg
Flowering plant	Asteraceae	*Hieracium acuminatum*			S:NR	O.10bgrnd, shveg
Flowering plant	Asteraceae	*Hieracium aggregatum*			DD, S:NR	O.10bgrnd, shveg
Flowering plant	Asteraceae	*Hypochaeris glabra*			VU	O.10Ldist
Flowering plant	Asteraceae	*Pulicaria vulgaris*		1	CR, S:NR, BAP	O.7bgrnd
Flowering plant	Asteraceae	*Senecio paludosus*	ER		CR, S:NR, BAP	O.5wlveg
Flowering plant	Asteraceae	*Sonchus palustris*			S:NS	O.5wlveg
Flowering plant	Boraginaceae	*Cynoglossum officinale*			NT	O.10bgrnd, shveg
Flowering plant	Boraginaceae	*Lithospermum arvense*			EN	O.10Hdist
Flowering plant	Brassicaceae	*Arabis glabra*		2	EN, S:NS, BAP	O.12dist, graz
Flowering plant	Brassicaceae	*Camelina sativa*			S:NS	O.10Hdist
Flowering plant	Brassicaceae	*Lepidium latifolium*			S:NS	O.10Hdist
Flowering plant	Brassicaceae	*Teesdalia nudicaulis*			NT	O.12dist, graz
Flowering plant	Caryophyllaceae	*Dianthus armeria*			EN, S:NS, BAP	O.10Ldist
Flowering plant	Caryophyllaceae	*Dianthus deltoides*			NT, S:NS	O.12dist
Flowering plant	Caryophyllaceae	*Herniaria glabra*			S:NR	O.10bgrnd, shveg
Flowering plant	Caryophyllaceae	*Minuartia hybrida*			EN, S:NS, BAP	O.12dist
Flowering plant	Caryophyllaceae	*Petrorhagia prolifera*			S:NR	O.12dist
Flowering plant	Caryophyllaceae	*Scleranthus annuus*			EN, BAP	O.10Hdist
Flowering plant	Caryophyllaceae	*Scleranthus annuus subsp. annuus*			EN, BAP	O.10Hdist
Flowering plant	Caryophyllaceae	*Scleranthus annuus subsp. polycarpos*			DD, S:NS	O.10Hdist
Flowering plant	Caryophyllaceae	*Scleranthus perennis subsp. prostratus*			EN, S:NR, BAP	O.10bgrnd, shveg
Flowering plant	Caryophyllaceae	*Silene conica*			VU, S:NS	O.10Hdist
Flowering plant	Caryophyllaceae	*Silene gallica*			EN, S:NS, BAP	O.10Hdist
Flowering plant	Caryophyllaceae	*Silene noctiflora*			VU	O.10Hdist
Flowering plant	Caryophyllaceae	*Silene otites*			EN, S:NR, BAP	O.10Hdist
Flowering plant	Caryophyllaceae	*Spergula arvensis*			VU	O.10Hdist
Flowering plant	Caryophyllaceae	*Stellaria palustris*			VU, BAP	O.7mdveg

Flowering plant	Chenopodiaceae	*Atriplex longipes*			S:NS	saltm
Flowering plant	Chenopodiaceae	*Chenopodium bonus-henricus*			VU	O.10Hdist
Flowering plant	Chenopodiaceae	*Chenopodium urbicum*		1	CR, S:NR, BAP	O.10Hdist
Flowering plant	Chenopodiaceae	*Salicornia nitens*			DD, S:NS	saltm
Flowering plant	Chenopodiaceae	*Salicornia pusilla*			S:NS	saltm
Flowering plant	Chenopodiaceae	*Salsola kali subsp. kali*			VU, BAP	O.10Ldist
Flowering plant	Chenopodiaceae	*Sarcocornia perennis*			S:NS	saltm
Flowering plant	Chenopodiaceae	*Suaeda vera*			S:NS	saltm,upper
Flowering plant	Crassulaceae	*Crassula tillaea*			S:NS	O.10bgrnd, shveg
Flowering plant	Cuscutaceae	*Cuscuta epithymum*			VU	O.10Ldist
Flowering plant	Cuscutaceae	*Cuscuta europaea*			S:NS	O.7wlveg
flowering plant	Cyperaceae	*Blysmus compressus*			VU, BAP	O.7mdveg
Flowering plant	Cyperaceae	*Carex appropinquata*			NT, S:NS	O.5wlveg
Flowering plant	Cyperaceae	*Carex divisa*			VU, S:NS, BAP	O.7mdveg
Flowering plant	Cyperaceae	*Carex ericetorum*			VU, S:NS, BAP	O.10shveg
Flowering plant	Cyperaceae	*Carex lasiocarpa x riparia = C. x evoluta*			VU, S:NR	X
Flowering plant	Droseraceae	*Drosera anglica*			NT	O.5bgrnd
Flowering plant	Elaeagnaceae	*Hippophae rhamnoides*			S:NS	PSS.10
Flowering plant	Euphorbiaceae	*Euphorbia exigua*			NT	O.10Hdist
Flowering plant	Fabaceae	*Astragalus danicus*			EN, BAP	O.10bgrnd, shveg
Flowering plant	Fabaceae	*Genista anglica*			NT	O.10Ldist
Flowering plant	Fabaceae	*Lathyrus aphaca*			VU, S:NS	O.10Ldist
Flowering plant	Fabaceae	*Lathyrus hirsutus*			S:NR	O.10Ldist
Flowering plant	Fabaceae	*Lathyrus palustris*	SS		NT, S:NS	O.5wlveg
Flowering plant	Fabaceae	*Medicago minima*			VU, S:NS	O.12dist
Flowering plant	Fabaceae	*Medicago sativa subsp. falcata*			S:NS	O.10Hdist
Flowering plant	Fabaceae	*Onobrychis viciifolia*			NT	O.10Ldist
Flowering plant	Fabaceae	*Trifolium glomeratum*			S:NS	O.10bgrnd, shveg
Flowering plant	Fabaceae	*Trifolium ochroleucon*		2	NT, S:NS	O.10shveg
Flowering plant	Fabaceae	*Trifolium suffocatum*			S:NS	O.10bgrnd, shveg
Flowering plant	Fabaceae	*Vicia parviflora*			VU, S:NS	O.10Ldist
Flowering plant	Frankeniaceae	*Frankenia laevis*			NT, S:NS	saltm,upper
Flowering plant	Fumariaceae	*Fumaria parviflora*			VU, S:NS	O.10Hdist
Flowering plant	Fumariaceae	*Fumaria vaillantii*			VU, S:NS	O.10Hdist
Flowering plant	Haloragaceae	*Myriophyllum verticillatum*			VU	O.13mdveg

Flowering plant	Hydrocharitaceae	*Hydrilla verticillata*		1	VU, S:NR	O.13wlveg
Flowering plant	Hydrocharitaceae	*Hydrocharis morsus-ranae*			VU	O.4wlveg
Flowering plant	Hydrocharitaceae	*Stratiotes aloides*			NT, S:NR	O.13wlveg
Flowering plant	Juncaceae	*Juncus compressus*			NT	O.5mdveg
Flowering plant	Juncaceae	*Luzula pallidula*	ER		CR, S:NR, BAP	O.5bgrnd, dist
Flowering plant	Lamiaceae	*Clinopodium acinos*			VU, BAP	O.12dist
Flowering plant	Lamiaceae	*Clinopodium calamintha*			VU, S:NS	O.12dist
Flowering plant	Lamiaceae	*Galeopsis angustifolia*			CR, S:NS, BAP	O.12dist
Flowering plant	Lamiaceae	*Galeopsis speciosa*			VU	O.10Hdist
Flowering plant	Lamiaceae	*Lamiastrum galeobdolon subsp. galeobdolon*			VU, S:NR	POW.10
Flowering plant	Lamiaceae	*Nepeta cataria*			VU	O.10Hdist
Flowering plant	Lamiaceae	*Stachys arvensis*			NT	O.10Hdist
Flowering plant	Lamiaceae	*Teucrium scordium*	PS		EN, S:NR, BAP	O.7bgrnd
Flowering plant	Lamiaceae	*Thymus serpyllum*			S:NR	O.12dist, graz
Flowering plant	Liliaceae	*Fritillaria meleagris*			S:NS	O.10shveg
Flowering plant	Liliaceae	*Muscari neglectum*			VU, S:NR, BAP	O.12dist
Flowering plant	Linaceae	*Linum perenne*			S:NS	O.10Ldist
Flowering plant	Lythraceae	*Lythrum hyssopifolia*			EN, S:NR, BAP	O.7bgrnd
Flowering plant	Malvaceae	*Althaea officinalis*			S:NS	O.7wlveg
Flowering plant	Menyanthaceae	*Nymphoides peltata*	PS		S:NS	O.13wlveg
Flowering plant	Orchidaceae	*Aceras anthropophorum*			EN, S:NS, BAP	O.10wlveg
Flowering plant	Orchidaceae	*Cephalanthera damasonium*			VU, BAP	CW.10detri
Flowering plant	Orchidaceae	*Coeloglossum viride*			VU, BAP	O.10bgrnd, shveg
Flowering plant	Orchidaceae	*Dactylorhiza incarnata subsp. ochroleuca*	PS		CR, S:NR, BAP	O.7wlveg
Flowering plant	Orchidaceae	*Gymnadenia conopsea subsp. densiflora*			DD	O.5mdveg
Flowering plant	Orchidaceae	*Himantoglossum hircinum*			NT, S:NS	O.10wlveg
Flowering plant	Orchidaceae	*Liparis loeselii*		2	EN, S:NR, BAP	O.7mdveg
Flowering plant	Orchidaceae	*Orchis morio*			NT	O.10shveg
Flowering plant	Orchidaceae	*Platanthera chlorantha*			NT	O.10wlveg
Flowering plant	Orchidaceae	*Spiranthes spiralis*			NT	O.10shveg
Flowering plant	Papaveraceae	*Papaver argemone*			VU	O.10Hdist

Flowering plant	Plumbaginaceae	*Limonium bellidifolium*		2	S:NR	saltm,upper
Flowering plant	Plumbaginaceae	*Limonium humile*		2	S:NS	saltm
Flowering plant	Poaceae	*Apera spica-venti*			NT	O.10Hdist
Flowering plant	Poaceae	*Bromus hordeaceus subsp. thominei*			S:NS	O.10wlveg
Flowering plant	Poaceae	*Bromus secalinus*			VU, S:NS	O.10Hdist
Flowering plant	Poaceae	*Calamagrostis stricta*			VU, S:NR, BAP	O.5wlveg
Flowering plant	Poaceae	*Corynephorus canescens*			NT, S:NR	O.12dist, graz
Flowering plant	Poaceae	*Festuca arenaria*			S:NS	O.10Ldist
Flowering plant	Poaceae	*Festuca longifolia*			S:NR	O.12dist, graz
Flowering plant	Poaceae	*Hordelymus europaeus*			S:NS	POW.10
Flowering plant	Poaceae	*Hordeum marinum*			VU, S:NS, BAP	O.7bgrnd
Flowering plant	Poaceae	*Parapholis incurva*			S:NS	O.10Ldist
Flowering plant	Poaceae	*Phleum phleoides*			S:NR	O.12dist, graz
Flowering plant	Poaceae	*Poa bulbosa*			S:NS	O.12dist, graz
Flowering plant	Poaceae	*Puccinellia rupestris*			S:NS	O.7bgrnd
Flowering plant	Poaceae	*Spartina maritima*			EN, S:NS, BAP	saltm
Flowering plant	Poaceae	*Vulpia ciliata subsp. ambigua*			S:NS	O.10Ldist
Flowering plant	Polygonaceae	*Persicaria mitis*			VU, S:NS	O.6bgrnd
Flowering plant	Potamogetonaceae	*Groenlandia densa*			VU	O.13brsub
Flowering plant	Potamogetonaceae	*Potamogeton coloratus*	SS		S:NS	O.4shveg
Flowering plant	Potamogetonaceae	*Potamogeton compressus*			EN, S:NS, BAP	O.13mdveg
Flowering plant	Potamogetonaceae	*Potamogeton friesii*			NT, S:NS	O.13mdveg
Flowering plant	Potamogetonaceae	*Potamogeton natans x lucens = P. x fluitans*			VU, S:NR	O.13
Flowering plant	Potamogetonaceae	*Potamogeton praelongus*			NT	O.13mdveg
Flowering plant	Potamogetonaceae	*Potamogeton praelongus x perfoliatus = P. x cognatus*			VU, S:NR	X
Flowering plant	Ranunculaceae	*Adonis annua*		1	EN, S:NS, BAP	O.10Hdist
Flowering plant	Ranunculaceae	*Myosurus minimus*			VU	O.7bgrnd
Flowering plant	Ranunculaceae	*Ranunculus arvensis*			CR, BAP	O.10Hdist
Flowering plant	Ranunculaceae	*Ranunculus reptans*			VU, S:NR	X
Flowering plant	Rosaceae	*Potentilla argentea*			NT	O.12dist, graz
Flowering plant	Rubiaceae	*Galium parisiense*			VU, S:NS	O.10Ldist
Flowering plant	Ruppiaceae	*Ruppia cirrhosa*			NT, S:NS	O.13brsub
Flowering plant	Scrophulariaceae	*Verbascum pulverulentum*			S:NS	O.10Hdist
Flowering plant	Scrophulariaceae	*Veronica triphyllos*			EN,	O.10Hdist

					S:NR, BAP	
Flowering plant	Scrophulariaceae	*Veronica verna*			EN, S:NR, BAP	O.12dist, graz
Flowering plant	Solanaceae	*Hyoscyamus niger*			VU	O.10Hdist
Flowering plant	Violaceae	*Viola canina*			NT	O.10bgrnd, shveg
Flowering plant	Violaceae	*Viola canina subsp. canina*			NT	O.15graz
Flowering plant	Violaceae	*Viola canina subsp. montana*	ER		EN, S:NR	O.7bgrnd
Flowering plant	Violaceae	*Viola persicifolia*	PS		EN, S:NR, BAP	O.7bgrnd
Flowering plant	Violaceae	*Viola tricolor*			NT	O.10bgrnd, shveg
Flowering plant	Violaceae	*Viola tricolor subsp. tricolor*			NT	O.10bgrnd, shveg
Mollusc	Hydrobiidae	*Hydrobia acuta subsp. neglecta*	SS			O.4wlveg
Mollusc	Hydrobiidae	*Marstoniopsis insubrica*			R	O.13wlveg
Mollusc	Hydrobiidae	*Mercuria cf. similis*		2	BAP	O.14wlveg
Mollusc	Lymnaeidae	*Myxas glutinosa*		2	G:DD, EN, BAP	O.13mdveg
Mollusc	Lymnaeidae	*Omphiscola glabra*		2	VU, BAP	O.14bgrnd, shveg
Mollusc	Ostreidae	*Ostrea edulis*			BAP	X
Mollusc	Planorbidae	*Anisus vorticulus*			VU, BAP	O.4heveg
Mollusc	Planorbidae	*Segmentina nitida*		2	EN, BAP	O.4heveg
Mollusc	Sphaeriidae	*Pisidium pseudosphaerium*			R	O.4heveg
Mollusc	Sphaeriidae	*Sphaerium solidum*	ER		EN, BAP	O.13
Mollusc	Succineidae	*Oxyloma sarsii*		2	VU	O.4heveg
Mollusc	Unionidae	*Pseudanodonta complanata*			G:NT, BAP	O.13wlveg
Mollusc	Valvatidae	*Valvata macrostoma*	PS		VU, BAP	O.4wlveg
Mollusc	Vertiginidae	*Vertigo angustior*			G:LR, BAP	O.7shveg
Mollusc	Vertiginidae	*Vertigo moulinsiana*			G:LR, R, BAP	O.5swrdm
Annelid	Hirudinidae	*Hirudo medicinalis*			G:NT	O.4heveg
False scorpion	Chernetidae	*Dendrochernes cyrneus*			R	T/SC.10vet
Spider	Araneidae	*Araneus alsine*		2	NT*	POW.10wlveg
Spider	Araneidae	*Araneus triguttatus*			N:B*	CW.10
Spider	Araneidae	*Cercidia prominens*			N:B*	O.10juxt
Spider	Araneidae	*Hypsosinga albovittata*			N:B*	O.10wlveg
Spider	Araneidae	*Hypsosinga heri*	ER	1	EN	O.5mdveg
Spider	Araneidae	*Larinioides patagiatus*			N:A*	PSS.10
Spider	Clubionidae	*Cheiracanthium virescens*			N:B*	O.12dist
Spider	Clubionidae	*Clubiona juvenis*			VU	O.5wlveg
Spider	Clubionidae	*Clubiona rosserae*	ER		EN, BAP	O.5/8detri
Spider	Dictynidae	*Argenna patula*			N:A*	saltm,detri
Spider	Dictynidae	*Argenna subnigra*			N:B*	O.10juxt

Spider	Dictynidae	*Cicurina cicur*			N:B*	OS.8
Spider	Gnaphosidae	*Drassodes pubescens*			N:B*	O.10juxt
Spider	Gnaphosidae	*Drassyllus lutetianus*			N:A*	O.6detri
Spider	Gnaphosidae	*Drassyllus praeficus*			N:A*	O.10wlveg
Spider	Gnaphosidae	*Micaria subopaca*			VU*	T/SC.10
Spider	Gnaphosidae	*Trachyzelotes pedestris*			N:B*	O.10bgrnd, shveg
Spider	Gnaphosidae	*Zelotes electus*			N:B*	O.10
Spider	Hahniidae	*Hahnia pusilla*			VU*	O.10detri
Spider	Linyphiidae	*Agyneta cauta*		2	N:B*	O.10detri
Spider	Linyphiidae	*Allomengea vidua*			VU*	O.5mdveg
Spider	Linyphiidae	*Araeoncus crassiceps*		2	VU*	O.7mdveg
Spider	Linyphiidae	*Baryphyma maritimum*			NT*	O.10detri
Spider	Linyphiidae	*Bathyphantes setiger*			N:A*	O.5mdveg
Spider	Linyphiidae	*Centromerus capucinus*			NT*	CW.10detri
Spider	Linyphiidae	*Centromerus semiater*			VU	O.5/8detri
Spider	Linyphiidae	*Ceratinella scabrosa*			N:B*	V.detri/fungi
Spider	Linyphiidae	*Donacochara speciosa*			VU*	O.5wlveg
Spider	Linyphiidae	*Entelecara omissa*	SS		N:A*	O.5wlveg
Spider	Linyphiidae	*Erigonella ignobilis*			VU*	O.5mdveg
Spider	Linyphiidae	*Glyphesis servulus*			INSU	O.7wlveg
Spider	Linyphiidae	*Gongylidiellum murcidum*	SS		VU*	O.5/8detri
Spider	Linyphiidae	*Halorates distinctus*			VU*	O.6detri
Spider	Linyphiidae	*Hypomma fulvum*			N:B*	O.5wlveg
Spider	Linyphiidae	*Hypselistes jacksoni*			N:B*	O.7
Spider	Linyphiidae	*Lepthyphantes insignis*			N:B*	O.10Ldist
Spider	Linyphiidae	*Leptothrix hardyi*			VU*	X
Spider	Linyphiidae	*Maro sublestus*	SS		EN*	T/SC.5dead/detri
Spider	Linyphiidae	*Maso gallicus*	SS		N:A*	O.7wlveg
Spider	Linyphiidae	*Meioneta mollis*			EN*, BAP	O.10juxt
Spider	Linyphiidae	*Microctenonyx subitaneus*			N:B*	O.10wlveg
Spider	Linyphiidae	*Moebelia penicillata*			N:B*	PWP.10
Spider	Linyphiidae	*Panamomops sulcifrons*			N:B*	O.10wlveg
Spider	Linyphiidae	*Pelecopsis nemoralioides*			N:B*	O.10Ldist
Spider	Linyphiidae	*Porrhomma campbelli*			N:B*	sub.10
Spider	Linyphiidae	*Porrhomma convexum*			N:B*	OS.8
Spider	Linyphiidae	*Porrhomma oblitum*			N:A*	CW.8
Spider	Linyphiidae	*Saaristoa firma*			VU*, BAP	CW.10detri
Spider	Linyphiidae	*Saloca diceros*			N:A*	CW.8
Spider	Linyphiidae	*Tapinocyba insecta*			N:A*	CW.10detri
Spider	Linyphiidae	*Taranucnus setosus*	SS		N:B*	O.5wlveg
Spider	Linyphiidae	*Tmeticus affinis*			N:B*	O.5/8detri
Spider	Linyphiidae	*Typhochrestus digitatus*			N:B*	O.12dist, graz
Spider	Linyphiidae	*Walckenaeria alticeps*			DD*	T/SC.5dead/detri
Spider	Linyphiidae	*Walckenaeria capito*			N:B*	O.10shveg

Spider	Linyphiidae	*Walckenaeria corniculans*		2	CR*, BAP	O.10wlveg
Spider	Liocranidae	*Agraecina striata*			N:A*	O.5
Spider	Liocranidae	*Agroeca cuprea*			EN*, BAP	O.12dist
Spider	Liocranidae	*Agroeca inopina*			N:B*	X
Spider	Liocranidae	*Scotina celans*			N:B*	V.detri/fungi
Spider	Lycosidae	*Alopecosa cuneata*			N:B*	O.10bgrnd, shveg
Spider	Lycosidae	*Hygrolycosa rubrofasciata*	PS		EN*	O.7
Spider	Lycosidae	*Pardosa agrestis*			N:B*	O.10bgrnd, shveg
Spider	Lycosidae	*Pardosa hortensis*			N:B*	O.10Hdist
Spider	Lycosidae	*Pardosa paludicola*	LR		R	O.7wlveg
Spider	Lycosidae	*Pardosa proxima*			N:B*	O.7bgrnd
Spider	Lycosidae	*Pirata piscatorius*			N:B*	O.14detri
Spider	Lycosidae	*Pirata tenuitarsis*			N:B*	O.14detri
Spider	Lycosidae	*Trochosa robusta*			VU*	O.10
Spider	Lycosidae	*Trochosa spinipalpis*			N:B*	O.7mdveg
Spider	Mimetidae	*Ero tuberculata*			VU*	O.10wlveg
Spider	Philodromidae	*Philodromus collinus*			N:B*	POW.10
Spider	Philodromidae	*Philodromus fallax*			EN*, BAP	O.10juxt
Spider	Philodromidae	*Philodromus longipalpis*			N:A*	T/SC.10vet
Spider	Philodromidae	*Thanatus striatus*			N:B*	O.10
Spider	Pisauridae	*Dolomedes fimbriatus*			N:B*	O.14wlveg
Spider	Salticidae	*Evarcha arcuata*			N:B*	PSS.10
Spider	Salticidae	*Marpissa nivoyi*			N:A*	O.10
Spider	Salticidae	*Marpissa radiata*			NT*	O.5wlveg
Spider	Salticidae	*Neon valentulus*	SS		VU	O.5mdveg
Spider	Salticidae	*Sitticus caricis*			VU*, BAP	O.5mdveg
Spider	Salticidae	*Synageles venator*			N:A*	O.15
Spider	Theridiidae	*Crustulina sticta*			N:A*	O.7mdveg
Spider	Theridiidae	*Dipoena inornata*		2	VU*, BAP	O.10juxt
Spider	Theridiidae	*Episinus truncatus*			N:A*	O.10wlveg
Spider	Theridiidae	*Rugathodes instabilis*			N:B*	O.5wlveg
Spider	Theridiidae	*Steatoda albomaculata*			VU*	O.12juxt
Spider	Theridiidae	*Theridion blackwalli*			N:B*	O.10rock
Spider	Theridiosomatidae	*Theridiosoma gemmosum*			N:B*	PSS.5swrdm
Spider	Thomisidae	*Ozyptila brevipes*			N:B*	O.15
Spider	Thomisidae	*Ozyptila sanctuaria*			N:B*	O.10juxt
Spider	Thomisidae	*Ozyptila scabricula*			EN*	O.10juxt
Spider	Thomisidae	*Ozyptila simplex*			N:B*	O.10
Spider	Thomisidae	*Xysticus lanio*			N:B*	POW.10heveg
Spider	Zoridae	*Zora armillata*	PS	2	R	O.5wlveg
Crustacean	Astacidae	*Austropotamobius pallipes*			G:EN, BAP	O.13mdveg

Crustacean	Daphniidae	*Daphnia rosea*	ER			O.13
Crustacean	Gammaridae	*Gammarus insensibilis*			R, BAP	O.13wlveg
Dragonfly	Aeshnidae	*Aeshna isosceles*		2	EN, BAP	O.13wlveg
Dragonfly	Coenagrionidae	*Coenagrion pulchellum*			NT	O.13wlveg
Dragonfly	Coenagrionidae	*Ischnura pumilio*			NT	O.4brsub
Dragonfly	Lestidae	*Lestes dryas*			NT	O.4heveg
Dragonfly	Libellulidae	*Libellula fulva*			NT	O.4wlveg
Stonefly	Nemouridae	*Nemoura dubitans*			N	PSS.5wlveg
Caddisfly	Leptoceridae	*Ceraclea senilis*			N	O.13mdveg
Caddisfly	Leptoceridae	*Erotesis baltica*	PS		VU	O.4heveg
Caddisfly	Limnephilidae	*Grammotaulius nitidus*	ER		EN	O.4wlveg
Caddisfly	Limnephilidae	*Limnephilus pati*	SS		EN	X
Caddisfly	Limnephilidae	*Limnephilus tauricus*			EN	O.4wlveg
Caddisfly	Limnephilidae	*Phacopteryx brevipennis*			N	O.7wlveg
Orthoptera	Acrididae	*Stethophyma grossum*		2	VU, BAP	O.5mdveg
True bug	Cercopidae	*Aphrophora alpina*			N:B	PSS.5wlveg
True bug	Cicadellidae	*Agallia brachyptera*	SS		N:B	O.15graz
True bug	Cicadellidae	*Anoscopus albifrons*			N:B	saltm
True bug	Cicadellidae	*Cicadula flori*			N:B	O.5mdveg
True bug	Cicadellidae	*Cosmotettix caudatus*			N:A	O.6wlveg
True bug	Cicadellidae	*Edwardsiana alnicola*			N:B	T/SC.5
True bug	Cicadellidae	*Edwardsiana tersa*			N:B	T/SC.5
True bug	Cicadellidae	*Euscelidius variegatus*			N:B	O.12juxt
True bug	Cicadellidae	*Iassus scutellaris*			N:A	PSS.10
True bug	Cicadellidae	*Idiocerus fulgidus*			N:A	T/SC.10
True bug	Cicadellidae	*Macrosteles quadripunctulatus*			N:A	O.10juxt
True bug	Cicadellidae	*Macrosteles sordidipennis*			N:B	saltm
True bug	Cicadellidae	*Paralimnus phragmitis*			N:B	O.5wlveg
True bug	Cicadellidae	*Psammotettix nodosus*			INSU	X
True bug	Cicadellidae	*Sagatus punctifrons*	PS		INSU	PSS.5wlveg
True bug	Cicadellidae	*Stroggylocephalus livens*			N:B	O.5swrdm
True bug	Cixiidae	*Trigonocranus emmeae*			N:B	O.10bgrnd, shveg
True bug	Coreidae	*Bathysolen nubilus*			N:B	O.10Ldist
True bug	Delphacidae	*Asiraca clavicornis*			N:B	O.10juxt
True bug	Delphacidae	*Calligypona reyi*			INSU	O.7wlveg
True bug	Delphacidae	*Chloriona dorsata*			N:B	O.5wlveg
True bug	Delphacidae	*Chloriona vasconica*			N:B	O.5wlveg
True bug	Delphacidae	*Delphacodes capnodes*			N:B	O.5swrdm
True bug	Delphacidae	*Eurysula lurida*	ER		N:A	O.7mdveg
True bug	Delphacidae	*Florodelphax paryphasma*			N:A	O.5wlveg
True bug	Delphacidae	*Megamelodes lequesnei*			N:B	O.4wlveg
True bug	Delphacidae	*Paradelphacodes paludosus*			N:A	O.5swrdm
True bug	Delphacidae	*Paraliburnia clypealis*			INSU	O.5mdveg
True bug	Delphacidae	*Stenocranus fuscovittatus*			N:B	X
True bug	Hebridae	*Hebrus pusillus*			N:B	O.4wlveg
True bug	Lygaeidae	*Aphanus rolandri*			N:A	O.10bgrnd, detri

True bug	Lygaeidae	*Drymus latus*			N:B	X
True bug	Lygaeidae	*Drymus pilicornis*			N:B	POS.10
True bug	Lygaeidae	*Drymus pumilio*			N:B	POW.10shveg
True bug	Lygaeidae	*Eremocoris plebejus*			N:B	POW.10
True bug	Lygaeidae	*Graptopeltus lynceus*			N:B	O.12juxt
True bug	Lygaeidae	*Megalonotus antennatus*			N:B	O.10juxt
True bug	Lygaeidae	*Megalonotus praetextatus*			N:B	O.12juxt
True bug	Lygaeidae	*Megalonotus sabulicola*			N:B	O.12juxt
True bug	Microphysidae	*Myrmedobia coleoptrata*			N:B	POW.10
True bug	Miridae	*Adelphocoris seticornis*			N:A	O.7shveg
True bug	Miridae	*Adelphocoris ticinensis*			N:B	O.7mdveg
True bug	Miridae	*Agnocoris reclairei*	SS		N:B	T/SC.5
True bug	Miridae	*Capsus wagneri*			N:B	O.7wlveg
True bug	Miridae	*Halticus saltator*			N:B	X
True bug	Miridae	*Lygus pratensis*			R	POW.10
True bug	Miridae	*Orthotylus moncreaffi*			R	saltm
True bug	Miridae	*Tytthus pubescens*			N:B	O.5mdveg
True bug	Pentatomidae	*Sciocoris cursitans*			N:B	O.10
True bug	Rhopalidae	*Rhopalus rufus*			R	O.10bgrnd, shveg
True bug	Rhopalidae	*Stictopleurus abutilon*		1	EX	O.10juxt
True bug	Rhopalidae	*Stictopleurus punctatonervosus*		1	EX	O.10juxt
True bug	Saldidae	*Saldula opacula*			N:B	O.6juxt
True bug	Scutelleridae	*Eurygaster maura*			N:B	O.10swrdm
True bug	Scutelleridae	*Odontoscelis lineola*			N:B	O.10bgrnd, shveg
True bug	Veliidae	*Microvelia buenoi*	SS		R	O.4heveg
True bug	Veliidae	*Microvelia pygmaea*			N:B	O.4heveg
Beetle	Aderidae	*Aderus populneus*			N:B	T/SC.10dead
Beetle	Anobiidae	*Anobium inexspectatum*			N:B	T/SC.10
Beetle	Anobiidae	*Caenocara bovistae*			R	O.10fungi
Beetle	Anobiidae	*Dorcatoma dresdensis*			N:A	T/SC.10fungi
Beetle	Anobiidae	*Hedobia imperialis*			N:B	T/SC.10dead
Beetle	Anobiidae	*Ptinus sexpunctatus*			N:B	X
Beetle	Anobiidae	*Ptinus subpilosus*			N:B	T/SC.10vet
Beetle	Anthicidae	*Anthicus bimaculatus*			N:A	O.10detri
Beetle	Anthicidae	*Omonadus bifasciatus*			N:B	V.detri/fungi
Beetle	Anthribidae	*Anthribus nebulosus*			N:B	T/SC.10
Beetle	Anthribidae	*Choragus sheppardi*			N:A	T/SC.10dead
Beetle	Anthribidae	*Platyrhinus resinosus*			N:B	T/SC.10dead
Beetle	Anthribidae	*Platystomos albinus*			N:B	T/SC.10dead
Beetle	Apionidae	*Apion rubiginosum*			R	O.10bgrnd, shveg
Beetle	Apionidae	*Catapion pubescens*			N:B	O.10shveg
Beetle	Apionidae	*Diplapion stolidum*			N:B	O.10Hdist
Beetle	Apionidae	*Hemitrichapion reflexum*			N:A	O.10Ldist
Beetle	Apionidae	*Melanapion minimum*			R, N:B, BAP	T/SC.15

Beetle	Apionidae	*Perapion affine*		N:A	O.10shveg
Beetle	Apionidae	*Perapion lemoroi*		INSU	O.10Ldist
Beetle	Apionidae	*Protapion filirostre*		N:B	O.10Hdist
Beetle	Apionidae	*Protapion varipes*		N:B	POW.10shveg
Beetle	Apionidae	*Pseudaplemonus limonii*		N:B	saltm
Beetle	Apionidae	*Squamapion cineraceum*		N:A	O.10shveg
Beetle	Apionidae	*Squamapion vicinum*		N:B	O.7mdveg
Beetle	Bolboceratidae	*Odonteus armiger*		N:A	sub.10
Beetle	Bothrideridae	*Anommatus duodecimstriatus*		N:A	sub.10
Beetle	Buprestidae	*Agrilus laticornis*		N:B	POW.10dead
Beetle	Buprestidae	*Agrilus sinuatus*		N:A	T/SC.10dead
Beetle	Buprestidae	*Aphanisticus pusillus*		N:B	O.10wlveg
Beetle	Buprestidae	*Trachys scrobiculatus*		N:A	O.10Ldist
Beetle	Cantharidae	*Cantharis fusca*		R	O.7wlveg
Beetle	Cantharidae	*Crudosilis ruficollis*		N:B	O.6wlveg
Beetle	Cantharidae	*Malthinus balteatus*		N:B	T/SC.5dead/detri
Beetle	Cantharidae	*Malthinus frontalis*		N:B	T/SC.10vet
Beetle	Cantharidae	*Malthodes fibulatus*		N:B	T/SC.10dead
Beetle	Cantharidae	*Malthodes guttifer*		N:B	CW.10
Beetle	Cantharidae	*Malthodes maurus*		N:B	CW.8
Beetle	Cantharidae	*Rhagonycha lutea*		N:B	POW.10
Beetle	Carabidae	*Acupalpus exiguus*		N:B	O.6bgrnd
Beetle	Carabidae	*Acupalpus flavicollis*		N:A	O.7bgrnd
Beetle	Carabidae	*Agonum livens*		N:B	V.5detri/fungi
Beetle	Carabidae	*Agonum nigrum*		N:B	O.6
Beetle	Carabidae	*Agonum scitulum*		N:A, BAP	V.5
Beetle	Carabidae	*Agonum sexpunctatum*		N:A	O.7bgrnd
Beetle	Carabidae	*Agonum versutum*		N:B	O.6
Beetle	Carabidae	*Amara consularis*		N:B	O.10Hdist
Beetle	Carabidae	*Amara curta*		N:B	O.12dist
Beetle	Carabidae	*Amara equestris*		N:B	O.10Ldist
Beetle	Carabidae	*Amara fulva*		N:B	O.10Ldist
Beetle	Carabidae	*Amara lucida*		N:B	O.10Ldist
Beetle	Carabidae	*Amara praetermissa*		N:B	O.10Ldist
Beetle	Carabidae	*Amara strenua*		R	saltm
Beetle	Carabidae	*Anthracus consputus*		N:B	O.6bgrnd
Beetle	Carabidae	*Badister dilatatus*		N:B	O.5wlveg
Beetle	Carabidae	*Badister peltatus*		N:A	O.5wlveg
Beetle	Carabidae	*Badister unipustulatus*		N:B	O.7wlveg
Beetle	Carabidae	*Bembidion clarkii*		N:B	V.6/14
Beetle	Carabidae	*Bembidion ephippium*		N:A	saltm,detri
Beetle	Carabidae	*Bembidion fluviatile*		N:B	O.6bgrnd
Beetle	Carabidae	*Bembidion fumigatum*		N:B	O.6wlveg
Beetle	Carabidae	*Bembidion gilvipes*		N:B	O.6
Beetle	Carabidae	*Bembidion lunatum*		N:B	O.6bgrnd
Beetle	Carabidae	*Bembidion nigricorne*		N:B	O.10Ldist

Beetle	Carabidae	*Bembidion obliquum*			N:B	O.6bgrnd
Beetle	Carabidae	*Bembidion octomaculatum*		1	EX	O.6
Beetle	Carabidae	*Bembidion quadripustulatum*			N:B, BAP	O.6bgrnd
Beetle	Carabidae	*Bembidion saxatile*			N:B	O.10Ldist
Beetle	Carabidae	*Bembidion semipunctatum*			N:A	O.6bgrnd
Beetle	Carabidae	*Blemus discus*			N:B	O.6bgrnd
Beetle	Carabidae	*Blethisa multipunctata*			N:B	O.5
Beetle	Carabidae	*Brachinus crepitans*			N:B	O.10Ldist
Beetle	Carabidae	*Bracteon litorale*			N:B	O.6bgrnd
Beetle	Carabidae	*Bradycellus csikii*			INDE	X
Beetle	Carabidae	*Calathus ambiguus*			N:B	O.10Hdist
Beetle	Carabidae	*Carabus monilis*			N:B, BAP	X
Beetle	Carabidae	*Chlaenius nigricornis*			N:B	O.6
Beetle	Carabidae	*Chlaenius tristis*	SS	1	EN, BAP	O.6wlveg
Beetle	Carabidae	*Cicindela sylvatica*			N:A, BAP	O.10
Beetle	Carabidae	*Cymindis axillaris*			N:A	O.10Ldist
Beetle	Carabidae	*Demetrias imperialis*			N:B	O.5wlveg
Beetle	Carabidae	*Demetrias monostigma*			N:B	O.15
Beetle	Carabidae	*Dicheirotrichus obsoletus*			N:B	saltm,detri
Beetle	Carabidae	*Dyschirius nitidus*			N:A	O.6bgrnd
Beetle	Carabidae	*Elaphropus parvulus*			N:B	O.10Hdist
Beetle	Carabidae	*Elaphrus uliginosus*			N:B	O.6
Beetle	Carabidae	*Harpalus froelichii*			VU, BAP	O.10Hdist
Beetle	Carabidae	*Harpalus melancholicus*			EN, BAP	O.10
Beetle	Carabidae	*Harpalus pumilus*			N:A	O.10Hdist
Beetle	Carabidae	*Harpalus serripes*			N:B	O.10Ldist
Beetle	Carabidae	*Harpalus smaragdinus*			N:B	O.10bgrnd, shveg
Beetle	Carabidae	*Lebia chlorocephala*			N:B	O.10swrdm
Beetle	Carabidae	*Masoreus wetterhallii*			N:A	O.12dist, graz
Beetle	Carabidae	*Notiophilus aesthuans*			N:B	O.10bgrnd, shveg
Beetle	Carabidae	*Odacantha melanura*			N:B	O.5wlveg
Beetle	Carabidae	*Oodes helopioides*			N:B	O.14
Beetle	Carabidae	*Ophonus ardosiacus*			N:B	O.10Ldist
Beetle	Carabidae	*Ophonus azureus*			N:B	O.10Ldist
Beetle	Carabidae	*Ophonus laticollis*			N:A, BAP	O.10Hdist
Beetle	Carabidae	*Ophonus melletii*			N:A, BAP	O.10
Beetle	Carabidae	*Ophonus puncticollis*			R, BAP	O.10Ldist
Beetle	Carabidae	*Ophonus rupicola*			N:B	O.10Ldist
Beetle	Carabidae	*Ophonus sabulicola*			R	O.12dist
Beetle	Carabidae	*Ophonus schaubergerianus*			N:B	O.10
Beetle	Carabidae	*Ophonus stictus*			EN, BAP	O.10
Beetle	Carabidae	*Panagaeus bipustulatus*			N:B	O.10

Beetle	Carabidae	*Panagaeus cruxmajor*		2	EN, BAP	O.6wlveg
Beetle	Carabidae	*Paradromius longiceps*	SS		N:A	O.5wlveg
Beetle	Carabidae	*Philorhizus sigma*			N:A	O.7
Beetle	Carabidae	*Platyderus depressus*			N:B	O.10Hdist
Beetle	Carabidae	*Pogonus littoralis*			N:B	saltm,detri
Beetle	Carabidae	*Polistichus connexus*			VU	O.10
Beetle	Carabidae	*Pterostichus anthracinus*			N:B	V.6/14
Beetle	Carabidae	*Pterostichus aterrimus*			EN	O.6
Beetle	Carabidae	*Pterostichus gracilis*			N:B	O.6
Beetle	Carabidae	*Pterostichus longicollis*			N:B	O.6bgrnd
Beetle	Carabidae	*Pterostichus oblongopunctatus*			N:B	CW.10dead
Beetle	Carabidae	*Pterostichus quadrifoveolatus*			N:B	O.10Ldist
Beetle	Carabidae	*Stenolophus skrimshiranus*			N:A	O.6
Beetle	Carabidae	*Stenolophus teutonus*			N:B	O.6bgrnd
Beetle	Carabidae	*Tachys scutellaris*			N:A	saltm
Beetle	Carabidae	*Trechus rivularis*			R	O.5/8detri
Beetle	Carabidae	*Trechus rubens*			N:B	O.5/8detri
Beetle	Carabidae	*Zabrus tenebrioides*			N:A	O.10Hdist
Beetle	Cerambycidae	*Anaglyptus mysticus*			N:B	T/SC.10dead
Beetle	Cerambycidae	*Anoplodera sexguttata*			R	POW.10dead
Beetle	Cerambycidae	*Aromia moschata*			N:B	POW.7
Beetle	Cerambycidae	*Glaphyra umbellatarum*			N:A	T/SC.10dead
Beetle	Cerambycidae	*Grammoptera abdominalis*			N:A	CW.10dead
Beetle	Cerambycidae	*Lamia textor*	SS		EN	CW.10
Beetle	Cerambycidae	*Oberea oculata*	ER		EN, BAP	T/SC.5
Beetle	Cerambycidae	*Phytoecia cylindrica*			N:B	O.10wlveg
Beetle	Cerambycidae	*Saperda carcharias*			N:A	T/SC.5
Beetle	Cerambycidae	*Stenostola dubia*			N:B	T/SC.10
Beetle	Chrysomelidae	*Aphthona nigriceps*			N:A	O.15graz
Beetle	Chrysomelidae	*Bruchus atomarius*			N:B	O.10shveg
Beetle	Chrysomelidae	*Cassida hemisphaerica*			N:A	O.10Ldist
Beetle	Chrysomelidae	*Cassida nebulosa*			INDE	O.10Hdist
Beetle	Chrysomelidae	*Cassida nobilis*			N:B	O.10bgrnd, shveg
Beetle	Chrysomelidae	*Cassida prasina*			N:B	O.10shveg
Beetle	Chrysomelidae	*Chaetocnema aerosa*			INSU	O.5mdveg
Beetle	Chrysomelidae	*Chaetocnema sahlbergii*			N:A	saltm
Beetle	Chrysomelidae	*Chrysolina graminis*			N:A, BAP	O.15graz
Beetle	Chrysomelidae	*Chrysolina haemoptera*			N:B	O.10Ldist
Beetle	Chrysomelidae	*Chrysolina marginata*			N:A	O.10shveg
Beetle	Chrysomelidae	*Chrysolina oricalcia*			N:B	V.10
Beetle	Chrysomelidae	*Chrysolina sanguinolenta*			N:A	O.10Ldist
Beetle	Chrysomelidae	*Cryptocephalus aureolus*			N:B	O.10bgrnd, shveg
Beetle	Chrysomelidae	*Cryptocephalus bilineatus*			N:B	O.10shveg
Beetle	Chrysomelidae	*Cryptocephalus exiguus*			EN, BAP	O.5mdveg

Beetle	Chrysomelidae	*Cryptocephalus frontalis*			N:A	PSS.10
Beetle	Chrysomelidae	*Cryptocephalus parvulus*			N:B	CW.10
Beetle	Chrysomelidae	*Dibolia cynoglossi*			EN	O.10Ldist
Beetle	Chrysomelidae	*Donacia aquatica*			R, BAP	O.14wlveg
Beetle	Chrysomelidae	*Donacia bicolora*			VU, BAP	O.14wlveg
Beetle	Chrysomelidae	*Donacia cinerea*			N:B	O.14wlveg
Beetle	Chrysomelidae	*Donacia clavipes*			N:B	O.14wlveg
Beetle	Chrysomelidae	*Donacia crassipes*			N:B	O.13wlveg
Beetle	Chrysomelidae	*Donacia dentata*			N:A	O.14mdveg
Beetle	Chrysomelidae	*Donacia impressa*			N:A	O.14wlveg
Beetle	Chrysomelidae	*Donacia sparganii*			N:A	O.14wlveg
Beetle	Chrysomelidae	*Donacia thalassina*			N:B	O.14wlveg
Beetle	Chrysomelidae	*Epitrix atropae*			N:B	O.10Ldist
Beetle	Chrysomelidae	*Galeruca laticollis*	SS	2		X
Beetle	Chrysomelidae	*Gonioctena decemnotata*			N:B	CW.10
Beetle	Chrysomelidae	*Longitarsus aeneicollis*			N:B	O.10Ldist
Beetle	Chrysomelidae	*Longitarsus agilis*			N:A	O.10Ldist
Beetle	Chrysomelidae	*Longitarsus anchusae*			N:B	O.10Hdist
Beetle	Chrysomelidae	*Longitarsus ballotae*			N:B	O.10Ldist
Beetle	Chrysomelidae	*Longitarsus brunneus*			N:B	O.5wlveg
Beetle	Chrysomelidae	*Longitarsus curtus*			N:A	O.10Ldist
Beetle	Chrysomelidae	*Longitarsus dorsalis*			N:B	O.10Hdist
Beetle	Chrysomelidae	*Longitarsus ferrugineus*			EN	O.15graz
Beetle	Chrysomelidae	*Longitarsus ganglbaueri*			N:A	O.10Ldist
Beetle	Chrysomelidae	*Longitarsus lycopi*			N:B	O.15graz
Beetle	Chrysomelidae	*Longitarsus nasturtii*			N:B	O.10Hdist
Beetle	Chrysomelidae	*Longitarsus nigrofasciatus*			N:A	O.10Ldist
Beetle	Chrysomelidae	*Longitarsus ochroleucus*			N:B	O.10Hdist
Beetle	Chrysomelidae	*Longitarsus parvulus*			N:A	O.10Ldist
Beetle	Chrysomelidae	*Longitarsus plantagomaritimus*			N:B	saltm
Beetle	Chrysomelidae	*Longitarsus pratensis*			INSU	X
Beetle	Chrysomelidae	*Longitarsus rutilus*			N:A	POW.7
Beetle	Chrysomelidae	*Longitarsus tabidus*			N:B	O.10Hdist
Beetle	Chrysomelidae	*Lythraria salicariae*			N:B	O.7wlveg
Beetle	Chrysomelidae	*Macroplea appendiculata*			R	O.13wlveg
Beetle	Chrysomelidae	*Mantura chrysanthemi*			N:A	O.10bgrnd, shveg
Beetle	Chrysomelidae	*Mantura obtusata*			N:B	V.5
Beetle	Chrysomelidae	*Mantura rustica*			N:B	O.10Ldist
Beetle	Chrysomelidae	*Ochrosis ventralis*			R	O.10Ldist
Beetle	Chrysomelidae	*Phaedon concinnus*			N:B	saltm
Beetle	Chrysomelidae	*Phyllotreta cruciferae*			N:B	O.10Hdist
Beetle	Chrysomelidae	*Phyllotreta vittula*			N:A	O.10Hdist
Beetle	Chrysomelidae	*Plateumaris affinis*			N:B	O.14swrdm
Beetle	Chrysomelidae	*Plateumaris braccata*			N:A	O.14wlveg
Beetle	Chrysomelidae	*Podagrica fuscicornis*			N:B	O.10wlveg
Beetle	Chrysomelidae	*Podagrica fuscipes*			N:A	O.10wlveg

Beetle	Chrysomelidae	*Psylliodes chalcomera*			N:B	O.10Ldist
Beetle	Chrysomelidae	*Psylliodes luteola*			INSU	POW.10 Ldist
Beetle	Chrysomelidae	*Psylliodes sophiae*			R	O.10Hdist
Beetle	Ciidae	*Strigocis bicornis*			N:B	X
Beetle	Clambidae	*Clambus pallidulus*			INSU	X
Beetle	Cleridae	*Korynetes caeruleus*			N:B	T/SC.10dead
Beetle	Cleridae	*Opilo mollis*			N:B	T/SC.10dead
Beetle	Cleridae	*Tillus elongatus*			N:B	T/SC.10dead
Beetle	Coccinellidae	*Hyperaspis pseudopustulata*			N:B	X
Beetle	Coccinellidae	*Nephus quadrimaculatus*			VU	POW.10
Beetle	Coccinellidae	*Platynaspis luteorubra*			N:A	X
Beetle	Coccinellidae	*Scymnus limbatus*			N:B	T/SC.5dead/detri
Beetle	Coccinellidae	*Scymnus schmidti*			N:B	V.10
Beetle	Colydiidae	*Orthocerus clavicornis*			N:B	O.10bgrnd, shveg
Beetle	Colydiidae	*Synchita humeralis*			N:B	T/SC.10fungi
Beetle	Colydiidae	*Synchita separanda*			R	T/SC.10dead
Beetle	Corylophidae	*Orthoperus aequalis*			INSU	T/SC.10dead
Beetle	Corylophidae	*Orthoperus brunnipes*			R	V.detri/fungi
Beetle	Corylophidae	*Orthoperus nigrescens*			N:B	V.detri/fungi
Beetle	Cryptophagidae	*Atomaria atra*			N	O.5/8detri
Beetle	Cryptophagidae	*Atomaria barani*			N	O.5wlveg
Beetle	Cryptophagidae	*Atomaria pseudatra*			INDE	O.6detri
Beetle	Cryptophagidae	*Atomaria rhenana*			N	O.6detri
Beetle	Cryptophagidae	*Atomaria rubricollis*			INDE	O.15
Beetle	Cryptophagidae	*Atomaria umbrina*			N	CW.15detri,fungi
Beetle	Cryptophagidae	*Atomaria zetterstedti*			INSU	V.5
Beetle	Cryptophagidae	*Cryptophagus labilis*			N	T/SC.10dead
Beetle	Cryptophagidae	*Cryptophagus populi*			N	T/SC.15
Beetle	Cryptophagidae	*Cryptophagus schmidti*			INSU	V.detri/fungi
Beetle	Cryptophagidae	*Cryptophagus schmidtii*	PS			X
Beetle	Cryptophagidae	*Telmatophilus brevicollis*			R	O.6wlveg
Beetle	Cryptophagidae	*Telmatophilus schoenherrii*			INSU	O.6wlveg
Beetle	Cucujidae	*Pediacus depressus*			N:A	T/SC.10fungi
Beetle	Curculionidae	*Acalles ptinoides*			N:B	CW.10detri
Beetle	Curculionidae	*Acalyptus carpini*			N:B	T/SC.5
Beetle	Curculionidae	*Anthonomus rufus*			R	T/SC.10
Beetle	Curculionidae	*Anthonomus ulmi*			N:B	T/SC.10
Beetle	Curculionidae	*Attactagenus plumbeus*			N:B	O.10
Beetle	Curculionidae	*Aulacobaris lepidii*			N:A	O.6
Beetle	Curculionidae	*Aulacobaris picicornis*			N:B	O.10Ldist
Beetle	Curculionidae	*Bagous alismatis*			N:B	O.4wlveg
Beetle	Curculionidae	*Bagous limosus*			N:B	O.13mdveg
Beetle	Curculionidae	*Bagous puncticollis*			EN	O.13wlveg
Beetle	Curculionidae	*Bagous subcarinatus*			N:A	O.13wlveg
Beetle	Curculionidae	*Bagous tempestivus*			N:B	O.4wlveg
Beetle	Curculionidae	*Bagous tubulus*			VU	O.14mdveg

Beetle	Curculionidae	*Brachysomus echinatus*			N:B	O.10shveg
Beetle	Curculionidae	*Calosirus terminatus*			N:B	O.10Ldist
Beetle	Curculionidae	*Ceutorhynchus atomus*			N:A	O.10Hdist
Beetle	Curculionidae	*Ceutorhynchus constrictus*			N:B	O.10Ldist
Beetle	Curculionidae	*Ceutorhynchus pectoralis*			N:A	V.5
Beetle	Curculionidae	*Ceutorhynchus pulvinatus*			N:A	O.10Hdist
Beetle	Curculionidae	*Ceutorhynchus rapae*			N:B	O.10Hdist
Beetle	Curculionidae	*Ceutorhynchus resedae*			N:B	O.10Hdist
Beetle	Curculionidae	*Ceutorhynchus thomsoni*			INSU	O.10Ldist
Beetle	Curculionidae	*Cleopomiarus plantarum*			INSU	X
Beetle	Curculionidae	*Coeliodinus nigritarsis*			N:A	CW.10
Beetle	Curculionidae	*Cossonus linearis*			N:A	T/SC.15
Beetle	Curculionidae	*Cossonus parallelepipedus*			N:B	T/SC.10dead
Beetle	Curculionidae	*Cryptorhynchus lapathi*			N:B	T/SC.5
Beetle	Curculionidae	*Curculio betulae*			N:B	CW.8
Beetle	Curculionidae	*Curculio rubidus*			N:B	CW.10
Beetle	Curculionidae	*Datonychus angulosus*			N:A	O.7wlveg
Beetle	Curculionidae	*Dorytomus filirostris*			N:B	T/SC.5
Beetle	Curculionidae	*Dorytomus hirtipennis*			N:A	T/SC.5
Beetle	Curculionidae	*Dorytomus salicinus*			N:B	T/SC.5
Beetle	Curculionidae	*Drupenatus nasturtii*			N:B	O.4shveg
Beetle	Curculionidae	*Eubrychius velutus*			N:B	O.13mdveg
Beetle	Curculionidae	*Gronops inaequalis*			INSU	O.10Hdist
Beetle	Curculionidae	*Gronops lunatus*			N:B	O.10bgrnd, shveg
Beetle	Curculionidae	*Gymnetron veronicae*			N:B	O.5mdveg
Beetle	Curculionidae	*Gymnetron villosulum*			N:B	O.5mdveg
Beetle	Curculionidae	*Hadroplontus trimaculatus*			N:B	O.10Ldist
Beetle	Curculionidae	*Hypera dauci*			N:B	O.10Hdist
Beetle	Curculionidae	*Hypera fuscocinerea*			N:B	O.10shveg
Beetle	Curculionidae	*Hypera meles*			N:A	O.10bgrnd, shveg
Beetle	Curculionidae	*Isochnus populicola*			INSU	T/SC.5
Beetle	Curculionidae	*Kissophagus hederae*			N:B	T/SC.10
Beetle	Curculionidae	*Kyklioacalles roboris*			N:B	CW.10detri
Beetle	Curculionidae	*Lixus paraplecticus*	SS	1	EN	O.4wlveg
Beetle	Curculionidae	*Magdalis barbicornis*			N:A	T/SC.10
Beetle	Curculionidae	*Magdalis cerasi*			N:B	T/SC.10dead
Beetle	Curculionidae	*Melanobaris laticollis*			N:A	O.10Hdist
Beetle	Curculionidae	*Microplontus campestris*			N:B	O.10Hdist
Beetle	Curculionidae	*Mogulones geographicus*			N:B	O.10Hdist
Beetle	Curculionidae	*Neliocarus faber*			N:B	O.10shveg
Beetle	Curculionidae	*Neophytobius muricatus*			N:A	O.5
Beetle	Curculionidae	*Neophytobius quadrinodosus*			N:A	O.10Ldist
Beetle	Curculionidae	*Orchestes calceatus*			INSU	CW.10
Beetle	Curculionidae	*Orchestes testaceus*			VU, BAP	T/SC.5
Beetle	Curculionidae	*Orthochaetes setiger*			N:B	O.10Ldist

Beetle	Curculionidae	*Otiorhynchus raucus*			N:B	O.10Ldist
Beetle	Curculionidae	*Pelenomus canaliculatus*			N:B	O.4wlveg
Beetle	Curculionidae	*Pelenomus comari*			N:B	O.5mdveg
Beetle	Curculionidae	*Pelenomus zumpti*			N:A	saltm,upper
Beetle	Curculionidae	*Phyllobius vespertinus*			N:B	saltm,upper
Beetle	Curculionidae	*Phytobius leucogaster*			N:B	O.4wlveg
Beetle	Curculionidae	*Polydrusus formosus*			N:A	POW.10
Beetle	Curculionidae	*Polydrusus pulchellus*			N:B	saltm
Beetle	Curculionidae	*Pseudorchestes pratensis*			N:B	O.10wlveg
Beetle	Curculionidae	*Pseudostyphlus pillumus*			N:A	O.10Hdist
Beetle	Curculionidae	*Scolytus mali*			N:B	T/SC.10
Beetle	Curculionidae	*Sibinia primita*			N:B	O.10bgrnd, shveg
Beetle	Curculionidae	*Sirocalodes mixtus*			N:B	O.10Ldist
Beetle	Curculionidae	*Sitona macularius*			N:B	O.10Hdist
Beetle	Curculionidae	*Stenocarus ruficornis*			N:B	O.10Hdist
Beetle	Curculionidae	*Stereocorynes truncorum*			N:A	CW.10dead
Beetle	Curculionidae	*Tanymecus palliatus*			N:B	O.10
Beetle	Curculionidae	*Tapeinotus sellatus*			N:A	O.5wlveg
Beetle	Curculionidae	*Thamiocolus viduatus*			N:B	O.15graz
Beetle	Curculionidae	*Trachyphloeus aristatus*			N:B	O.10shveg
Beetle	Curculionidae	*Trachyphloeus asperatus*			N:A	O.10bgrnd, shveg
Beetle	Curculionidae	*Trichosirocalus barnevillei*			N:B	O.10shveg
Beetle	Curculionidae	*Trichosirocalus horridus*			N:A	O.10Hdist
Beetle	Curculionidae	*Trypophloeus binodulus*			N:A	CW.10dead
Beetle	Curculionidae	*Tychius pusillus*			N:B	O.10Ldist
Beetle	Curculionidae	*Tychius tibialis*			N:A	O.10Ldist
Beetle	Curculionidae	*Zacladus exiguus*			N:B	O.10bgrnd, shveg
Beetle	Dermestidae	*Ctesias serra*			N:B	T/SC.10vet
Beetle	Dryopidae	*Dryops anglicanus*			NT	O.14swrdm
Beetle	Dryopidae	*Dryops auriculatus*			NT, N:B	O.14wlveg
Beetle	Dryopidae	*Dryops griseus*			VU	O.14mdveg
Beetle	Dryopidae	*Dryops nitidulus*			NT	O.14
Beetle	Dryopidae	*Dryops similaris*			R, S:NS	O.14swrdm
Beetle	Dytiscidae	*Acilius canaliculatus*			S:NS	POW.4
Beetle	Dytiscidae	*Agabus biguttatus*			S:NS	X
Beetle	Dytiscidae	*Agabus conspersus*			S:NS	O.4
Beetle	Dytiscidae	*Agabus labiatus*			NT, N:B	O.14wlveg
Beetle	Dytiscidae	*Agabus uliginosus*			NT, N:B	O.14bgrnd, shveg
Beetle	Dytiscidae	*Agabus undulatus*	PS		NT	O.4heveg
Beetle	Dytiscidae	*Bidessus unistriatus*			CR, BAP	O.4shveg
Beetle	Dytiscidae	*Dytiscus circumcinctus*			S:NS	O.4shveg
Beetle	Dytiscidae	*Dytiscus dimidiatus*			NT	O.4wlveg
Beetle	Dytiscidae	*Graphoderus cinereus*			VU	O.4heveg
Beetle	Dytiscidae	*Graptodytes bilineatus*			S:NS	O.4

Beetle	Dytiscidae	*Graptodytes flavipes*			NT	O.4shveg
Beetle	Dytiscidae	*Hydaticus seminiger*			S:NS	O.4wlveg
Beetle	Dytiscidae	*Hydaticus transversalis*			S:NS	O.4wlveg
Beetle	Dytiscidae	*Hydroporus ferrugineus*			S:NS	sub.5
Beetle	Dytiscidae	*Hydroporus marginatus*			S:NS	O.4
Beetle	Dytiscidae	*Hydroporus neglectus*			S:NS	POW.4
Beetle	Dytiscidae	*Hydroporus obsoletus*			S:NS	sub.5
Beetle	Dytiscidae	*Hydroporus rufifrons*			EN, BAP	O.4wlveg
Beetle	Dytiscidae	*Hygrotus decoratus*			S:NS	O.4wlveg
Beetle	Dytiscidae	*Hygrotus nigrolineatus*			S:NS	X
Beetle	Dytiscidae	*Hygrotus parallelogrammus*			S:NS	O.4
Beetle	Dytiscidae	*Hygrotus quinquelineatus*			S:NS	POW.4
Beetle	Dytiscidae	*Ilybius subaeneus*			S:NS	O.4wlveg
Beetle	Dytiscidae	*Laccornis oblongus*			NT	POW.4
Beetle	Dytiscidae	*Nebrioporus depressus*			NT, N:B	X
Beetle	Dytiscidae	*Potamonectes griseostriatus*			N:B	O.13
Beetle	Dytiscidae	*Rhantus bistriatus*		1	RE	O.14
Beetle	Dytiscidae	*Rhantus frontalis*			S:NS	O.13wlveg
Beetle	Dytiscidae	*Scarodytes halensis*			S:NS	O.13mdveg
Beetle	Dytiscidae	*Stictonectes lepidus*			NT	O.4shveg
Beetle	Elateridae	*Ampedus cinnabarinus*			R	CW.10dead
Beetle	Elateridae	*Ampedus pomorum*			N:B	CW.10dead
Beetle	Elateridae	*Ampedus quercicola*			N:B	CW.10dead
Beetle	Elateridae	*Cardiophorus asellus*			N:B	O.10swrdm
Beetle	Elateridae	*Oedostethus quadripustulatus*			N:A	O.7
Beetle	Elateridae	*Paraphotistus nigricornis*			R	T/SC.5dead/detri
Beetle	Elmidae	*Oulimnius major*	SS		S:NS	O.13mdveg
Beetle	Elmidae	*Oulimnius rivularis*			S:NS	O.13mdveg
Beetle	Elmidae	*Oulimnius troglodytes*			S:NS	O.1
Beetle	Elmidae	*Riolus cupreus*			S:NS	O.13mdveg
Beetle	Elmidae	*Riolus subviolaceus*			S:NS	O.13mdveg
Beetle	Endomychidae	*Symbiotes latus*			N:B	CW.10dead
Beetle	Erirhinidae	*Grypus equiseti*			N:B	O.15graz
Beetle	Erirhinidae	*Notaris scirpi*			N:B	O.5wlveg
Beetle	Erirhinidae	*Tournotaris bimaculatus*			N:B	O.14wlveg
Beetle	Eucnemidae	*Melasis buprestoides*			N:B	T/SC.10dead
Beetle	Georissidae	*Georissus crenulatus*			S:NS	O.14bgrnd, shveg
Beetle	Gyrinidae	*Gyrinus aeratus*			S:NS	O.4wlveg
Beetle	Gyrinidae	*Gyrinus distinctus*			S:NS	O.4wlveg
Beetle	Gyrinidae	*Gyrinus paykulli*			S:NS	O.4wlveg
Beetle	Gyrinidae	*Gyrinus suffriani*			VU	O.4heveg
Beetle	Haliplidae	*Haliplus apicalis*			S:NS	O.4
Beetle	Haliplidae	*Haliplus mucronatus*			S:NS	X
Beetle	Haliplidae	*Haliplus variegatus*			VU	O.4wlveg
Beetle	Haliplidae	*Peltodytes caesus*			S:NS	O.4
Beetle	Helophoridae	*Helophorus alternans*			S:NS	O.4

Beetle	Helophoridae	*Helophorus dorsalis*			S:NS	POW.7
Beetle	Helophoridae	*Helophorus fulgidicollis*			S:NS	O.14
Beetle	Helophoridae	*Helophorus granularis*			S:NS	O.7shveg
Beetle	Helophoridae	*Helophorus longitarsis*			R, S:NS	O.7shveg
Beetle	Helophoridae	*Helophorus nanus*			S:NS	O.14bgrnd, shveg
Beetle	Helophoridae	*Helophorus nubilus*			S:NS	O.5/8detri
Beetle	Helophoridae	*Helophorus strigifrons*			S:NS	O.5/8detri
Beetle	Heteroceridae	*Augyles maritimus*			NT	O.6bgrnd
Beetle	Heteroceridae	*Heterocerus marginatus*			S:NS	O.6bgrnd
Beetle	Heteroceridae	*Heterocerus obsoletus*			S:NS	O.6
Beetle	Histeridae	*Onthophilus punctatus*			INSU	sub.10
Beetle	Histeridae	*Plegaderus dissectus*			N:B	T/SC.15
Beetle	Hydraenidae	*Hydraena palustris*			NT	O.14detri
Beetle	Hydraenidae	*Hydraena pygmaea*			VU	O.1
Beetle	Hydraenidae	*Hydraena rufipes*			S:NS	O.1
Beetle	Hydraenidae	*Limnebius aluta*			NT	O.14bgrnd, shveg
Beetle	Hydraenidae	*Limnebius papposus*			NT	O.14detri
Beetle	Hydraenidae	*Ochthebius nanus*			S:NS	O.4
Beetle	Hydraenidae	*Ochthebius punctatus*			S:NS	O.13
Beetle	Hydraenidae	*Ochthebius pusillus*			R, S:NS	O.13
Beetle	Hydraenidae	*Ochthebius viridis*			N:B	O.13
Beetle	Hydrochidae	*Hydrochus brevis*			NT	O.4heveg
Beetle	Hydrochidae	*Hydrochus crenatus*	SS		NT	O.14detri
Beetle	Hydrochidae	*Hydrochus elongatus*			NT	O.4wlveg
Beetle	Hydrochidae	*Hydrochus ignicollis*			NT	O.14wlveg
Beetle	Hydrophilidae	*Berosus luridus*			NT, N:B	O.4wlveg
Beetle	Hydrophilidae	*Cercyon bifenestratus*			S:NS	O.6detri
Beetle	Hydrophilidae	*Cercyon littoralis*			S:NS	O.6detri
Beetle	Hydrophilidae	*Cercyon nigriceps*			N:B	V.detri/fungi
Beetle	Hydrophilidae	*Chaetarthria seminulum*			S:NS	O.14bgrnd, shveg
Beetle	Hydrophilidae	*Enochrus bicolor*			S:NS	O.14detri
Beetle	Hydrophilidae	*Enochrus halophilus*			S:NS	O.14detri
Beetle	Hydrophilidae	*Enochrus nigritus*			NT	O.14detri
Beetle	Hydrophilidae	*Enochrus quadripunctatus*			S:NS	O.4
Beetle	Hydrophilidae	*Enochrus quadripunctatus agg.*			N:B	O.4
Beetle	Hydrophilidae	*Helochares obscurus*			VU	O.4wlveg
Beetle	Hydrophilidae	*Helochares punctatus*			S:NS	O.4wlveg
Beetle	Hydrophilidae	*Hydrochara caraboides*			NT	O.14wlveg
Beetle	Hydrophilidae	*Hydrophilus piceus*			NT	O.4wlveg
Beetle	Hydrophilidae	*Laccobius atratus*			S:NS	O.5/8detri
Beetle	Hydrophilidae	*Laccobius atrocephalus*			N:B	O.5/8detri
Beetle	Hydrophilidae	*Limnoxenus niger*			NT	O.4shveg
Beetle	Latridiidae	*Corticaria inconspicua*			N	V.detri/fungi
Beetle	Latridiidae	*Enicmus brevicornis*			N	T/SC.10

Beetle	Latridiidae	*Enicmus fungicola*			N	CW.10dead
Beetle	Leiodidae	*Agathidium marginatum*			N	O.10
Beetle	Leiodidae	*Choleva glauca*			N	V.detri/fungi
Beetle	Leiodidae	*Hydnobius punctatus*			N	X
Beetle	Leiodidae	*Leiodes gyllenhalii*			INSU	sub.10
Beetle	Limnichidae	*Limnichus pygmaeus*			S:NS	O.5/8detri
Beetle	Lucanidae	*Lucanus cervus*			N:B, BAP	T/SC.10dead
Beetle	Lycidae	*Platycis minutus*			N:B	T/SC.10dead
Beetle	Melandryidae	*Anisoxya fuscula*			N:A	T/SC.10
Beetle	Melandryidae	*Conopalpus testaceus*			N:B	T/SC.10dead
Beetle	Melandryidae	*Orchesia micans*			N:B	T/SC.10fungi
Beetle	Meloidae	*Meloe proscarabaeus*			BAP	O.10juxt
Beetle	Melyridae	*Cerapheles terminatus*	SS		N:A	O.5wlveg
Beetle	Melyridae	*Clanoptilus marginellus*			N:B	O.10shveg
Beetle	Melyridae	*Dasytes plumbeus*			N:B	O.10
Beetle	Melyridae	*Malachius aeneus*			R, BAP	O.10wlveg
Beetle	Monotomidae	*Rhizophagus nitidulus*			N:B	T/SC.10dead
Beetle	Monotomidae	*Rhizophagus parvulus*			R	CW.10dead
Beetle	Mordellidae	*Mordella leucaspis*			INSU	CW.10dead
Beetle	Mordellidae	*Mordellistena acuticollis*			INSU	POW.10 Ldist
Beetle	Mordellidae	*Mordellistena humeralis*			INSU	POW.10wlveg
Beetle	Mordellidae	*Mordellistena neuwaldeggiana*			INSU	T/SC.10
Beetle	Mordellidae	*Mordellistena parvula*			INSU	O.10
Beetle	Mordellidae	*Tomoxia bucephala*			N:A	T/SC.10dead
Beetle	Mycetophagidae	*Mycetophagus piceus*			N:B	CW.10fungi
Beetle	Mycetophagidae	*Mycetophagus populi*			N:A	T/SC.10dead
Beetle	Mycetophagidae	*Mycetophagus quadriguttatus*			N:A	V.detri/fungi
Beetle	Mycetophagidae	*Pseudotriphyllus suturalis*			G:NT	CW.10fungi
Beetle	Nitidulidae	*Cryptarcha strigata*			N:B	T/SC.10
Beetle	Nitidulidae	*Epuraea fuscicollis*			N:B	T/SC.10
Beetle	Nitidulidae	*Epuraea silacea*			R	CW.10dead
Beetle	Nitidulidae	*Meligethes fulvipes*			N	O.10Ldist
Beetle	Nitidulidae	*Meligethes gagathinus*			N	O.7bgrnd
Beetle	Nitidulidae	*Meligethes ochropus*			N	O.10Ldist
Beetle	Noteridae	*Noterus crassicornis*			S:NS	O.4wlveg
Beetle	Oedemeridae	*Ischnomera cyanea*			N:B	T/SC.10dead
Beetle	Phalacridae	*Olibrus millefolii*			N:B	O.10shveg
Beetle	Phalacridae	*Olibrus pygmaeus*			N:B	O.15graz
Beetle	Phalacridae	*Stilbus atomarius*			INSU	O.5wlveg
Beetle	Ptiliidae	*Acrotrichis brevipennis*			N	V.detri/fungi
Beetle	Ptiliidae	*Acrotrichis pumila*			INSU	O.5/8detri
Beetle	Ptiliidae	*Microptilium palustre*	ER		INSU	O.5/8detri
Beetle	Ptiliidae	*Ptilium affine*	ER		INSU	O.5/8detri
Beetle	Ptiliidae	*Ptilium caesum*	ER	1	INSU	O.5/8detri
Beetle	Ptiliidae	*Ptinella britannica*			INSU	V.5
Beetle	Rhynchitidae	*Byctiscus betulae*			N:B	T/SC.10

Beetle	Rhynchitidae	*Temnocerus longiceps*		N:B	T/SC.15
Beetle	Salpingidae	*Lissodema cursor*		N:A	T/SC.15
Beetle	Salpingidae	*Lissodema denticolle*		N:B	T/SC.10dead
Beetle	Scarabaeidae	*Aphodius distinctus*		N:B	O.10detri
Beetle	Scarabaeidae	*Aphodius plagiatus*		N:B	O.10fungi
Beetle	Scarabaeidae	*Omaloplia ruricola*		N:B	O.10
Beetle	Scarabaeidae	*Psammodius asper*		N:B	O.10
Beetle	Scirtidae	*Cyphon pubescens*		S:NS	O.14swrdm
Beetle	Scirtidae	*Elodes elongata*		S:NS	X
Beetle	Scirtidae	*Elodes minuta*		S:NS	X
Beetle	Scirtidae	*Elodes pseudominuta*		S:NS	V.5detri/fungi
Beetle	Scirtidae	*Hydrocyphon deflexicollis*		NT	O.6bgrnd
Beetle	Scraptiidae	*Anaspis thoracica*		INDE	POW.10dead
Beetle	Scydmaenidae	*Eutheia schaumii*		N	V.detri/fungi
Beetle	Scydmaenidae	*Eutheia scydmaenoides*		N	V.detri/fungi
Beetle	Scydmaenidae	*Neuraphes plicicollis*		N	CW.10dead
Beetle	Scydmaenidae	*Scydmaenus rufus*		VU	CW.10detri
Beetle	Scydmaenidae	*Scydmoraphes helvolus*		N	V.detri/fungi
Beetle	Scydmaenidae	*Scydmoraphes sparshalli*		INSU	V.detri/fungi
Beetle	Silphidae	*Aclypea opaca*		N:A	V.detri/fungi
Beetle	Silphidae	*Aclypea undata*		EN	X
Beetle	Silphidae	*Dendroxena quadrimaculata*		N:B	CW.10
Beetle	Silphidae	*Nicrophorus interruptus*		N:B	V.carri
Beetle	Silphidae	*Nicrophorus vestigator*		N:A	V.carri
Beetle	Silphidae	*Silpha obscura*		VU	O.10
Beetle	Silphidae	*Silpha tyrolensis*		N:B	X
Beetle	Spercheidae	*Spercheus emarginatus*	1	RE	O.4wlveg
Beetle	Sphaeriusidae	*Sphaerius acaroides*		EN	O.5/8detri
Beetle	Sphindidae	*Sphindus dubius*		N:B	T/SC.10
Beetle	Staphylinidae	*Achenium humile*		N:B	O.7
Beetle	Staphylinidae	*Acidota cruentata*		N:B	V.detri/fungi
Beetle	Staphylinidae	*Acrolocha minuta*		N	O.10detri
Beetle	Staphylinidae	*Alaobia hybrida*		INSU	PWP.10
Beetle	Staphylinidae	*Aleochara binotata*		INSU	O.10dung
Beetle	Staphylinidae	*Aleochara brevipennis*		N	O.5/8detri
Beetle	Staphylinidae	*Aleochara discipennis*		N	V.carri
Beetle	Staphylinidae	*Aleochara inconspicua*		INSU	O.10juxt
Beetle	Staphylinidae	*Aleochara kamila*		N	V.detri/fungi
Beetle	Staphylinidae	*Aleochara moerens*		N	V.detri/fungi
Beetle	Staphylinidae	*Alevonota rufotestacea*		N	sub.10
Beetle	Staphylinidae	*Aloconota coulsoni*		INSU	O.5/8detri
Beetle	Staphylinidae	*Aloconota languida*		N	O.5/8detri
Beetle	Staphylinidae	*Aloconota longicollis*		N	O.5/8detri
Beetle	Staphylinidae	*Amidobia talpa*		N	CW.10detri
Beetle	Staphylinidae	*Anotylus insecatus*		N	sub.10
Beetle	Staphylinidae	*Astenus immaculatus*		N	V.detri/fungi

Beetle	Staphylinidae	*Atheta diversa*			N	O.10detri
Beetle	Staphylinidae	*Bibloplectus tenebrosus*			INSU	O.5/8detri
Beetle	Staphylinidae	*Bisnius pseudoparcus*			N	CW.10detri
Beetle	Staphylinidae	*Bledius occidentalis*			INSU	O.10detri
Beetle	Staphylinidae	*Brachyusa concolor*			N	O.5/8detri
Beetle	Staphylinidae	*Calodera riparia*			N	O.5/8detri
Beetle	Staphylinidae	*Carpelimus foveolatus*			N	O.6
Beetle	Staphylinidae	*Carpelimus fuliginosus*			N	O.5/8detri
Beetle	Staphylinidae	*Carpelimus lindrothi*			N	O.6bgrnd
Beetle	Staphylinidae	*Carpelimus similis*			N	O.6bgrnd
Beetle	Staphylinidae	*Cypha discoidea*			N:B	O.5/8detri
Beetle	Staphylinidae	*Cypha pulicaria*			N	O.5/8detri
Beetle	Staphylinidae	*Cypha seminulum*			INSU	CW.10detri
Beetle	Staphylinidae	*Dacrila fallax*			N	O.5/8detri
Beetle	Staphylinidae	*Datomicra zosterae*			N	O.5/8detri
Beetle	Staphylinidae	*Dexiogyia corticina*			N	T/SC.10dead
Beetle	Staphylinidae	*Dochmonota clancula*			N	O.5/8detri
Beetle	Staphylinidae	*Dropephylla gracilicornis*			N	T/SC.10detri
Beetle	Staphylinidae	*Emus hirtus*			EN	O.10dung
Beetle	Staphylinidae	*Euplectus kirbii*			N	T/SC.10dead
Beetle	Staphylinidae	*Falagria sulcatula*			N	O.5
Beetle	Staphylinidae	*Gabrius bishopi*			N:B	X
Beetle	Staphylinidae	*Gabrius osseticus*			N:B	O.5/8detri
Beetle	Staphylinidae	*Gyrophaena congrua*			N	CW.10fungi
Beetle	Staphylinidae	*Gyrophaena joyi*			N	O.5/8detri
Beetle	Staphylinidae	*Gyrophaena joyioides*			N	POW.10fungi
Beetle	Staphylinidae	*Gyrophaena manca*			N	CW.15detri,fungi
Beetle	Staphylinidae	*Gyrophaena munsteri*			INSU	CW.10fungi
Beetle	Staphylinidae	*Gyrophaena pseudonana*	ER		INDE	CW.10fungi
Beetle	Staphylinidae	*Gyrophaena pulchella*			INSU	CW.10fungi
Beetle	Staphylinidae	*Gyrophaena strictula*			N	CW.10fungi
Beetle	Staphylinidae	*Heterothops dissimilis*			INSU	V.detri/fungi
Beetle	Staphylinidae	*Ilyobates bennetti*			N	V.detri/fungi
Beetle	Staphylinidae	*Ilyobates propinquus*			N	O.7wlveg
Beetle	Staphylinidae	*Lathrobium pallidipenne*			N	O.6detri
Beetle	Staphylinidae	*Lathrobium rufonitidum*			INDE	O.6wlveg
Beetle	Staphylinidae	*Leptusa norvegica*			N	CW.10dead
Beetle	Staphylinidae	*Lomechusa emarginata*			N	X
Beetle	Staphylinidae	*Medon apicalis*			N	V.detri/fungi
Beetle	Staphylinidae	*Microdota benickiella*			N	V.detri/fungi
Beetle	Staphylinidae	*Microdota excelsa*			N	CW.15detri,fungi
Beetle	Staphylinidae	*Mocyta orphana*			N	V.detri/fungi
Beetle	Staphylinidae	*Mycetoporus longicornis*			N	CW.10detri
Beetle	Staphylinidae	*Mycetoporus punctus*			N	V.detri/fungi
Beetle	Staphylinidae	*Neobisnius procerulus*			INSU	O.5/8detri
Beetle	Staphylinidae	*Ocypus fortunatarum*			N:B	X

Beetle	Staphylinidae	*Ocypus fuscatus*			N:B	O.10detri
Beetle	Staphylinidae	*Ocypus nitens*			N:A	V.detri/fungi
Beetle	Staphylinidae	*Ocypus ophthalmicus*			N:A	O.10
Beetle	Staphylinidae	*Oligota apicata*			N	T/SC.10detri
Beetle	Staphylinidae	*Omalium allardi*			N	V.detri/fungi
Beetle	Staphylinidae	*Omalium rugatum*			N	PWP.10
Beetle	Staphylinidae	*Oxypoda exoleta*			N	V.detri/fungi
Beetle	Staphylinidae	*Oxypoda flavicornis*			N	T/SC.10detri
Beetle	Staphylinidae	*Oxypoda lurida*			N	O.10
Beetle	Staphylinidae	*Oxypoda nigricornis*			N	O.10detri
Beetle	Staphylinidae	*Pachyatheta mortuorum*			INSU	O.10detri
Beetle	Staphylinidae	*Parameotica difficilis*			N	O.5
Beetle	Staphylinidae	*Philhygra deformis*			N	X
Beetle	Staphylinidae	*Philhygra hygrobia*			N	V.5detri/fungi
Beetle	Staphylinidae	*Philhygra parca*			INSU	O.5
Beetle	Staphylinidae	*Philonthus fumarius*			N:B	O.5/8detri
Beetle	Staphylinidae	*Philonthus mannerheimi*			N:B	O.5
Beetle	Staphylinidae	*Phyllodrepa salicis*			INSU	CW.10detri
Beetle	Staphylinidae	*Platydracus fulvipes*			N:B	X
Beetle	Staphylinidae	*Platydracus latebricola*			N:B	X
Beetle	Staphylinidae	*Platystethus nodifrons*			N	O.5bgrnd
Beetle	Staphylinidae	*Proteinus crenulatus*			N:B	CW.10detri
Beetle	Staphylinidae	*Pselaphaulax dresdensis*			N	O.5/8detri
Beetle	Staphylinidae	*Pseudopsis sulcata*			N	V.detri/fungi
Beetle	Staphylinidae	*Quedius balticus*	LR		EN	O.5/8detri
Beetle	Staphylinidae	*Quedius fulgidus*			N:B	V.detri/fungi
Beetle	Staphylinidae	*Quedius longicornis*			N:B	V.detri/fungi
Beetle	Staphylinidae	*Quedius nigrocaeruleus*			N:B	V.detri/fungi
Beetle	Staphylinidae	*Quedius puncticollis*			N:B	V.detri/fungi
Beetle	Staphylinidae	*Quedius scitus*			N:B	T/SC.10dead
Beetle	Staphylinidae	*Quedius truncicola*			N:B	T/SC.10dead
Beetle	Staphylinidae	*Rugilus fragilis*			N	V.detri/fungi
Beetle	Staphylinidae	*Rugilus similis*			N	V.detri/fungi
Beetle	Staphylinidae	*Scaphisoma boleti*			N:B	T/SC.10fungi
Beetle	Staphylinidae	*Schistoglossa gemina*			N	O.5/8detri
Beetle	Staphylinidae	*Schistoglossa viduata*	SS		INSU	O.5wlveg
Beetle	Staphylinidae	*Sepedophilus bipunctatus*			N:B	T/SC.10dead
Beetle	Staphylinidae	*Sepedophilus constans*			N	CW.10detri
Beetle	Staphylinidae	*Sepedophilus pedicularius*			N	O.5/8detri
Beetle	Staphylinidae	*Sepedophilus testaceus*			N	T/SC.10dead
Beetle	Staphylinidae	*Staphylinus caesareus*			INDE	V.10
Beetle	Staphylinidae	*Stenus argus*			N:B	O.5/8detri
Beetle	Staphylinidae	*Stenus ater*			N:B	O.10detri
Beetle	Staphylinidae	*Stenus atratulus*			N:B	O.6detri
Beetle	Staphylinidae	*Stenus butrintensis*			N	O.6
Beetle	Staphylinidae	*Stenus carbonarius*			N:B	O.5/8detri

Beetle	Staphylinidae	*Stenus circularis*			N:B	V.detri/fungi
Beetle	Staphylinidae	*Stenus europaeus*			N:B	O.5/8detri
Beetle	Staphylinidae	*Stenus fuscicornis*			N:B	V.detri/fungi
Beetle	Staphylinidae	*Stenus nigritulus*			N:B	O.6detri
Beetle	Staphylinidae	*Stenus opticus*			N:A	O.5/8detri
Beetle	Staphylinidae	*Stenus palustris*			N:B	O.5wlveg
Beetle	Staphylinidae	*Stenus proditor*			INDE	O.5/8detri
Beetle	Staphylinidae	*Stenus pusillus*			N:B	O.10detri
Beetle	Staphylinidae	*Stenus subdepressus*			INDE	O.10detri
Beetle	Staphylinidae	*Sunius bicolor*			INSU	X
Beetle	Staphylinidae	*Sunius melanocephalus*			N	O.10detri
Beetle	Staphylinidae	*Tachinus bipustulatus*		1	EN	T/SC.10vet
Beetle	Staphylinidae	*Tachinus flavolimbatus*			INSU	O.10detri
Beetle	Staphylinidae	*Tachyporus formosus*			N:A	O.5/8detri
Beetle	Staphylinidae	*Tasgius pedator*			N:A	O.10
Beetle	Staphylinidae	*Thinobius brevipennis*	PS	2	INSU	O.6bgrnd
Beetle	Staphylinidae	*Trichophya pilicornis*			N:B	T/SC.15
Beetle	Tenebrionidae	*Crypticus quisquilius*			N:B	O.10Ldist
Beetle	Tenebrionidae	*Diaperis boleti*			VU	CW.10fungi
Beetle	Tenebrionidae	*Eledona agricola*			N:B	T/SC.10fungi
Beetle	Tenebrionidae	*Mycetochara humeralis*			N:A	CW.10dead
Beetle	Tenebrionidae	*Myrmechixenus vaporariorum*			R	V.detri/fungi
Beetle	Tenebrionidae	*Prionychus ater*			N:B	T/SC.10dead
Beetle	Tenebrionidae	*Scaphidema metallicum*			N:B	V.detri/fungi
Beetle	Tetratomidae	*Hallomenus binotatus*			N:B	T/SC.10fungi
Butterfly	Hesperiidae	*Erynnis tages*			VU, BAP	O.10juxt
Butterfly	Hesperiidae	*Pyrgus malvae*			VU, BAP	O.10juxt
Butterfly	Lycaenidae	*Cupido minimus*			NT, BAP	O.10juxt
Butterfly	Lycaenidae	*Hamearis lucina*		2	EN, BAP	POW.10shveg
Butterfly	Lycaenidae	*Lycaena dispar*	SS	1	G:RE, RE	O.5mdveg
Butterfly	Lycaenidae	*Lysandra coridon*			NT	O.10swrdm
Butterfly	Lycaenidae	*Satyrium pruni*	SS		EN	POW.10wlveg
Butterfly	Lycaenidae	*Satyrium w-album*			EN, BAP	POW.10wlveg
Butterfly	Lycaenidae	*Thecla betulae*			VU, BAP	POW.10wlveg
Butterfly	Nymphalidae	*Aglais polychloros*		1	RE	POW.10
Butterfly	Nymphalidae	*Apatura iris*			NT	CW.10
Butterfly	Nymphalidae	*Boloria euphrosyne*			EN, BAP	POW.10shveg
Butterfly	Nymphalidae	*Coenonympha pamphilus*			NT, BAP	O.10juxt
Butterfly	Nymphalidae	*Euphydryas aurinia*		2	VU, BAP	O.10swrdm
Butterfly	Nymphalidae	*Hipparchia semele*			VU, BAP	O.10juxt
Butterfly	Nymphalidae	*Lasiommata megera*		1	NT, BAP	O.10juxt
Butterfly	Nymphalidae	*Limenitis camilla*			VU, BAP	POW.10wlveg
Butterfly	Papilionidae	*Papilio machaon*			NT	O.5wlveg
Butterfly	Pieridae	*Aporia crataegi*		1	RE	POW.10
Butterfly	Pieridae	*Leptidea sinapis*			EN, BAP	POW.10wlveg
Moth	Adelidae	*Nemophora fasciella*			BAP	O.10juxt

Moth	Arctiidae	*Arctia caja*			BAP	O.15
Moth	Arctiidae	*Pelosia muscerda*			R	T/SC.5
Moth	Arctiidae	*Spilosoma lubricipeda*			BAP	X
Moth	Arctiidae	*Spilosoma luteum*			BAP	V.10
Moth	Arctiidae	*Tyria jacobaeae*			BAP	O.10Ldist
Moth	Cossidae	*Cossus cossus*			BAP	T/SC.5
Moth	Cossidae	*Phragmataecia castaneae*	PS		VU	O.5wlveg
Moth	Drepanidae	*Cymatophorima diluta*			BAP	CW.10
Moth	Drepanidae	*Watsonalla binaria*			BAP	CW.10
Moth	Ethmiidae	*Ethmia dodecea*			N:B	POW.10 Ldist
Moth	Ethmiidae	*Ethmia quadrillella*			N:A	O.7bgrnd
Moth	Gelechiidae	*Aristotelia subdecurtella*	PS	1	EX	O.5wlveg
Moth	Gelechiidae	*Athrips tetrapunctella*	SS		INDE	O.7wlveg
Moth	Gelechiidae	*Brachmia inornatella*			N:B	O.5wlveg
Moth	Gelechiidae	*Bryotropha basaltinella*			N	O.10detri
Moth	Gelechiidae	*Chionodes distinctella*			N:B	O.10bgrnd, shveg
Moth	Gelechiidae	*Eulamprotes wilkella*			N:B	O.10Ldist
Moth	Gelechiidae	*Gelechia muscosella*			VU	T/SC.5
Moth	Gelechiidae	*Gelechia turpella*			INSU	T/SC.10
Moth	Gelechiidae	*Monochroa arundinetella*			INDE	O.4wlveg
Moth	Gelechiidae	*Monochroa conspersella*			INDE	O.5wlveg
Moth	Gelechiidae	*Monochroa divisella*			VU	O.5mdveg
Moth	Gelechiidae	*Monochroa lutulentella*			INSU	O.7mdveg
Moth	Gelechiidae	*Monochroa palustrella*			N:B	O.15graz
Moth	Gelechiidae	*Monochroa suffusella*			N	O.5mdveg
Moth	Gelechiidae	*Pexicopia malvella*			N:B	O.7wlveg
Moth	Gelechiidae	*Recurvaria nanella*			N:B	POW.10
Moth	Gelechiidae	*Scrobipalpa pauperella*	ER		INSU	O.5mdveg
Moth	Gelechiidae	*Scrobipalpa salinella*			N	saltm
Moth	Geometridae	*Chesias legatella*			BAP	PSS.10
Moth	Geometridae	*Chesias rufata*			BAP	PSS.10
Moth	Geometridae	*Chiasmia clathrata*			BAP	O.15graz
Moth	Geometridae	*Costaconvexa polygrammata*		1	EX	O.7mdveg
Moth	Geometridae	*Cyclophora pendularia*			R, BAP	T/SC.5
Moth	Geometridae	*Cyclophora porata*			BAP	PWP.10
Moth	Geometridae	*Ecliptopera silaceata*			BAP	O.15graz
Moth	Geometridae	*Ennomos erosaria*			BAP	T/SC.10
Moth	Geometridae	*Ennomos fuscantaria*			BAP	T/SC.10
Moth	Geometridae	*Ennomos quercinaria*			BAP	T/SC.10
Moth	Geometridae	*Epirrhoe galiata*			BAP	O.10shveg
Moth	Geometridae	*Eulithis mellinata*			BAP	POW.10heveg
Moth	Geometridae	*Eupithecia extensaria*			R	X
Moth	Geometridae	*Eupithecia extensaria subsp. occidua*	PS		BAP	saltm,upper
Moth	Geometridae	*Hemistola chrysoprasaria*			BAP	PSS.10
Moth	Geometridae	*Idaea dilutaria*			R, BAP	O.10bgrnd,

						shveg
Moth	Geometridae	*Lithostege griseata*			R, BAP	O.10Hdist
Moth	Geometridae	*Lycia hirtaria*			BAP	T/SC.10
Moth	Geometridae	*Macaria wauaria*			BAP	POW.10heveg
Moth	Geometridae	*Melanthia procellata*			BAP	PSS.10
Moth	Geometridae	*Orthonama vittata*			BAP	O.5mdveg
Moth	Geometridae	*Pelurga comitata*			BAP	O.10Hdist
Moth	Geometridae	*Perizoma albulata subsp. albulata*			BAP	O.10shveg
Moth	Geometridae	*Perizoma sagittata*	PS		VU	O.5wlveg
Moth	Geometridae	*Rheumaptera hastata*			BAP	PSS.5wlveg
Moth	Geometridae	*Scopula marginepunctata*			BAP	O.10Ldist
Moth	Geometridae	*Scopula rubiginata*			R	O.10Ldist
Moth	Geometridae	*Scotopteryx bipunctaria*			BAP	O.10bgrnd, shveg
Moth	Geometridae	*Scotopteryx chenopodiata*			BAP	O.10juxt
Moth	Geometridae	*Timandra comae*			BAP	O.10wlveg
Moth	Geometridae	*Xanthorhoe biriviata*			R	PSS.5wlveg
Moth	Geometridae	*Xanthorhoe ferrugata*			BAP	X
Moth	Hepialidae	*Hepialus humuli*			BAP	O.10Ldist
Moth	Lasiocampidae	*Eriogaster lanestris*			VU	PSS.10
Moth	Lasiocampidae	*Malacosoma neustria*			BAP	T/SC.10
Moth	Lasiocampidae	*Trichiura crataegi*			BAP	T/SC.10
Moth	Lymantriidae	*Laelia coenosa*	PS	1	EX	O.5wlveg
Moth	Lymantriidae	*Lymantria dispar*		2	EX	T/SC.15
Moth	Lymantriidae	*Orgyia recens*			VU, BAP	PWP.10
Moth	Noctuidae	*Acronicta psi*			BAP	T/SC.10
Moth	Noctuidae	*Acronicta rumicis*			BAP	X
Moth	Noctuidae	*Acronicta strigosa*	SS	1	EN	T/SC.10
Moth	Noctuidae	*Agrochola helvola*			BAP	POW.10
Moth	Noctuidae	*Agrochola litura*			BAP	T/SC.10
Moth	Noctuidae	*Agrochola lychnidis*			BAP	T/SC.10
Moth	Noctuidae	*Allophyes oxyacanthae*			BAP	PWP.10
Moth	Noctuidae	*Amphipoea oculea*			BAP	O.7mdveg
Moth	Noctuidae	*Amphipyra tragopoginis*			BAP	X
Moth	Noctuidae	*Apamea anceps*			BAP	O.10swrdm
Moth	Noctuidae	*Apamea remissa*			BAP	O.10wlveg
Moth	Noctuidae	*Aporophyla lutulenta*			BAP	O.10
Moth	Noctuidae	*Archanara algae*			R	O.6wlveg
Moth	Noctuidae	*Archanara neurica*			R, BAP	O.14wlveg
Moth	Noctuidae	*Asteroscopus sphinx*			BAP	CW.10
Moth	Noctuidae	*Atethmia centrago*			BAP	PWP.10
Moth	Noctuidae	*Athetis pallustris*	LR		R, BAP	O.7shveg
Moth	Noctuidae	*Blepharita adusta*			BAP	X
Moth	Noctuidae	*Brachylomia viminalis*			BAP	T/SC.15
Moth	Noctuidae	*Caradrina morpheus*			BAP	X
Moth	Noctuidae	*Celaena haworthii*			BAP	O.5swrdm

Moth	Noctuidae	*Celaena leucostigma*			BAP	O.5wlveg
Moth	Noctuidae	*Chortodes brevilinea*			R, BAP	O.7wlveg
Moth	Noctuidae	*Chortodes extrema*	SS		R, BAP	O.7mdveg
Moth	Noctuidae	*Coenophila subrosea*			EN	PSS.5wlveg
Moth	Noctuidae	*Cosmia diffinis*	SS		BAP	CW.10
Moth	Noctuidae	*Deltote bankiana*	PS		VU	O.5mdveg
Moth	Noctuidae	*Diarsia rubi*			BAP	X
Moth	Noctuidae	*Dicycla oo*			BAP	PWP.10
Moth	Noctuidae	*Emmelia trabealis*		1	EN	O.10Hdist
Moth	Noctuidae	*Eugnorisma glareosa*			BAP	O.10wlveg
Moth	Noctuidae	*Euxoa nigricans*			BAP	O.10shveg
Moth	Noctuidae	*Euxoa tritici*			BAP	O.10
Moth	Noctuidae	*Graphiphora augur*			BAP	T/SC.10
Moth	Noctuidae	*Hadena irregularis*		1	EN	O.10Hdist
Moth	Noctuidae	*Hecatera dysodea*		1	EX	O.10
Moth	Noctuidae	*Heliophobus reticulata*			BAP	O.10Ldist
Moth	Noctuidae	*Heliothis maritima*			R, BAP	O.10wlveg
Moth	Noctuidae	*Heliothis viriplaca*			R	O.10juxt
Moth	Noctuidae	*Herminia tarsicrinalis*			R	POW.10heveg
Moth	Noctuidae	*Hoplodrina blanda*			BAP	O.10Ldist
Moth	Noctuidae	*Hydraecia micacea*			BAP	X
Moth	Noctuidae	*Melanchra persicariae*			BAP	O.10Ldist
Moth	Noctuidae	*Melanchra pisi*			BAP	PSS.10
Moth	Noctuidae	*Mesoligia literosa*			BAP	O.10Ldist
Moth	Noctuidae	*Mythimna comma*			BAP	O.7mdveg
Moth	Noctuidae	*Mythimna flammea*			R	O.5wlveg
Moth	Noctuidae	*Noctua orbona*			BAP	O.10swrdm
Moth	Noctuidae	*Oria musculosa*			BAP	O.10Hdist
Moth	Noctuidae	*Orthosia gracilis*			BAP	PSS.5wlveg
Moth	Noctuidae	*Pechipogo strigilata*			BAP	POW.10wlveg
Moth	Noctuidae	*Polia bombycina*			BAP	X
Moth	Noctuidae	*Rhizedra lutosa*			BAP	O.7wlveg
Moth	Noctuidae	*Shargacucullia lychnitis*			BAP	O.10Hdist
Moth	Noctuidae	*Tholera cespitis*			BAP	O.10
Moth	Noctuidae	*Tholera decimalis*			BAP	O.10
Moth	Noctuidae	*Trachea atriplicis*		1	EX	O.7bgrnd
Moth	Noctuidae	*Tyta luctuosa*			VU, BAP	O.12dist
Moth	Noctuidae	*Xanthia gilvago*			BAP	T/SC.10
Moth	Noctuidae	*Xanthia icteritia*			BAP	T/SC.5swrdm
Moth	Noctuidae	*Xestia agathina*			BAP	O.10wlveg
Moth	Noctuidae	*Xestia castanea*			BAP	O.10wlveg
Moth	Noctuidae	*Xylena exsoleta*			BAP	O.10swrdm
Moth	Notodontidae	*Diloba caeruleocephala*			BAP	T/SC.10
Moth	Pterophoridae	*Emmelina argoteles*	ER			X
Moth	Pyralidae	*Anania verbascalis*			N:B	O.10Ldist
Moth	Pyralidae	*Calamotropha paludella*			N:B	O.6wlveg

Moth	Pyralidae	*Crambus hamella*			N:B	O.10swrdm
Moth	Pyralidae	*Crambus pratella*			N:B	O.10shveg
Moth	Pyralidae	*Crambus silvella*			R	O.7mdveg
Moth	Pyralidae	*Crambus uliginosellus*			N:B	O.5mdveg
Moth	Pyralidae	*Eudonia delunella*			N:B	CW.10
Moth	Pyralidae	*Eudonia lineola*			N:B	PSS.10
Moth	Pyralidae	*Evergestis extimalis*			N:B	O.10Ldist
Moth	Pyralidae	*Gymnancyla canella*			N:A	O.10Ldist
Moth	Pyralidae	*Homoeosoma nebulella*			N:B	O.10Ldist
Moth	Pyralidae	*Loxostege sticticalis*		1	EX	O.10Hdist
Moth	Pyralidae	*Nascia cilialis*			N:A	O.14wlveg
Moth	Pyralidae	*Nephopterix angustella*			N:B	PWP.10
Moth	Pyralidae	*Paratalanta pandalis*			N:A	POW.10 Ldist
Moth	Pyralidae	*Pediasia aridella*			N:B	saltm
Moth	Pyralidae	*Pediasia contaminella*			N:B	O.10swrdm
Moth	Pyralidae	*Phlyctaenia stachydalis*			INSU	POW.10 Ldist
Moth	Pyralidae	*Platytes alpinella*			R	O.10detri
Moth	Pyralidae	*Schoenobius gigantella*			N:B	O.4heveg
Moth	Pyralidae	*Sciota hostilis*			EN, BAP	CW.10
Moth	Pyralidae	*Scoparia ancipitella*			N:B	CW.10
Moth	Pyralidae	*Sitochroa palealis*			N	O.10Ldist
Moth	Pyralidae	*Synaphe punctalis*			N:B	O.10detri
Moth	Pyralidae	*Thisanotia chrysonuchella*			N:B	O.10shveg
Moth	Sphingidae	*Hemaris tityus*			BAP	O.10swrdm
Moth	Stathmopodidae	*Stathmopoda pedella*			N:B	T/SC.5
Moth	Tortricidae	*Cydia leguminana*	PS	1	EN	PWP.10
Moth	Tortricidae	*Phtheochroa schreibersiana*	PS	1		T/SC.15
Moth	Zygaenidae	*Adscita statices*			BAP	O.15graz
True fly	Acroceridae	*Ogcodes pallipes*			N	POS.10
True fly	Agromyzidae	*Metopomyza ornata*			N	X
True fly	Anthomyiidae	*Chirosia aberrans*			INSU	X
True fly	Anthomyiidae	*Egle subarctica*			INSU	T/SC.5
True fly	Anthomyiidae	*Eustalomyia vittipes*			N	X
True fly	Anthomyiidae	*Phorbia longipilis*			INSU	X
True fly	Anthomyzidae	*Anagnota bicolor*			N	O.5wlveg
True fly	Anthomyzidae	*Typhamyza bifasciata*			N	O.5wlveg
True fly	Asilidae	*Asilus crabroniformis*		2	N, BAP	O.10dung
True fly	Asilidae	*Laphria marginata*			N	POW.10dead
True fly	Asilidae	*Lasiopogon cinctus*			N	POW.10 Ldist
True fly	Aulacigastridae	*Aulacigaster leucopeza*			N	CW.10
True fly	Bombyliidae	*Bombylius discolor*			N	O.10juxt
True fly	Bombyliidae	*Phthiria pulicaria*			N	O.10juxt
True fly	Calliphoridae	*Angioneura cyrtoneurina*			VU	V.5
True fly	Calliphoridae	*Eggisops pecchiolii*			N	POW.10
True fly	Carniidae	*Meoneura minutissima*			N	X
True fly	Carniidae	*Meoneura triangularis*			N	X

True fly	Chamaemyiidae	*Chamaemyia elegans*			N	O.7
True fly	Chamaemyiidae	*Chamaemyia fasciata*			N	V.5
True fly	Chamaemyiidae	*Chamaemyia paludosa*			VU	O.5mdveg
True fly	Chamaemyiidae	*Parochthiphila spectabilis*			EN	O.5wlveg
True fly	Chloropidae	*Chlorops adjunctus*			N	X
True fly	Chloropidae	*Chlorops gracilis*			N	X
True fly	Chloropidae	*Chlorops planifrons*			N	O.5wlveg
True fly	Chloropidae	*Cryptonevra consimilis*			VU	O.5wlveg
True fly	Chloropidae	*Cryptonevra nigritarsis*			N	O.5wlveg
True fly	Chloropidae	*Dicraeus raptus*			N	POW.10wlveg
True fly	Chloropidae	*Dicraeus scibilis*			N	O.7wlveg
True fly	Chloropidae	*Dicraeus tibialis*			N	X
True fly	Chloropidae	*Dicraeus vallaris*			N	X
True fly	Chloropidae	*Elachiptera austriaca*			N	O.5wlveg
True fly	Chloropidae	*Lasiambia brevibucca*			N	CW.10
True fly	Chloropidae	*Lipara rufitarsis*			N	O.5wlveg
True fly	Chloropidae	*Lipara similis*	LR		VU, BAP	O.5wlveg
True fly	Chloropidae	*Melanochaeta capreolus*			N	CW.10
True fly	Chloropidae	*Meromyza pluriseta*			N	saltm
True fly	Chloropidae	*Oscinella angularis*			N	O.5wlveg
True fly	Chloropidae	*Oscinella angustipennis*			N	O.5mdveg
True fly	Chloropidae	*Oscinimorpha arcuata*			N	O.10
True fly	Chloropidae	*Oscinimorpha sordidissima*			N	X
True fly	Chloropidae	*Oscinisoma gilvipes*			N	O.6
True fly	Chloropidae	*Pseudopachychaeta approximatonervis*			N	X
True fly	Chloropidae	*Rhopalopterum crucicarinatum*			INSU	X
True fly	Chloropidae	*Siphonella oscinina*			N	CW.10
True fly	Chloropidae	*Speccafrons halophila*			N	O.5wlveg
True fly	Conopidae	*Leopoldius brevirostris*			VU	POW.10wlveg
True fly	Conopidae	*Leopoldius signatus*			N	PWP.10
True fly	Conopidae	*Myopa polystigma*	LR		R	O.10juxt
True fly	Conopidae	*Myopa strandi*			R	O.10juxt
True fly	Conopidae	*Zodion cinereum*			N	O.10juxt
True fly	Cylindrotomidae	*Diogma glabrata*			N	CW.8
True fly	Cylindrotomidae	*Phalacrocera replicata*			N	O.14detri
True fly	Ditomyiidae	*Ditomyia fasciata*			S:NS	CW.10fungi
True fly	Dixidae	*Dixella filicornis*			S:NS	O.4wlveg
True fly	Dolichopodidae	*Campsicnemus magius*			NT, BAP	O.6bgrnd
True fly	Dolichopodidae	*Cyturella albosetosa*	ER			O.5mdveg
True fly	Dolichopodidae	*Dolichopus cilifemoratus*			S:NS	O.7
True fly	Dolichopodidae	*Dolichopus lineatocornis*			NT	O.5bgrnd
True fly	Dolichopodidae	*Dolichopus notatus*			S:NS	O.7
True fly	Dolichopodidae	*Dolichopus plumitarsis*	ER		EN	O.7
True fly	Dolichopodidae	*Dolichopus signifer*			S:NS	O.7
True fly	Dolichopodidae	*Dolichopus strigipes*			S:NS	saltm
True fly	Dolichopodidae	*Hercostomus nigrilamellatus*			S:NS	X

True fly	Dolichopodidae	*Hercostomus nigrocoerulea*			N	X
True fly	Dolichopodidae	*Hercostomus plagiatus*			S:NS	V.5
True fly	Dolichopodidae	*Hydrophorus viridis*			NT	O.7
True fly	Dolichopodidae	*Medetera inspissata*			NT	T/SC.10
True fly	Dolichopodidae	*Melanostolus melancholicus*			S:NS	O.7
True fly	Dolichopodidae	*Ortochile nigrocoerulea*			VU	X
True fly	Dolichopodidae	*Rhaphium fractum*			S:NS	O.6
True fly	Dolichopodidae	*Syntormon filiger*			S:NS	saltm
True fly	Dolichopodidae	*Syntormon mikii*			NT	O.5mdveg
True fly	Dolichopodidae	*Systenus leucurus*			S:NS	T/SC.10vet
True fly	Dolichopodidae	*Thinophilus ruficornis*	LR		S:NS	saltm,upper
True fly	Dolichopodidae	*Thrypticus cuneatus*			NT	O.5mdveg
True fly	Dolichopodidae	*Thrypticus divisus*			S:NS	O.7mdveg
True fly	Dolichopodidae	*Thrypticus nigricauda*			S:NS	O.7mdveg
True fly	Dolichopodidae	*Thrypticus tarsalis*			S:NS	O.7mdveg
True fly	Drosophilidae	*Chymomyza costata*			N	CW.10dead
True fly	Drosophilidae	*Stegana coleoptrata*			N	CW.10dead
True fly	Empididae	*Hilara lugubris*			S:NS	V.5
True fly	Empididae	*Hilara pseudochorica*			S:NS	CW.6
True fly	Empididae	*Hilara quadriseta*			S:NS	V.5
True fly	Empididae	*Hilara recedens*			S:NS	O.7mdveg
True fly	Empididae	*Rhamphomyia albitarsis*			S:NS	X
True fly	Empididae	*Rhamphomyia caliginosa*			S:NS	V.5
True fly	Empididae	*Rhamphomyia lamellata*			S:NS	V.5
True fly	Empididae	*Rhamphomyia physoprocta*			NT	T/SC.5swrdm
True fly	Ephydridae	*Ochthera manicata*			R	O.6
True fly	Fanniidae	*Fannia gotlandica*			N	CW.10dead
True fly	Fanniidae	*Fannia metallipennis*			N	X
True fly	Fanniidae	*Fannia nigra*			N	V.carri
True fly	Fanniidae	*Fannia speciosa*			N	CW.10detri
True fly	Fanniidae	*Piezura graminicola*			INSU	CW.15detri,fungi
True fly	Heleomyzidae	*Suillia dumicola*			N	V.detri/fungi
True fly	Heleomyzidae	*Suillia oxyphora*			VU	CW.10fungi
True fly	Hybotidae	*Bicellaria mera*			S:NS	O.5mdveg
True fly	Hybotidae	*Platypalpus aurantiacus*			S:NS	T/SC.10detri
True fly	Hybotidae	*Platypalpus cryptospina*			S:NS	T/SC.10dead
True fly	Hybotidae	*Platypalpus excisus*			S:NS	X
True fly	Hybotidae	*Platypalpus infectus*			S:NS	X
True fly	Hybotidae	*Platypalpus ingenuus*			NT	V.5
True fly	Hybotidae	*Platypalpus niveiseta*			S:NS	X
True fly	Hybotidae	*Platypalpus pallidiseta*	ER		VU	PSS.5swrdm
True fly	Hybotidae	*Platypalpus praecinctus*			S:NS	PSS.5swrdm
True fly	Hybotidae	*Platypalpus rapidus*			S:NS	CW.10detri
True fly	Hybotidae	*Platypalpus stigma*			S:NS	T/SC.10detri
True fly	Hybotidae	*Symballophthalmus dissimilis*			S:NS	X
True fly	Hybotidae	*Tachydromia connexa*			VU	V.6/14

True fly	Hybotidae	*Tachydromia halterata*	1	EN	X
True fly	Hybotidae	*Tachypeza fuscipennis*		S:NS	T/SC.15
True fly	Keroplatidae	*Keroplatus testaceus*		S:NS	CW.10dead
True fly	Keroplatidae	*Macrocera fascipennis*		S:NS	PSS.5swrdm
True fly	Keroplatidae	*Macrocera maculata*		S:NS	POW.10
True fly	Keroplatidae	*Macrocera pusilla*		S:NS	X
True fly	Keroplatidae	*Orfelia bicolor*		DD	X
True fly	Keroplatidae	*Pyratula perpusilla*		S:NS	O.15
True fly	Keroplatidae	*Rutylapa ruficornis*		S:NS	O.5wlveg
True fly	Lauxaniidae	*Homoneura interstincta*		R	CW.10detri
True fly	Lauxaniidae	*Meiosimyza laeta*		R	CW.10detri
True fly	Lauxaniidae	*Sapromyza opaca*		N	X
True fly	Limoniidae	*Cheilotrichia imbuta*		N	O.6wlveg
True fly	Limoniidae	*Erioptera bivittata*		VU	O.6bgrnd
True fly	Limoniidae	*Erioptera meigeni*		R	CW.6
True fly	Limoniidae	*Erioptera meijerei*		VU	V.5
True fly	Limoniidae	*Gnophomyia viridipennis*		N	T/SC.5dead/detri
True fly	Limoniidae	*Gonomyia bifida*		N	CW.6
True fly	Limoniidae	*Helius pallirostris*		N	O.4wlveg
True fly	Limoniidae	*Limnophila pictipennis*		VU	O.14wlveg
True fly	Limoniidae	*Limnophila pulchella*		N	V.5detri/fungi
True fly	Limoniidae	*Limonia lucida*		N	T/SC.5swrdm
True fly	Limoniidae	*Limonia ventralis*		N	O.6juxt
True fly	Limoniidae	*Molophilus bihamatus*		N	T/SC.5dead/detri
True fly	Limoniidae	*Molophilus propinquus*		N	O.6bgrnd
True fly	Limoniidae	*Paradelphomyia nielseni*		N	CW.6
True fly	Limoniidae	*Phylidorea abdominalis*		N	O.5bgrnd
True fly	Limoniidae	*Pilaria meridiana*		N	CW.6
True fly	Limoniidae	*Pilaria scutellata*		N	O.5bgrnd, dist
True fly	Limoniidae	*Tasiocera collini*		EN	CW.8
True fly	Limoniidae	*Tasiocera robusta*		N	CW.8
True fly	Lonchaeidae	*Dasiops spatiosus*		N	X
True fly	Lonchaeidae	*Earomyia schistopyga*		N	CW.10detri
True fly	Lonchaeidae	*Lonchaea laxa*		N	CW.10dead
True fly	Lonchaeidae	*Lonchaea nitens*		N	X
True fly	Lonchaeidae	*Lonchaea palposa*		N	CW.10dead
True fly	Lonchaeidae	*Lonchaea peregrina*		N	CW.10dead
True fly	Lonchopteridae	*Lonchoptera scutellata*		S:NS	O.6detri
True fly	Megamerinidae	*Megamerina dolium*		N	CW.10dead
True fly	Milichiidae	*Madiza britannica*		VU	X
True fly	Milichiidae	*Madiza pachymera*		R	X
True fly	Muscidae	*Caricea falculata*		N	X
True fly	Muscidae	*Coenosia atra*		N	O.7
True fly	Muscidae	*Helina abdominalis*		N	CW.10detri
True fly	Muscidae	*Helina arctata*		N	CW.10detri
True fly	Muscidae	*Hydrotaea parva*		N	O.10dung

True fly	Muscidae	*Hydrotaea pilipes*			N	CW.10dung
True fly	Muscidae	*Lispe nana*			N	O.6
True fly	Muscidae	*Lispe uliginosa*			N	X
True fly	Muscidae	*Lispocephala falculata*			R	X
True fly	Muscidae	*Phaonia atriceps*			N	O.5wlveg
True fly	Muscidae	*Phaonia canescens*			R	CW.10dead
True fly	Muscidae	*Phaonia falleni*			N	X
True fly	Muscidae	*Phaonia nymphaearum*			VU	T/SC.10dead
True fly	Muscidae	*Phaonia scutellata*		1	EX	X
True fly	Muscidae	*Phaonia siebecki*			N	X
True fly	Muscidae	*Pyrellia rapax*			VU	O.7
True fly	Muscidae	*Spilogona litorea*			R	X
True fly	Muscidae	*Spilogona scutulata*			R	O.6
True fly	Mycetophilidae	*Allodia angulata*			S:NS	T/SC.5dead/detri
True fly	Mycetophilidae	*Allodia embla*			S:NS	V.5detri/fungi
True fly	Mycetophilidae	*Allodia neglecta*			S:NS	CW.10fungi
True fly	Mycetophilidae	*Allodia silvatica*			S:NS	CW.10fungi
True fly	Mycetophilidae	*Docosia pallipes*			S:NS	CW.10detri
True fly	Mycetophilidae	*Exechia lucidula*			NT	CW.8
True fly	Mycetophilidae	*Exechiopsis membranacea*			S:NS	CW.10fungi
True fly	Mycetophilidae	*Leia longiseta*			S:NS	V.5
True fly	Mycetophilidae	*Manota unifurcata*			NT	CW.10dead
True fly	Mycetophilidae	*Mycetophila confusa*			S:NS	V.5detri/fungi
True fly	Mycetophilidae	*Mycetophila deflexa*			DD	CW.8
True fly	Mycetophilidae	*Mycetophila uliginosa*			S:NS	CW.8
True fly	Mycetophilidae	*Palaeodocosia flava*			NT	CW.10detri
True fly	Mycetophilidae	*Pseudexechia parallela*			S:NS	O.5fungi
True fly	Mycetophilidae	*Rymosia britteni*			S:NS	V.5detri/fungi
True fly	Mycetophilidae	*Rymosia fosteri*			NT	V.5detri/fungi
True fly	Mycetophilidae	*Rymosia spinipes*			S:NS	CW.10fungi
True fly	Mycetophilidae	*Sceptonia tenuis*			S:NS	CW.10fungi
True fly	Mycetophilidae	*Sciophila antiqua*	1		NT	T/SC.15
True fly	Mycetophilidae	*Sciophila interrupta*			S:NS	CW.10fungi
True fly	Mycetophilidae	*Synplasta rufilatera*			S:NS	CW.10fungi
True fly	Mycetophilidae	*Trichonta fragilis*			S:NS	CW.8
True fly	Odiniidae	*Odinia hendeli*			VU	X
True fly	Odiniidae	*Odinia meijerei*			N	CW.10dead
True fly	Opomyzidae	*Geomyza apicalis*			N	O.15
True fly	Opomyzidae	*Geomyza hendeli*	PS		R	X
True fly	Opomyzidae	*Geomyza majuscula*			N	O.5mdveg
True fly	Opomyzidae	*Opomyza lineatopunctata*			N	O.5mdveg
True fly	Opomyzidae	*Opomyza punctata*			N	O.15
True fly	Periscelididae	*Periscelis annulata*			N	CW.10
True fly	Phoridae	*Phora bullata*			DD	T/SC.5swrdm
True fly	Phoridae	*Phora hamata*			DD	PSS.5swrdm
True fly	Phoridae	*Plectanocnema nudipes*			DD	CW.8

True fly	Pipunculidae	*Cephalops chlorionae*			S:NS	O.5wlveg
True fly	Pipunculidae	*Cephalops pannonicus*			S:NS	O.10wlveg
True fly	Pipunculidae	*Cephalops perspicuus*			NT	O.5mdveg
True fly	Pipunculidae	*Dorylomorpha clavifemora*			VU, BAP	O.5wlveg
True fly	Pipunculidae	*Eudorylas kowarzi*			NT	POW.7
True fly	Pipunculidae	*Eudorylas ruralis*		1	DD	POW.10wlveg
True fly	Pipunculidae	*Eudorylas zermattensis*			S:NS	O.10wlveg
True fly	Pipunculidae	*Pipunculus zugmayeriae*			S:NS	POW.10wlveg
True fly	Platypezidae	*Agathomyia collini*			VU	POW.10fungi
True fly	Platypezidae	*Agathomyia elegantula*			S:NS	CW.10fungi
True fly	Platypezidae	*Agathomyia wankowiczii*			S:NS	CW.10fungi
True fly	Platypezidae	*Seri obscuripennis*			NT	CW.10fungi
True fly	Psilidae	*Chyliza vittata*			N	CW.10detri
True fly	Rhagionidae	*Chrysopilus laetus*			EN	CW.10dead
True fly	Sarcophagidae	*Blaesoxipha plumicornis*			N	O.10wlveg
True fly	Sarcophagidae	*Macronychia polyodon*			R	X
True fly	Sarcophagidae	*Macronychia striginervis*			N	T/SC.10dead
True fly	Sarcophagidae	*Sarcophaga arcipes*			N	X
True fly	Sarcophagidae	*Sarcophila latifrons*			N	O.10
True fly	Scathophagidae	*Cordilura aemula*			R	O.5wlveg
True fly	Scathophagidae	*Gimnomera tarsea*			N	O.5mdveg
True fly	Scathophagidae	*Norellia spinipes*			N	V.10
True fly	Scenopinidae	*Scenopinus niger*			N	CW.10detri
True fly	Sciomyzidae	*Anticheta analis*			R	O.6
True fly	Sciomyzidae	*Anticheta brevipennis*			VU	O.6
True fly	Sciomyzidae	*Anticheta obliviosa*	ER		VU	X
True fly	Sciomyzidae	*Colobaea bifasciella*			N	PSS.14swrdm
True fly	Sciomyzidae	*Colobaea distincta*			N	PSS.14swrdm
True fly	Sciomyzidae	*Colobaea pectoralis*			VU	PSS.14swrdm
True fly	Sciomyzidae	*Colobaea punctata*			N	PSS.14swrdm
True fly	Sciomyzidae	*Dichetophora finlandica*			R	PSS.14swrdm
True fly	Sciomyzidae	*Ditaeniella grisescens*			N	O.14swrdm
True fly	Sciomyzidae	*Pelidnoptera nigripennis*			N	POW.7
True fly	Sciomyzidae	*Pherbellia argyra*			VU	O.14swrdm
True fly	Sciomyzidae	*Pherbellia brunnipes*			N	O.14swrdm
True fly	Sciomyzidae	*Pherbellia dorsata*			N	V.6/14
True fly	Sciomyzidae	*Pherbellia griseola*			N	V.6/14
True fly	Sciomyzidae	*Pherbellia nana*			N	V.6/14
True fly	Sciomyzidae	*Psacadina verbekei*			N	O.14swrdm
True fly	Sciomyzidae	*Psacadina vittigera*			VU	O.14swrdm
True fly	Sciomyzidae	*Pteromicra glabricula*			N	O.14swrdm
True fly	Sciomyzidae	*Pteromicra leucopeza*			VU	PSS.14swrdm
True fly	Sciomyzidae	*Pteromicra pectorosa*			VU	O.14swrdm
True fly	Sciomyzidae	*Sciomyza dryomyzina*			VU	O.14swrdm
True fly	Sciomyzidae	*Sciomyza simplex*			N	PSS.5swrdm
True fly	Sciomyzidae	*Tetanocera phyllophora*			N	T/SC.5swrdm

True fly	Sciomyzidae	*Tetanocera punctifrons*			N	O.7mdveg
True fly	Sepsidae	*Meroplius minutus*			R	O.5carri/dung
True fly	Sepsidae	*Sepsis nigripes*			R	O.7dung
True fly	Sepsidae	*Themira biloba*			INSU	O.6detri
True fly	Sepsidae	*Themira nigricornis*			R	O.5carri/dung
True fly	Spaniidae	*Ptiolina obscura*			N	CW.6
True fly	Spaniidae	*Spania nigra*			N	V.detri/fungi
True fly	Sphaeroceridae	*Lotobia pallidiventris*	SS			O.7dung
True fly	Stenomicridae	*Stenomicra cogani*			R	O.14mdveg
True fly	Stratiomyidae	*Beris clavipes*			N	O.5/8detri
True fly	Stratiomyidae	*Chorisops nagatomii*			N	V.5detri/fungi
True fly	Stratiomyidae	*Eupachygaster tarsalis*			N	T/SC.10vet
True fly	Stratiomyidae	*Neopachygaster meromelas*			N	T/SC.10dead
True fly	Stratiomyidae	*Odontomyia angulata*			EN	O.14swrdm
True fly	Stratiomyidae	*Odontomyia argentata*			VU	T/SC.5swrdm
True fly	Stratiomyidae	*Odontomyia ornata*			VU	O.14mdveg
True fly	Stratiomyidae	*Odontomyia tigrina*			N	O.14wlveg
True fly	Stratiomyidae	*Oxycera analis*			VU	V.6/14
True fly	Stratiomyidae	*Oxycera morrisii*			N	O.5bgrnd
True fly	Stratiomyidae	*Oxycera pygmaea*			N	O.6detri
True fly	Stratiomyidae	*Stratiomys chamaeleon*			EN	O.14swrdm
True fly	Stratiomyidae	*Stratiomys longicornis*			VU	saltm
True fly	Stratiomyidae	*Stratiomys potamida*			N	V.6/14
True fly	Stratiomyidae	*Stratiomys singularior*			N	O.14swrdm
True fly	Stratiomyidae	*Vanoyia tenuicornis*			N	PSS.5swrdm
True fly	Syrphidae	*Anasimyia interpuncta*			R	X
True fly	Syrphidae	*Brachyopa bicolor*			R	POW.10dead
True fly	Syrphidae	*Brachyopa insensilis*			N	T/SC.10
True fly	Syrphidae	*Callicera spinolae*			EN, BAP	PWP.10
True fly	Syrphidae	*Cheilosia barbata*			N	POW.10shveg
True fly	Syrphidae	*Cheilosia cynocephala*			N	O.10Ldist
True fly	Syrphidae	*Cheilosia nebulosa*			R	POW.7
True fly	Syrphidae	*Cheilosia soror*			N	e o-w
True fly	Syrphidae	*Criorhina asilica*			N	POW.10dead
True fly	Syrphidae	*Didea fasciata*			N	POW.10
True fly	Syrphidae	*Epistrophe diaphana*			N	POW.10
True fly	Syrphidae	*Lejogaster tarsata*			N	O.5swrdm
True fly	Syrphidae	*Mallota cimbiciformis*			N	T/SC.10vet
True fly	Syrphidae	*Melangyna barbifrons*			N	POW.10
True fly	Syrphidae	*Melanogaster aerosa*			N	O.14wlveg
True fly	Syrphidae	*Metasyrphus latilunulatus*			N	POW.10shveg
True fly	Syrphidae	*Myolepta dubia*			N	T/SC.15
True fly	Syrphidae	*Neoascia geniculata*			N	O.5wlveg
True fly	Syrphidae	*Neoascia interrupta*			N	O.5swrdm
True fly	Syrphidae	*Neocnemodon latitarsis*			N	POW.10wlveg
True fly	Syrphidae	*Neocnemodon pubescens*			N	POW.10

True fly	Syrphidae	*Orthonevra brevicornis*			N	O.6juxt
True fly	Syrphidae	*Orthonevra geniculata*			N	PSS.14swrdm
True fly	Syrphidae	*Pipizella virens*			N	O.10wlveg
True fly	Syrphidae	*Platycheirus sticticus*			N	POW.7
True fly	Syrphidae	*Triglyphus primus*			N	X
True fly	Syrphidae	*Volucella inanis*			N	PSS.10
True fly	Syrphidae	*Volucella inflata*			N	T/SC.10vet
True fly	Syrphidae	*Volucella zonaria*			N	T/SC.10
True fly	Syrphidae	*Xanthandrus comtus*			N	POW.10
True fly	Syrphidae	*Xylota abiens*			N	T/SC.5dead/detri
True fly	Syrphidae	*Xylota florum*			N	CW.8
True fly	Syrphidae	*Xylota xanthocnema*			N	T/SC.10vet
True fly	Tabanidae	*Haematopota bigoti*			R	saltm,upper
True fly	Tachinidae	*Bactromyia aurulenta*			R	POW.10
True fly	Tachinidae	*Belida angelicae*		1	EN	POW.10
True fly	Tachinidae	*Cistogaster globosa*			EN	O.10swrdm
True fly	Tachinidae	*Diplostichus janitrix*			R	PWP.10
True fly	Tachinidae	*Eloceria delecta*			N	CW.10detri
True fly	Tachinidae	*Mintho rufiventris*			N	V.detri/fungi
True fly	Tachinidae	*Peribaea setinervis*			N	POW.10
True fly	Tachinidae	*Rondania fasciata*			N	V.10
True fly	Tachinidae	*Subclytia rotundiventris*			R	V.10
True fly	Tachinidae	*Thecocarcelia acutangulata*			VU	O.10wlveg
True fly	Tachinidae	*Wagneria gagatea*			R	POW.10
True fly	Tachinidae	*Zophomyia temula*			N	X
True fly	Tanypezidae	*Tanypeza longimana*			VU	T/SC.5dead/detri
True fly	Tephritidae	*Acanthiophilus helianthi*			N	O.10wlveg
True fly	Tephritidae	*Acinia corniculata*	SS		EN	O.10wlveg
True fly	Tephritidae	*Dioxyna bidentis*			N	O.7mdveg
True fly	Tephritidae	*Euphranta toxoneura*			N	T/SC.5
True fly	Tephritidae	*Goniglossum wiedemanni*			N	POW.10
True fly	Tephritidae	*Icterica westermanni*			N	O.10Ldist
True fly	Tephritidae	*Myopites inulaedyssentericae*			R	O.10Ldist
True fly	Tephritidae	*Paroxyna absinthii*			N	O.10juxt
True fly	Tephritidae	*Urophora solstitialis*			R	O.10Ldist
True fly	Tephritidae	*Vidalia cornuta*			R	O.5bgrnd
True fly	Therevidae	*Thereva plebeja*			N	O.10bgrnd, shveg
True fly	Tipulidae	*Ctenophora pectinicornis*			N	CW.10dead
True fly	Tipulidae	*Limonia inusta*			N	CW.8
True fly	Tipulidae	*Nephrotoma crocata*			R	X
True fly	Tipulidae	*Prionocera subserricornis*			VU	PSS.14swrdm
True fly	Tipulidae	*Tipula helvola*			N	CW.10
True fly	Tipulidae	*Tipula holoptera*			N	O.5swrdm
True fly	Tipulidae	*Tipula livida*			N	POW.10
True fly	Tipulidae	*Tipula peliostigma*			N	CW.10detri
True fly	Tipulidae	*Tipula pseudovariipennis*			N	CW.10dead

True fly	Ulidiidae	*Herina oscillans*		R	O.15
True fly	Ulidiidae	*Homalocephala albitarsis*		EN	X
True fly	Ulidiidae	*Melieria cana*		N	X
True fly	Ulidiidae	*Melieria picta*		N	O.5/8detri
True fly	Ulidiidae	*Ulidia erythrophthalma*		R	O.10dung
Hymenoptera	Apidae	*Andrena alfkenella*		R	POS.10
Hymenoptera	Apidae	*Andrena marginata*		N:A	O.12juxt
Hymenoptera	Apidae	*Andrena minutuloides*		N:A	O.10juxt
Hymenoptera	Apidae	*Andrena niveata*		VU	O.10juxt
Hymenoptera	Apidae	*Andrena tarsata*		BAP	O.10juxt
Hymenoptera	Apidae	*Andrena tibialis*		N:A	POS.10
Hymenoptera	Apidae	*Andrena varians*		N:B	e o-w
Hymenoptera	Apidae	*Bombus distinguendus*	2	N:B, BAP	O.10swrdm
Hymenoptera	Apidae	*Bombus humilis*		BAP	O.10swrdm
Hymenoptera	Apidae	*Bombus muscorum*		BAP	O.10wlveg
Hymenoptera	Apidae	*Bombus ruderarius*		BAP	O.10swrdm
Hymenoptera	Apidae	*Bombus ruderatus*		N:B, BAP	O.10swrdm
Hymenoptera	Apidae	*Bombus rupestris*		N:B	O.10swrdm
Hymenoptera	Apidae	*Bombus subterraneus*	1	N:A, BAP	O.10swrdm
Hymenoptera	Apidae	*Bombus sylvarum*		N:B, BAP	POS.10
Hymenoptera	Apidae	*Colletes halophilus*		N:A, BAP	O.10juxt
Hymenoptera	Apidae	*Dasypoda hirtipes*		N:B	O.10juxt
Hymenoptera	Apidae	*Halictus confusus*		R	O.10juxt
Hymenoptera	Apidae	*Hylaeus cornutus*		N:A	POS.10
Hymenoptera	Apidae	*Hylaeus pictipes*		N:A	POS.10
Hymenoptera	Apidae	*Hylaeus signatus*		N:B	POS.10
Hymenoptera	Apidae	*Hylaeus spilotus*		R	O.10juxt
Hymenoptera	Apidae	*Lasioglossum brevicorne*		R	O.10juxt
Hymenoptera	Apidae	*Lasioglossum leucopus*		R	X
Hymenoptera	Apidae	*Lasioglossum malachurum*		N:B	O.10juxt
Hymenoptera	Apidae	*Lasioglossum puncticolle*		N:B	O.10juxt
Hymenoptera	Apidae	*Lasioglossum xanthopus*		N:B	O.10swrdm
Hymenoptera	Apidae	*Macropis europaea*		N:A	e moist
Hymenoptera	Apidae	*Megachile dorsalis*		N:B	X
Hymenoptera	Apidae	*Nomada armata*		EN, BAP	O.12juxt
Hymenoptera	Apidae	*Nomada ferruginata*		EN	e o-w
Hymenoptera	Apidae	*Nomada fucata*		N:A	O.10juxt
Hymenoptera	Apidae	*Nomada fulvicornis*		R	POS.10
Hymenoptera	Apidae	*Nomada lathburiana*		R	POS.10
Hymenoptera	Apidae	*Nomada roberjeotiana*		R	O.10juxt
Hymenoptera	Apidae	*Osmia bicolor*		N:B	e o-w
Hymenoptera	Apidae	*Osmia pilicornis*		N:A	POW.10shveg
Hymenoptera	Apidae	*Sphecodes crassus*		N:B	O.10juxt

Hymenoptera	Apidae	*Sphecodes niger*		R	O.10juxt
Hymenoptera	Apidae	*Sphecodes reticulatus*		N:A	O.10juxt
Hymenoptera	Apidae	*Sphecodes rubicundus*		N:A	O.10juxt
Hymenoptera	Apidae	*Stelis phaeoptera*		VU	e o-w
Hymenoptera	Chrysididae	*Chrysis fulgida*		EN, BAP	e o-w
Hymenoptera	Chrysididae	*Chrysura radians*		N:A	e o-w
Hymenoptera	Chrysididae	*Cleptes semiauratus*		N:B	PSS.10
Hymenoptera	Chrysididae	*Hedychridium cupreum*		N:B	O.10juxt
Hymenoptera	Chrysididae	*Hedychrum niemelai*		R	O.10juxt
Hymenoptera	Chrysididae	*Omalus puncticollis*		N:A	POW.10dead
Hymenoptera	Chrysididae	*Pseudomalus violaceus*		N:B	e o-w
Hymenoptera	Crabronidae	*Argogorytes fargeii*		N:A	O.10juxt
Hymenoptera	Crabronidae	*Cerceris quinquefasciata*		R, BAP	POS.10
Hymenoptera	Crabronidae	*Crabro scutellatus*		N:A	e moist
Hymenoptera	Crabronidae	*Crossocerus binotatus*		N:B	e o-w
Hymenoptera	Crabronidae	*Crossocerus distinguendus*		N:A	POS.10
Hymenoptera	Crabronidae	*Crossocerus palmipes*		N:B	POS.10
Hymenoptera	Crabronidae	*Crossocerus vagabundus*		EN	e o-w
Hymenoptera	Crabronidae	*Crossocerus walkeri*		N:B	POW.7
Hymenoptera	Crabronidae	*Didineis lunicornis*		N:A	X
Hymenoptera	Crabronidae	*Ectemnius ruficornis*		N:B	e o-w
Hymenoptera	Crabronidae	*Ectemnius sexcinctus*		N:B	POW.10wlveg
Hymenoptera	Crabronidae	*Gorytes laticinctus*		R	POS.10
Hymenoptera	Crabronidae	*Mimumesa littoralis*		R, N:A	X
Hymenoptera	Crabronidae	*Mimumesa spooneri*		R	e moist
Hymenoptera	Crabronidae	*Nysson dimidiatus*		N:B	O.10bgrnd, shveg
Hymenoptera	Crabronidae	*Nysson trimaculatus*		N:B	POS.10
Hymenoptera	Crabronidae	*Oxybelus argentatus*		N:A	O.10juxt
Hymenoptera	Crabronidae	*Oxybelus mandibularis*		N:A	O.10juxt
Hymenoptera	Crabronidae	*Passaloecus clypealis*		R	O.5wlveg
Hymenoptera	Crabronidae	*Pemphredon morio*		N:B	POW.10dead
Hymenoptera	Crabronidae	*Philanthus triangulum*		VU	O.10juxt
Hymenoptera	Crabronidae	*Rhopalum gracile*		VU	O.5wlveg
Hymenoptera	Formicidae	*Lasius brunneus*		N:A	T/SC.10vet
Hymenoptera	Mutillidae	*Mutilla europaea*		N:B	POS.10
Hymenoptera	Pompilidae	*Anoplius caviventris*		N:B	PSS.5wlveg
Hymenoptera	Pompilidae	*Arachnospila consobrina*		R	O.10juxt
Hymenoptera	Pompilidae	*Arachnospila minutula*		N:B	O.10juxt
Hymenoptera	Pompilidae	*Dipogon bifasciatus*		R	POW.10wlveg
Hymenoptera	Pompilidae	*Evagetes dubius*		N:B	O.10bgrnd, shveg
Hymenoptera	Pompilidae	*Priocnemis agilis*		N:B	O.10swrdm
Hymenoptera	Pompilidae	*Priocnemis cordivalvata*		N:B	POW.10wlveg
Hymenoptera	Pompilidae	*Priocnemis gracilis*		N:B	O.10swrdm
Hymenoptera	Pompilidae	*Priocnemis hyalinata*		N:B	POS.10
Hymenoptera	Sapygidae	*Monosapyga clavicornis*		N:B	e o-w

Hymenoptera	Sphecidae	*Podalonia affinis*		R	O.10juxt
Hymenoptera	Tiphiidae	*Tiphia minuta*		N:B	O.10dung
Hymenoptera	Vespidae	*Dolichovespula media*		N:A	PWP.10
Hymenoptera	Vespidae	*Dolichovespula saxonica*		INSU	T/SC.10dead
Hymenoptera	Vespidae	*Microdynerus exilis*		N:B	e o-w
Hymenoptera	Vespidae	*Odynerus melanocephalus*		N:A, BAP	POS.10
Hymenoptera	Vespidae	*Symmorphus connexus*		R	POW.10wlveg
Hymenoptera	Vespidae	*Symmorphus crassicornis*		R	e o-w
Fish	Acipenseridae	*Acipenser sturio*		G:CR, BAP	X
Fish	Anguillidae	*Anguilla anguilla*		G:CR, BAP	X
Fish	Cobitidae	*Cobitis taenia*		BAP	X
Fish	Lotidae	*Lota lota*	1	BAP	X
Fish	Osmeridae	*Osmerus eperlanus*		BAP	X
Fish	Petromyzontidae	*Lampetra fluviatilis*		BAP	X
Fish	Rajidae	*Raja clavata*		G:NT	X
Fish	Salmonidae	*Salmo salar*		BAP	X
Fish	Salmonidae	*Salmo trutta*		BAP	X
Herptile	Anguidae	*Anguis fragilis*		BAP	X
Herptile	Bufonidae	*Bufo bufo*		BAP	X
Herptile	Colubridae	*Natrix natrix*		BAP	X
Herptile	Lacertidae	*Zootoca vivipara*		BAP	X
Herptile	Salamandridae	*Triturus cristatus*		BAP	X
Herptile	Viperidae	*Vipera berus*		BAP	X
Bird	Accipitridae	*Circus aeruginosus*		B:A	X
Bird	Accipitridae	*Circus cyaneus*		B:R	X
Bird	Accipitridae	*Circus pygargus*		B:A	X
Bird	Accipitridae	*Haliaeetus albicilla*	1	B:R	X
Bird	Accipitridae	*Milvus milvus*		G:NT, B:A	X
Bird	Accipitridae	*Pernis apivorus*		B:A	X
Bird	Alaudidae	*Alauda arvensis*		B:R	X
Bird	Alaudidae	*Eremophila alpestris*		B:A	X
Bird	Alaudidae	*Lullula arborea*		B:A, BAP	X
Bird	Alcedinidae	*Alcedo atthis*		B:A	X
Bird	Alcidae	*Alca torda*		B:A	X
Bird	Alcidae	*Fratercula arctica*		B:A	X
Bird	Alcidae	*Uria aalge*		B:A	X
Bird	Anatidae	*Anas acuta*		B:A	X
Bird	Anatidae	*Anas americana*		B:A	X
Bird	Anatidae	*Anas clypeata*		B:A	X
Bird	Anatidae	*Anas crecca*		B:A	X
Bird	Anatidae	*Anas platyrhynchos*		B:A	X
Bird	Anatidae	*Anas querquedula*		B:A	X
Bird	Anatidae	*Anas strepera*		B:A	X

Bird	Anatidae	*Anser albifrons subsp. albifrons*		B:R, BAP	X
Bird	Anatidae	*Anser albifrons subsp. flavirostris*		B:R, BAP	X
Bird	Anatidae	*Anser anser*		B:A	X
Bird	Anatidae	*Anser brachyrhynchus*		B:A	X
Bird	Anatidae	*Anser fabalis*		B:A	X
Bird	Anatidae	*Anser fabalis subsp. fabalis*		B:R	X
Bird	Anatidae	*Aythya ferina*		B:A	X
Bird	Anatidae	*Aythya fuligula*		B:A	X
Bird	Anatidae	*Aythya marila*		B:R, BAP	X
Bird	Anatidae	*Branta bernicla*		B:A	X
Bird	Anatidae	*Branta bernicla subsp. bernicla*		B:R, BAP	X
Bird	Anatidae	*Branta leucopsis*		B:A	X
Bird	Anatidae	*Bucephala clangula*		B:A	X
Bird	Anatidae	*Cygnus columbianus*		B:A	X
Bird	Anatidae	*Cygnus columbianus subsp. bewickii*		BAP	X
Bird	Anatidae	*Cygnus cygnus*		B:A	X
Bird	Anatidae	*Melanitta fusca*		B:A	X
Bird	Anatidae	*Melanitta nigra*		B:R, BAP	X
Bird	Anatidae	*Mergellus albellus*		B:A	X
Bird	Anatidae	*Somateria mollissima*		B:A	X
Bird	Anatidae	*Tadorna ferruginea*		B:A	X
Bird	Apodidae	*Apus apus*		B:A	X
Bird	Ardeidae	*Botaurus stellaris*		B:R, BAP	X
Bird	Ardeidae	*Egretta garzetta*		B:A	X
Bird	Burhinidae	*Burhinus oedicnemus*		B:A, BAP	X
Bird	Caprimulgidae	*Caprimulgus europaeus*		B:R, BAP	X
Bird	Charadriidae	*Charadrius dubius*		B:A	X
Bird	Charadriidae	*Charadrius morinellus*		B:A	X
Bird	Charadriidae	*Pluvialis apricaria*		B:A	X
Bird	Charadriidae	*Pluvialis squatarola*		B:A	X
Bird	Charadriidae	*Vanellus vanellus*		B:R, BAP	X
Bird	Columbidae	*Columba oenas*		B:A	X
Bird	Columbidae	*Streptopelia turtur*		B:R, BAP	X
Bird	Cuculidae	*Cuculus canorus*		B:R, BAP	X
Bird	Emberizidae	*Calcarius lapponicus*		B:A	X
Bird	Emberizidae	*Emberiza calandra*		B:R	X
Bird	Emberizidae	*Emberiza cirlus*		B:R	X
Bird	Emberizidae	*Emberiza citrinella*		B:R, BAP	X

Bird	Emberizidae	*Emberiza schoeniclus*		B:A, BAP	X
Bird	Emberizidae	*Plectrophenax nivalis*		B:A	X
Bird	Falconidae	*Falco columbarius*		B:A	X
Bird	Falconidae	*Falco tinnunculus*		B:A	X
Bird	Fringillidae	*Carduelis cabaret*		B:R, BAP	X
Bird	Fringillidae	*Carduelis cannabina*		B:R	X
Bird	Fringillidae	*Carduelis flavirostris*		B:R	X
Bird	Fringillidae	*Coccothraustes coccothraustes*		B:R, BAP	X
Bird	Fringillidae	*Loxia pytyopsittacus*		B:A	X
Bird	Fringillidae	*Pyrrhula pyrrhula*		B:A	X
Bird	Fringillidae	*Serinus serinus*		B:A	X
Bird	Gaviidae	*Gavia arctica*		B:A, BAP	X
Bird	Gaviidae	*Gavia stellata*		B:A	X
Bird	Gruidae	*Grus grus*		B:A	X
Bird	Haematopodidae	*Haematopus ostralegus*		B:A	X
Bird	Hirundinidae	*Delichon urbicum*		B:A	X
Bird	Hirundinidae	*Hirundo rustica*		B:A	X
Bird	Hirundinidae	*Riparia riparia*		B:A	X
Bird	Laniidae	*Lanius collurio*	1	B:R, BAP	X
Bird	Laridae	*Larus argentatus*		B:R	X
Bird	Laridae	*Larus canus*		B:A	X
Bird	Laridae	*Larus fuscus*		B:A	X
Bird	Laridae	*Larus glaucoides*		B:A	X
Bird	Laridae	*Larus hyperboreus*		B:A	X
Bird	Laridae	*Larus marinus*		B:A	X
Bird	Laridae	*Larus melanocephalus*		B:A	X
Bird	Laridae	*Larus michahellis*		B:A	X
Bird	Laridae	*Larus minutus*		B:A	X
Bird	Laridae	*Larus ridibundus*		B:A	X
Bird	Laridae	*Rissa tridactyla*		B:A	X
Bird	Motacillidae	*Anthus pratensis*		B:A	X
Bird	Motacillidae	*Anthus spinoletta*		B:A	X
Bird	Motacillidae	*Anthus trivialis*		B:R, BAP	X
Bird	Motacillidae	*Motacilla cinerea*		B:A	X
Bird	Motacillidae	*Motacilla flava*		B:R	X
Bird	Motacillidae	*Motacilla flava subsp. flavissima*		BAP	X
Bird	Muscicapidae	*Ficedula hypoleuca*		B:A	X
Bird	Muscicapidae	*Muscicapa striata*		B:R, BAP	X
Bird	Oriolidae	*Oriolus oriolus*		B:R	X
Bird	Pandionidae	*Pandion haliaetus*		B:A	X
Bird	Paridae	*Poecile montanus*		B:R	X

Bird	Paridae	*Poecile palustris*			B:R	X
Bird	Passeridae	*Passer domesticus*			B:R, BAP	X
Bird	Passeridae	*Passer montanus*			B:R, BAP	X
Bird	Phalacrocoracidae	*Phalacrocorax aristotelis*			B:A	X
Bird	Phasianidae	*Coturnix coturnix*			B:A	X
Bird	Phasianidae	*Perdix perdix*			B:R, BAP	X
Bird	Picidae	*Dendrocopos minor*			B:R	X
Bird	Picidae	*Jynx torquilla*		1	B:R, BAP	X
Bird	Picidae	*Picus viridis*			B:A	X
Bird	Podicipedidae	*Podiceps auritus*			B:A	X
Bird	Podicipedidae	*Podiceps grisegena*			B:A	X
Bird	Podicipedidae	*Podiceps nigricollis*			B:A	X
Bird	Podicipedidae	*Tachybaptus ruficollis*			B:A	X
Bird	Procellariidae	*Fulmarus glacialis*			B:A	X
Bird	Procellariidae	*Puffinus puffinus*			B:A	X
Bird	Prunellidae	*Prunella modularis*			B:A	X
Bird	Rallidae	*Crex crex*		1	B:R, BAP	X
Bird	Rallidae	*Porzana porzana*			B:A	X
Bird	Recurvirostridae	*Recurvirostra avosetta*			B:A	X
Bird	Scolopacidae	*Actitis hypoleucos*			B:A	X
Bird	Scolopacidae	*Arenaria interpres*			B:A	X
Bird	Scolopacidae	*Calidris alpina*			B:R	X
Bird	Scolopacidae	*Calidris canutus*			B:A	X
Bird	Scolopacidae	*Calidris maritima*			B:A	X
Bird	Scolopacidae	*Calidris temminckii*			B:R	X
Bird	Scolopacidae	*Gallinago gallinago*			B:A	X
Bird	Scolopacidae	*Limosa lapponica*			B:A	X
Bird	Scolopacidae	*Limosa limosa*			G:NT, B:R	X
Bird	Scolopacidae	*Limosa limosa subsp. limosa*			BAP	X
Bird	Scolopacidae	*Lymnocryptes minimus*			B:A	X
Bird	Scolopacidae	*Numenius arquata*			G:NT, B:A, BAP	X
Bird	Scolopacidae	*Numenius phaeopus*			B:R	X
Bird	Scolopacidae	*Phalaropus lobatus*			B:R, BAP	X
Bird	Scolopacidae	*Philomachus pugnax*			B:R	X
Bird	Scolopacidae	*Scolopax rusticola*			B:A	X
Bird	Scolopacidae	*Tringa erythropus*			B:A	X
Bird	Scolopacidae	*Tringa glareola*			B:A	X
Bird	Scolopacidae	*Tringa ochropus*			B:A	X
Bird	Scolopacidae	*Tringa totanus*			B:A	X
Bird	Stercorariidae	*Stercorarius parasiticus*			B:R, BAP	X

Bird	Stercorariidae	*Stercorarius skua*			B:A	X
Bird	Sternidae	*Chlidonias niger*		1	B:A	X
Bird	Sternidae	*Sterna dougallii*			B:R, BAP	X
Bird	Sternidae	*Sterna hirundo*			B:A	X
Bird	Sternidae	*Sterna paradisaea*			B:A	X
Bird	Sternidae	*Sterna sandvicensis*			B:A	X
Bird	Sternidae	*Sternula albifrons*			B:A	X
Bird	Strigidae	*Asio flammeus*			B:A	X
Bird	Sturnidae	*Sturnus vulgaris*			B:R	X
Bird	Sulidae	*Morus bassanus*			B:A	X
Bird	Sylviidae	*Locustella luscinioides*			B:R, BAP	X
Bird	Sylviidae	*Locustella naevia*			B:R, BAP	X
Bird	Sylviidae	*Phylloscopus sibilatrix*			B:R, BAP	X
Bird	Sylviidae	*Phylloscopus trochilus*			B:A	X
Bird	Sylviidae	*Regulus ignicapilla*			B:A	X
Bird	Sylviidae	*Sylvia communis*			B:A	X
Bird	Threskiornithidae	*Platalea leucorodia*			B:A	X
Bird	Timaliidae	*Panurus biarmicus*			B:A	X
Bird	Turdidae	*Luscinia megarhynchos*			B:A	X
Bird	Turdidae	*Oenanthe oenanthe*			B:A	X
Bird	Turdidae	*Phoenicurus ochruros*			B:A	X
Bird	Turdidae	*Phoenicurus phoenicurus*			B:A	X
Bird	Turdidae	*Saxicola rubetra*			B:A	X
Bird	Turdidae	*Turdus iliacus*			B:R	X
Bird	Turdidae	*Turdus philomelos*			B:R	X
Bird	Turdidae	*Turdus pilaris*			B:R	X
Bird	Turdidae	*Turdus torquatus*			B:R, BAP	X
Bird	Turdidae	*Turdus viscivorus*			B:A	X
Bird	Tytonidae	*Tyto alba*			B:A	X
Marine mammal	Phocidae	*Phoca vitulina*			BAP	X
Marine mammal	Phocoenidae	*Phocoena phocoena*			BAP	X
Terrestrial mammal	Erinaceidae	*Erinaceus europaeus*			BAP	X
Terrestrial mammal	Leporidae	*Lepus europaeus*			BAP	X
Terrestrial mammal	Muridae	*Micromys minutus*			BAP	X
Terrestrial mammal	Mustelidae	*Lutra lutra*			G:NT, BAP	X
terrestrial mammal	Vespertilionidae	*Barbastella barbastellus*			G:NT, BAP	X
Terrestrial mammal	Vespertilionidae	*Nyctalus noctula*			BAP	X
Terrestrial	Vespertilionidae	*Pipistrellus pygmaeus*			BAP	X

mammal						
Terrestrial mammal	Vespertilionidae	*Plecotus auritus*			BAP	X