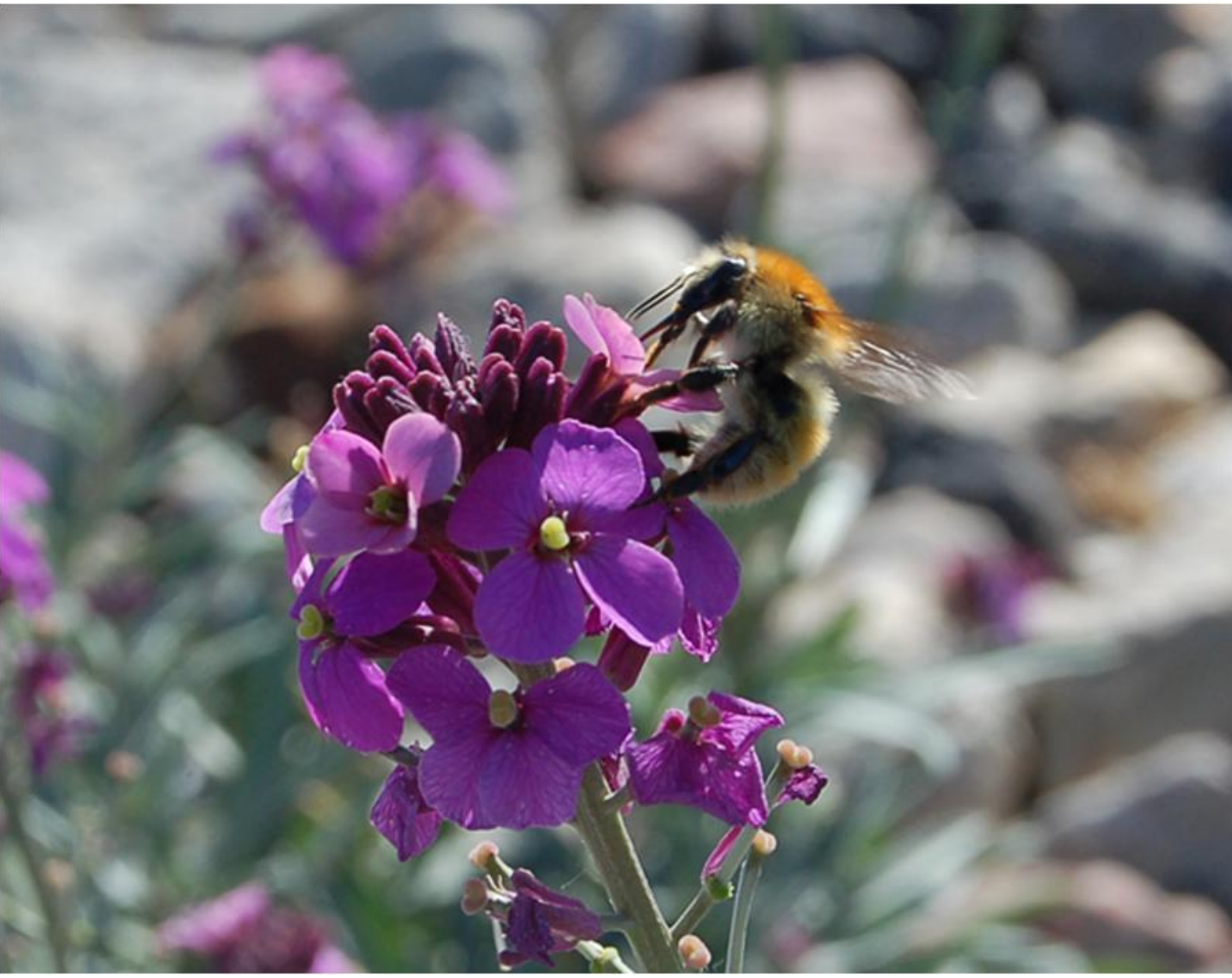
Barking Riverside ISIS Invertebrate Assemblage Analysis



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Cover photo: *Bombus humilis* on flower at Barking Riverside, August 2010 © Stuart Connop

1. Introduction

In the UK, the Thames Gateway, Greater London, has been designated a national priority for urban regeneration and sustainable development. The area is, however, also recognised under Natural England's Natural Area designations for its distinctive and unique nature conservation value in terms of wildlife and natural features. In addition to statutory designation, the value of brownfield (post-industrial) sites in the area is being increasingly recognised.

A series of post-industrial sites have been found to support nationally significant populations of numerous UK Biodiversity Action Plan (UKBAP) and Red Data Book (RDB) invertebrates (Jones 2007; Harvey 2007). These brownfield sites are under greatest pressure from Thames Gateway development (Harvey 2000). For development in the region to be environmentally sustainable, nationally important invertebrate populations in the region must be protected through the landscape-scale conservation of suitable habitat. One step towards achieving this aim is the innovative incorporation of green infrastructure into new and existing developments.

The Barking Riverside regeneration of a substantial brownfield site in the heart of the Thames Gateway (Barking Riverside 2009) aims to become a sustainable community. As such there is a need to incorporate ecological interest within residential and recreational infrastructure. Natural England's commitment to conserve the region's distinctive and unique wildlife and natural features requires that the region's unique invertebrate assemblages, and more specifically, the habitat features of interest supporting these populations, must be incorporated when planning landscape design. In order to sustainably conserve these invertebrate populations, these habitat features must be incorporated into green infrastructure on a landscape scale (Usher 1997, Bourn and Thomas 2002; Gilpin 1987, Opdam 1990, Reed 2004).

As part of the Barking Riverside development planning process, ecological surveys were carried out on the site prior to initiation of building works (Barking Riverside 2004). These ecological surveys included invertebrate surveys throughout a range of habitat types across the site and recorded a number of species of national conservation importance. In order to conserve these species during site development and, eventually within the Barking Riverside community, it is vital that habitat interest features supporting these species are identified and incorporated into landscape management across the site.

This report attempts to identify and characterise these habitat interest features in order to inform landscape design of Barking Riverside greenspace.

2. Methods

ISIS invertebrate assemblage assessment programme was used to analyse the invertebrate survey species lists generated in the original EIS ecological report (Barking Riverside (2004). ISIS is a spreadsheet-based application currently being developed by Natural England for the identification and scoring of invertebrate assemblage types (Drake *et al*. 2007). With this application it is possible to analyse species lists collected at a range of different scales and score them according to conservation value. It is therefore possible to characterise regional invertebrate interest. Methods used for analysis are discussed here briefly, but can be studied in more depth in ISIS development reports (Drake *et al*. 2007; Lott 2007; Lott *et al*. 2007a; Lott *et al*. 2007b; Lott 2009).

ISIS characterises invertebrate species lists in terms of particular habitat preferences displayed by the individual species in each list. It assigns the species into assemblages at two levels based on their conservation value and fidelity to particular habitat features. The two levels recognised in the classification are:

i) **Broad Assemblage Types** (BATs) – these represent a range of broader habitat types (e.g. W53: salt marsh estuary and mudflat) characterised by species which display marked fidelity to this broad habitat but not necessarily to the more tightly defined Specific Assemblage Types (SATs – see below) (Lott 2007).

ii) **Specific Assemblage Types** (SATs) – these assemblages are characterised by ecologically restricted species that are faithful to this one habitat type, and which are also generally only found on sites with conservation value (Lott 2007).

Complete lists of the assemblage types and associated habitat features are described in reports by Lott *et al*. (2007a; 2007b).

ISIS was created by defining assemblages based on suites of species occurring together and labelled according to their favoured habitat (Drake *et al*. 2007). Assemblage species compositions were determined by a consultation exercise comprising: a series of standardised sampling exercises; analysis of data generated by 'Detrended correspondence analysis' (DECORANA) (Hill 1979); analysis of similarity (PISCES Conservation 2003); and discussion with experts to identify assemblage types that are of intrinsic value for nature conservation. This rigorous data analysis was carried out to ensure that designated aggregations reflect real variations in nature (Drake *et al*. 2007).

ISIS recognises assemblage types and assigns scores for representation and conservation value. Whilst BATs are a measure of widespread species, SATs are designed to have

intrinsic value for nature conservation by being based on stenotopic species which are more or less restricted (faithful) to each assemblage type. For this reason, SATs were of particular value for the purposes of the present study. Thus by analysing the species list for Barking Riverside using ISIS, it was possible to identify assemblages of nature conservation value on the sites and then attempt to link the occurrence of these assemblages with particular habitat features.

ISIS also calculates a “percentage of national species pool” score for SATs. This is a proportional calculation of the number of species recorded from a particular SAT compared to the total number of species coded to the particular SAT nationally. This value in itself can be used as an indicator of conservation value and for setting invertebrate conservation objectives. High values obtained for “percentage of national species pool” are therefore particularly indicative of conservation value. A score of over 10% for most wetland SATs and over 6% for most non-wetland SATs indicates that it is of national significance (Lott 2007).

The SATs identified for Barking Riverside were identified and are presented in the results section. Identified SATs which meet the Natural England threshold for assemblages of national conservation significance are highlighted. This report attempts to identify and characterise these habitat interest features in order to inform landscape design and management.

3. Results

In total, 470 species of invertebrate were recorded at Barking Riverside (Appendix 1). Of these, 417 species were recognised within the ISIS programme and 53 were not. Not all UK invertebrate species are included within the database. Whilst the majority of groups have been assessed and included in the ISIS development process, for some groups (such as micromoths) assessment of assemblage designation has yet to be carried out. When attempts are made to analyse such species in ISIS, the species is designated with an error flag. It is therefore possible that some species of conservation priority in site species lists might be error-flagged if they have not been assigned to appropriate assemblages. In such cases, individual analysis of status and ecological requirements needs to be carried out.

Other reasons that ISIS gives an error flag as an analysis output include:

- taxonomic changes in species nomenclature;
- spelling errors in species names;
- formatting errors in text.

Whenever an error flag was obtained as a species analysis output in this present study, the reason behind it was investigated and the issue corrected (as far as possible). Consequently the only (or at least major) reason for the occurrence of error flags within the analysis of the present study should be that the species is yet to be formally included in the ISIS application.

Of the species not recognised by the ISIS programme, only 5 are considered to be national or regional conservation priority species. These were:

- *Gymnosoma nitens (*Diptera, Tachinidae) – RDB1. Parasite of the Nationally Scarce ground-dwelling shieldbug *Sciocoris cursitans*. This species is especially, but not exclusively, associated with chalk grassland and calcareous sand, and is always found on unshaded, well-drained and friable soils with a rather open vegetation structure and usually with a component of bare ground. Though believed to be phytophagous, there appear to be no certainly identified food plants, and it may be polyphagous (Essex Field Club 2011).
- *Calamotropha paludella* (Lepidoptera, Micromoth) – Nb. Scarce and locally distributed in marshes, fens and other wet habitats in south and south-east England. The slender larva mines the leaves, stems and upper rootstock of bulrush (*Typha* spp.) from September to May, pupating there in June and July (UK Moths 2011).
- *Ostrinia nubilalis* (Lepidoptera, Micromoth) – Local. The single generation flies in June and July, and the main food plant in Britain is mugwort (*Artemisia vulgaris*). Abroad it is often a pest on maize crops (UK Moths 2011).
- *Pyrausta aurata (*Lepidoptera, Micromoth) – Local. Larvae feed on mints, including spearmint (*Mentha spicata*) and Apple mint (*Mentha rotundifolia*), marjoram (*Origanum vulgare*), Meadow-clary (*Salvia pratensis*), Lemon balm (*Melissa officinalis*), catmint (*Nepeta cataria*) and calamints (*Calamintha spp*). Locally common in England, Wales and southern Scotland, both larvae and adults occurring in gardens as well as wild habitats with the food plants (UK Moths 2011).
- *Sitochroa verticalis* (Lepidoptera: micromoth) – Local. The adults fly in June and July over grassy areas and are attracted to light, but are readily disturbed by day. The larva feeds on a number of plants such as creeping thistle (*Cirsium arvense*), broom (*Sarothamnus*) and goosefoot (*Atriplex*) (UK Moths 2011).

From the Barking Riverside species recognised by the ISIS programme 10 SATs and 9 BATs were identified. The SATs identified are represented in Table 1. The BATs identified are represented in Table 2.

Table 1. SATs identified from Barking Riverside invertebrate survey data.

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Threshold values
F002	rich flower resource	33	fav	14	14
W314	reedfen and pools	8		7	10
F112	open short sward	12		6	12
F111	bare sand & chalk	11		3	18
W126	seepage	1		2	5
F001	scrub edge	3		2	10
F003	scrub-heath & moorland	4		1	8
F006	dung	1		1	10
A211	heartwood decay	1		1	6
A212	bark & sapwood decay	2		0	19

Table 2. BATs identified from Barking Riverside invertebrate survey data.

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	Threshold values
F2	grassland & scrub matrix	40	136		166	160
F1	unshaded early successional mosaic	19	186	fav	80	160
W3	permanent wet mire	10	212	fav	41	180
W2	mineral marsh & open water	5	175	fav	20	150
A1	arboreal canopy	4			15	170
F3	shaded field & ground layer	1			6	150
W1	flowing water	1			6	150
A2	wood decay	1			5	190
M3	saltmarsh, estuary & mud flat	1			4	200

In terms of species rarity, two species were found to be of the highest rarity category (16), one was of the second highest (8), twenty-five were of the next highest (4), 103 were of the next highest (2), 279 were of the next highest (1) and seven were in the most common category (0). Table 3 provides an indication of the national conservation status corresponding to each rarity value.

Table 3. List of ISIS rarity scores and corresponding national status designations.

Score	Corresponding national status
16	Extinct; Presumed extinct; Ireland Only; RDB1; RDB2; pRDB1; pRDB2
8	RDB3; pRDB3; RDBI
4	RDBK; pRDBK; RDB4 (out of danger); RDB5 (endemic); Na; Notable/Nb(endemic)
2	Local, Nr

4. Discussion

In order to inform landscape design, conservation, creation and management, it is important to identify the habitat interest features characterising each of these SATs and BATs. The following is a description of the habitat interest features characterising each of the SATs and BATs identified within the study. Those SATs scoring above the threshold for national significance (a score of over 10% for most wetland SATs and over 6% for most non-wetland SATs) and those BATs which received 'favourable' in relation to their national conservation status are listed first. Descriptions are based on summaries produced by Drake *et al*. (2007) and Lott *et al*. (2007a & b).

4.1 Favourable status SAT habitat descriptions:

- **Flower-rich resource (F002)** - this SAT is expressed across a large range of habitats and is characterised by aculeates. The assemblage is commonly recorded on sites with a diverse and abundant flora with a long flowering season (Lott 2007). This assemblage would most likely be associated with open, drier areas and with low levels of grazing, or with areas prone to drought and nutrient-stress. These conditions prevent scrub development and maintain the diverse flora which provides nectar and pollen resources. The presence of stems of plants or areas of bare ground for nesting is also a requirement for the occurrence of this assemblage.

4.2 Favourable status BAT habitat descriptions:

- **Unshaded early successional mosaic (F1)** – characterised by a large range of invertebrates with beetles and aculeates being the largest groups. The assemblage

type is dominant in lowland areas where disturbance removes vegetation to create areas of bare and sparsely vegetated ground. The juxtaposition of disturbed areas of bare ground with other structural types of vegetation is important to insects with complex life cycles requiring different microhabitats. Thermophilic species are typical of this habitat, thus south-facing slopes can be particularly valuable (Drake *et al*. 2007).

- **Permanent wet mire (W3)** – characterised by two-winged flies and beetles, this assemblage type is dominant in wetlands where disturbance is limited. It is characteristic of well-vegetated edges of open-water bodies and permanently wet mire. Periodic removal of vegetation can play an important role in creation of suitable habitat or the prevention of ecological succession, but large-scale disturbance and changes in hydrology (particularly water abstraction) can affect this assemblage negatively (Drake *et al*. 2007).
- **Mineral marsh & open water (W2)** – characterised by a wide range of groups, with beetles being the largest, associated with still open water bodies. Typical habitats are sparsely vegetated and subject to repeated disturbance (though vegetation may rapidly colonise between disturbance events) (Drake *et al*. 2007).

4.3 Additional SAT habitat descriptions:

- **Reedfen and pools (W314)** - This assemblage type is characterised by a number of invertebrate groups, particularly two-winged flies and beetles, and is largely restricted to mires and fens (Lott *et al*. 2007b). Sites supporting this SAT tend to be floodplains or lake margins. Such sites tend to experience significant water-level fluctuations but the substratum rarely dries out completely. Elements of this assemblage type can occur extensively around the margins of ponds and ditches, particularly in association with beds of tall monocots (Lott *et al*. 2007b).
- **Open short sward (F112)** - The presence of this SAT is associated with lowland habitats where grazing or cutting of vegetation over calcareous soils limits the development of taller vegetation. Soils are generally nutrient poor restricting the development of grasses and encouraging the widespread development of broad-leaved-herbs (Lott *et a*l. 2007b). A mosaic of bare ground, shorter vegetation and taller scrub vegetation is considered to be important to provide habitat requirements for nesting, feeding and for thermophilic larvae. As with the bare chalk and sand SAT, south facing slopes are considered to be a particularly valuable microhabitat for this assemblage type, while floristic diversity is another important feature (Lott et al. 2007b).
- **Bare sand and chalk (F111)** - This SAT comprises several insect groups including Aculeates, Coleoptera, larger Diptera, day-flying Lepidoptera, Heteroptera and Orthoptera and is associated with the ground and field layer of terrestrial habitats (Lott 2007). It contains species associated with the hot dry soil conditions normally

found on bare ground in early successional habitats. Assemblages are generally also dependent upon the proximity other structural vegetation to satisfy all life cycle requirements (Lott et al. 2007b), nectar and pollen for food and stems and leaf litter for nesting. Such habitat can be maintained by a range of disturbance processes both natural and anthropogenic.

Many associated species have thermophilic larvae and therefore bare ground on south facing slopes is particularly valuable for this assemblage (Lott et al. 2007b). Such sites in the Thames Gateway have been recognised as having national importance for invertebrate conservation (Harvey 2000a; Jones 2008). Habitat continuity has also been recognised as supporting the highest conservation value assemblages of the SAT with a series of sites in proximity facilitating dispersal and colonisation and therefore supporting population metapopulation dynamics (Hanski and Gilpin 1991; Opdam 1990; Bourn and Thomas 2002; Lott *et al.* 2007b).

- **Seepage (W126)** - This SAT is associated with groundwater sources which constantly saturate the soil, resulting in soils containing a high proportion of organic matter. Vegetation is often limited and deadwood is an important component of these seepages (Lott et al. 2007b). Such conditions tend to be found in limestone and some chalk districts.
- **Scrub edge (F001)** - This assemblage represents species associated with early successional habitat matrices and close sward grass matrices (Lott 2007). The assemblage is most commonly recorded in scattered scrub or woodland interspersed with open areas of grassland, heathland or early successional vegetation types (Lott et al. 2007b). Assemblages are linked to scrub management and the maintenance of graded edge habitats. Assemblages are considered to depend on the different microhabitats at different stages throughout their complex life cycles. This assemblage would be associated with drier areas of the sites where scrub develops but succession to woodland is prevented by disturbance
- **Scrub heath and moorland (F003)** - This assemblage type is characterised by a wide range of invertebrate groups, but beetles and spiders represent important components. It is associated with nutrient-poor acid soils where herbaceous or dwarf shrub vegetation is dominant, although trees and taller shrubs can be an important component of the overall habitat (Lott *et al*. 2007b). It occurs on both damp and dry soils. Changes in management (e.g. changes in the pattern of grazing) can have dramatic impacts on assemblage composition (Lott *et al*. 2007b). On Thames coastal sites, invertebrates from this assemblage are most likely to be associated with areas of low scrub possessing a certain degree of floral diversity.
- **Dung (F006)** - This SAT is characterised by beetles and two-winged flies (Lott et al. 2007b). Assemblages are associated with the presence of grazing livestock on a site and absence of veterinary broad spectrum de-wormers which are considered to

impact invertebrates within this assemblage (Lott 2007; Buglife 2008). Horse grazing on the site may explain the presence of the dung SAT.

- **Heartwood decay (A211) -** This SAT is mainly characterised by beetles and two-winged flies and is found in and around mature and ancient trees and shrubs (Drake *et al*. 2007). Species tend to be associated with small pockets of heartwood decay and a proportion of two-winged flies have aquatic or semi aquatic larvae within waterlogged decayed woody tissues (Lott *et al*. 2007b). The species tend to be associated with old growth and require space for sunlight to reach trunk and main boughs to increase temperatures for larval development and adult flight (Lott *et al*. 2007b). Open areas with flowers and shrubs are also generally a key factor because the adult stages of many insect species feed on pollen and nectar (Lott *et al*. 2007b). This assemblage is likely to be associated with pockets of old woodland, scrub and more flower-rich patches found on drier, disturbed areas.
- **Bark and sapwood decay (A212)** - This assemblage type is characterised by beetles which are found in and around trees and shrubs, particularly older specimens (Lott *et al*. 2007b). The assemblages are primarily associated with the death and decay of outer woody tissues and with sap runs (Drake et al. 2007). In general these species are less restricted by the density of tree cover than the heartwood decay assemblage (Lott *et al*. 2007b). However, as with the heartwood decay assemblage, adjacent areas of flower-rich forbs and shrubs are important for the adult stages of many species in this group (Drake *et al*. 2007). As with the heartwood decay assemblage, this type is likely to be associated with old growth woodland, scrub, or even individual trees within the site, as well as with the flower-rich areas found on drier, disturbed areas.

4.4 Additional BAT habitat descriptions:

- **Grassland and scrub matrix (F2)** – assemblage type dominant in areas of dense herbage or partial shade where a humid microclimate is maintained at ground level. Dominance of woody plants is limited by exposure, grazing or cutting of vegetation. Examples of this assemblage type include hay meadows, scattered scrub and woodland edge. Sward height and density is often an important factor in species representation, as are extent of flowering and seedset (Drake *et al*. 2007).
- **Arboreal canopy (A1)** – characterised by a wide range of invertebrate groups, with the largest being butterflies and moths. Assemblage found in the canopy of trees and scrub regardless of their density and overlap. Assemblage include phytophagous species that feed on leaves, flowers and fruits, and their predators and parasites. Many target new shoots so, unlike saproxylic species, are as commonly found on young trees and shrubs as mature ones (Drake *et al*. 2007).
- **Shaded field and ground layer (F3)** – this assemblage type is characterised by a wide range of groups, with two winged-flies being the largest group. Assemblage is

dominant in closed canopy woodland and scrub. It is associated with low levels of disturbance. Plant cover at ground level is restricted by relatively low light levels and accumulation of leaf litter. Many characteristic species occur on or under leaf litter and are either saprophagus or predaceous (Drake *et al*. 2007).

- **Flowing water (W1)** – this assemblage is characterised by two-winged flies, beetles and aquatic macro-invertebrates. Dominant along stretches of slow and fast-flowing rivers and streams. Assemblages are particularly impacted by water abstraction and eutrophication (Drake *et al*. 2007).
- **Wood decay (A2)** – this assemblage type is characterised mainly by beetles, two-winged flies and wasps. Associated with trees and shrubs wherever they are growing. Wood decay species are saproxylic (associated with the decomposition of woody materials and their agents, most notably fungi. Many species develop in specific microhabitats, some of which are mostly or entirely restricted to mature trees (Drake *et al*. 2007).
- **Saltmarsh, estuary and mudflat (M3)** – characterised mainly by two-winged flies and beetles. Restricted to less exposed shorelines characterised by net deposition of fine sediment. Habitats defined by levels of salinity and tidal disturbance. Suitable habitats occur in saltmarsh, tidal creeks, estuarine shores and brackish water marshes that grade into freshwater marsh.

5. References

Barking Riverside (2004) Ecological survey and assessment: Environmental statement technical appendix 9, Barking Riverside Ltd, Renwick Rd London, UK.

Barking Riverside (2009) Development Vision. Online. Available from http://www.barkingriverside.co.uk/vision.html [Accessed February 2011]

Bourn, N.A.D and Thomas, J.A. (2002) The challenge of conserving grassland insects at the margin of their range in Europe. Biological Conservation 104, pp. 285-292.

Drake, C.M., Lott, D.A., Alexander, K.N.A. and Webb, J. (2007) Surveying terrestrial and freshwater invertebrates for conservation evaluation. Natural England Research Report NERR005, Peterborough, UK.

Essex Field Club (2011) *Gymnosoma nitens* species account, Essex Field Club website. Available from http://www.essexfieldclub.org.uk/portal/p/Species+Account/s/Gymnosoma%20nitens [Accessed April 2011].

Gilpin, M.E. (1987) Spatial structure and population vulnerability. In: Viable populations for conservation (ed. Soule, M.E.), pp. 125-140, Cambridge University Press.

Hanski, I. and Gilpin, M. (1991) Metapopulation dynamics: brief history and conceptual domain. Biological Journal of the Linnean Society 42, pp. 3-16.

Harvey, P.R. (2000) The East Thames Corridor: a nationally important invertebrate fauna under threat. British Wildlife 12, 91-98.

Harvey, P.R. (2007) All of a buzz project reports. Report for Buglife, Peterborough.

Hill, M.O. (1979) DECORANA, a FORTRAN program for detrended correspondence analysis and reciprocal averaging. New York: Cornell University.

Jones, R.A. (2007) Caught in the greenwash: What future for invertebrate conservation on the brownfield sites of the Thames Gateway?. Report for Buglife, Peterborough.

Lott, D. (2007) Synopsis of ISIS 2008 and its use in Common Standards Monitoring. Report produced by for Natural England, Stenus Research, Leicestershire.

Lott, D. (2009) Synopsis of ISIS 2009 and its use in Common Standards Monitoring. Report produced by for Natural England, Stenus Research, Leicestershire.

Lott, D., Alexander, K.N.A. and Drake, C.M. (2007a) ISIS Invertebrate Species – habitat information system: Broad Assemblage Type Descriptions. Report produced by for Natural England, Stenus Research, Leicestershire.

Lott, D., Alexander, K.N.A., Drake, C.M. and Foster, G.N. (2007b) ISIS Invertebrate Species – habitat information system: Specific Assemblage Type Descriptions. Report produced by for Natural England, Stenus Research, Leicestershire.

Opdam, P. (1990) Understanding the ecology of populations in fragmented landscapes. Transcript from the 19th IUGB Congress, Trondheim 1989, 373-380.

PISCES Conservation (2003) Community Analysis Package. Version 2.1. Available from http//:www.pisces-conservation.com [Accessed July 2008].

Reed, D.H. (2004) Extinction risk in fragmented habitats, Animal Conservation, 7, 181–191.

Usher, M.B. (1997) Small populations: fragmentation, populations dynamics and population genetics. In Tew, T.G. et al. (eds) The role of genetics in conserving small populations, pp. 11-21, JNCC, Peterborough.

UK Moths (2011). Online guide to the moths of UK and Ireland. Available at http://ukmoths.org.uk/index.php [Accessed April 2011].

6. Appendices

Appendix 1 – Invertebrate species list for Barking Riverside (Barking Riverside 2004)

Acidia cognata
Adalia bipunctata
Aelia acuminata
Aeshna grandis
Aethes smeathmanniana
Agapeta hamana
Agelena labyrinthica
Agriotes acuminatus
Agriotes lineatus
Agriotes obscurus
Agriotes pallidulus
Agriotes sputator
Agroeca inopina
Agrotis exclamationis
Altica lythri
Altica palustris
Anasimyia contracta
Anax imperator
Andrena dorsata
Andrena flavipes
Andrena minutula
Andrena nigroaenea
Andrena scotica
Anisosticta novemdecimpunctata
Anthocomus rufus
Anthocoris confusus
Anthocoris nemoralis
Anthocoris nemorum
Anthonomus rubi
Anthophora bimaculata
Aphelia paleana
Aphodius rufipes
Aphrodes makarovi
Aphthona euphorbiae
Apion miniatum
Apis mellifera
Aplocera efformata
Aplocera plagiata
Araneus diadematus
Archanara geminipuncta
Archanara sparganii
Arenostola phragmitidis
Armadillidium vulgare
Asiraca clavicornis
Autographa gamma
Bactra lancealana
Bathyphantes gracilis
Bembecia ichneumoniformis
Beris chalybata
Beris vallata
Bibio johannis
Bibio marci
Bledius germanicus
Bombus humilis
Bombus lapidarius
Bombus lucorum
Bombus pascuorum
Bombus pratorum
Bombus sylvestris
Bombus terrestris
Bruchus loti
Byrrhus pilula
Byturus tomentosus
Calamotropha paludella
Calathus fuscipes
Calathus melanocephalus
Calobata cibaria
Calocoris norvegicus
Campaea margaritata
Campiglossa misella
Campsicnemus curvipes
Campsicnemus scambus

Camptogramma bilineata
Cantharis cryptica
Cantharis decipiens
Cantharis lateralis
Cantharis nigra
Cantharis nigricans
Cantharis rufa
Cantharis rustica
Capsus ater
Cassida rubiginosa
Cassida vibex
Cassida viridis
Cataclysta lemnata
Catops nigricans
Celastrina argiolus
Celypha lacunana
Ceratapion carduorum
Ceratapion onopordi
Cerceris arenaria
Cerceris quinquefasciata
Ceroxys urticae
Ceutorhynchus pollinarius
Ceutorhynchus quadridens
Chaetocnema concinna
Chaetocnema hortensis
Cheilosia pagana
Cheilosia proxima
Chloromyia formosa
Chorisops nagatomii
Chorisops tibialis
Chorthippus albomarginatus
Chorthippus brunneus
Chorthippus parallelus
Chrysolina banksi
Chrysolina oricalcia
Chrysopa commata
Chrysopa perla
Chrysoperla carnea
Chrysopilus cristatus
Chrysops relictus
Chrysoteuchia culmella
Chrysotoxum bicinctum
Chrysotoxum cautum
Chrysotus gramineus
Coccinella septempunctata
Cochylis atricapitana
Cochylis hybridella
Coenagrion pulchellum
Coenonympha pamphilus
Coenosia mollicula
Conocephalus discolor
Conocephalus dorsalis
Cordilura impudica
Coremacera tristis
Coreus marginatus
Coriomeris denticulatus
Crambus lathoniellus
Crambus pascuella
Crambus perlella Scop
Crepidodera ferruginea
Crepidodera transversa
Crioceris asparagi
Cryptocephalus fulvus
Cryptocephalus hypochaeridis
Cryptocephalus moraei
Cylindromyia interrupta
Demetrias atricapillus
Demetrias imperialis
Deraeocoris lutescens
Deraeocoris ruber
Dichetophora obliterata
Dicyphus epilobii
Dilophus femoratus
Dinera grisescens
Dioctria atricapilla
Dioctria baumhaueri
Diodontus luperus
Dolichopus festivus
Dolichopus popularis
Donacia semicuprea

Donacia vulgaris
Elgiva cucularia
Emmelina monodactyla
Empis aestiva
Empis albinervis
Empis livida
Empis tessellata
Enallagma cyathigerum
Enoplognatha latimana
Enoplognatha ovata
Epiblema cynosbatella
Epiblema uddmanniana
Epistrophe eligans
Episyrphus balteatus
Erigone atra
Erigone dentipalpis
Eriothrix rufomaculata
Eristalis arbustorum
Eristalis horticola
Eristalis intricarius
Eristalis pertinax
Eristalis tenax
Eucosma cana
Euleia heraclei
Eupeodes corollae
Eupeodes latifasciatus
Eurrhypara hortulata
Euscelis incisus
Euthrix potatoria
Eutrichapion ervi
Fannia armata
Forficula auricularia
Geomyza tripunctata
Glyphipterix simpliciella
Grapholita compositella
Grapholita jungiella
Gymnosoma nitens
Haematopota pluvialis
Halyzia sedecimguttata
Helina duplicata
Helina impuncta
Helophilus hybridus
Helophilus pendulus
Helophilus trivittatus
Hepialus humili
Hepialus lupulinus
Herina frondescentiae
Heterogaster urticae
Heterotoma merioptera
Hilara anglodanica
Homoeosoma sinuella
Hoplitis claviventris
Hoplitis spinulosa
Hylaeus annularis
Hylaeus hyalinatus
Hylaeus signatus
Hypena proboscidalis
Hypera postica
Hypera rumicis
Icterica westermanni
Idaea rusticata
Idaea rusticata
Ilione albiseta
Ischnopterapion loti
Ischnura elegans
Kleidocerys resedae
Larinioides cornutus
Lasioglossum malachurum
Lasioglossum minutissimum
Lasioglossum morio
Lasioglossum smeathmanellum
Lasius niger
Legnotus limbosus
Leiobunum rotundum
Lejogaster metallina
Lepthyphantes tenuis
Leptogaster cylindrica
Leptopterna dolabrata
Leptopterna ferrugata
Lestes dryas

Lestes sponsa
Leucozona lucorum
Libellula depressa
Limnia unguicornis
Lindenius albilabris
Linyphia triangularis
Liocoris tripustulatus
Lonchoptera furcata
Lonchoptera lutea
Longitarsus dorsalis
Longitarsus luridus
Longitarsus parvulus
Lycaena phlaeas
Lydella grisescens
Lygus rugulipennis
Machimus atricapillus
Machimus cingulatus
Malachius bipustulatus
Malachius viridis
Maniola jurtina
Megachile leachella
Megachile maritima
Melanostoma mellinum
Melanostoma scalare
Melieria omissa
Meligethes aeneus
Meligeths carinulatus
Meliscaeva auricollis
Melitta leporina
Mellinus arvensis
Merodon equestris
Mesoligia furuncula
Metrioptera roeselii
Micraspis sedecimpunctata
Microchrysa flavicornis
Microchrysa polita
Micromus variegatus
Micropeza corrigiolata
Miltogramma germari
Miltogramma punctatum
Mompha raschkiella
Myathropa florea
Myrmica scabrinodis
Nabis rugosus
Necrodes littoralis
Nemopoda nitidula
Nemotelus notatus
Nemotelus uliginosus
Neoascia interrupta
Neoascia meticulosa
Neoascia podagrica
Neoascia tenur
Neophilaenus campestris
Neophilaenus lineatus
Neoscona adianta
Noctua pronuba
Nomada fabriciana
Nomada flava
Nomada flavoguttata
Nomada flavopicta
Nomada fucata
Nomada goodeniana
Nonagria typhae
Notiophilus biguttatus
Notiophilus palustris
Notiophilus rufipes
Notostira elongata
Nysius senecionis
Nysson dimidiatus
Ochlodes venata
Ocytata pallipes
Odontomyia tigrina
Oedemera lurida
Oedemera nobilis
Oligia fasciuncula
Oniscus asellus
Opisthograptis luteolata
Oplodontha viridula
Opomyza germinationis
Opomyza petrei

Ostrinia nubilalis
Oxybelus uniglumis
Oxycera trilineata
Oxystoma craccae
Pachygaster atra
Pachygaster leachii
Pachygnatha degeeri
Pales pavida
Palloptera arcuata
Palloptera muliebris
Palloptera umbellatarum
Palloptera ustulata
Palomena prasina
Panorpa germanica
Panurgus calcaratus
Paragus haemorrhous
Pardosa prativaga
Parhelophilus versicolor
Perapion marchicum
Perapion violaceum
Phaedon tumidulus
Phaonia variegata
Phaonia viarum
Phasia pusilla
Pherbellia cinerella
Pherbellia grisescens
Pherbina coryleti
Philaenus spumarius
Philanthus triangulum
Philoscia muscorum
Phlogophora meticulosa
Phyllobius pomaceus
Phyllobius pyri
Phyllotreta atra
Phyllotreta undulata
Pieris brassicae
Pieris rapae
Pipizella viduata
Pipizella virens
Plagiognathus arbustorum
Platyarthrus hoffmannseggi
Platycheirus albimanus
Platycheirus clypeatus
Platycheirus fulviventris
Platycheirus granditarsus
Platycheirus manicatus
Platycheirus peltatus
Platyptilia pallidactyla
Platystoma seminationis
Pleuroptya ruralis
Podops inuncta
Poecilobothrus nobilitatus
Polietes lardarius
Pollenia pediculata
Pollenia rudis
Polyommatus icarus
Porcellio scaber
Prasocuris phellandrii
Propylea quattuordecimpunctata
Prosternon tessellatum
Protapion assimile
Protapion fulvipes
Protapion trifolii
Psyche casta
Psylliodes napi
Pterophorus pentadactyla
Ptychoptera albimana
Ptychoptera contaminata
Pyrausta aurata
Raglius alboacuminatus
Rhagio lineola
Rhagio scolopaceus
Rhagonycha fulva
Rhagonycha limbata
Rhinophora lepida
Rhyzobius litura
Scellus notatus
Sciapus platypterus
Scolopostethus affinis
Scoparia ambigualis

Scymnus frontalis
Scymnus suturalis
Semiaspilates ochrearia
Sepedon spinipes
Sepsis cynipsea
Sepsis fulgens
Sepsis punctum
Sitochroa verticalis
Sitona humeralis
Sitona lepidus
Sitona lineatus
Sphaeroderma testaceum
Sphaerophoria rueppellii
Sphaerophoria scripta
Sphecodes crassus
Sphecodes ephippius
Sphecodes geoffrellus
Sphecodes monilicornis
Sphenella marginata
Staphylinus aeneocephalus
Staphylinus olens
Stenocranus major
Stenocranus minutus
Stenodema calcaratum
Stenodema laevigatum
Stenoptilia pterodactyla
Stenotus binotatus
Stictopleurus punctatonervosus
Stratiomys potamida
Strophosomus melanogrammus
Stygnocoris sabulosus
Subcoccinella vigintiquattuorpunctata
Sympetrum sanguineum
Sympetrum striolatum
Syritta pipiens
Syrphus ribesii
Syrphus vitripennis
Tabanus autumnalis
Tachycixius pilosus
Taeniapion urticarium
Tegenaria agrestis
Tephritis bardanae
Tephritis cometa
Tephritis formosa
Tephritis vespertina
Terellia ruficauda
Tetanocera arrogans
Tetanocera elata
Thea vigintiduopunctata
Themira annulipes
Thereva nobilitata
Thumatha senex
Thymelicus lineola
Timandra comae
Tingis ampliata
Tingis cardui
Tipula oleracea
Triglyphus primus
Tropidia scita
Trypeta zoe
Tytthaspis sedecimpunctata
Udea olivalis
Urophora cardui
Urophora quadrifasciata
Urophora stylata
Vanessa cardui
Vespula germanica
Vespula vulgaris
Volucella bombylans
Volucella pellucens
Volucella zonaria
Voria ruralis
Xanthogramma citrofasciatum
Xanthogramma pedissequum
Xanthorhoe montanata
Xyphosia miliaria
Zygaena filipendulae
Zygaena lonicerae