Lowland heathland

Lowland heathland is infertile, uncultivated land mainly comprising dwarf shrubs, such as heathers and gorses. The best heathland for invertebrates comprises large areas of mixed habitat, rather than uniform heather swards. Here, heathers grow alongside acid grassland, valley mire, ponds, scrub and trees. Many heathland invertebrates need a combination of these habitat features to complete their life-cycles. Conserving both common and rare species depends on managing all heathland elements, generating a diverse landscape. Good heathland management may differ from standard heather management, as many heathland invertebrates do not require heathers.

Left - The solitary bee *Andrena ovatula* relies on gorse flowers.
Right - Large marsh grasshopper.

Some important S41 species of Lowland heathland mosaics

S41 species are some of our rarest or most threatened species which have been identified by the UK government as needing particular conservation action.

Ants: Shining guest ant (*Formicoxenus nitidulus*), Erratic ant (*Tapinoma erraticum*)

Bees: Tormentil mining bee (*Andrena tarsata*), Potter flower-bee (*Anthophora retusa*), Brown-banded carder bee (Bombus humilis), Long-horned bee (*Eucera longicornis*)

Beetles: Black (*Meloe proscarabaeus*) and Violet (*M. violaceus*) oil beetles

Butterflies: High brown fritillary (*Argynnis adippe*), Pearl-bordered fritillary (*Boloria euphrosyne*), Grayling (*Hipparchia semele*), Silver-studded blue (*Plebeius argus*)

Damselflies: Southern damselfly (*Coenagrion mercuriale*)

Flies: Hornet robberfly (*Asilus crabroniformis*), Heath bee-fly (*Bombylius minor*), Bog hoverfly (*Eristalis cryptarum*), Mottled bee-fly (*Thyridanthrax fenestratus*)

Grasshoppers: Large marsh grasshopper (*Stethophyma grossum*)

Moths: Basil-thyme case bearer (*Coleophora tricolor*), Lunar Yellow Underwing (*Noctua orbona*), Argent and sable (*Rheumaptera hastata*)

Spiders: Golden lantern spider (*Agroeca cuprea*), Silky gallows spider (*Dipoena inornata*), Heath grasper spider (*Haplodrassus dalmatensis*), Peus's long-back spider (*Mecopisthes peusi*)

Wasps: Five-banded weevil wasp (*Cerceris quinquefasciata*), Bloody spider-hunting Wasp (*Homonotus sanguinolentus*), Purbeck mason wasp (*Pseudepipona herrichii*)

Key habitat components of the mosaic and their management

Above - Heather interspersed with grassland, scrub and bare ground
Left - The solitary bee (*Colletes succinctus*), which forages mostly on heathers, supports the parasitic Heath bee-fly.

1 Heathers

Flowering Heathers (*Calluna vulgaris, Erica* species) dramatically increase the capacity of a landscape to support pollinators. Compared to other habitats, heathland can be the best source of pollen and nectar between June and September, attracting vast numbers of insects and their predators. Many specialist invertebrates depend on species that feed only on heathers, e.g. the Purbeck mason wasp preys on caterpillars of the Heath button moth (*Acleris hyemana*). Some invertebrates only live in heather litter.

- Use grazing, cutting or controlled burning to develop variable age and structure within heathers; from short, young plants with exposed ground, to older, taller plants providing shelter.
- Avoid creating structural monocultures of heathers that lack patches of other habitat elements, e.g. grasses, scrub, bare ground.

South-facing, sandy cutting in the New Forest.

2 Bare ground, sandpits and cuttings

A large number of invertebrates (e.g. tiger beetles, solitary wasps, mining bees) make burrows in bare ground and sand for rearing their offspring. They often rely on other habitats nearby for hunting or foraging. These insects, in turn, support other species, including 'cuckoo' bees and wasps, oil beetles and bee-flies.

- Create open, sandy areas and keep these free from ongoing disturbance. Old sandpits, fire-breaks, quarries and cuttings with sheltered, south-facing slopes provide good sites.
- Ensure that paths and tracks have bare, stable ground at their edges, which provides burrowing sites.
- Watch-out for motorbikes or horses that can churn up paths and tracks and create loose sand. This doesn't provide suitable habitat.
- Avoid surfacing paths as important bare ground habitat will be lost.

3 Scrub 4 trees and dead wood

Scrub (e.g. gorses and Common broom) and isolated trees (e.g. Birch, Scots pine and oaks) support many specialist invertebrates. From spring onwards, Gorse flowers attract solitary bees, which nest in sandy areas. The litter found under scrub and trees is valuable for hibernating insects. The dead wood associated with trees is an important breeding site for various beetles, bees and wasps. These species also use food resources found elsewhere on the heathland, such as flowers and insect prey.

- Allow some self-seeded scrub and scattered trees to establish, but manage carefully to prevent them encroaching on other habitats. Ideally remove, rather than coppice, unwanted scrub and trees, then allow new establishment elsewhere.
- Maintain Gorse and Broom as discrete stands. Promote varied age structure by encouraging regeneration on adjacent disturbed ground.
- Always aim to eradicate Rhododendron and non-native conifers.
- Leave dead trees standing

5 Acid grassland

Acid grassland, occurring on deeper and richer soils, is a vital component of heathland. It provides nectar and pollen before heathers flower (e.g. Cat's-ear, Bird's-foot trefoil), in addition to resources later on, e.g. Harebell, Heath bedstraw and Tormentil. These are used by pollinators such as the Tormentil mining bee and Pantaloon bee (*Dasypoda hirtipes*). The flowerheads of grasses support the spider prey of the Bloody spider-hunting wasp. Heath violet is an important foodplant for the Pearl-bordered Fritillary.

- Little or no grazing during the growing season will allow grassland plants to flower.
- If cutting grassland, establish a minimum 2-3 year rotation and leave land uncut into the autumn. This will allow longer vegetation to develop and maximise flowering. Remove arisings to avoid enriching the sward.

6 Bracken

Bracken is a natural component of most heathland, providing food for some widespread herbivorous insects. In the west of Britain, it harbours woodland plants such as violets, the food plant of the High brown fritillary (*Argynnis adippe*). Bracken also provides shelter from the wind, creating warm areas that benefit solitary bees and wasps.

- Manage Bracken to maintain core areas, while preventing it from smothering more valuable habitats.
- Graze with cattle or ponies, which can break up bracken litter, allowing the ground flora to regenerate.

Gorse is an important foodplant for caterpillars of the Silver-studded blue butterfly.

Longhorn beetles, such as *Leptura quadrifasciata*, will breed in the dead wood of trees like birches.

7 Heathland edge and verges

Flowery and scrubby areas on the heathland edge, or beside tracks and roads, can support brambles, umbellifers (e.g. Cow Parsley and Hogweed), thistles, ragworts, knapweeds, and spring-flowering shrubs (e.g. Blackthorn and Hawthorn). These are all valuable for insect pollinators.

- Manage heathland edge and verges with cutting or grazing if they risk encroaching on heathers. Try to prevent enrichment caused by dog-fouling or tipping of garden waste.
- Manage the heathland edge and verges on rotation, to allow both short and taller vegetation to develop.

New Forest ponies grazing valley mire.

8 Mire, wet heath, pools and ditches

Wetland features, such as Sphagnum bog mosses, swamp, carr, tussocks, seepages and old peat-filled ditches support many scarce invertebrates, e.g. Large marsh grasshopper, Southern damselfly and Bog Hoverfly. Pools are also valuable for their aquatic invertebrates, with rarities like the Medicinal leech (*Hirudo medicinalis*). Plants, such as Grey willow, Water mint, Angelica, Marsh ragwort and Lesser spearwort attract vast numbers of pollinators between spring and late summer.

- Don't drain pools or mire and do not deepen temporary pools, which naturally dry out.
- Undertake rotational scrub or rush control to create a varied vegetation structure and prevent excessive shading.
- Prevent pollution or excessive trampling of wet areas by stock although some bare mud is valuable for numerous invertebrates.

Heathland pool with swamp at Sutton Park, Birmingham.

9 Livestock, rabbits and dung

Livestock and rabbit dung can support many invertebrates, especially dung beetles and uncommon flies, e.g. Hornet robberfly and the Giant dungfly (*Scathophaga scybalaria*). Stock also supports a range of nationally important horseflies, as found in the New Forest. Rabbits can be crucial for maintaining sandy habitats and they also provide carrion for specialist invertebrates.

- Maintain any traditional grazing regimes, but avoid excessive stocking.
- Don't provide supplementary feeding except were vital for livestock health.
- Avoid using avermectins.
- Allow some livestock carrion to lie on remoter sites.

Livestock dung supports scarce invertebrates like the Giant dungfly, *Scathophaga scybalaria*.

Livestock supports important populations of horseflies, like the Bog horsefly, *Atylotus fulvus*.

CASE STUDY 1

Mottled bee-fly

(*Thyridanthrax fenestratus*)

The Mottled bee-fly occurs in south-east and central southern England. It depends indirectly on a range of habitats to complete its life-cycle. Its host, the Heath sand wasp (*Ammophila pubescens*), digs nest burrows in bare sand, among heather. The female wasp stocks the burrows with moth caterpillars – found mainly on the heather – providing a larder for her offspring. The bee-fly's own young consume the wasp's offspring. Adult bee-flies also require the warmth of bare ground for basking.

CASE STUDY 2

Southern damselfly

(*Coenagrion mercuriale*)

One of the principal habitats where the Southern damselfly occurs, in England, is mineral-enriched streams and runnels on heathland. It requires shallow, sun-exposed water bodies that flow all year. Adequate grazing, by heavier stock, is critical in preventing encroachment by scrub and invasive vegetation.

Females lay eggs into perennial, aquatic and emergent plants. Larvae develop for two years, feeding on aquatic invertebrates. Emerging adults rest in tussocky vegetation around the stream. Scrub and shrubs, within a few tens of metres of streams, provide roosting and hunting sites for adults. However, scrub must not block dispersal between adjacent stream sites.

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