

How to create invertebrate and reptile mounds

Why create invertebrate mounds?

In recent years, people have come to realise that areas of bare and poorly vegetated habitat are important for supporting high biodiversity and a range of rare species. Many species of bee, solitary wasp, spider and beetle are dependent on bare ground to hunt and nest because these areas provide the necessary warm micro-climate and easy tunnelling. However, bare ground does not remain bare for long, vegetation colonises and soon the bare ground is lost. An invertebrate mound can create an open patchwork and mosaic of habitat in quite a small area.

Many different types of invertebrates need areas of bare ground to bask and nest in:

- **Butterflies** - are 'cold-blooded' which means that they *do* not generate enough heat from their own metabolism to provide them with the heat and energy they need to fly. Therefore, butterflies rely on heat absorbed from the sun. Butterflies often sit with their wings outstretched in a patch of sunlight.
- **Solitary bees** - roughly 70% are mining bees and nest in underground burrows. They drink nectar directly from the flower and spend most of their time collecting pollen which is mixed with a small amount of nectar as food. They are fantastic pollinators: a single red mason bee is equivalent to 120 worker honeybees in the pollination it provides.
- **Reptiles**, such as adders and lizards, - will also use mounds for basking and warming up their 'cold-blooded' bodies.

Topographical structures

Structures have been created using materials found on the site (stone dug from the bed of a newly created pond, timber cut when laying hedgerows etc.). These appear to have been thrown together but have been constructed with south facing slopes and crevices as habitat for reptiles especially **common lizards** and **slowworms**.



Display board near a mound at Blakehill Farm
© Wiltshire Wildlife Trust

Bare ground is often created in areas with high traffic. For example, footpaths where constant trampling restricts grass growth. These disturbed areas are not always a good place for invertebrates, as they may get trampled.

In a flat landscape, mounds away from areas of high traffic can create different micro-climate areas of bare ground that invertebrates and other species can colonise and use. They also create wind shelters and thermal micro-climates.



Invertebrate mound two years after it has been constructed in February 2017 at Blakehill Farm © Kathy Stearne

Considerations in the design of invertebrate mounds

- **Target species** - it's a good idea to know what species already use the area and which species need better provision of micro-climate habitat. However 'derelict' a piece of land may look, it is likely to hold some wildlife. So, surveys at appropriate times of year should be carried out before any work starts to ensure the construction of the mound is not detrimental to existing wildlife.
- **Permissions** -the mounds should not be constructed on any designated land e.g. Site of Special Scientific Interest (SSSI) or Ancient Monument (AM) without the permission of the appropriate authority (Natural England or Heritage England). The location of invertebrate mounds requires agreement between all interested parties that are involved with the site. An area of 'derelict' or 'waste' land may seem most suitable. If the mound is placed on agricultural land receiving farming payments, the relevant authority would consider it a

Permanent Ineligible Feature (PIF) meaning that the subsidy could not be claimed (for example, in England the Rural Payment Agency would be the authority in charge of agricultural payments). Agreement might need to be made with the Environment Agency, or other authority, if mounds are to be made within a watercourses floodplain, as this could affect flooding and flood water storage. If large amounts of material are to be brought on site to create mounds then the Environment Agency may need to be consulted in regard to Waste Movement.

- **Consultation** - neighbours should be consulted if the bunds could affect them. Local partners should also be consulted.
- **Light** - the mound should not be constructed in an area shaded by trees or other obstruction to light. Most invertebrates want high levels of warmth and light.
- **Soil material** - locally sourced soils should be used where possible, as the

indigenous invertebrates are likely to colonise locally sourced soils more readily. If a pond is being excavated locally, the soil could be used to create a mound. This would also save the cost of transporting materials in (or off) the site. Alternatively, a ditch and bank can be created with the material from the ditch used to make the bank. Or if topsoil needs to be scraped back to expose the subsoil for grassland restoration, the earth could be used to create a mound. However, this might be quite nutrient rich and could become a site for problem weeds such as thistles and nettles. If there is only limited material on site then the area of the mound should be scraped clean of topsoil and subsoil (which should be piled separately). Clean un-contaminated rubble or hard-core can be used to make the centre of the mound. The subsoil and topsoil can then be used to cover the mound. If rubble or other such material is being used, there may be an issue of voids and holes appearing in the mound. This is positive for wildlife, as reptile and small mammals may use the holes, but it may also create a hazard for people if they climb on the mound or animals if they get hooves stuck in the holes. The mounds should be fenced to prevent people and livestock from accessing the feature if rubble is used in the construction.

- **Other materials** - Untreated wood sleepers/timbers can be incorporated

into the mound. They can be pre-drilled to provide habitat holes for invertebrates. Tree stumps, from woodland clearance, have been used as the centre of a habitat mound. As with using rubble, this can create additional habitat for reptiles and small mammals, but with the same hazard, so these mounds should also be fenced.

- **Aspect** - a south facing slope is desirable as this is usually the warmest side of a mound feature. It will create the micro-climate conditions that invertebrates and reptiles prefer and need for basking. A south facing slope will also mean there are north, west and east facing slopes, providing a variety of micro-climates in a small area.
- **Shape** - this may depend on the area of land available, but to maximise a south facing aspect create long thin sides on the east and west axes to use small areas to the optimum. Mounds can be long and thin, squat and fat, T-shaped - there really are no rules or ideal shapes.
- **Slopes** - the slope achievable on the mound will depend on the construction materials. Clayey soils will hold a steeper slope than sandy soils. A rule of thumb would be to aim for 'as steep as possible' on the south side, with shallower slopes on the other sides. A steep slope of the southern side will



- Invertebrate mound in the first summer following constructed in May 2015 at Blakehill Farm © Marc Taylor

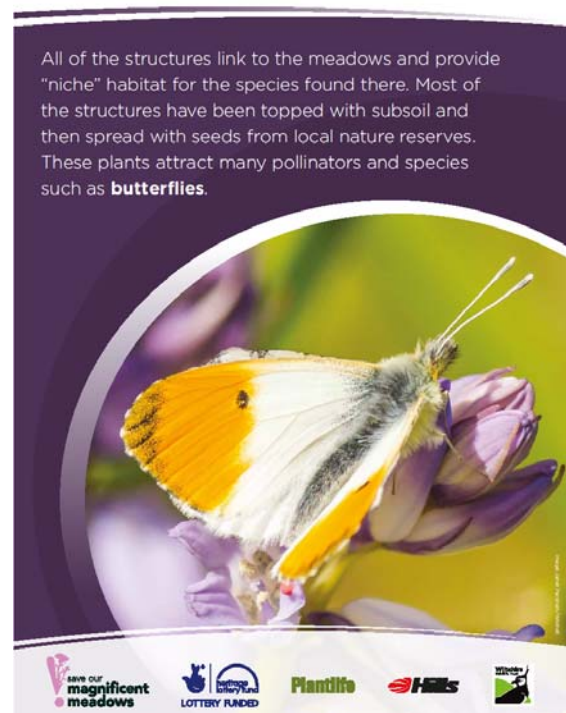
maximise the warming aspect of the sun on that face. A variable slope will create a variety of micro-climates.

- **Height** - the mound should be less than 1 m in height. If the mounds are more than a metre, then planning permission may be required.
- **Seeding** - the mound can be left to natural regeneration, or seeded as desired. The whole structure could be left for 12 months to settle before any decisions are made as to the requirement for seeding. If the mound is seeded, use a low rate, as areas of bare ground are highly desirable for invertebrates.
- **Other issues** - chalk is often used as a good facing material for the south facing slope. It absorbs heat from the sun making it a good surface for basking insects. However, while chalk is seen as a soft material that invertebrates can burrow into; if it is disturbed and compacted, which will happen when transporting the soil, it can break-up and once settled can become hard and impenetrable to burrowing invertebrates. If there is heavy rain after it is placed, 'finings' can be washed into the pores and spaces making it impenetrable for invertebrates.
- **After care** - as with any disturbed site, there will be initial vegetation colonisers. If the soil is nutrient rich there might be undesirable species, such as thistles and nettles. However, grass can also be a quick coloniser reducing the amount of bare ground. In the first year the mound should be cut two to three times depending on vegetation growth. Depending on the slopes, this will probably need to be a hand operation with a scythe. When the mounds have settled after year two, and if there are no 'holes' in the mound then grazing can be introduced to keep down the vegetation. Bare ground is desirable, especially on the

southern slope so areas may need to be scarified by hand on an annual basis.

- **Fencing** - if there are any health and safety issues for people or livestock the mounds should be fenced.
- **Signage** - these strange mounds can become a talking point. So if they are in an area open to the public interpretation boards describing why they have been created should be positioned appropriately, ideally by a foot path overlooking the mound. This might also be a good place to advertise for volunteers to help with the monitoring.
- **Monitoring** - surveillance of mounds can be invaluable. Ideally, a transect across the mounds and the surrounding area should be set up to gather data on invertebrates and vegetation changes. Something as simple as fixed point photography can also show how the mounds change over time.

Topographical structures



An interpretation sign placed near a mound at Blakehill Farm © Wiltshire Wildlife Trust