

Introduction to Brownfields

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Learning objective

- To be able to identify areas of brownfield land and **understand some of the characteristic features of the novel habitats** that develop there.
- To learn some of the **diagnostic identification features of key NPMS+ species** for brownfield land, including both positive and negative indicators.



What is **brownfield** land?

- **Any previously developed land.**
- Brownfield sites could include quarries, post-industrial spoil, landfills, mines.
- Includes sites of **high biodiversity importance.**
- Includes sites of **high heterogeneity.**



What is **brownfield** land?

Novel habitats develop which are often characterised by:

- Thin soils;
- Available bare ground; and
- Early successional vegetation.



Why are they so important?

- **Soils are often low in available soil nutrients!**
- Plants not tolerant of high soil nutrient levels are able to thrive in a novel habitat.



Marsh Orchid
(*Dactylorhiza* sp.)

Why are they so important?

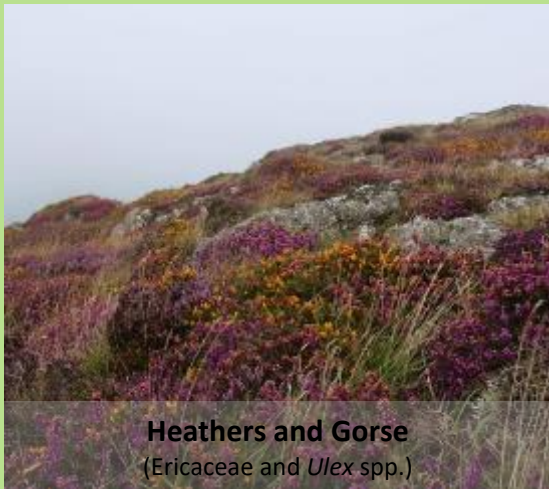
- **Heterogeneity** in habitat structure.
- South-facing vs north-facing banks important for different plants
- Lower lying, flushed areas home to a different set of species than higher, drier areas



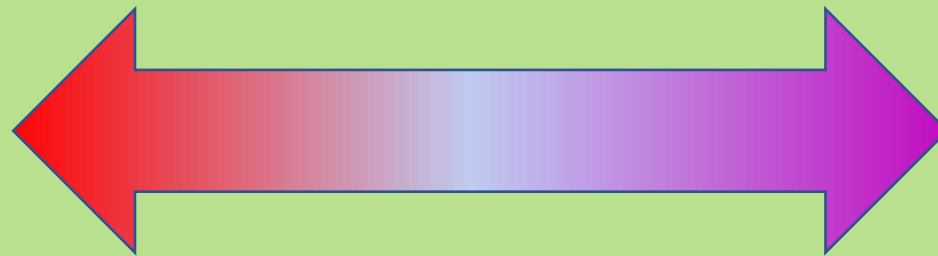
Small Cudweed
(*Logfia minima*)

Why are they so important?

- Another important factor which influences species diversity is **soil pH**.
- Some brownfield sites can be made up of a mix of both acid and alkaline substrates



Acidic



Alkaline



Why are they so important?

Diversity in **soil structure**
can also promote an
increase in plant diversity!



Threats

Brownfield sites are often devalued and 'remediation' strategies involving tree-planting, the importation of topsoil and development often threaten sites which are of high biodiversity value.



Biting Stonecrop (*Sedum acre*) 🌸

A **small, succulent perennial** plant of parched places including walls, rocks and maritime sand and clifftop grasslands. This plant is characterised by its **slender, creeping stems** and terminal bright yellow flowers and is very **peppery to the taste**.

Flowers Jun-Jul



Black Horehound (*Ballota nigra*)

A perennial herb **to 1m tall** with entire leaves that have a **serrated margin** and produce a foul smell when crushed. The purple flowers have a hooded upper lip and a three-lobed lower lip and **occur in clusters in leaf axils**. This plant grows in a variety of well-drained habitats.

Flowers Jun-Oct



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Blue Fleabane (*Erigeron acris*)

An annual, hairy **calcicole** up to 60cm tall with **purplish to mauve ligules**. This plant is often found within **early successional habitats** and is most frequently associated with brownfield sites, disturbed calcareous ground and dunes.

Flowers Jul-Aug



Carline Thistle (*Carlina vulgaris*)

A biennial **calcicole** up to 60cm tall with **straw-coloured ligules**. It has stems without spines and very piny leaves, whilst this plant is usually found within open grasslands, quarries and maritime sand dunes and clifftops.

Flowers Jul-Oct



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Common Centaury (*Centaureum erythraea*)

A glabrous biennial plant to 50cm of grassland, heaths and dunes **on well drained soils**. It has opposite, **oval leaves** which have 3-7 prominent veins and pink flowers with 5 petals, **each about 1cm across**.

Flowers Jun-Oct



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Common Fleabane (*Pulicaria dysenterica*)

A very hairy, **rhizomatous** perennial up to 1m tall. It has alternate leaves which are **sessile** on flowering stems, and can produce large quantities of yellow flowers late in the year. Unlike many other species we've spoken about, this is **a plant of damp and wet places.**

Flowers Aug-Sep



Common Reed (*Phragmites australis*) 🌸

A perennial, rhizomatous grass **up to 3.5m tall**. The **inflorescences** are purple and made up of many **spikelets** which are 8-16mm long. When not in flowering, it can be distinguished from similar species by its ligule which is made of a **fringe of hairs**. It's preferred habitat includes wet places.

Flowers Aug-Oct



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Fairy Flax (*Linum catharticum*) ☼

An **small annual plant** which grows to 25cm tall. The plant is glabrous, has **oblong leaves with a single vein** running through them and has **white flowers with five petals**. Like Carline Thistle and Blue Fleabane, this species is a real calcicole!

Flowers Jun-Sep



Hare's-foot Clover (*Trifolium arvense*)

A small, hairy annual up to 20cm tall. This plant has **trifoliate** leaves, with each leaflet being oblong. **Flowers are white to pink** and all packed into dense flowering heads which give the appearance of a hare's foot. Most often **found within early successional habitats** on dry, often sandy soils.

Flowers Jun-Sep



Heath Speedwell (*Veronica officinalis*)

A low-growing perennial **calcifuge** that sprawls along surfaces and is able to root at the nodes. It has **serrated, hairy and obovate leaves** and **produces spikes of blue, four-petalled flowers** in mid to late summer.

This plant's preferred habitat includes **acid grasslands and heaths** on well-drained soils. On brownfield sites, you might find this plant on leached industrial waste or sand quarries.

Flowers May-Aug



Himalayan Balsam (*Impatiens glandulifera*)

A tall annual and highly **invasive plant** to 2m in size. This plant is **glabrous** and tends to have a sheen to stems and leaves which are often tinged purplish. Flowers are pink or white and produced during late summer and autumn, while plants may be found by **water courses and in wet places**.

Flowers Jul-Oct



Japanese Knotweed (*Reynoutria japonica*) 🌸

A tall, rhizomatous perennial and highly **invasive plant** to 2m in size. This plant is similarly glabrous, with green stems spotted red and heart-shaped leaves. The white flowers occur in dense clusters in late summer.

This plant is found across a variety of habitats, and is especially common by **rivers, railways and roads**.

Flowers Aug-Oct



Mugwort (*Artemisia vulgaris*)

A tall, **aromatic** perennial plant up to 1.5m tall. Leaves are dissected and glabrous on the upper surface, but white and **tomentose** on the lower surface. The **inflorescence** is made up of many collections of smaller flowering heads, whilst this plant is **most commonly found across rank habitats** and on waste ground.

Flowers Jul-Sep



Orchids (Orchidaceae)

Orchids are perennial plants of low-nutrient soils. Many are calcicoles and produce **basal rosettes**. Leaves are often fleshy and have **unbranched veins** that run down them. Flowers are characterised by **three sepals, and three petals** which includes a lower, modified petal (**the labellum/lip**).

Flowering time variable but usually mid to late summer



Common Spotted
Orchid
(*Dactylorhiza fuchsii*)



Pyramidal Orchid
(*Anacamptis pyramidalis*)



Bee Orchid
(*Ophrys apifera*)

Oxford Ragwort (*Senecio squalidus*)

A small, **glabrous or sparsely hairy** annual or perennial to 50cm tall. Its leaves are highly dissected, whilst its yellow flowering heads are produced in **diffuse inflorescences**. The preferred habitat of this plant includes waste ground, waysides and walls.

Flowers May-Dec*



Red Bartsia (*Odontites vernus*)

A small annual and **hemiparasitic** plant up to 50cm in height. This plant has toothed leaves in opposite pairs which **become purple further up flowering stems**. Long flowering spikes are produced during summer with pink flowers and usually **lean to one side**. This plant is an early successional species which **requires disturbance** and may be found on arable land, waste land, in short grassland and on shingle.

Flowers Jun-Aug



Thyme-leaved Sandwort (*Arenaria serpyllifolia*)

A small annual up to 30cm in height although generally much shorter. It has small, ovate leaves which grow in opposite pairs on branching stems and bears white flowers with **petals shorter than sepals**. It grows on all manner of well-drained, **often calcareous soils**.

Flowers Jun-Aug



Viper's Bugloss (*Echium vulgare*) 🌸

A bristly biennial up to 1m tall that spends its first year forming a dense rosette. In its second year, it throws up flowering spikes coated in **blue flowers**, each to **2cm across**. This plant is **another calcicole** and can be found on free-draining soils.

Flowers Jun-Sep



Weld (*Reseda luteola*)

A glabrous biennial up to 1.5m in height which also forms a rosette in its first year. During summer, **plants produce tall stems with elongated flowering spikes**, with each flower producing small, yellow petals to 6mm across. This plant grows on a range of **disturbed sites on calcareous substrates**.

Flowers Jun-Aug



Wild Mignonette (*Reseda lutea*) ☼

A branching, glabrous biennial or perennial up to 75cm tall. Unlike its close cousin Weld, **this plant produces leaves which aren't linear, but deeply divided**. Flowering spikes are very similar to those of Weld, although generally smaller. Wild Mignonette can be found across a range of calcareous disturbed soils, although is often commoner by the sea.

Flowers Jun-Aug

