IMPORTANT INVERTEBRATE AREA PROFILE

Mid Cornwall

Left: Goss Moor © Andrew Smith (CC BY-SA 2.0). Right: Heath Fritillary (*Melitaea athalia*) © Ryszard Szczygieł, butterfly-conservation.org

The Mid Cornwall Important Invertebrate Area (IIA) includes a chain of inland sites around Wadebridge, Bodmin and St Austell, together with three stretches of the north coast. The inland sites north od St Austell belong to the Hensbarrow National Character Area, which is known for extensive mineral extraction, with the china clay deposits here believed to be the largest in the world. The abundant china industry markers including the white terraces, conical heaps, chimneys, kilns and dams are interspersed with lowland heathland and peatland of European importance, creating an unusual and unique landscape.

Goss Moor National Nature Reserve (NNR) / Breney Common and Goss & Tregoss Moors Special Area of Conservation (SAC) in the south-west of the IIA marks the edge of an extensive mosaic of high-quality sites for invertebrates with wet and dry heathland, culm grassland, lowland fen, moorland, and wet and dry woodland habitats. The NNR/SAC is part of the larger Mid Cornwall Moors Site of Special Scientific Interest (SSSI) that stretches nearly to Lostwithiel, forming the best area in Cornwall for Marsh Fritillary (*Euphydryas aurinia*). The area around Goss and Tregoss Moors in the west supports an assemblage of beetles including the rove beetle *Ischnosoma longicorne*, the weevil *Neophytobius muricatus*, and Gravel Water Beetle (*Hydrochus nitidicollis*) which can be found in gravel pits. In the east, Breney Common and Red Moor support the Endangered spiders Gentle Groove-head Spider (*Tapinocyba mitis*) and Ground Dwarf-spider (*Wiehlea calcarifera*), and the cranefly *Prionocera pubescens*. North of the A30, Retire Common supports the only Cornish records of the Devon Globetail hoverfly (*Sphaerophoria potentillae*). Similar habitat north of Goss Moor at Rosennanon and Trelow Downs,

and Borlasevath and Retallack Moor SSSI support the European Vulnerable Moss Carder Bee (*Bombus muscorum*) and the ant nest parasite Limestone Ant Fly (*Microdon mutabilis*).

South and west of Bodmin lies a series of wooded valleys with fast-flowing streams that cut north to south through the area and support many woodland and wood-associated rare invertebrates. The National Trust's Lanhydrock parkland with ancient trees supports the spiders Brown Zodarion (*Zodarion fuscum*) and Lichen Running-spider (*Philodromus margaritatus*), and the woodpecker fly *Medetera inspissata*. Woodland habitat around the River Fowey at Forestry England's Cardingham Woods and Cornwall Wildlife Trust's Cabilla and Redrice Woods nature reserve are a combination of conifer plantation, temperate rainforest, upland oak woodland and wet woodland. The ancient south-facing wooded valleys provide the ideal habitat for Blue Ground Beetle (*Carabus intricatus*) and the Endangered Serrated Tongue-spider (*Centromerus serratus*). Other rare species that can be found here include the Cloaked Pug moth (*Eupithecia abietaria*), the false darkling beetle *Hypulus quercinus,* and the polypore fungus beetle *Tetratoma ancora*. The only wooded site in this large area that benefits from protection is the ancient woodland and parkland of Boconnoc Park & Woods SSSI with further records of Blue Ground Beetle. Further west, south of Wadebridge, lies another high-quality conifer habitat at Hustyn Wood with more Serrated Tongue-spider populations and Striped Flea Beetle (*Phyllotreta striolata*) by the River Camel. The presence of several small mines as well as signs of medieval tin streaming across woodland in these areas, adds unique and important micro-features such as rocky mosaics and less boggy areas in wet woodlands, which are especially important for wet woodland invertebrates.

On the north coast, three stretches of coastal habitats that are within the Cornwall Natural Landscape are also included in the IIA. The presence of old mineshafts in this coastal stretch, causes any surface water to quickly drain down the shafts, creating an unusually arid scree environment, which is especially important for spiders as well as ground-nesting bees and wasps. West of Padstow, the Trevose Head and Constantine Bay SSSI's maritime grassland supports Common European Thief Ant (*Solenopsis fugax*), a species that builds their nests close to other ant species and steals their food. Further east, the maritime grassland, scrub and cliffs at Pentire Peninsula SSSI and the coastal stretch up to Port Quinn support the Critically Endangered Dorset Mesh-weaver (*Altella lucida*), the Endangered Nose Gallows-spider (*Lasaeola prona*), the flea beetle *Longitarsus obliteratoides*, and the weevil *Cathormiocerus maritimus*. Lastly, the maritime grassland and coastal slopes around Tintagel are interspersed with unique rocky screes resulting from slate quarries, which support the same rare spiders as well as the leaf beetle *Apteropeda splendida*, and the dung beetle *Chilothorax paykulli*.

Reasons for selection

The Mid Cornwall IIA supports at least 29 qualifying IIA species of conservation concern. The area supports the following species which are endemic, Critically Endangered or Endangered on a national scale, or threatened on a European scale:

- Endemic British Cave Shrimp (*Niphargus glenniei*)
- Critically Endangered Dorset Mesh-weaver (*Altella lucida*)
- Endangered Serrated Tongue-spider (*Centromerus serratus*)
- Endangered Gentle Groove-head Spider (*Tapinocyba mitis*)
- Endangered Ground Dwarf-spider (*Wiehlea calcarifera*)
- Endangered Nose Gallows-spider (*Lasaeola prona*)
- European Vulnerable Moss Carder Bee (*Bombus muscorum*)

Blue Ground Beetle (*Carabus intricatus*) © John Walters

The IIA also supports the nationally Vulnerable species of Brown Zodarion, Gravel Water Beetle, Striped Flea Beetle, Devon Globetail, Marsh Fritillary and the weevil *Cathormiocerus maritimus*. Nationally, the Mid Cornwall IIA is the only area that Ground Dwarf-spider and Dorset Mesh-weaver have been found in the UK in the last 30 and 50 years respectively. Devon Globetail is only known from Devon and Cornwall, the site entailed within this IIA is the only site it's known from in Cornwall. This IIA is also a stronghold for other species including the leaf beetle *Apteropeda splendida* and Gravel Water Beetle.

Additionally, this IIA is also regionally important in the South West for a number of other rare or declining bee and butterfly species (but not IIA qualifying species) including Large Scabious Bee (*Andrena hattorfiana*), Pearl-bordered Fritillary (*Boloria euphrosyne*) and Small Pearl-bordered Fritillary (*Boloria selene*).

These important invertebrate populations rely on the Mid Cornwall IIA's unique range of habitats from wet and dry heathland, peatland, wet woodland, and coastal grassland and cliffs. Whilst parts of the IIA are under some form of legal protection (e.g. SSSI, SAC), there are considerable portions that are outside of any designated areas.

Key habitats for rare invertebrates in the IIA

Using the Pantheon analytical tool, we identified some of the key habitats and microhabitats for the selected rare invertebrates, and listed a selection of invertebrates associated with them.

Dorset Mesh-weaver (*Altella lucida*) © Tylan Berry

- **Short sward and bare ground** (including litter & ground layer; stones, boulders, shingle and scree; sward/field layer; exposed sand; and dung) e.g. Brown Zodarion, Common European Thief Ant, Dorset Mesh-weaver, Nose Gallows-spider, Ground Dwarf-spider, the leaf beetle *A. splendida* and the dung beetle *C. paykulli.*
- **Tall sward and scrub** (including sward/field layer; litter & ground layer; and nests; and soil & roots) e.g. Devon Globetail, Marsh Fritillary, Moss Carder Bee, the weevil *N. muricatus*, Gentle Groove-head Spider, Limestone Ant Fly and Striped Flea Beetle.
- **Decaying wood** (including red rot; bark & cambium; and dead trunk & branches) e.g. the false darkling beetle *H. quercinus*, the woodpecker fly *M. inspissate* and the polypore fungus beetle *T. ancora*.
- **Arboreal** (including mature tree canopy; and trunk & branches) e.g. Cloaked Pug and Lichen Running-spider.
- **Running water** (including exposed riverine sediments) e.g. Gravel Water Beetle and British Cave Shrimp.
- **Sea cliff** e.g. the weevil *C. maritimus* and the leaf beetle *L. obliteroides*.
- **Acid and sedge peats** (including sphagnum/moss lawn) e.g. the cranefly *P. pubescens*.
- **Wet woodland** (including woodland litter) e.g. Blue Ground Beetle.

Other habitats that don't have any qualifying species but are important in supporting the wider invertebrate assemblages in the IIA include:

- **Shaded woodland floor**
- **Marshland**
- **Lake**

Habitat Threats and Opportunities

Heathland

Threats

- Poor management or implementation of the same management approach too widely can lead to uniform heathland habitats that lack structural and age variation, reducing their value for invertebrates.
- Overgrazing can lead to a loss of heather stands,

creating open grass-dominated areas and making them more prone to be invaded by competitive plants such as Bracken. Conversely, lack of management or undergrazing can lead to a loss of bare ground, soil disturbance and succession to scrub and woodland.

- The loss of wet habitat features on wet heathland sites, bog and heathland carr due to drainage or otherwise changing hydrology can significantly reduce their value for invertebrates.
- Habitat fragmentation due to development pressure or agricultural improvement can create isolated patches of habitat, making dispersal harder and lowering the genetic diversity of invertebrate populations.
- Fire is a growing threat to remnant heathland sites, with the potential for smaller sites to be irreparably damaged through a single incident.
- Footpaths receiving moderate use can be of very high value to invertebrates (e.g. by maintaining open bare ground). But excessive recreational pressure such as motorcycle activity or horse riding can alter vegetation communities through trampling, soil compaction and erosion, damaging habitat and affecting continuity.

<u>Opportunities</u>

- Aim to produce a mosaic of heathland successional stages to support the highest number of invertebrates. These should include bare and disturbed ground, moss and lichen-dominated areas, grasses, flower-rich areas and young heather plants, through to tall swards with establishing and established blocks of mature heather, scrub and scattered trees.
- Aim to establish grazing of appropriate stocking levels, avoiding under or overgrazing, to maintain a mosaic of heathland structure. Cattle tend to produce a more varied vegetation structure than sheep and their greater weight will suppress Bracken growth and provide areas of disturbed ground.
- Provide bare ground and early successional vegetation, which provide basking, nesting and hunting opportunities for ground-active invertebrate species as well as opportunities for key early successional flowering species. If grazing is not available, this can be achieved via rotational cutting and scraping of the soil surface to create exposures.
- Consider excluding grazing from some areas all year round to provide permanent cover and opportunities for species using standing stems and seed heads to complete their life cycle. While too much Bracken can be a problem, it does support rare sawflies and flies, so areas of Bracken, both shaded and in the open, should be retained.
- Restore degraded or damaged heathland sites, including the removal of trees from plantation sites and restore open heathland habitat mosaics across the landscape to improve connectivity and to provide opportunities for invertebrates to develop resilient populations.
- Protect existing valley mires, wet heath, streams and ponds.
- Retain dead and decaying wood.

Left: Common European Thief Ant (*Solenopsis fugax*) © Gilles San Martin (CC-BY-SA). Right: Striped Flea Beetle (*Phyllotreta striolata*) © komet2022 (CC-BY-NC)

Peatlands

Threats

- Changes in hydrology caused by drainage ditches or presence of peat cliffs (steep slopes following peat extraction or disturbance) can result in peatland drying out and the loss of water features for invertebrates.
- Low water tables lead to more favourable conditions for scrub and tree encroachment, which in turn leads to the loss of Sphagnum habitats through compaction, overshadowing and increased evapotranspiration of stored water by the scrub.
- Burning, whether controlled or uncontrolled, can lead to total destruction of this habitat and its invertebrates and is not advised.
- Historically, large areas of peatland were lost through incentivised afforestation of conifer plantations. Any peatland habitat left in the vicinity of the plantations or which is being restored from forest to bog, is under the threat of scrubbing over in the absence of an appropriate grazing management plan.
- Competitive species (e.g. Purple Moor Grass, heather, Rhododendron, Birch) can negatively affect the vegetation and structural composition of peatland habitats.
- Nutrient enrichment through aerial deposition or water run-off can cause increased damage to Sphagnum moss.

Opportunities

- Re-wet degraded peatlands to restore active hydrological processes and water tables through the blocking of ditches, purchase of additional land and removal of tree cover.
- Restore damaged and degraded peatland through the installation of peat bunds and reprofiling of sharp edges to reinstate its water-retention abilities.
- Where necessary, introduce conservation grazing to reach an appropriate grazing pressure to control competitive species and tree encroachment, and to create a diverse sward structure.
- Avoid using any kind of burning as a tool to manage vegetation (e.g. heathers) on peatlands. Instead, rewet peatland habitat which can act as a natural firebreak in the wider landscape.
- Keep peatland in favourable condition and avoid it drying out as this can exacerbate tree encroachment and the spread of competitive species.
- Target restoration work around or near to existing high quality peatland sites, to improve connectivity and to provide opportunities for invertebrates to develop resilient populations.
- Control the input of extra nutrients and chemicals inside the whole water catchment area, not only in the core portion of the bog.

Woodland and trees (including temperate rainforest)

Threats

- Historical damage of woodland through industrial use and large-scale conifer timber planting resulted in direct habitat loss of native woodland, causing a slow recolonisation rate of invertebrates into some of these areas.
- Loss of woodland grazing or management such as

Left: The false darkling beetle *Hypulus quercinus* © Romas Ferenca (CC-BY-NC). Right: Serrated Tongue-spider (*Centromerus serratus*) © Tylan Berry


Left: Cloaked Pug (*Eupithecia abietaria*) © Jaro Schacht (CC-BY-NC). Right: The cranefly *Prionocera pubescens* © Raimo Peltonen

maintenance of rides or coppicing, can lead to woodlands becoming shaded and the development of Ivy, Holly or bramble thickets, significantly impacting ground flora vegetation that provides nectar and pollen sources for invertebrates.

- Overgrazing and disturbance by deer, squirrel or rabbit populations prevents young trees from being recruited creating a uniform tree age structure, reduces ground layer vegetation and creates difficulties for woodland regeneration.
- Important veteran trees and decaying wood sources are often at risk from overzealous management, including the tidying-up of standing and fallen trees, over-pruning and collection of fallen material for firewood. Lack of spatial and temporal continuity of veteran trees can affect the dispersal of associated specialist species and lead to the loss of populations.
- Fragmentation of woodlands can lead to inability of invertebrates to move between blocks of habitat.
- Invasive non-native species (e.g. Rhododendron, Sycamore) can negatively affect the vegetation and structural composition of woodlands.
- Ash Die-back and other tree diseases and pests, which are exacerbated by the climate change, can result in changes in tree species and age composition.
- Pheasants and other non-native birds can impact invertebrate populations in woodlands by excessive predation.
- In temperate rainforest, inappropriate grazing pressure can negatively impact the recruitment and survival of lichens, bryophytes and epiphytes, thus affecting associated invertebrates. Too much grazing can strip trees and boulders of lichen and moss mats, while too little grazing can cause lichens and mosses to be overshaded by fast-growing vascular plants and unable to grow. Sheep can be especially damaging in temperate rainforest because they specifically target and browse off new saplings.
- In temperate rainforest, stands of Hazel are likely to hold significant conservation value in terms of bryophytes, lichens and fungi, supporting associated invertebrates. Hazel is also an important part of the mitigation plan for the impacts of Ash Die-back.
- In wood pasture and parkland, sustained high levels of grazing can result in low wildflower numbers and no recruitment of new trees, causing gaps in tree age structure and no suitable habitat for specialist veteran tree invertebrate species.

<u>Opportunities</u>

- Overall, aim for a mix of deadwood, healthy live trees, young saplings, scrub areas and open spaces such as glades, rides or scallops. In addition to the increased light levels in the forest, rides create varied woodland edge microhabitats and allow grasses and wildflowers to regrow.
- Consider long-term age structure, aiming to increase the recruitment of young trees and ensuring a continuity of mature trees. This can be achieved through practices such as coppicing and thinning. Additionally, mark out ‘future veteran’ trees to ensure the existing veterans will be replaced in the future.
- Maintain/re-establish light grazing regimes in ancient woodlands to manage understorey vegetation.

- Retain all deadwood, both standing and fallen, in situ and discourage the collection of firewood. Additionally, retain trees showing decay features and do nothing to damage those features.
- In temperate rainforest, extensive grazing is the only practical method of maintaining important lichen and bryophyte-rich woodlands in the long term. Follow existing rainforest assessment guidance available online to assess the current grazing level effectively and create a targeted management plan for a temperate rainforest site.
- In temperate rainforest, do not undertake coppice management of Hazel or underplant with other species. Consider creating new pure stands of Hazel, if appropriate for the site.
- Promote tree growth of suitable tree species land between existing woodland sites to extend and reconnect fragmented patches of woodland.
- Control or remove invasive and competitive species such as Rhododendron, Japanese Knotweed, Sycamore and bramble.
- In wood pasture and parkland, create sensitive and flexible grazing management plans with the aim to create a mosaic of habitats with young trees being recruited and areas of open grassland or heathland ground vegetation. Retain all existing old trees where possible and retain deadwood of all ages, both standing and fallen.

Wet grassland (including culm grassland)

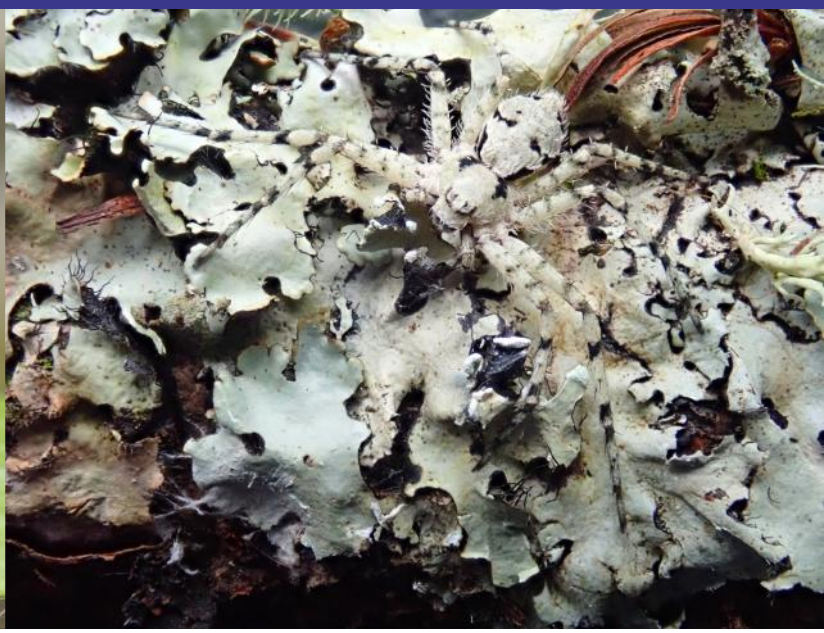
Threats

- Water pollution through chemicals, nutrients and sediment from agriculture, sewage discharges and road run-off can directly kill or alter populations of invertebrate and plant species.
- Grassland 'improvement' through drainage, ploughing, re-seeding, fertiliser and slurry application, and conversion to arable reduce invertebrate biodiversity through direct habitat loss and reduction in foodplants, flower and pollen resources.
- Lack of grazing management or abandonment leads to an excessive spread of Purple Moor Grass, scrub and thatch, eventually turning sites into wet scrubland and woodland. This causes the loss of structural mosaic in the sward and reduction in flowering-plant diversity and associated invertebrates.
- Over-stocking or bringing heavy machinery onto sites, especially in the wetter months can cause soil compaction, leading to excessive spread of competitive species such as rush and docks, at the cost of other wildflowers.
- Extensive grazing, especially with sheep and over the spring and summer months, can cause a short uniform sward and inability of wildflowers to bloom and set seed.
- Changes in the water levels as a result of land drainage, flood alleviation engineering, or gravel and surface and ground water abstraction can lead to drying out of the sites and removal of valuable seasonal and permanent wet habitat features for invertebrates.
- Endectocides used in the treatment of livestock parasites can negatively affect dung beetles and other dung invertebrates.

Opportunities

- Avoid grassland-damaging practices such as drainage, ploughing, re-seeding, fertiliser treatment and slurry application.
- Establish conservation-led grazing regimes which avoid excessive poaching or scrub establishment and aim to create a mix of taller tussocks of Purple Moor Grass as well as open and shorter areas favouring other flowering plants. This structural diversity will support the widest diversity of invertebrates, including rare species such as Marsh Fritillary, which is dependent on the presence of both grass tussocks and Devil's-Bit Scabious.
- If possible, avoid grazing by sheep and use ponies or cattle instead, ideally hardy breeds that are lighter in weight and can cope with wetter ground and feeding on rush and Purple Moor Grass.
- Avoid compaction by lowering stocking densities during the wet months and perform any

Gravel Water Beetle (*Hydrochus nitidicollis*) © Cédric Alonso (CC BY NC)

Left: Limestone Ant Fly (*Microdon mutabilis*) © Francis Birlenbach (CC BY NC). Right: Lichen Running-spider (*Philodromus margaritatus*) © Tylan Berry

mechanical works required in the dry months of the year.

- Restore natural hydrological processes to re-wet drained grasslands through blocking of ditches and removal of tree cover. Local water companies and landowners should be made aware of the sensitivity of wet grasslands to changes in water abstraction patterns or groundwater quality.

Coastal cliffs and slopes

Threats

- Cliff stabilisation measures can disrupt the dynamic natural processes of erosion and slippage that shape cliffs with soft geology, leading to stabilisation and the loss of habitats such as friable bare ground and early successional vegetation stages required by many cliff-dwelling invertebrates.
- The use of fertilisers and pesticides and loss of low intensity grazing on adjacent land can negatively impact on soil-dwelling invertebrates reliant on high quality cliff top habitats for foraging or for dispersal.
- Wider water abstraction in the landscape and local artificial drainage to improve pasture and cliff stability can impact on freshwater seepages, cliff face springs, pools, small streams and wet mud, that are crucial to the life cycle of many rare and threatened species.
- The loss of natural processes such as slumping and slippage impedes the creation of new nesting habitat and the introduction of wildflower seeds to cliff faces from cliff top grasslands.
- Non-native species such as Sea Buckthorn and Sour Fig outcompete and shade out native species and adversely transform natural vegetation communities on cliff tops and slopes, tending to smother the bare ground required by many specialist invertebrates.
- Climate change increases the frequency of extreme storm surge events causing coastal slopes and cliffs to retreat faster than they would normally.

Opportunities

- Ensure Shoreline Management Plans recognise the importance of cliffs and slopes for biodiversity and avoid damaging management. Any activity that changes the natural rate of cliff or slope erosion, such as re-profiling or the introduction of coastal defences, should be avoided wherever possible.
- Maintain cliffs and landslips in a natural state, avoiding any changes to the character of the vegetation especially with respect to the pollen sources, bare ground extent and seepages.
- Restore species-rich cliff top grassland habitat mosaics to provide forage for cliff-dwelling species and to improve habitat connectivity along the coast. Ideally, management should aim to create a mosaic of short and longer vegetation mixed with bare and stony areas and patches of scrub, which can be achieved by grazing or cutting.
- Scrub encroachment and the extent of invasive plant should be monitored and managed.

Moss Carder Bee (*Bombus muscorum*) © Steven Falk

Cliff top grassland-scrub mosaic

Threats

- The direct loss of cliff top grasslands to intensive grazing and arable agriculture or development such as sea defences, caravan parks or golf courses, reduces the wildflower-rich habitats that cliff specialists utilise as a source of forage, for overwintering or to disperse between sites.
- Retreating cliff lines on many sections of coast have left only a thin remnant strip of cliff top wildflower-rich grasslands, leading to coastal squeeze.
- Overgrazing or grazing at the wrong time of year can lead to a loss of structural variation and a short sward that lacks the flowers and shelter needed by many invertebrates.
- Although limited scrub or patches of scrub provide important shelter, nectar and pollen, the loss of grazing or other management can lead to areas becoming dominated by thick grass, Bracken and scrub at the expense of valuable flowery grassland and bare ground.
- Applications of pesticides and herbicides directly impact invertebrate survival, can alter soil biology, function and soil invertebrate communities as well as leach out to the nearby coastal slopes and cliffs.
- While well-structured footpaths receiving moderate use can be of very high value (e.g. by maintaining open bare ground), excessive recreational pressure can alter vegetation communities through trampling, soil compaction and erosion – this can affect habitat continuity.
- Invasive non-native plant species (e.g. Cotoneaster) can negatively affect the vegetation and structural composition of cliff top grasslands.

Opportunities

- Enhance existing species-poor grasslands through changes in grazing management and overseeding/ green haying where appropriate, to improve connectivity between small and isolated cliff top grasslands.
- Although valuable in limited amounts or patches, dominant scrub on cliff top grasslands should be removed by cutting or grazing to encourage areas of wildflower-rich grasslands and scrub mosaic.
- Aim to produce a mosaic of successional stages, from bare ground in short sward areas, through to tall swards with establishing and established scrub.
- Restore species-rich grassland via arable reversion where opportunities occur.
- Try for flexible coastal squeeze solutions, moving inland in line with retreating coastlines to maintain the extent of useful cliff top habitat.
- When reviewing grazing strategies, consider reducing intensity and avoiding spring and summer grazing to enable wildflower species to flower and set seed. Winter grazing can help to encourage a more wildflower-rich sward by controlling grasses and creating germination opportunities.
- On agricultural land, create buffers (by planting wildflower strips of leaving tussocky grasses which are cut every 2-3 years) to improve the water quality of freshwater cliff features.
- Manage recreational pressures using fencing and signage to divert people away from sensitive areas.
- Control or remove invasive plant species.

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https://www.buglife.org.uk/our-work/important-invertebrate-areas/