Worcestershire County Council

BIODIVERSITY AND MINERAL SITES IN WORCESTERSHIRE

GUIDANCE FOR THE SUSTAINABLE MANAGEMENT OF BIODIVERSITY ACTION PLAN HABITATS AT WORCESTERSHIRE MINERAL SITES

TECHNICAL RESEARCH PAPER

"Biodiversity is the variety of all life forms around us. The inter-relations between different species and between species and habi.7yfbetwe

Executive Summary

Mineral companies are increasingly aware of the potential contribution and important role they play in biodiversity conservation. The minerals industry has already made a considerable contribution to the conservation of habitats and species across the country as well as here in Worcestershire. Many restored sites balance biodiversity conservation with the delivery of the broader ‘Green Infrastructure’ objectives and a considerable amount of knowledge and expertise has now accumulated in formulating, implementing and monitoring restoration strategies.

Working minerals in Worcestershire poses a unique opportunity: quarry restoration can contribute at a landscape scale towards Biodiversity Action Plan targets; providing a net-gain in biodiversity and improving the coherence and resilience of ecological networks, enabling wildlife to

2. A targeted approach: a clear and well-defined set of restoration goals will ensure that the most effective use of resources can be made. This document includes a framework to guide the decision-making process for a biodiversity-led approach to mineral site restoration. A clear set of priorities (refer to page 17) will help focus habitat restoration efforts to maximise their effectiveness through strategic location throughout the county. Additionally an appended ‘habitat creation toolbox' will help guide restoration strategies in identifying key actions and the means to achieve them.

3. Smart restoration aims: practical and creative restoration plans set out phased operations with clear timescales; are sensitive to pre-existing biodiversity interest and incorporate the principles of strategic habitat creation which include elements of natural regeneration and non-native species control from the outset in order to minimise capital expenditure and future maintenance costs.

To deliver this targeted approach, biodiversity-led restoration strategies should focus effort on creating and extending locally appropriate Biodiversity Action Plan habitats, especially in key locations (such as “Biodiversity Delivery Areas”). This will contribute most significantly to the existing and complementary conservation efforts. More detail on the habitats appropriate for these areas has been provided and a Habitat Creation Toolbox is appended to this document.

On the accompanying webtool[1] spatial synergies with other environmental initiatives are also identified so that, where minerals are extracted outside a Biodiversity Delivery Area, restoration plans can continue to ensure that biodiversity conservation efforts are tailored to a range of prioritised Biodiversity Action Plan habitats appropriate for that locality. More information on the habitats appropriate for each “Ecological Zone” in which minerals may be extracted is also provided within this document. Within Biodiversity Delivery Areas restoration strategies should contribute to the priorities identified by the

[1] available at http://gis.worcestershire.gov.uk/website/mineralspublishing/maps.aspx

Contents

1.1 The minerals industry has already made a considerable contribution to biodiversity (Nature After Minerals/RSPB, 2006[3]) with many positive effects such as the creation of lakes for wildfowl and deep hard rock quarries that provide nesting habitat for some of our rarest birds.

1.2.1 This paper has been prepared in partnership with Natural England, the Environment Agency, Forestry Commission, RSPB, Nature After Minerals and Worcestershire Wildlife Trust through a desktop review and drawing together of the key policies, guidance, emerging best practice and available evidence as it relates to Worcestershire. A consultation exercise has been undertaken with key stakeholders on the draft paper.

1.3.1 This is one in [redacted]ries of natural resource tech[redacted] research papers[4] prepared by W[redacted]estershire County Council.

1.3.2 The intended [redacted]ences for this paper are mineral industry operators, land-managers, ecologists, planning officers, Local Nature Partnership, the local strategic partnership, biodiversity partnership and other strategic stakeholders with an interest in biodiversity and mineral sites in Worcestershire.

1.3.3 Although the paper has benefited from scrutiny and consultation with stakeholders it ifrom

2.1. The approach for restoring mineral sites in the past has shown considerable diversity: while many sites are infilled with inert material and put to agricultural use, some sites have been restored for amenity use - frequently featuring large and regular shaped waterbodies supporting activities such as fishing or water-sports. Many sites have featured an area set aside for 'nature conservation' purposes and a number of restoration strategies have created multi-functional sites which deliver many of these features. In this paper a framework is established for a cohesive and spatially strategic approach to biodiversity-led restoration plans. This will maximise the benefits which can be delivered through mineral site restoration in Worcestershire. This supports the aspirations of Biodiversity 2020: a strategy for England's wildlife and ecosystem services (see information box) 0 0 (1 1TJET4(ate)4D13(E)/0 1 108.02 387.53 T1 1TJET4(ate)4D13(E)/e)4D13(E)/

2.2.2.

within this document. The plan must be developed as an integral part of the scheme's preparation, together with plans to address onsite and local ecology throughout the full lifecycle of the scheme. These plans must be submitted in support of an application for planning permission.

2.3.2 It is crucial that proposals for site restoration are accompanied by a site-specific restoration plan. This should identify

identify habitat networks which will likely be associated with future mineral working in Worcestershire (refer to the webtool at: www.gis.worcestershire.gov.uk/website/mineralspublishing/maps.aspx for further detail).

2.4.3. Current estimates on workable reserves within the emerging Minerals Local Plan are based BGS geological memoirs and on 1:50,000 scale British Geological Survey Digital Data

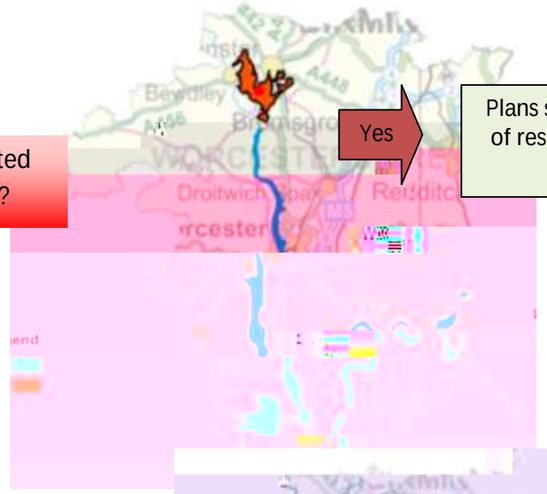
2.4.12. Given the anticipated focus on sand and gravel extraction within Worcestershire, this Framework focuses on the BAP habitats prioritised for conservation action within the Biodiversity Delivery Areas associated within the three Ecological Zones in which the Mineral Resource Areas are predominantly located.

2.4.13. Although much of the advice within the Habitat Creation Toolbox is appropriate when establishing, restoring or extending habitats at

reconnecting the existing natural assets.

Where located outside a BDA or similar target areas, and in areas identified as moderate-to-low biodiversity value, restoration plans can still make a significant contribution towards the cohesiveness and resilience of the surrounding BAP habitat networks:

Is the site located inside a BDA?

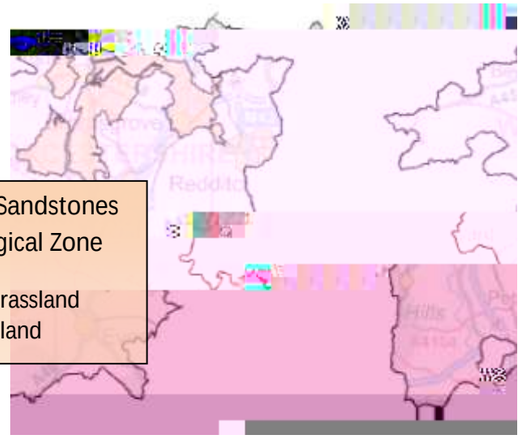


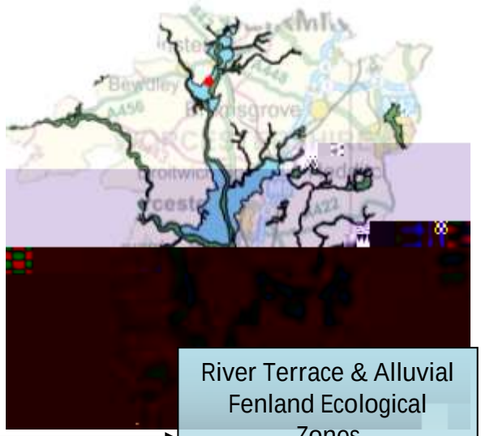
Yes

Plans should aim to contribute 100% of restoration area to following Key BAP habitats:

Forest Sandstones Ecological Zone

- Acid grassland
- Heathland

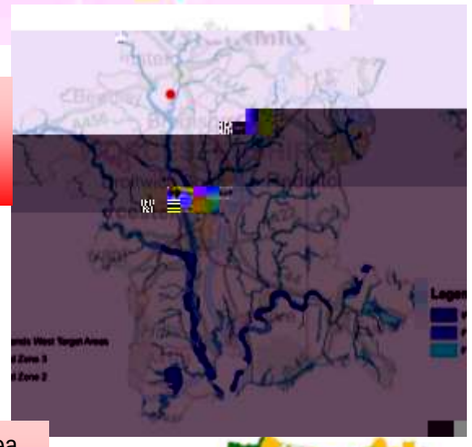




River Terrace & Alluvial Fenland Ecological Zones

- Fen & Marsh
- Wet grassland
- Neutral grassland
- Rivers & streams
- Wet woodland
- Reedbeds

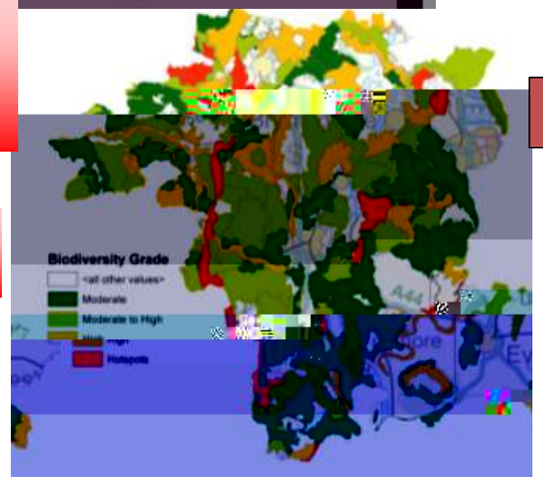
Is the site located inside Flood Zones 2 or 3, or within Wetlands West target area



Yes

BAP habitats can provide flood water attenuation and alleviation features and should comprise a significant (>50%) proportion of the restoration plan

Is the site located inside an area identified within the Biodiversity Basemap as having "Moderate" or greater value.



Yes

Is this an extension of an existing minerals site?

Extraction located on existing BAP habitats...

Within certain areas (especially where identified in the Worcestershire Habitat Inventory) there will be elevated risks of impact to existing BAP habitats and species through mineral working.

In these cases the County Planning Authority will anticipate that applications will contain sufficient detail to demonstrate the avoidance, mitigation and/or compensation of impact to these features and a commitment to the long-term management of such sites for the benefit of biodiversity. It will be anticipated that restoration plans (or other strategies such as compensation or enhancement measures secured through biodiversity offsetting) will ensure 'no-net-loss' for biodiversity is achieved.

Compensation for BAP habitat loss should achieve a net increase in BAP habitat provision.

2.5.1. The National Planning Policy Framework sets out the general principles of development with regards biodiversity interest (also known as the 'development hierarchy'). Paragraph 118 states the aims of biodiversity conservation and enhancement: to avoid significant harm (e.g. through locating development on alternative sites which pose less harmful impacts). Or, failing this, by providing adequate mitigation to minimise the damage caused or, "as a last resort" compensating for such damage.

2.5.2. Following the guidance proposed in Lawton (2010), in implementing the Restoration Framework, restoration plans should adopt the following principles:

2.5.3. Where mineral extraction is proposed which would adversely impact BAP habitats, this would only be supported where the following measures can be secured:

- Adequate protection for habitats which will be indirectly impacted (e.g. noise, vibration, dust, de-watering). This might be through buffering (e.g. through new habitat creation), or through phased operations and careful timing of certain stages of extraction (to avoid more significant impacts).

- Adequate mitigation for any direct impacts, e.g. through new habitat provision, contributions to habitat monitoring and management (not necessarily financial).

- Adequate compensatory measures such as new BAP habitat provision (preferably onsite, but potentially achieved via offsite habitat creation and management where this can be secured e.g. by S.106). Habitat translocations can have significant cost implications and a long-term commitment to monitoring and management of translocated habitats will be anticipated.

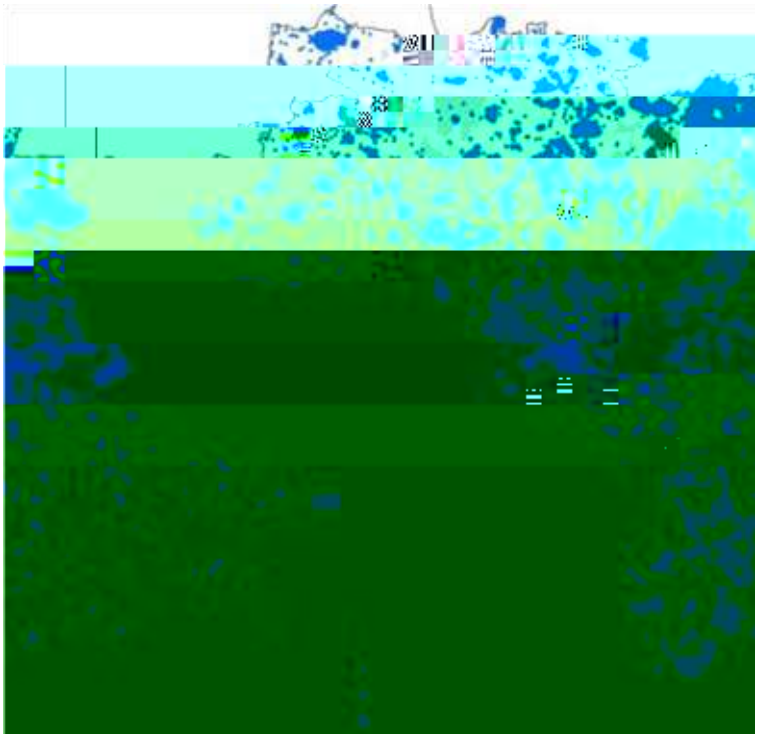
- Adequate enhancement measures: where an adverse impact to BAP habitats is likely, developments should achieve more than "no-net-loss" for biodiversity by restoring a significantly larger extent of those habitats destroyed by mineral working.

- Where mineral extraction is proposed **abutting a BAP habitat**, restoration strategies should aim to **extend the existing BAP habitats** using sympathetic seeding or planting, preferably using the adjacent habitats as a cheap source of vegetative material.

- Where mineral extraction is proposed **in the proximity** of known BAP habitats(e.g. within 500 meters), the restoration plan should aim to make a significant contribution (e.g. >50% of

- Creation of buffers to prevent colonisation of the working area by protected species (such as a network of ditches and ponds which mediate dispersal of reptiles and amphibians in areas protected from heavy vehicle movements).

- Creation of new BAP habitat on completed sections of quarries or land marginal to working quarries to



contribute to the network of local BAP habitats. Even as a transitory habitat these features can offer valuable opportunities for wildlife.

"the aftercare perÐÖË?ÔÌÈÕÚÈ×ÌÙÐÖËÖÍÍÐÝÌ years from compliance with the restoration condition or such other maximum period after compliance with that condition as may be prescribed; and in respect of any part of a site, the aftercare period shall commence on compliance with the restoration condition in respect of that part.

Town and Country Planning Act, 1990 (as

2.6.2. The Worcestershire Habitat Inventory can be used to identify where new wetland features will contribute most significantly in the county. In the example below the network of standing water in the county is highlighted; where larger numbers of ponds are found within 500 meters of each other larger blue aggregations indicate the strength of the waterbody network. Such networks are essential for species such as wading and wintering birds and amphibians who exist in 'meta-populations' and require a strong network of ponds in order to survive; for instance great crested newts are generally believed to disperse up to around 500 metres from a breeding pond, and therefore the number of good quality ponds or lakes in an area is likely to be a constraining factor in the viability of a great crested newt meta-population. The mapping resource can therefore indicate where new ponds or lakes can contribute to defragmenting the existing network, and also where networks can be extended into areas where water-features have been lost. Even temporary water-features created during phased extraction can have significant value to species such as great crested newts (temporary ponds rarely having the opportunity to accumulate species which predate newts), but mineral operators must plan carefully to ensure that wildlife is duly protected during operational phases, for instance creating set-asides and safe corridors for movement of wildlife and vehicles.

2.6.3 Further advice with regards priority habitats and species found within the sand and gravel mineral resource areas is provided within Appendix 2.

3.1.1 The three Ecological Zones in which sand and gravel deposits are found (thought to be of principle interest for BAP habitat gain in Worcestershire in the foreseeable future) are the focus of this Framework: Worcestershire's River Terraces, Alluvial Fenlands, and Forest Sandstones. Further information on Worcestershire's Ecological Zones can be found in Trees and Woodland in Worcestershire[19], a document accompanying the Worcestershire Woodland Guidelines[20].

3.1.2. John Day's work defining Worcestershire's Natural Areas, on which the Ecological Zones have in part been based, can be found at: www.wbrc.org.uk/worcRecd/Issue10/natarea.htm.

Fig 4 - Worcestershire's River Terraces (highlighted here in blue)

3.2.1 The river terraces mainly represent the ghosts of the ancient rivers extending back in time some half a million years. They are associated with the county's rivers and streams, occurring mainly in the valleys of the Severn, Avon, Stour, Salwarpe and as smaller downwash areas from local high ground such as the Cotswold Scarp, Bredon Hill, Bromyard Plateau, Clent and Lickey Hills. They frequently run parallel courses to the rivers and occur as localised raised plateaus above the watercourses. Soils are light, freely draining, sandy and have a high pebble content. Natural fertility and pH are low.

3.2.2 This is an intensively managed landscape and the majority of the terrace landscape is devoid of semi-natural habitats. The main land use is arable cropping but significant areas are under urban development and mineral extraction sites for sand and gravel.

3.2.3 Mineral workings have over the past fifty years provided the main locus for biodiversity on the river terraces. They have the potential to rejuvenate the diversity of habitats and reintroduce wetlands to a largely drained and dry landscape. The lowering of the ground levels and the removal of sand and gravel in the river terraces often provides conditions similar to those that naturally occur in the alluvial fenlands. In these situations, it is important to make reference to, and consider t neETBT1 0 0 1 351.43 703 4967(t i9 d51.43

[19] www.worcestershire.gov.uk/cms/worcestershire-woodland-guide.aspx

[20] www.worcestershire.gov.uk/cms/worcestershire-woodland-guide.aspx

Fig 5 – Showing Worcestershire's Forest Sandstones

principal component species. Holly can also be found locally. There is a smaller but important group of ancient boundaries. The hedgerow resource is generally in a poor and declining condition.

- The **woodland** resource is varied. The region was cleared early and Ancient Woodland sites are very few and of high conservation value. They are confined to

Fig 6

semi-natural and more biodiverse). It occurs mainly within the Stour catchment and on former brickworks in the Severn valley. Included here are a number of interesting Willow woodlands. Most tree cover is associated with linear belts along watercourses.

- **Neutral permanent grasslands** are an extensive and important component of the landscape. These sites are naturally eutrophic with a limited species composition. Most of the resource is improved but a significant proportion can be classed as semi-improved. Unimproved flood meadows are scarce but characteristic of the alluvial flood plains. Included here are some traditional large and commud cl0 1 90.024 553s mf can

an p mosaands

3.6.3 A key aim of the Partnership is to "Work with the aggregates industry and appropriate partners to develop wetland habitat creation opportunities linked to mineral extraction sites and plans most especially reedbed and wet woodland".

3.7.1 Acid grassland and heathland is a particularly uncommon habitat in Worcestershire (recorded acid grassland covers just under 0.5% of the county) and are both habitats particularly vulnerable to fragmentation and insensitive habitat management such as heavy grazing, development pressure, afforestation and nutrient enrichment. When in favourable condition the habitats support a wealth of specialist and scarce invertebrates, small mammals, reptiles, bird species of conservation concern and uncommon plants. Recorded heathland covers around 0.1% of the county.

3.7.2 These habitats are heavily dependent on the underlying geology and outside several large nature reserves exist scattered and fragmented sites largely in private ownership. Although acid grassland can be found in mosaics with heathland along the flanks of the Malvern Hills, the same habitats can be found patchily distributed on the urban fringes of Kidderminster, Bewdley and Stourport in the North of the county. Here these habitats are under considerable human pressure and have been prioritised through the partnership's designation of a Biodiversity Delivery Area.

3.7.3 The Worcestershire Biodiversity Partnership aims to create 13 hectares of new heathland in Worcestershire by 2017 and sand and gravel extraction can contribute significantly towards these targets.

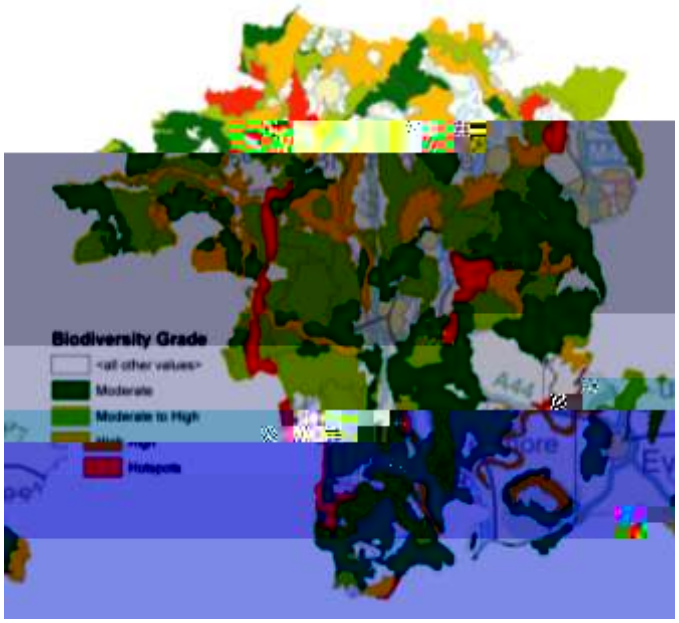
3.7.4 Much of the land surrounding the BDA

3.8.1 The Worcestershire Local Sites Partnership[23] has already recognised much of Worcestershire's most valuable BAP habitat through the Local Site listing process and is responsible for approving any new sites and ensuring reporting is undertaken on an annual basis: contributing to the monitoring of progress against national and local indicators as well as Worcestershire State of the Environment targets. Currently Worcestershire has:

Four National Nature Reserves (NNR)
Two Special Areas of Conservation (SAC's)
114 Sites of Scientific Interest (SSSI's)
553 Local Sites (LS's)
44 Roadside Verge Nature Reserves (RVNR's)

3.8.2 Although much fragmented and reduced in area, Worcestershire's contribution to the country's natural environment is significant, the West Midlands is thought to contain:

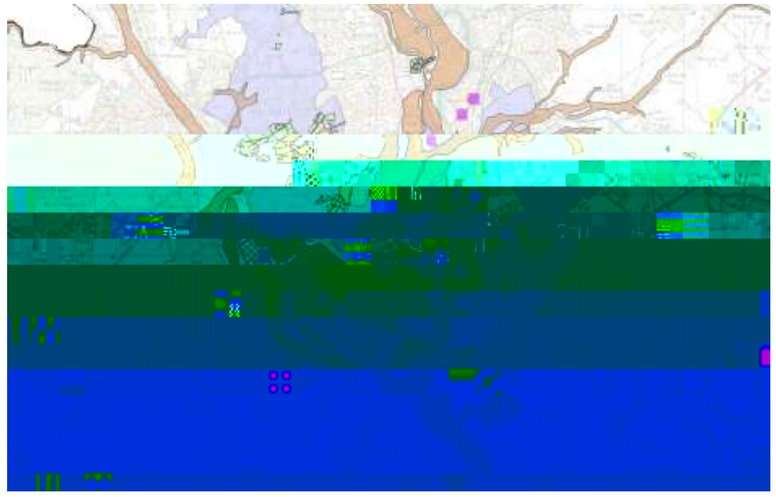
9% of England's total lowland heathland
20% of England's total of lowland meadows
10% of England's broad-leaved woodland, and
9% of England's total lowland woodland parkland and pasture.

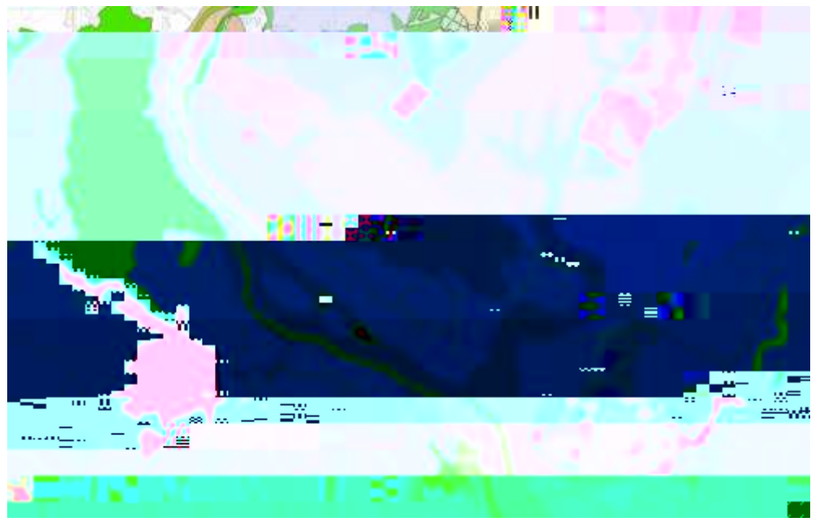


3.9.1 Analysis of a combination of datasets which includes the known networks of ancient woodland, grasslands, heathland, veteran tree distribution and ancient countryside was

[23] www.worcestershire.gov.uk/cms/ecology/local-sites-partnership.aspx

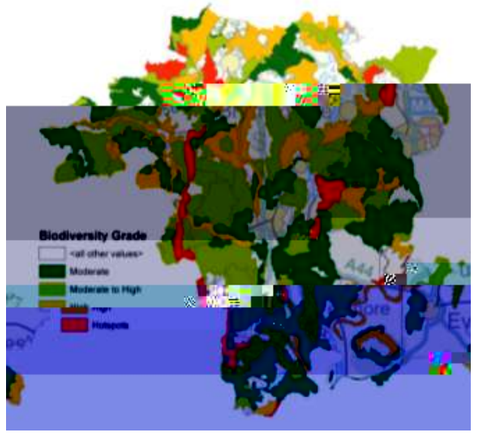
connectivity between a site and the wider landscape. For instance, the WHI does not consider linear features, ancient countryside features such as parish boundaries and is limited to assessing certain BAP habitats (for instance acid grassland

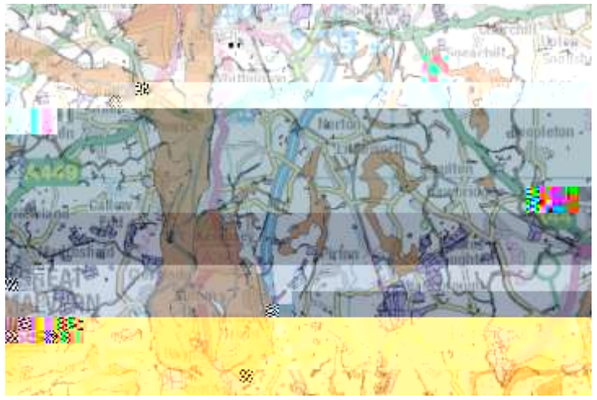


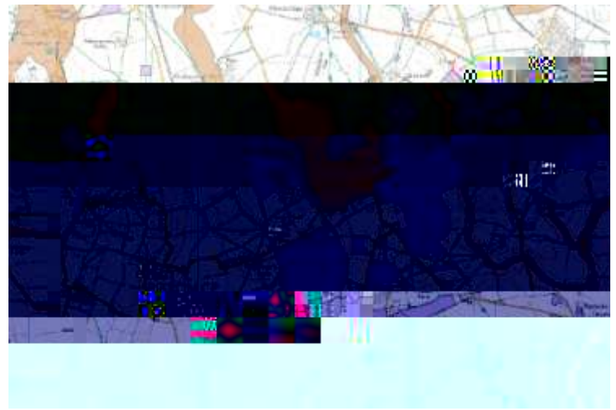


4.2.1 A theoretical mineral extraction site is proposed within the sand and gravel deposits of south-central Worcestershire. This area is located within the River terraces Ecological Zone. Although not located within a Biodiversity Delivery Area the webtool indicates that the site is in an area of moderate biodiversity value and is surrounded by a landscape of fragmented and discrete stands of BAP woodland (highlighted here in purple).

4.2.2. Analysis of the network reveals both broadleaved and wet woodland (shown map and aerial photograph overleaf). Further analysis reveals the area is in the Woodland







5.

Operator: Lafarge Aggregates Ltd in partnership with The National Memorial Arboretum Co. Ltd
Size: 60 hectares
Restored to: Nature Conservation/Contribution to Biodiversity and Recreation/Leisure
Further information: www.thenma.org.uk

The National Memorial Arboretum is the UK's memorial to those who have given their lives in the service of their country. Comprising over 60 hectares of trees and memorials, it has been created on land restored by Lafarge Aggregates Ltd following sand and gravel extraction. The National Memorial Arboretum compliments the restoration plans for the Lafarge site which incorporates more than 50,000 planted trees to create wooded parkland. However, there is also a rich tapestry of lakes, ponds, riverine habitat, grassland, reedbeds and wetlnalr-ma.org.undgrassBiodiversity an aporom(y)18o(d)-9((a)-9hr7(nt

BTJETBT1 0 0 1 352.03 699BTJETBT1 0 0 1 352.03 Tm5B5(he)4(NatiJwetl(h)-9(ng)4d NatiJwetl(e6a-i)s84(t(y)18(La)4o)s840(th)-7)-4

Size: 55ha

Size: 28ha
Location: Bedfordshire
Operator: Lafarge Aggregates Ltd
Mineral Type: Sand
Habitats Created: lowland dry acid grassland & heathland.
Further information:

Worcestershire's Acid Grassland

Lowland acid grassland typically occurs on nutrient-poor, generally free-draining soils with

Worcestershire's Meadow & Pasture (Including other neutral grasslands)

This description includes the traditionally managed neutral meadows and pastures including the MG4 and MG5 grasslands and other neutral grassland types that are of conservation importance but are not managed using traditional methods.

Meadow and pastures are species-rich grasslands that have not been significantly altered by recent

Worcestershire's Lowland Wet Grassland

Wet grassland is seasonally waterlogged low-lying grassland where the drainage is poor or impeded. Typical management is by grazing or cutting for hay or silage.

Worcestershire's Fen, Marsh & Reedbed

The term ‘Fen and Marsh’ covers a range of habitats that contain permanently or seasonally waterlogged vegetation frequently associated with springs, floodplains and lakesides. The plains communities described here are the swamp and mire communities that typically exist in close association and often form mosaics with the marshy grassland communities.

Mire grasslands are similar in appearance to wet grasslands, but generally comprise lower growing sedges and a variety of rushes. Swamps are almost always permanently waterlogged and comprise stands of species-poor vegetation often dominated by one or two species such as Common Reed, Reedmace, Reed sweet- grass, Greater pond-sedge and Branched bur-reed Fen & Marsh has undergone massive declines, primarily a consequence of agricultural drainage and intensification.

Some of the County's most important fen, marsh & reedbed habitats are found at former quarries. Prime examples can be found at former brickpits that are situated on Alluvial Fenlands. Included here is Grimley Brick pits and Northwick marshes. Sand and gravel quarries also provide ideal conditions for the establishment of fen, marsh and swamp and there are many situations where these communities now occur.

Creating fen, marsh and reedbeds

It is imperative when designing open water bodies for conservation purposes to have sinuous edges with extensive drawdown zones. In the case of creating opportunities for swamp and mire generation, these extensive shallow areas are critical in ensuring that swamp vegetation has the opportunity to establish.

The guidelines for creating marshy grassland also apply to the creation of fen and marsh habitats, except that fen and marsh communities generally occupy habitats with a higher water table. As with marshy grassland, the resultant habitat is dependent on water availability, water quality and soil conditions. They are particularly appropriate to mineral sites situated on the Alluvial Fenlands and River Terraces, but should also be a component of all wetland habitats, regardless of location.

- Shallow water is a critical factor when developing fen and marsh habitat. Ideally shallow water should be < 1.5m in depth. But variations in depth within these shallow waters will promote a greater diversity of species (See also Marshy Grassland). Where extensive monocultures are desired for breeding birds, ground levels of a more uniform design are appropriate. Large Reedbed swamps are frequently created for these purposes.

- Reedbed. Extensive areas of Reedbed are of

Worcestershire's Open Water

Open Water is an extremely valuable wildlife habitat in Worcestershire. A huge variety of invertebrate, plant, amphibian and bird life is dependent upon still, enclosed water bodies for part or all of their life-cycle. The diversity and type of wildlife varies enormously according to the local environment, lake structure and water chemistry. Artificial open water habitat created through extraction has occurred at many of the quarries in Worcestershire including the clay brick pits of the Mercian mudstones, sand and gravel quarries in the alluvial fenlands and River Terraces and also in the hard rock quarries of the West Worcestershire and Malvern Hills. Many of these sites are now used for recreational purposes such as boating and fishing, some have been left to natural succession and others have been designed to benefit wildlife.

Limestone extraction in the Abberley Hills has created a number of limestone lakes at Woodbury Quarry and Shavers End, the low nutrient conditions particularly important for the Stonewort (*Charophyte)* populations. Earnshall Quarry in the Malverns has also developed botanical interest in its shallow waters. Where clay has been extracted on the alluvial fenlands, a range of open water and wetland habitats have been created.

Sand and gravel extraction offers great potential for the creation of open water habitats. Mineral workings have rejuvenated the diversity of habitats and re-introduced wetlands to a largely drained and dry landscape. These large open water bodies are particularly important for both passage and breeding birds. Reasons for the loss or degradation of open water bodies include; infilling, development and increased eutrophication.

The creation of areas of open water are of enormous benefit to wildlife and likely to increase the biodiversity of an area. Where open waterbodies are planned, the incorporation of serpentine and sinuous edges with significant shallow areas and a broad drawdown zone is encouraged.

It is particularly important to recognise that features that are designed for conservation purposes complement and enhance recreational lakes designed for fishing and water sports, and should therefore be included in the final design.

Creating new ponds and lakes

A number of resources [25]are available through Pond Conservation to help in the design and creation of new ponds.

- There are a number of design features that allow for greater habitat diversity of open water, but of these perhaps shallow water is the most valuable for wildlife. Ponds and lakes designed with deeply shelving banks (which provide little room for the development of marginal vegetation) are discouraged.
- Marginal vegetation is of enormous conservation value and provides valuable habitat for breeding birds and a number of invertebrates and amphibians. Variations in depth within these shallow waters, including artificial reefs will promote an even greater diversity of species aBT1 0 0 1 69(i)-9(ef)-6(s w)14(i)-90tty of species 0 14lif9(es)i(o)-7(pment)4( )-2(o)-7(f)-3( )-2(m)3(a)6(rgi)-1

25 http://www.pondconservation.org.uk/millionponds/pondcreationtoolkit

ponds may turn into extensive Reedbeds or even Osier habitat.

Operational procedure should aim to leave an ongoing supply of maturing habitats. Temporary habitats of high conservation importance should be considered and if possible brought into the restoration plan.

They are likely to give an indication of the potential of the site. Where possible, minimise disturbance to wildlife on these areas, especially during the spring and summer months.

Opportunities for action before and after extraction

Ponds and lakes should not be created on areas with existing wildlife interest. Try to link open water bodies with other areas of wildlife interest such as fens and marshes and other riparian habitats including rivers and streams.

Worcestershire's Wet Woodland

Wet woodland occurs on poorly drained or seasonally wet soils, usually with Alder, Birch and Willows as the predominant tree species, but sometimes including Ash and Oak on the drier riparian areas. It is found on floodplains, as successional habitat on fens and bogs and around water bodies, along streams and hillside flushes, and in localised peaty hollows.

Wet woodlands frequently occur in mosaic with other woodland and open ground habitats. Many Alder woodlands are ancient and have a long history of coppice management. Other wet woodland has developed through natural succession on open wetlands and have little forestry influence. Some are the results of planting of Osiers for basketwork, which through long abandonment have developed into semi-natural stands.

Wet woodland is frequently associated with mineral sites. Recent wet woodland of high conservation value occurs on moist ground in old clay pits such as

always the possibility of including scrub habitats in marginal areas.

- Natural regeneration should be the favoured option. Benefits of natural regeneration include the presence of species local to the immediate area. It also provides a balanced age structure and spatial distribution.

- In certain situations, non-native species will occur and a decision will need to be made on the desirability of that species and whether it detracts from the conservation objectives. For example, the Butterfly Bush (*Buddleia davidii*) is present in high numbers at some of the Malvern quarries. The impracticality of removing this species, plus its perceived benefits for a wide variety of invertebrates means that the species is regarded as acceptable here.

- Structural variation will increase the number of niches in which different species can breed and feed. Areas of scrub should aim to include variations in height, canopy, shape and spacing. The diagram above shows the preferred sinuous edges (dark green) which benefit wildlife. The balance of management should aim to diversify the structure of scrub. This may occur as a response to grazing but can be

50 years, this decline has been particularly marked in the last 20 years. Species that were once common such as Cornflower and Shepherd's Needle are now threatened severely in Worcestershire. The Brown Hare remains widespread in its distribution but has also suffered a substantial decrease in numbers since the 1960s. Many once common bird species including Bullfinch, Corn Bunting, Grey Partridge and Skylark have significantly declined in numbers.

Modern agricultural practices have greatly exacerbated losses of many arable weeds. Species in significant decline include Cornflower, Corn Buttercup, Upright Hedge Parsley, Bur Chervil and Corn Marigold. Many of these wildflowers are important nectar sources for invertebrates such as Bumblebees. Although some weeds and insects have undesirable effects, the vast majority are benign.

Technological progress over the last fifty years has resulted in enormous advances in the efficiency of food production, providing improved weed control, larger, faster machinery, new crop varieties with different timing of sowing and harvesting, increased land drainage and less reliance on traditional crop rotations with grass. It is this efficiency that has led to the drastic declines in the wildlife associated with arable habitat.

Many aggregate sites that are returned to agricultural use have considerable potential to incorporate a variety of wildlife friendly arable schemes such as field margins and conservation headlands. There are also many other situations where there is considerable opportunity to create similar gains on open ground in a number of situations at former aggregate sites.

Following is a brief description of the different types of wildlife friendly habitat that are being created in the arable landscape.

Arable field margins are strips of grassland situated at the field edge. They provide valuable habitat for invertebrates, small mammals and farmland birds. Dense grass cover can contain over 1500 beetles and spiders per square metre. Pesticide reduction in these areas means that predatory insects are available to attack crop pests. Natural regeneration is the favoured method of establishment but in instances where weeds are a recognised problem, it may be necessary to plant a selection of grasses of local provenance.

Conservation headlands are strips of arable crop

The Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention) was adopted in Bern, Switzerland in 1979, and was ratified by the UK in 1982. The principal aims of the Convention are:

- To ensure conservation and protection of wild plant and animal species and their natural habitats (listed in Appendices I and II of the Convention).
- To increase cooperation between contracting parties.
- To regulate the exploitation of those species (including migratory species) listed in Appendix 3.

To this end the Convention imposes legal obligations on contracting parties, protecting over 500 wild plant species and more than 1000 wild animal species.

To implement the Bern Convention in Europe, the European Community adopted Council Directive 79/409/EEC on the Conservation of Wild Birds (the EC Birds Directive) in 1979, and Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the EC Habitats Directive) in 1992. Among other things the Directives provide for the establi

eu(r)-2(th)id 476.62 512.83 Tml-7(ro5eb)-7(e)4(workd)-4(o)-5(f)4(p)-7(ro)-3(tecre)5

- Specification of the conditions under which hunting and falconry can be undertaken (Article 7).
- Prohibition of large-scale non-selective means of bird killing (Article 8).
- Procedures under which Member States may derogate from the provisions of Articles 5-8 (Article 9) — that is, the conditions under which permission may be given for otherwise prohibited activities.
- Encouragement of certain forms of relevant research (Article 10 and Annex V).
- Requirements to ensure that introduction of non-native birds do not threatened other biodiversity (Article 11).

The requirements of the European Landscape Convention (ELC) became binding in the UK in March 2007. The Convention emphasises not only the importance of all landscapes, whether designated or not, but also our shared responsibility in guiding future landscape change. Perceiving landscape as an

specific needs and quantitative or qualitative deficits or surpluses of open space, sports and recreational facilities in the local area. Information gained from the assessments should be used to determine what open space, sports and recreational provision is required.

75. *Planning policies should protect and enhance public rights of way and access. Local authorities should seek opportunities to provide better facilities for users, for example by adding links to existing rights of way networks including National Trails.*

94. *Local planning authorities should adopt proactive strategies to mitigate and adapt to climate change, taking full account of flood risk, coastal change and water supply and demand considerations.*

99. *Local Plans should take account of climate change over the longer term, including factors such as flood risk, coastal change, water supply and changes to biodiversity and landscape. New development should be planned to avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure.*

100. *Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. Local Plans should be supported by Strategic Flood Risk Assessment and develop policies to manage flood risk from all sources, taking account of advice from the Environment Agency and other relevant flood risk management bodies, such as lead local flood authorities and internal drainage boards. Local Plans should apply a sequential, risk-based approach to the location of development to avoid where possible flood risk to people and property and manage any residual risk, taking account of the impacts of climate change, by:*

- *applying the Sequential Test;*
- *if necessary, applying the Exception Test;*
- *safeguarding land from development that is required for current and future flood management;*
- *using opportunities offered by new development to reduce the causes and impacts of flooding; and*
- *where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking* opportunities to facilitate the relocation of development, including housing, to more sustainable locations.

109. *The planning system should contribute to and enhance the natural and local environment by:*

- *protecting and enhancing valued landscapes, geological conservation interests and soils;*
- *recognising the wider benefits of ecosystem services;*
- *minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;*
- *preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability; and*
- *remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.*

110. *In preparing plans to meet development needs, the aim should be to minimise pollution and other adverse effects on the local and natural environment. Plans should allocate land with the*

suitability of the proposals of the proposed after-use. Before designing a reclamation scheme, the operator should undertake a comprehensive site survey to identify any existing features on the site that may be incorporated into the reclamation scheme, together with a survey of the soil resource and site hydrology. Consideration should also be given to the potential impacts of the reclamation proposals on adjacent land.

37. To demonstrate that a site can be reclaimed to an acceptable standard and after-

- *drainage;*
- *management of soil, fertility, weeds etc;*
- *irrigation and watering.*

46. *A map should accompany the outline, identifying clearly all areas subject to aftercare management, with separate demarcation of areas according to differences in the year of aftercare and proposed management. Where a choice of options is retained this should be made clear together with criteria to be followed in choosing between them.*

47. *The detailed programme should cover requirements for the forthcoming year. It should:*

Applications for planning permission to extract sand or gravel in an area not within an identified preferred area for sand and gravel extraction will first be assessed against the methodology set out in paragraphs 5.3 and 5.4 of this plan. If the area is subject to no constraints or only one secondary constraint, planning permission will be granted subject to an evaluation against other relevant development plan policies. If the area is subject to a primary constraint or more than one secondary constraint planning permission will not normally be granted.

POLICY 5 – Cumul

There are a number of priority outcomes set out in the SCS which are appropriate to this Supplemental Guidance document including;

Tackling the challenges of Climate Change

- To assist adaptation to the impacts of climate change in the county

Community Engagement

- To empower local people to have a greater choice and influence over local decision making and a greater role in the planning, design and delivery of public service

A better environment for today and tomorrow

- To enhance Worcestershire's countryside and urban green space and appropriate access to them while protecting the natural and historic environment.
- To address issues of water quality, supply and consumption and land drainage in Worcestershire (this includes flood risk)

These priority outcomes have been considered in developing the vision, objectives and policy framework set out in the second edition of 'Partnership Towards Excellence - A Community Strategy for Worcestershire 2003 – 2013'.

The Corporate Plan establishes key areas of focus and commits the County Council to "maximise our environmental assets in order to deliver sustainable economic growth"

Key themes within the Corporate Plan which this document supports are:

Open for Business
The Environment
Health and well-being

27

In discussing bio-and-geodiversity the following statements are of relevance:

3.13. The Minerals Local Plan will need to consider the protection and enhancement of biodiversity during both the working and restoration phases of activity. This will include making appropriate provision to protect designated or locally important environmental assets and will need to complement the wider regulatory regime relating to the protection of species and habitats. However there may be the need to balance temporary adverse effects against the long-term gains that could be realised through appropriate restoration.

3.14. Appropriate restoration can provide significant environmental gains where it is sympathetic to the local environment and the specific needs of the locality. For example restoration schemes can deliver Local Biodiversity Action Plan Priority

[26] www.worcestershire.gov.uk/cms/general-council-information/corporate-plan-2011-2017.aspx

[27] Available at: www.worcese

Habitats or enhancing networks of green infrastructure. Geodiversity can also be enhanced through the exposure of interesting geological features.

3.18. There are also opportunities to increase climate change resilience through the restoration of mineral operations. For example restoration schemes could be tailored to contribute towards flood attenuation or water storage, or to enhance wildlife corridor to improve the resilience of the natural environment to climate change.

- For certain species and habitats surveys can be carried out at any time of year, but for other species, particular times of year are required to give the most reliable results, as indicated in table below.
- Surveys conducted outside of optimal times may be unreliable. For certain species (e.g. Great Crested Newt), surveys over the winter period are unlikely to yield any useful information. Similarly, negative results gained outside the optimal period should not be interpreted as absence of a species and further survey work maybe required during the optimal survey season. This is especially important where existing surveys and records show the species has been found previously on site or in the surrounding area. An application may not be valid until survey information is gathered from an optimum time of year.
- Species surveys are also very weather dependent so it may be necessary to delay a survey or to carry out more than one survey if the weather is not suitable, e.g. heavy rain is not good for surveying for otters, as it washes away their spraint (droppings). Likewise bat surveys carried out in wet or cold weather may not yield accurate results
- Absence of evidence of a species does not necessarily mean that the species is not there, nor that its habitat is not protected (e.g. a bat roost is protected whether any bats are present or not).
- Worcestershire Biological Records Centre may have useful existing information and records.
- Competent ecologists should carry out any surveys. Where surveys involve disturbance, capture or

Abstraction	The removal of water from a river, stream, reservoir, lake, pond, canal, spring or underground source. A Catchment Management Strategy (CAMS) licence is likely to be required if more than 20 cubic metres (4,000 gallons) of water is proposed for abstraction per day. The legal duties as per the Conservation Regulations, 1994 and the Wildlife and Countryside Act, 2000 should be considered where abstraction might threaten (directly or indirectly) valuable habitats or species.
Afforestation	The conversion of bare or cultivated land into forest. While afforestation can have significant benefit in terms of carbon capture, amenity and community use or commercial timber production, sites must be selected carefully to avoid damaging other important features (e.g. wildflower meadows). Refer to Woodland Opportunities Map and Woodland Guidelines for further information.
Alluvial	Soil, clay, silt or gravel which has been deposited by streams or rivers. Alluvial terraces are plains created by the deposition of sediment over long periods of time by one or more rivers.
Ancient Semi-Natural Woodland	Land that has had continuous woodland cover since at least 1600AD. Before this period planting of new woodland was uncommon, so a wood present in 1600 is likely to have developed naturally. Ancient semi-natural woodland may have been managed by coppicing or felling but allowed to regenerate naturally. Where extensive areas of native trees have historically been felled and replaced (usually with conifers for commercial rather than biodiversity value), these woodlands are termed "ancient replanted woodland".
Assart	Formerly forested land cleared of trees and understorey vegetation, usually for agricultural or other purposes.
Biodiversity	Derivation of biological diversity. The full diversity of plant and animal life in a particular area, encompassing variety at the genetic, species and habitat levels. Often used as a measure of health of biological systems.
Calcareous	Composed of or containing or resembling calcium carbonate or calcite or chalk. Referring to limestone or lime-rich soils or chalky sands or shales. Alkaline or 'basic'.
Calcifuge	A species that does not tolerate alkaline soil. Calcifuge plants are also known as 'ericaceous'.
Colonise	Colonisation is the process by which a species spreads into new areas. The term can be used to describe colonisation on a small scale (i.e. where a species moves into new areas at a particular site, perhaps as a result of a change in conditions) or on a large scale (i.e. where a species expands its range to encompass new areas).
Corvid	A member of the bird family *Corvidae* which includes crows, ravens, jays and coughs.
Disperse	To spread over a wider area: "ecologically functional networks" permit the dispersal of wildlife, in response to factors such as their natural lifecycle, to create new populations and in response to climate change.
Drawdown Zone	The margins of a pond, lake or reservoir which are revealed whenever water levels drop. These ephemeral habitats are of particular value to wildlife, supporting a range of specialised species. Waterbodies with a wide drawdown zone (i.e. at least one bank with a long and shallow sculpted margin, preferably with several scrapes to retain some level of water) provide excellent opportunities for wildlife.

The functionality of an ecosystem is a measure of both the quality of the m is -

Ecologically Functional

	will use the same pond to breed from year to year, but the survival of the population depends on individuals being able to disperse to other ponds and maintain exchange of their genetic material from sub-population to sub-population. This is why a network of healthy ponds is vital to ensure that all the sub-populations of great crested newts do not become extinct over time.
Off-Water-Habitats	A habitat which adjoins a riverine system, for instance seasonally inundated ponds, networks of reedbeds or ditches which can carry over-flow from canals, rivers or streams. These off-water habitats benefit from the protection which isolation can bring, and can act as important nurseries for invertebrates and fishes as well as mammals such as water vole.

Andrew, J. and Kinsman, D. (1990).*Gravel pit restoration for wildlife. A practical manual.* RSPB, Sandy

Andrew J and Rebane M (1994), *Farming and wildlife: A practical management handbook.* RSPB, Sandy

Carreck, N and Williams, L (1998) *The Economic Value of Bees in the UK*. International Bee Research Association, Cardiff.

Davies A and Weir J (2008) *Creating Environmental Improvements Through Biodiversity*. Sustainable Aggregates, RSPB.

Gilbert, O L and Anderson, P (1998) *Habitat Creation and Repair.* Oxford University Press, Oxford

Rodwell, J (1991) *British Plant Communities. Volume 1. Woodlands and scrub.* Cambridge University Press, Cambridge

Rodwell, J (1991) *British Plant Communities. Volume 2. Mires and heaths.* Cambridge University Press, Cambridge

Rodwell, J (1992) *British Plant Communities. Volume 3. Grasslands and montane communities.* Cambridge University Press, Cambridge RSPB (1994)

Rodwell, J (1995) *British Plant Communities. Volume 4. Aquatic communities, swamps and tall-herb fens.* Cambridge University Press, Cambridge

Rodwell, J (2000) *British Plant Communities. Volume 5. Maritime communities and vegetation of open habitats.* Cambridge University Press,

RSPB, EN and ITE (1997) *The wet grassland guide: managing floodplain and coastal wet grasslands for wildlife.* The RSPB, Sandy

Symes N, and Day J (2003) *A Practical Guide to the Restoration and Management of Lowland Heathland*. RSPB, Sandy

The Woodland Trust. 2003. *New woods for people. The Woodland Trust's experience of woodland creation.*

White G, and Gilbert J (2003) *Habitat creation handbook for the minerals industry*. RSPB.

Woodland Guidelines. Worcestershire County Council, 2010. http://www.worcestershire.gov.uk/cms/environment-and-planning/woodland-guidelines.aspx

Worcestershire County Council – Environmental Policy Team
WEB: www.worcestershire.gov.uk/cms/ecology
PHONE: 905 766723
EMAIL: ecology@worcestershire.gov.uk

Worcestershire District Councils: www.worcestershire.gov.uk/planning

Natural England
WEB: www.naturalengland.org.uk/
PHONE: 0845 600 3078
EMAIL: enquiries@naturalengland.org.uk

Worcestershire Wildlife Trust
WEB: www.worcswildlifetrust.co.uk/
PHONE: 01905 754919
EMAIL: enquiries@worcestershirewildlifetrust.org

Environment Agency
WEB: www.environment-agency.gov.uk
PHONE: 03708 506 506
EMAIL: enquiries@environment-agency.gov.uk

For queries or responses to this document please contact:

Strategic Planning and Environmental Policy Team

Business, Environment and Community Directorate

Worcestershire County Council

County Hall

Spetchley Road

Worcester

WR5 2NP

ecology@worcestershire.gov.uk

Minicom: 01905 766399

The Biodiversity Action Plan manager can be reached at biodiversity@worcestershire.gov.uk or 01905 766852.

For issues regarding the Minerals local Plan, please contact the Minerals and Waste Planning policy Section 01905 766374, minerals@worcestershire.gov.uk

Planning works best when the process is accessible, but for some it isn't. West Midlands Planning Aid provides a free and independent professional town planning advice and support service to communities and individuals.