

Appendix N – Species Shortlist and species niches

Grouping	Species or Group	General description	Overarching pressures	Measures (actions) needed Direct action – in black Supporting action – in blue	Species which may benefit most	
Mammals	All bat species	Bucks has records for 16 out of the 18 species known nationally. All bat species in the UK are under pressure from manmade impacts such as light and noise pollution, development, habitat loss, insecticides and global warming challenges. Pressures on the landscape through development and the need for major infrastructure reduce available safe spaces for bats, create barriers to feeding and natural movements year-round. As insectivorous species, bats have been particularly impacted by the global crash in insect numbers. Bats are extremely vulnerable to disturbance especially when hibernating over winter or when in breeding communities. The Bechstein's bat, one of England's rarest mammals, needs extensive quiet high-quality woodland in combination with open grown mature trees and has been discovered in ex-ancient hunting Forest in north Bucks and veteran tree rich landscape in South Bucks relatively recently. Barbastelle's Bat similarly in north Bucks as well as scattered sites in the Chilterns and South Bucks. Destruction of ancient mature forests along with intensive woodland management, habitat fragmentation and disturbance has put great pressure on this and other species. Buckinghamshire and Milton Keynes are on the edge of the Lesser Horseshoe and Grey Long Eared bats distributions but currently retains suitable habitat and connectivity with wider populations acting as a necessary buffer for these and other species. See also UK Bats - Types of bats - Bat Conservation Trust	<ul style="list-style-type: none"> • Strategic infrastructure projects (road, rail, airport etc), energy security measures and housing developments. • Bats are nocturnal animals that have adapted to a life in darkness, partly to avoid predation during daylight hours from bird of prey species such as sparrowhawks. The artificial lighting of bat roosts, access points and foraging pathways can be extremely disturbing to bats particularly species such as Bechstein's, Barbastelle's, Daubenton's, Natterer's, Whiskered and Brandt's Bats. • Intensification of landscape uses be they forestry, farming, new housing and infrastructure, or recreation leading to disconnection and loss of suitable habitats. • Generally crashing insect numbers in both urban and rural spaces. • Global warming and shifting UK long term weather patterns 	<ul style="list-style-type: none"> • Retention of well managed and connected broadleaved woodland, ex hunting forest spaces and landscapes of open grown mature /veteran trees in farmland, woodpasture and parklands etc. • Largescale planning of new build and infrastructure to retain key features and habitats and create new feeding, roosting and hibernating spaces, and to ensure that these remain connected as seen by bats. • Implementation of best practice for all developments (see Bat Conservation Trust Bat Surveys for Professional Ecologists: Good Practice Guidelines 4th edition - Guidance for professionals - Bat Conservation Trust). 	Bechstein's (<i>Myotis bechsteini</i>), Barbastelle (<i>Barbastella barbastellus</i>), Serotine (<i>Eptesicus serotinus</i>), Leisler's (<i>Nyctalus leisleri</i>), Lesser Horseshoe (<i>Rhinolophus hipposideros</i>), Grey Long Eared Bats (<i>Plecotus austriacus</i>) and Nathasius' Pipistrelle (<i>Pipistrellus nathusii</i>), as well as Natterer's (<i>Myotis nattereri</i>), Whiskered (<i>Myotis mystacinus</i>), Brandts (<i>Myotis brandtii</i>) and Daubenton's (<i>Myotis daubentonii</i>).	
	Most relevant niches: Damp oak woodland Woodland rides and glades Scrub transition habitats Open grown trees Hollowed trees Ancient or Veteran Trees Green lanes and Holloways Churches, churchyards and burial grounds Grottos, caves and icehouses Historic bridges, revetments and retaining walls Mire Permanent and ephemeral pools and ponds.	Mammals	Harvest Mouse	Harvest mice are known to have had substantial population losses in the 20 th Century, primarily due to loss of habitat. Buckinghamshire and Milton Keynes populations are similarly at very low ebb, with a few known current sites in the Chilterns, Vale of Aylesbury and Greensand Ridge. Although, a chance recent discovery of a totally new population in the Brickhills, many miles from other known sites, suggests that they may still be found in new sites. This iconic species favours a wide range of complex habitats that have tall grasses and other vegetation, including tussocky grasslands, hedgerows, field margins, road verges, reed beds, and ditches. They eat a mixture of seeds, grains, berries, fungi and insects. Harvest mice play a vital role in British ecosystems. They are also an important indicator species for arable habitat health, so understanding where they are found can help reinforce the case for responsible farming practices and support for enhanced protections that align with that. See also Harvest mouse — Mammal Society	<ul style="list-style-type: none"> • Loss of traditional small scale mixed farmland, with landscape wide mixes of arable, grassy margins and lanes, hedgerow networks and less intensively managed field corners. • Earlier harvesting dates for arable land, increased efficacy of combine harvesters, losses of long grass field margins / corners throughout the summer and autumn. • Predators, primarily weasels, stoats, polecats, foxes, cats, owls, hawks, crows, and pheasants. • Previously stubble burning (now banned) was a potential major threat to local populations, as is current pesticide use in their habitats. 	<ul style="list-style-type: none"> • Incorporate spring cereals into arable/grassland rotations. • Create grassy margins/corners which are left unmown spring – autumn (these can beneficially also contain volunteer corn crops). • Additional surveys to establish their presence/absence, targeting known and previous locations for this species to inform where conservation effort should be targeted. • Promotion of the Harvest Mouse as a species of significant conservation concern to relevant landowners and managers, including those of railway networks, of known populations and potential adjacent habitats. • Wider promotion of the Harvest Mouse to the farming and general public to promote activity to identify new sites and general appreciation of this diminutive species.
Most relevant niches: Green lanes and Holloways, Ancient Semi Natural Woodlands, Woodland rides and glades.	Hazel Dormouse		Dormice have declined in the 21st century across their whole UK range despite strict protection in law. In Bucks the number of known viable populations appears to still be dropping, its current presence in the Chilterns in unconfirmed. The largest known population lies north of Milton Keynes where it has shifted from being primarily based in a local woodland to using an extensive hedgerow network nearby. see also Hazel dormouse — Mammal Society	<ul style="list-style-type: none"> • Loss and fragmentation of ancient woodland, and potentially large overgrown hedgerow networks attached to them. • Climate change, warming and fluctuating weather patterns in winters affect hibernation. • Loss of traditional woodland management, including coppice rotations, continuous cover forestry with regular thins, well managed ride networks and small area felling. • Their principal requirement is for a diverse habitat featuring several different trees and shrubs to provide food throughout 	<ul style="list-style-type: none"> • Create a woodland / woodland edge / high hedge habitats with diverse canopy levels, to include several canopy species of native broadleaved trees alongside extensive shrub layer such as hawthorn, blackthorn, hazel etc. Wild Honeysuckle and Clematis are also highly desirable. • Ensure arboreal connections across woodland rides every 50-100m. 	Hazel Dormouse (<i>Muscardinus avellanarius</i>)

		As a very small mammal they need extensive nectar and pollen food resources as well as nuts whenever they are active. Hazel dormice are unable to spread far from their current locations or from reintroduction sites without directly connecting habitat.	the summer. Coppice management of woodlands can create such conditions; but cleared areas and wide rides may interfere with the movements of dormice, because the animals live almost exclusively in the trees.	<ul style="list-style-type: none"> • Retain understory in winter and avoid clear felling in dormouse locations. Consider managing woodland through traditional coppice of non-adjacent coupes. • Retain trees of no commercial value where dormice occur i.e. those with cracks, crevices, and deadwood; and retain woody species like blackthorn and hazel in sunny, open areas. • Consider addition of nest boxes to boost natural hibernation opportunities in known sites. • Buffer known sites with additional high quality and fully linked habitats to allow populations to move more freely in a resource rich environment. • Promote Hazel Dormouse as a species of conservation concern to all landowners / managers to all land adjacent to known populations, particularly a challenge if unlicensed felling harms their habitat. 	
Mammals	Hedgehog	Hedgehogs have significantly declined in number nationally despite their protection from legislation. In Buckinghamshire and Milton Keynes numbers anecdotally appear to have dropped with partial or total losses in some places.	<ul style="list-style-type: none"> • The biggest threat to hedgehogs is thought to be habitat loss, with the change from pastoral farming to arable crops, and increasing field size with the removal of hedgerows over the last 30 years. • Road casualty numbers continue to be high • The use of chemicals in gardens and for intensive farming kills the creatures hedgehogs need for food and may also poison them directly. • Bonfire heaps may contain sleeping or dormant hedges, twinned with mower and strimmer threats as well as harm to younger animals by domestic pets. 	<ul style="list-style-type: none"> • Create “hedgehog highways” through urban environments but leaving gaps under or through domestic fence lines, adding escape ramps or stone heaps to garden ponds. • Adopt a more relaxed management of verges and urban parks and greenspaces with a mosaic of tree and shrub cover, longer grass, short grass and undisturbed corners as refugia. • In larger sites create specific hedgehog refugia from carefully stacked log piles brushwood topped. Signage or local promotion may be needed to prevent its accidental relocation by site users. • Gardeners to turn over garden bonfire heaps before burning. Hedgehogs hibernate under garden bonfire heaps. These should always be turned over before being burnt. • Ponds (and swimming pools) should have a piece of chicken wire dangling into the water to help the animals climb out. Hedgehogs swim well but easily drown in smooth-sided garden ponds, being unable to escape from them. • Promote hedgehog conservation to landowners and managers in wider farmed landscape. 	European Hedgehog (<i>Erinaceus europaeus</i>)
	Most relevant niches: All terrestrial habitats.	There also appears to be a significant shift in their populations from lowland farmed landscapes into town centres and urban edges. Hedgehogs survive well in gardens, particularly assisted by food put out for them, as modern tidy gardens may not otherwise provide sufficient food. Gardens and urban spaces can also be hazardous. see also European hedgehog — Mammal Society			
Mammals	Otter	The otter is a secretive semi-aquatic species which was once widespread in Britain. In the late 1950s and early 1960s otters underwent a sudden and catastrophic decline throughout much of Britain and Europe. The cause appears to be the combined effects of pollution and habitat destruction, particularly the drainage of wet areas and occasional hunting. Buckinghamshire and Milton Keynes followed this trend with the Otter being largely lost from Buckinghamshire and Milton Keynes by the 1980’s	<ul style="list-style-type: none"> • Pesticide pollution, both industrial, farm related and urban runoff. • Drainage of wetland areas, often little accessed by the public and secluded. • Loss of larger interconnected landscapes of high-quality habitat on a whole river basis. • Fragmentation of existing populations, allowing little intermixing. • Accidental drownings by inadequately fitted fish and crayfish traps. 	<ul style="list-style-type: none"> • Create larger and connected areas managed for conservation and water quality purposes along main rivers and tributaries. Increases in local invertebrates, amphibians, birds and fish supports many species including otters. On a smaller scale, cover can be created for otters to lie up during the day on or near rivers, and in wider floodplains. Large brash and woodpiles in long vegetation away from all disturbance/ public access is ideal. Such areas can be made more attractive to otters by establishing “otter havens,” where riverbanks are planted-up and kept free from human disturbance. Marshes may also be very important habitat for raising young and as a source of frogs. • Ensure that fish and crayfish traps that are being used are legally compliant by having adequate otter guards to prevent otters from drowning in traps. • Include otter passes in new road/ rail schemes and at known roadkill hotspots. • Highlight otter related issues with landowners and managers 	Eurasian Otter (<i>Lutra lutra</i>)
	Most relevant niches: All rivers, streams, lakes and other large water bodies.	Since organochlorines were withdrawn from use, some recovery in fish stocks and specific otter focused conservation effort, otters have been spreading back into some areas, Buckinghamshire and Milton Keynes included, but still they face many challenges. Often seen as a bellwether for good water and riverine habitat quality as they rely on a good supply of bank-side vegetation offering secluded sites for their holts as well as fish, especially eels and salmonids, and crayfish at certain times of the year. Frogs can be an important food source in spring. See also Otter — Mammal Society			

Mammals	Water Vole	Water voles have experienced drastic declines in England over the 20 th century. Legally protected in Britain, evidence indicates that water voles have undergone a long-term decline in Britain, disappearing from 94% of their former sites. Water Voles can still be found in the banks and waters of Buckinghamshire and Milton Keynes's fens, rivers, streams, and ditches in scattered locations in north Bucks but primarily on the Misbourne, Chess and Colne. See also Water vole — Mammal Society	<ul style="list-style-type: none"> • Predation by the introduced American mink (which has been responsible for some local extinctions) habitat degradation through drainage, overgrazing, and the encroachment of cultivated land into riparian habitats. • Water pollution. • Domestic pet predation. 	<ul style="list-style-type: none"> • Mink control, in combination with all other counties in the Thames and Ouse Catchments. • Create suitable well managed habitats to link existing small populations to limit isolation and reliance issues. • Improve bank and ditch management to create well vegetated and undisturbed continuous strips. • Limit point source and diffuse pollution in all relevant catchments to improve general habitat and water quality. • Additional surveys for water voles in key areas to locate remaining or recently recovered populations. • Target bottle necks into key water vole habitats for mink monitoring 	Water Vole (<i>Arvicola amphibius</i>)
	Most relevant niches: River and streamside margins.				
Birds	Bittern	Previously widespread Bittern has almost gone extinct in the UK twice in the last 150 years. Numbers have been making a slow recovery since the late 1990's following heavily targeted conservation effort. In Buckinghamshire and Milton Keynes Bittern seems relatively faithful to sites near Calvert, at Willen, Great Linford and Marsworth as well as others more sporadically. Although far from a common bird the major limiting factor is lack of suitable habitat in the county. Bitterns breed in our largest and least disturbed reedbeds, most often in nature reserves, where they benefit from well-directed conservation efforts and carefully designed habitat creation. When on migration, and in winter, they also occur in smaller and more open wetlands, though still preferring dense cover.	<ul style="list-style-type: none"> • Loss of their primary habitat of large undisturbed multi aged reedbed stands and lowering water tables in key sites. • Climate change. • Decreasing small fish stocks in some water bodies due to pollution, siltation and introduction of larger predator species. 	<ul style="list-style-type: none"> • Create large reedbeds (≤ 1 ha) in new lakes and mineral workings.(See RSPB guidance Reedbed Management for Bitterns.pdf) • Manage existing reedbeds with cyclical cutting regimes to keep mixed aged stands on each site. • Prevent widescale willow and alder incursion into reed stands where breeding occurs. • Improve water quality in lakes to support more diverse and healthier fish populations. 	Eurasian Bittern (<i>Botaurus stellaris</i>)
	Most relevant niches: Reedbeds and large waterbodies				
Birds	Farmland birds	Some of our most iconic birds are those living in farmland. Farmland birds have shown the biggest decline overall since 1970, with 63% of species showing a decrease. In 2022 the UK farmland bird index was 60% below its 1970 value for the UK as a whole. Habitat loss, mainly driven by changes in agriculture, is considered one of the biggest drivers of UK bird decline. Modernisation of farming led to a lower diversity of plants and animals with resultant fewer opportunities for birds to forage in different habitats, year-round. Changing practices from spring to autumn arable crop sowing has largely eradicated winter stubbles in much of Buckinghamshire and Milton Keynes, a keystone in most farmland birds support network. Good farmland bird populations still existing across the county, albeit often in a very localised and beleaguered state. They have the capacity to expand countywide following sensitive management and public promotion.	<ul style="list-style-type: none"> • Loss of small scale mixed agricultural landscapes. • Intensification of cropping practices to counter climate challenges and provide food security and pressures on land increase. • Increase in pesticides and fertiliser use. • Removal of some wide hedgerow networks with adjacent flower rich grassland or grassy strips. • Move from hay to silage and haylage which s cut much earlier, now in many breeding seasons. • Loss of winter stubbles containing seed and insect food sources in cold weather. • Increased disturbance from expanding public access to the countryside and free running dogs. 	<ul style="list-style-type: none"> • Incorporate good wildlife management or hedges, including allowing hedges to grow larger and only cutting hedges every two years where practical to retain over winter cover and food sources. • Plant and restore hedgerows as part of wider networks. • Incorporate spring cereals and winter stubbles as part of a wider agricultural management system, especially where twinned with cover crops and legume mixes to limit soil losses and feed soils. • Introduce insect friendly headlands / beetle banks and bird seed mixes in less desirable margins and field corners. • When cutting haylage or silage consider mowing fields in smaller lands, or using a centre out approach to push birds away from cutting not ever focussing in the fields centre with inevitable results. • Promote farmland bird awareness where public access crosses farmland, particularly unintended disturbance effects from unleashed dogs. • Provide temporary information signs to interested farmers and land managers with ground nesting arable and grassland species explaining effects of disturbance. 	Rook (<i>Corvus frugilegus</i>), Kestrel (<i>Falco tinnunculus</i>), Yellow Wagtail (<i>Motacilla flava</i>), Tree Sparrow (<i>Passer montanus</i>), Mistle Thrush (<i>Turdus viscivorus</i>), Yellowhammer (<i>Emberiza citrinella</i>), Bullfinch (<i>Pyrrhula pyrrhula</i>), Skylark (<i>Alauda arvensis</i>), Cuckoo (<i>Cuculus canorus</i>), and Barn Owl (<i>Tyto alba</i>)
	Most relevant niches: All farmland habitats, including Arable margins.				

Birds	Turtle Dove	The turtle dove is arguably England's most threatened farmland bird. Breeding populations, both in this country and in Europe, have collapsed in recent decades and the decline is continuing – Breeding Bird Survey data shows a 97% fall in breeding abundance between 1995 and 2021, making it the country's fastest declining bird.	As a summer visitor, factors outside of England have impacted populations of Turtle Dove, including, until recently, hunting.	Where Turtle Doves are recorded on or within proximity, provide the following combination of resources.	Turtle dove (<i>Streptopelia turtur</i>)
	Most relevant niches: Tall hedges and dense scrub, close to weedy but open cultivated margins and plots and pools/ponds	The turtle dove is a summer visitor to England. As a breeding bird, it is closely associated with lowland arable and mixed farmland where dense, scrubby cover is available for nesting. The birds prefer to nest in wide, dense hedgerows or areas of scrub, especially those characterised by thorny shrubs, such as hawthorn, blackthorn and wild rose, especially with climbers such as traveller's joy (wild clematis), honeysuckle or bramble. Birds also commonly nest in conifers. The first clutches are laid from early May and adults and juveniles can still be on their breeding territories into September.	Within England, the loss of the habitats that Turtle Doves rely on being present, and in close proximity to each other, are the main factor, brought about by:- <ul style="list-style-type: none"> Increased herbicide use reducing natural arable plant seed availability. Loss of large wide hedges and dense scrub for nesting Loss of local pools and ponds 	<p>Nesting Resource: Plant, restore, manage wide hedgerows or areas of scrub, at least 3m tall, especially those with thorny shrubs and climbers (500m–2000m of hedge pre 100ha of farmland)</p> <p>Foraging Resource: Create cultivated margins or plots with early-seeding plants that retain openness from mid- April to July, to allow birds to access the seeds, sited within 300m of suitable nesting habitat 2-3 ha. Supplementary feeding is recommended, particularly early in the breeding season.</p> <p>Drinking water resource: Create water sources within 300m of nesting and foraging habitat which have gentle sloping edges and can retain water throughout the summer.</p> <p>More practical information and step-by-step guide here: https://www.operationturtledove.org/wp-content/uploads/024/06/Helping-your-local-Turtle-Doves-v1.4-May24.pdf</p>	
Birds	Corn Bunting	The corn bunting generally inhabits open, arable and mixed farmland in England. The species is principally a crop-nester, in well-grown (and, preferably, weedy) cereals. It is a very late breeder (especially for a resident bird), with very few clutches laid in May and the vast majority of first clutches laid in June – few genuine second brood attempts are now recorded in England compared to past observations. Most chick-food is caught from within 250m of the nest. Weedy crops, unsprayed field margins and unimproved grassland (and, formerly, set-aside) are key habitats for chick food.	Decline of the corn bunting is associated with a combination of a lack of seed and invertebrate food resources, and suitable nest sites within modern agricultural systems. This means that fewer birds may survive the winter and those that do are in a poorer condition which could affect their productivity. This is compounded by reduced availability of suitable chick-food (invertebrates) which in turn is related to pesticide use.	On farms where corn bunting are recorded or are known to be adjacent, the following mix of resources should be provided	Corn Bunting (<i>Emberiza calandra</i>)
	Most relevant niches: Arable farmland		<ul style="list-style-type: none"> Increased pesticide use reducing weeds and invertebrates. 	<p>Safe nesting areas: Dense vegetation within cereal crops from mid-May to late July/August, as provided by:</p> <ul style="list-style-type: none"> weedy, extensively managed (and, ideally, sacrificial) areas of spring sown cereals, or winter-sown crops with areas of high tiller density (ideally, in field centres – ie 100m+ from crop edge) <p>Summer chick food: A source of abundant and accessible invertebrates suitable as chick-food within 250m of nest sites positioned away from large hedges and trees (e.g. wildflower plots in the open landscape).</p> <p>Winter Seed Food: A source of abundant, accessible seed food throughout the winter and into early spring (e.g. wild bird seed plots and supplementary feeding)</p>	
Birds	Lapwing	The UK Population of this ground nesting, wading bird has declined by 55% since 1967.	<ul style="list-style-type: none"> Loss of mixed farming, The move from spring to autumn sown crops Intensification of grassland management. Increased stocking rates – Lapwings are prone to disturbance when nesting. Unsustainable levels of predation 	<ul style="list-style-type: none"> Provision of open nesting sites, such as fallow lapwing plots and/or spring sown cereals, close to invertebrate rich grassland and/or damp areas. Avoid destruction of nests by grazing or cultivations, by reducing stocking densities or adjusting cultivations between Mid-March and June. Provide temporary information signs to interested farmers and land managers with ground nesting arable and grassland species explaining effects of disturbance. Avoid planting new trees or hedges in areas used to by breeding Lapwings 	Lapwing (<i>Vanellus vanellus</i>)
	Most relevant niches: Lowland wet grassland, open arable land close to insect rich grasslands				
Birds	Urban and urban edge birds	Studies indicate a steep decline in Swift populations across England, Scotland and Wales in the mid-late 20 th Century. The UK breeding population suffered a 66% decrease between 1995 and 2022. For Swallows the decline of the UK breeding population 24% over the same period.	For all four species the exact drivers of loss are still not entirely understood, their lifestyles and seasonal mobility make them difficult species to study in detail. Key drivers may well include the following: - <ul style="list-style-type: none"> Agricultural intensification, particularly the loss of low intensity pastoral farming systems which are invertebrate rich and provide varied foraging habitats. Changes to over-winter survival (climate change?) Long term effects of late 20th Century stock wormers, which although beneficial for the stock's health can lead to substantial losses many groups of insects in a farming system. Increased netting of eaves and roof overhangs in town centres to eliminate pigeon issues also deprive Swifts in particular of habitual nesting sites. 	<ul style="list-style-type: none"> Removal of pigeon netting in key town centre locations where historic building concerns allow and the issue can be negated in other ways. Encourage the use of Swift bricks and other suitable nest boxes in new build and house / building restoration projects. Consider the creation of Swift Towers in key locations. Establish communications with professional veterinary bodies to discuss current wormer recommendations for both domestic stock and household pets as modern anthelmintics have an increasingly large role in invertebrate losses across many groups, the majority not the original target. Promotion within the wider farming and land-owning community, particularly stock and horse owners, of the negative effects of some drenches and wormers. 	Common Swift (<i>Apus apus</i>), House Martin (<i>Delichon urbicum</i>), Starling (<i>Sturnus vulgaris</i>), Swallow (<i>Hirundo rustica</i>)
	Most relevant niches: All built up areas including small scale hard landscape urban refugia.	House Martin numbers led to this species being added to the UK Red List in 2020. These declines have been most severe in the south and east of Britain. Starlings like other species seem to be suffering from mixed fortunes, although notable recent increases have been visible in Buckinghamshire and Milton Keynes with the reestablishment of mass murmuration's at a few key locales, a spectacle almost lost in			

		much of the county by the late 20 th century. Numbers still appear to be lower than at other times in living memory.	<ul style="list-style-type: none"> • Move towards using UPVC materials for house eaves and soffit boxes, seemingly harder for birds to bond their nests to (leading to failure when nesting) than the traditional brick, tile or timber. 		
Birds	Waterside and wetland birds	The challenges to this group of species are many and often disparate, some local to Buckinghamshire and Milton Keynes but more normally at a national or even on occasion international scale. In 2022 the water and wetland bird index were 13% lower than in 1975. In the last 5 years the index decreased by 3%.	<ul style="list-style-type: none"> • Loss of low intensity cattle grazed wet grassland. • Impoverished water quality, in stream aquatic plant mats and less diverse stream bank vegetation. • Increased disturbance by walkers and off leash dogs. • Stock wormers which kill many groups of invertebrates in the wider environment not just target internal parasites 	<ul style="list-style-type: none"> • Give greater priorities to Heronries, and their continued welfare when considering small and largescale development which impact them. • See also actions for fish. • Avoid additional wet grassland drainage or agricultural improvement in key areas, such as the Upper Ray / Otmoor, Misbourne, Chess, Alderbourne, Ousel and Wye valleys, as well as larger systems on the main Ouse and Thames. • Reintroduce low intensity cattle grazing on sites where it was a traditional practice using hardy native breeds. • Retain and expand areas of extensive, shallow, well vegetated water during breeding months (April and May). These can occupy grasslands as well as wider areas of reed and sedges bed often used for nesting. Water levels should draw down later in the summer, grassland areas should be extensively grazed late summer - autumn. • Promote areas of slow water flow and ground water recharge using various leaky dams, cover crops and long grass reserve areas. • Shooting concerns to avoid species currently legally available as “game” within this group • Design in specific sand martin banks when long term landscaping of sites post mineral extraction is being considered • Promote unintended effects of large internal and external wormers and insect control substances to beef and dairy farmers, and horse /donkey / lama owners. • Promote issues relating to unintended effects of wormers with small animal vets and pet owners. 	Grey Heron (<i>Ardea cinerea</i>), Redshank (<i>Tringa tetanus</i>), Curlew (<i>Numenius arquata</i>), Common Snipe (<i>Gallinago gallinago</i>) and Sand Martin (<i>Riparia riparia</i>)
	Most relevant niches: All small and large waterbodies, Permanent and ephemeral pools and ponds, Draw down zones, Mire, North Bucks fens and fen meadows, River and streamside margins, Mini river cliffs, bluffs and beaches.				
Birds	Woodland, wood pasture, scrub and heath birds	Bird populations in all of these habitats have declined, often markedly throughout much of the last century. Woodland birds have suffered the biggest impact with 59% of species declining between 2015-2020. In 2022 the UK woodland bird index was 37% below its 1970 value.	<p>Likely causes are</p> <ul style="list-style-type: none"> • Lack of woodland management leading to stagnation of stands, loss of open spaces and sunny rides and general loss of woodlands rich in multiple habitats at a relatively small scale. • Pressures from increased deer browsing, reducing the availability of suitable nesting and foraging habitats. • Loss of woodland edge habitat. • Loss of all heathland and acid grassland habitats. • Diminishing traditional management of heathy areas with their previous mosaics of short grass and shrub heath, taller scrub and scattered woodland edge elements. • Increased access related disturbance, especially unlicensed motorbikes, and unleashed dogs. 	<ul style="list-style-type: none"> • Reinvigorate woodland management, to create mosaics of woodland stand types and ages as well as open glade and ride networks. • Avoid any additional woodland drainage in key areas for species requiring wet woodland elements such as Lesser Spotted Woodpecker. • Carry out deer control in coordinated way across the County. • Primarily through natural regeneration, add scrub buffers and links out from existing woodland sites. Natural regeneration is very cost effective, has a very small carbon footprint, and prioritises species which do well in local environments. • Promote mixed stands of dwarf shrub heath and taller broadleaved local shrubs around margins of heathland, and where possible to form links with adjacent woodland stands. • When creating new woodland adjacent to existing woods, retain existing edge habitat where feasible, such as incorporating into new rides and glades. • Promote awareness among woodland owners and managers of each species requirements to aid their inclusion in existing and new woodland management operations. 	Lesser Spotted Woodpecker (<i>Dryobates minor</i>), Spotted Flycatcher (<i>Muscicapa striata</i>), Wood Warbler (<i>Phylloscopus sibilatrix</i>), Woodcock (<i>Scolopax rusticola</i>), Tree Pipit (<i>Anthus trivialis</i>), Grasshopper Warbler (<i>Locustella naevia</i>), Nightjar (<i>Caprimulgus europaeus</i>), Woodlark (<i>Lullula arborea</i>)
	Most relevant niches: All woodland and woodpastures, including Woodland rides and glades, Damp oak woodland, Scrub transition habitats, Open grown trees, Hollowed trees, Ancient or Veteran Trees, Singleton fruit trees				

Amphibian and Reptiles	Adder	<p>The adder is one of our three native snake species, most often found on heaths, moors and coastal areas. However, its secretive nature and camouflaged markings mean it often goes unnoticed.</p> <p>Whilst it has a large range across the UK, recent declines especially in central England, mean it is of major conservation concern. The adder is considered one of the most vulnerable widespread species, as it is not very mobile and populations can become isolated.</p> <p>In Buckinghamshire and Milton Keynes the Adder is now limited to a very few heathland sites on the Greensand Ridge and in the Burnham and Langley areas, as well as very unusual reports from Chilterns Sites. Adders feed mainly on lizards and small mammals, such as voles.</p>	<ul style="list-style-type: none"> • Loss of large areas of suitable and connected habitat across landscapes without roads, extensive disturbance and other risks. • Disturbance, mainly increased public access to many open spaces and heaths. • Accidental harm, from conservation-based mowing and bracken rolling activities carried out when snakes are most likely to be basking but too cold to move away. • Predation, especially juveniles. Their main predators include game birds, crows and buzzards. 	<ul style="list-style-type: none"> • Improve the condition of known Adder sites to include a mosaic of heathland, scrub, and woodland habitat. Manage these areas to create and retain structural diversity like rides and glades, the ground topography should be varied to create topographical features for basking and hibernation sites. • Create new areas of suitable habitat on the edges of existing sites or forming connections between them, as a species with low mobility it cannot move far to get from one suitable area to another. The placement of these should be considered across Bucks and adjacent counties wherever suitable habitat or populations exists, ie along the Greensand Ridge and across the South Bucks / Thames Basin Heaths. • Consider strategic translocations of Adders to increase suitable site availability and to counter problems from small and dwindling populations. • (See https://www.arc-trust.org/adder) • Raise awareness of the Adder as a native species in peril, to counter persecution when perceived as being a “threat”. 	Adder (<i>Vipera berus</i>)
	Common Lizard (Also known as Viviparous Lizard)	<p>A species which in the past, and currently, had a scatter of sites across much of the county. The present overall distribution is likely to hide many local extinctions or losses of individuals with sites and populations becoming ever more pressured.</p> <p>The common lizard likes open sunny places and is usually found in dry, exposed locations for basking where dense cover exists close by to avoid predators and to overwinter. Common lizards feed predominantly on spiders and insects.</p> <p>In Bucks populations are most likely to be found in open and scrub heaths, as well as occasionally on chalk grasslands, in gardens and other built up areas particularly ones with old brickwork and hardstanding, old buildings or linked by existing / redundant railway lines.</p>	<ul style="list-style-type: none"> • Predation by introduced game birds, (especially pheasants) and domestic cats • Mowing of basking habitat in spring and summer when not warm enough to allow lizards to be mobile and move away from harm. • Lack of survey effort to identify sites where they are present. • Populations becoming more pressured and isolated as development, major infrastructure, changes in land use and land management have all lead to fragmentation and habitat loss. • Accidental loss of hibernating and refuge habitats when buildings / structures are updated or removed. • Lack of recognition that it is a species of importance in Buckinghamshire and Milton Keynes, and so is not considered or surveyed for in many developments. • Lack of robust and accurate up-to-date surveys 	<ul style="list-style-type: none"> • Create additional habitats of open bare ground in close proximity to open mortared stone walls, brick bridges and retaining walls on Victorian railways (used and derelict), extensive stone track beds or other suitable refugia • Avoid mowing areas in spring / summer, working only in colder winter months • (See Lizards Amphibian and Reptile Conservation) • Encourage surveys, especially those linked to development to include searches for common lizards which can be easily overlooked. • Promote this as a species of concern, especially with companies and rail network managers / ecologists. • Promote this as a species of interest for which positive actions can be taken with heathy woodland and golf course managers, as well as those of more classic heathland sites. 	Common Lizard (<i>Zootoca vivipara</i>)
Amphibian and Reptiles	Palmate Newt	<p>Unlike the better known Great Crested Newt (which is common in many parts of Aylesbury Vale and Milton Keynes) the palmate newt is far less common in the County. It is largely a species preferring more acidic conditions and has a distinct preference for shallow ponds on heathy, sandy or gravel rich soil; which are focused in South Bucks, the Greensand Ridge and small hilltop areas of the Chilterns.</p> <p>It is most commonly found on heathland or in heathy areas locally; often travelling further from water in their nonbreeding season than other species.</p>	<ul style="list-style-type: none"> • Total loss of clean water ponds associated with heathy conditions. Or their degradation through pollution, scrubbing over, dewatering or increased levels of disturbance. • Loss of suitable habitat mosaics accommodating both aquatic and terrestrial phases and suitable refugia can result from urbanization, wetland drainage and new infrastructure. • Agricultural improvements including pesticides, fertilizers, and chemicals contamination of breeding ponds, which negatively impacts their health and reproductive success. • New or busier roads within a groups home range, leading to higher road casualties especially in the spring. 	<ul style="list-style-type: none"> • Specifically consider this, and other newt species, as part of a site native suite when planning heathland management. • Avoid the addition of fish to any pond within 1km of a known Palmate Newt site. • Consider non-native fish control in keys ponds where the newts are most at risk. Create or maintain large, fish free ponds, which ideally are within 1km of other ponds that could support Great Crested Newts. • Create grassy and non-treated margins or similar barriers around all water bodies (standing or flowing) to protect from chemical or soil ingress. • Incorporate well-designed wetland / SUDSs, such as varying pond forms (including those designed to fully dry out late summer) well-established marginal and open water vegetation, waterside banks of rotting woody debris and stones. • Ensure kerbing / drainage pots are used in developments to allow newts to escape. • Promote this species as one of concern to owners and managers of suitable habitats, particularly those used for amenity purposes such as reserves, parks, golf courses etc • (See Palmate newt Amphibian and Reptile Conservation) 	Palmate Newt (<i>Lissotriton helveticus</i>)
	Most relevant niches: Permanent and ephemeral pools and ponds, Mire, Damp oak woodland, Scrub transition habitats, all heathland habitats.				

Fish	All freshwater fish species	All rivers within Bucks are highly adapted, often with substantial loss of naturally functioning, diverse reaches of river habitat which are strongly connected which create habitat for all fish species and allow for recolonisation after drought or pollution impacts. Key threats to all fish species include lack of good quality water, man-made channel interventions which damage habitats and limit fish movement and migration, loss of clean gravels beds essential for spawning, and water extraction pressures.	<ul style="list-style-type: none"> Poor water quality. Lack of rich marginal and in-channel vegetation. Silt build-up, and lack of clean riverbed gravels for spawning. Loss of widespread fully interconnecting habitats throughout catchments. Limited refugia in flood conditions. Water extraction. 	<ul style="list-style-type: none"> Improvements to general water qualities throughout, targeting point and non-point source pollution. Strategic policies to create widespread interconnected functioning habitat throughout for all species, in all stages, throughout the year. Creating space for plant rich marginal habitats to develop on banks and adjacent ground Reinstating more natural restricted width and depth channels in key areas to flush silts, promote aeration, and recreate clean bed gravels. Installation of fish passes for all salmonid species, and specific eel passes, where their natural migrations are blocked . Creation of small backwaters and interconnected water bodies as refugia when in flood (See Brown Trout Wild Trout Trust) 	Brown Trout (<i>Salmo trutta</i>), Brook Lamprey (<i>Lampetra planeri</i>), Stone Loach (<i>Barbatula barbatula</i>), Eel (<i>Anguilla anguilla</i>) and Bullhead (<i>Cottus gobio</i>).
	Most relevant niches: All rivers, streams and large waterbodies, Backwaters, Permanent and ephemeral pools and ponds, River and streamside margins.				
Invertebrates	Duke of Burgundy Fritillary	In southern England the Duke of Burgundy is only found in small, scattered colonies. In the UK it has declined by over 50% in recent decades and many of the colonies now have either been lost or significantly reduced in size. It has two primary habitats, one of chalk grassland with scrub, the other woodland rides and glades where it feeds on Primrose and Cowslip. In both habitats the Fritillary requires foodplants growing among tussocky vegetation and on downland it prefers north or west-facing slopes.	<ul style="list-style-type: none"> Lack of woodland management, particularly losses in wide ride and glade networks within and on the edge of Ancient Semi-Natural Woodlands, and their adjacent hedged landscapes and lanes. Lack of traditional grazing management on semi-improved grasslands, primarily beef cattle in non-intensive extensive grazing patterns. Climate change. Loss of connectivity between existing sites. Low population numbers on some sites and linked genetic pressures. 	<p>Manage existing sites specifically for this species in key areas, creating additional extension habitat wherever possible.(see Duke of Burgundy Butterfly Conservation)</p> <p>In Grasslands -</p> <ul style="list-style-type: none"> Create a mosaic of open, sunny grassland with abundant Primulas in medium height swards (5-20cm), with scrub edges or patches comprising up to 20% of the grassland area. Maintain taller vegetation for breeding and shorter vegetation to ensure continuity of foodplant supply. Extensive light cattle grazing is ideal, with light to moderate grazing from late summer to winter. Where there is no alternative, rotational sheep grazing can be used, but only up to 25% of the site should be grazed each season. Scrub to be cut on long rotations (e.g. 20 years) creating younger, scattered scrub over relic grassland or for bays in scrub edges. <p>In woodland rides, or glades –</p> <p>Breeding success is likely to be highest in east-west rides. Create a continuous supply of clearings with abundant Primulas in open, sunny conditions.</p> <ul style="list-style-type: none"> Permanent glades should be maintained by controlling scrub regrowth, brambles and coarse grasses, to a height of 10cm every 2-3 years; ensuring all cut material is removed. Open rides to be maintained by short-rotation coppicing (5-8 years), cutting back the woodland edge to 5-8m depending on the vigour of regrowth 	Duke of Burgundy Fritillary (<i>Hamearis Lucina</i>)
	Most relevant niches: Woodland rides and glades, Scrub transition habitats.				
Invertebrates	Liquorice Piercer Moth	The Liquorice Piercer micro-moth is a very localised species, limited in the UK to a few southern sites on chalk and limestone where the foodplant (itself with a very restricted distribution) grows. The only known Bucks sites are in the far north of the county, on limestone. This species is named for its caterpillar's habit of piercing the pods of Wild Liquorice, its only foodplant.	<ul style="list-style-type: none"> Loss of Wild Liquorice (<i>Astragalos glycyphyllos</i>) in the wider landscape. Liquorice's primary habitat is unimproved / semi-improved lime rich grasslands and occasionally disturbed arable margins. Often lost through grassland improvements, conversion to woodland, arable, or other more intensive uses. Lack of awareness of the foodplant and the moth. 	<ul style="list-style-type: none"> Remove scrub near or over liquorice populations to avoid it being shaded out. Ensure any existing sites are protected from the impact of agricultural operations, development or any other activities that may be damaging to the species. Liaise with landowners of existing sites to secure appropriate management. (see Liquorice Piercer Butterfly Conservation) Carry out additional targeted surveys to locate the food plants in known and old sites to determine current distribution and whether any other colonies persist. On sites where the foodplant is located survey for the moth specifically in late summer. Promote the presence and importance of both species to relevant landowners and managers of chalk and limestone grasslands. 	Liquorice piercer Moth (<i>Grapholita pallifrontana</i>)
	Most relevant niches: Limestone and chalk grasslands and arable margins, Transport corridors				

Invertebrates	Noble Chafer	A rare beetle which associated with traditional orchards and wood pasture where it is dependent on old, decaying wood within live trees especially cherry, plum and apple; and most likely hawthorn, blackthorn and crab apple as well. They exhibit a preference for orchards that contain mature fruit trees between 50 and 80 years old and potentially woodpasture as well in Bucks. These sites are vulnerable to removal or clearance, particularly if the trees are reaching the end of their productive life or are perceived as not being of value or “dangerous”.	<ul style="list-style-type: none"> • Loss traditional orchards as a working or valued crop / landscape in Bucks • Perception that old trees are not of value, or are “dangerous” • Life spans of remaining trees, apples are more long lived as are pears; plums gauges and cherries are much shorter lived and hence naturally disappear unless replaced more frequently • Decline of extensive wood pasture, especially that which contains older Thorn and Crab Apple trees as well as Oak and Beech • Increasing fragmentation of suitable habitat which needs both old trees (larval stage) and tall flower rich herb communities / scrub and hedgerows edges for adult feeding • Loss of whole orchards by neglect or to development / major infrastructure. • Loss of many “hidden” trees which occur in low numbers in domestic gardens and paddocks around villages. • Unknown effects of pesticides, especially systemic or long-acting varieties 	<ul style="list-style-type: none"> • Retain traditional orchards or large single fruit trees • Plant new orchard plantings (using local varieties where possible) of mixed stands of apple, plum, cherry, pear, quince, medlar etc. • Retain old / veteran / ancient Crab Apple, Blackthorn and Hawthorn trees, often associated with old wood banks or parcel boundaries as significant trees in their own right. They are often overlooked as lesser species to Oak and Beech and cleared as part of management cycle. • Retain standing and fallen deadwood generally within woodland or hedge management. • Retain and encourage low intensity wood pasture / parkland management (especially with cattle). • Incorporate Crab Apple, Blackthorn, Hawthorn etc to woodland managers, as a suitable transition between dense woodland stands and open rides when new planting takes place. • (See https://ptes.org/campaigns/noble-chafer-beetles/) • Raise awareness with gardeners, landowners and managers of the wildlife significance of traditional orchards and the local significance of some varieties of tree stock they can hold. 	Noble Chafer (<i>Gnorimus nobilis</i>)
	Most relevant niches: All traditional orchards, Singleton fruit trees, Ancient or Veteran Trees, Woodland rides and glades.	Thought to be only and two or 3 sites in the County several new colonies have been found in recent years. Suggesting possible conservation action and widened concerns over habitat losses.			
Invertebrates	Striped Lychnis Moth	Although not uncommon in Bucks, the county holds a substantial portion of the national population. Within the county its distribution is very much limited to the Chilterns where its primary foodplant (Dark Mullein) is limited to free draining friable soils with bare ground or very thin vegetation. It needs occasional soil disturbance to persist.	<ul style="list-style-type: none"> • Lack or irregularly disturbed soils in fields and field margins, roadsides, allotments etc in which the host plant can grow. • Mowing of flower spikes. • Lack of awareness of the moth and its only foodplant as a wildlife resource. 	<ul style="list-style-type: none"> • On verges and waste ground -avoiding mowing Dark Mullein flower spikes in mid-late summer when all the larvae are focussed high up in the blooms • Increased availability of irregularly disturbed / cultivated light chalk soils in core areas to allow the biannual food plants to flourish. Field corners and margins are ideal, as well as wider waste places. • (see butterfly-conservation.org/sites/default/files/1.striped_lychnis-psf.pdf) 	Striped Lychnis (<i>Shargacucullia lychnitis</i>)
	Most relevant niches: Chalk & limestone rubble scrapes or very friable minimally vegetated soils Transport Corridors, Arable margins.				
Invertebrates	Wood White Butterfly	The Wood White is a delicate, slow-flying butterfly usually encountered in sheltered situations, such as woodland rides or scrub edges. It has a very localised distribution in England and Wales and has declined greatly in Britain over the past few decades.	<ul style="list-style-type: none"> • Lack of woodland management, particularly in Ancient Semi-Nature Woodlands and adjacent hedged landscapes and lanes. • Climate change. • Loss of connectivity between existing sites. • Low population numbers on some sites and linked genetic pressures. 	<ul style="list-style-type: none"> • Manage towards a continuity of open sunny rides, with grass or scrub margins that are lightly shaded by surrounding trees and have abundant vetches. (see Revised Wood White Factsheet BC comments March 2015) • Rotational cutting of clearings and rides is most beneficial. Edges can be mown on rotation every 2 to 4 years. • Cut scrub margins every 4 to 8 years. • Cutting all vegetation in autumn and winter months is preferable. • Managed open spaces and rides with various aspects towards a rich and varied canopy edge / grassland junction to maximise nectar sources. • Grassland and ride management is aimed at supporting larvae foodplants, including a variety of legumes, the most common being Meadow Vetchling <i>Lathyrus pratensis</i>, Greater Bird's-foot-trefoil <i>Lotus pedunculatus</i>, Bird's-foot-trefoil <i>Lotus corniculatus</i>, Tufted Vetch <i>Vicia cracca</i> and Bitter Vetch <i>Lathyrus linifolius</i>. • Plan works using ride widening and edge scalloping to create suitable habitat connectivity between populations. • Avoid cutting all ride edges and margins at the same time, ie ensuring that entire ride networks are not managed uniformly in any one year. • Install protection around some habitats (such as temporary fencing around a particularly sensitive patch during forestry work). • Monitor key breeding areas so that potential problems can be avoided or mitigated. 	Wood White (<i>Leptidea sinapis</i>)
	Most relevant niches: Woodland rides and glades	In Buckinghamshire and Milton Keynes its is sporadically found in old woodlands, often within or linked to old Chase, Hunting Forest or ex Woodpasture, usually in the far north of Milton Keynes such as Yardley Chase, North Milton Keynes city, the larger parts of these populations likely to be in Northamptonshire; one additional site is in the Bernwood Ancient Hunting Forest, on the Oxfordshire border. The butterfly breeds in herb-rich vegetation at the edges of open sunny rides and within glades. Ditches and trackways can be important breeding areas in some woods; they also utilise mosaics of scrub and tall grassland and adjacent hedgerows. These include abandoned commons, disused railways and quarries			

Invertebrates	Blackthorn Butterflies and Moths	<p>The Black Hairstreak is one of our most elusive butterflies. This rather sedentary butterfly declined steadily during the twentieth century, with the majority of the remaining 50 or so sites in the country found in Buckinghamshire, Milton Keynes and Oxfordshire. It is found only in thickets of Blackthorn in woodlands on heavy clay soils between Oxford and Peterborough.</p> <p>The Brown Hairstreak is one of the UK's most elusive butterflies spending much of their lives in the treetops or along woodland edges feeding on honeydew secreted by aphids and secretions produced by ash trees. Once very widespread in England and Wales but has declined severely due to the loss of woodlands and hedgerows and increasingly intensive hedgerow management. In Buckinghamshire, much of its stronghold overlaps with that of the Black Hairstreak.</p> <p>Lappet moths, often identified by their characteristic protruding snout and unusual resting wing posture where the hind wings protruding in front of the forewings, as larvae feed on Blackthorn, as well as Hawthorn, Crab Apple, Willows, Buckthorn etc. The Lappet is in decline in Bucks, most often seen in the Vale of Aylesbury.</p> <p>In line with national trends the Figure of Eight moth is declining in Bucks, although seems to be persisting better in the low-lying Vale of Aylesbury and in Milton Keynes district often associated with old woodpasture/chase landscapes. This species also feeds on Blackthorn, and Hawthorn as well as Plum, cherry and Crab Apple.</p>	<ul style="list-style-type: none"> • Loss of habitat, particularly worked woodlands with rotationally managed open sunny glades and rides housing a mixture of shorter flower rich swards, scrub edge and denser scrub stands. • Loss of interconnecting habitats. Hairstreaks particularly are largely sedentary species they are unable to bridge gaps in hedgerow / woodland networks when habitats are removed, lost to lack of management, or changed to such a degree that they are no longer of use. • Loss or degradation of woodpasture and open Hunting Forest" or Chase, with their mixtures of small fields, large hedgerows, and many substantial in-field and hedgerow trees. • Climate change. • Ash dieback impacting on food source. 	<ul style="list-style-type: none"> • Woodland management that retains Blackthorn will be of benefit, particularly on wide ride sides and edges of clearings which should be managed on a 10-20 year rotation to avoid complete overshadowing by scrub. • Retention and long-term management of wide Blackthorn rich hedgerows, especially where alongside road verges and green lanes or near woodlands to form continuous network of mature shrubs. (See c0852 Hedgerows for Hairstreaks) (https://butterfly-conservation.org/sites/default/files/black-hairstreak-regional-priority-species-factsheet.pdf) and (https://butterfly-conservation.org/sites/default/files/1.brown-hairstreak-species-factsheet.pdf) • Cut even-aged Blackthorn stands in small patches (10-15sq m patches or 10-15m length of hedgerow) on long rotations (20-50 years depending upon the site) and allow to regenerate into mature stands. Traditional hedgelaying will promote suitable blackthorn coverage also. • Include Blackthorn, Crab Apple, Buckthorn and Hawthorn stands in any new woodland plantings in their native ranges. Select south-facing, sheltered locations, unshaded by trees. Only plant half the available area and create indented edge. • Retain all mature trees in hedgerows near woods or close to known hairstreak habitats as congregation areas. • Include Crab Apples, and Hawthorn as well as Buckthorn on appropriate sites when plantings new hedgerows and woodland edge plantings. 	<p>Black Hairstreak (<i>Satyrrium pruni</i>), Lappet (<i>Gastropacha quercifolia</i>), Figure of Eight (<i>Diloba caeruleocephala</i>), Brown Hairstreak (<i>Thecla betulae</i>)</p>
	Dead wood specialist insects	<p>Deadwood or saproxylic invertebrates are species which are dependent upon dead or decaying wood and deadwood species at some stage of their lifecycle. Living in or on the deadwood, its fungi and associated bark. They include some of our rarest species, saproxylics are among the most threatened invertebrates in Europe. Some being so specific in their habitat requirements and so dependent on centuries of continuity of such trees in the same locality, that they can be used as good indicators of habitat quality and continuity.</p> <p>Many sites across the county which are ex extensive wood pasture, parkland and old tree rich spaces are of international significance for deadwood species. Key areas include the original extent of Bernwood Hunting Forest stretching from Brill to Buckingham, Whadden Chase, Whittlewood and Salcey Forests in the far north of Milton Keynes and a swathe stretching right across south Bucks from Clivedon to Denham which is linked to the better-known Windsor Royal Forest.</p>	<ul style="list-style-type: none"> • Continuing loss or substantial harm to Ancient, Veteran and Notable trees across the county from development, highway and rail infrastructure, service trenches, drainage schemes and root compaction. • Loss of traditional pastoral management systems using primarily cattle on woodpasture and parkland settings; including ploughing and conversion to arable. • Climate change. • Widely held perceptions that deadwood is a sign of a trees ill health or makes it an increasing risk. • Lack of training in the professional arborist community about specific management measures for older trees. • Changing stocking of land to horses, often unfenced from older trees. • Increasing pressures from perceived "tree safety issues" often by public authorities, or blanket removal policies by insurance companies primarily for urban and domestic properties. • General move to a more "tidy" countryside, greenspaces and parks. • Increased use of modern systemic wormers in farm animals and pets (primarily horses and dogs). 	<ul style="list-style-type: none"> • Retain old trees and in-situ dead wood habitats as a key space for wildlife, to counter "tidiness" styles of management. • Promote extensive woodpasture / parkland grazing systems, particularly cattle. • Incorporate Ancient Tree Forum principles for tree care and management. (See Ancient tree guides Ancient Tree Forum) • Where still under continuous management, to continue with existing management practices on all older trees (ie pollarding, coppicing) using traditional length of cycle and cutting techniques. • Promote root protection zones to developers, landowners and managers, commercial service providers and forestry / woodland specialists. • Adopt policy at various levels of local government to prioritise works on old trees using contractors Vet Cert qualified. (see VETcert Ancient Tree Forum) • For old, veteran or ancient trees encourage the use of all tree conservation techniques which prolong life, retain all standing and fallen habitats in situ including the movement of challenges away from trees in preference to removing the tree considered an issue. • Include fruit trees in considerations for old / ancient / notable trees. • Highlight issues from systemic agricultural and horse wormers on insects in the wider environment. • Carry out targeted surveys to locate and assess all veteran and ancient trees in likely landscapes (known current / ex woodpasture / parkland, chase or Hunting Forest) to fill in spatial gaps to existing mapping. 	<p>Species such as: Tree Snipe Fly (<i>Chrysopilus laetus</i>), Oak Click Beetle (<i>Lacon quercus</i>), a Staphylinid Beetles (<i>Batrissodes delaporti</i>, and <i>Euplectus tholini</i>), Crane Flies (<i>Ctenophora ornata</i> and <i>C. flaveolata</i>), Wood-Boring Weevil (<i>Dryophthorus corticalis</i>), Rusty Click Beetles (<i>Elater ferrugineus</i>), Bark Beetles (<i>Ernoporicus caucasicus</i> and <i>E. tiliae</i>), False Click Beetle (<i>Eucnemis capucina</i>), True Flies (<i>Heteromeria nigrimana</i>) and (<i>Rainieria calceata</i>), Hornet Rove-Beetle (<i>Quedius dilatatus</i>), Beetles (<i>Teredus cylindricus</i>, <i>Vanonus brevicornis</i>, <i>Globicornis nigripes</i>, <i>Aulonothroscus brevicollis</i>, <i>Hylis olexai</i> and <i>Trinodes hirtus</i>), Cardinal and Redohordinal Cardinal Click Beetles (<i>Ampedus cardinalis</i> and <i>A. rufipennis</i>), Wasp (<i>Ancistrocerus antilope</i>), Pseudoscorpion (<i>Dendrochernes cyrneus</i>), Sap Beetle (<i>Eपुरaea silacea</i>), False Darkling Beetle (<i>Hypulus quercinus</i>), Darkling Beetles (<i>Pentaphyllus testaceus</i> and <i>Mycetophagus populi</i>), Forest Silver-stiletto (<i>Pandivirilia melaleuca</i>), False Flower Beetle (<i>Scraptia fuscula</i>), Stag Beetle (<i>Lucanus cervus</i>), a Larder Beetle (<i>Trinodes hirtus</i>), a beetle (<i>Vanonus brevicornis</i>)</p>
Invertebrates	Dead wood specialist insects	<p>Deadwood or saproxylic invertebrates are species which are dependent upon dead or decaying wood and deadwood species at some stage of their lifecycle. Living in or on the deadwood, its fungi and associated bark. They include some of our rarest species, saproxylics are among the most threatened invertebrates in Europe. Some being so specific in their habitat requirements and so dependent on centuries of continuity of such trees in the same locality, that they can be used as good indicators of habitat quality and continuity.</p> <p>Many sites across the county which are ex extensive wood pasture, parkland and old tree rich spaces are of international significance for deadwood species. Key areas include the original extent of Bernwood Hunting Forest stretching from Brill to Buckingham, Whadden Chase, Whittlewood and Salcey Forests in the far north of Milton Keynes and a swathe stretching right across south Bucks from Clivedon to Denham which is linked to the better-known Windsor Royal Forest.</p>	<ul style="list-style-type: none"> • Continuing loss or substantial harm to Ancient, Veteran and Notable trees across the county from development, highway and rail infrastructure, service trenches, drainage schemes and root compaction. • Loss of traditional pastoral management systems using primarily cattle on woodpasture and parkland settings; including ploughing and conversion to arable. • Climate change. • Widely held perceptions that deadwood is a sign of a trees ill health or makes it an increasing risk. • Lack of training in the professional arborist community about specific management measures for older trees. • Changing stocking of land to horses, often unfenced from older trees. • Increasing pressures from perceived "tree safety issues" often by public authorities, or blanket removal policies by insurance companies primarily for urban and domestic properties. • General move to a more "tidy" countryside, greenspaces and parks. • Increased use of modern systemic wormers in farm animals and pets (primarily horses and dogs). 	<ul style="list-style-type: none"> • Retain old trees and in-situ dead wood habitats as a key space for wildlife, to counter "tidiness" styles of management. • Promote extensive woodpasture / parkland grazing systems, particularly cattle. • Incorporate Ancient Tree Forum principles for tree care and management. (See Ancient tree guides Ancient Tree Forum) • Where still under continuous management, to continue with existing management practices on all older trees (ie pollarding, coppicing) using traditional length of cycle and cutting techniques. • Promote root protection zones to developers, landowners and managers, commercial service providers and forestry / woodland specialists. • Adopt policy at various levels of local government to prioritise works on old trees using contractors Vet Cert qualified. (see VETcert Ancient Tree Forum) • For old, veteran or ancient trees encourage the use of all tree conservation techniques which prolong life, retain all standing and fallen habitats in situ including the movement of challenges away from trees in preference to removing the tree considered an issue. • Include fruit trees in considerations for old / ancient / notable trees. • Highlight issues from systemic agricultural and horse wormers on insects in the wider environment. • Carry out targeted surveys to locate and assess all veteran and ancient trees in likely landscapes (known current / ex woodpasture / parkland, chase or Hunting Forest) to fill in spatial gaps to existing mapping. 	<p>Species such as: Tree Snipe Fly (<i>Chrysopilus laetus</i>), Oak Click Beetle (<i>Lacon quercus</i>), a Staphylinid Beetles (<i>Batrissodes delaporti</i>, and <i>Euplectus tholini</i>), Crane Flies (<i>Ctenophora ornata</i> and <i>C. flaveolata</i>), Wood-Boring Weevil (<i>Dryophthorus corticalis</i>), Rusty Click Beetles (<i>Elater ferrugineus</i>), Bark Beetles (<i>Ernoporicus caucasicus</i> and <i>E. tiliae</i>), False Click Beetle (<i>Eucnemis capucina</i>), True Flies (<i>Heteromeria nigrimana</i>) and (<i>Rainieria calceata</i>), Hornet Rove-Beetle (<i>Quedius dilatatus</i>), Beetles (<i>Teredus cylindricus</i>, <i>Vanonus brevicornis</i>, <i>Globicornis nigripes</i>, <i>Aulonothroscus brevicollis</i>, <i>Hylis olexai</i> and <i>Trinodes hirtus</i>), Cardinal and Redohordinal Cardinal Click Beetles (<i>Ampedus cardinalis</i> and <i>A. rufipennis</i>), Wasp (<i>Ancistrocerus antilope</i>), Pseudoscorpion (<i>Dendrochernes cyrneus</i>), Sap Beetle (<i>Eपुरaea silacea</i>), False Darkling Beetle (<i>Hypulus quercinus</i>), Darkling Beetles (<i>Pentaphyllus testaceus</i> and <i>Mycetophagus populi</i>), Forest Silver-stiletto (<i>Pandivirilia melaleuca</i>), False Flower Beetle (<i>Scraptia fuscula</i>), Stag Beetle (<i>Lucanus cervus</i>), a Larder Beetle (<i>Trinodes hirtus</i>), a beetle (<i>Vanonus brevicornis</i>)</p>

Invertebrates and fungi	Dung associated species	Dung living species are key recyclers in the natural world. Not a glamorous role but critical one to avoid dung materials ever piling up in our environment. Many species have seen widespread population collapses from the mid 20th century onwards	<ul style="list-style-type: none"> Persistent effects of chemicals used to treat agricultural stock, horses and dogs for all forms of worms, lice, ticks, fleas etc. This is particularly a challenge for horses and domestic pets as restrictions on chemicals which can be used on stock in the food chain do not apply. Use of neonicotinoids in agricultural systems have received limited legal licencing in the UK. Lack of large livestock in winter landscapes, with the move to more barn-based stock management the large sized fresh dung supply can disappear in the landscape. 	<ul style="list-style-type: none"> On key sites using grazing stock which have not been extensively medicated for worms and other pests; in particular systemic types should be completely avoided and all Ivermectins. Avoid any applications of neonicotinoids which have notable persistence in environments killing many invertebrate species for multiple generations. Use dung associates as part of larger suite of species which indicate to landowners and managers the health of their environments. Signpost information on horse worming and invisible affects of wormers to horse owners. 	Species such as: Insects – Hornet Robberfly (<i>Asilus crabroniformis</i>), Soldier Flies (<i>Sargus bipunctatus</i> and <i>flavipes</i>), Minotaur Beetle (<i>Typhaeus typhoeus</i>), Dung Beetles <i>Chilothorax conspurcatus</i> and <i>Esymus merdarius</i> . Fungi – Nail Fungus (<i>Poronia punctata</i>), Inkcap (<i>Coprinopsis xenobia</i> and <i>luteocephala</i>), <i>Parasola cuniculorum</i> , <i>megasperma</i> and <i>nudiceps</i>), False Rayed Inkcap (<i>Coprinopsis pseudoradiata</i> and <i>pseudonivea</i>).
	Most relevant niches: Dung				
Invertebrates	Species associated primarily with open standing and running water	Across all Priority Habitats, a collection of species which specialise in ponds, pools, open ditches, lakes, strongly flooded marshes, streams, and rivers.	<ul style="list-style-type: none"> Direct loss of many standing/flowing water habitats through agricultural land drainage changes, increased ditch cleaning / level lowering, regular river vegetation removal and bank reprofiling, water course straightening and canalisation, infilling, quarrying, afforestation, new infrastructure and development-based drainage, excess flooding, water extraction etc. Indirect changes to water levels from widespread sources across their local water catchment such as new gravel lined service trenches, small scale scattered local development, road schemes, large local quarrying etc which change local water tables. Pollution from neighbouring land ie road runoff (salt / particulates and oils), agrochemicals, soil particles etc. Loss of traditional land management practices such as peat extraction, low intensity common grazing, birch and heather collection. Climate change. Unknown effects of pesticides both commercial and domestic. 	<ul style="list-style-type: none"> Discourage further losses of habitat to additional drainage / artificial swamping, afforestation; or if to be damaged suitably compensated very locally. Create/maintain grassy and not-treated margins to buffer all water bodies (standing or flowing) from chemical or soil ingress. Manage water courses towards more natural profiles and courses, countering channelisation and straightening. In Thames valley prevent over cleaning of slow leaf litter rich backwaters and ditch networks. (See Sheet-2-General-guidance-web.pdf) (see Sheet-3-Managing_Spring_Seepages_Woodlands-web.pdf) Promote habitats as being of importance with developers, consultants, forestry specialists, farmers, land managers and reserve staff. Encourage the use of wormers in commercial /conservation herds grazing these sites which are not systemic and have no secondary affects. Raise awareness of the value of all waterbodies as habitats for all wildlife. 	Species such as: Beetles (<i>Gyrinus distinctus</i>), (<i>Ochthebius exsculptus</i>), (<i>Polistichus connexus</i>), (<i>Cercyon bifenestratus</i>), Flies (<i>Stratiomys longicornis</i>), (<i>Platycheirus immarginatus</i>), (<i>Melanostolus melancholicus</i>), Common Club-tailed Dragonfly (<i>Gomphus vulgatissimus</i>)
	Most relevant niches: All rivers and streams, Permanent and ephemeral pools and ponds, Backwaters, Mires, North Bucks fens and fen meadows, River and streamside margins.				
Invertebrates	Species associated with wet or damp habitats	A collection of species which specialise in wet or damp habitats, ranging from acidic through neutral to calcareous soils. Habitats in which they exist include mire, marshland, grazing marsh, wet acid grasslands, peat stands, and damp woodlands.	<ul style="list-style-type: none"> Direct loss of many damp habitats through agricultural improvements, quarrying, afforestation, deforestation, new infrastructure and development-based drainage, excess flooding, water extraction etc. Indirect changes to sites from widespread sources across their local water catchment such as new gravel lined service trenches, small scale scattered local development, road schemes, large local quarrying etc. which change local water tables. Loss of traditional land management practices such as peat extraction, low intensity common grazing, birch and heather collection etc. Climate change. Unknown effects of pesticides both commercial and domestic. 	<ul style="list-style-type: none"> Retain existing wet and damp habitats, avoiding additional drainage / artificial swamping, afforestation; or if to be damaged suitably compensated very locally. Create/maintain grassy and not-treated margins to buffer all water bodies (standing or flowing) from chemical or soil ingress. Promote habitats as being of importance with developers, consultants, forestry specialists, farmers, land managers and reserve staff. Encourage the use of wormers in commercial /conservation herds grazing these sites which are not systemic and have no secondary affects. 	Species such as: Beetles (<i>Clemnius decorates</i>), (<i>Contacyphon punctipennis</i>), (<i>Gyrinus paykulli</i>), (<i>Hydrophilus piceus</i>), (<i>Helochaeres punctatus</i>), (<i>Hydaticus seminiger</i>), (<i>Acupalpus exiguus</i>), (<i>Badister dilatatus</i>), (<i>Pterostichus anthracinus</i>), (<i>Pterostichus gracilis</i>), Flies (<i>Dorylomorpha haemorrhoidalis</i>), (<i>Atylotus rusticus</i>) Spider (<i>Evarcha arcuate</i>), True Bug (<i>Microvelia pygmaea</i>)
	Most relevant niches: Permanent and ephemeral pools and ponds, Backwaters, Mires, North Bucks fens and fen meadows.				
Invertebrates	White-Clawed Atlantic Stream Crayfish	The UK's only native freshwater crayfish species. Although locally still abundant in some areas of England and Wales, the white-clawed crayfish has declined dramatically in recent years. It is under threat throughout its range in Britain and in other areas of Europe. The principal causes of decline are competition from nonnative crayfish and a lethal disease (crayfish plague) carried by introduced species. Once a relatively common species in clean oxygen rich rivers in Bucks, primarily chalk and limestone-based streams. Now reduced to a very low number of isolated sites where it has avoided the losses because of its isolation – non-native species are able to travel overland quite some distance and colonise most waterbodies.	<ul style="list-style-type: none"> Widespread introduction of non-native species either for interest, or food collection. Habitat deterioration and loss coupled with lowering water qualities, barriers to movement, and disturbance can also have significant impacts on remaining populations. Lack of awareness of problems caused by non-native species introductions including loss of local insect and fish biota through feeding. 	<ul style="list-style-type: none"> If located, liaise with landowners and Environment Agency re possible site management changes (additional refugia/ cleaner aerated water flows / larger available habitats) and to flag species location for future changes in water network. Keep up-to-date with latest research on methods for alien species control and consider their use in populations most likely to be threat to White Clawed Crayfish in Bucks. Survey of all known sites where the species has been recorded in the last 25years. Liaise with fishing community if they have any recent sightings of either native or alien species. Raising awareness of issues with moving / introducing non-native crayfish species with public. 	White-Clawed Crayfish (<i>Austropotamobius pallipes</i>)

Higher Plants	Black Poplar	Cited by the Forestry Commission as “the most endangered native timber tree in Britain” (Forestry Commission Research note 239). Its genetic diversity is limited, recent estimates suggest roughly half all existing trees in the UK exist in Buckinghamshire; predominantly in the Vale of Aylesbury area.	<ul style="list-style-type: none"> • Loss of “natural” rivers with constantly shifting channels and erosion / accretion dynamics. • Lack of spaces suitably large and damp habitats to allow natural phoenixing to occur. • Loss of historic knowledge that phoenixing is a natural and positive process for Black Poplars and other species utilising the complex marshy spaces it creates. • Specimens traditionally pollarded were regularly cut, lack of modern cutting usually leads to catastrophic tree failure. 	<ul style="list-style-type: none"> • Inclusion of Black Poplars in areas where re-wilding or more natural channels are being recreated in rivers and wetland systems. • Inclusion of native tree cuttings in new tree plantings on wet ground. • Promotion of the trees value for wildlife and as a historic artefact with landowners and managers. 	Black Poplar (<i>Populus nigra betulifolia</i>)
	Most relevant niches: River and streamside margins, Backwaters, Open grown trees	The Black Poplar is most commonly a river- side tree in England and Wales. Its true native habitat is braided river systems, moving from island to island as they come and go after flood events. This habitat is now extremely scarce in the UK and practically absent from Bucks. It has long established uses for various building materials so has been widely planted for hundreds of years along stream banks and in wet places Black Poplars have the ability to live extremely long lives through the process of phoenixing, where trees fall over, remain attached at the base, and reshot new growth upright from the fallen stem; a cycle it can ever repeat.			
Higher Plants	Juniper	In lowland England Juniper has suffered from substantial reductions in nearly all sites in the 20 th Century, in many cases with its total loss. In Bucks primarily a species of hot, open chalk turf most often on the steep Chilterns scarp or its side valleys. Historically Bucks also had a few isolated acid sites on clays or gravels; only one of which, at Burnham Beeches, remains as a continuous population.	<ul style="list-style-type: none"> • Lack of traditional extensive livestock grazing. • Dense scrub encroachment. • Lack of friable open turf / open bare chalk rubble for recruitment • Other changes in land management such as agricultural improvements and ploughing out of old grasslands have all led to the decline. • Climate change will add further pressures on this slow growing species survival in Bucks. • Infection with <i>Phytophthora austrocedri</i> - an aggressive, fungus-like pathogen which infects juniper and cypress trees causing dieback and tree death. 	<ul style="list-style-type: none"> • Creation of new areas for seedling recruitment on existing sites using carefully placed new bare chalk rubble scrapes. • Infrequent haloing of all individuals currently overtopped by scrub and woodland. No more than 1/6 of shade of be removed every 5 years to avoid scorching and eventual loss of bushes which can suffer fatal shock if manged too rapidly. • Encourage existing owners (especially non SSSI sites) to take care of juniper stands and to promote their welfare. • Consider additional management techniques on existing and adjacent sites which regularly create more open, friable, rubbly chalk / sandy soils for future recruitment including occasional poaching, cultivation or raking. • Create larger extensively grazed sites, which allow for additional opportunities for Juniper to colonise, and join up existing stands. • Follow good biosecurity (plant hygiene) practice, such as cleaning and disinfecting footwear, tools and vehicles before entering and after leaving juniper sites. 	Juniper (<i>Juniperus communis communis</i>)
	Most relevant niches: Chalk & limestone rubble scrapes or very friable minimally vegetated soils, Open grown trees.				
Higher Plants	Arable and disturbed ground plants	These plants have evolved to take advantage of disturbed areas where vegetation is sparse or completely absent either because of man-made environments such as arable fields and their margins, or now less commonly from weather and wild animal disturbance. In the modern world they are primarily found in current or recently abandoned arable fields, occasionally on bare ground created by other factors. They used to thrive across much of lowland Britain because they exploit the same niche as crop plants. Some are native species that sidestepped into the manmade habitats as organised agriculture became more prevalent in landscapes, others have been accidentally brought in as a seed contaminant over millennia. Communities vary across different soil types.	<ul style="list-style-type: none"> • Increased power and effectiveness of modern agricultural machinery which creates a much deeper cover when ploughing and is able to get into even tricky field corners previously too hard to work. • Herbicides used as part of crop management. • Deliberate eradication from farming systems either because seeds can taint grain crops, or in the case of plants such as Poppies because they remain green late into harvest and their extremely sticky sap clogs up combines and seed sieves. • Earlier harvesting dates in modern farming and lack of stubbles left over winter for more traditional crops – both limit seeds which can be effectively deployed. • Conversion of many marginal very chalky or sandy fields to other uses such as permanent grass, maize, silage or golf greens. 	<ul style="list-style-type: none"> • Leave less valuable and harder to crop field margins and corners un-sprayed and cropped on a rotational basis. Plants need tilling at least once every 5 years to keep populations in good number. Consider twinning with farmland bird feeding areas and winter stubbles where possible to create multiple benefit. • Gardeners and allotment holders can support these species by leaving small areas un-weeded, every other year, where they occur. • Promote Species native to Buckinghamshire and Milton Keynes as valuable assets in modern landscapes. 	Field Gromwell (<i>Buglossoides arvensis</i>), Few-flowered Fumitory (<i>Fumaria vaillantii</i>), Red Hemp-nettle (<i>Galeopsis angustifolia</i>), Corn Buttercup (<i>Ranunculus arvensis</i>), Shepherd's-needle (<i>Scandix pecten-veneris</i>), Night-flowering Catchfly (<i>Silene noctiflora</i>), Corn Spurrey (<i>Spergula arvensis</i>), Spreading Hedge-parsley (<i>Torilis arvensis</i>) Narrow-fruited Cornsalad, (<i>Valerianella dentata</i>)
	Most relevant niches: Arable margins, Sandy scrapes or very friable minimally vegetated soils, Sandy scrapes or very friable minimally vegetated soils				

Higher Plants	<p>Plants of dry heath and acid grassland</p> <p>Most relevant niches: Acid grasslands, Sandy scrapes or very friable minimally vegetated soils,</p>	<p>In the past dry heaths and acid grasslands were often wide-open landscapes, typically occurring on free-draining soil that has a relatively low nutrient content. Dominated by plants such as heathers, gorse, dwarf shrubs, rough grasses with occasional scattered trees.</p> <p>Usually, an integral part of much larger agricultural systems of communal grazing across whole landscapes, forming part of an annual cycle of stock movements. They are poorer in terms of agricultural outputs than easier land such as meadows and leys because of their plant communities are surviving stressful soil conditions with low nutrient availability.</p> <p>The intimate mosaic of dwarf shrubs such as heathers and gorses and more open grass dominated swards, with limited shrub or no larger shrubs or trees is a result of centuries of long-term stock grazing, as well as the collection of heather and gorse for burning and similar activities.</p> <p>Localised extraction of sand and gravel was a common practice for nearby building projects creating small seasonal ponds, areas of open primary habitat required by some bees, wasps, beetles, plants and reptiles.</p>	<ul style="list-style-type: none"> Planned afforestation, often with Pine Cessation of traditional grazing rotations and patterns of landscape wide movements, particularly those including cattle, horses and pigs. Lack of suitable large livestock for heathland grazing in modern farming systems. Unplanned afforestation where ungrazed areas progress to secondary woodland. Once abandoned, or with major drops in management pressures, vegetation changes to a more monocultural stands without the small-scale intimate mix of niches previously present. Cessation of small scale but widespread locally sand, gravel, clay and stone quarrying / borrow pits for building and minerals. Loss of small-scale open ponds (often generated by new localised quarrying) to shade and tree cover. Lack of irregularly generated early successional habitats (bare areas) which can rejuvenate wider landscapes, opening up seedbanks and creating new niches for wildlife. Abandonment of traditional trackways and routes, leading to loss of regularly disturbed soils and rutting Invasive species such as Rhododendron, Laurel, Bracken, Bramble and Scots Pine Changing perceptions – seeing less open more wooded landscapes as being the norm for that space Increased informal recreation, species disturbance, challenges with livestock vs dogs and dog poo nutrification. Public perceptions around tree felling and management 	<ul style="list-style-type: none"> Reintroduction of extensive grazing, particularly hardy native breeds of cattle and horses. Explore new models of land management which support sizable herds of suitable breeds of grazing stock, which can be moved across the whole landscape as and where needed. Application of new technologies, such as no fence (a wireless GPS based “fence” system) to allow stock grazing in particular sites or site compartments without the need for permanent fencing Targeting invasive species such as Bracken, Rhododendron, Laurel and Holly through site-based control and eradication programmes. Creation of new small pits, in sands and gravels particularly. Where sites are large enough create areas with dynamic mobile exposures of sands through turf stripping and scrub control, to enable occasional windblow / water erosion events. Reuse of old trackways, and acceptance of disturbed soils, occasional rutting and bare ground. Wider interpretive piece to explain the values of dry heath and acid grasslands, their history, wildlife and management needs; including occasional fencing, tree felling and stock grazing. 	<p>Petty whin (<i>Genista anglica</i>), Sheep's-bit (<i>Jasione montana</i>), Upright Chickweed (<i>Moenchia erecta</i>), Annual Knawel (<i>Scleranthus annuus</i>), Tower Mustard (<i>Turritis glabra</i>), Hoary Cinquefoil (<i>Potentilla argentea</i>), Shepherd's Cress (<i>Teesdalia nudicaulis</i>), Subterranean Clover (<i>Trifolium subterraneum</i>), Spring Vetch (<i>Vicia lathyroides</i>)</p>
Higher Plants	<p>Woodland plants</p> <p>Most relevant niches: Woodland rides and glades, Green lanes and Holloways, Scrub transition habitats.</p>	<p>Woodland plants occur in a wide range of habitats from open and light rich glades, rides and clearings to denser stands of trees and shrubby communities. Some prefer damper conditions others more free draining, but all are heavily dependent on the persistence of their chosen habitat for very long periods of time somewhere local to where they currently grow; ie the persistence of all relevant habitats in a landscape.</p> <p>Despite their often-untouched appearance, woodlands have been heavily managed for millennia, providing much needed timber and underwood resources. These various cycles of management provided a continuous source of habitats for woodland plants. Post WWII drops in manpower are becoming more evident in declining woodland health in many places.</p>	<ul style="list-style-type: none"> Lack of management, many woodlands are now without regular programmes of management, losing key components such as open light rich rides networks, varying structural and species mixes within their canopies and cycles of rejuvenation. Changing and often declining markets for timber and underwood. Climate change, generally affecting local conditions within individual woodlands and on a much wider landscape scale. Less cold, or seemingly damper winters, affect species ability to survive and increase likelihood of some pest species to proliferate (such as Holly). Winter cold influences mechanical breakdown to leaf litter and other materials, recycling them for reuse and restricting matting effects. More research is needed to understand changes to woodlands and how this affects the myriad species within them. Despite seemingly wetter weather, in some locales the woodlands are drying out, others becoming damper. Many woodland species are very slow to adapt to change and have little capacity to escape to new habitats. Deer impacts. Both native and non-native species have significantly increased in numbers during the latter half or the C20th due to changes in land management practices in the wider landscape and lack of culling for food. Changes to ground flora, often linked to soil enrichment from nutrient rain, air and traffic pollution, aircraft overflight and wider industrial and domestic sources. Increased competition from species which form thick light reducing mats at ground level or in the sub canopy which swamp natural regeneration and create soggy litter traps inhibiting germination. Native species such as Holly, Bramble and Ivy are increasingly an issue, as are non-natives such as Laurel and Rhododendron. 	<ul style="list-style-type: none"> Reinvigoration of woodland management. Where possible adopt Continuous cover management practices as this is less disruptive to the ecosystem as a whole, retaining more shade and moisture and protecting woodland soils from erosion and carbon release. Adopt management practices which ensure the long-term continuity of all local tree and shrub species. Create and maintain networks of open rides and glades with varying aspects throughout woodland. Control deer numbers. Control pest plant species such as Bramble, Holly, Bracken and Rhododendron. Avoid operation of heavy machinery around known/potential sites of sensitive woodland plant species. Where unavoidable, use ground protection mats to preserve soil structure and fungal communities associated with these species. Limit soil structure damage by avoiding all sources of compaction. especially the use of machinery in wet ground conditions. Where excessive brash is generated which can't be stockpiled use chipping to reduce the excess, deposit in heaps. Consider onsite burning as a last resort, reuse old sites to avoid soil damage. Better promote the need for continued woodland management and the opportunities it creates for landowners as well as wildlife. 	<p>Yellow Bird's-nest (<i>Hypopitys monotropa</i>), Bird's-nest Orchid (<i>Neottia nidus-avis</i>), Fly Orchid (<i>Ophrys insectifera</i>), Large-fruited Prickly-sedge (<i>Carex muricata subsp. muricata</i>), Coralroot (<i>Cardamine bulbifera</i>), Narrow-lipped Helleborine (<i>Epipactis leptochila</i>), Narrow-leaved Everlasting-pea (<i>Lathyrus sylvestris</i>) Herb-paris (<i>Paris quadrifolia</i>)</p>

Higher Plants	<p>Calcareous grassland plants</p> <p>Most relevant niches: Chalk & limestone rubble scrapes or very friable minimally vegetated soils.</p>	<p>Chalk or calcareous grassland is characterised by well drained, open soil, typically in a sunny position. These nutrient-poor high stress conditions are ideal for species specialised in coping with such conditions. a specialised array of flora and fauna.</p> <p>Calcareous grasslands include both those on the chalk of the Chilterns as well as various limestone outcrops on the Midvale Ridge, scattered across the Vale of Aylesbury or in the far north of Buckinghamshire near Olney.</p> <p>Typically, sites have, at a very small scale, localised niches driven by changes in their aspect, slope angle, scrub cover, shading, earthworks and hollow-ways, and even around individual features such as anthills. Different species prefer different microclimates or niches within the much larger patchwork of longer grass dominated swards, scrub edges and stands, short turf and open brashy soils.</p>	<ul style="list-style-type: none"> • Agricultural improvements such as ploughing, seeding and the application of artificial fertilisers. • Widespread changes to land management, particularly post WWI with shortages of manpower and improvements to the availability of tractors and other heavy machinery. • Loss of traditional farming practices which managed calcareous grasslands as part of a much wider landscape within which farmstock moved. • Lack of often heavy livestock, particularly cattle and horses as well as to a lesser extent hardy sheep able to survive on these sites. • Natural scrub and woodland development. • Planned afforestation. • Cessation of very old traditions of widely used but small-scale quarrying or borrow pitting for chalk and limestone (for lime production and road surfacing) and flint (for building). • Changes to flora and fauna, often linked to soil enrichment from nutrient rain, air and traffic pollution, aircraft overflight and wider industrial and domestic sources. • Long term changes to localised soils from mass scrub and woodland encroachment mid C20th. 	<ul style="list-style-type: none"> • Reinstatement of extensive grazing of all sites, particularly with heavier hardy breeds of cattle, sheep and horses. • Training of specific specialist herds of cattle familiar with no fence grazing systems, which use GPS collars to manage where stock can and can't go and hence reduce more expensive fencing requirements. • Drive the recreation of more intimately mixed habitat niches by enlarging and joining up existing grassland sites, even with less interesting habitats, to allow grazing stock to roam across much wider areas. • Consider the results of site management over more than one year, for instance allowing effects such as poaching to happen in wetter years, but no more than once every 5 years. • Recreate local quarrying and friable ground surfaces on an occasional basis using small machinery, very localised light cultivating / ploughing /turf stripping. 	<p>Basil Thyme (<i>Clinopodium acinos</i>), Frog Orchid (<i>Coeloglossum viride</i>), Chalk Eyebright (<i>Euphrasia pseudokernerii</i>), Slender Bedstraw (<i>Galium pumilum</i>), Early Gentian (<i>Gentianella amarella</i> subsp. <i>anglica</i>), Chiltern Gentian (<i>Gentianella germanica</i>), Fringed Gentian (<i>Gentianopsis ciliata</i>), Musk Orchid (<i>Herminium monorchis</i>), Wild Candytuft (<i>Iberis amara</i>), Military Orchid (<i>Orchis militaris</i>), Pasqueflower (<i>Pulsatilla vulgaris</i>), Field Fleawort (<i>Tephrosia integrifolia</i> subsp. <i>integrifolia</i>), Pale St John's-wort (<i>Hypericum montanum</i>), Common Juniper (<i>Juniperus communis</i> subsp. <i>communis</i>), Meadow Clary (<i>Salvia pratensis</i>)</p>
Higher Plants	<p>Plants of meadows, wet grassland and fen</p> <p>Most relevant niches: North Bucks fens and fen meadows, damp meadows.</p>	<p>These habitats are most often found on low lying or gently undulating areas across Buckinghamshire and Milton Keynes, and occasionally on clay plateaus in the Chilterns, but not necessarily close to existing large watercourses.</p> <p>Meadows were traditionally managed with a mixture of early and late season grazing whilst often being shut up for hay cutting in summer. Some wetter examples of these flower and grass rich fields were damper, requiring adjusted timing and management techniques /stock types to overcome wet ground conditions. Many were subject to seasonal flooding and natural nutrient enrichment.</p> <p>Fens are very wet areas, of peat-accumulating (even at very minimal scales) wetland but critically fed by mineral-rich ground or surface water. Typically, this input results in higher mineral concentrations and a more basic pH than found in bogs. The unique water chemistry of fens, particularly the North Bucks type of fen is a result of the ground or surface water input. Fens are normally very small and so much more likely to be affected by changes in surrounding land management, even often quite trivial seeming ones.</p> <p>Significantly losses occurred from the C18th century onwards with widespread investments into in-field land drainage and new or deeper ditch networks. Challenges with the agricultural management of wetter ground made many areas undesirable and hence their conversion.</p>	<ul style="list-style-type: none"> • Widespread land drainage. • Shift from hay to silage crops. • Other changes to land management such as conversion to forestry, playing fields, golf courses etc. • Other agricultural improvements such as ploughing, reseeding, and artificial fertiliser application. • Climate change. • Pollution and eutrophication of ground and surface water sources. • Changes to localised water tables and water movements brought about by new large infrastructures such as road, rail, canal and house developments and water abstraction. • More localised effects of new service trenches with gravel fills, changes to ditch levels etc on local water tables. • Fens "improved" by excavation of large pools or ponds for fish, ducks and other wildlife. 	<ul style="list-style-type: none"> • Give wider consideration of new infrastructure, both its effects below as well as above ground. • Continue or re-introduce low intensity grazing, particularly using traditional heavy cattle breeds which create microsites for plant recruitment in hoof cuts and holes, control scrub and generate. • Manage blocks of fields as one wider landscape, allowing stock to flow throughout, to create a richer mix of niches within the wider landscape. • Cut for hay, rather than silage, on suitable meadow land • Localised and sporadic mowing in more mixed/wet sites using the little and often approach to controlling coarser vegetation. • Adopt of more episodic forms of management, often weather-related, where some years land is managed more heavily than others, allowing a mix of vegetation stands and more open cut turf to develop. • Develop additional local planning guidance on developments incursions to the water tables of all Statutory and Non-Statutory Sites, and Habitats of Principle Importance 	<p>Dyer's Greenweed (<i>Genista tinctoria</i>) Mousetail (<i>Myosurus minimus</i>), Tubular Water-dropwort (<i>Oenanthe fistulosa</i>), Marsh Stitchwort (<i>Stellaria palustris</i>), a Dandelion (<i>Taraxacum anglicum</i>), Heath Dog-violet (<i>Viola canina</i>), Marsh Helleborine (<i>Epipactis palustris</i>), Marsh Arrowgrass (<i>Triglochin palustris</i>), Marsh Valerian (<i>Valeriana dioica</i>), Distant Sedge (<i>Carex distans</i>), Long-stalked Yellow-sedge (<i>Carex lepidocarpa</i>), Bottle Sedge (<i>Carex rostrata</i>), Meadow Thistle (<i>Cirsium dissectum</i>)</p>

<p>Plants of wet heath and mires</p>	<p>Historically wet heaths and mires were often wide-open landscapes, typically occurring on poorly draining soils with relatively low nutrient content. Dominated by plants such as heathers, gorse, dwarf shrubs, rough grasses with occasional scattered trees.</p> <p>Usually, an integral part of much larger agricultural systems of communal grazing across whole landscapes, forming part of an annual cycle of stock movements. They are poorer in terms of agricultural outputs than easier land such as meadows and leys because of their plant communities are surviving stressful soil conditions with low nutrient availability.</p> <p>The intimate mosaic of dwarf shrubs such as heathers and gorses and more open grass dominated swards, with limited shrub or no larger shrubs or trees is a result of centuries of long-term stock grazing, as well as the collection of heather and gorse for burning and similar activities.</p> <p>Localised extraction of sand and gravel was a common practice for nearby building projects creating small seasonal ponds, areas of open primary habitat required by some bees, wasps, beetles, plants and reptiles.</p>	<ul style="list-style-type: none"> • Drainage and other agricultural improvements • Planned afforestation. • Unplanned afforestation where ungrazed areas progress to secondary woodland. • Cessation of traditional grazing rotations and patterns of landscape wide movements, particularly those including cattle and horses. Once abandoned, or with major drops in management pressures, vegetation changes to a more monocultural stands without the small-scale intimate mix of niches previously present. • Lack of suitable large livestock for heathland grazing in modern farming systems. • Cessation of small scale but widespread locally sand, gravel, clay and stone quarrying / borrow pits for building and minerals. • Pollution of ground and surface water from road runoff and highway drainage, agricultural and industrial operations, domestic clargesters etc. • Loss of small-scale open ponds (often generated by new localised quarrying) to shade and tree cover. • Abandonment of traditional trackways and routes, leading to loss of regularly disturbed soils and rutting • Invasive species such as Rhododendron, Birch, Scots Pine, Gaultheria, Laurel and New Zealand Swamp Stonecrop. • Changing perceptions – seeing less open, dryer, more wooded landscapes as being the norm for that space • Increased informal recreation, species disturbance, challenges with livestock vs dogs and dog poo nutrification. • Public perceptions around wet habitats, tree felling and management 	<ul style="list-style-type: none"> • Re-wet key areas where it is possible to reverse previous drainage schemes or overland flow diversions. • Give wider consideration of new infrastructure, both its effects below as well as above ground. • Develop additional local planning guidance on developments incursions to the water tables of all Statutory and Non-Statutory Sites, and Habitats of Principle Importance. • Reintroduction of extensive grazing, particularly hardy native breeds of cattle and horses • Explore new models of land management which support sizable herds of suitable breeds of grazing stock, which can be moved across the whole landscape as and where needed. • Application of new technologies, such as no fence (a wireless GPS based “fence” system) to allow stock grazing in particular sites or site compartments without the need for permanent fencing • Targeting invasive species through site-based control and eradication programmes. • Creation of new small pits, in sands and gravels particularly. • Reuse of old trackways, and acceptance of disturbed soils, occasional rutting and bare ground. • Wider interpretive piece to explain the values of wet heath and mire, their history, wildlife and management needs; including occasional fencing, tree felling and stock grazing. 	<p>Oblong-leaved Sundew (<i>Drosera intermedia</i>), Common Cottongrass (<i>Eriophorum angustifolium</i>), Lousewort (<i>Pedicularis sylvatica</i>), Star Sedge (<i>Carex echinata</i>), Flea Sedge (<i>Carex pulicaris</i>), Cross-leaved Heath (<i>Erica tetralix</i>), Marsh Pennywort (<i>Hydrocotyle vulgaris</i>), Marsh St John's-wort (<i>Hypericum elodes</i>), Heath Milkwort (<i>Polygala serpyllifolia</i>), Bog Pimpernel (<i>Lysimachia tenella</i>), Bog Pondweed (<i>Potamogeton polygonifolius</i>), Marsh Fern (<i>Thelypteris palustris</i>)</p>
<p>Aquatic plants</p>	<p>Aquatic plants comprise open water species growing in lakes and ponds, others submerged or emerging from waters, and those which prefer to live on the very margins of both temporal and permanent water bodies; right across the size scale.</p> <p>Geographically aquatic plants grow right across Buckinghamshire and Milton Keynes. Waterbodies are very variable in nature, running across a range of PHs from acidic – neutral - calcareous in canals and reservoirs, lakes and ponds, ditches and mill leats and in rivers or streams.</p> <p>Waterbodies can be complex with extensive ranges of water depth, bank profile and shape, especially larger ones, or more simple temporal ponds and pools which dry out regularly. Chalk streams are of international importance, many having permanently flowing sections as well as being winterbournes higher in their catchment with only seasonal flows</p>	<ul style="list-style-type: none"> • Over extraction related lowering of natural groundwater waters in winterbournes. • Decrease of water quality from point source and diffuse pollution such as industrial, agricultural and domestic runoff, particulates / oil and salt from highways and air pollution falling in rain. • Increased localised nutrient loads from artificially high fish and water-fowl populations. • In the last few hundred years many natural processes have largely been designed out of whole landscapes, ie seasonal flooding is prohibited, natural channel movement is prevented and structures introduced which affect water levels, sediment deposition, flow rates and species migration. • General losses especially field ponds as the pastoral land management systems are converted to other agricultural and commercial uses which don't need ponds as water sources. Ponds can be abandoned, filled in, or become tree covered when fenced out from stock. • Inappropriate dredging, especially over deepening and uniform bank profiling of streams and ditches • Increased water traffic in canals causing plant disturbance and increase nutrient loads /turbidity through stirring basal sediments and bank wash. • Climate change, including more erratic weather and diminished ground water recharge from changing rainfall patterns. • Misunderstanding of water body ecology, ie the presumption that to be a good pond it needs to stay full all year round, often the counter is true. • Loss of small-scale quarrying which generates a conveyor belt of new sumps which can become ponds and pools, particularly valuable when they have a draw down zone or are summer dry. • Invasive species such as Floating Water Pennywort (<i>Hydrocotyle ranunculoides</i>) which chokes chalk streams, Signal Crayfish which deplete invertebrates and have out competed native species, and large Carp species with few natural predators. 	<ul style="list-style-type: none"> • Continue alleviation of low flow schemes for chalk streams • Control invasive species such as Floating Pennywort (<i>Hydrocotyle ranunculoides</i>) particularly in chalk streams. • Manage key areas of river systems to allow more natural flooding and watercourse self-adjustments to occur. • Create new pond complexes over time in areas with existing ponds to expand numbers and create variable stages of development in them but only where they can be created without loss of other important habitats. • Create other new water bodies of other scales, across the County, where opportunities occur. Adopt no planting solutions, where natural colonisation is the primary driver for vegetation development. • Allow natural vegetation to develop (not artificially planting) in new ponds, and “Ghost ponds” where previous lost ponds have been sensitively restored. • Encourage better quality water body design, including much more variable water depths, bank profiles and extensive beaches and draw down zones, in ex quarry areas. • Consider the adoption of quiet water areas in backwaters or wider sections of the Grand Union canal where mooring and boat-wash can be limited. • Keep the unnavigable section of the Wendover Arm as free of boat traffic, to retain its better water quality and subsequent higher wildlife value. • Limit excess boat passages on the Slough arm of the Grand Union to retain its well-developed wildlife value. • Reintroduction of grazing, particularly hardy native breeds of cattle and horses, to extensive pastoral and commons systems. • Encourage understanding of ponds, their value and the species naturally within them, particularly where they dry out seasonally. 	<p>Brown Galingale (<i>Cyperus fuscus</i>), Starfruit (<i>Damasonium alisma</i>), Opposite-leaved Pondweed (<i>Groenlandia densa</i>), Lesser Marshwort (<i>Helosciadium inundatum</i>), Frogbit (<i>Hydrocharis morsus-ranae</i>), Grass-wrack Pondweed (<i>Potamogeton compressus</i>), Flat-stalked Pondweed (<i>Potamogeton friesii</i>), Loddon Pondweed (<i>Potamogeton nodosus</i>) Needle Spike-rush (<i>Eleocharis acicularis</i>), Orange Foxtail (<i>Alopecurus aequalis</i>), Floating Club-rush (<i>Eleogiton fluitans</i>), Mudwort (<i>Limosella aquatica</i>), Fine-leaved Water-dropwort (<i>Oenanthe aquatica</i>), River Water-dropwort (<i>Oenanthe fluviatilis</i>), Bladderwort (<i>Utricularia australis</i>). All Stoneworts (<i>Charophytes</i>).</p>

Lichens	Lichens on veteran and ancient trees	Old trees form three-dimensional habitat frameworks for all manner of species including lichens. Host tree barks vary in moisture content, aspect, PH etc from species to species, and on a finer scale from tree to tree depending on its exact location. In general, the older a tree, the more it may be colonised by increasing amounts of lichen and different lichen species. Craggy barked tree species and those with a certain beneficial PH's are more likely to be colonised, ie Oak, Field Maple, Cherries, Apples, Poplars and Elms. On the whole lichens grow very slowly so have challenges when conditions change rapidly.	<ul style="list-style-type: none"> • Air and dust pollution (including nitrogen) both from domestic and industrial sources, as well as transport (trains, road traffic and plane overflight.) • Wind-blown nutrient pollution from animal husbandry and farming as well as industrial processes. • Loss of old and ancient trees across the landscape. • Reductions or total loss of traditional habitat management processes such as pollarding which can significantly extend and individuals lifespan, and woodpasture which creates specific local conditions more akin to ancient landscapes than modern ones. • Rapid changes to management around tree hosts, which alters conditions for the lichens which have a very limited response rate. 	<ul style="list-style-type: none"> • Retention of old trees be they notable, veteran or ancient across the county, including those with substantial deadwood or which have died. • Taking lichens into consideration throughout the planning process and biodiversity management. Particularly major infrastructure projects which cause changes at a landscape scale. • Consider gradually haloing around older trees overtopped by scrub and woodland vegetation (follow Ancient Tree Forum guidelines (See https://www.ancienttreeforum.org.uk/resources/ancient-tree-guides/ and VETcert Ancient Tree Forum) • Promote wood pasture and traditional orchard management. • Establish new pollarded trees where the practice has a local history to act as next generation for colonisation. • Promotion of lichens and their needs to landowners and manager, particularly the role played by older orchard and garden trees as well as those in the wider landscape 	Species such as (<i>Pyrenula nitida</i>), (<i>Pyrenula nitidella</i>), (<i>Bellicidia incompta</i>), (<i>Scutula circumspecta</i>) and (<i>Porina Hibernica</i>)
	Most relevant niches: Damp oak Woodland, Open grown trees, Ancient or Veteran Trees, Singleton fruit tree, Churches, churchyards and burial grounds.				
Mosses and Liverworts	Mosses and Liverworts in unusual habitats	Our more uncommon species are often limited to very specific, unusual and highly threatened habitats. Knothole Yoke-moss is only found on formerly pollarded or naturally damaged, veteran beech trees (<i>Fagus sylvatica</i>) in fairly open, well-lit sites. Spiral Chalk-moss is a species which has not been seen in its occasional old haunts on chalk and limestone in many years and may be subject to a reintroduction programme in Bucks where it once occurred. Cavernous Crystalwort, an annual liverwort species which only occurs on seasonally flooded habitats such as recently exposed mud at the edge of ponds, lakes, reservoirs and flooded gravel pits; rare habitats in their own right in Bucks. All local Sphangum species require damp/wet acid conditions with low pollution, traditionally limited to heaths and mires across the county, now very much restricted in range largely to the Greensand Ridge and South Bucks heaths with occasional Chilterns relic sited. They play a vital role in the creation of peat bogs: by storing water in their spongy forms, they prevent the decay of dead plant material and eventually form peat.	<ul style="list-style-type: none"> • Lack of suitable trees in existing or ex woodpasture systems with open and well managed woodland / grassland mosaics. • General losses of well managed chalk / limestone grasslands and arable with areas with temporal and open swards. • Lack of seasonally inundated soils with regularly drawdown zones. Often engineered out of possible new sites by over planting of aquatic marginals and emergent species resulting from lack of appreciation that summer baked draw down zones are very valuable habitat in their own right. • Extensive loss of previous heath and mire systems to agricultural improvement, drainage, and/or conversion to dry woodland / built up areas / infrastructure. • Climate change. 	<ul style="list-style-type: none"> • Retention of old trees be they notable, veteran or ancient across the county, including those with substantial deadwood or which have died. • Expand areas of wood pasture and extensive parkland grazing systems. • Design in new areas of gently sloping fine sand, gravel and chalk marl "beaches" islands &/or spits which have functional draw down water regime in all post quarrying landscape proposals. (also likely to support key bird and higher plant populations). • Retain existing sphagnum habitat (acidic heaths, mires and swampy areas) avoiding further drainage, agricultural improvement, afforestation, development and new infrastructure. • Survey for Spiral Chalk-moss in all old sites. Establish presence / absence and condition of habitat and likelihood of persistence before any consideration of possible future translocations. Highlight the value of drawn down zones for a various forms of wildlife with conservation site owners and managers. • Survey all known and ex Sphagnum sites across Buckinghamshire and Milton Keynes. Establish presence / absence and condition of habitat; provide support to land managers to promote sensitive management. 	Knothole Yoke-moss (<i>Zygodon forsteri</i>), Spiral Chalk Moss (<i>Pterygoneurum lamellatum</i>), Cavernous Crystalwort (<i>Riccia cavernosa</i>), and <i>Sphagnum</i> species
	Most relevant niches: Mires, Draw down zones, Permanent and ephemeral pools and ponds woodpastures and parklands, Chalk grasslands				

Fungi	Dead wood specialist fungi	Deadwood is a crucial component of the landscape; silently complex ecosystems are driven by the actions of thousands of species of fungi.	<ul style="list-style-type: none"> • Misunderstanding of fungi and the essential role they play in healthy ecosystems, usually seen as the “bad guys”. • Removal of deadwood from single branches, through ground lying trunks and logs right through to whole trees from woodlands, parks, parklands, gardens etc for firewood. • Tidy mindedness, the deadwood on which the fungi feed is often considered “messy “and should be tidied, burnt or removed entirely. • Misunderstanding of the structural complexities of mature trees. Rotting heartwood and other fungi driven features often aid a trees stability and resilience to windthrow whilst providing crucial feeding / nesting / hibernating niches for insects, birds, bats, small mammals as well as other fungi species. 	<ul style="list-style-type: none"> • Promote root protection zones to developers, landowners and managers, commercial service providers and forestry / woodland specialists. • Promote woody debris dams within damp or wet areas. • Develop policy against substantial/old hedgerow loss as part of development. • Promote Ancient Tree Forum principles for tree consideration and management. • Where still under continuous management continue with existing management practices on all older trees (ie pollarding, coppicing) using traditional length of cycle and cutting techniques to be maintained. • For old, veteran or ancient trees encourage the use of all tree conservation techniques which prolong life, retain all standing and fallen habitats in situ including the movement of challenges away from trees in preference to removing the tree considered an issue. • Include fruit trees in considerations for old / ancient / notable trees. • Increase understanding of deadwood fungi as an essential part of a thriving landscape both within professional forestry, arboriculture and agricultural spheres and more generally with the wider public. • Publicise these fungi’s key role as carbon sequesters, recyclers and ecosystem drivers. • Carry out targeted surveys to locate and assess all veteran and ancient trees in likely landscapes (known current / ex woodpasture / parkland, chase or Hunting Forest) to fill in spatial gaps to existing mapping. • Change perceptions, promote old trees and in-situ dead wood habitats (both as open grown trees and those within woodland stands) as a key space for wildlife, to counter “tidiness” styles of management. 	Fungi such as Gilded Brittlegill (<i>Russula aurea</i>), Oak Polypore (<i>Buglossoporus quercinus</i>), Red Belted Bracket (<i>Fomitopsis pinicola</i>), Branched Shanklet (<i>Dendrocollybia racemosa</i>), Piggyback Rosegill (<i>Volvariella surrecta</i>), Piggyback, Splitpea and Lentil Shanklets (<i>Collybia cirrhata</i>), (<i>Collybia cookei</i>), (<i>Collybia tuberosa</i>), Silky and Powdery Piggybacks (<i>Asterophora parasitica</i> and <i>Lycoperdoides</i>), Genera (<i>Amanitas</i>), Boletes (<i>Boletus</i>), Webcaps (<i>Cortinarius</i>), Fibrecaps (<i>Inocybe</i>), Poisonpies (<i>Hebeloma</i>), Knights (<i>Tricholoma</i>), Milkcaps (<i>Lactarius</i>) and Tooth Fungi (<i>Hericium</i>) and Stipitate Hydroids.
	Most relevant niches: Woodpasture and parkland, all woodlands, Damp Oak Woodland, Open grown trees, Hollowed trees, Ancient or Veteran Trees	Deadwood and the fungi which live in it, existing right across the Buckinghamshire and Milton Keynes landscape far beyond their better-known woodland haunts. Deadwood exists in many forms, at all physical levels in the biosphere. Each location creates a unique habitat or niche ranging from the more obvious standing dead trees and large aerial branches, through stacks and trunks rotting on the ground, woody debris in wet places and water courses to vast hidden resources above and below ground in hedges, at the heart of living trees and in their and the root-spheres. Wood rotting fungi play an essential role in nutrient and material recycling, soil formation, sustaining biodiversity, and delivering essential ecosystem services. As wood decomposes it returns important nutrients to the soil, supporting new growth. It also supports up to a fifth of tree related species, depending on dead or dying wood, to complete their life cycles. Many of these species are considered rare or threatened. The actions of many wood rotting fungi within living trees are essential to their survival (from germination to eventual death) and longevity.			
Fungi	Old grassland specialist fungi	The grasslands of the UK are amongst the most important in the world for grassland fungi. The complex below ground ecosystems which develop in old grasslands can (by various estimates) take hundreds if not thousands of years to develop.	<ul style="list-style-type: none"> • Agricultural improvements such as the application of fertilisers, ploughing, conversion to silage, reseeded. • Cessation of traditional grazing systems. • Scrub encroachment and tree planting. • National infrastructure projects, quarrying and general land development. 	<p>In agricultural systems</p> <ul style="list-style-type: none"> • Retain permanent grassland. • Avoid any form of cultivation of the soil which disrupts or destroys the underground networks of the fungi - the mycelia. • Avoid the use of artificial fertilisers, manures, and herbicides • Soil compaction from heavy machinery or over grazing when too wet may affect the soil structure and damage the mycelia. • Prevent the encroachment and establishment of trees and scrub which will render the habitat less suitable for grassland fungi. <p>In parks / gardens / graveyards / cemeteries etc</p> <ul style="list-style-type: none"> • Keep the grass short in late summer / autumn through regular mowing. Ideally July onwards. • Remove all cut grass to ensure nutrients do not build up; avoid dog fouling also. • Avoid the use of pesticides, fungicides, or proprietary lawn weed and feed treatments. Vehicular compaction and heavy trampling can be particularly damaging to the soil structure and trampling. • Soil preparation and reseeded is damaging, limit its use wherever possible. 	Fungi such as Sulphur Knight (<i>Tricholoma hemisulphureum</i>), Picture Mushroom (<i>Lactarius rubrocinctus</i>) and Genera including Webcaps (<i>Cortinarius</i>), Fibrecaps (<i>Inocybe</i>) and close associates, Coral Fungi (<i>Clavaria</i>), Pinkgills (<i>Entoloma</i>), Waxcaps (<i>Hygrocybe</i>), and Poisonpies (<i>Hebeloma</i>)
	Most relevant niches: All unimproved grasslands, North Bucks fens and fen meadows, Acid grasslands, Churches, churchyards and burial grounds	Grassland fungi’s preference for ancient pastures and grasslands that have not been agriculturally improved means that many species are rare and declining. Even small amounts of fertilisers or other artificial additives can significantly adversely affect the fungi living within, naturally lower fertility systems like chalk / gravel or limestone grasslands are particularly at risk. Grassland fungi can act as visible indicators of ancient grassland habitats.			
Mosses and insects	Thatch species	Thatch-moss, once more likely to be found in acid grassland and heath, where it occurs at the base of grassy tussocks, and even on rabbit droppings. Now largely retreated to less sunny well weathered thatched roofs. Thatch can also house specialist insects such as beetles, particularly north facing well-rotted soggy areas of roofs; c Characteristic carpets of fairy cup like lichens develop over long periods of time in similar niches	<ul style="list-style-type: none"> • Thatching is a traditional practice across much of the UK but is now very expensive and less common than it was. Both long straw and reed thatch are affected. • The modern use of chicken wire or similar over a newly thatched roof limits bird damage but inhibits plant species due to local toxicity from leaching metals. • It’s likely the most biodiverse areas of thatch rooves are the less slightly soggy areas, which tend to be removed for aesthetic reasons as well as possible future leaks. 	<ul style="list-style-type: none"> • Compost waste thatch following renewal, rather than burning, particularly damper better rotted parts of a roof. • Raise awareness of thatch living species and the need for some less neat rooves with older better rotted thatch areas. 	Thatch-moss (<i>Leptodontium gemmascens</i> , and Beetle (<i>Corticaria culminis</i>)

Additional niches

Buckinghamshire and Milton Keynes is an area which, although not vast in surface area, has a very rich series of habitats and niches as the result of its varied geology and topography, historic land use traditions and location. When considering which species and habitats should be the primary focus for the Local Nature Recover Strategy it quickly came clear that whilst the better-known Habitats of Principle Importance (as designated under The Natural Environment and Rural Communities (NERC) Act 2006) were a driver and focus for many actions they were, often, too broad a classification to highlight some of the more detailed environments needed. And in some cases, missed out key areas completely.

Habitats of Principle Importance known to be within the County are:-

- Arable field margins
- Coastal and floodplain grazing marsh
- Eutrophic standing waters
- Lowland Fens
- Lowland Heathland
- Lowland beech and yew woodland
- Lowland calcareous grassland
- Lowland dry acid grassland
- Lowland meadows
- Lowland mixed deciduous woodland
- Woodpasture and parkland
- Purple moor grass and rush pastures
- Reedbeds
- Traditional Orchards
- Wet woodland
- Open mosaics on previously developed land

Additional niches which are of known significant to wildlife in Buckinghamshire and Milton Keynes includes the following:-

	Broad name	Brief description	Where found	Likely location
	Acid grasslands	Improved or semi-improved swards on acidic conditions. Includes land which is primarily agricultural, horsey culture , public park or golf course.	In areas with sand and gravel soils, often associated with terraces, alluvial plains or ex Commons.	South Bucks / Thames terraces and Greensand Ridge
	Mini river cliffs, bluffs and beaches	Small features no more than 2m high and a few meters long often featuring exposed soil cliff with fine sand / gravel/ silt beach often below or nearby.	On all watercourses, especially where channel has less manmade features and is allowed to behave to some extent in a natural way.	Bucks and Milton Keynes wide
	Draw down zones	Areas of land which are subject only part of the year to flooding, comprising bare soils / sand / gravel and fine silts which eventually become parched once the annual water level drop has started.	Edges of lakes, large ponds, gravel pits, islands and spits etc, as well as entire water bodies when they are smaller and temporal in nature. Can be associated with pools (see below).	Bucks and Milton Keynes wide
	Permanent and ephemeral pools and ponds	Small bodies of water which can either retain water all year round or dry out refilling the following year.	Historically as fields ponds in pastoral landscapes and old commonly grazed heaths but increasingly new examples are more closely associated with development and Sustainable Urban Drainage Systems.	Bucks and Milton Keynes wide

	Backwaters	Small areas of wet habitat which spend at least some of each year flooded.	Usually on larger river systems or tributaries but can be in wider flood plains in the form of extensive ditch networks.	Bucks and Milton Keynes wide
	Mire	Mires and acidic wetlands with impeded drainage, they can include small open water pools. Dominated by unpalatable (to stock) species often heathy in nature.	Locally normally associated with heathland and open acidic woodland areas.	Greensand Ridge, and South Bucks / Thames and gravel terraces. Rarely on Chilterns Commons.
	Damp oak woodland	Areas of woodland which have impeded drainage either because of localised perched water tables, impenetrable ground conditions, or build-up of woody debris blocking water flow along minor water courses.	Always on more acidic soils.	Greensand Ridge, South Bucks
	Chalk & limestone rubble scrapes or very friable minimally vegetated soils	Exposes of bedrock, or very thin impoverished soils on either chalk or limestone. They can be brashy in nature, formed by kibble like lumps or finer silty surfaces. All subject to extremes of droughting and heating due to their locations, aspect and free draining nature.	Limestone brash areas where soils are very poor, old quarries and extraction pits, tumbledown arable areas and chalk grassland on steep slopes; occasionally road and rail cuttings.	North Milton Keynes and Midvale Ridge (limestone) and chalk slopes / bare hilltops in the Chilterns
	Sandy scrapes or very friable minimally vegetated soils	Exposes of bedrock, or very thin impoverished soils on either sands, greensands or gravels. They can be rough in nature, formed by kibble like lumps or more normally finer silty surfaces. All subject to extremes of droughting and heating due to their locations, aspect and free draining nature.	Gravel terraces, greensand outcrops and valley floors where glacial alluvial elements are dominant. Also, can be within formal parks and gardens as paths and similar friable surfaces.	Thames / South Bucks gravel terraces, Greensand Ridge. Gardens and parks Countywide.
	Scrub transition habitats	Dominated by a mixture of scattered light scrub and denser scrub areas.	Areas where woodland, tree lines and large hedgerows grade out to shorter grassy habitats.	Bucks and Milton Keynes wide
Some trees can be in more than one of these	Open grown trees	Field boundaries, town parks, old parklands, and wood pastures, chases and ex Hunting Forest (includes Ancient, Veteran and Notable trees).	Stand alone trees or small groups which are scattered anywhere in a non-wooded area of the landscape.	Bucks and Milton Keynes wide
	Hollowed trees	Any age tree, although often mature or aged examples, which have hollowed trunks or branches.	Often associated with old land boundary banks (especially in or around old woodlands), rural lanes and greenways, in woodpasture areas and old parklands but can be anywhere in landscape.	Bucks and Milton Keynes wide
	Ancient or Veteran Trees	An <u>ancient tree</u> is one that has passed beyond maturity and is old, or aged, in comparison with other trees of the same species. Its canopy may be small. It will	Often associated with old land boundary banks (especially in or around old woodlands), rural lanes and greenways, in woodpasture areas and old parklands but can be anywhere in landscape.	Bucks and Milton Keynes wide

		probably have a very wide trunk relative to other trees of the same species and it is very likely that it will be hollow. A <u>veteran tree</u> is younger than an ancient tree but has, as a result of life pressures, developed some of the habitat features such as wounds, knot holes, lightening damage, or decay areas found an ancient tree.		
	Singleton fruit trees	Established well grown fruit trees, usually in low numbers or as lone trees. Often specimens can be of a significant age and may or may not be on a rootstock.	Usually in gardens, parks and allotment spaces which are either the remains of once larger orchards or were garden trees associated with older houses grown in low numbers for their fruit.	Bucks and Milton Keynes wide
	Green lanes and Holloways	Ancient routes across the countryside, often unsurfaced.	Usually associated with boundary banks or hedges and often deeply cut into surrounding landscape.	Bucks and Milton Keynes wide
	Churches, churchyards and burial grounds	Rich in different architectural stones in the buildings and grave markers, often the site has trapped ancient grasslands which have been largely unimproved within its bounds.	Church sites, cemeteries, burial grounds and equivalents.	Bucks and Milton Keynes wide
	Grottos, caves and icehouses	All manmade spaces, some caves resulting from old chalk / flint or building stone quarrying.	Grottos and other architectural features are associated with formal landscaped gardens, often around old parks and gardens. Icehouses are usually associated with large old houses and placed within their grounds.	Cliveden / Thames Valley, Greensand ridge, various old houses parks and gardens Countywide.
	Historic bridges, revetments and retaining walls	Hand built brickwork facades, retaining walls and bridge / viaduct features. Often dark brick from various dates in the Victorian period.	Found along many extinct and current railways, tramways and canals which cut across the landscape as well as currently used stretched of railway and canal.	All branches of the Grand Union Canal and large complex of largely derelict rail / tram routes crossing the whole of north Bucks, as well as live mainline railways in the County.
	Small scale hard landscape urban refugia	Including traffic splitter islands, central reservations, roundabouts and storm channels. Often defined by hard landscaping materials at their edges, with gravels, pea shingle, woodchip and other loose materials within.	Found within large conurbations or adjacent to large infrastructure and transport corridors.	Bucks and Milton Keynes wide in all urban spaces