Species Priorities List

Oxfordshire's Local Nature Recovery Strategy

Draft version 06 September 2024

OXFORDSHIRE COUNTY COUNCIL

Contents

Local Nature Recovery Strategy (LNRS) draft ‘Species Priorities List’ (Oxfordshire)

Draft version, 6 September 2024.

Introduction

‘Species’ are the types of animals, plants, fungi, and other living things that exist as part of nature. Local Nature Recovery Strategies (LNRS) are designed to help to recover populations of species, especially those who are at risk of extinction from the local area. Many species are expected to benefit from the actions (potential measures) that are already listed on the LNRS’s ‘Statement of Biodiversity Priorities’ document, but some species will need actions which are more specific. This document has used available information to identify those species in Oxfordshire which are believed to need more specific recovery actions to support their populations to increase in Oxfordshire.

What is the draft Species Priorities List

The ‘LNRS species priorities list’ is one of four LNRS elements (three written documents and a map tool). The Species Priorities List contains a table showing species in Oxfordshire which need particular and specific actions to be taken by people and organisations to support their populations to survive, recover, or spread further. Government asked LNRSs to create these species priorities list with a manageable number of deliverable species priorities to help focus local resources towards halting the loss of biodiversity. LNRSs were advised to include species which this strategy can best support and which reflect the species issues that are of greatest importance to the strategy area, local people, and local organisations. **In brief, the species listed here are the species that require specific actions over and above the good management and creation of habitats**.

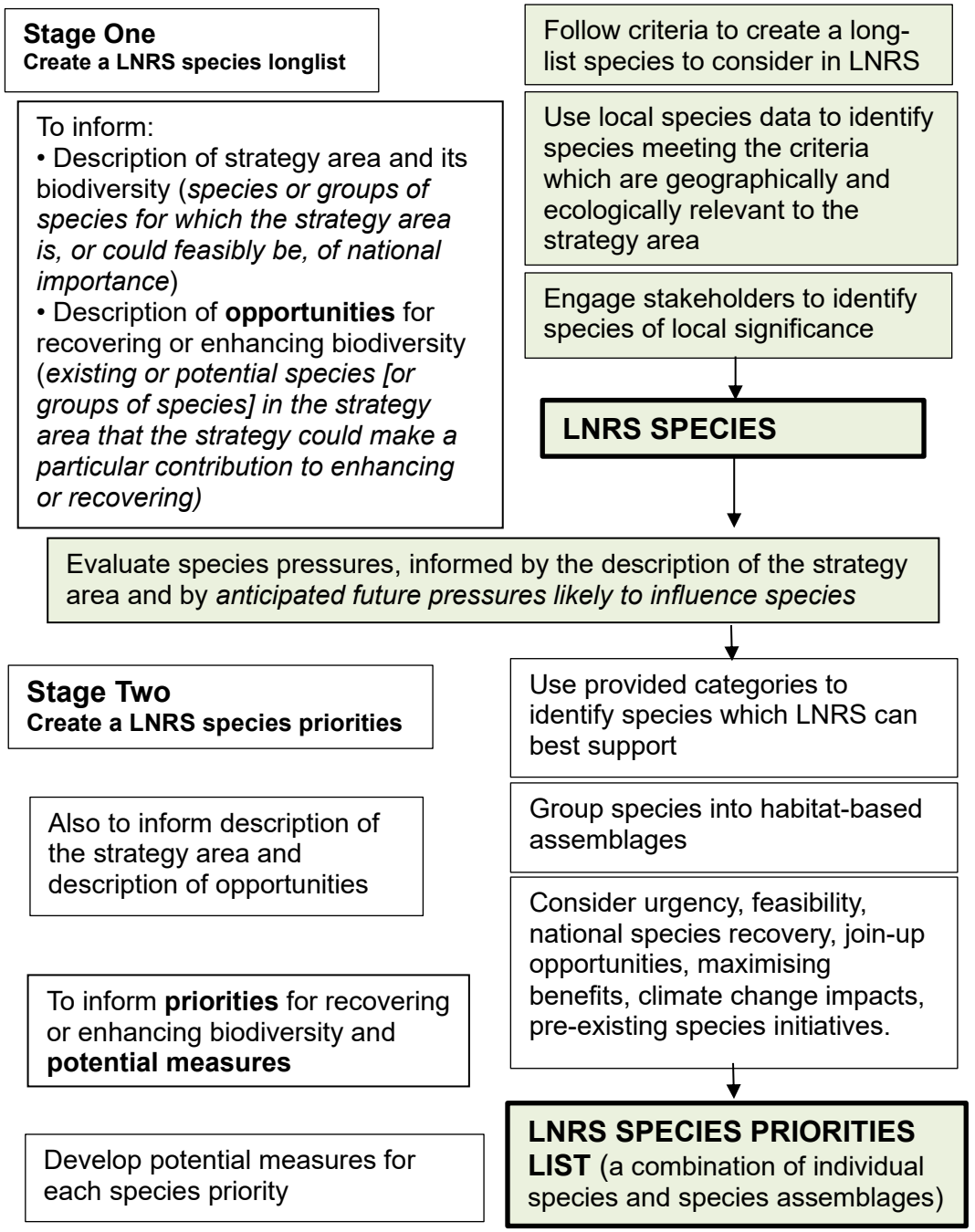
How was this list made?

This draft ‘Species Priorities List’ was produced by refining a longlist of 879 species which are all considered to be ‘threatened’ or ‘near threatened’ by extinction from Oxfordshire. The total rose to 883 after species experts suggested additional species for the list. The listing process followed a methodology outlined by Natural England and Defra which can be viewed on the LNRS website and on a summary flow chart image (see below).

In Oxfordshire, the species listing process was greatly supported by Thames Valley Environmental Centre and by species experts including those who record species within the county. Experts helped to add and remove species from the list to help sense-check the process, they also helped during the listing process by informing the LNRS about which actions were needed to support different species, important locations to carry out work, and the types of habitats that these species relied on for survival.

This support allowed the LNRS to see which species needed similar broad habitat actions (e.g. leaving deadwood in woodlands) and which needed something more specific (e.g. create electric fencing around nests to prevent predation). The species which needed habitat level measures are still being supported through the measures listed on the draft 'Statement of Biodiversity Priorities' (e.g. deadwood) but the species who have much more specific needs are being represented on this list. To prevent the loss of further biodiversity in Oxfordshire, it is of key importance to support both sets of priorities. To view documents and spreadsheets that show how the species lists were made, please view the documents on Oxfordshire County Council's LNRS website.

Disclaimer: Collecting information on 883 rare and threatened species is a challenging task and this LRNS contacted a large range of experts to collect information. So far, the LNRS has received information about 468 species but there are many species which were not fully categorised within time to create this draft. We will be bringing this list to the attention of species experts during the consultation to ensure that this is discussed.



How will LNRS ‘Species Priorities Lists’ contribute towards the government’s species ambitions?

The government has set legally binding targets to:

- Halt the decline in species abundance by the end of 2030
- Increase species abundance by the end of 2042 so that is greater than in 2022 and at least 10 per cent greater than in 2030
- Reduce the risk of species’ extinction by 2042, when compared to the risk of species’ extinction in 2022

LNRSs were advised by the government’s Department for the Environment, Food, and Rural Affairs (DEFRA) that the “LNRS is a critical new tool for driving the national ambition to increase species abundance and reduce risk of species extinctions… the LNRS system forms a coordinated spatial approach for planning a nationwide network of more, bigger, better, better-connected habitat to support species recovery and resilience. Each strategy contributes to this national picture by planning coherent ecological networks at the local level to help local species populations thrive.” To support species, LNRSs are advised to follow particular processes to create a written list of local priority species and to propose specific measures (actions) which would help to recover and enhance local populations. In some suitable cases, actions could be mapped onto the LNRSs ‘Local Habitat Map’ to show where those would produce the greatest benefits for the species. This may be particularly important where isolated populations of rare species remain.

LNRS Potential measures (actions) that could help to recover and enhance species populations may include:

- Creating new habitat for species
- Expanding existing habitat to provide more space for species to flourish
- Enhancing habitat to better support species’ needs through new or improved management practices
- Connecting habitat to enable species to move through the landscape and populate new areas
- Actions to mitigate specific pressures impacting species in the local area, some pressures include: recreational disturbance, poor water quality, or the presence of invasive non-native species
- Bespoke actions such as localised surveys, conservation translocation, and appropriate (re-)introductions of species.

How to navigate this document?

Individual species or groups of species are listed in alphabetic order (A – Z) by a common name (where a common name is known). To the right of each name, you will see a column that tells you the action (potential measure) which the LNRS recommends would support the recovery of, or increase of that species in Oxfordshire. A column then tells you particular locations where the species is expected to need focused support (if known). Finally, another column indicates the names of threatened and near threatened species which are expected to particularly benefit from that action (potential measure) being carried out in Oxfordshire.

At the end of the document you will find an appendix that tells you about other species who are expected to benefit from the actions (potential measures) listed on the LNRS draft 'Statement of Biodiversity Priorities'. If these actions are taken, these species (which are also threatened or near threatened with extinction) are expected to also be supported in the county.

A note on climate change

At the time of writing, these were expected to be the most suitable actions to support these species but the expected changes to climate patterns may be unpredictable and the actions to support species should be adapted to the latest understanding of how these species are also being affected by the changing climate.

The next pages (7 – 38) list the draft Species Priorities List for Oxfordshire in a table, (species are listed in alphabetical order by common name).

Draft Species Priorities List

Species by Common Name (ordered A – Z)	Potential measure (the action needed help the relevant species to recover). Potential measures are in bold with additional detail about the species added below.	Particularly important locations for the action(s)	Which species are intended to benefit most from this measure?
Adder 	**Create new areas that include a mosaic of heathland, scrub, and woodland habitat or manage and improve existing mosaic habitats to reintroduce adders. 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. Most likely to be suitable in the Chilterns or Cotswolds. Limit the presence of game birds and human disturbance within these mosaic habitats.** Adders used to be widespread in Oxfordshire before the year 2000 but recent evidence shows strong declines across northern Europe. Oxfordshire itself has one remaining population of adders which were previously reintroduced back into the county. Small and fragmented populations are highly vulnerable to extinction. Major threats to adders include predation by game birds, disturbance and persecution by people. There is potential for carefully targeted re-introduction in the Chilterns or Cotswolds following IUCN guidelines working with authorities and local reptile organisations across borders to restore habitat connectivity with populations in neighbouring counties.	The final Oxfordshire adder population in the Chilterns	Adder (Vipera berus)

Barberry Carpet Moth 	**Plant new Barberry plants in suitable locations, especially aiming to connect up of increase the size of existing areas of Common Barberry.** This moth is a rare and declining species in the UK, and is a local priority since one of its largest UK colonies is in Oxfordshire. Read more here.	West Oxfordshire where a small population is established	Barberry Carpet (Pareulype berberata)
Bats 	**Identify woodlands where bats exist and roost and report sightings to the Environmental Records Centre. In these locations, Retain mature, dead, and dying standing trees, especially trees with cracks, loose bark, ivy, and holes (or hollows). Maintain dark and humid conditions around these trees through management such as growing out understory layers, creating woodland ponds or blocking drainage ditches. Create foraging corridors by planting trees and hedgerows within 6 kilometres of known bat roosts. Near bat roost locations, plant new trees and/or woodland that can grow to develop veteran features such as hollowing, to support future bat populations.** Bats can be found in woodlands, parklands, urban areas, farmland, and along hedgerows. They particularly favour areas with standing dead trees and storm-damaged trees. Report sightings of bat roosts to TVERC. There are 18 species of bat in the UK and 14 bat species have been recorded in Oxfordshire between 2019-2023. One of England's rarest bats, is the Bechstein which is at great risk of extinction from Oxfordshire (and from the UK). An isolated population may be breeding in Bernwood where it is key to preserve and appropriately manage this woodland.	Known bat roosts, especially Bechstein roosts near Bernwood.	Barbasetlle bat (Barbastella barbastellus), Bechstein bat (Myotis bechsteinii), Greater Horseshoe bat (Rhinolophus ferrumequinum), Leisler's bat (Nyctalus leisleri), Lesser Horseshoe bat (Rhinolophus hipposideros), Nathusius' pipistrelle bat (Pipistrellus nathusii), Noctule bat (Nyctalus noctula), Serotine bat (Eptesicus serotinus)

Beaver 	**Reintroduce beavers into suitable Oxfordshire locations where they are given space and time to naturally restore river and wetland ecosystems with the goal to increase the diversity of the habitat(s) in that area (once wild releases are authorised).** Beavers are a native species to the UK but there have been no confirmed wild populations present in Oxfordshire for approximately 400 years, since the species had been extinct in the UK for several centuries. Reintroductions are subject to national policy and licensing and, although new wild releases are currently not being licensed in England, it is expected that this will change during the period of this LNRS and reintroductions are expected to be promoted to benefit both biodiversity and the wider benefits that Beavers can bring. These wider benefits include mitigating damage during flood events and drought events because they can create resilient habitats that can store and hold water benefitting both people and biodiversity.		Eurasian Beaver (Castor fiber)
Beetle of Autumn Gentian 	**Manage existing populations of Autumn gentian to maintain existing populations and where suitable, take action to create new areas of autumn gentian, allowing the population of this beetle and plant to expand.** This beetle reproduces by producing larvae in the roots of Autumn Gentain (Gentianella amarella), a late flowering plant which favours dry, chalk grassland. The plant itself is at risk of extinction and the populations of this beetle are rarer still in England and populations exist in Oxfordshire including Aston Rowant NNR.	Aston Rowant NNR	Beetle - Smicronyx reichi. Flowering plant - Autumn Gentian (Gentianella amarella)

Bittern 	**Create, extend, or manage large reedbeds (over 1 hectare) for bitterns. Lower any reedbeds at risk from drying out and manage the reed structure to achieve diversity within the reedbed. Aim for no more than 30 per cent being older than 7 years and no more than 5 per cent of the area being scrub. Manage the reedbed through cyclical cutting of different sections of reed over time and regularly remove willow.** Bitterns breed in the UK's largest and least disturbed reedbeds. Bittern numbers have declined to the point where they had previously been extinct from the UK. Habitat loss and disturbance has been a major challenge for the success of these birds. However they are now present in the UK again and their populations have recently been with targeted habitat management techniques. They are found in Oxfordshire and are a bird which is expected to improve in number and breeding success with the right habitat management to create dense cover. The 30 per cent and 5 per cent above are ideal guidelines but management should be tailored to what is working for bitterns in Oxfordshire.	Otmoor, Lower Windrush Valley	Eurasian Bittern (Botaurus stellaris)

Blackthorn butterflies 	**Retain existing thickets of blackthorn and mature hedges with blackthorn. Plant new thickets and hedgerows containing blackthorn. Plan to carry out management and coppicing routines for hedges, trees, and thickets which are suitable to the species. Increase the connectivity of suitable habitats by creating and extending stands, trees, and hedgerows containing blackthorn which connect existing areas. Create wide rides, glades, and scrub edges in and around woodlands**. In the UK, the black hairstreak butterfly is found mostly within only Buckinghamshire and Oxfordshire making them a key priority species for Oxfordshire to support. The brown hairstreak is reported to be spreading well from a population in Otmoor and extending into Oxford city. The main threat to the success of these species is the damage, poor management, or removal of mature blackthorn habitats. These rare butterflies are expected to benefit from long-term habitat restoration and creation of sheltered (but unshaded) stands of blackthorn which are allowed to spread and grow to about 5 metres in height. Populations of this butterfly do not readily spread away from blackthorn where they are present so connecting habitats is key to the expansion of their populations.	MOD Bicester and hotspot record sites for Black Hairstreak. Otmoor for Brown Hairstreak)	Black Hairstreak (Satyrium pruni), Brown Hairstreak (Thecla betulae)

Breeding waders 	**Create (and maintain high quality) areas of extensive, shallow, vegetated water during breeding months. Include reeds and greater pond sedges within these areas for nesting. Ideal sites have moist soils and hold surface water on 10 – 30 per cent of the site from April/May with water levels reducing in June and covering only a small area of the site in July – August. Seasonal grazing on these sites helps to create an optimal sward. Avoid agricultural activities or activities of high disturbance on breeding sites during breeding season and reduce the shooting of any species considered to be 'game' species within this group to support populations to recover.** Alongside those more specific measures, this LNRS will support these species and others by recommending that Oxfordshire improve existing wetland sites and create new wetland mosaic habitats. Within Oxfordshire, we are lucky to have 485 hectares of Otmoor, an expansive floodplain grazing marsh area which is a reliable hotspot and home for many species including wading birds where particular care is taken to manage this area of Oxfordshire for these birds. This national asset means that Oxfordshire is a particularly important location within the UK for breeding waders and other species.	Otmoor	**Breeding waders** Common crane (grus grus), Common Snipe (Gallinago gallinago), Common Redshank (Tringa tetanus)
Common lizard 	**Carefully manage habitat near known colonies to create open, sunny places in dry, exposed sites with areas of dense cover is nearby where they can feed on spiders and insects. Additional survey work is required to identify where their populations are present.** Common lizards have been widespread across Oxfordshire but their current numbers are not as well known other than their presence at some protected sites including Otmoor and Wychwood. Where they are known to be present and where habitat management is appropriate, they are doing well. The greatest threats to their success includes the fragmentation and disturbance of their habitats and predation by game birds. If common lizards are lost from a site, there is little to no opportunity that they will naturally recolonise the location so additional survey and monitoring work is also needed to understand where populations are present locally.	Otmoor, Wychwood	Common lizard (Zootoca vivipara)

Curlew 	**Protect curlew nests from predation by using electric fencing and any emerging techniques which increase the success of breeding curlews to hatch chicks**. Electric fencing techniques have shown success at supporting curlews to hatch chicks with a good success rate in Oxfordshire. Oxfordshire's farmers, nature recovery organisations, and volunteers are already supporting this species' recovery and should continue to be supported. Curlew breeding populations in the UK are recorded as having declined by 48 per cent between 1995-2020 and are one of Britain's most endangered birds. Nesting adults, eggs, and chicks have lost wet habitats through land use change, loss of habitat, and drainage of land and will also benefit from the creation and expansion of wet habitats.	Otmoor, Upper Thames Curlew Recovery Project areas	Eurasian Curlew (Numenius Arquata)
Cigarello Gall-fly	**Manage and cut reedbed in the Chilswell Valley on long rotation and prevent scrub and trees from invading.** After being absent from records in Oxfordshire for at least 30 years, this species was recently found and recorded in Oxfordshire's Chilswell Valley. They need targeted habitat management to support the species to survive here.	Chilswell Valley	Cigarello gall-fly (Lipara similis)
Clubbed general soldierfly 	**Ensure that specific alkaline tufa spring-fed fens in Oxfordshire have a flow of clean alkaline calcareous spring flow into the fen and graze, or cut and rake, vegetation to keep open short sunny pools.** The only records of this soldierfly in England are in Oxfordshire meaning we have a key role in preventing the loss of this species through targeted habitat management including ensuring that clean aquifer water continues to feed the habitats which are found to support these species.	Cothill fen SSSI and Dry Sandford pit SSSI only	Clubbed general soldierfly (Stratiomys chamaeleon)

Dark green Fritillary 	**Create or improve areas of calcareous grassland with scrub, particularly on slopes which face East or West with plentiful populations of violets growing amongst scrub. Manage scrub and woodland rides to promote violet abundance.** This species breeds in lightly scrubbed grassland. After a long period of decline in Oxon it has been spreading a little in recent years but remains very localised to suitable habitat. Habitat recovery could see it become more widespread here.		Dark green Fritillary (Speyeria aglaja)
Downy Woundwort 	**Support existing populations of Downy Woundwort and previously populated areas by managing woodland edges, rides, glades, roadside verges, and hedgerows to limit competitive vegetation growth and create suitable soil disturbance to help this species to spread. Clear scrub on sites where this species has previously grown.** Perhaps our most endangered native wildflower, this species of flowering plant has only been recorded in four sites in England since 1930, all in West Oxfordshire meaning we have a particular responsibility to help this species. It has been noted to grow along tracks, ancient pathways, and woodland and hedgerow edges on thin disturbed soil above oolitic limestone. In one of those four sites, the most recent survey found one plant. The species relies on its long-lived seed which can survive in the soil for a many years. Therefore, the actions to help recover this species include causing soil disturbance to places where there may have previously been downy woundwort populations. Habitat management suggestions can be found here (p67) and here.	Burford and Charlbury. See Distribution map and page 62 of Wats17p59.pdf (bsbi.org.uk)	Downy Woundwort (Stachys germanica)

Duke of Burgundy butterfly 	**Create (or maintain existing areas of) scrubby calcareous grassland slopes which face East, North, or West and have strongly growing populations of cowslip and primrose. Light grazing (not by sheep) can create open, sunny conditions which support this species. Within the grassland, aim for 10 per cent - 20 per cent of the area to be scrub of varying ages, types, and structures cut on rotation to avoid overshading the grassland. Allow new scrub areas to emerge. Cut or bruise dense bracken areas**. In woodland near or on these slopes, improve or create woodland rides and keep or create bare patches of ground. The butterflies typically breed in vegetation at woodland edges 2 – 5 years after the vegetation was last cut so rotational coppicing of trees at edges or rides over a 3 – 10 year cycle would support these butterflies. This small butterfly has declined by over 50 per cent in recent decades in the UK and remains in only very small and restricted areas on scrubby chalk grasslands and clearings of ancient woodlands. In Oxfordshire, one small grassland population is known to remain and woodland populations of this butterfly have been extinct in the county since the 1990s.	One tiny population known to remain in Oxfordshire with some records adjacent to West Berkshire and in West Oxfordshire.	Duke of Burgundy (Hamearis lucina)

Dung specialists 	**Graze animals which are unmedicated to supply unmedicated dung on pastures which support rare species**. **Introduce this management to new sites and particularly continue this management on sites where unmedicated animal grazing has been long-established.** This particularly applies to horses not treated with anthelmintics to produce dung that enables rare species to survive and spread including the Hornet Robberfly. See more details through Buglife.		Hornet Robberfly (Asilus crabroniformis)
Ellipteroides alboscutellatus	**Increase the presence and amount of the moss (palustriella commutate) in tufa springs with open woodland. Moss growth could be achieved by coppicing woodland on a rotation to achieve consistent, partially shaded seepages along tufa springs.** This fly relies on the presence of this moss for survival and the fly itself is a very rare species with fewer than 20 records in England at the time of writing with a recent record in Worton Wood, Oxfordshire.	Worton Wood	True fly (Ellipteroides alboscutellatus)

Farmland birds 	**Provide and maintain seed sources to support farmland birds, especially during late winter either by directly providing seed or by allowing plants to go to seed in suitable areas. Increase the presence of invertebrates on and around farmland to support birds by maintaining diverse habitats and unfarmed wild corners. Organic grazing and organic farming with reduced chemical inputs (insecticides) can be particularly beneficial to birds who feed on invertebrates. Reduce, delay or avoid ploughing after harvest to increase winter stubble cover and green cover crops and avoid cutting all hedges annually. On more intensively farmed arable land, the cropped area provides valuable nesting and foraging habitats and wildflower, grass and nectar rich margins or plots are essential to help boost insect populations and provide summer food resources for breeding birds. Together these measures offer greater food sources and habitat for roosting and breeding. To increase breeding opportunities for offer nesting boxes specific to the species in your area, (particularly tree sparrows).** Tree Sparrows, Linnets, Skylarks, Yellow Wagtails, Corn Buntings and Yellowhammers are particularly expected to benefit from the measures above as well as wider action across the county to create and appropriately manage habitats including grasslands, hedgerows, wetland-edges, and hay meadows. Yellow Wagtails are expected to respond particularly well on farmland and wetland habitats in Oxfordshire if habitat management can meet their needs, and local projects are working to achieve this. Unlike some other farmland bird species, Corn Buntings and Linnet specifically benefit from wildflower plots when they are positioned out in the open landscape away from large hedgerows or trees. Providing diverse grassland habitat alongside arable land is perfect for Corn Buntings whether that be margins, plots, or whole fields of lowland meadow or calcareous grassland. A good population of farmland birds exists on arable land in Oxfordshire, and strong populations are noted in the Cotswolds National Landscape and in the North Wessex Downs National Landscape. Some are at greater risk of extinction from Oxfordshire and the measures above are suggested to support those species. Banbury Ornithological Society's (BOS) "Winter Random Square Survey" has shown that several resident	Specific 4-mile stretch of the River Thames is being managed for the Yellow Wagtail Project	Corn bunting (Emberiza calandra), Linnet (Linaria cannabina), Skylark (Alauda arvensis arvensis), Tree sparrow (Passer montanus), Yellowhammer (Emberiza citrinella), Yellow wagtail (Motacilla flava flavissima)

	farmland birds, including yellowhammer and linnet, declined greatly in the 70s and 80s, before stabilising somewhat in the late 90s and 2000s. For a few, the declines are continuing, notably for corn buntings and tree sparrows. Since more than 70 per cent of Oxfordshire's land is used for agricultural purposes, it is of key importance to focus on species which can benefit from good sustainable farmland management to achieve population recovery and Oxfordshire's farmland birds are a great example of species which, have been recovering and can continue to do so in future with support like that already ongoing by Farmland Bird Aid projects in Oxfordshire.		
Fish 	**Provide bespoke fish passes at suitable structures along rivers to enable fish to move between river sections and lay eggs to reproduce (salmonid passes for trout and eel passes for eels).** Eels are experiencing a major global decline in numbers including within Oxfordshire rivers in the past 30 years with declines also noted for Brown Trout. Alongside overall improvement to river quality and river beds, these fish also need to be able to move through rivers but have struggled to do this in recent history after the creation of numerous barriers in our rivers and watercourses (e.g. weirs and river locks). Creating fish passes help fish to move between sections of river to access places to lay their eggs and reproduce.		Brown trout (Salmo trutta), European Eel (Anguilla Anguilla)
Fly orchid 	**Where Fly Orchids could be present, manage scrub along the edges, rides, and glades of woodland to create dappled light and grassland with a short sward and bare patches under a canopy of open scrub or grassland canopy**. The Fly Orchid is expected to be able to quickly recover through traditional management techniques. In woodlands, this may be achieved through pollarding glade and ride-side trees, reducing soil disturbance, creating new rides and glades, and coppicing or seasonally cutting ground flora in rides and glades. Grazing management could also be used, with livestock exclusion during the spring and early summer flowering period and taking into consideration existing pressure from wild herbivores.	There have been 55 records of this species in Oxfordshire in the past 30 years.	Fly orchid (Ophrys insectifera)

Fungi and fungi-associated plants found with woodland  	**Retain trees where these associated plants and fungi are found. Ensure the long-term continuity of suitable tree species in these locations (saplings through to veterans) through planting or encouraging regeneration. In hotspot areas of these species protect soils by avoiding felling or coppicing trees and avoid fires, fertilisers, and using heavy machinery. Avoid mowing during peak fruiting/flowering periods and control vegetation competing with the target species. Control deer and remove grazing animals, limit scrub and bramble encroachment and consider fencing populations where necessary. To increase the population of these species, create new areas or suitable tree species adjacent to the sites where these species are currently found.** These plants and fungi may be found in a range of habitats including woodlands, parkland, hedgerows. Oxfordshire is a particular stronghold for these species found amongst the ancient and veteran trees which have been retained and well-managed (sites like Blenheim, Aston Rowant, and Headington). These ancient and veteran trees have long-established soils that still support populations of these now rare species and expansion of these species needs to expand from sites where the species are present.	Various records exist around the county including for fungi at Blenheim, Aston Rowant & Headington.	**Flowering plants** Bird's-nest Orchid (Neottia nidus-avis), Yellow Bird's-Nest (Hypopitys monotropa), White Helleborine (Cephalanthera damasonium) **Fungi** (Boletus aereus), Devil's bolete (Boletus Satanas),
Great-Crested Newt 	**Create or maintain large, fish free ponds, which ideally are within 1km of other ponds that could support Great Crested Newts. Aim to have diversity within pond structure, depth, shape, and edge vegetation. Include a gently sloping entrance to suitable pond edges. Within suitable range of breeding ponds, ensure the existence of foraging habitats and undisturbed areas of deadwood or stones for hibernation which can include creating hibernacula. New development/infrastructure can include requires amphibian friendly landscaping e.g. dropped kerbs, wildlife-friendly gully pots, SuDS ponds, and large amphibian tunnels.** Great Crested Newts Have suffered significant declines and as a result are listed as species of principle importance under legislation offering them a high degree of protection as a European protected species. Creating ponds to support this species would also support a wide range of species. Support Great Crested Newts by managing habitats to meet relevant requirements with organisations who can support this or following habitat guidance.	Nature Space pond creation priority locations.	Great Crested Newt (Triturus cristatus), Common Toad (Bufo Bufo)

Greenweed flatbody/Greenweed Buff Moth	**Manage meadows to grow and increase populations of Dyer's greenweed (Genista tinctoria) to prevent scrub and grasses outcompeting this plant.** Grazing and cutting should be managed flexibly according to habitat requirements to support the moths that rely on this plant for survival. Grazing should not be carried out during the flowering season. The moth Greenweed flatbody remains in few sites in England with one strong population present in Oxfordshire at Otmoor MOD and may have spread from this area to Arncott MOD or Wendlebury Meads.	Otmoor and MOD sites	Moth: Greenweed flatbody (Agonopterix atomella)
Hazel dormouse 	**Hazel dormice are unable to spread far from their current locations or from reintroduction sites without directly connecting habitat. Within 2km of suitable sites, create suitable connecting habitats e.g. coppice, woodland, or thick hedgerows. Retain trees which have cracks, crevices, and deadwood and retain woody species like blackthorn and hazel in sunny, open areas. Ensure arboreal connections across woodland rides every 50-100m and erect dormouse boxes and/or tubes. Retain understory in winter and avoid clear felling in dormouse locations. Consider managing woodland through traditional coppice of non-adjacent coupes.** Hazel Dormouse populations are estimated to have fallen by 52 per cent since 1995 and are a species that are at risk of extinction in the UK. It requires the above specific measures as well as good woodland management techniques to improve the structure and diversity of woodlands. Within conifer plantations, maintain the margins of deciduous trees and shrubs beside rides, glades and edges.		Hazel dormouse (Muscardinus avellanarius)

Hedgehog 	**In gardens, parks, urban environments, and new developments to reduce or stop the use of slug pellets and pesticides, create 13cm x 13cm holes through fences and walls to create 'hedgehog highways' to help hedgehogs forage. Create or install 'hedgehog houses' give that provide undisturbed, safe space. Sweep fallen leaves into permanent leaf stores and manage grass in gardens and parks to create a mosaic of long grass, short turf, open soil, and tussocks**. Hedgehogs have declined in number greatly. They used to be a common sight in both rural and urban areas. In addition to the more urban actions above, the rural hedgehog populations will benefit from broader, general habitat improvements including the creation and good management of hedges, scrub, woodlands, deadwood, and grasslands as well as increasing regenerative farming practices. Wider actions to support hedgehogs can be viewed here which would also support a range of other species.	Hedgehog roadkill hotspots, new developments	Hedgehog (Erinaceus europaeus)
Juniper 	**Manage suitable areas to regenerate and increase the presence of juniper and its associated species by creating scrapes down to bare soil to establish the seeds. Exclude rabbits, deer, and sheep from these areas.** Mature Juniper colonies have been dying out in lowland England and have not, by themselves been naturally regenerating any new young Juniper with any success in the past 60 years. Without Juniper regeneration projects this plant is expected to go extinct within the next 50 years from lowland England. Oxfordshire is one of a few counties which have key areas of southern chalk grassland where Juniper could be re-established, and work is being undertaken to better understand and develop natural regeneration methods to prevent the loss of Juniper and dependent species form Oxfordshire.	Aston Upthorpe and Aston Rowant NNR	Juniper (Juniperus communis), Moth (Argyresthia praecocella)

Lichens (on veteran trees) 	**Retain veteran trees which host rare lichens. Selectively thin trees to open overstocked woods and create structural variety. Control regeneration to maintain an open wood structure through actions such as reintroducing grazing where historically lost, paying consideration to grazing pressure from wild herbivores. Veteran trees surrounded by dense regrowth should have regrowth felled and glades should account for a third of the woodland are and should vary in age and size. Reduce local air pollution levels to as low as possible including reducing intensive agricultural practices locally to enable lichen to survive.** The above measures would be important alongside broader good woodland management practices including the control of invasive species like rhododendron and to create and retain deadwood. Look for opportunities to reconnect existing populations of lichens through pasture, tree, woodland, or hedgerow creation. Lichens are an excellent indicator of good quality, clean air so measures taken to support this species are also measures which can improve air quality for people and the wider environment (e.g. reducing local air pollution levels).	Bacidia incompta – 4 records in past 30 years Buellia hyperbolica – 14 records in past 30 years Lecanora quercicola: 1 record in past 30 years Lecanora sublivescens (18 records in past 30 years) Usnea articulata (only found in Nettlebed common)	Lichens; (Bacidia incompta), (Buellia hyperbolica), (Lecanora quercicola), (Lecanora sublivescens), (Usnea articulata)

Liquorice Piercer Moth 	**Maintain and increase the amount of Wild Liquorice plants (Astralagus glycophyllos) and their seed pods on suitable rough, unimproved calcareous grassland, lanes and scrub margins. Introduce suitable grazing regimes to benefit this species.** Time-limited, light cattle grazing is a beneficial regime to manage the foodplant for the Liquorice Piercer Moth and support seeds to set where cattle disturb the ground. Where grazing is not possible small scale management should aim to reduce competing vegetation in and around wild liquorice. Ideally this should be undertaken in late autumn/winter on a rotation so that not all the site is managed in any one year. Remove arisings from the site. This Liquorice Piercer Moth is very local to sites in a few southern counties in England and their numbers are declining. However, there are a number of strong colonies in Oxfordshire, particularly in the Chilswell area. The caterpillar of this moth feeds only on the seedpods of the wild Liquorice plant during July, August and September. As this species has an annual lifecycle, it requires the foodplant to flower and set seed on an annual basis to survive.	Chilswell	Liquorice Piercer (Grapholita pallifrontana)
Long-Leaved Helleborine 	**Create and/or enhance glades and open spaces within suitable woodlands to create permanently light areas within the woodland like glades or wide rides. Retain a few trees or shrubs in open areas to avoid exposing these plants to too much light. Control competing vegetation (particularly in permanently open areas). Vegetation control with occasional soil disturbance in open areas can be achieved through time-limited grazing by suitable animals or other suitable methods.** This helleborine is associated with ancient or mature calcareous woodlands where the plant has been found. This plant does not enjoy changing conditions and benefits from permanent open, sunny areas in woodlands with enough shade to avoid drying out. Similarly, the land should be moist and not waterlogged or dried out. Typically, cattle or horses are used for grazing in a time-limited manner to thin competing vegetation and cause slight soil disturbance without compacting the soil or overgrazing. Avoid herbicides, pesticides, and fungicides.		Long-Leaved Helleborine (Cephalanthera longifolia)

Lousewort flea beetle	**Conserve, manage and enhance suitable areas to increase populations of Marsh Lousewort.** Marsh Lousewort is a rare plant which can be found in alkaline fens. The Lousewort Flea Beetle requires this plant to be able to breed. In Oxfordshire this beetle is only known to be present in Cothill Fen SSSI.	Cothill fen SSSI	lousewort flea beetle (Longitarsus holsaticus)
Marsh Fritillary 	**Encourage the spread and abundance of Devil's-bit Scabious throughout the year (including winter), by introducing or maintaining appropriate grazing or other suitable techniques. Where suitable, reintroduce Marsh Fritillary butterflies to areas which have very, very large populations of Devil's-bit Scabious.** The Marsh Fritillary butterfly has become locally extinct due to habitat loss. It relies on well-managed, very large areas of wet meadows which contain Devil's-bit scabious and are appropriately grazed. Guidance suggests that good habitat should exceed 70 hectares with at least 20 per cent of the area containing three or more Devil's bit scabious plants per square metre. To support this butterfly, Devil's-bit Scabious needs to be retained on large sites including adequate areas retained throughout winter. Extensive grazing regimes are ideal to support this. Devil's-bit Scabious creates no seedbank which is why it requires regular, consistent management to maintain its populations and avoid losing both the species mentioned here.	Existing sites of Devil's bit Scabious Otmoor (other known large areas of grazed Devil's bit scabious)	Devil's-Bit Scabious (Succisa pratensis),  Marsh Fritillary (Euphydryas aurinia).
Meadow ant hoverfly 	**Manage grasslands that are good quality, warm, sunny, and open to encourage and retain yellow meadow anthills. Graze to a short sward using suitable species like sheep.** This hoverfly lives in the ant nests of 'Lasius flavus' (yellow ants) which need good quality grassland. In suitable grassland reversion projects, consider the reintroduction of yellow ants if they have not naturally colonised the area.	Aston Rowant NNR, Barracks lane meadow.	Meadow ant hoverfly (Microdon devius)

Military Orchid 	**Where military orchids exist in woodlands, create open conditions in glades. This can be achieved through selective felling to expand glades, controlled time-limited grazing, seasonal mowing, or raking vegetation to control encroaching scrub near existing orchid populations. Exclude and control deer and rabbits and clear moss cover**. Oxfordshire has 6 records of Military Orchids in the past 30 years. This orchid takes 4 years to grow from seed but can live for 15 years. Because they take such a long time to grow, management of sites where they already exist is of key importance to their survival in Oxfordshire.	Woodlands south of Lower Assendon and south of Christmas Common	Military orchid (Orchis militaris)
Monkey Orchid 	**Manage yew woodland and chalk grassland to retain moisture and increase populations of rare species, including the Monkey Orchid.** Oxfordshire is home to one of only three UK populations of Monkey Orchid at Hartslock nature reserve. Hartslock Wood: Yew woodland and chalk grassland supporting one of only three UK populations of Monkey Orchid. This orchid typically flowers earlier than others and care should be taken to manage the area according to its flowering period.	Hartslock nature reserve,Hartslock Wood	Monkey Orchid (Orchis simia)
Montagu's Harrier 	**Locate and protect nesting sites on farmland in arable fields when breeding Montagu's Harriers are identified. Landowners and local organisations can work together to monitor ground nesting birds to secure their breeding success when these ground nesting birds nest in maturing crops.** Montagu's Harriers visit the UK in early summer and only very few (8 pairs) breed in the UK each year. Oxfordshire has 137 records of Montagu's Harrier in in the past 30 years and Oxfordshire is one of the counties where this species is known to be found breeding. This bird feeds on small mammals, birds, and other small animals. When nesting birds are observed, contact local organisations which support bird conservation. Montagu's Harrier | BTO - British Trust for Ornithology		Montagu's Harrier (Circus pygargus)

Mountain Bulin snail 	**Manage suitable woodlands to achieve shaded conditions particularly in ancient beech native woodland. Light thinning or selective felling may be appropriate when regeneration of trees or the shrub layer is required. Minimise the disturbance of the ground, leaflitter, and wet areas within woodland as much as possible. Control grazing to minimise disturbance, some light grazing may be suitable to control coarse vegetation but can also be achieved through small-scale mechanical means. Maintain graded woodland margins with site-native trees on external wood-edges. Where appropriate, introduce management through rotational coppice in small coupes, on rotations of more than 12 years which can be highly beneficial to developing the dense litter layer required.** Land snails like the Mountain Bulin Snail are highly sensitive to local disturbance. Good woodland management is important whilst following the actions above and generally, longer coppice rotations seem to be more beneficial to invertebrate communities living in the woodland litter.	Cotswolds and Chilterns	Mountain Bulin (Ena montana)

Nightingale 	**Introduce coppicing to woodland and manage it so that all stages of the coppice lifecycle are always present in the woodland. To do this, sequentially coppice coupes (groups of woodland trees) which are next to each other on rotation. Within woodlands, encourage dense layers of shrub to develop (including bramble) and control deer where necessary. On woodland edges allow dense scrub and shrubs to develop to offer feeding and nesting habitat and create rides and glades that have space for a scrub zone**. **Re-wet woodlands to improve invertebrate presence and food supply for these birds. Connect existing suitable habitats with tall, thick hedges.** Nightingales fly from West Africa to the UK in April for about 3 months to breed before flying back. Numbers of breeding birds are thought to have reduced by over 90 per cent since the 1960s. In Oxfordshire, breeding Nightingales had been lost from the county for 2-3 decades but around 2020 after dedicated habitat work by MOD Bicester, nightingales returned once again, to breed in Oxfordshire. Habitat actions should be focused towards areas where Nightingale records emerge in Oxfordshire and Nightingales are also expected to benefit from countywide creation of large scrub and woodland mosaic habitats. Nightingales prefer to nest in the medium growth stage of coppiced trees (aged 4 – 10 years since they were coppiced). It takes about 7 years for scrub to be sufficiently dense for nightingale breeding. View conservation advice guide here.	Southeast of Bicester, between Bicester and Brill	Common Nightingale (Luscinia megarhynchos)

Noble Chafer A rare metallic-green beetle which can be found in traditional orchards. 	**Support Noble Chafer populations by keeping mature, large, dead, dying, and decaying wood within traditional orchards where this species is present. Avoid removing or burning deadwood from these areas and keep mature suitable tree species in and around the orchard. Introduce Chafer boxes to create temporary habitat for Noble Chafers. Plan to grow a future succession of trees that will become mature. For orchard creation, consider using early-maturing varieties of fruit trees.** There are 6 records of Noble Chafers in Oxfordshire in the past 30 years showing that this is a species right on the brink of being lost from the county. The Noble Chafer relies on dead and dying wood for it's young (larvae) to survive in, particularly on orchard trees. The larvae feed on deadwood for up to three years before the adults emerge as a beetle in summer for six weeks to reproduce. Use techniques to retain, increase, and prompt new deadwood each year in orchards where noble chafers are known to be present. Ensure the longevity and presence of large, mature, veteran, and dying trees within the orchard and alongside orchard trees consider planting nearby oak, ash, and beech which can support Noble Chafers. To help noble chafers spread, create new areas of traditional orchard, with plans to retain deadwood, to rebuild connectivity of the habitat that they rely on. Chafer beetle boxes can also be brought in to create temporary habitat as stepping stones to help them spread, or to attract noble chafers into to an area before the habitat has reached maturity (this is being trialled in England and has been successful in Sweden before).	Very restricted to traditional orchards	Noble chafer (Gnorimus nobilis)

Otter 	**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.**		Eurasian otter (Lutra lutra)
	Address roadkill hot spots where there is evidence of regular otter roadkill to improve their chance of survival as they move through the landscape. Otter populations have been recovering in Oxfordshire in recent decades which is a great success story. They are however, still considered 'near threatened' with extinction globally and they used to be much more prevalent along the River Thames than they are at present. In addition to the actions above, Otters and other species require protection and broad improvements to riverside habitats which are already measures that the LNRS is promoting. There is information for landowners and woodland owners for otter habitat management. Developments and planners should use available information about supporting otters.	Otter roadkill hotspots	Eurasian otter (Lutra lutra)
Poplar trees 	**Plant or allow poplars to grow in suitable locations in Oxfordshire and retain dead and dying poplars where they were growing. Don't remove or burn deadwood.** Particular species like the true fly (*Solva marginata*) breed under the bark of live, dead, and dying poplars and require dead, dying, and rotting poplar trees to be kept in the environment, not removed or burned. Plant new suitable poplar species, particularly in locations near to mature, dead, and dying poplars to ensure a local new source of aging poplars. Of the various poplar species, native Black Poplar (*Poplar nigris)* trees are one of Britain's rarest tree species associated with wet woodland and forested floodplain. Thought to be declining over the long-term in Oxfordshire, more information is needed about this species which requires DNA-testing to confirm its identity.		True fly (Solva marginata)  Tree: Black Poplar (poplar nigris)

Silver-spotted skipper 	**Create and manage south-facing calcareous grassland to achieve extremely short turf with Sheep's Fescue growing. In the absence of sufficient rabbits, implement a rotational grazing regime to achieve short turf. Consider translocating the Silver-spotted skipper into suitable sites since natural colonisation is unlikely.** This rare butterfly is only found in chalk downs in southern England but have good potential to expand over the coming years but they need sustained habitat management to maintain short turf conditions. Recommendations are to graze with sheep in spring/early summer (but not after June) and cattle in autumn/winter. In Oxfordshire, there is one critically endangered small population remaining where management can be targeted.		Silver-spotted skipper (Hesperia comma)
Small blue butterfly 	**Create and manage wide field margins and sheltered grasslands to contain Kidney Vetch (Anthyllis vulneraria) on low nutrient soils which get disturbed.** The Small Blue is our smallest resident butterfly and requires habitat management to recover their numbers in Oxfordshire. Oxfordshire is reported to have local populations which are declining but this species is expected to be able to recover if suitable habitats are created and maintained.		Small blue (Cupido minimus)
Snail killing fly 	**Continue extensive grazing management (or cutting and raking) over suitable large areas to keep wetlands shot and open throughout the year (including Port Meadow). Retain or create pools in these open wetlands to host snails.** This fly is found in very few locations in England, one of which is Oxfordshire's Port Meadow. It is important to do this where the site can host snails, which this fly relies on to survive. Other species are also expected to benefit from this open wetland with, nutrient rich mud, and pools.	Port Meadow	Snail killing fly (Sciomyza dryomyzina), Marsh Dock (Rumex palustris)

Southern Damselfly 	**Manage sites where Southern Damselflies are known to be present or could become present to create unpolluted, base-rich shallow streams with a constant moderate flow rate of water and relatively high water temperatures. Maintain open banksides with unshaded streams.** Endangered in England and at risk of extinction globally, they remain in the UK in approximately ten areas including one location in Oxfordshire, Dry Sandford Pit. This species requires channels with a permanent flow of water which does not dry out or freeze. They occur in heathland streams, water meadow ditches on chalk habitats, and fen habitat. See the management handbook for Southern Damselfly.	Dry Sandford Pit	Southern Damselfly (Coenagrion mercurial)
Spider (Tuberta maerens)	**Create new areas of connected coppice with standard featuring oaks (Quercus robur) especially in and around Brasenose Wood, Oxfordshire**. This spider is reported to be highly specialised to managed habitats and its range is greatly limited to Oxfordshire, Dorset, Berkshire and Wiltshire.	Brasenose Wood	
Stone Curlew 	**In grassland, create open, sparsely vegetation grassland areas with stony ground grazed short typically by rabbits and sheep. In suitable arable fields, create specially prepared plots of open, stony ground with buffer zones that are managed to protect nesting birds and chicks from machinery. These plots offer suitable, less disturbed nesting spaces. This can be done with organisations who can ring and monitor the birds.** Stone Curlew numbers have been in decline in the UK until the 1980s where dedicated conservation efforts more than doubled the breeding numbers and these birds are increasingly present in the UK when habitats are managed to meet their needs. These birds do appear to favour locations where suitable habitat plots are created and managed for them. Typically they fly from Spain and Northern Africa to the UK in early summer to breed here. Their chances of breeding success on farmland plots is notable and farmers can work with organisations to organise this, see an example here. Whilst the birds continue to nest on working farmland in counties which are as highly agricultural as Oxfordshire, success of these birds here relies on suitable support being available to enable farmers to recover Stone Curlew populations.		Stone-Curlew (Burhinus oedicnemus)

Swifts and house martins  	**Provide nesting spaces that are suitable for Common Swifts and House Martins and do not disturb, remove nests, or try to limit these birds from nesting**. These birds migrate to the UK each year from Africa to breed in summer. In addition to nesting spaces, they require good foraging habitats, particularly along rivers, which is being addressed in the LNRS through wider habitat improvements. However, they are expected to be able to recover significant numbers if additional nesting spaces (boxes, swift bricks, spaces in buildings and structures) were provided and if existing nesting sites are retained for these birds. Swifts and House Martins are present in towns and cities across Oxfordshire including Oxford, Cherwell, Didcot, and Harwell offering a real opportunity for people to support nature on (or above) our doorsteps. Nesting sites can be lost during renovation or redevelopment of older buildings and structures (e.g. bridges) and providing new nesting spaces could be provided in those locations. These nest boxes can also support other birds like house sparrows and starlings.   Common swift numbers are estimated to have declined by 60 per cent between 1995 – 2020 but Oxfordshire is a particular stronghold for these birds and there are projects in Oxfordshire to get involved with. Similarly the House Martin is present throughout the county but numbers are notably declining by 37 per cent between 1995-2020.		Common Swift (Apus apus), House Martin (Delichon urbicum)

Turtle Dove 	**Provide scrub trees for nesting, freshwater sources (ponds, streams), and small seeds for food. Create suitable habitat by providing areas of uncropped margins or plots that are set aside. Plant buffer strips around arable fields and sow suitable wild bird seed mix and/or provide scattered seed sources. Restore or create semi-natural grassland. Manage hedges to provide nesting opportunities and allow suitable areas of scrub to regenerate. In areas which already have suitable habitat, consider captive breeding programmes to increase Turtle Dove numbers.** The UK numbers of breeding Turtle Doves has dropped by 99 per cent between 1967 and 2020 which shows how perilous the situation is for Turtle Doves in the UK. This species used to be common across farmland and farmland practices could greatly benefit the Turtle Doves which fly to the UK from Africa to breed in summer. See how you can help Turtle Doves here and consider emerging practices like captive breeding.	Otmoor	Turtle Dove (Streptopelia turtur)
Water vole 	**Manage riverside banks, ditches, and watercourses to create areas of sunny shallow water margins with bankside vegetation but avoid overshadowing of the water from scrub or trees. Avoid trampling and intensive grazing along the watercourse edge. Ensure that American Mink are also being controlled with the aim to achieve their exclusion where Water Voles are present.** Water voles have experienced drastic declines of in England. Their number dropped by almost 90 per cent between 1989 - 1998 but Water Voles can still be found in the banks and waters of Oxfordshire's fens, rivers, streams, and ditches. Effort should be made where remaining populations can be joined up. Alongside improved bank and ditch management, it is key to control the (non-native invasive species) American mink which predate on water voles in an unsustainable manner and cause local extinctions which have driven the decline of this species. To support Water Voles, see management handbooks, advice for landowners, and advice for planning decisions.	Areas that bridge a gap between existing populations	Water vole (Arvicola amphibius), Water-Violet (Hottonia palustris),

White Admiral 	**Create and manage woodlands to achieve shaded (not dark) conditions with honey suckle growing in sheltered conditions for White Admirals to lay eggs on. Manage and enhance woodland rides and glades to have zones with bare ground present and allow brambles to grow and flower in large patches to offer nectar**. **Consider management through coppicing woodlands on 12 – 30-year rotations, retaining trees which support honeysuckle. Control grazing to promote coppice regrowth and seek to create and connect open areas within the woodland.** Local White Admiral populations have declined and some have been lost in the past 30 years but suitable woodland conditions are expected to be able to support populations to re-establish. Creating new woodlands with the above habitat need in mind is expected to help the species spread into new woodlands as the newly planted woodlands mature.		White Admiral (Limenitis camilla)

White clawed crayfish 	**Survey watercourses to identify populations of White Clawed Crayfish and where they are present (or where they could be introduced), prioritise their habitat needs by achieving consistent, steady flows of good or very good quality water. Manage riverbanks to offer numerous natural or artificial 'refuges' which offer opportunities to hide from predators. Take suitable effective actions to exclude American Signal Crayfish if effective techniques emerge. Consider (re)introducing White Clawed Crayfish into habitats which are identified as suitable.** The UK is thought to support a quarter of the world's population of White Clawed Crayfish - the UK's only native crayfish species. It is under threat due to the spread of American Signal Crayfish (an invasive non native species) which quickly exterminates native crayfish populations. White Clawed Crayfish numbers have dropped dramatically in recent years but in Oxfordshire, this species remains in 1-2 watercourses in the county as isolated populations. Here, careful monitoring should be continued with targeted surveys to establish if additional populations are still present and to survey previously surveyed watercourses, potentially using eDNA techniques. At risk populations could also be carefully considered for relocation to Ark sites (e.g. new sites created after mineral/extraction work). Without action and support, it is expected that this species will be lost from Oxfordshire and from the UK. See habitat management guidance for White Clawed Crayfish here and details about Ark sites and mineral extraction guidance for this species here.	Chalk streams in Oxfordshire, Letcombe brook.	White-clawed crayfish (Austropotamobius pallipes)

White-letter Hairstreak 	**Retain Elm trees and plant or grow new disease-resistant Elms especially within 2km of existing Elm woodlands. Do not fell mature, healthy Elm trees as a precaution against Dutch Elm disease. Allow Elm suckers to grow where they appear. In areas where scrub or woods show evidence of Dutch Elm disease, introduce coppicing on a 10-year cycle. Manage hedgerow shelterbelts that contain elm and avoid cutting edges where new elm suckers appear. Enhance rides and glades and create extensive ride and glade networks within woodlands. Connect habitats with hedgerows containing Wych Elm (*Ulmus glabra*) as a hedging plant and disease-resistant elms as hedgerow trees.** The White-Letter Hairstreak exists in small remaining populations where elms are present including large, isolated elm trees and hedgerows, scrub, and woodland rides or edges which contain elm. Many butterflies have been lost over recent decades during the period where many Elms were lost to Dutch Elm Disease. Elm is now a relatively rare tree species and these butterflies need target action around remaining or newly planted Elm sites in Oxfordshire to expand and/or connect butterfly populations.	Elm sites in Oxfordshire	White-letter hairstreak (Satyrium w-album), Orange fruited elm lichen (Caloplaca luteoalba)

Willow tit 	**Retain and create a successive supply of deadwood, such as tall stumps, within and around wet woodland and scrub. Create structural diversity and promote dense scrub growth near Willow Tit nesting sites through selective felling or the reintroduction of coppicing within damp woodlands. Restore wet woodlands by reversing drainage where suitable. To improve the stability of Willow Tit populations, link up suitable habitats by creating or retaining scrub lined river corridors and mature hedgerows**. Willow Tits are found throughout the UK but are less common in the South East of England but they are present in Oxfordshire. The measures above should be considered in addition to the need for good woodland management and the creation of new wet woodlands. When creating tall deadwood stumps, the ideal trees are willow and alder with stumps at least 1.5 metres tall. Scrub growth around wet woodland should aim to achieve height of 2-4 metres and it may be necessary to control browsing animals to achieve this. Where coppicing is practiced, willow is preferable over alder. For more information, see the Willow Tit habitat guide.		Willow tit (Poecile montanus)
Whorled Solomon's Seal 	**Control deer populations and consider reintroducing Whorled Solomon's Seal to suitable locations in wooded gorges where the population has historically been present.** In the past 30 years there has been one verified record of Whorled Solomon's Seal in Oxfordshire. There are about six sites in England where the species has been recorded with more sites in Scotland. Reintroduction to suitable sites would be the most effective way to increase local numbers. Suitable sites need to be retained and created.		Whorled Solomon's Seal (Polygonatum verticillatum)

Wood White Butterfly 	**Reintroduce the Wood White butterfly to suitable woodlands and manage woodland ride sides to provide shelter and a tapered edge between tracks and maturing timber. Consider management through coppice on rotations of fewer than 12 years and create connections between open areas in woodlands. Supplemental seeding of primary larval foodplants may be necessary eg. Bitter-vetch (Lathyrus linifolius), Common Bird's-foot-trefoil (Lotus corniculatus), Greater Bird's-foot-trefoil (Lotus pedunculatus), Meadow Vetchling (Lathyrus pratensis) and Tufted Vetch (Vicia cracca).** This species is reported to be no longer present in Oxfordshire and it is not well understood why. The species is still present on the Buckinghamshire side of the Oxfordshire's North Eastern border meaning that Wood White populations could be recoverable and re-established if woodlands can be managed to achieve suitable conditions. See a management guide here.	Woodlands in Northeast Oxfordshire close to Buckinghamshire populations	Wood white butterfly (Leptidea sinapis)

You have now reached the end of Oxfordshire's LNRS draft Species Priorities List. Please report any sightings of these (and other) species to Thames Valley Environmental Records Centre to help inform future biodiversity recovery work.

Summary

The list above contains 56 specific, potential measures which are intended to support 88 species (which are noted in the species column of each measure listed above). These potential measures are actions which would also have knock-on wider benefits to a further, non-exhaustive list of species which cannot all be mentioned.

How will other threatened and near-threatened species be supported in the LNRS?

There are approximately 800 other threatened and near threatened species in Oxfordshire in addition to the 88 listed above. Many of those further 800 species need large-scale habitat improvement(s), connectivity, and the creation of new habitat(s) to help their population numbers recover and spread. Many species are expected to be supported through the LNRS's draft Statement of Biodiversity Priorities and draft Local Habitat Map which show priority actions which could be taken by people and organisations across Oxfordshire to create network of nature across which is bigger, better, and more joined-up to support a wider range of species. In Appendix 1 below, you can see how a further 217 species are expected to benefit from habitat improvement and/or creation actions which are already included as actions on the draft 'Statement of Biodiversity Priorities'.

View the draft Statement of Biodiversity Priorities and the draft Local Habitat Map on our consultation platform.

Limitation notice

One limitation of this drafted list is that we were not able to collect a measure for every one of the 883 species which are threatened and near threatened with extinction in Oxfordshire. The LNRS did create this shortlist from the information that could be collected within project timescales. So far, 468 of the 883 species (53 per cent) were given a categorisation, habitat assemblage, and potential measure by species experts. The LNRS intends to raise this number during the consultation to develop our understanding further. Therefore, during the consultation, please do tell us about information that you think needs adding or removing to improve this list.

Acknowledgements

The LNRS would like to acknowledge the support given by species experts and county recorders (nationally and locally) to help create this draft list. Collecting the specific actions needed by nearly 900 threatened and near threatened species within the county is a significant undertaking and we have only been able to create this draft with the support from individuals and organisations who have collaborated with this project. During the Longlisting and Shortlisting process, Oxfordshire received support for the LNRS partner organisations (see image right) as well as contact with over 70 species experts. Alongside the LNRS partner organisations we also heard responses from species representatives at:

- Banbury Ornithological Society
- Banbury Town Council
- Butterfly Conservation Upper Thames Group
- Centre for Hydrology and Ecology
- Environment Agency
- Forestry Commission
- Natural England
- Oxfordshire Amphibian and Reptile Group
- Oxfordshire Bat Group
- Oxfordshire Ornithological Society (OOS)
- Plant Life
- RSPB
- RSPB Otmoor
- Species Recovery Trust
- The Ashmolean Natural History Society of Oxfordshire (ANHSO)
- The Fungus Survey of Oxfordshire
- The River Thame Conservation Trust
- Over 20 further county recorders and individuals with expertise in habitat management for a variety of species.
- Representatives from each of the below LNRS project partner organisations (see image below)

The images used within this document are not those owned by Oxfordshire County Council and were made available by the following for the purposes of illustration, their inclusion does not indicate that the photographers endorse this strategy.

1. Adder - photo - Adder | Adder Vipera berus Credit: © Natural England/Allan D… | Flickr
2. Barberry Carpet Moth: Barberry Carpet Moth | Barberry Carpet Moth (Pareulype berbe… | Flickr
3. Bats: Myotis bechsteinii | Netopier Bechsteinov Bechstein's Bat | Ján Svetlík | Flickr
4. Beaver: (explored) Beaver in the neighbourhood, Almere, May 2021 | Flickr
5. Beetle of Autumn Gentian: Smicronyx reichi | Mark Gurney | Flickr
6. Bittern: Bittern | Richard Towell | Flickr
7. Blackthorn butterflies: Black Hairstreak - butterfly | Black Hairstreak, Glapthorn C… | Flickr
8. Breeding waders: Common snipe 2016-08-05_07 | Thomas Landgren | Flickr
9. Common lizard: Common Lizard | Common Lizard (Zootoca vivipara) © Natural E… | Flickr
10. Curlew: Curlew | Scotland | caroline legg | Flickr
11. Cigarello Gall-Fly: no image
12. Clubbed general soldierfly: Stratiomys chamaeleon (Diptera: Stratiomyidae), ♀ | Stratiom… | Flickr
13. Dark Green Fritillary: Speyeria aglaja | dark green fritillary Großer Perlmuttfalte… | xulescu_g | Flickr
14. Downy Woundwort: Stachys germanica, Saltway | Sam Thomas | Flickr
15. Duke of Burgundy Butterfly: Hamearis lucina | Duke of Burgundy Schlüsselblumen-Würfelfal… | xulescu_g | Flickr
16. Dung specialists: Asilus crabroniformis | Hornet Robberfly female Finistère, F… | Flickr
17. Ellipteroides alboscutellatus: no image
18. Farmland Birds: Alvéola-amarela, Yellow Wagtail | Motacilla flava, Leziria g… | Flickr
19. Fish: Brown Trout at Seedskadee National Wildlife Refuge | Flickr and European Eel (Anguilla anguilla) | Aquarium du Val-de-Loire,… | Flickr
20. Fly orchid: Fly Orchid | Ophrys insectifera - Buckinghamshire, UK, 23/05… | Flickr
21. Fungi and fungi-associated plants found with woodland: Yellow Bird's-nest, Hypopitis monotropa, Brierley Wood SK3… | Flickr and Satan's Bolete, Devil's Bolete (Rubroboletus satanus) (Bol… | Flickr
22. Great Crested Newt: Great-crested newt | Streatham Common, The Rookery | Carron Brown | Flickr
23. Greenweed flatbody/Greenweed Buff Moth: no image
24. Hazel dormouse: Hazel dormouse (Muscardinus avellanarius), Skole, Lviv Obl… | Flickr
25. Hedgehog: Twinklehog comes to say hi | Beautiful mature Hedgehog trund… | Flickr
26. Juniper: Juniperus communis | Juniperus communis | Joan Simon | Flickr
27. Lichens (on veteran trees): Usnea articulata on dead hawthorn twigs | Usnea articulata (… | Flickr
28. Liquorice Piercer Moth: Grapholita pallifrontana | Exemplar found: Russia, Moscow Ob… | Flickr
29. Long-Leaved Helleborine: Miekkavalkku, narrow-leaved helleborine (Cephalanthera lon… | Flickr
30. Lousewort flea beetle: no image
31. Marsh Fritillary: Marsh Fritillary | Etienne Gosse | Flickr and Devil's-bit Scabious (Succisa pratensis) Dipsacaceae | Flickr
32. Meadow Ant Hoverfly: Microdon devius, North Wales, June 2016 | Janet Graham | Flickr
33. Military Orchid: Military orchid - Orchis militaris | Björn S... | Flickr
34. Monkey Orchid: Monkey Orchid Orchis simia | Parkgate Kent | Len Worthington | Flickr

35. Montagu's Harrier (cropped image): A Montagu's Harrier in flight | A migratory raptor from Cent… | Flickr
36. Mountain Bulin snail (cropped image and rotated): Ena montana | gastropods.wordpress.com/2017/07/07/photo-of-t… | Flickr
37. Nightingale: Nightingale | Mathijs van Lisdonk Photography | Flickr
38. Noble chafer: Noble Chafer - Gnorimus nobilis on Meadowsweet | WWT Grafton… | Flickr
39. Otter: old world otter eating a fish | A picture of an otter | Flickr
40. Poplar trees: Black Poplar Trees - Worcestershire | Pool / Berrow Down / C… | Flickr and true fly: Wood soldier fly (Solva marginata, Xylomyidae), Parc de Wo… | Flickr
41. Silver Spotted Skipper: Silver-spotted skipper | A common and large skipper - I used… | Flickr
42. Small Blue butterfly - Small Blue | Cupido minimus - Pitstone, Buckinghamshire, UK,… | Flickr
43. Snail killing fly: Sciomyza dryomyzina male - Brook Meadow, Warwickshire 2009… | Flickr
44. Southern Damselfly: Southern Damselfy at rest | At a location in the New Forest | Flickr
45. Spider (Tuberta maerens): no image
46. Stone Curlew: Alcaravão | Alcaravão Burhinus oedicnemus Eurasian Thick-kne… | Flickr
47. Swifts and House martins: Gierzwaluw - Apus apus | Gierzwaluw - Apus apus | Flickr and House Martin | An archive shot from the Romney Marsh, during… | Flickr and Tornseglare i holk | Fem dagar efter uppsättning sitter en t… | Flickr and House Martin (Delichon urbicum) | The photos contained in th… | Flickr
48. Turtle Dove: Turtle Dove (Streptopelia turtur) ... Sutton Bank , York… | Flickr
49. Water Vole: Water Vole | Seen at the British Wildlife Centre, Newchapel,… | Flickr
50. White Admiral: Väikelumik; Limenitis camilla; White Admiral | Tirbiku, Lään… | Flickr
51. White Clawed Crayfish: White-footed Crayfish (Austropotamobius pallipes) | Aquarium… | Flickr
52. White letter hairstreak: White-Letter Hairstreak | At Brockholes | HELEN M BUSHE | Flickr
53. Willow Tit: Willow Tit | Willow Tit - Parus montanus - Пухляк Russia, Mo… | Flickr
54. Whorled Solomon's Seal: Polygonatum verticillatum, Kinnaird Burn | Sam Thomas | Flickr
55. Wood White butterfly: Leptidea sinapis-reali 170717 116.jpg | Jürgen Mangelsdorf | Flickr

Appendices

You have already reached the end of Oxfordshire's LNRS draft Species Priorities List (on page 36). The species listed below are within an appendix to enable those who are interested to view which of the other threatened and near threatened species are accounted for through actions which are being suggested via the LNRS Statement of Biodiversity Priorities.

Appendix 1

Of the overall 883 species on Oxfordshire's draft Species Priorities list, 88 are represented in the list above. A further 217 were expected to need habitat improvement and/or creation actions which are specified below. Those actions (potential measures) can be found on the draft 'Statement of Biodiversity Priorities' but below you can see which of the groups of species are being included through those habitat measures.

Which of Oxfordshire's threatened or near threatened species are likely to be supported by habitat creation and improvement measures on the draft Statement of Biodiversity Priorities?	**Habitat that they rely on**	**Recommended action(s)** **Which habitat creation and/or improvement measure(s) are needed by these species? Each of these measures are represented in one way or another within the draft Statement of Biodiversity Priorities**
Arable plants Group A; Corn Buttercup (Ranunculus arvensis), Corn Chamomile (Anthemis arvensis), Field Woundwort (Stachys arvensis), Heartsease (Viola tricolor), Sheperd's needle (Scandix pecten-veneris), Small-flowered Buttercup (Ranunculus parviflorus), Stinking Chamomile (Anthemis cotula), Rye Brome (Bromus secalinus), Wild candytuft (Iberis amara) Group B; Broad-leaved Cudweed (Filago pyramidata), Common Cudweed (Filago vulgaris), Cotswold Pennycress (Thlaspi perfoliatum), Pheasant's Eye (Adonis annua), Small Cudweed	**Arable farmland** (or land which is growing food) with disturbed soils e.g. headlands or margins)	Each of the flowering arable plants and grasses in Group A and B need the soil to be cultivated or disturbed in some way each year (typically in autumn) to allow their seeds to reach the soil and grow in the following years. Minimise or stop the use of herbicides within this area. Group B would only benefit from this measure to be taken in chalky or sandy soils. Even though the potential measures (actions) listed above should support these species to recover their populations, it does not imply that these potential measures are suitable for all areas where food is being produced.

(Filago minima), Spreading Bur Parsley (Torilis arvensis)		Each landowner should decide which potential measures are suitable to incorporate within their landholding
Deadwood detritovores/ Flies, beetles, and lichen dependent on deadwood **True flies**: (Clusia tigrine), (Sciophila antiqua), (Odinia hendeli), (Neoempheria bimaculate), Wasp-banded comb-horn cranefly (Ctenophora flaveolata) **Beetle**: (Nemozoma elongatum), (Tachinus bipustulatus), (Sitaris muralis) **Lichen**: (Chaenothecopsis savonica)	**Deadwood** (dead, dying, and decaying)	As far as safe and possible, keep dead, decaying, or dying wood in the environment. Keep a range of sizes and ages of deadwood as well as a variation of standing deadwood (upright trees, trunks, or stumps which are dead or dying), fallen deadwood (wood on the floor), and deadwood branches on alive trees. Hollows within standing trees support a wide range of species. Avoid fungicides to allow and encourage fungal growth on this deadwood. Also manage and thin trees and branches to ensure that you are regularly adding new dead wood to the environment. Where necessary, reduce dead and dying tree height in stages to make the tree safe & prolong the presence of dead and dying wood in this location. This is important across the landscape including parks, gardens, woodlands, fens. The following locations are of particular importance to carry out this measure for the following species; Sydlings Copse (Sciophila antiqua). Milham Ford (Odinia hendeli)
Ditches Flowering plant Whorled Milfoil (Myriophyllum verticillatum) **True flies;** Four lined Horsefly (Atylotus rusticus),	**Ditch**	Introduce or maintain rotational ditch management to create areas of open water and prevent species being shaded out by other vegetation.
Fen pools **True flies** Flecked General (stratiomys singularior), Long horned soldier (Vanoyia tenuicornis), Long horned	**Cothill, Lye valley SSSIs, Dry sandford pit SSSI**	Create (restore) or improve existing fens to ensure the presence and flow of clean water and create **open sunny fen pools. P**revent excessive tree and scrub invasion taking over the fen pools. Scattered bushes and trees such as sallows provide a valuable resource for invertebrates and will add considerably to the diversity

soldier (Stratiomys longicornis), Pygmy soldier (Oxyvera pygmaea) **Flowering plants** Distant Sedge (Carex distans), Few-flowered Spike-rush (Eleocharis quinqueflora), Lesser Bladderwort (Utricularia minor), Marsh Pennywort (Hydrocotyle vulgaris) **Fen carr (open)** **Insect - beetle** Hydraena palustris, **Flowering plant** Purple Small-reed (Calamagrostis canescens),		of species on a fenland site. Begin, or continue, grazing, cutting and raking pond marginal vegetation to ensure light, low nutrient, shallow pools and wet runnels. **Retain and create 'fen carr',** a wet woodland fen habitat that tend to be made up from 'sallow' willow species and alder. Maintain an open structure with open areas within fen carrs. See advice on habitat management at Fens - Buglife
Fen (tufa spring fed) True flies; Dark-winged soldierfly (Oxycera analis), Silver colonel (Odontomyia argentata), Southern Yellow splinter (Lipsothrix nervosa), Yellow-tipped soldierfly (Oxycera terminata) **Beetle**; Eubria palustris **Flowering plants;** Black Bog-rush (Schoenus nigricans), Bogbean (Menyanthes trifoliata), Bog Pimpernel (Anagallis tenella), Broad-leaved Cottongrass (Eriophorum latifolium), Common Cottongrass (Eriophorum angustifolium), Dioecious Sedge (Carex dioica), Fen Pondweed (Potamogeton coloratus), Flat Sedge	**Fen** **Cothill fen SSSI, Pixey Mead SSSI**	On tufa springs ensure clean, high calcium, alkaline calcareous spring flow and lightly manage trees to achieve partial shade over the fen (avoid overshading the fen). Graze, cut, and rake vegetation in fens and springheads to keep open short sunny pools. Avoid grazing and cutting during flowering periods for flowering plant species. Prevent excessive scrub from invading the fen. Ensure continual deadwood of all diameters fall into tufa spring areas. No removal of deadwood from springs & shallow pools. recorded in Oxon's calcareous fens.

(Blysmus compressus), Grass of Parnassus (Parnassia palustris), Long-stalked Yellow-sedge (Carex viridula subsp. brachyrrhyncha), Marsh Fragrant-orchid (Gymnadenia densiflora), Narrow-leaved Marsh-orchid (Dactylorhiza traunsteinerioides), Marsh Lousewort (Pedicularis palustris), Parsley Water-Dropwort (Oenanthe lachenalia), Tawny Sedge (Carex hostiana), **Moss**: Curled Hook moss (Palustriella commutata), Intermediate hook-moss (Scorpidium cossonii), Fine leaved Feather moss (Campyliadelphus elodes), Thick nerved apple moss (Philonotis calcarea),		
Flooding Marsh Dock (Rumex palustris), Mudwort (Limosella aquatica), Narrow-leaved Water-dropwort (Oenanthe silaifolia),	**Floodplain**	Species which needs both flooding then drying with soil disturbance from grazing. Winter flooding with grazing and trampling to disturb the seedbank.
Grassland species have currently been separated by the types of measures suggested and for the final version of the LNRS, we intend to more clearly define certain species groupings within this appendix. For example, we intend to more clearly separate out some of the lowland meadow and MG4 assemblages with their relevant measures.		
Grassland **True fly**; Smart-banded Hunchback (Ogcodes gibbosus), Yellow Downlooker Snipefly (Rhagio strigosus), **Bird:** Grasshopper warbler (Locustella naevia), **Butterfly**; Green Hairstreak (*Callophrys rubi*), **Flowering plant:** Lady Orchid (Orchis purpurea),	**Grassland with scrub**	Keep grassland short through grazing or cutting and collecting with a scattered scrub mosaic. In woodlands adjoining grasslands, create and manage rides and glades to keep open areas. Expansion and creation of oak scrub in appropriate areas. Retain isolated scrub and trees within grasslands, heathlands and wetland habitats. Allow scrub and brambles to regenerate and seasonally cut or graze the grassland. Grasshopper warblers have their ‘reliable’ sites) then management will be focused on not compromising their needs where possible. ADDITION 16MAY24: A red-listed bird in 'Birds of Conservation

		Concern' - a regular Oxon breeder that could benefit from habitat-based conservation action. Could be part of a broader farmland assemblage linked to grassland/scrub. The following locations are of particular importance to carry out this measure for the following species; Yellow Downlooker Snipefly, Aston Rowant NNR
Grassland grazing species **Calcareous flowering plants** Common Fragrant-orchid (Gymnadenia conopsea), Common Rock-rose (Helianthemum nummularium), Field Fleawort (Tephroseris integrifolia), Field Scabious (Knautia arvensis), Harebell (Campanula rotundifolia), Pasqueflower (Pulsatilla vulgaris), Purple Milk-Vetch (Astragalus danicus), Spiny Restharrow (Ononis spinosa), Tower Mustard (Arabis glabra), Quaking-grass (Briza media), **Butterfly** Grizzled Skipper (Pyrgus malvae) **True fly** Bishop's-mitre parasite fly (Cistogaster globosa)	**Light, extensive grazing or annual cutting (and collecting) on grassland**	Introduce or maintain light grazing through autumn and winter (for example by sheep) with periodic disturbance of soil and turf to create bare ground to support these species to regrow from new seeds which are short lived perennials with no seed bank. Avoid grazing during the flowering and seeding time which can vary between spring and summer (dependent on the species present).
Grassland (short turf and bare soils) **Calcareous** Flowering plants; Annual Knawel (Scleranthus annuus), Autumn Lady's-tresses (Spiranthes spiralis), Chiltern Gentian (Gentianella germanica), Fine-leaved Sheep's-fescue (Festuca filiformis), Fringed Rock-Cress (Arabis hirsuta), Frog Orchid (Coeloglossum viride), Maiden Pink (Dianthus	**Short grassland turf with bare patches of soils**	Across Oxfordshire's calcareous, acid, and sandy soils to graze, cut, or mow some areas of grassland vegetation to maintain a short sward in spring, autumn, and winter. Any cuttings should be collected and removed from the turf to maintain a low nutrient grassland which supports these species. Do not cut/graze during the summer flowering period of these flowering plants. The areas of bare soil are important and disturbing some minority

deltoides), Sainfoin (Onobrychis viciifolia), Sand Catchfly (Silene conica), **Moss**; Fir Tamarisk moss (Abietinella abietina), Montagnes cylinder moss (Entodon concinnus), Philbert's Tamarisk moss (Thuidium assimile), Slender Ditricum (Ditrichum gracile), **Butterflies**: Adonis Blue (Polyommatus bellargus), Chalkhill Blue (Polyommatus coridon) **Sandy** Silver Hair-grass (Aira caryophyllea), Slender Parsley-piert (Aphanes australis), **Acid grasslands** Sheep's Bit (Jasione montana), Smooth Cat's-Ear (Hypochaeris glabra), **Unspecified:** Dingy Skipper (Erynnis tages),		area of the turf every 1 – 3 years will encourage the dispersal of seeds and the regrowth of flowering plant species. Using grazing to maintain the turf and to disturb the soils could be used on these sites in spring, autumn, and winter but grazing/cutting times may change based on seasonal weather changes and/or particular species that you may be working to conserve. Amend/add to SBP measures to make it clear of need for variety of structure to sward heights to support local species, Show that Adonis is supported through wider habitat measures. Create, or continue managing, grasslands and wide field margins which have good quality, south-facing calcareous grassland with horseshoe vetch growing in extremely short turf. These species are becoming more frequently recorded in Oxfordshire in areas that have suitable flowering plant species, long term management, and aspect. There are good prospects for it's success with an expansion of suitable habitat.
Hedgerow **Beetle**; Cryptocephalus frontalis **Flowering Plants**: Wild Pear Archaeophyte (Pyrus pyraster)		Create new hedgerows including blackthorn, hawthorn, grey willow, and wild pear (Pyrus pyraster). Manage hedges by cutting each winter and have a thick hedge base with vertical sides.
Cothill fen SSSI **True fly:** Fungus gnat (Neoempheria striata), Ornate brigadier (Odontomyia ornate), scarce forest horsefly (Hybomitra solstitialis),	**Cothill Fen SSSI**	Ensure a consistent presence of clean, shallow water in pools and runnels. The area should be grazed with livestock, or cut and raked to keep pools and runnels open and short to manage the vegetation. Prevent the excessive growth of scrub and trees over open pools. Maintain shallow, waterlogged moss mats around sunny fen pools. Manage ditches on rotation so that vegetation is removed over time

		and not all at once. Keeping livestock within Cothill supports a number of rare fly species. Keep as much deadwood as possible in wet woodland and fen margins to allow fungus to grow and support species in this area.
Heathland **Flowering plants:** Common Heather (Calluna vulgaris), Dense Silky-bent (Apera interrupta), Heath Dog-Violet (Viola canina), Heath Rush (Juncus squarrosus), (Potentilla erecta), Lousewort (Pedicularis sylvatica), Tormentil (Potentilla erecta)	**Heathland**	Manage areas of heathland and acid grassland with light grazing to create short sward or use annual cut and collect techniques Introduce or maintain light extensive grazing on heathland, moorland, fens, and meadows, control scrub invasion light extensive grazing on heathland and moorland needs sparse sward and regular soil disturbance, on sandy soil
Mature trees Lichen: (Anaptychia ciliaris), (Biatora veteranorum), (Caloplaca lucifuga), (Lecanora horiza), True flies; Forest Windowfly (Scenopinus niger), Tree Snipefly (Chrysopilus laetus), Milichiid fly (Milichia ludens), Wasp Wood-soldierfly (Xylomya maculata), Beetle Malthodes crassicornis, Vanonus brevicornis	**Mature trees**	Retain ancient, veteran, and mature trees, especially those which are out in the open and those which have hollows with dead, dying, or decaying wood, and plan to have generations of future veteran trees. Supporting parks to understand the importance of these trees. Plan for future generation of veteran trees. The following locations are of particular importance to carry out this measure for the following species; Bladon - Malthodes crassicornis, A milichiid fly (Milichia ludens) a rare sp breeds only in the nests of Jet Ants L. fuliginosus. Cothill fen, Milham ford
Open mosaic habitats True fly Phoenix fly (Dorycera graminum), picture wing fly (Acinia corniculata), picture wing fly (Campiglossa malaris), **Flowering plants** Small-leaved Sweet-briar (Rosa agrestis),	**Open mosaic habitats**	Limit excessive scrub growth to keep habitats open and sunny and encourage flowering plants like ragwort and knapweed. This includes open sunny exposed bare sites like scrub, grassland, hedges, old quarries and on coastal headlands, but also on woodland margins, roadsides, tracksides, and brownfield sites.

Pond specialists Common Toad (Bufo bufo), Flowering plant Creeping Marshwort (Apium repens), Fine-leaved Water-dropwort (Oenanthe aquatica), Frogbit (Hydrocharis morsus-ranae), Lesser Marshwort (Apium inundatum), Pillwort (Pilularia globulifera),	**Ponds** (large ponds)	Create new large low nutrient ponds within fields, woodlands, arable margins, or large gardens. Ponds should have at least one gentle sloping edge, be created in irregular shapes, have a variety of different depths to them and be created within 1 kilometre of another large pond. Create ponds at different points in time so that landscapes have older ponds, younger ponds, and ponds which are allowed to dry/die out. Retain permanent, undisturbed, piles of logs, stones, and deadwood near to ponds as hibernation sites for amphibians and other animals. Cut back vegetation in the immediate area around ponds to prevent them becoming overgrown by tall, dominant reed and sedge. Allow for some shade as well as light, bright areas of the pond with no shade (especially on the south side of the pond). Allowing ponds to dry down in summer allows various species to flourish and
Orchard **Sciophila pomacea** – fungus gnat	**Orchard**	Retain fungal infections of cushion bracket fungi in aging 'prunus' tree species (cherries, plums, peaches, nectarines, apricots) and do not remove or burn the trees or deadwood. This true fly is very rare in the UK but is reported to be in Oxfordshire in Kidlington hosted by old prunus trees which have cushion bracket fungus present within a traditional orchard. The following locations are of particular importance to carry out this measure for the following species; Kidlington traditional orchards
Reedbed species **Mollusc** Des Moulin's Snail (Vertigo (Vertigo) moulinsiana)	**Reedbed**	Maintain vegetation structure on current sites
River and riparian German Hairy snail (Pseudotrichia rubiginosa), Beetle (Hydraena pulchella) Dragonfly; Scarce Chaser (Libellula fulva),	**River and riparian**	Plant willow trees alongside rivers and streams (riparian willow planting) and allow bare, wet mud underneath riparian (riverside) trees. Improved water quality across the catchment with occasional trees maintained or planted along river and stream edges. Maintaining open, sunny areas along the river edge. Keep watercourses clean and natural with a diverse structure including sand banks. Manage riverside vegetation by grazing or

True fly; Cranefly (Erioptera limbate), Flowering plants River Water-dropwort (Oenanthe fluviatilis), Small Water-Pepper (Persicaria minor) Horsetail; Shady Horsetail (equisetum pratense)		cutting and collecting to reduce competition from dominant vegetation and create disturbance to activate seeds. avoid excessive growth of dominant species. Manage trees along river banks to avoid overshadowing from scrub and trees over sunny shallow water margins.
Waterbodies Black Headed Gull (Chroicocephalus ridibundus)		Create natural and/or artificial waterbodies and wetland habitats to preserve nesting sites. Birds nest along natural and artificial waterbodies vary from a few pairs to thousands.
Grazed wetlands **Birds**; Lapwing, Northern Lapwing (Vanellus vanellus), Golden Plover (Pluvialis apricaria), Shoveler (Anas clypeata) **Flowering plants** Bottle Sedge (Carex rostrata), Bulbous Rush (Juncus bulbosus), Common Yellow-sedge (Carex viridula subsp. oedocarpa), Corn Mint (Mentha arvensis), Downy-fruited Sedge (Carex filiformis), Dyer's Greenweed (Genista tinctoria), Fen Dandelion (Taraxacum palustre), Fen Violet (Viola persicifolia), Grass Poly (Lythrum hyssopifolia), Great Water-Parsnip (Sium latifolium), Greater Dodder (Cuscuta europaea), Greater Spearwort (Ranunculus lingua), Green-winged Orchid (Anacamptis morio), Lax-Flowered Persicaria (Persicaria mitis), Lesser Spearwort (Ranunculus flammula), Marsh Arrowgrass (Triglochin palustre), Marsh Ragwort (Jacobaea aquatica), Marsh Speedwell (Veronica scutellata), Marsh Stitchwort (Stellaria palustris),		Maintain existing and create new mosaics of wetland habitats including floodplain grazing marsh, wet meadows, fens, marshes, pond margins, and ditches, introduce or maintain annual light grazing animals, suitable hay cutting, or cutting and collecting at least once a year in autumn. This creates periodic disturbance to reduce competition and create bare areas each year to help plants spread. In suitable areas, create scrapes and avoid draining wet habitats. Wetland mosaics should include some cover of shallow surface water through April – August with seasonal grazing to create the best diversity of the sward. Stock density should be managed to avoid trampling any ground nesting birds and avoid agricultural activities during bird breeding seasons. Creating (or maintain high quality) areas of extensive shallow water in suitable locations throughout winter will support wintering birds and other species. Allow flooding across fields and focus land management to support the survival and increase of wintering bird populations where they appear.

Marsh Willowherb (Epilobium palustre), Marsh Valerian (Valeriana dioica), Nodding Bur-marigold (Bidens cernua), Orange Foxtail (Alopecurus aequalis), Round-fruited Rush (Juncus compressus), Sea Club-rush (Bolboschoenus maritimus), Slender Spike-rush (Eleocharis uniglumis), Small Sweet-grass (Glyceria declinata), Strawberry Clover (Trifolium fragiferum), Ragged Robin (Silene flos-cuculi), Tubular Water-dropwort (Oenanthe fistulosa), Variegated Horsetail (Equisetum variegatum), Water Germander (Teucrium scordium) **True flies**; Tabanus bovinus (a horsefly),		Waders are typically birds which wade through shallow water and muddy margins to feed in UK winter including on farmland fields, wetlands, and grasslands.
Woodland (general) **Flowering plants** Lesser Hairy-brome (Bromopsis benekenii), Spreading Bellflower (Campanula patula), **Birds** Mistle Thrush (Turdus viscivorus), Tawny Owl (Strix aluco), Woodcock (Scolopax rusticola), **Spider** Small-horned Wacklenaer (Walckenaeria corniculans) **Beetle**; Silpha carinata		Encourage tussock formation and provide or retain deadwood. Maintain any existing areas where soil retains water and improve the area to enhance soil moisture levels to help the woodland avoid drying out. Retain dead standing trees with holes and hollows that can be used for nesting. Wide buffer strips with tussocky grass along woodland edges for foraging habitat. Scrubby edges to woodland. Possibility of nest boxes where natural sites deficient. Manage browsing to allow healthy shrub layer with high species diversity. Introduce and continue general good practice woodland management. Thin out areas of overly-dense young woodland which has created a closed-canopy structure. Thinning will allow light into the woodland and will restore shrubs and 'ground layers' (lower growing plants and flowers) to help prevent them from getting shaded out. Retain mature and old growth stands. In woodlands, allow deep leaf litter to build up without disturbance. Woodland thinning to create more open conditions (25-35 per cent canopy

		gap). Suppress Bramble growth. Small group felling or coppice (short-medium rotation - <12yrs) adjoining rides/glades if possible Disturb soils in small, sunny areas (don't remove topsoil) Create/maintain open areas around existing plants Light grazing beneficial (removes comp. from tall plants) Maintain open, sunny woodland edges Connect open areas within woods Create and buffer woodland to reduce woodland isolation including landscape-scale deer control in necessary areas. Green bridges and the landscape-scale connectivity of suitable woodlands
Woodland (ancient) **Lichens** (Gyalecta flotowii), (Ochrolechia arborea), (Enterographa sorediata),		Within ancient woodlands, plan for a generation of future veteran trees, and create clearings, rides, or glades around occasional veteran and ancient trees within woodlands which can become suitable host trees to species which rely on light within woodlands on veteran trees. Retain veteran trees along rides, selectively fell small groups where this can 'rescue' veteran trees, don't coppice or clear-fell near rich stands that support lichen, and create glades with various levels of thinning to created diverse structure of vegetation. In suitable areas of ancient or old growth woodland, introduce or restore grazing to prevent excessive tree density which could cause unfavourable levels of shade for some species. Moving animals through the woodland can offer short periods of lower intensity grazing to allow new growth to come through.
Woodland (coppice) **Birds** Marsh Tit (Poecile palustris),		Restore percentage of neglected coppice (e.g. 15-20 yrs old) on long rotation coppice cycle with standards – young dense coppice required for foraging. Marsh Tit breed low down in neglected coppice, so retention of some neglected coppice is recommended. Retain deadwood as nests in holes (including deadwood low in shrub layer). Increase patch size to >0.5 ha. preserve untidy woods. Marsh and Willow Tit – arguably creating more areas of suitably managed woodland (and implementing deer control) will benefit an assemblage of species along with these

Insect – beetles: (Chrysomela tremula)		Create or continue coppice of aspen, poplar and willow woodlands
Woodland rides and glades **Flowering plants;** Alder Buckthorn (Frangula alnus), Copse-Bindweed (Fallopia dumetorum), Greater Wintergreen (Pyrola media), Green Hound's Tongue (Cynoglossum germanicum), Meadow Saffron Colchicum autumnale), (Hydrotelephium Sedum telephium), Thin-spiked Wood-sedge (Carex strigose), Giant Bellflower (Campanula latifolia), Great Wood-rush (Luzula sylvatica), **Mammals:** Harvest mouse (Micromys minutus), **Insect – true flies** Smart-banded Hunchback (Rhagio annulatus), Scarce Awl Robberfly (Neoitamus cothurnatus), **Insect – beetle** Hazel pot beetle (Cryptocephalus coryli)		In suitable locations in all woodlands, create, manage, and maintain wide and open woodland rides, glades, and edges. Keep rides open to avoid overshading with periodic disturbance along rides and glades to activate seeds. Maintain areas of light and dappled shade. Avoid soil compaction/ waterlogging to retain important mycorrhizal fungi. Where suitable, introduce controlled, time limited grazing by cattle/horses to create occasional soil disturbance. Manage deer levels to reduce loss of species and biodiversity. Ride and glade enhancement – wide with cover for foraging. Manage browsing to maintain open conditions with shrub layer. Buffer woodland edge to intensive agriculture (damp, rough grassy margins could aid foraging) At woodland edges, manage the woodland to to include scrub transition areas, to avoid a sharp distinction between woodland blocks and open grazed land. In the scrub edges, promote the planting or regrowth of young birch, hazel and sallow
Woodland (wet) **flowering plants** Greater Butterfly-orchid (Platanthera chlorantha), Ivy-Leaved Bellflower (Wahlenbergia hederacea), Mossy Saxifrage (Saxifraga hypnoides), Narrow-leaved Bitter-cress (Cardamine impatiens), Fern		Create woodland along rivers in suitable wet locations. Create wet woodland and manage it to have open space(s) within the woodland. Retain wet features within woodlands. Avoid use of chemicals (herbicides/pesticides etc.)

Hard-fern (Blechnum spicant) **insect - beetles** (Ischnosoma longicorne)		Creation of new wet woodland including open woodland and willow carr Creation of new wet woodland around flooded gravel pits. If waterflows have previously been diverted away from wet woodlands, fen and carr, find opportunities to rewet or restore the waterflows into the woodland area. Rewet woodlands, fields, and hedgerows and reduce disturbance from trampling The following locations are of particular importance to carry out this measure for these species; Tubney wood, Stow wood
Woodland (calcareous steep slopes) Mezereon (Daphne mezereum), Lesser Butterfly Orchid (Platanthera bifolia)		Create open woodland on open, steep calcareous slopes

*whilst the LNRS statement of biodiversity potential measures intend to support these which are listed within the appendices, there would be many other plant, animal, fungal species and microorganisms which would be helped by any of these actions and the listed species are non-exhaustive.