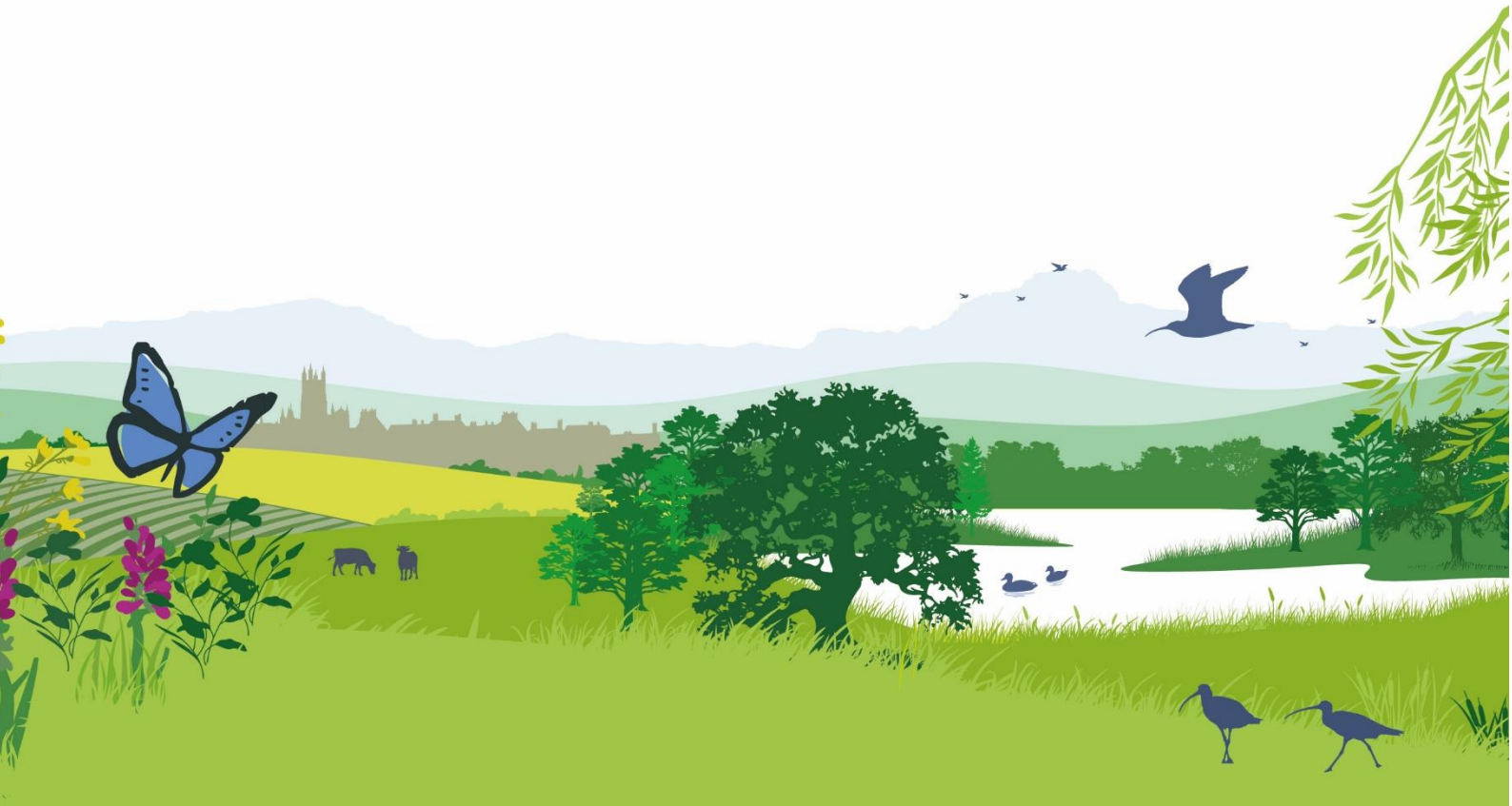
Gloucestershire Local Nature Recovery Strategy

Part 2 - Gloucestershire's Biodiversity Priorities and Potential Measures



glos nature
GLOUCESTERSHIRE LOCAL NATURE PARTNERSHIP

Gloucestershire
COUNTY COUNCIL

Contents

Introduction

Part 2 of the strategy draws from the pressures and opportunities highlighted in Part 1 and sets out the practical actions that can be taken to both protect our existing wildlife and biodiversity, and expand and create new wildlife rich habitat. These actions for nature are described as "Potential Measures", with each linking directly to achieving the aims of 10 Biodiversity Priorities set out in this document. These Biodiversity Priorities are also linked directly to the Key Messages of this strategy, as defined and expanded on in Part 1.

The Key Messages of this strategy

This strategy has been developed through a range of discussions and input of information from nature conservationists, planners, local authority officers and members, farmers, landowners, land managers, and members of the public in Gloucestershire. From these discussions and information, we have drawn out some overall key messages for this strategy:

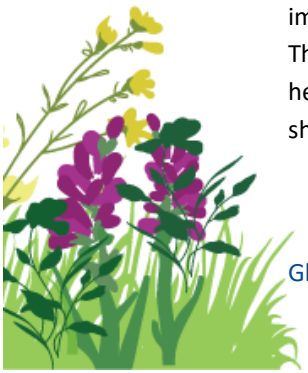
1. **Safeguarding, managing and enhancing existing biodiversity-rich sites –** The complex ecological relationships between species in a habitat are difficult to recreate quickly once a habitat is degraded or destroyed. With the pressures on Gloucestershire's wildlife, the highest priority is to safeguard and enhance high quality nature sites and species populations. Landowners and land managers who are already doing this should be supported.

2. **Landscape scale connectivity: Better, bigger, more, and more joined** – Working from existing good habitat, these sites should be increased in size, with connective habitat created to join multiple areas of value for wildlife. This is the core theme of Nature Recovery as expressed in the *Making Space for Nature* report, with the aim of creating a resilient and coherent nature recovery network. Areas put forward for new habitat creation can contribute to meeting the Government's goal of 30 by 30 - at least 30% of land to be protected for nature recovery by 2030.

3. **Climate emergency** – Climate change is already affecting our wildlife with temperature, rainfall and growing season changes affecting the timing of natural events such as emergence, pollination and where species can thrive. Nature based solutions can help mitigate some impacts of climate change. Landscape-scale nature recovery will allow species to move and migrate to new or cooler habitat, when the conditions in their existing habitat are no longer suitable due to the impact of climate change.

4. **Our relationship with water** – Management of our watercourses needs to focus on re-naturalisation, restoration of floodplains and improving water quality. Actions to restore natural meanders and wiggles, along with removing artificial barriers, can have a wealth of benefit both for people and nature, such as slowing the flow of water, creating natural flood resilience and allowing fish to move freely. It is recognised that efforts to improve water quality need to focus on both point and diffuse sources, tackling sources of pollution such as run off, as well as how it moves through the watercourse.

5. **The value of mixed and wilder habitats** – In the right location, allowing sites to become "messy" and a complex mosaic of scrub, species rich grassland with varying sward heights and bare ground can result in a diverse ecosystem, supporting a wide range of species. The variety in structure also improves climate resilience allowing species to adapt and move between different patches of habitat. These habitats can be created through "natural regeneration" – the process of allowing large herbivores shape and maintain the habitat mosaic, or manual techniques that mimic the way they shape the landscape.



6. **Biodiversity in our developments and settlements** – The importance of nature in our settlements, urban areas and new developments was emphasised by participants in our public engagement sessions, as well as by other stakeholders. Nature in our urban areas and settlements is important for health and wellbeing, for nature connection, for climate change mitigation and for connecting habitats and wildlife areas within and adjacent to settlements.

Statement of Biodiversity Priorities

The statement of Biodiversity Priorities identifies ten categories of actions, arranged mainly by habitat type. The description of each Biodiversity Priority sets out an aim, highlighting the ways in which the strategy and Potential Measures will improve biodiversity, connectivity and climate resilience, in both existing and newly created habitats.

1. **Grassland, meadows and heathland** (open habitats): Improve the condition of and increase the resilience of grassland, meadows and heathland by striving towards achieving species-rich sward (calcareous and neutral grasslands), and a diversity in structure to create micro-habitats and shelter for small mammals, invertebrates and reptiles. The extent of these species-rich grassland, meadows and heath habitats needs to be significantly increased, along with connectivity, including through road verges and arable field margins.

2. **Woodland habitats**: Improve the condition of and increase the resilience of woodlands and tree habitats, through creating diversity in structure in existing woodlands by coppicing and thinning, and increasing the species diversity where is has not established in newer woodlands or where it has been previously lost in established woodlands.. Woodland creation should focus on species diversity for climate resilience, extending existing woodlands and forming connectivity between them.

3. **Mixed and mosaic habitats**: Create complex and dynamic mosaics of scrub, grassland, trees and wetland. These mosaic habitats can be strategically placed to act as stepping stones between existing woodland and grassland habitats, and their diversity and complexity supports species that need variety in structure and food sources.

4. **Open water habitats**: Improve the ecological condition of ponds and lakes which are increasingly under threat from drought, pollution, and invasive species, which have a negative impact on the diversity of species they support. Creating new ponds and scrapes provides connectivity between existing features, also allowing for migration of semiaquatic species.

5. **Running water habitats**: Create more natural river courses and river banks, and dynamic mosaics of linked wetlands and floodplain habitat. Together these measures can alleviate flooding by slowing the flow and increasing water storage. Improving water quality by reducing pollution and improving riparian buffers benefits both riverine species and people.

6. **Wetland habitats**: Improve the condition of and increase the resilience, extent and connectivity of wetland habitats by creating connections between open water and river habitats and managing invasive species.

7. **Estuarine habitats**: Protect and enhance internationally important estuarine habitats through limiting disturbance from recreational pressure and restoring and creating new saltmarsh.

8. **Nature-friendly farming and forestry**: Build the health of soils through reducing the intensity of farming practices, and utilising the farmed landscape to increase connectivity and food sources for wildlife. Reduce the use of pesticides and herbicides to protect wildlife and reduce pollution into

surrounding landscape and habitats. Provide food sources for wildlife and habitat connectivity through our countryside.

9. **Biodiversity in settlements and developments**: Increase biodiversity and wildlife corridors in the land around residential areas by ensuring green space is created in new developments and is improved for wildlife in existing areas, as well as increasing the biodiversity of habitat found on urban corridors such as road verges, canals, and cycleways.

10. **Species priorities**: Strengthen the resilience of rare and threatened species that need specific management measures by targeting habitat management to support them and strategically creating connectivity between places where they are known to have strongholds.

Categories of Potential Measures

- Habitat Measures (mapped)
- General Measures (unmapped): These can be applied in relation to a range of other measures, but it is not appropriate to map them spatially.
- Nature-friendly farming and forestry Measure (mapped)
- Nature-friendly farming and forestry Measures (unmapped)
- Biodiversity in settlements and developments Measures (mapped)
- Biodiversity in settlements and developments Measures (unmapped)
- Species Measures (partially mapped)

Where potential measures have been mapped, this mapping expresses the most effective places to deliver the measures in order to achieve the biodiversity priorities of this strategy. Habitat management and creation will also be relevant outside the zones mapped in the strategy, but this mapping represents the *best* opportunities for increasing connectivity and expanding existing sites.

An important caveat - site specific management advice and monitoring

An important caveat to take into account when using this strategy is that this is a high-level county-scale strategy developed using the current best existing biodiversity information.

For all detailed decisions about habitat management or creation on any particular site, the general recommendations of this strategy should be supplemented with site-specific advice as appropriate, from ecologists, land agents, land managers, local authorities, Gloucestershire County Council Historic Environment Record (HER), regulators including the Forestry Commission, Environment Agency and Natural England, and within protected landscapes the National Landscape teams.

Site specific advice including baseline ecological surveys and/or soil tests should be taken before determining habitat management plans or the best options for land management on that site. Within National Landscapes, the statutory Management Plan and associated guidance including Nature Recovery Plans should be followed. If felling trees, consent and an approved felling licence may be required from the Forestry Commission. The ongoing management costs of habitat creation and enhancement should be planned for. Ongoing survey and monitoring is needed to assess the long-term impact of conservation management interventions.

Wider Environmental Benefits or Ecosystem Services

This strategy also considers the wider environmental benefits of nature recovery. These wider environmental benefits are also known as ecosystem services, which is a way to demonstrate how biodiversity is essential for the resources we need to live. Symbols for some of these key ecosystem services, or wider environmental

benefits, are shown next to the potential measures which make a significant contribution to one or more of these wider environmental benefits.

These symbols are used with permission from the Natural Capital Team at the Environment Agency. The Environment Agency's Natural Capital Team has developed a set of natural capital icons for use in their own tools, guidance, and products, as well as those of their partners, that support a natural capital approach. These icons are designed to give natural capital a strong, recognisable identity, making it easier for people to identify and engage with it.

Key to symbols for key wider environmental benefits / ecosystem services

Carbon storage and sequestration	
Air pollutant removal	
Water quality	
Water flow regulation / flood management	
Local climate regulation / shading / urban cooling	
Soil health / Soil erosion prevention	
Cultural / Recreation / education / health and wellbeing / landscape beauty / sense of place	

Guidance links and funding sources

We have not included links to further guidance and best practice, or links to potential funding sources in this document, because these are likely to be updated or change during the lifetime of this strategy. Instead, through the Local Habitat Map website you can access summary documents in pdf format for each Potential Measure, which bring together in one place:

- All the relevant text of the main Potential Measure and those Potential Measures that apply in relation to and alongside it
- The important caveat on site-specific management advice and monitoring
- The species from the Gloucestershire Priority Species List that could benefit from the actions of this Potential Measure
- Symbols showing the main Ecosystem Services or wider environmental benefits
- Further guidance links (which may be updated)
- Potential funding sources (which may be updated)

Biodiversity Net Gain

Areas covered by the most strategic habitat measures combine to form the Areas that Could Become of Particular Importance for Biodiversity (ACIB)**.** Users can apply high strategic significance on the Statutory Metric for implementing a mapped Potential Measure in Areas that Could Become of Particular Importance for Biodiversity. The relevant potential measures can be found under the ACIB layer group on the LNRS Local Habitat Map.

Where hedgerows, riparian tree planting or riparian buffer strips are Potential Measures that are listed as applying alongside or in relation to a Potential Measure in the Areas that Could Become of Particular Importance, users can also apply *high* strategic significance on the Statutory Metric for carrying out this action, in the location of the ACIB measure. Habitat creation that meets the criteria for the "other potential measures" listed on the Local Habitat Map is still considered important but is less strategic and therefore will only achieve *low* Strategic Significance.

Note that whilst some species measures align with the Areas that Could Become of Particular Importance for Biodiversity, it is the Habitat measure underlying that must be actioned to achieve *high* Strategic Significance within the Statutory Metric.

Potential Measures that are relevant to Biodiversity Net Gain are described using UK Habitat Classification[1] habitat names, and where habitat condition is also given, this corresponds to the Biodiversity Metric[2].

[1] UK Habitat Classification https://www.ukhab.org/
[2] Statutory Metric User Guide - https://assets.publishing.service.gov.uk/media/689c5ee17b2e384441636196/The_Statutory_Biodiversity_Metric_-_User_Guide_-_July_2025.pdf

Summary of Potential Measures

Habitat Potential Measures (mapped)

Grassland, meadows and heathland

001. Manage lowland calcareous grassland
002. Restore and create lowland calcareous grassland
003. Manage neutral grassland and lowland meadows
004. Restore and create neutral grassland and lowland meadows
005. Manage floodplain meadows
006. Restore and create floodplain meadows
007. Manage acid grassland and wet and dry heath
008. Restore and create acid grassland and wet and dry heath

Woodland

009. Manage ancient semi-natural woodland, semi-natural woodland and broadleaved woodland
010. Expand and buffer ancient semi-natural woodland, semi-natural woodland and broadleaved woodland
011. Establish new woodland and tree cover
012. Restore Plantations on Ancient Woodland Sites
013. Manage and expand wet woodland

Mixed and mosaic habitats

014. Create mixed mosaic habitats including scrub and orchard
015. Manage wood pasture and parkland
016. Restore and create wood pasture and parkland
017. Traditional orchard management, restoration and creation

Open water

018. Manage, improve and create ponds for wildlife
019. Manage lakes for biodiversity

Running water

020. River re-naturalisation
021. Remove in-stream barriers
022. Improve ecological condition of rivers
023. Safeguard tufa and headwater springs
024. Natural flood management

Wetland

025. Manage wetland and floodplain wetland mosaic
026. Restore and create wetland and floodplain wetland mosaic
027. Manage and restore fens, mires and lowland peatland sites

Estuarine habitats

028. Protect and manage saltmarsh and mudflats
029. Restore and create saltmarsh

General Potential Measures (unmapped)

030. Create wildlife corridor connectivity
031. Road verge biodiversity
032. Physical structure
033. Ecotones and edges
034. Safeguard and establish ancient and veteran trees
035. Woodland climate adaptation
036. Ash dieback response
037. Floodplain reconnection
038. Water quality
039. Sewage and wastewater
040. Reduce impacts from dogs
041. Remove invasive non-native species
042. Severn Estuary marine biosecurity
043. Slow the flow
044. Limit groundwater abstraction and surface flow abstraction

Nature-friendly farming and forestry Potential Measures (mapped)

045. Field margins, hedgerows, buffer strips, ponds, trees and sustainable farming and forestry

Nature-friendly farming and forestry Potential Measures (unmapped)

046. Reduce pollution from agricultural inputs
047. Soil health and regenerative farming
048. Drought resilient farming techniques
049. Sustainable forestry and nature recovery
050. Agroforestry
051. Field margins
052. Conservation grazing
053. Hedgerows
054. Protecting tree growth
055. Riparian tree planting
056. Riparian buffer strips

Biodiversity in settlements and developments (mapped)

057. Urban green spaces, blue spaces and wildlife corridors
058. Biodiversity in settlements and gardens
059. New developments and green and blue infrastructure
060. Green bridges and wildlife crossings

Biodiversity in settlements and developments (unmapped)

061. Canals, rivers and urban blue spaces
062. Green Infrastructure Standards for Nature
063. Swift, house martin and bat bricks
064. Biodiversity in gardens
065. Dark skies
066. Access to biodiversity-rich green spaces
067. Urban tree planting and management
068. Wildlife corridors on travel routes
069. Highway amphibian protection
070. Biodiversity-rich Sustainable Drainage Systems

Species Measures

071. Strengthen breeding curlew population
072. Increase resilience of wood warbler population
073. Strengthen hazel dormouse population
074. Strengthen Bechstein's bat population
075. Strengthen greater horseshoe bat population
076. Greater horseshoe bat flightlines
077. Strengthen lesser horseshoe bat population
078. Strengthen western barbastelle population
079. Strengthen serotine population
080. Strengthen soprano pipistrelle population
081. Beaver reintroduction and habitat creation
082. Strengthen adder population
083. Strengthen great crested newt population
084. Strengthen White clawed crayfish population
085. Strengthen scarce blue-tailed damselfly population
086. Strengthen violet click beetle population
087. Strengthen rugged oil beetle population
088. Strengthen hairy click beetle population
089. Strengthen large blue population
090. Strengthen Duke of Burgundy population
091. Strengthen wood white population
092. Strengthen lead belle population
093. Strengthen *Phyllonorycter sagitella* population
094. Maintain chalk carpet population
095. Strengthen *Lauria sempronii* snail population
096. Strengthen juniper population
097. Strengthen black poplar population
098. Individual species needs of farmland birds
099. Add food sources for ground-nesting adult farmland birds
100. Add food sources for ground-nesting farmland bird chicks
101. Add food sources for hedge-nesting adult farmland birds
102. Add food sources for hedge-nesting farmland bird chicks
103. Pearl-bordered fritillary and small pearl-bordered fritillary
104. Butterflies and moths with specific food plants on grassland
105. Butterflies and moths with specific food plants in woodland
106. Rare arable plants and soil fauna, flora and fungi
107. Dead wood
108. Veteran ash pollards
109. Fly orchid and white helleborine
110. Wye Valley bryophytes and distinctive species
111. Moths dependent on small- and large-leaved lime
112. Strengthen Severn Estuary and Floodplain waterbird populations
113. Strengthen River Severn fish populations

Potential Measures

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
	1. Grassland, meadows and heathland			
001	**Measure 001: Manage lowland calcareous grassland.** Manage wildflower grasslands according to the broad requirements of the habitat whilst allowing for the specialist needs of any priority species, through light grazing, cutting and scrub management.	Management may involve a mid to late summer hay cut with follow-on grazing until late winter or early spring. Ensure that autumn/winter grazing and/or cutting (with the removal of cuttings) prevents nutrient levels from building up. Extensive year-round grazing may be suitable for some large sites. Ensure that a thick thatch of grassy matter doesn't develop to increase nutrients, suppress wildflowers and create a fire risk. Maintaining a low sward by low-level grazing in some areas will encourage mycorrhizal fungi fruiting. Consider a certain level of scrub and scattered trees to provide shade, to reduce flowering plants reacting to drought conditions by reducing or ceasing nectar production, for stock, and for refugia for insects. Prevent scrub from completely overrunning wildflower grasslands. Avoid activities that cause soil compaction.	031. Road verge biodiversity 032. Physical structure 033. Ecotones and edges 040: Reduce impacts from dogs 052. Conservation grazing 053. Hedgerows 104. Butterflies and moths with specific food plants on grassland	
002	**Measure 002: Restore and create lowland calcareous grassland.** Restore and create new areas of wildflower grassland, especially by	Create new areas of wildflower grassland, especially by increasing size, variety and connectivity of existing grassland. Aim for the creation of lowland calcareous grassland, but if this is not achievable then create other calcareous grassland in good condition, as species-rich as possible. If	030. Create wildlife corridor connectivity 031. Road verge biodiversity 032. Physical structure 033. Ecotones and edges	

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
	increasing size, variety and connectivity of existing grassland.	surveys or soil tests indicate calcareous grassland is not feasible, create neutral grassland of equivalent distinctiveness. Slopes where the soils are thinner are particularly good for grassland restoration. Semi-improved or modified grasslands can be diversified by light harrowing and over-seeding. Arable can be reverted to wildflower grassland through seeding, following site preparation. Plants grown as plugs can be used for species that do not spread well as seed. Use brush-harvested seed or plug sources of local provenance and similar soil conditions. Green hay from similar wildflower meadows can be spread as an alternative to seed. Consider a certain level of scrub and scattered trees to provide shade, to reduce flowering plants reacting to drought conditions by reducing or ceasing nectar production, for stock, and for refugia for insects. Avoid activities that cause soil compaction. To increase fungi species, use local inoculants, such as molehill soil or turf, to introduce native beneficial fungi.	053. Hedgerows 104. Butterflies and moths with specific food plants on grassland	
003	**Measure 003: Manage neutral grassland and lowland meadows.** Manage wildflower grasslands according to the broad requirements of the habitat whilst allowing for the specialist needs of any priority species, usually through a mid to late summer hay cut with follow-on grazing until late winter or early spring.	Ensure that autumn/winter grazing and/or cutting (with the removal of cuttings) prevents nutrient levels from building up. Ensure that a thick thatch of grassy matter doesn't develop to increase nutrients, suppress wildflowers, waxcaps and other grassland fungi, and create a fire risk. Where appropriate, consider a certain level of scrub and scattered trees to provide shade, to reduce flowering plants reacting to drought conditions by reducing or ceasing nectar production, for stock, and for refugia for insects. Prevent scrub from completely overrunning wildflower grasslands.	031. Road verge biodiversity 032. Physical structure 033. Ecotones and edges 040: Reduce impacts from dogs 052. Conservation grazing 053. Hedgerows 104. Butterflies and moths with specific food plants on grassland	

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
004	**Measure 004: Restore and create neutral grassland and lowland meadows.** Restore and create new areas of wildflower grassland, especially by increasing size, variety and connectivity of existing grassland.	Aim for creation of lowland meadow, but if this is not achievable then create other neutral grassland in good condition, as species-rich as possible. If surveys or soil tests indicate calcareous grassland is not feasible, create neutral grassland of equivalent distinctiveness. Slopes where the soils are thinner are particularly good for grassland restoration. Semi-improved or modified grasslands can be diversified by light harrowing and over-seeding. Arable can be reverted to wildflower grassland through seeding, following site preparation. Plants grown as plugs can be used for species that do not spread well as seed. Use brush-harvested seed or plug sources of local provenance and similar soil conditions. Green hay from similar wildflower meadows can be spread as an alternative to seed. Where appropriate, consider a certain level of scrub and scattered trees to provide shade, to reduce flowering plants reacting to drought conditions by reducing or ceasing nectar production, for stock, and for refugia for insects. To increase fungi species use local inoculants, such as molehill soil or turf, to introduce native beneficial fungi.	030. Create wildlife corridor connectivity 031. Road verge biodiversity 032. Physical structure 033. Ecotones and edges 053. Hedgerows 104. Butterflies and moths with specific food plants on grassland	
005	**Measure 005: Manage floodplain meadows.** Manage and protect existing species-rich floodplain meadow habitat, usually with an annual hay cut between late June and September, with one late cut every 3-5 years, then graze.	Remove livestock before the ground becomes too wet to avoid poaching and soil compaction. Be flexible with the timing and extent of these management options in response to long term changes and seasonal variability in conditions. Wet grasslands need an adequate supply and quality of water to adapt to changes in climate.	040: Reduce impacts from dogs 046. Reduce pollution from agricultural inputs 104. Butterflies and moths with specific food plants on grassland	

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
006	**Measure 006: Restore and create floodplain meadows.** Create new areas of floodplain meadow grassland, where possible by increasing size, variety and connectivity to existing grassland.	To restore or create floodplain meadow it is important to use seed, plugs or green hay sourced from local floodplain meadows and from similar soil conditions. Semi-improved or modified grasslands can be diversified by light harrowing and over-seeding with appropriate species mix for the soil and geohydrology. Arable can be reverted to wildflower grassland through seeding, following site preparation. Plants grown as plugs can be used for species that do not spread well as seed. Use brush-harvested seed or plug sources of local provenance and similar soil conditions. Green hay from similar meadows can be spread as an alternative to seed. Consider creation of floodplain scrapes to increase floodplain storage and improve habitat. Incorporate the creation and management of floodplain meadows into river restoration and natural flood management solutions.	030. Create wildlife corridor connectivity 037. Floodplain reconnection 046. Reduce pollution from agricultural inputs 104. Butterflies and moths with specific food plants on grassland	
007	**Measure 007: Manage acid grassland and wet and dry heath.** Protect and manage existing heath and acid grassland habitats. Encourage a mosaic of wet and dry heath.	Manage grasslands according to the broad requirements of the habitat whilst allowing for the specialist needs of any priority species. This may involve light grazing all year round or seasonal grazing. Grazing should be reactive and site specific, tailored to climatic and vegetational changes. Cutting and removing arisings can be beneficial in restoration but longer-term maintenance must be sustainable to avoid a boom and bust cycle in diversity. Consider a mosaic of scrub and scattered trees to assure reptile refuge, bird nesting, and invertebrate life-cycles. Prevent invasive scrub from dominating or converging - this will depend on nutrient levels. A network of breaks in scrub will ensure good grazing penetration. Water sources such as ponds also facilitate well dispersed grazing especially with cattle who drink most regularly. Principles of structure and age class apply equally to dwarf shrub mosaics such as heather and gorse. Identify at	040: Reduce impacts from dogs 043. Slow the flow 052. Conservation grazing 104. Butterflies and moths with specific food plants on grassland	

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
		least four age classes of priority vegetation and ensure they are equally represented. This avoids all degenerate heather from expiring due to heather beetle defoliation for example. Pioneer heathers are a good indication of heathland health as is a varied structure of gorse. Degenerate gorse should be less than 10% and gorse connectivity should be assessed in terms of fire risk (fuel load). Fire breaks help ensure better manageability of any wildfires but also ensure a framework of structural diversity that can be built on with accessibility for volunteer work parties and grazing livestock.		
008	**Measure 008: Restore and create acid grassland and wet and dry heath.** Restore previous heathland habitats, create new areas of extensively grazed acid grassland and heath, and create habitat to connect heath patches. Encourage a mosaic of wet and dry heath.	Increase size, variety and connectivity of existing grassland and heath. If the creation of lowland dry acid grassland is not achievable then create other lowland acid grassland in good condition. Invest highly in ground preparation that assures longer term maintenance. Scraping topsoils into south facing beetle banks works well for basking reptile and butterflies and slows succession of bare mineral soils exposed. Remove brash and store in islands of refugia preferably under adjacent wood edge (shade). Avoid linear bunds favoured by plant machinery as this will hinder grazing access and stimulate dominance by coarser invasive plants such as bracken. Integrate ponds to support any livestock grazing aims for widespread roaming. Identify water flows across the site and delay drainage to encourage percolated flow across wider areas of habitat. This often requires plant machinery to remove drainage ditches and is important to apply at the restoration phase before sensitive species colonise. Focus on hindering dominant vegetation early rather than promoting desirable vegetation as ultimately efforts will be more successful.	043. Slow the flow 049. Sustainable forestry and nature recovery 104. Butterflies and moths with specific food plants on grassland	

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
	2. Woodland habitats			
009	**Measure 009: Manage ancient semi-natural woodland, semi-natural woodland and broadleaved woodland.** Manage woodland to improve and maintain ecological condition, including improved structural diversity and availability of dead wood habitat.	Manage woodland to the UK Forestry Standard as a minimum. Create diversity in woodland age, species, provenance and structure through thinning, coppicing, creation of rides and glades, and restocking through a combination of planting, natural regeneration, coppice regrowth and restoration of natural ecological function. Strategically locate rides and glades to encourage greater continuity and connectivity of grassland and grassland edge habitats. Maintain existing coppice rotations and restore or create new coppice woodland in suitable areas. Ensure some areas of minimally managed, undisturbed, moist, low-light semi-natural ancient woodland with mature and veteran trees to offer a good environment for mycorrhizal fungi, heartwood and dead wood species. If needed, consider nest boxes, if they can be maintained, for species including pied flycatcher, marsh tit, redstart and spotted flycatcher. Include standing dead wood for species including lesser spotted woodpecker. Introduce fire breaks where climate change may increase the risk of fire. Eradicate invasive non-native plants such as laurel and rhododendron. Avoid placing game bird pens in woodland areas with a high botanical value or within 500 metres of a SSSI or other site with high biodiversity value.	034. Safeguard and establish ancient and veteran trees 035. Woodland climate adaptation 036. Ash dieback response 053. Hedgerows 054. Protecting tree growth 105. Butterflies and moths with specific food plants in woodland 107. Dead wood	
010	**Measure 010: Expand and buffer ancient semi-natural woodland, semi-natural woodland and broadleaved woodland.** Create or	Establish connective habitat by natural regeneration and colonisation or by planting. Favour natural regeneration over the planting of trees in the creation of new woodlands, especially near existing ancient woodland. Plant a range of fruiting species which fruit through different times of the	011. Establish new woodland and tree cover 033. Ecotones and edges	

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
	establish native woodland, hedgerows, scrub and rough grassland around ancient woodland and other existing woodland.	year including cherry, hornbeam and yew, to support species including hawfinch which has rare, important populations in Gloucestershire. Beech should be included in planting and restocking mixes in the Cotswolds. Creation of woodland more than 2 hectares in size may require an Environmental Impact Assessment; you can contact the Forestry Commission to check this.	034. Safeguard and establish ancient and veteran trees 035. Woodland climate adaptation 053. Hedgerows 054. Protecting tree growth 105. Butterflies and moths with specific food plants in woodland 107. Dead wood	
011	**Measure 011: Establish new woodland and tree cover.** Design new woodlands and tree cover in the right place appropriate to the identified landscape character, with a varied ecological structure.	Include a wide variety of tree species, prioritising native species, but including non-native tree species in some cases using evidence-based advice, for resilience and adaptation to climate change, and to maximise genetic diversity and resistance to pests and diseases. Manage new woodlands to promote biodiversity, including by diversifying the woodland structure with coppicing, dense shrubby edges, rides and glades. Introduce fire breaks where climate change may increase the risk of fire. Creation of woodland more than 2 hectares in size may require an Environmental Impact Assessment; you can contact the Forestry Commission to check this. Consult the Gloucestershire Historic Environment Record to identify any known archaeological sites within the proposed area of planting and seek specialist advice on tree planting and management around archaeological or historic landscape character features. Ensure that other existing priority and species-rich habitats are	016. Restore and create wood pasture and parkland 017. Traditional orchard management, restoration and creation 033. Ecotones and edges 034. Safeguard and establish ancient and veteran trees 035. Woodland climate adaptation 050. Agroforestry 053. Hedgerows 054. Protecting tree growth 055. Riparian tree planting 067. Urban tree planting and management 105. Butterflies and moths with specific food plants in woodland	

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		not planted up and avoid blocking opportunities to expand and link other priority habitats.	107. Dead wood	
012	**Measure 012: Restore Plantations on Ancient Woodland Sites.** Restore Plantations on Ancient Woodland Sites (PAWS) to a more semi-natural composition.	Gradually reduce the proportion of non-native and conifer tree species during thinning and harvesting, to restore semi-natural habitat structure. Consent and an approved felling licence may be required from the Forestry Commission. Encourage Plantations on Ancient Woodland Sites survey and assessment to identify ancient remnants and important features are protected during works, and to identify opportunities for management.	009. Manage ancient semi-natural woodland, semi-natural woodland and broadleaved woodland 033. Ecotones and edges 035. Woodland climate adaptation 054. Protecting tree growth 105. Butterflies and moths with specific food plants in woodland 107. Dead wood	
013	**Measure 013: Manage and expand wet woodland.** Manage, expand and create wet woodlands in appropriate locations, including by natural regeneration, and manage existing wet woodlands for the benefit of wildlife.	Increase the extent of wet woodland and the wetness of existing woodlands by blocking previous drainage. Ensure there is standing dead wood for willow tit.	020. River re-naturalisation 055. Riparian tree planting 081. Beaver reintroduction and habitat creation	
	3. Mixed and mosaic habitats			
014	**Measure 014: Create and manage mixed mosaic habitats including**	Allow natural processes to form a complex and dynamic mosaic of habitats of scrub, grassland, bare and disturbed ground and trees, with an	002. Restore and create lowland calcareous grassland	

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
	scrub and orchard. Create areas where natural processes are allowed to create a complex and dynamic mosaic of scrub, grassland, disturbed ground, ecotones and edges, and trees.	average tree and scrub canopy cover of between 10% and 30%, and complex structural variety. Manage through extensive, low intensity grazing to retain this structural variety. Apply the appropriate grassland creation measures at an early stage to give the site an initial injection of species richness. Where appropriate, manage scrub to create a varied age and physical structure including glades and scalloped edges. Encourage trees to self-seed where scrub or other protection can protect saplings from grazing. Consider natural regeneration or rewilding principles as the preferred methods for the creation of new mosaic habitats that include trees and small woody areas. Value dynamic scrub and complex grassland/woody mosaic habitats and resist the perception of them as being unmanaged, neglected, messy or overgrown. Planting traditional orchards can also help create extensively grazed mosaic habitats.	004. Restore and create neutral grassland and lowland meadows 008. Restore and create acid grassland and wet and dry heath 017. Traditional orchard management, restoration and creation 030. Create wildlife corridor connectivity 032. Physical structure 033. Ecotones and edges 040: Reduce impacts from dogs 052. Conservation grazing 053. Hedgerows 107. Dead wood	
015	**Measure 015: Manage wood pasture and parkland.** Manage and improve the ecological condition of ancient wood pasture and parkland, and other similar wood pasture, including improved structural diversity and availability of dead wood habitat, the presence of grazing animals,	Manage the grassland understory for species diversity, with seasonal grazing or cutting, in the ways set out in the relevant open habitats measures. Create a more dynamic mosaic of successional semi-natural habitat and retain large dead wood and brash piles. Protect and buffer areas around trees, including by fencing. The nature of wood pasture and parkland as an irreplaceable habitat should be the focus of the management.	001. Manage lowland calcareous grassland 003. Manage neutral grassland and lowland meadows 033. Ecotones and edges 034. Safeguard and establish ancient and veteran trees 036. Ash dieback response 052. Conservation grazing	

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
	microhabitats, and nectar sources for invertebrates.		107. Dead wood	
016	**Measure 016: Restore and create wood pasture and parkland.** Establish new wood pasture habitats and connect and buffer areas of ancient wood pasture and parkland, extensively grazed mosaic habitats which include trees, scrub, and small woody areas rich in edge habitats.	Restore and create new wood pasture using a variety of tree species such as common and sessile oak, lime and beech. This can include woodland with substantial glades and rides. Establish fringe areas around existing ancient wood pasture and parkland habitat for natural colonisation of trees, and for the creation of native woodland, hedgerows, scrub and rough grassland, and to provide connections to other woodland, open or hedgerow habitats. Consider planting traditional orchard and fruit trees as a faster maturing interim stage towards a veteran tree habitat. Restore the grassland understory for species diversity, with seasonal grazing or cutting, in the ways set out in the relevant open habitats measures.	002. Restore and create lowland calcareous grassland 004. Restore and create neutral grassland and lowland meadows 010. Expand and buffer ancient semi-natural woodland, semi-natural woodland and broadleaved woodland. 030. Create wildlife corridor 033. Ecotones and edges 034. Safeguard and establish ancient and veteran trees 053: Hedgerows 054. Protecting tree growth 107. Dead wood connectivity	
017	**Measure 017: Traditional orchard management, restoration and creation.** Maintain and improve existing traditional orchard sites and create or restore traditional orchard habitat, deadwood habitat or wood	Expand existing traditional orchard habitats. Plant new orchards and/or wood pasture or create deadwood habitat in locations that can form habitat stepping stones between known or likely noble chafer and orchard toothcrust orchards, including on historical former orchard sites. Increase the species and structural diversity of orchards at a site and landscape-scale to reduce vulnerability.	001. Manage lowland calcareous grassland 002. Restore and create lowland calcareous grassland 003. Manage neutral grassland and lowland meadows	

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	pasture and parkland, especially within 200 metres of existing traditional orchards, to increase the viability of deadwood habitats including for the noble chafer and for fungi.	Continue or reintroduce low input, active orchard management, responding to weather patterns and seasonal variations. Leave standing deadwood for noble chafer habitat. Produce habitat boxes to trial the effectiveness of using artificial deadwood habitat as replacement orchard habitat/stepping-stones between known or likely noble chafer orchards. Reduce or stop the use of pesticides. Retain and manage mistletoe. Prune orchard trees for longevity - traditional orchards provide trees with veteran features on a much shorter timescale. Plant a good genetic variety of orchard trees including local heritage varieties which are less likely to depend on pesticides and fungicides, and a range of pollinator groups to increase the length of time a site has trees in bloom, to increase nectar availability. When planting, use home-produced local inoculants, such as molehill soil, instead of commercial mycorrhizal inoculants which can introduce unwanted mycorrhizal species. Encourage the growth of trees on traditional non-dwarfing rootstocks which tend to live longer and give rise to better dead wood opportunities and consider planting ungrafted trees on their own rootstocks. Manage the grassland understory for species diversity, with seasonal grazing or cutting, in the ways set out in the relevant open habitats measures, retaining some areas of long grass for overwintering animals. Consider wildflower grassland creation and restoration measures when creating new orchards.	004. Restore and create neutral grassland and lowland meadows 034. Safeguard and establish ancient and veteran trees 040: Reduce impacts from dogs 053. Hedgerows 054. Protecting tree growth 107. Dead wood	

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	4. Open water			
018	**Measure 018: Manage, improve and create ponds for wildlife.** Retain existing good quality pond habitats, improve condition of existing ponds and create new ponds for wildlife with a clean water source, without fish, and with varying depth profiles, hydrological regimes, shapes, sizes and shading.	Use Freshwater Habitats Trust pond management guidance, in particular the risk assessment for identifying valuable ponds. Avoid fencing ponds unless necessary to restrict disturbance or to manage livestock access at an acceptable level. Limit pond disturbance by people and dogs. Also retain ephemeral or seasonally wet ponds as an important wildlife habitat – these are particularly vulnerable. Ensure existing ponds include a buffer of terrestrial habitat to connect to over-wintering habitat in the surrounding landscape (for amphibians). Manage for a diverse pondscape of different ages, shading, sizes and designs. Create new ponds for wildlife in locations with restricted public access and a clean water source, including on agricultural land, gardens and green spaces. Consider a buffer zone of restricted public access to ensure undisturbed terrestrial habitat for newts. Restore old ponds, or ghost ponds, where they will meet clean water criteria and be of high value to biodiversity. Incorporate the creation and management of ponds into river restoration and natural flood management solutions. Assess the risk of damaging habitat or archaeology before undertaking pond restoration and creation. Use the Freshwater Habitats Trust pond creation toolkit and risk assessment. Ensure shallow banks and a variety of profile gradients and designs including deeper areas to maintain wetness in summer and to create varying levels of succession. Do not add fish to wildlife ponds.	030. Create wildlife corridor connectivity 040: Reduce impacts from dogs 041. Remove invasive non-native species 046. Reduce pollution from agricultural inputs 083. Strengthen great crested newt population 084. Strengthen white clawed crayfish population 085. Strengthen scarce blue-tailed damselfly population	
019	**Measure 019: Manage lakes for biodiversity.** Protect and enhance	Maintain or restore lake marginal habitat and particularly communities of emergent plants which protect shores from wave action, reduce	030. Create wildlife corridor connectivity	

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	lakes to provide high quality, undisturbed, semi-natural open water lake and lakeshore habitats for the specialised suite of species that use them.	disturbance and provide high quality habitat. Survey and monitor lakes for aquatic macrophytes, including charophytes, and protect areas where notable plant assemblages occur. Where appropriate, diversify shoreline and lakebed morphology with the provision of inlets, bays, promontories, berms, islands and areas of shallow water. Manage shoreline tree cover to ensure sufficient open areas and sufficient light penetration for emergent, floating and submerged flora communities. Improve land management practices to reduce eutrophication, creating buffers along waterbodies upstream of lakes. Manage and remove invasive non-native species. Monitor and carefully manage human usage and disturbance of high biodiversity value lakes including fishing, watersports, sailing, bathing and dog-swimming.	038. Water quality 040. Reduce impacts from dogs 041. Remove invasive non-native species 046. Reduce pollution from agricultural inputs	
	5. Running water			
020	**Measure 020: River re-naturalisation.** Where appropriate, restore and re-naturalise the channels of rivers and streams and reconnect to their floodplains, restoring the wider footprint of river corridors, creating buffer habitat in riparian corridors and increasing morphological diversity of river in-channel and bankside.	Where appropriate, restore and re-naturalise river and wetland habitats to a structurally diverse condition. Restore natural floodplain connection, securing flood risk and wetland habitat benefits. Restore natural processes to encourage development of meanders, pools, and riffles that can enhance fish spawning opportunities. Raise the channel bed and reconnect the river with the floodplain to form mosaics of wetlands, riparian woodlands and floodplain meadows. Wherever possible and appropriate, remove and realign culverts and artificial bed and bank materials and obstructions. Check for historic riverine features such as culverts, weirs and fish traps before undertaking any restoration works. Consider restoration of paleochannels as part of the re-naturalisation approach, reversing historic straightening and excessive erosion in rivers.	013. Manage and expand wet woodland 026. Restore and create wetland and floodplain wetland mosaic 037. Floodplain reconnection 043. Slow the flow 044. Limit groundwater abstraction and surface flow abstraction 055. Riparian tree planting 056. Riparian buffer strips	

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
		Give the river room to change naturally by allowing it to spread out over its floodplain and create multi-threaded systems, with full floodplain reconnection - this approach is often termed ‘stage 0 restoration’. Avoid dredging where possible. • A range of interventions should be considered such as:Improving lateral connectivity between the river and its floodplain by removing embankments, lowering banks and gradients, raising the riverbed, and introducing woody material to encourage flow diversity and "spillage" into adjacent floodplain areas. Reconnecting the river to its floodplain can support the creation and re-establishment of wetland mosaics, riparian woodlands, and floodplain meadows. • Where appropriate, removing artificial in-channel obstructions and restoring natural bed and bank characteristics to re-establish natural flow regimes and to support hydrological and ecological processes. • Promoting morphological complexity within modified and straightened rivers by restoring natural sinuosity, re-creating in-channel features such as meanders, pools, and riffles, and enhancing habitat diversity through the introduction of natural materials such as gravels and woody debris. • Providing room for the river to function dynamically, encouraging natural features like braided channels, active floodplain	081. Beaver reintroduction and habitat creation 113. Strengthen River Severn fish populations	

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		inundation, making space for beavers, and sediment deposition associated with a 'stage 0' state. • Enhancing river resilience by provisioning riparian buffer strips and avoiding damaging activities that compromise natural processes, such as dredging and channel realignment.		
021	**Measure 021: Remove in-stream barriers.** Remove artificial in-stream barriers where appropriate, to help fish populations to move, and to increase river connectivity for re-naturalisation processes. Solutions for fish passage can include weir removal, bypassing channels or installing fish passes or rock ramps, and creation of wetland habitat around the barrier.	Aim to remove barriers to fish passage and restore geomorphological processes such as gravel movements in priority catchments and main stems of watercourses such as the River Frome and Nailsworth Stream. Increase the chances for fish to migrate in and out of the river systems by modifying weirs such as those on the River Severn to allow upstream and downstream passage. Where white-clawed crayfish populations are present, in-stream barrier removal may not be appropriate, as the barriers can prevent spread of the invasive American signal crayfish. Feasibility and design of river restoration should consider geomorphological processes, and check for historic riverine features such as culverts, weirs and fish traps, before undertaking any removal or restoration works.	081. Beaver reintroduction and habitat creation 113. Strengthen River Severn fish populations	
022	**Measure 022: Improve ecological condition of rivers.** Improve the ecological condition of rivers, including water quality, by ensuring low levels of contaminants and suspended sediment, and high quality in-channel and riparian	Establish unsprayed buffer strips alongside watercourses in areas with high levels of diffuse pollution and surface water runoff. Add large woody debris and gravel where appropriate to narrow channels, to act as filters. Minimise soil erosion and silt runoff from farmland by creating low bunds to intercept overland flow paths, cover crops, contour ploughing, margins and buffer strips across slopes. Block drainage ditches to allow land to re-wet. Create ponds connected to or near streams to capture and filter	038. Water quality 039. Sewage and wastewater 040: Reduce impacts from dogs 046. Reduce pollution from agricultural inputs 047. Soil health and regenerative farming	

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
	habitat protected from degradation, to support diverse aquatic wildlife.	runoff prior to discharge into larger watercourses. Avoid arable cropping on steep slopes and intensive grazing along river banks. Establish 10-50m buffer strips with both open and shaded habitat to provide a mosaic of habitats and resilience to climate change through river cooling. Fence livestock from accessing rivers and in vulnerable areas, convert arable fields to species-rich grassland. Where appropriate, undertake rotational vegetation management on river banks to maintain structural diversity and create niches. Promote local litter picks from rivers and install a sea cleaning device such as a Seabin at Lydney Harbour to reduce plastics entering the Severn Estuary. Kingfishers nest in the banks of rivers and streams and so can be particularly susceptible to increasingly frequent spring flood events. Creation of artificial nesting banks above past flood-levels can provide safe nesting sites.	055. Riparian tree planting 056. Riparian buffer strips 113. Strengthen River Severn fish populations	
023	**Measure 023: Safeguard tufa and headwater springs.** Protect tufa depositing springs, streams and watercourses with tufa dam sequences; retain and maintain in good condition.	Ensure forestry activities and vehicles do not damage tufa features. Avoid damage from recreational and livestock access to streams. Avoid direct water abstraction from tufa springs. Drainage into tufa streams should be restricted or reduced to improve water quality and water levels to ensure invertebrates and chemical conditions are protected and kept at correct levels. Maintain or establish native riparian woodland buffers in agricultural areas to shade tufa springs and watercourses, to benefit cold-adapted (sometimes glacial relict) invertebrate communities.	044: Limit groundwater abstraction and surface flow abstraction 055: Riparian tree planting	

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024	**Measure 024: Natural flood management.** Manage flood risk using the 'Working with Natural Processes' methodology in High and Medium risk catchments, as identified in the Government's spatial prioritisation of catchments suitable for using natural flood management, to protect communities, as well as restore nature.	Work in High and Medium priority catchments to slow flows of water by (i) increasing surface roughness (ii) storing water in the landscape and (iii) take up of water by trees and vegetation on flow pathways. Natural flood management is an approach to flood risk reduction rather than a single action. The approach is outlined in the 'Working with Natural Processes' methodology. Projects that can demonstrate they will achieve these aims may be eligible for funding through local and national flood funding streams. Integrate additional and best outcomes and measures for biodiversity while implementing nature based solutions.	005. Manage floodplain meadows 006. Restore and create floodplain meadows 013. Manage and expand wet woodland 020. River re-naturalisation 026. Restore and create wetland and floodplain wetland mosaic 037. Floodplain reconnection 043. Slow the flow 047. Soil health and regenerative farming 055. Riparian tree planting 056. Riparian buffer strips 070. Biodiversity-rich Sustainable Drainage Systems 081. Beaver reintroduction and habitat creation	
	6. Wetland			
025	**Measure 025: Manage wetland and floodplain wetland mosaic.** Manage wetland and floodplain wetland mosaic habitat for biodiversity to support thriving and diverse species,	Maintain and improve the biodiversity of wetlands. Undertake vegetation management (e.g. cutting) on rotation, as appropriate, to maintain structural diversity and create variety in habitat structure. Avoid drying out of wetlands as a result of excessive tree and scrub growth (such as willow). Consider light grazing or browsing by livestock to replicate natural	020. River re-naturalisation 032. Physical structure 033. Ecotones and edges 037. Floodplain reconnection 040: Reduce impacts from dogs	

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	contribute to natural flood management and sequester carbon.	herbivory patterns and create structural diversity and dynamic mosaic habitat. Conserve mature pollarded willows to support birds including redstart. Some very long-established heronries need continued protection and quality habitats for their sustenance zones.	046. Reduce pollution from agricultural inputs	
026	**Measure 026: Restore and create wetland and floodplain wetland mosaic.** Create new functional wetlands appropriate to the site, including fens, reedbeds, marshes, wet woodland, or floodplain wetland mosaic habitat, with a diversity of niches and micro-habitats, in locations where natural processes can optimise habitat quality.	Re-profile drainage ditches and other low-lying areas subject to inundation, where desirable, to create new marginal habitat and wetland. Undertake vegetation management (e.g. cutting) on rotation, as appropriate, to maintain structural diversity and create niches. Consider whether a new wetland may offer water storage opportunities during high rainfall events. Large-bodied birds, particularly those which form flocks, can be a safety hazard to aircraft, especially close to airfields. Therefore, creation of open water or other habitat attractive to these birds is subject to restrictions within 13km or 8 mi of airfields, including MoD sites.	013. Manage and expand wet woodland 020. River re-naturalisation 032. Physical structure 033. Ecotones and edges 037. Floodplain reconnection 046. Reduce pollution from agricultural inputs	
027	**Measure 027: Manage and restore fens, mires and lowland peatland sites.** Retain, maintain and restore existing fen, mire and lowland peatland sites in good ecological condition, and ensure that water quality does not impact the ability of these habitats to survive.	Maintain water levels of fen, mire and lowland peatland sites by manipulation of ditches and streams, and prevent scrub from taking over. Use 'Working with Natural Processes' techniques such as ditch-blocking and allowing areas to re-wet. Where there are peaty soils already, enhance semi-natural habitat to keep wetness. Grazing should be assessed and any over grazing brought under control, including from deer and rabbits. Reduce air pollution which can hinder the growth of sphagnum. Ensure no peat exploitation for horticulture or fuel.	038. Water quality 040: Reduce impacts from dogs 046. Reduce pollution from agricultural inputs	

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	7. Estuarine habitats			
028	**Measure 028: Protect and manage saltmarsh and mudflats.** Protect and manage existing areas of intertidal saltmarsh and mudflat.	Minimise physical disturbance to saltmarsh and mudflats from trampling by people and dogs and from coastal development. Maintain the natural functioning and dynamic processes of the estuarine system, to enable mudflats to form and move. Undertake sustainable grazing management of saltmarsh, ensuring that soil health, vegetation diversity and sward condition are protected.	037. Floodplain reconnection 040: Reduce impacts from dogs 042. Severn Estuary marine biosecurity	
029	**Measure 029: Restore and create saltmarsh.** Where opportunities arise, create more saltmarsh habitat.	Where opportunities arise, use techniques such as managed realignment or regulated tidal exchange to create new saltmarsh, within areas above an appropriate salinity threshold. Keep Shoreline Management Plans updated.	037. Floodplain reconnection 042. Severn Estuary marine biosecurity	
	General Measures (unmapped)			
030	**Measure 030: Create wildlife corridor connectivity.** Develop wildlife corridor connectivity between habitats and across our landscape, by creating and maintaining structurally diverse habitats including woodland, scrub, tree cover, wetlands, wet woodland, rough grasslands, field margins, riparian buffer strips and hedgerows.	Aim to increase habitat connectivity across farmland. Create linked and transitional habitats to enable movement of species through the landscape to reach different feeding or resting sites. Connectivity also allows movement in response to climate change.	011. Establish new woodland and tree cover 013. Manage and expand wet woodland 014. Create mixed mosaic habitats including scrub and orchard 026. Restore and create wetland and floodplain wetland mosaic 031. Road verge biodiversity 033. Ecotones and edges	

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			034. Safeguard and establish ancient and veteran trees 050. Agroforestry 051. Field margins 053. Hedgerows 056. Riparian buffer strips 107. Dead wood	
031	**Measure 031: Road verge biodiversity.** Aim for floral biodiversity in road verges by avoiding cutting between April and July and through natural recolonisation or planting of native species.	Exceptions to avoiding cutting between April and July would be for safety cuts, where it is operationally not viable, or to control coarse grasses and non-native species. Ideally, annually mow road verges in August or September. Collect cuttings if possible and place in a sacrificial area away from any watercourse or take away for green recycling. Vary cutting height and frequency to create different zones or sections to benefit a larger range of species including invertebrates. Allow taller, more infrequently cut vegetation, including scrub and trees, towards the back of the verge, unless alongside a dry stone wall. Establish new biodiversity-rich road verges through natural recolonisation, by strewing local green hay in late summer, potentially from adjacent conservation road verges, or by planting native species. Avoid using topsoil for new verges. Verge restoration can include topsoil removal.	033. Ecotones and edges 070. Biodiversity-rich Sustainable Drainage Systems	
032	**Measure 032: Physical structure.** Within grassland and mixed mosaic habitat sites, maintain and consider the creation of a more varied physical	This variety in physical structure is similar to the lumps and bumps of small historic shallow quarries which increase species richness and microclimates. Include rocky bare ground, disturbed ground or thin skeletal soils which are required by some of Gloucestershire's most endangered species, including mosses such as *Weissia sterilis*,		

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	ground structure of different aspects and gradients.	*Gymnocarpium robertianum* and *Weissia condensa*. Subject to checks for archaeology, consider scrapes and pits.		
033	**Measure 033: Ecotones and edges.** Promote gradual changes in habitat structure, or ecotones, between habitats.	These gradual changes should be developed to reduce sharp boundaries between different habitats by encouraging scrub, shrubs and longer grasses and plants. For example, these can be developed between hedgerow and field or between woodland and grassland.		
034	**Measure 034: Safeguard and establish ancient and veteran trees.** Conserve existing ancient and veteran trees and establish and safeguard the next generation of veteran trees outside woodland.	The irreplaceable habitat of ancient and veteran trees should be identified and maintained along with old (but not ancient) trees with future conservation interest. Use halo-thinning or creation of an exclusion zone around the root protection area where it is vulnerable to ground compaction. Connect areas of ancient or veteran trees with more woodland, traditional orchard, wood pasture or parkland, trees, hedgerows, scrub and rough grassland, via planting and regeneration. Establish future veteran trees and plant new generations of appropriate species and genotypes to replace veteran trees before they are lost.	067. Urban tree planting and management 107. Dead wood 108. Veteran ash pollards	
035	**Measure 035: Woodland climate adaptation.** Assist the northward migration of woodland core species through the translocation of deadwood and flora and the inoculation of sites with woodland soil, in line with Forestry Research guidance to avoid the spread of pests and pathogens.			

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036	**Measure 036: Ash dieback response.** Retain ash, and leave dead and dying trees standing, where it is possible and safe to do so, maintain lichens, and encourage a variety of trees and shrubs to mitigate for the loss of ash.	Retain ash where it is possible and safe to do so since they may have genetic tolerance to dieback, thus enhancing the prospects for future populations of healthy ash in Gloucestershire's landscape. Leave dead and dying trees standing where safe to do so and retain deadwood stumps. Create and maintain optimum conditions for ash tree lichen and fungi by managing any retained ash trees and ensuring open, well-lit but sheltered conditions around veteran trees within traditionally grazed habitats. Replacement species for ash: plant a variety of trees and shrubs that can mitigate for the loss of ash and its reliant species. Refer to the Natural England AshEcol guidance for replacement species, especially where there are known rare or semi-obligate ash dependent species. Consider leaving areas previously dominated by ash to develop through natural regeneration. Refer to the most recent research on responding to ash dieback.	108. Veteran ash pollards	
037	**Measure 037: Floodplain reconnection.** Hydrologically reconnect floodplain to river, through the removal or breaching of flood banks and bunds.	Expand areas of floodplain meadow and fen by linking isolated sites where possible. Where agricultural land is on the floodplain facilitate inundation and farm it differently at different times of year. Remove or breach flood banks and bunds if appropriate after consultation with flood risk authorities. Subject to checks for archaeology, restore floodplain features such as scrapes, sluices and channels. Check for archaeology before removing any banks or bunds as they may be historically significant.		
038	**Measure 038: Water quality.** Ensure high water quality by monitoring and addressing point source and diffuse water quality issues, including both	Consider natural flood management and biodiversity-rich Sustainable Drainage Systems on a wide scale throughout catchments to intercept and slow flows, reduce poor water quality and create habitat for increased biodiversity. Biodiversity-rich Sustainable Drainage Systems should also be	024. Natural flood management 070. Biodiversity-rich Sustainable Drainage Systems	

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	surface water and groundwater, depending on the specific hydrology of the waterbody or wetland.	included at industrial sites. Contact the Environment Agency in relation to discharge licences.		
039	**Measure 039: Sewage and wastewater.** Ensure that treated effluent from wastewater treatment works is of optimum quality and eliminate untreated overflows of sewage and wastewater.	Increase treatment capacity and reduce overflow into rivers. Invest in separation of clean water from sewerage systems. Invest in biodiversity-rich urban Sustainable Drainage Systems. Beyond infrastructure and effluent quality improvements, consider natural wetland treatment systems using reedbeds to create more wetland habitat. Contact the Environment Agency in relation to discharge licences.	070. Biodiversity-rich Sustainable Drainage Systems	
040	**Measure 040: Reduce impacts from dogs.** Reduce wildlife disturbance, nutrient loading from urination and defecation and spread of pathogens resulting from dogs.	In publicly accessible wildlife-rich sites use signage and fencing to minimise disturbance and impacts from dogs. Signage should inform the public about the impacts of dog fowling on soil nutrients, spread of pathogens and insecticides (e.g. wormers and flea treatment), and the impact of dogs on ground nesting birds or other sensitive wildlife. Sites can be designed to have natural barriers, such as scrub, to prevent access to sensitive areas, or temporary fencing at certain points of the year (for example nesting season). Signage can also be used around aquatic habitats (rivers, ponds and lakes) to warn of the effects of flea treatment on these habitats, and to limit disturbance to more sensitive areas, such as ponds with great crested newts.		
041	**Measure 041: Remove invasive non-native species.** Control, and where possible or necessary, eradicate invasive non-native species in water bodies, ponds and rivers.	Promote good biosecurity to slow the spread of invasive non-native species and associated diseases.	084. Strengthen white clawed crayfish population 042. Severn Estuary marine biosecurity	

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
042	**Measure 042: Severn Estuary marine biosecurity.** Raise awareness of the Severn Estuary cross-border Biosecurity Plan and follow best practice biosecurity recommendations and actions to mitigate against the spread of invasive non-native species in the Severn Estuary.		041. Remove invasive non-native species	
043	**Measure 043: Slow the flow.** Introduce large woody debris, deflectors and dams in streams and roughened ground to slow the flow of water at times of high flow.	Roughen the ground to create diversity of habitat and reduce speed and volumes of overland flows before water enters drains or streams. Check for historic water management features before building dams and creating rough ground. Large woody debris should be as natural and leaky as possible and not create new barriers across watercourses.	024. Natural flood management	
044	**Measure 044: Limit groundwater abstraction and surface flow abstraction.** Ensure that groundwater and surface flow abstraction is limited to protect river and wetland habitats from low flows.	Contact the Environment Agency in relation to abstraction licences, including for potable drinking water supply or irrigation. Review and limit groundwater abstraction in aquifer areas which are proven to be hydraulically connected to rivers, wetlands and spring outflows such as tufa springs.		
	8. Nature-friendly farming and forestry (mapped)			

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
045	**Measure 045: Field margins, hedgerows, buffer strips, ponds, trees and sustainable farming and forestry.** Increase diversity and resilience of species in the wider countryside, including by increasing habitat connectivity through hedgerows, field margins and headlands, riparian buffer strips, biodiversity in road verges, sustainable or regenerative farming, increasing tree cover and sustainable forestry.	Minimise the use of fertilisers, pesticides, herbicides and fungicides. Protect existing mature ancient and veteran trees and allow veteran trees to establish. Protect and create hedgerows and create new ponds. Create grass or wildflower field margins, conservation headlands and plant nectar strips. Create 10-50m riparian buffer strips with a mosaic of open and shaded habitat along all watercourses. Dry stone walls can create beneficial microclimates and habitats for invertebrates and reptiles.	011. Establish new woodland and tree cover 018. Manage, improve and create ponds for wildlife 030. Create wildlife corridor connectivity 031. Road verge biodiversity 033. Ecotones and edges 034. Safeguard and establish ancient and veteran trees 046. Reduce pollution from agricultural inputs 047. Soil health and regenerative farming 048. Drought resilient farming techniques 049. Sustainable forestry and nature recovery 050. Agroforestry 051. Field margins 053. Hedgerows 056. Riparian buffer strips 079. Strengthen serotine population 106. Rare arable plants and soil fauna, flora and fungi 107. Dead wood	

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
	Nature-friendly farming and forestry (unmapped)			
046	**Measure 046: Reduce pollution from agricultural inputs.** Minimise the use of fertilisers, pesticides, herbicides and fungicides, especially on catchment slopes and in the immediate surrounds of water bodies. Use integrated pest management where appropriate.	Implement sensitive land management practices to reduce diffuse pollution from excess soil nutrients, including timing of field operations to reduce soil compaction during wetter periods, run-off management and soil erosion control. Ensure drainage ditches are not over-dug. Revert arable to species-rich grassland in high-risk areas to reduce diffuse pollution. In agricultural settings, follow *Catchment Sensitive Farming* guidance and the legal requirements of *Farming Rules for Water*. Contact the Environment Agency in relation to discharge licences.		
047	**Measure 047: Soil health and regenerative farming.** Improve soil health, including increasing the biomass of soil fungi, hyphae and mycorrhizae, to improve carbon sequestration, reduce soil erosion and support greater biodiversity.	Improve soil health and organic matter in soils, by continuing or establishing pasture-based farming and regenerative management practices. Use cover crops and herbal leys to improve soil cohesion and water retention. Use the principles of agro-ecological farming, and/or the 5 principles of regenerative farming (livestock at low density, protect and cover the soil surface, minimise soil disturbance, crop diversity, and maintain living roots). Minimise soil erosion and silt runoff from farmland by creating low bunds to intercept overland flow paths, sowing cover crops, contour ploughing, and creating margins and buffer strips across slopes. Avoid arable cropping on steep slopes and intensive grazing along river banks. Review growing of high-risk crops for soil erosion (for examples maize, potatoes and other crops that leave soil bare) and late harvesting on sandy soils in high-risk areas such as Wye Valley and Leadon Vale.	046. Reduce pollution from agricultural inputs 048. Drought resilient farming techniques 106. Rare arable plants and soil fauna, flora and fungi	

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
048	**Measure 048: Drought resilient farming techniques.** In areas of Gloucestershire which are becoming drier due to climate change, such as the Cotswolds, incorporate dry farming practices which reduce the irrigation needs of crops and increase and utilise soil moisture.	Build up organic matter in the soil through regenerative farming, adding organic amendments and rotational grazing on arable land. Study water flow across the land, creating opportunities to store water in ponds, wetlands and lakes while ensuring flow is maintained across the waterbody. Repair drainage and irrigation infrastructure to reduce risk of soil damage through flooding, stagnation and eutrophication. Reduce soil compaction to increase volume of water held in soil structure by reducing grazing pressure. Select crops that are adapted to the appropriate soil type, rainfall and predicted climate. Plant a diversity of crops to be adaptive to climate change.	106. Rare arable plants and soil fauna, flora and fungi	
049	**Measure 049: Sustainable forestry and nature recovery.** Introduce and sustain ecological practices in woodlands used for timber production, to increase biodiversity and develop greater resilience to threats including climate change and pests and diseases.	Adopt ecologically sound forestry practices to UK Forestry Standard and above in woodlands used for timber production. These include low impact silvicultural systems, which attempt to mimic natural processes and make best use of natural regeneration for restocking, integration of areas and corridors of native broadleaved woodland in coniferous forests, and diversifying woodland structure and range of tree species. Establish practices that minimise disturbance to all nesting birds and ensure no disturbance to Schedule 1 listed species. Where there are populations of nightjars, tree pipit, woodlark and adder, use rotational clearfell of compartments to restore open heathland and provide additional suitable habitat to reinforce these populations. Restore Plantations on Ancient Woodland Sites (PAWS) to a more semi-natural composition. Create new multifunctional or productive woodlands	008. Restore and create acid grassland and wet and dry heath 033. Ecotones and edges 036. Ash dieback response 050. Agroforestry 107. Dead wood	

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
		providing timber within wildlife-rich forest design. Minimise soil erosion from woodland during felling operations.		
050	**Measure 050: Agroforestry.** Integrate more agroforestry practices within the farmed landscape to combine food production and farm businesses with tree planting and tree cover.	Agroforestry practices include arable (silvoarable) and grazing (silvopasture) systems. Agroforestry can include planting Optimal Shelterbelts to create a protective micro-climate for crops from wind damage and for wildlife and livestock by providing shade. Care must be taken to site agroforestry away from sites which are strongholds for species that require open landscapes such as lapwing, corn bunting and skylark	098. Individual species needs of farmland birds	
051	**Measure 051: Field margins.** Create grass or wildflower field margins and conservation headlands in arable fields to provide a diversity of wildflowers, wildflower seed and invertebrates for farmland birds. Leave areas and field margins unsprayed.	Plant nectar strips and cultivated headlands for arable plants. Include species and cultivars in planted field margins that can tolerate and flower under hotter and drier summers. Use variable mowing regimes to ensure cover for small mammals and winter refugia for invertebrates. Where possible mow annually in August-September, and remove arisings after mowing to avoid the build-up of nutrients. Consult the Gloucestershire HER to check where archaeological sites/features are present and would also benefit from being protected by conservation headlands in field margins.	053. Hedgerows 098. Individual species needs of farmland birds 099. Add food sources for ground-nesting adult farmland birds 100. Add food sources for ground-nesting farmland bird chicks 101. Add food sources for hedge-nesting adult farmland birds 102. Add food sources for hedge-nesting farmland bird chicks	

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
			106. Rare arable plants and soil fauna, flora and fungi 107. Dead wood	
052	**Measure 052: Conservation grazing.** Manage grassland, meadow, mosaic, wood pasture and heath habitats with extensive (light) or seasonal grazing, ideally by native breeds.	GPS collar virtual fencing can allow for targeted grazing without excess fence infrastructure, helping to allow a varied sward structure to be maintained, areas protected for scrub and trees where appropriate, and areas protected for rare plants, ground nesting birds or great crested newts breeding ponds. Manage grazing of sites flexibly in response to seasonal variations in vegetation growth, increased climatic variation and increases in extreme events. Where feasible, use rotational management to leave some areas uncut and ungrazed each year. Cattle and ponies in combination are best as they simulate the grazing pressure that plant communities and wildlife originally developed in adaptation to. Cattle are excellent non-selective grazers, taking a little from each vegetation type. Horned cattle breeds have the added capacity to pull down small sapling trees to browse, limiting succession rates. Ponies are very hardy and suited to year-round applications but have a stronger grass bias resulting in stronger contrast between short pastures and tall scrub. Sheep are beneficial where bramble dominates and for some species measures and grassland restorations.		

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
053	**Measure 053: Hedgerows.** Manage and improve the biodiversity of hedgerows and increase the connectivity of hedgerows across the landscape.	Manage hedgerows to a thick and tall condition (at least 1.5m wide and 1.5m tall). Gap up and thicken weakened hedges. Create new species-rich hedges of 5 or more species and reinstate ancient hedgerows. Include native fruit species, hawthorn and cherry plum, as hedgerow trees for nectar, bird food and for habitat stepping stones between orchards. Include elm, wych elm and hazel to support species including butterflies, moths and dormice. Introduce goat willow as an early source of nectar for bees emerging from hibernation. Tag occasional tree saplings (for example oak, field maple or sycamore) so they are allowed to grow into full size standards. Rotate hedge management years, and lay or coppice hedgerows, with protection from livestock, on a long rotation to improve cover and structural complexity and to regenerate their growth. Hedgerows should ideally be cut in late winter, outside the nesting season and once any berries have been eaten. Avoid trimming hedgerows where possible. If necessary, trim to a high A profile or just trim one side per year. Ensure any hedgerows near to any existing populations of corn bunting, skylark or lapwing are kept short.	030. Create wildlife corridor connectivity 031. Road verge biodiversity 033. Ecotones and edges 034. Safeguard and establish ancient and veteran trees 051. Field margins 107. Dead wood	
054	**Measure 054: Protecting tree growth.** Collaborate across land ownership boundaries to control deer, grey squirrels and wild boar at a scale that will enable natural regrowth, regeneration and woodland management.	Control muntjac and sika deer as invasive species whose browsing is particularly destructive to habitats and significantly reduce fallow deer populations and carry out ongoing roe deer control. Ensure natural regeneration and planting are protected during establishment. Preferably use thorny vegetation to envelope trees, rather than tree guards. If not possible, use alternatives to plastic tree guards.		

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055	**Measure 055: Riparian tree planting.** Plant or encourage natural regeneration of corridors of wet woodland broadleaved tree species alongside watercourses.	Include alder, willow, aspen and black poplar, with other native broadleaf species forming a minor component. Within the Forest of Dean, introduce 10 and 20 metre riparian buffer zones to priority watercourses, with their own management coupe and restocking coupe, as guided by Forestry England's Forest Waters team in the Forest of Dean. Gradually remove non riparian tree species such as non-native conifers from riparian areas and replace with riparian trees. Care must be taken to site riparian tree planting away from sites that are (or have potential to become) strongholds for breeding waders such as lapwing and curlew.		
056	**Measure 056: Riparian buffer strips.** Establish and maintain riparian buffer strips of 10-50 metres plus on each side of rivers and watercourses.	Larger buffers encourage greater biodiversity along rivers and add protection from pressures (such as agriculture) in surrounding habitat. Buffer strips should comprise a mosaic of vegetation including trees, species-rich grassland and reedbeds. Where grazing livestock is present, fencing can be used in areas where banks are particularly vulnerable to erosion, for the safety of livestock, or where vegetation is at risk of being over grazed and unable to recover/regenerate. Some shallow areas with livestock access can be beneficial however, to create variety in structure and areas of bare mud which are beneficial for invertebrates. Buffer strips should be fenced, including an access gate for vegetation management or pulse grazing to retain some open habitat. This will improve river ecology through creating a mix of open and shady habitats, establishing partial river cooling, creating natural wildlife corridors, reducing pollution from reaching rivers and providing natural flood management benefits. Where appropriate around deeper sections, meander bends and pools below riffles and increase the amount of tree cover to ensure rivers are kept cool for fish species.		

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
	9. Biodiversity in settlements and developments Measures (mapped)			
057	**Measure 057: Urban green spaces, blue spaces and wildlife corridors.** Manage, restore, improve and create new wildlife habitats, wildlife corridors and habitat edges in urban green spaces and parks, allotments, churchyards and blue spaces (rivers, canals and water-related).	Ensure existing green spaces and nature reserves have good connections, as wide as possible, to the wider countryside, with a priority of linking to the nearest core habitat in the Nature Recovery Network map. Ensure ecological connectivity through undeveloped green corridors to enable movement and genetic exchange to occur between species populations on the Cotswold outlier hills such as Robinswood Hill and Churchdown Hill, and the main Cotswolds. Use grass cutting regimes to create a diversity of heights of grassland, and where feasible no cutting between April and July except for safety cuts or to control coarse grasses with the aim of eventually restoring species diversity, or controlling non-native invasive species. Plant trees and hedgerows and create wildflower meadows, prioritising native species. Manage and create water features for habitat creation and flood risk benefits. Find areas where paving and hardstanding can be safely removed and replaced with planting spaces to reduce the amount of impermeable surfaces.	003. Manage neutral grassland and lowland meadows 004. Restore and create neutral grassland and lowland meadows 040: Reduce impacts from dogs 061. Canals, rivers and urban blue spaces 066. Access to biodiversity-rich green spaces 067. Urban tree planting and management 068. Wildlife corridors on travel routes 107. Dead wood	

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
058	**Measure 058: Biodiversity in settlements and gardens.** Maintain and improve the biodiversity and habitat connectivity potential of urban areas and settlements, gardens and green and blue spaces.	Create and manage habitats, wildlife corridors and connectivity, increased tree planting, water management schemes and other appropriate measures, to help increase tree equity and mitigate and reverse the effects of climate change and biodiversity loss.	018. Manage, improve and create ponds for wildlife 020. River re-naturalisation 031. Road verge biodiversity 034. Safeguard and establish ancient and veteran trees 061. Canals, rivers and urban blue spaces 062. Green Infrastructure Standards for Nature 063. Swift, house martin and bat bricks 064. Biodiversity in gardens 065. Dark skies 066. Access to biodiversity-rich green spaces 067. Urban tree planting and management 068. Wildlife corridors on travel routes 069. Highway amphibian protection 070. Biodiversity-rich Sustainable Drainage Systems 107. Dead wood	

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
059	**Measure 059: New developments and green and blue infrastructure.** Create green and blue infrastructure, maximally wide wildlife corridors, biodiversity-rich Sustainable Drainage Systems and other wildlife-friendly measures in new developments and infrastructure projects, to increase connectivity across the landscape with priority given to linking to the nearest core habitat in the Nature Recovery Network map. An effective habitat management plan for wildlife corridors and areas should be agreed with the local planning authority.	Avoid isolating nature reserves and wildlife sites through development. These sites must remain connected to similar features in the surrounding environment where possible. Include more wildlife corridors connecting larger areas of trees, woodlands or open space. Carry out soil sampling of proposed development sites to ensure that landscaping and habitat creation proposals are feasible with the existing soil conditions. Design open spaces in relation to the principles in Potential Measures 057 Urban green spaces, blue spaces and wildlife corridors and 064 Biodiversity in gardens. Consider the ambition for 30% tree cover in new developments, as recommended by the Woodland Trust. Establish 10-50m riparian buffers along waterbodies with a mosaic of open and shaded habitats. Avoid removing wild privet during building site developments and encourage planting of wild privet (*Ligustrum vulgare*) instead of the non-native garden privet (*Ligustrum ovalifolium*) to benefit the Barred Tooth-striped moth.	011. Establish new woodland and tree cover 018. Manage, improve and create ponds for wildlife 030. Create wildlife corridor connectivity 031. Road verge biodiversity 034. Safeguard and establish ancient and veteran trees 056. Riparian buffer strips 057. Urban green spaces, blue spaces and wildlife corridors 062. Green Infrastructure Standards for Nature 063. Swift, house martin and bat bricks 064. Biodiversity in gardens 065. Dark skies 066. Access to biodiversity-rich green spaces 067. Urban tree planting and management 068. Wildlife corridors on travel routes 069. Highway amphibian protection 070. Biodiversity-rich Sustainable Drainage Systems 107. Dead wood	

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060	**Measure 060: Green bridges and wildlife crossings.** Where appropriate, create green bridges, underpasses, overpasses or mammal gantry bridges to connect habitats and facilitate movement across busy roads in core habitat areas for species such as pine marten, hazel dormouse, amphibians and reptiles.		031. Road verge biodiversity 068. Wildlife corridors on travel routes 070. Biodiversity-rich Sustainable Drainage Systems	
	Biodiversity in settlements and developments Measures (unmapped)			
061	**Measure 061: Canals, rivers and urban blue spaces.** Protect, manage and create wildlife corridors along urban rivers and disused and active canals and protect and maintain wetland in disused canals.	Manage canals so that they can act as wildlife corridors through urban and rural landscapes. Where possible, instate a wide riparian buffer consisting of a mix of vegetation types, such as marginal and bankside vegetation, that provide shelter for aquatic or semiaquatic species within the canal, and a mix of scrub, trees and grassy habitat beyond the bank. If feasible, revert some areas of canal banks to water vole friendly soft banks with a more natural structure. Provide opportunities for combined blue-green infrastructure.	021. Remove in-stream barriers 057. Urban green spaces, blue spaces and wildlife corridors 068. Wildlife corridors on travel routes 021: Remove in-stream barriers	

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062	**Measure 062: Green Infrastructure Standards for Nature.** In line with Gloucestershire's Strategic Framework for Green Infrastructure, use Green Infrastructure Standards for Nature for designing and delivering biodiversity in new developments, for example, Building with Nature standards or Natural England's Green Infrastructure Framework.	Use of these Green Infrastructure Standards includes protecting and enhancing existing good quality wildlife habitat on the site, ensuring that new developments maintain and deliver Green Infrastructure that provides wildlife habitat connectivity to ecological features and networks beyond the development boundary, and incorporating Sustainable Drainage Systems. Include biodiversity advice in welcome packs given to new residents, emphasising the importance that private gardens can have in providing stepping-stones and corridors for wildlife, and the importance of permeable surfaces in flood alleviation.	064. Biodiversity in gardens 070. Biodiversity-rich Sustainable Drainage Systems	
063	**Measure 063: Swift, house martin and bat bricks.** Provide swift bricks, house martin nesting features, bird boxes and integrated bat boxes in new buildings, extensions and retrofit to existing buildings.	Protect existing swift nesting sites and bat roosts in buildings. National Planning Policy Guidance recommends that developments should include integrated nest boxes (commonly known as swift bricks), with the general aim across a development of a minimum of one nest box per unit. Swift bricks should be installed above 5m and away from driveways and windows, ideally on north-facing or east-facing walls, avoiding unshaded locations to avoid overheating. Masonry-fronted swift bricks may be installed in unshaded locations, as the mass of the masonry protects against overheating. Integrated bat boxes and roof access tiles can be included in new or renovated houses. These should provide access to the roof void and be		

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		located above 4m or under eaves, with an uninterrupted flight path, away from strong artificial light, in a warm south, south-east or south-west facing location for exposure to the sun for part of the day. For new build developments, integrated bat boxes ensure a suitable safe roosting space for the bats.		
064	**Measure 064: Biodiversity in gardens.** Increase biodiversity, habitats and the habitat connectivity potential of gardens and allotments.	Plant a range of nectar source plants including fruit trees, create small ponds, leave patches of longer grass and nettles, and plant native wildflowers and trees (as locally native as possible). Provide homes for wildlife such as brash and log piles, bird and bat boxes, and bee and insect hotels. Provide bird feeders and water for birds. Avoid the use of slug pellets, herbicides, fungicides, insecticides and peat-based garden products. Keep a compost heap for grass cuttings, leaves and organic kitchen waste. When planting, use home-produced local inoculants, such as molehill soil, instead of commercial mycorrhizal inoculants which can introduce unwanted mycorrhizal species. Create rain gardens from rainwater harvesting. Ensure gaps in fences between gardens to allow species movement, including hedgehogs. Plant native species in preference to non-native if there is an option. Plant or retain wild privet (*Ligustrum vulgare*) instead of the non-native garden privet (*Ligustrum ovalifolium*) to benefit the Barred Tooth-striped moth. Avoid replacing natural lawns and gardens with hard landscaping, parking spaces or astroturf.		
065	**Measure 065: Dark skies.** Exterior lighting and street lighting that affect roosting, foraging and/or commuting	Ensure light distribution is always downward facing (using hoods) and use dimmer lights at dusk and dawn, lights in the red spectrum that bats can better tolerate, and movement-triggered lights. Protect existing and		

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	habitat for bats should be avoided or minimised.	create new dark vegetated corridors to enhance connectivity and dispersal routes between bat roosts. Dark skies policies can reduce pressure on nocturnal species including pollinating insects. Exterior lighting should conform with the latest best practice guidelines outlined by the Bat Conservation Trust and the Institute of Lighting Professionals.		
066	**Measure 066: Access to biodiversity-rich green spaces.** Take actions to increase the potential for everyone to live 15 minutes from biodiversity-rich accessible green spaces.			
067	**Measure 067: Urban tree planting and management.** Maintain urban trees, woodlands and hedgerows, and plant and foster the survival of new street trees.	Maintain urban trees through management practices including mulching, appropriate pruning, reducing soil compaction, and creating an exclusion zone around the root protection area. Ensure inspections and bat surveys are conducted on trees with potential bat roosts before any tree works are undertaken. Plant new street trees in appropriately designed and maintained tree pits and pre-plan their watering and establishment to foster their survival. Plant a wide variety of street trees suitable for each location including insect and wind pollinators, and species that are adapted to future climates, prioritising areas that will connect existing green spaces and areas with low Tree Equity scoring.		
068	**Measure 068: Wildlife corridors on travel routes.** Protect, manage and create wildlife corridors and habitats along cycle paths, disused and active	Protect and maintain existing hedgerows, scrub and trees, and protect and maintain wetland in disused canals. Improve the biodiversity of grassland through native wildflower planting and seeding, and reducing nutrient load through clearing arisings when mowing. Plant native species including trees and hedgerows to increase wildlife habitat connectivity.	031. Road verge biodiversity 061. Canals, rivers and urban blue spaces	

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	railways, and disused and active canals.	Where new cycle paths and footpaths are created, take opportunities to deliver better wildlife connectivity, by incorporating existing habitats such as hedgerows, and creating a mosaic of linear habitats such as scrub, woodland and grassland edges. These should then be maintained in the long-term.		
069	**Measure 069: Highway amphibian protection.** Along highways, reduce the use of gully pots. Where used, place and site gully pots away from kerb edges and place ladders within gully pots to prevent amphibians and other species getting trapped.			
070	**Measure 070: Biodiversity-rich Sustainable Drainage Systems.** Create blue-green infrastructures in the form of Sustainable Drainage Systems along highways and verges, to create connectivity of green spaces in the urban environment while holding water in the catchment for longer.	Above ground drainage pathways, such as vegetated swales, should be prioritised over piped networks, and flood storage at rain gardens and wetlands should be prioritised over below ground attenuation, to ensure that all four pillars of sustainable surface water drainage (water quantity, water quality, amenity, and biodiversity) are achieved. Wetlands or permanent water level should be incorporated into flood attenuation where feasible to increase biodiversity and amenity benefits. Drainage strategies for new development adjacent to watercourses should mimic natural hydrological regimes by avoiding a single point of discharge and spreading attenuated runoff across the watercourse boundary. Highway, cycleway, car park, and public area upgrades should incorporate the retrofit of Sustainable Drainage Systems as these are likely to be the most cost-effective way of retrofitting blue-green infrastructure into the existing	024. Natural flood management 043. Slow the flow	

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		urban environment. All future drainage improvements in these spaces should include water quality mitigation to enhance environments further down the catchment.		
	11. Species Measures - Individual			
071	**Measure 071: Strengthen breeding curlew population.** Within floodplain meadow sites, provide bespoke support for Gloucestershire's threatened curlew population.	Maintain current grassland management practices of late hay cuts. Monitor and protect curlew nests from predators in fields where they are nesting. Increase the area of meadows managed with a late hay cut. Create new wetland sites for feeding near existing populations and near large late cut hay meadows suitable for nesting. See Severn Estuary Bird measure (112) in relation to overwintering curlews.	040: Reduce impacts from dogs 112. Strengthen Severn Estuary and floodplain waterbird populations	
072	**Measure 072: Increase resilience of wood warbler population.** Maintain minimum viable habitat size of mature closed canopy woodland to support wood warbler population.	Ensure woodlands have large areas of oak dominated, dense and closed canopy woodland with an open structure beneath canopy. Maintain and increase the area of suitable habitat.		

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073	**Measure 073: Strengthen hazel dormouse population.** Maintain and enhance the dormouse population in Gloucestershire, (which marks the edge of its reducing range in England), by encouraging appropriate woodland, hedgerow and scrub management and maintaining and enhancing habitat connectivity.	Within woodland, maintain, enhance and connect scrub and understory, ideally by appropriate ride management which can then be linked to areas of rotational hazel coppice. Within the wider countryside, maintain and enhance thick hedges that include hazel and a range of fruit and berries, and areas of dense scrub, by appropriate annual management and rejuvenate when necessary. Ensure veteran trees are retained to provide rot-holes for nesting and refuge for hazel dormouse and other species.	014. Create mixed mosaic habitats including scrub and orchard 030. Create wildlife corridor connectivity 053. Hedgerows 060. Green bridges and wildlife crossings	
074	**Measure 074: Strengthen Bechstein's bat population.** Protect, maintain and increase the population of Bechstein's bat, as Gloucestershire is near the north-west edge of its range in the UK.	Maintain all known Bechstein's bat maternity roosts and hibernation sites in a favourable condition, according to statutory guidance. Safeguard foraging habitat around Bechstein's bat maternity and hibernation sites by maintaining connectivity of hedgerows, tree lines and vegetated waterways between woodland roosts and foraging grounds of riparian vegetation, unimproved grassland, marsh, wetland habitats or coastal grassland within a 7km radius of the sites. Maintain and extend ancient woodlands in a favourable condition, where Bechstein's bats roost. These bats require a diverse three-tiered woodland structure with numerous mature trees with deep cavities available for roosting. Protect and maintain veteran trees within 1km of known roosts. Implement measures to limit the loss of structure and understorey, as a result of over-browsing by deer, heavy thinning, or intensive coppicing. Outside woodlands, individual trees should be connected by hedgerows or tree lines. This should also include at least 4 standing large girth dead or dying trees per hectare, where it is safe to do so, to provide Bechstein	009. Manage ancient semi-natural woodland, semi-natural woodland and broadleaved woodland 010. Expand and buffer ancient semi-natural woodland, semi-natural woodland and broadleaved woodland 030. Create wildlife corridor connectivity 034. Safeguard and establish ancient and veteran trees 053. Hedgerows 054. Protecting tree growth 065. Dark skies 107. Dead wood	

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		bats with splits and cavities within which to roost. Where lacking in large old trees, veteranisation of trees within 7km range of Bechstein bat roosts should be considered. A second option is to install suitable bat boxes or create artificial veteran trees by strapping dead trunks with holes to live trees. Restrict use of pesticides, insecticides and herbicides.		
075	**Measure 075: Strengthen greater horseshoe bat population.** Protect, maintain and increase the population of greater horseshoe bat, a rare species highly sensitive to disturbance.	Maintain all known greater horseshoe bat maternity roosts and hibernation sites in a favourable condition, according to statutory guidance. Prevent old buildings which host maternity roosts from deteriorating and avoid physical disturbance and lighting. Avoid disturbance to hibernating bats by preventing access to caves and mines where they are found and repairing and replacing damaged fencing or grills when necessary. To support foraging habitat, encourage grazing of permanent pasture by livestock, preferably cattle, within a radius of at least 4km of maternity roosts and 2km of hibernation sites. Around maternity roosts, maintain and enhance a mixed landscape of pasture, scattered trees and scrub, close to ancient woodland and linked with an abundance of tall bushy hedgerows. Maintain and create hedgerows and treelines within a 4km radius of known roosts (see hedgerow Measure). Do not use avermectin-based veterinary products on livestock, and restrict use of pesticides, insecticides and herbicides, so that livestock dung can provide habitat for beetles and flies upon which the bats feed. Refer to the requirements of the Natural England supplementary advice for the Wye Valley and Forest of Dean Bat Sites SAC.	030. Create wildlife corridor connectivity 053. Hedgerows 065. Dark skies	

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
076	**Measure 076: Greater horseshoe bat flightlines.** Improve habitat to encourage bats to move between Forest of Dean and Stroud Valleys to improve genetic diversity in the greater horseshoe bat population.	Maintain habitats within known greater horseshoe bat flyways for navigation between summer and winter sites or hibernacula. For this purpose, linear features of mature and tall, bushy hedgerows and treelines, and grazed pastures and saltings are important. To ensure continued connectivity, gaps should be closed within existing hedgerows and the creation of new interconnecting hedgerows should be considered. Do not use avermectin-based veterinary products on livestock, and restrict use of pesticides, insecticides and herbicides.	030. Create wildlife corridor connectivity 053. Hedgerows 065. Dark skies	
077	**Measure 077: Strengthen lesser horseshoe bat population.** Protect, maintain and increase the population of lesser horseshoe bat, to recover from significant declines in abundance.	Maintain all known lesser horseshoe bat maternity roosts and hibernation sites in a favourable condition, according to statutory guidance. Prevent the buildings which host maternity roosts from deteriorating and avoid physical disturbance and lighting. Avoid disturbance to hibernating bats by preventing access to caves and mines where they are found and repairing and replacing damaged fencing or grills when necessary. These bats forage in woodland, therefore, ensure there is tree cover and woodland adjacent to maternity roosts. Within at least a 3km radius of known maternity roosts, create and maintain a foraging landscape of grazed permanent pasture and ancient and semi-natural woodland, linked with an abundance of continuous, tall, bushy hedgerows. Refer to the requirements of the Natural England supplementary advice for the Wye Valley and Forest of Dean Bat Sites SAC.	009. Manage ancient semi-natural woodland, semi-natural woodland and broadleaved woodland 010. Expand and buffer ancient semi-natural woodland, semi-natural woodland and broadleaved woodland 030. Create wildlife corridor connectivity 034. Safeguard and establish ancient and veteran trees 053. Hedgerows 054. Protecting tree growth 065. Dark skies 107. Dead wood	

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078	**Measure 078: Strengthen Western barbastelle population.** Protect, maintain and increase the population of Western barbastelle, a rare bat species found in scattered locations in Gloucestershire.	Maintain all known Western barbastelle bat maternity roosts and hibernation sites in a favourable condition, according to statutory guidance. Safeguard foraging habitat around Western barbastelle bat maternity and hibernation sites by maintaining connectivity of hedgerows, tree lines and vegetated waterways between woodland roosts and foraging grounds of riparian vegetation, unimproved grassland, marsh, wetland habitats or coastal grassland within a 7km radius of known maternity roosts. Within ancient woodland, a broad range of tree age classes, including ancient and veteran trees should be promoted. This should also include at least 4 standing large girth dead or dying trees per hectare, where it is safe to do so, to provide Western barbastelles with splits and cavities within which to roost. Veteranisation of trees within 7km range of Western barbastelle roosts should be considered. Implement measures to limit the loss of structure and understorey, as a result of over-browsing by deer, heavy thinning, or intensive coppicing. Install bat boxes where there is suitable foraging habitat.	009. Manage ancient semi-natural woodland, semi-natural woodland and broadleaved woodland 010. Expand and buffer ancient semi-natural woodland, semi-natural woodland and broadleaved woodland 030. Create wildlife corridor connectivity 034. Safeguard and establish ancient and veteran trees 053. Hedgerows 054. Protecting tree growth 065. Dark skies 107. Dead wood	
079	**Measure 079: Strengthen serotine population.** Protect, maintain and increase the population of serotine bats, which are moving north and west into Gloucestershire due to climate change.	Maintain all known serotine bat maternity roosts and hibernation sites in a favourable condition, according to statutory guidance. Prevent buildings which host maternity roosts from deteriorating and avoid physical disturbance and lighting. To support foraging, enhance, extend and create a landscape of wood pasture and parkland, with pasture preferably grazed by cattle, and ancient woodland, linked with an abundance of tall, bushy hedgerows. Do not use avermectin-based veterinary products on	009. Manage ancient semi-natural woodland, semi-natural woodland and broadleaved woodland 010. Expand and buffer ancient semi-natural woodland, semi-	

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		livestock, and restrict the use of pesticides, insecticides and herbicides, so that livestock dung can provide habitat for beetles and flies upon which the bats feed.	natural woodland and broadleaved woodland 030. Create wildlife corridor connectivity 053. Hedgerows 065. Dark skies	
080	**Measure 080: Strengthen soprano pipistrelle population.** Protect, maintain and increase the population of soprano pipistrelle bats, which are often associated with lakes, wetlands and watercourses for foraging.	Maintain all known soprano pipistrelle bat maternity roosts in buildings and hibernation sites in a favourable condition, according to statutory guidance. Prevent buildings hosting roosts from deteriorating. Consider installing bat boxes within suitable riparian corridors to provide alternative roosting sites and improve resilience. Avoid physical disturbance and lighting. Maternity roosts of soprano pipistrelle are strongly associated with open waterbodies, often over 0.8 hectares in area. Maintain and enhance emergent vegetation and fringing riparian woodland around open water bodies**.** Ensure clean water enters lake and millpond catchments. Create shallow berms and banks in restored former gravel pits. Ensure there is undisturbed connectivity between the foraging grounds and potential roost sites, provided by wooded vegetation including hedgerows, linked trees and scrub. Provide opportunities for roosting Soprano pipistrelle around gravel pit lakes by providing bat boxes or pole mounted bat boxes where trees and buildings are not available.	009. Manage ancient semi-natural woodland, semi-natural woodland and broadleaved woodland 010. Expand and buffer ancient semi-natural woodland, semi-natural woodland and broadleaved woodland 030. Create wildlife corridor connectivity 053. Hedgerows 065. Dark skies	

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081	**Measure 081: Beaver reintroduction and habitat creation.** Create favourable habitat next to watercourses in anticipation of arrival of beaver populations and to facilitate beaver releases.	Encourage and enable beavers to settle, remain and increase in abundance to provide ecological functionality through naturalisation of stream channels, connection to floodplains and creation of diverse wetland habitats. Facilitate colonisation in socially and ecologically appropriate areas by planting favoured broadleaved species, including willow and aspen, in the riparian zone. Allow a wooded buffer of 20m between water's edge and adjacent land use to minimise conflict and improve foraging and burrowing opportunities. Consider installing 'beaver dam analogues' to impound water in strategic locations. If necessary, when and where beavers are present, protect individual trees of value using sand paint or mesh guarding. Support the set up and functioning of beaver stakeholder and management groups to help maximise benefits for people and nature and to minimise risks to property and infrastructure, potentially including reintroduction of free-living beaver where ecologically and socially feasible. This could be in locations where downstream flood risk alleviation is possible, in well-buffered streams or lakes with a riparian mosaic of trees, shrubs and soft vegetation, and where there is low risk of land-use conflict.	020. River re-naturalisation	
082	**Measure 082: Strengthen adder population.** Protect, maintain and increase populations of adder. This is particularly important as Gloucestershire is one of the few	Where adders have been identified, limit disturbance, particularly by discouraging disturbance by dogs and machinery. To retain and attract adders, ensure there is a mix of grassland or bare/rocky habitat for basking on south facing slopes, and mosaic scrub habitat and hedgerows for shelter. Maintain or introduce corridors of vegetation cover such as rough grass, hedgerows or scrub, to aid adders movement within. Adder	040: Reduce impacts from dogs	

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	remaining areas for adders in the Midlands.	hibernacula are usually underground in burrows, or in crevices in dry stone walls and log or brash piles.		
083	**Measure 083: Strengthen great crested newt population.** Protect, maintain and increase populations of great crested newt, to support recovery following historic declines in abundance and distribution.	Protect ponds with an existing great crested newt population and manage these ponds sensitively, including reducing disturbance from people and dogs and preventing eutrophication. Create new fish-free freshwater ponds relatively close to existing ponds with newts. Ensure there is a variety of habitats close to ponds for cover and dry shelter, including hedgerows, rough vegetation, dead wood, dry stone walls, woodland or grassland. Eliminate or minimise fertiliser, herbicide and pesticide use around ponds.	018. Manage, improve and create ponds for wildlife 030. Create wildlife corridor connectivity 038. Water quality 040: Reduce impacts from dogs 046. Reduce pollution from agricultural inputs 069. Highway amphibian protection	
084	**Measure 084: Strengthen white clawed crayfish population.** Retain and expand existing white clawed crayfish habitats and populations through translocations and establishment of Ark sites.	Where populations are known to exist, monitor for signal crayfish. Identify ark sites through assessing habitat suitability, ensuring signal crayfish and crayfish plague are not present. Favourable sites may include isolated areas with less connectivity, such as spring-fed ponds higher up the catchment, including creation of new ponds (as these are less likely to be impacted by crayfish plague).	041. Remove invasive non-native species	
085	**Measure 085: Strengthen scarce blue-tailed damselfly population.** Support the survival of the scarce blue-tailed damselfly that needs shallow water and bare or disturbed ground.	Retain colonies of scarce blue tailed damselfly, as its small-scale habitat requirements can be difficult to maintain. Scarce blue tailed damselfly require small, shallow, warm pools and puddles with some emergent plants and bare ground. Sites should be maintained at early successional stage. Create new ponds close to existing sites.		

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086	**Measure 086: Strengthen violet click beetle population.** Support the survival of the violet click beetle and encourage its spread and that of other click beetles into Gloucestershire from Bredon Hill in Worcestershire, one of only three population sites in the UK.	Increase habitat for violet click beetle through tree veteranisation techniques and beetle boxes in vicinity of Bredon Hill. Protect veteran ash and beech trees and leave as much of ash trunks and wood as is safe when working on infected ash trees. Increase planting of beech and encourage growth and maintenance of existing ash. Adding additional organics (bat droppings, prey remains and corpses) at base of newly excavated tree hollows will create the necessary conditions for black wood mould to thrive, which is beneficial for beetle species such as violet click beetle. Beetle boxes can be installed to mimic cavities in areas where they are naturally sparse.	034. Safeguard and establish ancient and veteran trees 036. Ash dieback response 107. Dead wood 108. Veteran ash pollards	
087	**Measure 087: Strengthen rugged oil beetle population.** Protect, maintain and increase populations of rugged oil beetle, which is scarce and needs specific grassland management on calcareous grassland sites.	On calcareous grassland sites, maintain a mosaic of shorter turf, bare soil and longer swards and tussocks through conservation grazing in the autumn and winter, ensuring open grass swards by removing or reducing livestock during the spring and summer. Areas of bare earth or scrapes in sheltered, sunny spots will provide nesting opportunities for solitary bees, which are hosts for rugged oil beetle larvae, and for adult rugged oil beetles. Leave some areas uncut or ungrazed each year on rotation.	001. Manage lowland calcareous grassland 052. Conservation grazing	
088	**Measure 088: Strengthen hairy click beetle population.** Hairy click beetles need reed canary-grass and common reed vegetation on river banks with brackish influence.	Ensure the riparian vegetation (herb rank as well as reed) is not cut before July, to ensure appropriate habitat is present when adult beetles emerge. Depending on the size and height of the bank, an earlier 'safety cut' of the top of bank and around a flail width down the bank can be undertaken to ensure the bank top and sides are visible. Avoid disturbance of the top spoil without appropriate mitigation measures in place. In addition to habitat management and creation, consider translocations and reintroductions to new sites from captive rearing and breeding.		

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089	**Measure 089: Strengthen large blue population.** Support the continued reintroduction and re-establishment of large blues in Gloucestershire.	On calcareous grassland sites, maintain a short sward through targeted conservation grazing to promote a warm microclimate for red ant *Myrmica sabuleti* to act as host for butterfly larvae. Retain some sheltered scrub areas for roosting adult butterflies. Ensure wild thyme and marjoram is available as food plants, with plug planting of local provenance in the autumn if necessary. Continue reintroductions of large blues on suitable sites, working with the Royal Entomological Society large blue programme and other stakeholders.	001. Manage lowland calcareous grassland 052. Conservation grazing	
090	**Measure 090: Strengthen Duke of Burgundy population.** Protect, maintain and increase populations of the duke of burgundy butterfly which has declined by over 50% in recent decades.	In calcareous grassland habitats, maintain a mosaic of open, sunny grassland with abundant cowslips, primroses or false oxlips in medium height swards, with scrub edges or patches comprising up to 20% of the grassland area. Utilise north or west-facing slopes for more humid conditions. Maintain taller vegetation for breeding butterflies and shorter vegetation to ensure continuity of cowslip and primrose food plants. Maintain habitat through extensive winter conservation grazing with cattle and regular scrub management to create a mosaic of different aged but predominantly young scrub, a varied age of cowslips and to prevent the sward becoming closed in. Avoid sheep grazing in the summer on Duke of Burgundy sites. In woodland clearings and short-rotation coppice, ensure abundant primroses in open, sunny conditions, and control regrowth of scrub, brambles and coarse grasses, removing cut material.	001. Manage lowland calcareous grassland 009. Manage ancient semi-natural woodland, semi-natural woodland and broadleaved woodland 052. Conservation grazing	
091	**Measure 091: Strengthen wood white population.** Protect, maintain and increase populations of wood white butterfly, as key national	Maintain open sunny rides with lightly shaded grass margins in woodland, and sunny but sheltered habitat in hedgerows and mosaic habitats, with abundant vetches as foodplants. Cutting of clearings and rides at any time of year is very likely to affect or destroy some butterfly life stages so it is		

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	populations are present in the Forest of Dean, Wye Valley and Stroud district areas of Gloucestershire.	important to only cut part of the verge in any one year and to monitor the impact.		
092	**Measure 092: Strengthen lead belle population.** Support populations of lead belle moth that rely on gorse, with the population at Cleeve Common being one of a small number south east of the Tees-Exe line.	Ensure food plants of gorse, broom, petty whin and Dyer's greenweed are available to support populations of Lead Belle moth. Manage gorse in a sensitive way, with long-term rotational cutting.		
093	**Measure 093: Strengthen *Phyllonorycter sagitella* population.** Support the survival of the *Phyllonorycter sagitella* moth which is rare in Gloucestershire and the UK.	Maintain and increase extent of coppiced aspen in Highnam Woods, ensuring a mix of trees of different ages, as foodplant for *Phyllonorycter sagitella* moth.		
094	**Measure 094: Maintain chalk carpet population.** Support the survival of the chalk carpet moth which is rare in the UK and found at Cleeve Common.	In the area of former quarries in the east part of Cleeve Common, maintain a mosaic of varied vegetation structure, with patches of bare ground and areas of short turf and controlled scrub, and availability of foodplants of trefoils, clovers and vetches.		
095	**Measure 095: Strengthen *Lauria sempronii* snail population.** Protect the *Lauria sempronii* snail that is	Protect dry stone walls where *Lauria sempronii* is recorded by not excessively removing foliage and not removing stones, and by preventing encroachment by a thick cover of ivy. If possible, extend known sites with dry stone walls with cracks and fissures or loose rocks.		

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	found in the UK only within Gloucestershire.			
096	**Measure 096: Strengthen juniper population.** Support the survival of juniper which is rare and characteristic in the Cotswolds and is facing significant decline across lowland Britain.	Protect and encourage juniper where it is present through management of scrub to avoid encroachment or shading of juniper bushes, and deer and rabbit control to prevent over browsing. Introduce juniper to new sites to assist migration of this tree species northwards due to climate change, and to increase its extent. Juniper seeds require bare subsoil to germinate, often with rubble and bedrock exposed and little topsoil present, followed by a long period without disturbance to enable the seedlings to grow. Juniper scrapes are a proven technique to support germination and specialist advice should be sought in creating them. Seed shelters can be used to prevent seeds and seedlings from being eaten.		
097	**Measure 097: Strengthen black poplar population.** Protect, maintain and increase the population of rare and characteristic black poplar trees in Gloucestershire.	Ensure existing black poplar trees are protected. Seek opportunities for new planting within the floodplain and near rivers and wetlands, either through propagation from cuttings or by working with black poplar breeding programmes, ensuring that native black poplars are planted, not hybrid cultivars. Plant black poplar in male and female pairs to help improve the genetic stock.		
	12. Species Measures - Groups			
098	**Measure 098: Individual species needs of farmland birds.** Increase, expand and re-establish populations of rare and threatened farmland birds including corn bunting, grey	Within fields, field margins and hedges, provide plants and habitats that meet the nesting and feeding needs of both adult farmland birds (predominantly seed) and chicks (predominantly invertebrates), within the same location. Nearly all species will benefit from the creation of invertebrate and seed rich habitat such as tussocky grass field margins and	040: Reduce impacts from dogs 051. Field margins 053. Hedgerows	

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	partridge, lapwing, linnet, skylark, tree sparrow, turtle dove, woodlark and yellowhammer.	wildflower margins or plots, and of winter supplementary feeding to overcome the hungry gap in later winter. Add over-winter stubbles for winter feeding and roosting. In addition to this, different species have specific needs: **Corn bunting** - Corn bunting require open habitats so planting trees or tall hedgerows in corn bunting strongholds should be avoided, however occasional small trees and shrubs for song-posts are beneficial. They benefit from dense patches of double-drilled cereal crop to nest in. These areas should be sited away from field margins and tramlines used by predators and left unharvested, or harvested very late (June onwards) to avoid impacting nests, as corn bunting are late nesters. Ideally these measures should be sited within their favoured crop of spring barley. Corn buntings prefer barley seed for winter feeding. **Grey partridge** - Grey partridge particularly benefit from the creation of tussocky margins alongside dense hedgerows and in-field beetle banks, as well as protection from predation. **Lapwing** - Lapwing nest in both wetland sites and the farmed landscape. On farmland, lapwing tend to nest on open arable adjacent to damp pasture on which they can feed their chicks once they've hatched. Spring-sown crops are suitable but autumn-sown cereal will be too tall by the spring, so lapwing plots (large in-field bare areas) can be created in autumn-sown cereals to create suitable nesting areas. Lapwing plots are ideally situated in fields next to damp pasture or wetland sites. Lapwing are very susceptible to nest destruction and so working with landowners	099. Add food sources for ground-nesting adult farmland birds 100. Add food sources for ground-nesting farmland bird chicks 101. Add food sources for hedge-nesting adult farmland birds 102. Add food sources for hedge-nesting farmland bird chicks	

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
		to locate nests within crops in April and protect them from agricultural operations can significantly help survival. Protection from predators through electric fencing or predator control is also beneficial to both farmland and wetland nesting lapwing. Lapwing require open habitats, so planting trees or hedgerows in lapwing strongholds should be avoided. **Skylark** - Skylark require open habitats, so planting trees or tall hedgerows in skylark strongholds should be avoided. Skylark have been shown to benefit from the creation of skylark plots (small, in-field, bare areas) to feed in and access nests. These should be sited away from field margins and tramlines used by predators. Skylark strongly favour over-winter stubble fields outside the breeding season. **Tree sparrow** – Tree sparrows respond well to the provision of nest boxes in colonies, and have been shown to do well if they have access to ponds and wet areas that boost invertebrate numbers. This will help re-establish tree sparrow populations. Tree sparrow prefer millet for winter feeding. **Turtle dove** – Turtle dove particularly benefit from bespoke food plant seed mixes, access to ponds and wet areas, creation of dense scrub, thick and tall hedges, and edge scrub habitat with seed-rich herbs. This will help re-establish turtle dove populations. **Woodlark** - Woodlark occasionally nest on farmland in the Cotswolds. They require bare stony areas to nest and forage and can benefit from lapwing-style plots (large, bare, in-field areas), located close to field or woodland edge, in areas where they are known to be present. They are a		

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		Schedule 1 protected species and so no field operations should be carried out in fields where they are suspected to be nesting from March to July. **Yellowhammer** – Yellowhammer require dense hedgerows with adjacent tussocky margins to provide safe nesting sites protected from predation and agricultural operations.		
099	**Measure 099: Add food sources for ground-nesting adult farmland birds.** Adult farmland birds (other than lapwing) tend to feed predominantly on seeds throughout the year.	Options for food sources include arable weed seeds, wildflower seeds, split seed from cereal crops and supplementary winter food. Encourage a diversity in food sources by sowing cover crops, limiting herbicide use to ensure presence of arable weeds, and by providing supplementary food.	098. Individual species needs of farmland birds	
100	**Measure 100: Add food sources for ground-nesting farmland bird chicks.** Farmland bird chicks feed almost exclusively on invertebrates.	Options for food sources include insects, spiders, larvae and worms. Invertebrate abundance can be boosted by creating – wildflower or tussocky field margins, beetle banks or other buffer strips, or other areas of rough grassland.	098. Individual species needs of farmland birds	
101	**Measure 101: Add food sources for hedge-nesting adult farmland birds.** Adult farmland birds tend to feed predominantly on seeds throughout the year. Hedges or scrub, ideally with adjacent field margins, are needed for nesting.	Options for food sources include arable weed seeds, wildflower seeds, split seed from cereal crops and supplementary winter food. Encourage a diversity in food sources by sowing cover crops, limiting herbicide use to ensure presence of arable weeds, and by providing supplementary food.	098. Individual species needs of farmland birds	

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
102	**Measure 102: Add food sources for hedge-nesting farmland bird chicks.** Farmland bird chicks feed almost exclusively on invertebrates. Hedges or scrub, ideally with adjacent field margins, are needed for nesting.	Options for food sources include insects, spiders, larvae and worms – which can be found in field margins, beetle banks or other buffer strips, wildflower margins or plots or other areas of rough grassland.	098. Individual species needs of farmland birds	
103	**Measure 103: Pearl-bordered fritillary and small pearl-bordered fritillary.** Protect, maintain and increase populations of the pearl-bordered and small pearl-bordered fritillary butterflies.	Pearl-bordered fritillary needs violets amongst dead leaf litter (usually oak, bramble or bracken) with live green grass for warmth, within coppice, clearfells and young plantations. Small pearl-bordered fritillary needs extensive violet flushes along bracken edges or amongst short grass cover, usually in long-term woodland clearings. Woodland clearings, glades and rides should therefore be maintained within their colonisation range, including through rotational coppicing and felling, to enable a continuity of habitat as clearings become more shaded and less suitable as the coppice regrows.		
104	**Measure 104: Butterflies and moths with specific food plants on grassland.** Protect, maintain and increase populations of butterflies and moths with specific food plants, including Pearl-bordered Fritillary, Small Blue, Dingy Skipper, Marsh	Maintain and increase extent of specific food plants, by planting plugs and seeds, to help butterflies and moths in open grassland habitats: Pearl-bordered Fritillary - Common Dog Violet and Marsh Violet Small Blue - Kidney Vetch Adonis Blue - Horseshoe Vetch Dingy Skipper - Common Bird's-foot-trefoil and Horseshoe Vetch		

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	Fritillary, Liquorice Piercer, Chalk Hill Blue, Grizzled Skipper, and *Agonopterix atomella*, as many of these species are highly localised and several have declined with a marked contraction of their range.	Marsh Fritillary - Devil's-bit Scabious Liquorice Piercer - Wild Liquorice Chalk Hill Blue - Horseshoe Vetch Grizzled Skipper - A variety of plants from the Rosaceae family *Agonopterix atomella* - Dyer's Greenweed		
105	**Measure 105: Butterflies and moths with specific food plants in woodland.** Protect, maintain and increase populations of butterflies and moths with specific food plants, including Pearl-bordered Fritillary, Small Pearl-bordered Fritillary, Liquorice Piercer, Barberry Carpet, Plumed Prominent, Grizzled Skipper, White-letter Hairstreak, White-barred Clearwing, Barred Tooth-striped, and *Caryocolum kroesmanniella*, as many of these species are highly localised and several have declined with a marked contraction of their range.	Maintain and increase extent of specific food plants, by planting plugs and seeds, to help butterflies and moths in woodland, hedgerow and woodland edge habitats: Pearl-bordered Fritillary - Common Dog Violet Small Pearl-bordered Fritillary - Common Dog-violet and Marsh Violet Liquorice Piercer - Wild Liquorice Barberry Carpet - Common Barberry (not a cultivar) Plumed Prominent - Field maple and Sycamore Grizzled Skipper - A variety of plants from the Rosaceae family White-letter Hairstreak - Elm species White-barred Clearwing - Alder Barred Tooth-striped - Wild Privet *Caryocolum kroesmanniella* - Greater Stitchwort and Bog Stitchwort		

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106	**Measure 106: Rare arable plants and soil fauna, flora and fungi.** Leave areas unsprayed and annually cultivate to support arable wildflowers and soil fungi, particularly in areas where important species are present.	Manage arable fields and their margins with important populations of arable flowers present for those species. Shallow till margins around fields. Cultivate both autumn and spring germinating arable plant species.	047. Soil health and regenerative farming 051. Field margins	
107	**Measure 107: Dead wood.** Ensure the dead wood conditions that invertebrates and fungi need for food, shelter or survival are created and managed.	Retain standing and fallen deadwood where safe to do so. Create additional dead wood resource through tree veteranisation techniques, aiming for microhabitats including large diameter hollowing trees, decaying wood, rot holes, ageing bark and fallen but regenerating trees. Create brash and log piles, including partially buried log piles, to benefit some saprophytic beetles and fungi.	034. Safeguard and establish ancient and veteran trees 036. Ash dieback response 108. Veteran ash pollards	
108	**Measure 108: Veteran ash pollards.** Take action to mitigate the effect of the loss of ash trees on the most vulnerable species that rely on ash, such as lichens, fungi, and dead-wood species, especially click beetles.	Conserve existing ash pollards as long as possible, where safe to do so. To help mitigate the eventual loss of these pollards, with expert advice, consider pollarding nearby younger ash trees. Avoid coppicing, re-pollarding out-of-cycle pollards or tree surgery on veteran ash.	034. Safeguard and establish ancient and veteran trees 036. Ash dieback response 086. Strengthen violet click beetle population 107. Dead wood	
109	**Measure 109: Fly orchid and white helleborine.** Where fly orchid and white helleborine occur in beech woodland, they need open or bare	This open ground cover at the woodland edge can be achieved by targeted and rotational scrub removal, strimming or conservation grazing.		

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	ground cover, relatively free of brambles, at the woodland edge.			
110	**Measure 110: Wye Valley bryophytes and distinctive species.** Protect rare ferns, bryophytes, hieracium species, whitebeams, service trees and other distinctive Wye Valley species from disturbance including land management operations and recreational pressure, including rock-climbing.	Maintain some open disturbed areas on thin soils and screes to benefit rare bryophytes and ferns. Ensure that bryophytes that require very open habitats on thin soils such as quarry areas, have these areas kept open. This may require the maintenance of a short turf assisted by a degree of trampling and grazing, for example by rabbits or sheep. Consider micro-management for individual endangered species where present. Notable whitebeam species in the Wye Valley include English whitebeam, round-leaved whitebeam and grey-leaved whitebeam.		
111	**Measure 111: Moths dependent on Small- and Large-leaved Lime.** Protect and maintain long continuity Large-leaved and Small-leaved Lime woodland characteristic of Wye Valley and the invertebrate species dependent on these.	Maintain and increase extent of Large-leaved Lime and Small-leaved Lime in the Wye Valley, by planting plugs both within the existing woods and adjoining areas.		
112	**Measure 112: Strengthen Severn Estuary and Floodplain waterbird populations.** Maintain and improve the capacity of the Severn estuary and surrounding land to support waterbirds and waders, including Bewick's swan, wigeon, teal, pintail,	Maintain and increase floodplain meadow, wetland, pasture and open water habitat in the Severn and Avon Vales, and field margins and stubble in arable fields, for favourable conditions for feeding and roost sites for wintering and migrating birds. Maintain and increase floodplain meadow habitat for nesting sites for waders including lapwing, curlew, redshank, oystercatcher and avocet. Protect their nests from predators, by installing electric fences around fields where they are nesting, and monitor nests.	005. Manage floodplain meadows 028. Protect and manage saltmarsh and mudflats 029. Restore and create saltmarsh 037. Floodplain reconnection	

Number	Potential Measure	Potential Measure Additional Detail	Other measures that apply in relation to and alongside this potential measure	Wider Environmental Benefits
	ringed plover, dunlin, shelduck, lapwing, curlew, redshank, oystercatcher, avocet and little ringed plover.	Protect wintering waterbirds from first arrivals in June to last departures in April by reducing disturbance along the foreshore of the Severn Estuary SPA. The disturbance is caused by a wide range of activities. Examples include ramblers, dog-walkers, wildfowlers, clay pigeon shooting, sailing boats, jet-skis and low flying helicopters.	071. Strengthen breeding curlew population	
113	**Measure 113: Strengthen River Severn fish populations.** Maintain, enhance and expand access to fish spawning habitats.	Ensure no significant deterioration in the available spawning substrate for Atlantic salmon, trout, shad and lamprey species in the main River Severn and flagship programme areas identified by the Severn Vale Catchment Partnership. Ensure that abstraction pressure is carefully managed and causes no significant deterioration in river flows on the River Severn and tributaries. Enhance resilience to extreme high and low flows through catchment-wide actions to naturally slow the flow of water, conserving lamprey and elver habitats and reducing the need for de-silting of channels by dredging. Ensure a diversity of in-river habitat and vegetation cover throughout Gloucestershire, to maintain cool rivers in summer and provide varying habitats that can support thriving populations of coarse fish, salmonids and eels. Where feasible, improve the potential for eel movement through removing river barriers and estuarine and floodplain habitat improvements.	020. River re-naturalisation 021. Remove in-stream barriers 022. Improve ecological condition of rivers 037. Floodplain reconnection 038. Water quality 039. Sewage and wastewater 042. Severn Estuary marine biosecurity 044. Limit groundwater abstraction and surface flow abstraction 046. Reduce pollution from agricultural inputs 055. Riparian tree planting 056. Riparian buffer strips 061. Canals, rivers and urban blue spaces	