West Lothian

Biodiversity Action Plan

2025-35

West Lothian Biodiversity Action Plan 2025-35

SECTION A - INTRODUCTION

What is Biodiversity and what does it do?

'Biodiversity' means the variety of life on Earth, which includes all plants, animals, fungi, micro-organisms (e.g. bacteria and viruses) and it includes the genetic diversity between organisms of the same species. Each of these species and organisms work together at different scales - from communities to habitats and larger ecosystems - to maintain balance and to support life. In turn, these ecosystems are essential for providing us with clean air, clean water, food, fuel, medicines, building materials and other vital products and services.

As humans put increasing pressure on the environment, using and consuming more resources, and expelling 'waste' products such as carbon dioxide and pollutants, we are upsetting the balance of ecosystems, losing biodiversity and becoming more and more vulnerable to stressors, such as dwindling food/resources and disease, which are made worse by climate change.

The Current State of Nature

Globally, biodiversity has declined substantially in the last 50 years, and in Scotland 1 in 9 (11%) species are currently threatened with extinction. The PREDICTS (Projecting Responses of Ecological Diversity In Changing Terrestrial Systems) team at the Natural History Museum has calculated a global Biodiversity Intactness Index (BII) to assess each country's biodiversity, and how it's responding to human pressures such as land use change and intensification. A BII of 90% or more means the area has enough biodiversity to be a resilient and functioning ecosystem. Under 90%, further biodiversity loss means ecosystems may function less well and less reliably. If the BII is 30% or less, the country's biodiversity has been depleted and the ecosystem could be at risk of collapse. The UK as a whole has a BII of 53%, which is in the bottom 10 percent globally.

This susceptibility to ecosystem collapse is recognised at a global scale, with regular United Nations meetings aiming to address issues and agree actions and targets at an international level (Conference of the Parties or COP). These agreed actions are taken on by participating nations, who develop their own legislation, policies, strategies and targets to ensure that action is taken at a national scale. These new international agreements and subsequent national policies have regard to the quality and size of protected areas, connectivity between valuable habitats through nature networks, species protection, habitat protection and investment in nature.

Drivers of Biodiversity Loss

The IPBES identified five *direct* drivers of biodiversity loss: 1) The way we use land and sea; 2) Direct exploitation of organisms for food and materials; 3) Climate change; 4) Pollution; 5) Invasive non-native species. Additionally, two *indirect* drivers of loss were identified (underlying causes of the direct drivers). These are: people's disconnect with nature and a lack of recognition for the value and importance of nature. Both direct and indirect drivers must be addressed in order to reverse and restore biodiversity around the globe.

Biodiversity and Climate Change

Biodiversity and Climate Change

As mentioned above, climate change is already having an effect on global biodiversity – exacerbating human-induced biodiversity damage and loss; but nature also plays a key role in helping us to reduce our carbon emissions and build resilient communities that can adapt to climate change.

Habitats can store carbon in the long-term, absorbing it from the atmosphere and locking it away within their structure. Peat bogs are one such system - when intact and in good condition, and actively forming peat, they are valuable carbon sinks, which can lock atmospheric carbon away for millennia. However, they do need to be managed

appropriately, which means keeping them wet and disturbing them as little as possible. Mature woodlands can also act as carbon sinks - trees and woodland plants effectively absorb carbon from the atmosphere year on year (sequestration) whilst they are living, and store it up within their structures.

Natural systems can help us adapt to Climate Change by helping us to manage water, microclimates and human health– these are often called 'nature-based solutions'. For example, street trees in urban areas can provide shade and reduce the amount of heat reflected/absorbed by concrete and tar (the urban heat island effect), which can in turn improve the health and wellbeing of people living and working in urban centres; restored bogs can hold surface water back from rivers in times of excess rainfall; living roofs and raingardens in urban areas can delay the passage of excess rain into drainage systems, reducing the pressure on our grey infrastructure; and well connected habitats can provide corridors for animals and plants to move to more favourable areas as the climate changes.

The council recognises the inherent value of nature, and also its role in helping to realise our climate emissions and adaptation targets.

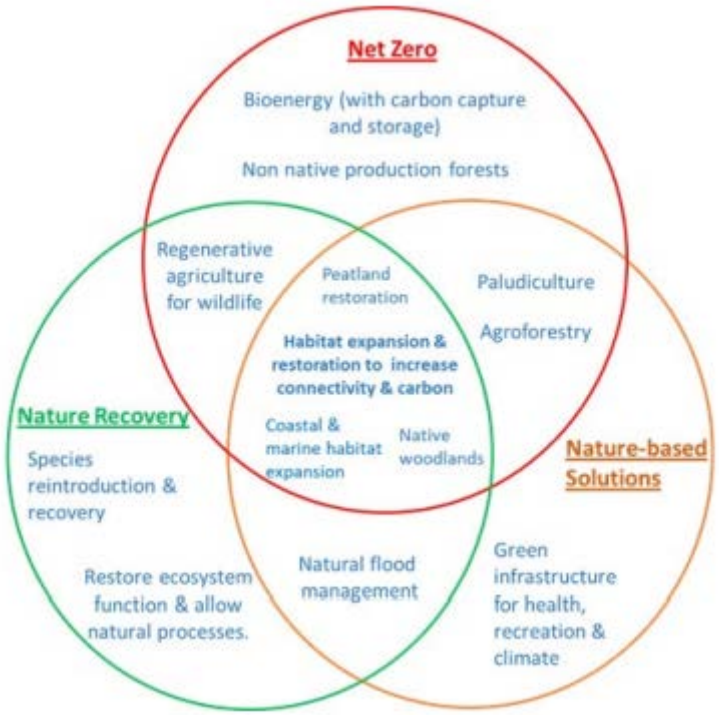


FIG X Example of relationships between biodiversity and nature-based solutions, nature recovery and net zero (ref x)

Ref x: R Gregg, J. L. Elias, I Alonso, I.E. Crosher and P Muto and M.D. Morecroft (2021) Carbon storage and sequestration by habitat: a review of the evidence (second edition) Natural England Research Report NERR094. Natural England, York.

West Lothian BAP Purpose

Through this plan, we will deliver local action to combat biodiversity loss and mitigate climate change, focussing effort and resources in the most effective way to meet legislative requirements and nationally important goals for conservation, communication and education as they relate to biodiversity. This plan also aims to ensure that local stakeholders continue to have input into a cohesive overarching plan to guide how we will collectively tackle biodiversity loss, and act to protect and enhance our shared resource.

Input from local landowners, managers and supporting organisations has identified local priorities, and how we can best support each other to protect, connect and enhance biodiversity across West Lothian.

The plan aims to enable us to halt the loss of biodiversity in WL (by 2030) by identifying key habitats and species that require protection and restoration; setting plans to restore habitats; linking up with climate change actions – mitigation and adaptation; and working strategically to ensure that everybody across West Lothian benefits from the services that nature provides.

The document gives an overview of the current state of nature in West Lothian; sets out a vision as to where we would like to be in 10 years' time; lays out our strategic nature network; gives a guide as to what a biodiverse habitat is; establishes our overall priorities; and lists the actions that will get us to where we want to be.

We envisage that the BAP will be used to help guide grassroots action; to assist in council land management and related policies; to assist other land managers in prioritising and planning their actions to generate changes at scale; to inform planning and development decisions; and to determine a framework for communications and learning about biodiversity. This will ensure that the actions of all groups/ organisations/ development/ individuals dedicated to conservation and the environment are complementing each other and not working in isolation.

SECTION B – PRESENT: WHERE WE ARE NOW

Geodiversity

The geology and landforms of West Lothian remain similar to those in the previous action plan, acting as the fundamental building blocks that affect the structure, soils, drainage and micro-climate of the area. The uplands, moors, river valleys, coastal plain and hills broadly influence the natural vegetation cover and human exploitation and manipulation of the rich geology has added to the varied landscape and created the niche habitats we see today. A detailed report on the geology of West Lothian can be found on the council's Geodiversity web page.

The Lothian and Borders Geo-Conservation Group of the Edinburgh Geological Society has an ongoing programme of monitoring Local Geodiversity Sites in West Lothian and have been involved in raising awareness of illegal fossil collecting at Petershill SSSI.

The Scottish Geology Trust is currently developing a Geosites map which brings together information about over 1000 sites designated as important for geology and geomorphology across Scotland, making it easy for people to connect with their geoheritage and share information about sites.

The West Lothian shale bings are a distinctive and rare type of post-industrial waste, which is unique in Britain; they are also examples of sites of primary succession. Primary sites are only found naturally on sand dunes, glaciers and volcanoes; all of which are very uncommon in Britain. These two factors give the bings great ecological and scientific importance, and they are considered as an ecosystem in their own right in this action plan. For a fuller account of the vegetation on the bings of West Lothian, see Urban Biodiversity: Successes and Challenges: Biodiversity on Bings by Barbra Harvie.

Habitat data

The last habitat survey of West Lothian as a whole took place in 1994 and this was used to inform the previous two Biodiversity Action Plans. To bring us up to date, consultants were employed in 2022/3 to remotely survey and digitally map the whole area using aerial photographs and a variety of national datasets.

All habitats classified as Scottish Biodiversity List habitats (or could potentially be SBL habitats) within WLC landholdings were also surveyed on the ground, excluding areas within Local Biodiversity Sites and Country Parks (for which the council already has information). Outside of WLC landholdings, approx. 10% of West Lothian was

surveyed, from the following broad habitat types: W1 - Broadleaved and yew woodland, G1 - Acid grassland, G3 - Neutral grassland, F2 - Fen, marsh and swamp, H1 - Dwarf shrub heath, F1 – Bog, in order to ascertain whether SBL habitats were present in these areas. This venture has produced a baseline digital habitat map of the whole of West Lothian, to be used for strategic biodiversity planning by the council. This mapping can also be updated with relevant information as we move forward and make changes. A report of this exercise can be found on our Biodiversity Action Plan webpage and a summary of habitats and their area can be viewed in the chart below (Figure xx).

Currently, improved grassland, primarily associated with agriculture, comprises 25% of the region, with arable agricultural land occupying a further 12%. Semi-natural grassland comprises over 15% of the area, and 'active' woodlands take up almost 16% of the area (with recently felled woodland a further 5%). Built-up areas and infrastructure take up 8.6% of the area, with associated areas of amenity grassland comprising 5.2% and private gardens 4.3%.

In comparison, the most common habitat type across WLC landholdings are woodland and tree habitats, as a whole comprising 34%, including 16% of broadleaved woodland. Amenity grassland is the next most common habitat taking up 21%. Semi-natural grassland occupies 6.3% of the areas and improved grassland comprises 8%. There is very little arable land. Built up areas and infrastructure together make up 19%, with council-tenanted residential gardens comprising 5.4%.

The habitats in each polygon of the West Lothian basemap were also assigned distinctiveness, condition and strategic significance scores. Mapping these qualities has also helped us to identify the beginnings of a strategic nature network across the area (see page xxx)

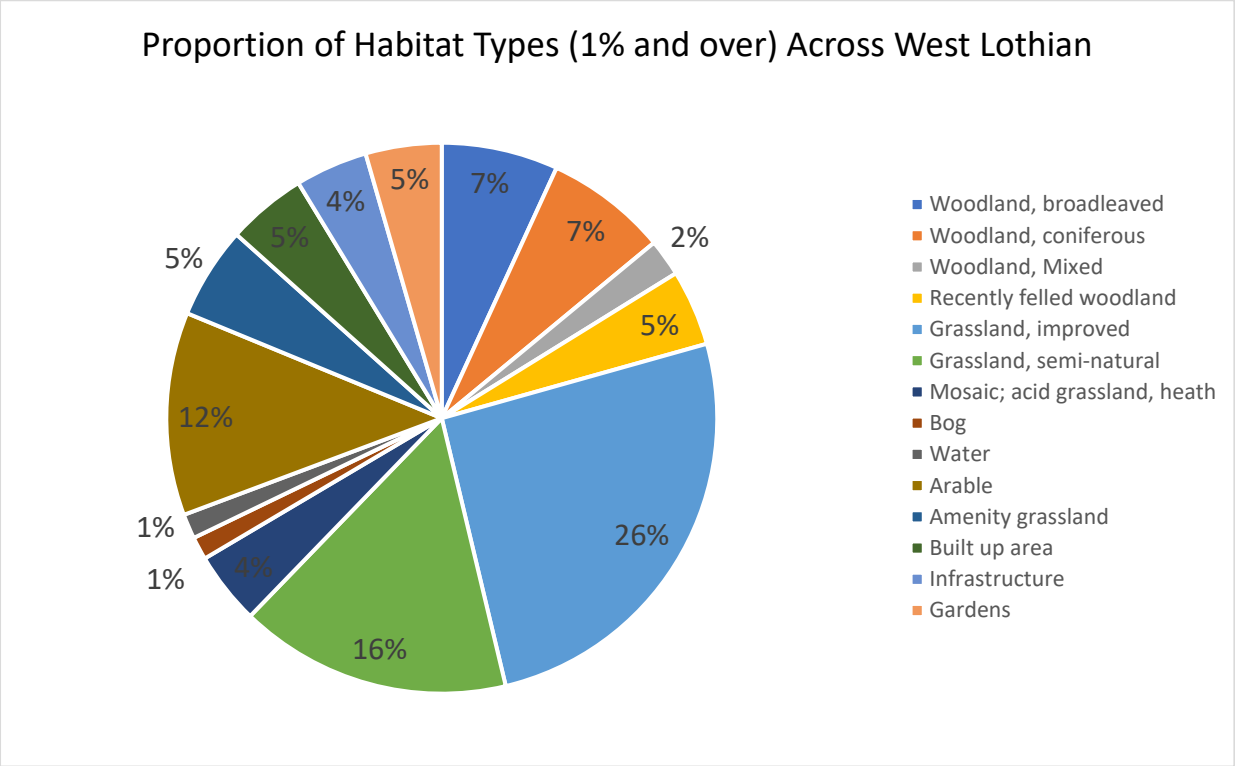
The current Scottish Biodiversity List national priority habitats present in West Lothian (with their UKHab classifications) are:

- Other lowland mixed deciduous woodland (w1f7)
- Lowland meadows (g3a)
- Lowland dry acid grassland (g1a)
- Lowland/upland heathland (h1b5 and h1b6)
- Blanket bog (degraded) (f1a5/6)
- Lowland raised bog (degraded) (f1b5/6)
- Lowland fen (f2a)
- Purple moor grass and rough pasture (f2b)

Other national priority habitats we know are present in West Lothian, but were not picked up in the habitat mapping (either too small/narrow to register, or particular variations couldn't be determined from aerial photos)

- Upland oak woodland (w1a)
- Upland ash woodland (w1b6)
- Upland birch woodland (w1e)
- Lowland calcareous grassland (g2a5?)
- Eutrophic standing waters
- Ponds
- Rivers
- Hedgerows (h2a/b)
- Arable field margins (maybe) (c1a5/6/7)

Figure xx - Proportion of Habitat Types (1% or more) across West Lothian
(Source – WL Baseline Habitat Assessment Report WSP/NCS 2023)



Natural Capital Assessment

Using the newly-created baseline habitat map, eleven ecosystem services were then modelled. These are: carbon storage and sequestration, air purification, noise regulation, local climate (urban heat) regulation, pollination capacity, water flow regulation, water quality (sediment yield and nutrient deposition) regulation, food production, timber production and accessible nature.

For every ecosystem service listed, the capacity of the natural environment to deliver that service – or the current supply – was mapped. These 'heat maps' show us broadly which habitats/areas are currently giving us the most benefit for each function e.g. we can see which areas regulate flood water the best, have the ability to store the most carbon (over the long term), to sequester the most carbon (year on year), etc.

For air purification, noise regulation, local climate regulation and accessible nature it was also possible to map the local demand (the beneficiaries) for these services.

Having a broad overview of which areas are currently performing the best, and having an idea of where demand is highest enables us to plan for the future and provide resilient landscapes for future known and unknown impacts.

In summary:

- For West Lothian as a whole, the presence of large areas of deep peat soils in the blanket bogs and raised bogs in the south and west mean there is a significant carbon stock within the soil of West Lothian, with an average of 153 tC/ha stored across the region. WLC landholdings have a lower average (130 tC/ha) when compared to the region as a whole, mainly due to the abundance of mineral soils over peat.
- Woodland assets are shown as important for the provision of many ecosystem services (carbon sequestration, air quality, local climate and noise regulation, pollination, water flow and quality). These also lie primarily to the south and west of the region. Within WLC landholdings both Beecraigs Country Park and Almondell and Calderwood Country Park were identified as important assets for the provision of many ecosystem services.
- The West Lothian region is identified, on average, to be a source of yearly carbon emissions from the land at a rate of -0.33 tCO2e/ha/yr, primarily due to emissions associated with agriculture and degraded bog

habitats, which are not currently offset by the presence of good condition semi-natural habitats. WLC landholdings, in comparison, sequester carbon at an average across the whole landholding of 2.4 tCO2e/ha/yr, as woodland is common and emissions from farming and degraded peat habitats are much less common on these sites.

- Demand for air purification, noise regulation, local climate regulation and accessible nature is greatest in urban areas close to major roads (e.g. Livingston and Whitburn), as these contain large populations with potentially poor health, that would benefit from pollution amelioration and noise abatement from the main roads.
- WLC landholdings provide higher (better) levels of ecosystem service provision when compared to West Lothian as a whole, for 6 services - carbon sequestration capacity, air purification capacity, noise regulation capacity, pollination capacity, timber production capacity and accessible nature capacity.
- Council landholdings perform worse than the rest of West Lothian for 4 services - carbon storage capacity, local climate regulation capacity, water flow capacity and food production capacity

- The reasons for these differences are that, typically, WLC landholdings contain more woodland, less agriculture, less peat soils and less upland areas than the county average.
- WLC landholdings also have a higher than average demand for these services given their location in urbanised areas of the region.

The final analysis report for all Natural Capital Assessment findings can also be viewed on the council's Biodiversity Action Plan webpage.

Protected Sites

- Statutory (legally) protected sites include 16 Sites of Special Scientific Interest, 1 National Nature Reserve, and 2 Special Areas of Conservation (European designated sites); there is also 1 Local Nature Reserve and a small part of the Pentland Hills Regional Park lies within the West Lothian boundary.
- However, the chief protected sites consist of non-statutory Local Nature Conservation Sites, which are safeguarded through the Local Development Plan. These are called Local Biodiversity Sites and Local Geodiversity Sites. West Lothian currently has approx. 172 Local Biodiversity and Geodiversity Sites.
- Information on all these protected areas can be found on the council's website.
- These protected areas account for 16% of the whole of West Lothian. 51% of West Lothian Council landholdings is protected land.
- It is recognised that other areas, which do not have any current protection, may also play a part in aiding nature conservation and restoration throughout West Lothian. These areas could be sites owned by the council, such as urban parks and greenspaces, or they could be permanent woodlands, some areas of farmland, etc. The technical term for these areas is "Other Effective area-based Conservation Measures" or OECMs.

- MAPS?

Stakeholder feedback

Stakeholders, managing approximately 30% of land in West Lothian, have so far participated in questionnaires and an event to inform this action plan, together with 16 supporting organisations. For detailed stakeholder feedback, please see the reports on our WLBAP webpage.

In summary:

- There is a broad range of people carrying out actions for biodiversity already, either as specific paid work, as voluntary work, or as part of a wider remit
- Many stakeholders are already working in partnership, but there is a will to work together on a broader sale for biodiversity across the area
- Top priorities for landholders are: Managing land / enhancements for biodiversity, also access and recreation, safety issues and engaging with communities.
- Top priorities for supporting organisations are: Habitat restoration/ quality, collaboration/ partnership working, habitat connectivity/ habitat creation, reducing impact of invasive species and humans, and data collection/ monitoring
- 83% of landowning participants are already actively manging land for biodiversity. The habitats being managed are mostly woodlands and species-rich meadows / grassland. There is also some wetland/ water management and a small amount of invasive species control.
- 53% of supporting participants focus on particular habitats in their work – the most widespread being burn or river, then woodland and springs or ponds; followed by hedgerow, bog and semi-natural grassland.
- Approx 57% of participants either manage or help to monitor protected sites across the area.
- 53% of respondents are actively managing / monitoring other areas for biodiversity, including waterways, bogs and bings, and also species that occur across sites including raptors and badgers.
- Biodiversity work is mostly financed through grants or subsidies. Also in-kind support from others, using or redirecting existing budgets/ resources, and some carry out work unfunded / self-funded.
- The most prominent challenges for everyone are: funding/ resources, balancing priorities, limits of land designations, lack of control (tenancies or pollution issues), skills / advice, education / engagement.

Top priorities identified by stakeholders:

% of vote	**Subject**
24%	Working together – networking, overall group/forum, themed working groups, sharing good practice/ case studies, large partnership projects, connecting farmers
17%	Influencing upward – improved grant systems: made simpler, with better guidance and also tying in with planned Nature Networks
11%	Education and awareness-raising – both formal (school, higher education) and informal, including behaviour change and campaigns
9%	Connecting up habitats in networks – hedges, tree-lines/woodlands, water courses; for biodiversity, recreation and climate change mitigation/adaptation
7%	Protected sites – step up protection of existing biodiverse sites and also manage to ensure good condition
7%	Tackle water quality issues – through pollution control, monitoring and partnership working
7%	Support for volunteering – coordination, publicity, sharing knowledge/skills
5%	Monitoring and benchmarking – assessing existing biodiversity across the area for baseline comparison data; monitoring and benchmarking to ensure restoration. Sharing knowledge and skills in how to audit biodiversity, monitor and benchmark

Species information

West Lothian is home to a wide array of species, including protected, priority and notable species. These range from the 8 species (?) of bats found here to raptors such as Kestrel and Barn Owl, to Great Crested Newts and tiny plants, such as the rare Marsh Saxifrage and mosses/ lichens and tiny animals such as craneflies, beetles and moths.

Records of species in the area can be found online at NBN Atlas (the national database) and also from The Wildlife Information Centre (TWIC). Members of the public are encouraged to submit their observations to the national database through the iNaturalist and iRecord apps. Local environment groups are also encouraged to share their findings with TWIC, who share key records with West Lothian Council. Planning applicants are also asked to submit their findings to TWIC and NBN Atlas, if they have carried out Ecology surveys to support their application. This is considered best practice by CIEEM, as it helps us all to collectively catalogue and track the species presence and abundance throughout the area.

The Scottish Government is legally required to produce an up-to-date list of national Priority species and habitats, in the Scottish Biodiversity List. The national priority species which we know are found in West Lothian are listed in Appendix X, together with key species which are known indicators of good habitat health.

Invasive Non-Native Species

In 2021 there were approximately 2,000 non-native species known to live in the wild in Great Britain. Of these species, 10 to 15% are considered 'invasive' and detrimental to our native flora and fauna [Ref x] Invasive Non-Native Species (INNS) as a group are one of the main drivers of biodiversity loss, as they compete with native species and may also spread diseases that weaken native populations that have evolved within native habitats. Eg Squirrel pox is carried by non-native grey squirrels and is fatal to our native red squirrels.

The INNS species we know to be present in West Lothian include: Mink and Signal crayfish found in rivers and burns, Himalayan balsam, Japanese knotweed and Giant hogweed found mainly on riverbanks, Grey squirrel in woodland and urban areas and New Zealand pigmyweed in ponds. We also have one known case of Pond Apple Snail (imported non-native species) in a Beecraigs pond.

The council currently deals with INNS when they are reported. At the time of writing, the council is also working with Forth Rivers Trust (FRT) to map, monitor and control INNS along water courses; FRT is training volunteer groups who use West Lothian's water courses to help control INNS, as we know that many groups already carry out valuable conservation work, including removing INNS, along many stretches of water.

Ref x: The Great Britain Invasive Non-Native Species Strategy (2023 to 2030)

People (behaviours/attitudes/access to nature)

In the summer of 2021, the council carried out an extensive consultation and engagement exercise, through the Community Choices participatory budgeting process, to find out local residents' attitudes to the council's grounds maintenance service and to help prioritise future changes to the service.

In summary:

- In total, the council received 1,208 responses and 849 comments on the grounds maintenance consultation
- The majority of comments were in favour of a more flexible approach to grass cutting; introducing the collection and removal of grass in some high amenity areas whilst leaving grass uncut to grow naturally in some areas of parks and open spaces to improve biodiversity
- Nearly 500 participants said they wanted to see more wildflower meadows and summer bedding areas across West Lothian to improve natural habitats and biodiversity within West Lothian

- In particular were suggestions for the council to introduce planting or wildflowers on the roadside verges on approaches to towns and villages, and on roundabouts to improve their appearance at key locations throughout West Lothian

The council's Ranger Service also leads volunteer groups, guided walks and activities….. approx. numbers participating

Many community groups with an interest in biodiversity or looking after their local environment also exist in West Lothian. The West Lothian Litter pickers have at least 3600 Facebook members, and other groups such as the Linlithgow Angling Club, Skolie Burn SCIO, Little Boghead group, Easter Breich Community Woodland, as well as others and many community garden groups are actively improving their local environments, for people and for wildlife.

SECTION C – FUTURE: WHERE WE WANT TO BE

LBAP Mission: to reverse biodiversity loss and to effectively protect and enhance biodiversity throughout West Lothian.

A long-term vision for 2045:
Despite increased human growth, West Lothian remains a principally green area with substantially reduced habitat fragmentation; planned developments exist within a network of functionally connected and diverse thriving habitats, which contain enough resources to support wildlife and with space for nature to expand, move and adapt as necessary; healthy mosaics of habitat exist right across the area, with protected characteristics and niches, and functional connections ensuring a resilient diversity, at all scales from genetic to habitat. People value their local environment, appreciate the dependency of humans on natural systems and respect wildlife. Everyone has the knowledge and skills to incorporate biodiversity into their decision-making at home, work and school, and to protect and enhance biodiversity through their actions.

General guiding principles

Protect, restore and enhance

Our protected sites characterise the most biodiverse sites in West Lothian. They act as refugia and also sources of diversity, from which species should be able to freely migrate across the network when links are connected. These also signify the sites most able to mitigate and adapt to climate change, as they are the least degraded and hence the most resilient areas.

Outcome:

- We aim for all protected sites to achieve 'favourable' status by 2035 [related to SBS action]

A key element of protecting and recovering species is to know which species are present in an area and how their numbers are faring over time. This indicates levels of species diversity in an area and whether populations are healthy. All species observations therefore need to be recorded and shared with TWIC and NBN Atlas, to help us all plan and coordinate actions that will benefit species across the area. [SBS – Better Biodiversity Data action]

Outcomes:

- Ecologists working in the area submit their species records to TWIC and/or NBN Atlas, as per CIEEM best practice guidelines.
- Local groups and individuals submit species observations to the National database through iRecord, iNaturalist and/or TWIC.
- Long-term monitoring and research on habitats and species, and the dynamics between them, is encouraged and supported

Areas of existing high biodiversity must be protected and areas of significant yet degraded habitat restored. The size of some protected areas may be increased and new protected areas created. The condition of all areas must ensure optimal and resilient ecosystem functions.

Outcomes:

- We aim for 30% of land protected, by area, in West Lothian by 2030 (increase of 14%)
- Protection is provided through Statutory site designations and designations upheld by the Local Development Plan

In order to ensure the survival of species and habitats, everyone in West Lothian must adhere to their legal responsibilities concerning protected species and habitats.

Outcome:

- Wildlife crime is prevented through awareness and the observance of good practice.

Pollution, non-native invasive species and disease/pathogens are key drivers of biodiversity loss. Due to their ability to spread through water and air, their effective management and control can only be carried out by working in partnership with others.

Outcomes:

- We work together to prevent point source and diffuse pollution throughout the area
- Invasive Non-Native Species (INNS) are monitored, removed and their spread is prevented
- INNS and diseases are not spread to other areas, such as woodland, water courses and water bodies, by implementing and promoting biosecurity measures. Awareness is raised of biosecurity measures so that everyone can play their part.

Connect and allow flow

Many species rely on more than one habitat type to complete their life cycle (e.g. newts use ponds for breeding and spend the rest of their time on land, in long grass, scrub or woodland). Patchworks or mosaics of habitats - two or more habitat types – are therefore needed to support a wide array of wildlife to thrive. Mosaics can be provided at different scales – either within one site (e.g. open mosaic habitat) or across the landscape (e.g. a 100ha farm). Harsh edges to habitats may reduce the effective size of the habitat for specialist species. Gradual edges/boundaries between habitats (ecotones) are therefore more preferable. These can also act as habitats in their own right and they can help to guard against habitat fragmentation.

Outcome:

- The creation of gradual transition zones between habitats will be promoted.

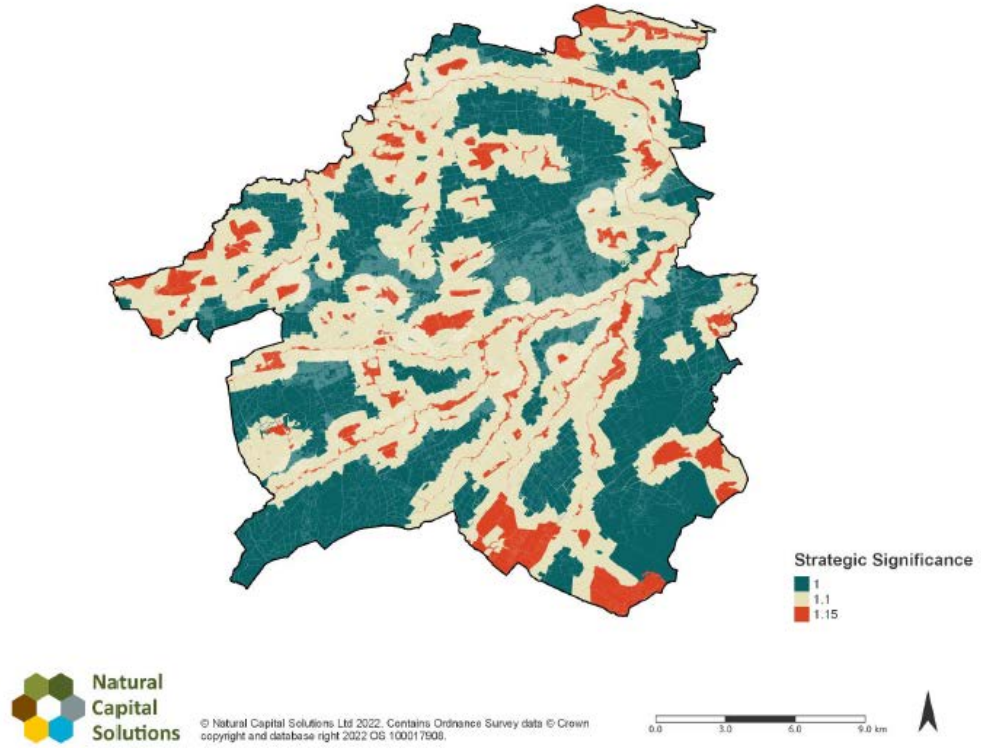
Habitat fragmentation erodes the viability of a habitat to support all the species that have evolved to live within in. Fragmentation can happen when the size of habitats is reduced through gradual habitat loss around the edges or where infrastructure is built through a habitat, dividing it up. Fragmentation is minimised through ecological awareness in master-planning. It can be reversed over time, by joining areas back up if land is still available to do so.

"A Nature Network connects together nature-rich sites, including restoration areas and other environmental projects, through a series of areas of suitable habitat, habitat corridors, and stepping-stones." NatureScot Providing buffers around these core connecting sites cushions the core network from surrounding pressures. These networks offer functional connectivity and habitat creation opportunities. The overall plan is to create a landscape that has an abundance of wildlife.

Outcome:

- Nature Networks in West Lothian will be mapped and strengthened by providing *quality habitats* that are *better connected*. [SBS action]

- We will work in partnership to identify and implement ecologically functional Nature Networks across West Lothian



The map above shows Strategically Significant areas within West Lothian. This was achieved by identifying all protected sites (statutory and non-statutory) – in red, and applying a 500m buffer [ref x] around the sites – in cream. The buffer exists to protect the areas of high biodiversity from external pressures and to allow for graded transitions around the edges of protected areas. 500m is also an approximate average of how far organisms can disperse and therefore indicates how ecologically functional the connections between 'stepping stones' are likely to be (although maximum ranges do vary from species to species).

We will use this Strategic Significance map to create the main Strategic Nature Network throughout West Lothian, to ensure that habitats are connected across the area as a whole and with habitats in adjoining Local Authorities. We will also identify more detailed secondary and tertiary networks, to ensure that wards and settlements have ribbons of greenspace, and opportunities for nature, woven throughout them. This will ensure that all communities benefit from the ecosystem services provided by nature and that all households have access to nature close by.

Some of our habitats may either be within the identified Strategic Nature Network or out with it. If Scottish Biodiversity List 'priority' habitats fall out with the primary strategic Nature Network, they are still a priority for conservation, management and enhancement.

Ref x: 500m buffer comes from **Crick, H. Q. P., Crosher, I. E., Mainstone, C. P., Taylor S. D., Wharton, A., Langford, P., Larwood, J., Lusardi, J., Appleton, D., Brotherton, P. N. M., Duffield, S. J. & Macgregor N. A. (2020)** Nature Networks Evidence Handbook. Natural England Research Report NERR081. Natural England, York.

Outcome:

- Stepping stones may be more preferable for some habitats to connect than physical links on the ground. Where invasive species or disease are prevalent, stepping stones may be used help to prevent / hinder their spread.

Repair human connections with nature

People's disconnect with nature and a lack of recognition for the value and importance of nature are the indirect drivers of habitat loss. In order to address these drivers in West Lothian we need to involve and engage with many different people, from stakeholders such as landowners, community groups, environmental organisations and local businesses to visitors to the countryside, people who engage in leisure pursuits and the general public.

Outcome:

- Engagement opportunities will be offered, such as events, citizen science, volunteering, training, peer to peer learning, Friends groups, focussed campaigns, social media and led activities (e.g. guided walks).

As public knowledge is increased, so is public engagement, and the bar for biodiversity is raised. People are able to share their skills and experience and our understanding is deepened.

SECTION D - OUTCOMES FOR ECOSYSTEMS

Benchmarking and rules of thumb

What is a biodiverse habitat? What are we aiming for? Measuring 'biodiversity' is extremely complicated, as all life is interconnected and there's still so much we don't know. There are many ways to measure aspects of biodiversity and habitat health, including 'ecological condition' assessments, indicator species and their trends, the ages of trees in a woodland, the presence/abundance of INNS, the presence of species that are sensitive to pollution, etc. These numerous and varied approaches can be very confusing, so we have created some very simple guides, below, as a rule of thumb for all partners in our steps to raise the bar and to create healthy, well-functioning, ecologically diverse habitats across the area.

As well as the rules of thumb below, we also need to gauge: 1) whether there are multiple habitats are on a site (a 'mosaic'); 2) how well each habitat links up with similar nearby (connectivity)

Very simple rules of thumb*

Grassland - *Poor diversity* = less than 6 species on average per m^2, more than 5% bare ground, damage due to trampling/poaching/machinery more than 5%, uniform sward height, lots of bracken, few indicator species, INNS present. *Moderate* = at least 6-8 species per m^2, small amount bare ground, small amount physical damage, varied sward height (above and below 7cm), high proportion of indicator species; *Good* = 10 sp or more per m^2, less than 5% bare ground, less than 5% damage, varied sward height, high proportion of indicator species, no INNS. Species-rich grassland = 25 or more species per m^2 (not including Creeping thistle, Spear thistle, Docks, Nettle, Creeping buttercup, Greater plantain, White clover, Cow parsley)
Hedgerow - *Poor diversity* = 3 or less native hedgerow species, no climbers/ground flora, big gaps in hedges, INNS present along hedgerow; *Moderate* = 4-7 species of hedgerow plants, climbers and ground flora, fewer gaps; *Good* = 8-15 or more hedgerow species including climbers and ground flora; good vegetation cover under the hedgerow, good mix of flowering fruit-bearing plants, berry-producing plants allowed to ripen, very small amount of INNS present if any, gaps less than 10% of whole hedge length, all gaps less than 5m, hedge undisturbed by human activity.
Woodland – *Poor diversity* = substantial cover of INNS, little ground flora, 2 or less species of native tree or shrub with less than 50% coverage, hard edges, no glades and very dark *or* openings really big and lacking trees *Moderate* = less than 10% INNS cover, trees of different ages, understorey present (shrubs), at least 3-4 native species of tree or shrub with average of 75% coverage, some recognisable ground flora, some glades/openings, presence of dead wood, some shrubs at woodland edges, presence of some natural regeneration *Good* = no INNS, 5 or more native tree or shrub species with over 80% coverage, good age range of trees – from large and mature to small saplings, good cover of ground flora with ancient woodland specialists present, moderate glades/openings, presence of dead wood, gradual transitions to adjacent habitats on edges of woodland
Coastal – *Poor diversity* = little variation in vegetation structure, excessive erosion/trampling/grazing, visual evidence of pollution, litter, few quality habitat indicator species, hard sea defences, INNS present. *Moderate* = mixed sea defences

(allowing some dynamism), moderate grazing/ human use, little pollution / litter, presence of several habitat indicator species, vegetation varied with evidence of some succession, INNS controlled, moderate water quality / quantity. *Good* = characteristic habitat indicator species present, different successional stages / transitions / mosaics of vegetation, varied vegetation structure, naturally open / bare ground, no INNS present, no visual evidence of pollution, very little litter, light grazing/erosion/trampling. Breeding waders present.
Ponds / Lochs / Reservoirs - *Poor diversity* = cloudy water, presence of invasive species, over 50% surface covered by duckweed, no marginal vegetation, no buffer of vegetation around pond; *Moderate* = clear water, no invasive species, less than 30% surface covered by vegetation, observation of some invertebrates *Good* = clear water, less than 10% of surface covered by duckweed, observation of many invertebrates, buffer of at least 10m around the pond, no INNS present.
Rivers/streams – *Poor diversity* = banks lacking vegetation, much erosion, sheer banks, presence of invasive species, no shade, no vegetation buffer on either side, predominantly leeches and aquatic worms found in water. *Moderate* = some bank vegetation, sloping banks, few invertebrates present, no invasive species , approx. 5m vegetation buffer on either side, presence of mayflies, stoneflies and caddisflies, dragon/damselfly nymphs, alderfly larvae, beetles, crustaceans and molluscs; *Good* = bank vegetation has mix of herbaceous plants and trees, no invasive species present, vegetation buffer of at least 10m on either side of water course, presence of dead wood / large stones, presence of mayfly and stonefly nymphs and caddisfly larvae
Wetlands – *Poor diversity* = rather dry, much exposed soil, drainage, visible soil erosion, INNS present, water shows signs of pollution, large coverage of scrub/trees; *Moderate* = some exposed soil, at least x species per m2, wet/moist for much of year, water may show signs of pollution, moderate coverage of scrub/trees; *Good* = wet all year, water clear – no obvious pollution, minimal exposed soil (less than 5%), minimal cover of scrub/trees (less than 10%)
Heathland – *Poor diversity* = more than 1/3 heather shoots recently grazed, lots scattered trees / scrub, heather of uniform age, lots bare ground, disturbance, lots bracken, presence of INNS, damage such as drains/ peat extraction/ leachate/ nutrients, large amount of gorse. *Moderate* = heather of varying ages, little bare ground, some scattered trees / scrub, actively improving from damaging activity, some gorse. *Good* = no INNS, bare ground less than 10%, good range of heather age classes, at least 2 dwarf shrub species present, less than 1/3 heather shoots recently grazed, small amount scattered trees/scrub, bracken cover less than 5%, small amount gorse, *no* signs of damaging activities.
Urban – Green infrastructure: *Poor diversity* = no variation in plant height, single habitat type present, INNS present in more than 5% of vegetated area; *Moderate* = some variation in plant height, some variation in habitat types, INNS cover less than 5% of vegetated area; *Good* = varied vegetation structure, varied plant species beneficial for varied species of invertebrates at different life stages, no INNS present **Blue infrastructure**: *Poor diversity* = culverts carry water underground, land drains carry water straight to drainage system; *Moderate* = above-ground water management, drains include some raingarden/swale/basin for holding water; *Good* = meandering above-ground water course with bankside vegetation and adequate buffer, fully integrated blue/green water management

*[In the absence of a Scottish metric, these simple rules of thumb broadly align with DEFRA biodiversity metric 4 habitat condition assessment tool and Forest Research Woodland Ecological Condition guidance]

In the following section, we have grouped our habitats under different ecosystems - as they all share certain characteristics, they will often be linked/adjacent and transitions between them may often be blurred. An explanation of the sub-headings used under each ecosystem is as follows:

- **Ecosystem name =** name of overall ecosystem
- **Percentage cover =** the proportion of West Lothian that is currently collectively covered by these habitats
- **Habitats included** = all the habitats that are grouped in this ecosystem
- **Linked habitats =** habitats from a different ecosystem type that are often adjacent to / merge with these habitats
- **Associated priority habitats =** habitats within this ecosystem type that are listed on the Scottish Biodiversity List (2021 edition)
- **Associated priority species** = species found in West Lothian on the Scottish Biodiversity List that are labelled 'conservation action needed', or 'avoid negative impacts'
- **Outcomes** = what we want to change over the next 10 years

AQUATIC ECOSYSTEM

Current percentage cover of West Lothian: river coverage and large, standing/ open water… TBC

Habitats included: Lowland fen, Marsh, Swamp, Reedbeds, Rivers and streams, Riparian corridors, Ditches, Canals, Standing open water (ponds, reservoirs), Coastal habitats and Intertidal zones

Linked habitats: Transition zones between fast-flowing and sluggish rivers/stream, and sluggish river/stream and Eutrophic lake; acid and neutral grasslands, rush pasture; riparian woodland, wet woodland

Associated Priority Habitats:
Coastal saltmarsh, Coastal sand dunes, Coastal vegetated shingle, Machair, Maritime cliff and slopes, Coastal and floodplain grazing marsh, Eutrophic standing waters, Lowland fens, Mesotrophic lakes, Oligotrophic lakes, Ponds, Reedbeds, Rivers, Upland flushes, fens and swamps

Associated priority species:
Great crested newt, Otter, Water vole, Kingfisher, Marsh saxifrage, Daubenton's bats

The aquatic ecosystems are characterised by water. This can be permanently water-logged areas or seasonally wet areas. Typically, these areas are dominated by sedges and rushes.

The overall aims are to recognise the importance of aquatic habitats for invertebrates, amphibians, birds and mammals; and to recognise and optimise the role of aquatic environments in flood prevention/mitigation and carbon storage; to avoid erosion and protect against diffuse pollution of water courses by ensuring suitable buffers of marginal and bankside vegetation; to improve water quality and the health of aquatic habitats. E.g. by improving water quality and removing barriers to species movement eg weirs); to enhance the resilience of the water environment to climate change (e.g. optimising river morphology where possible); reduce the spread of INNS by improving biosecurity measure; improve connections for species by creating more pond networks.

Outcomes

1. Achieve 'improving' condition for biological indicators of key water courses by 2035
2. Achieve 'good' status of water quality in x% of water bodies by 2030 [SBS / SEPA action]
3. Reduced abundance of INNS across aquatic habitats [exact species?] [SBS action]
4. Increase in varied bank vegetation of native species– in particular riparian woodland, with buffers of at least 10m (SEPA guideline) [helps address SBS action]
5. Decrease in barriers to fish movement, through targeted barrier removal
6. More people are aware of West Lothian's wetland network
7. Increased volume of wetland habitat types within appropriate places: increasing the number of seasonal ponds and encouragement of landowners to create seasonal wetlands for waders
8. Increased awareness of the importance of biosecurity in/around water ecosystems and awareness of potential negative effects to species in certain areas [SBS action]
9. Increased populations of aquatic species: Water vole, Great Crested Newt, Eels, Lamprey and Atlantic Salmon and Pond Mud Snail by 2034

BOG AND HEATH (Wet and Dry)

Current percentage cover of West Lothian: TBC

Habitats included: Heathland, Peatland, Bog, Heather moorland

Linked habitats: transitions between upland wet heath, upland dry heath and blanket bog; transitions between lowland wet heath and valley mire

Associated Priority Habitats: Lowland raised bog, Blanket bog, Upland heathland, Lowland heathland, Dystrophic (peat-stained) lakes

Associated priority species:
Pond mud snail, Marsh saxifrage

Heaths are areas of short scrub. They can be dry or wet.
Mire is a term used for any ecosystem that accumulates peat – coming from the Scandinavian *myr*. The vegetation present, and local conditions, can form wetlands, peatlands, fens and marshes. In these areas the water table is at or above ground level for at least half the year.

The overall aims are similar to Aquatic Ecoystems: to recognise the importance of bog and heath habitats for invertebrates, amphibians, reptiles, birds and mammals; and to fully recognise and optimise the role of bog and heath in flood prevention/mitigation and carbon storage – as peatlands have the capacity to store more carbon than forests in the long-term.

As drained peatlands erode, they emit carbon and contribute to climate change. They can also cause nutrient leaching, subsidence and loss of biodiversity. Therefore by rewetting them and waterlogging soils, oxidisation of dead organic matter almost ceases, CO2 loss to the atmosphere is minimised and these vulnerable habitats are able to support their specialised flora and fauna once more.

Outcomes

1. Better 'condition' status for bog and heath habitats across the area [SBS peatland action]
2. Increase in awareness of importance of bog and heath with landowners/managers
3. Habitats are in better condition to support threatened species. Through partnership projects, each of our areas is contributing to positive conservation of threatened species.
4. Increase in ecosystem services of bogs - water retention and carbon storage
5. Increase in community engagement in bog habitats
6. Increase in protection and management of bogs
7. Ensure protection and management of heathland
8. Increase assistance for species conservation programmes for bog/heath species e.g. Marsh saxifrage

.

GRASSLAND ECOSYSTEM

Percentage land cover of West Lothian (Grassland and marsh): 40.3%

Explanation of 'grassland' terms: semi-natural, improved and unimproved grassland

Habitats included: From 'man-made' - i.e. amenity grass/ golf courses / arable fields (cereals) / pasture / planted wildflower meadow - through to semi-natural / natural: Acid Grassland, Neutral Grassland, Dwarf Shrub Heath, Dunes, upland grassland

Linked habitats: scrub, woodland, dry heath, marsh, wetland, heathland, lowland fen, dwarf-shrub and montane habitats; habitat boundaries such as walls, ditches and hedgerows

Associated Priority Habitats:
Arable Field Margins; Lowland Calcareous Grassland (Annex 1); Lowland Dry Acid Grassland; Lowland Meadows; Upland Hay Meadows (Annex 1); Upland Calcareous Grassland (Annex 1)

Associate priority species:
Hen harrier; Barn owl; Black grouse; skylark; Common blue butterfly; Marsh saxifrage; Greater butterfly orchid

Overall aims are to recognise the importance of different grassland habitats for supporting a wide range of micro-organisms, invertebrates, amphibians, reptiles, birds and mammals; to recognise and optimise the role of grasslands in supporting pollinators and soil organisms in particular, slowing water run-off and storing carbon; and to ensure resilience to climate change by connecting grassland habitats. To improve the diversity of species supported by grasslands, through iterative management; to improve the condition of grasslands, inc soils, species diversity, varied sward heights; to ensure biodiverse transition zones between grassland and adjacent habitats; to allow habitat mosaics in grassland landscape – with some succession to scrub; and to protect existing semi-natural grasslands.

Outcomes

1. No net loss of semi-natural grassland (currently 15.4%) in West Lothian
2. x% increase of semi-natural grassland to be protected by 2034
3. x% increase of semi-natural grasslands to be ecologically connected by 2034 – including mosaic habitats
4. Increase in understanding of the ecological condition of grassland across West Lothian
5. Semi-natural grassland across the area to be in better condition by 2034
6. x% increase in man-made species-rich grassland by 2034
7. Increase in support for farmers and landowners to improve biodiversity at landscape scale
8. Habitats are in better condition to support threatened species. Through partnership projects, each of our areas is contributing to positive conservation of threatened species.
9. x% increase of semi-natural grassland within WLC landholdings
10. Increase in species diversity of all grassland; including pasture, amenity grassland, margins, etc
11. Increase in awareness of the benefits of transitional habitats e.g. field margins, etc
12. Increase in marginal / edge habitats to improve transitions between habitats
13. Increase in records of farmland birds? Brown Hare (Scottish Biodiversity List – conservation action needed)? {related to SBS action on farmland species]

WOODY ECOSYSTEM

Current percentage cover of West Lothian: 21%

Habitats included: Forest, Broadleaved and Mixed Woodlands, Ancient Woodland, Riparian woodland, Wet Woodland, Wood Pasture, Hedgerows, Parkland, Scrub, Tree-lined Streets

Linked habitats: transitional scrub - between woodland and grassland / heathland; transition s between wet woodland and bog, reeds, or open water (e.g. ponds); coastal habitats; arable fields and pasture; bracken swathes

Associated SBL Priority Habitats:
Lowland mixed deciduous woodland, Native pine woodlands, Upland birchwoods, Upland mixed ashwoods, Upland oakwood, Wet woodland, Wood pasture and parkland

Associated priority species:
Badger, Red squirrel, Pine marten, Natterers bat, Common pipistrelle bat, Daubenton's bat, Brown long-eared bat, Intermediate wintergreen

Overall aims are to recognise the importance of and enhance the ecological condition of woody habitats to support a wide range of micro-organisms, invertebrates, amphibians, reptiles, birds and mammals; to recognise and optimise the role of woody habitats in intercepting rainfall and slowing water run-off, sequestering and storing carbon, supporting a diverse array of species, including pollinators; promote gradual transitions between habitats; to ensure resilience to climate change by expanding and connecting woody habitats; and to protect and improve condition of ancient/semi natural woodlands. New priority planting areas will include the expansion of existing woodland, riparian/hedgerow planting to increase connectivity and to provide appropriate habitat mosaics within the landscape.

Outcomes

1. Increase in protected woodland / hedgerow habitat by 2030
2. Increase native woodland cover in priority areas: restructuring existing woodland through restocking [SBS action], expanding existing woodlands, joining up woodland fragments, improving connectivity between woodland habitats (physical connection or stepping stones), reducing run-off and/or improving carbon sequestration, where appropriate.
3. Minimise the spread of disease and INNS through raising awareness of biosecurity measures and implementing best biosecurity practice [related to SBS action]
4. Increase in sustainable woodland management -balance between productive woodland that needs to make an income and management for ecology
5. x% of woodland protected by 2034 (increase of x%) check existing figures
6. Increase the area of woodland whose ecological condition [ref x] has been assessed by 2030 [related to SBS action]
7. 50% of all woodland assessed is in better ecological condition [ref y] (increased resilience) by 2035
8. Increased awareness of Ancient Woodland throughout West Lothian
9. Ancient woodland in 'unfavourable' condition restored by 2030 [SBS action]
10. x% increase in riparian woodland by 2035 (at least 10m either side of watercourse) Reference SEPA riparian planting priority map [SBS action]
11. No decrease in existing hedgerow – no matter what condition
12. Increase in overall length and condition of hedgerow across West Lothian; through filling gaps between existing remnants, planting hedgerow to join up woodland habitats and improving condition of existing hedgerows.
13. Increased tree planting in school grounds, through Learning for Sustainability [related to SBS action]

Ref x: https://defrafarming.blog.gov.uk/sustainable-farming-incentive-pilot-guidance-complete-a-woodland-condition-assessment/

Ref y: https://www.woodlandtrust.org.uk/state-of-ukwoods-and-trees/#:~:text=Woodland%20today%20covers%2013.2%25%20(3.2,non%2Dnative%20commercial%20conifer%20plantation.

OR https://www.forestresearch.gov.uk/tools-and-resources/national-forest-inventory/what-our-woodlands-and-tree-cover-outside-woodlands-are-like-today-nfi-inventory-reports-and-woodland-map-reports/nfi-woodland-ecological-condition/

URBAN ECOSYSTEM

Current percentage cover of West Lothian: 18.5%

Habitats included: Parks and Green spaces, School Grounds, Vacant and derelict land, Transport and active travel corridors, all man-made blue/green infrastructure and nature-based solutions (inc green roofs, SuDS, etc), Allotments and Community Gardens, private gardens, graveyards and cemeteries, woodland and shelter-belts,

Linked habitats: Ancient woodland, semi-natural grassland, hedgerow, scrub, riparian habitat

Associated SBL priority habitats:
Wood pasture and Parkland, Open Mosaic Habitats on Previously Developed Land (watching brief only), Traditional orchards (watching brief only), Ponds, Rivers, Lowland raised bog

Associated priority species:
Common pipistrelle, Kestrel, Swift, House sparrow, House martin, Great crested newt, Purple ramping-fumitory

Overall aims are to create a mosaic of habitats within urban areas to support the life cycles of a wide range of micro-organisms, invertebrates, amphibians, reptiles, birds and mammals; to recognise and optimise the role of urban habitats and blue-green infrastructure to ensure resilience to climate change by supporting pollinators and soil organisms in particular; increasing rain interception and slowing the flow of water into our rivers and drainage systems, sequestering carbon, providing shade and reducing the urban heat island effect, reducing air pollution and enhancing air quality, and providing healthy, local food.

Outcomes

1. Establish system to replace current felled trees, and future felled trees, on WLC landholdings by end 2027
2. Increase in nature positive public urban greenspaces by 2026 [SBS action]
3. No net loss of priority habitats within urban areas (SBL habitats and species)
4. Increased awareness of nature positive green and blue management
5. Increased use of nature-based solutions for surface water management by 2034
6. Increased awareness of how gardens can be managed to better support biodiversity [SBS action]
7. Increased urban biodiversity through enhancements associated with new transport / active travel infrastructure [SBS action]
8. Increased public awareness of the mitigation hierarchy (avoid, minimise, compensate) for all outdoor, and some indoor, construction/renovation projects
9. Use of Building with Nature is supported as a standard for developments [related to SBS action]

The measures outlined in NatureScot's Developing with Nature guidance can aid in all the above.

GEODIVERSITY, SOILS AND BINGS

Percentage cover of West Lothian: 0.4% (139ha)

Each bing is a specialist habitat. Study on the Bings of WL. 6 bings left? 1 working bing which is depleting. Exact locations? 19 bings (1998) – 8 restored/partially restored/reclaimed; 3 intact but with high biodiversity value; 3 with planning permission; 3 without planning permission but would be welcomed (by Planning).

A legacy of West Lothian's industrial past, the red shale bings stand prominently in the landscape, mostly occurring between Winchburgh and West Calder. The bings are islands in a primarily agricultural landscape and provide a valuable refuge for wildlife. This is illustrated well at North Addiewell Nature Reserve, South Addiewell LBS, Faucheldean and the Five Sisters at Westwood, all of which have some protection from development. Both the Five Sisters and Greendykes Bings are scheduled as historic industrial monuments.

Habitats included: Oil shale bings, Inland outcrops and scree habitats

Linked habitats:

Associated priority habitats:
Open Mosaic Habitat on Previously Developed Land

Associated priority species:
Lapwing, Golden Plover; also notable lichens and mosses

Outcomes

1. Bings that have been abandoned or where resources are exhausted should be considered for restoration – this should be carefully planned and managed, with some areas left to 'naturally regenerate', creating opportunities to replicate conditions on other Bings with diverse habitats
2. All abandoned/decommissioned Bings in WL will have an appropriate management plan with opportunities for future restoration/reclamation considered - allow 'natural regeneration' of sites providing unique habitat conditions only found on WL Bings.
3. Increased awareness-raising and management to reduce the impact of recreation and illegal trail bikes
4. Further study will have been carried out by 2034 into the long-term evolution of bing habitats to help inform ongoing management – including current conditions and opportunities for improving conditions for nesting birds and bing-associated mosses
5. At least one LNR on a bing site designated by 2034
6. Improved soil health, through implementation of NPF4, Policy 5 (Soils) [SBS action]
7. Minimise loss of organic carbon, erosion, compaction, and poaching through sustainable land use practices [SBS action]
8. GEODIVERSITY?

MAP OF WL SHOWING BINGS

GLOSSARY OF TERMS

Bings- large, red shale spoil-heaps, resulting from industrial shale mining in the area

Nature Networks - "A Nature Network connects together nature-rich sites, including restoration areas and other environmental projects, through a series of areas of suitable habitat, habitat corridors, and stepping-stones." NatureScot

Paludiculture - farming and agroforestry systems designed to generate a commercial crop from wetland conditions using species that are typical of (or tolerant of) wetland habitats.

Priority habitats - habitats that are listed on the Scottish Biodiversity List (2021 edition)

Priority species - species found in West Lothian on the Scottish Biodiversity List that are labelled 'conservation action needed', or 'avoid negative impacts'

SECTION E – ACTION PLAN Overall Action Plan to 2035, with review in 2029/30 EXAMPLES

Action reference	Outcomes (cross reference all against stakeholder feedback and SBS targets)	Actions	Targets	Responsibility	Timescale	LBAP Theme		
						Protect / restore/ enhance	Connect and allow flow	Repairing human connections
	Progressing the BAP							
	Working together	Organise themed working group meetings throughout year, as required		LBAP stakeholders				
	Working together	Organise 1 event for all stakeholders and 2 meetings per year: event in summer (case study – different places): 2 meetings online	More stakeholders (baseline = 50) – all better connected and informed	WLC - E&BD				
	Working together	Highlight good practice / case studies / volunteer opportunities through partner communications / local media (following meetings above)						
	Funding	Stakeholders to explore forming spatial clusters to submit 1 large joint funding bid?			By Dec 2030			
	Protected sites							
	All protected sites to achieve 'favourable' status by 2035	All sites to be assessed and regularly monitored						
		All sites have up to date management plans and to be managed adaptively. Support to be provided to landowners.						
	30% of land protected, by area, in West Lothian by 2030 (increase of 14%). Protection is provided through Statutory site	Identify additional areas to be protected through gaps in the Nature Network, identifying high biodiversity areas that are currently not protected				√		

	designations, the Local Development Plan							
	Nature Networks							
	Protection / enforcement	Produce strategic Nature Network map and ensure inclusion in LDP2					√	
		Through development planning controls, maximise enhancement and creation of networks						
	Non-Native Invasive Species							
	Invasive Non-Native Species (INNS) are monitored, removed and their spread is prevented	work with all stakeholders to map INNS across the area (prioritise species)						
	Increase public awareness and engagement in INNS control	Involve public in reporting and mapping INNS (and treating?)						
	Aquatic Ecosystem							
A1.1	Achieve better status for biological indicators of key water courses by 2034	Map and prioritise water courses for action						
A3.1	Decrease barriers to fish movement through targeted removal	Map and remove barriers to fish as per SEPA priorities and funding						
	Bog and Heath							

BH1.1	Better condition status for bog and heath habitats across the area	Identify, map and survey all bogs in West Lothian. Peatland condition assessment completed on all known areas. Write up recommendations for management.						
BH1.2		Facilitate joint working to enhance condition of bog and heath and increase awareness of available grant schemes						
BH2.1	Increase awareness of importance of bog and heath with landowners/managers	Have 1 bog/heath event per year for landowner/managers						
	Grassland Ecosystem							
	x% increase of semi-natural grasslands to be ecologically connected by 2034 – including mosaic habitats	Mapping opportunities within the Nature Network						
	x% increase in man-made species-rich grassland by 2034	Map man-made species-rich grassland through interactive mapping						
		Partnership working to increase the area of man-made species-rich grassland created and managed						
	Woody Ecosystem							

		WLC Forest and Woodland Strategy completed		WLC Trees and Woodlands, Planning Services	Spring 2026	√	√	√
		WLC tree and woodland strategy/ plan completed		WLC Trees and Woodlands, Planning Services	Spring 2026			
	Increase in connectivity between woodland in general (physical connection or stepping stones)	Map tree planting opportunities to improve connection within the Nature Network; prioritising riparian tree planting (SEPA riparian planting map) and hedgerow planting						
	Increased awareness of Ancient Woodland	Publicise / share Ancient Woodland mapping on WLC website;						
	Urban Ecosystem							
	Increase awareness of nature-positive blue / green management [SBS action]							
	Increase in nature-based solutions for surface water management by 2034 [SBS action]	Prepare and implement a vision for surface water management including appropriate actions for blue green infrastructure by 2030 [SBS action]						
	Increase awareness of how gardens can be managed to better support biodiversity [SBS action]	Share information and promote biodiversity measures for residential gardens, communal gardens, community gardens and allotments						
		Share information and promote the management of gardens to support						

		biodiversity with WLC Housing and other social housing managers						
	Geodiversity, Soils and Bings							
	Increase awareness of the importance of bings, and manage to reduce impact of recreation and illegal bike trails	Increase awareness through publicity, signage and community engagement						
	Increased study of bings	Long-term study to assess evolution of bing habitats; include identification of opportunities for nesting birds and bing-associated mosses						
	Increase protection of bings	At least 1 bing designated as LNR by 2034						

APPENDICES

Appendix 1 – Policy context

International Agreements

In recent years, the global response to climate change and biodiversity has gathered pace. The latest global meeting COP28 – Climate Change took place in Dubai in Nov-Dec 2023 and the global meeting COP15 – Biodiversity took place in Canada in Nov 2022. Both have resulted in new international agreements and further targets for climate change and nature recovery which both the UK and Scottish governments have signed.

Preceding COP 15, the Scottish Government led a consultation, called the Edinburgh Process, with sub-national governments including regional, city and local authorities, to address their role in the post-2020 global biodiversity framework and targets. Information sessions, thematic webinars and consultations enabled the development of key outputs, including the Edinburgh Declaration, which demonstrates the commitment of subnational authorities across the world in delivering for nature over the next decade. The declaration was signed by West Lothian Council in November 2021.

National Policy

The new Scottish Biodiversity Strategy establishes a national vision for biodiversity to 2045, requiring a halt to biodiversity loss by 2030 and by 2045 beginning to make substantial headway to restoring biodiversity. Methods used to do this include the concepts of 30 x 30 (protecting 30% of Scotland's land and 30% of sea by 2030) and Nature Networks – linking together habitats and protected areas across local authority areas and nationally to enable species to move and to adapt naturally to changing circumstances and the inevitable changing climate.

Agriculture is a major land use in Scotland – approx. 69% of Scotland's total land in 2023. The vision of the Scottish Government is to "transform how we support farming and food production in Scotland to become a global leader in sustainable and regenerative agriculture." The route map to achieving this goal includes the adoption of a new Agriculture and Rural Communities Bill to replace the Common Agricultural Policy, as farmers and landowners will need financial support to make necessary changes.

Scotland's Land Use Strategy shifted the national approach to land use, by looking at the big picture, using an ecosystems approach (acknowledging the benefits we receive 'for free' from natural systems) and making links between how we own, manage and use land for conservation, energy production, housing, farming, industry, transport, etc. to achieve sustainable land use at scale. It provides a vision for how land should be used across the country with a projected increase in urban woodlands, rooftop and rain gardens to green our cities and towns; an increase in forested land, integrated with agriculture; more habitats restored, connected and enhanced; better-quality peatland habitats, and a wider range of wildlife thriving in wild areas. Targets include tree planting rates to reach 18,000 hectares per year by 2024-25 and 250,000 hectares of restored peatland by 2030.

The Scottish Climate Change Plan 2018-32 recognises that Scotland's landscape and natural environment is one of our greatest national assets, and recognises the ecosystem services provided by these natural assets. It notes issues of deforestation, soil quality, peatland degradation and loss of native species. The plan influences major changes in our landscape through requirements to change how we produce energy (e.g. wind and solar farms) and also through carbon-storage, sequestration and biodiversity measures such as bog restoration and woodland creation, including agro-forestry.

Scotland's Forestry Strategy (2019-2029) presents a 50-year vision to expand, protect and enhance Scotland's forests and woodlands, in order to deliver greater economic, social and environmental benefits to Scotland's people. One of its key priorities for action is to increase the environmental benefits derived from Scotland's forest and woodland resource, in particular protecting and enhancing associated biodiversity. Biodiversity-specific indicators for this strategy are: Woodland ecological condition score, Condition of protected forest and woodland sites and Index of Abundance for Scottish Terrestrial Breeding Birds – Woodland Species.

The Scottish National Adaptation Plan 2024-29 is currently out for consultation. Connecting Nature is one of its proposed 5 outcomes, recognising the impact climate change has on wildlife and habitats, that connectivity is crucial for functioning healthy ecosystems and recognising the role of green spaces in climate resilience.

National Planning Framework 4 is also new (adopted in Feb 2023) with key changes that bring spatial planning and policy together; it also brings the climate and nature crises to the forefront of decision-making through new, updated policies.

National legislation presents key legal requirements for all public bodies to comply with:

The Climate Change (Scotland) Act 2009 requires that the council must, in exercising its functions, act: "in the way best calculated to contribute to the delivery of net-zero by 2045... (and) in a way that it considers is most sustainable".

The Nature Conservation (Scotland) Act 2004 states that "It is the duty of every public body and office-holder, in exercising any functions, to further the conservation of biodiversity so far as is consistent with the proper exercise of those functions." The Wildlife and Natural Environment (Scotland) Act 2011 requires public bodies in Scotland to provide a publicly available report every three years, on the actions which they have taken to meet this biodiversity duty.

The Natural Environment Bill, scheduled to be tabled in 2024, will put in place new legislation to restore and protect nature, as well as introducing targets to drive action.

Local Policy

West Lothian Council declared a Climate Emergency in 2019 and a Nature Emergency in 2023. Therefore, action for sustainability in its widest sense is a priority.

The following local strategies and plans influence, and are in turn, influenced by this LBAP:

The WLC Climate Change Strategy 2021-28 provides a framework for the council's actions as a public sector organisation aimed at reducing greenhouse gas emissions and preparing for the unavoidable impacts of changing weather patterns. The council's interim emissions targets are 61% reduction by 2028, 65% reduction by 2030, 86% reduction by 2040, net-zero by 2045. Within the strategy are actions relating to Energy, Transport, Waste, Adaptation, Resilience & Biodiversity and Land Use. This LBAP is one of the actions listed in the strategy, together with the Natural Capital Assessment, and actions for increasing woodland cover and restoring habitats.

The LBAP will also contribute to the council's Local Outcomes Improvement Plan, under the pillar of Creating Net-Zero Carbon Communities. Specifically, this means using nature-based solutions to help achieve net zero carbon and to mitigate and adapt to climate change impacts.

The WLC Open Space Plan contains audits of all parks and open spaces over 0.2ha and strategically plans public parks and open spaces across the area for the primary purposes of health, play, recreation, sociability and access, with additional multifunctional benefits such as flood resilience, biodiversity, etc. WLC requirements for Active Open Space are: 6 acres (2.4ha) per 1000 population, 500m from dwellings, taken from the Fields in Trust 6 acre standard. The Fields in Trust benchmark guidelines for Natural and Semi-natural informal outdoor space (Woodland, scrub, grassland, wetlands, open and running water and open access land) are 1.8ha per 1000 population, 720m from dwellings.

The WLC Food Growing Strategy takes stock of community food growing provision (such as community gardens and allotments) across the area and aims to facilitate further opportunities through strategic planning and by setting a West Lothian standard.

The WLC Forestry and Woodland Strategy (being drafted) will be informed by this LBAP, which will help to steer future woodland creation and ensure that woodlands of high conservation value are protected and form part of ecologically functional Nature Networks.

This BAP will be used to inform the next Local Development Plan, which is currently being compiled. Local Development Plans are intended to provide a vision and land use strategy for how communities will grow and develop and also to provide certainty for all by clearly illustrating where and how new development should take place. It also identifies those parts of West Lothian that should be protected from development.

Appendix 2 – Successes for biodiversity in West Lothian since the previous action plan

- Designation of 51 Local Geodiversity Sites; by the Lothian and Borders Geo-Conservation Group
- Designation of 121 Local Biodiversity Sites and designation of Easter Inch Moss as a Local Nature Reserve
- The West Lothian Soil Sustainability Report (2004); Planning Guidance - Soil Management & After Use of Soils on Development Sites; Planning Guidance – Planning for Nature (2020)
- River Basin Management Plan for the Forth Estuary
- Woodland Trust Scotland BOWL project – creating resources for schools and educating about local trees and woodlands
- Livingston South Blue-Green Network – a partnership project between West Lothian Council and Green Action Trust involving habitat restoration work along a key blue-green corridor through south Livingston
- Dedridge Environment Ecology Project – a community group who, over 10 years, carried out extensive water and woodland restoration work in Dedridge, Livingston
- Riverlife – an ambitious 5-year partnership project between West Lothian Council, City of Edinburgh Council and Forth Rivers Trust (FRT) to make improvements to the catchments of the Almond and Avon, including extensive works to remove barriers to fish and a broad programme of practical engagement activities
- West Lothian B-lines – a partnership project between West Lothian Council and Buglife to create wildflower meadows in 11 urban parks across the area as part of the UK B-Lines initiative, with engagement activities.
- Trout in the Classroom projects, drain marking, litter-picks and burn clearance by Linlithgow Angling Club, together with FRT.
- Skolie Burn SSSI restoration and management through the Skolie Burn Community Meadow and Woodland SCIO.
- The council's Climate Change Emergency Fund has funded projects on WLC land, including: extensive tree planting (at Nelson Park, Howden Park, Whitburn Town Centre Walk, Wee Forest at Boghall), invasive species removal and pathworks along the Livingston North Blue-Green Network, bog restoration works at Black Moss and Easter Inch Moss, Greening of the Shale Trail tree/hedge planting with Edinburgh and Lothians Greenspace Trust. This fund also secured the habitat mapping and Natural Capital assessment relating to this LBAP.
- The Scottish Government's direct allocation Nature Restoration Fund has enabled the council to carry out projects over the last 3 years, including: Invasive, non-native species mapping and control along watercourses in the Avon and Almond catchments with biodiversity enhancement works in partnership with Forth Rivers Trust (FRT), management of Black Moss, Ash Dieback replacement tree planting, purchase of meadow management machinery, monitoring of Local Biodiversity Sites with The Wildlife Information Centre, Great Crested Newt monitoring ahead of habitat enhancements, Buglife meadow monitoring and workshops, creation and refurbishment of urban raingardens in parks, installation of amphibian ladders, installation of a fish counter in the River Almond, willow spiling on various water courses and nutrient analysis and action plan for Beecraigs Loch.
- The council has worked in partnership with Edinburgh Napier University, providing locations for field research into the effectiveness of urban wildflower meadows and grassland management for supporting invertebrates in and around Livingston's greenspaces. This research is being used to inform management practices.
- The Ranger Service continues to lead practical conservation work with community groups, including control of invasive species, tree planting and habitat management at Almondell and Calderwood Country Park, Beecraigs Country Park, Skolie Burn SSSI, Blackridge, Little Boghead and Easter Inch Moss; meadow management for the Greater Butterfly Orchid at Beecraigs; as well as an annual programme of educational activities.
- The purchase of Easter Breich Community Woodland by the community and the establishment and development of Beechbrae Woodland Centre.
- Creation of habitats and management to support biodiversity, including ponds, across the Hopetoun Estate together with a Long Term Forest Plan.
- Creation and management of many community gardens including habitats and features for supporting biodiversity including Polbeth/West Calder, Craigshill, Bathgate (Whitehill), Winchburgh and Murieston.
- The award of FIRNS funding (Facility for Investment Ready Nature in Scotland) to the Pentland Land Managers Association and creation of Project L-and.

Appendix 3 - Habitat areas from previous BAP compared with latest habitat mapping

(source : West Lothian phase 1 habitat survey 1994; West Lothian Baseline Habitat Map by WSP / NCS 2023)

	Area (ha) 1994	**% Cover 1994**	**Area (ha) 2023**	**% Cover 2023**
West Lothian [1.] Habitat Types	42,504	100%	43,170	100%
Woodland and Scrub	6,741	14.0%	9,054	21.0%
Grassland and Marsh	17,757	36.0%	17,408	40.3%
Tall Herb and Fen	299	0.6%	3	0.0%
Heathland	1,399	3.0%	176	0.4%
Mires and peatlands	2,201	4.0%	2,303	5.3%
Swamp	70	0.1%	3	0.0%
Open Water	500	1.0%	603	1.4%
Coastland	273	0.5%	281	0.6%
Rock and spoil	316	0.6%	372	0.9%
Miscellaneous (cultivated land etc)	13,296	27.0%		
Arable			4,986	11.5%
Urban unsurveyed areas	5,611	13.2%		
Miscellaneous (amenity grassland, built up area, infrastructure, gardens, other)			7,819	18.1%
Unclassified (under development)			164	0.4%

[1.] Footnote: West Lothian represents approximately 0.5% of the land area of Scotland.

Appendix 4 - Species lists

Ecosystems	**Priority species** species found in West Lothian on the Scottish Biodiversity List that are labelled 'conservation action needed', or 'avoid negative impacts'	**Indicator species** other locally important species that are indicators of the health, state or age of habitats. These are characteristic of the habitats found in West Lothian, therefore indicators of good habitat management / health.
Aquatic	Kingfisher *Alcedo atthis* Daubenton's bat *Myotis daubentonii* Water vole *Arvicola amphibious* Otter *Lutra lutra* Eurasian Beaver *Castor fiber* Pond mud snail *Omphiscola glabra* (Lochcote Marsh SSSI) Brown Trout *Salmo trutta* Common toad *Bufo bufo* Reed bunting *Emberiza schoeniclus* Great crested newt *Triturus cristatus* Eelgrass *Zostera marina* Dwarf eelgrass *Zostera noltii*	Rivers and streams: Daubenton's bat *Myotis daubentoniid* Brown Trout *Salmo trutta* Water vole *Arvicola amphibius* Otter *Lutra lutra* Stoneflies Caddisflies Ponds and Wetlands: Smooth newt *Triturus vulgaris* Common frog *Rana temporaria* Large Red Damselfly *Pyrrhosoma nymphula* Common blue damselfly *Enallagma cyathigerum* Common hawker dragonfly *Aeshna juncea* Snipe *Gallinago gallinago* Ragged robin *Silene flos-cuculi* Basic flush: Few-flowered spike-rush *Eleocharis quinqueflora* Broad-leaved cotton-grass *Eriophorum latifolium* Long-stalked yellow-sedge *Carex lepidocarpa* Mosses - *Scorpidium* sp*., Campylium* sp*., Drepanocladus* sp*., Calliergon* sp Coast: Ringed plover *Charadrius hiaticula* Curlew *Numenious arquata* Oystercatcher *Haematopus ostralegus* Sea thrift *Armeria maritima* Coltsfoot *Tussilago farfara* Sea mayweed *Tripleurospermum maritimum* Sea pea *Lathyrus japonicus* Dwarf eelgrass *Zostera noltii*
Bog and heath	Mountain hare *Lepus timidus* Adder *Vipera berus* Merlin *Falco columbarius* Hen harrier *Circus cyaneus* Peregrine *Falco peregrinus* Black grouse *Tetrao tetrix* Red grouse *Lagopus lagopus* Golden plover *Pluvialis apricaria* Curlew (upland)*Numenius arquata* Marsh saxifrage *Saxifraga hirculus* [actively monitored on Craigengar SSSI. RBGE species programme] Sword-grass *Xylena exsoleta* Sphagnum mosses (various spp)	Bog habitat: Black darter dragonfly *Sympetrum danae* (bog pools) Bog asphodel *Narthecium ossifragum* Hare's tail cotton grass *Eriophorum vaginatum* Common cotton grass *Eriophorum angustifolium* Round-leaved sundew *Drosera rotundifolia* Cranberry *Vaccinium oxycoccos* Heath: Heather *Calluna vulgaris* Blaeberry *Vaccinium myrtillus* Cross-leaved heath *Erica tetralix* Bell Heather *Erica cinerea* Crowberry *Empetrum nigrum* Cowberry *Vaccinium vitis-idaea* Bearberry *Arctostaphylos uva- ursi* Lichens - *Cladonia portentosa, Cladonia arbuscula, Cladonia uncialis* Mosses - *Sphagnum compactum, Sphagnum tenellum*

Grassland	Natterer's bat *Myotis nattereri* Daubenton's bat *Myotis daubentonii* Pipistrelle *Pipistrellus pipistrellus* Brown long-eared bat *Plecotus auritus* Brown hare *Lepus europaeus* Barn owl *Tyto alba* Hen harrier *Circus cyaneus* Grey Partridge *Perdix perdix* Kestrel *Falco tinnunculus* Lapwing *Vanellus vanellus* Tree sparrow *Passer montanus* House sparrow *Passer domesticus* Skylark *Alauda arvensis* Curlew *Numenius arquata* Linnet *Carduelis cannabina* Yellowhammer *Emberiza citrinella* Bullfinch *Pyrrhula pyrrhula* Purple ramping fumitory *Fumaria purpureau* Cornflower *Centaurea cyanus*	Acid grassland: Fine-leaved bent; Fescues Tormentil Heath bedstraw Harebell Devils-bit scabious Dog violet Bitter vetch Neutral grassland: Common blue butterfly *Polyommatus icarus* Sweet vernal grass Yellow rattle *Rhinanthus minor* Common bird's foot *Lotus corniculatus* trefoil Knapweed Lady's bedstraw Yarrow Self heal Greater butterfly orchid Calcareous grassland: Quaking grass Meadow cranesbill *Geranium pratense* Wild thyme Rock rose Fairy flax Field gentian Salad burnet Marshy grassland (Purple Moor Grass/rush pasture): Purple moor grass Angelica Melancholy thistle Meadowsweet Sneezewort Sharp flowered rush Marsh/Common spotted orchid Improved grassland: Perennial rye grass White clover Dandelion Common daisy Meadow buttercup Grassland with hedegrow: Linnet *Carduelis cannabina* Whitethroat *Sylvia communis* Yellowhammer *Emberiza citrinella* Dunnock *Prunella modularis* Small pearl-bordered fritillary *Boloria selene* Buildings and gardens: House sparrow *Passer domesticus*
Woody ecosystem	Natterer's bat *Myotis nattereri* Daubenton's bat *Myotis daubentonii* Common pipistrelle bat *Pipistrellus pipistrellus* Brown long-eared bat *Plecotus auritus* Red squirrel *Sciurus vulgaris* Pine marten *Martes martes* Black grouse *Tetrao tetrix* Song thrush *Turdus philomelos* Spotted flycatcher *Muscicapa striata*	Woodland: Sparrowhawk *Accipiter nisus* Eurasian jay *Garrulus glandarius* Tawny Owl *Strix aluco* Purple Hairstreak butterfly *Favonius quercus* Downy birch *Betula pubescens* Pedunculate oak *Quercus robur* Bluebell *Hyacinthoides non-scripta* Dog's mercury *Mercurialis perennis*

	Intermediate wintergreen *Pyrola media* Sword-grass *Xylena exsoleta*	Honeysuckle *Lonicera periclymenum* Sanicle *Sanicula europaea* Sweet Woodruff *Galium odoratum* Wild garlic / Ramsons *Allium ursinum* Townhall Clock / Moschatel *Adoxa moschatellina* Foxglove *Digitalis purpurea* Broad-leaved Helleborine *Epipactis helleborine* Toothwort *Lathraea squamaria* Lichens saproxylic insects (those associated with decaying wood) Scrub: Hawthorn *Crataegus monogyna* Blackthorn *Prunus spinosa* Common alder *Alnus glutinosa* Juniper *Juniperus communis* Gorse *Ulex europaeus* Grey willow *Salix cinerea* Bog myrtle *Myrica gale* Yellowhammer *Emberiza citrinella* Fieldfare *Turdus pilaris* Bullfinch *Pyrrhula pyrrhula* Hedgerow: Hawthorn *Cratagus monogyna* Blackthorn *Prunus spinosa* Hazel *Corylus avellana* Bramble *Rubus fruticosus* spp Honeysuckle *Lonicera periclymenum* Common ivy *Hedera helix* Cow parsley *Anthriscus sylvestris* Garlic mustard *Allaria petiolata* Red admiral butterfly *Vanessa atalanta* Orange-tip butterfly *Anthocharis cardamines* Whitethroat *Sylvia communis* Yellowhammer *Emberiza citrinella* Dunnock *Prunella modularis*
Urban	Common pipistrelle *Pipistrellus pipistrellus* Kestrel *Falco tinnunculus* Swift *Apus apus* House sparrow *Passer domesticus* Great crested newt *Triturus cristatus* Purple ramping-fumitory *Fumaria purpurea*	European hedgehog *Erinaceus europaeus* Blackbird *Turdus merula* House martin *Delichon urbicum* Barn swallow *Hirundo rustica* Common frog Common blue damselfly Common bird's-foot trefoil Meadow cranesbill
Oil shale bings	Lapwing *Vanellus vanellus* Golden plover *Pluvialis apricaria*	*Micarea lithinella* (a lichen) *Steinia geophana* (a lichen) *Stereocaulon nanodes* (a lichen) *Stereocaulon saxatile* (a lichen) *Stereocaulon leucophaeopsis* (a lichen) *Bacidia viridescens* (a lichen) *Caloplaca cerinella* (a lichen) *Buxbaumia aphylla* (a moss)