



# D5.6 Natural environments and biodiversity

The natural environment provides “ecosystem services” that are essential for life and human health, as well as benefitting physical, mental, spiritual and social wellbeing.

## Characterisation of impact on natural environments and biodiversity

| Intensity                      | Likelihood | Duration | Intensity        | Likelihood | Duration |
|--------------------------------|------------|----------|------------------|------------|----------|
| Positive impacts/opportunities |            |          | Negative impacts |            |          |
| ☀️☀️                           | ❓          | S to L   | ☀️☀️☀️           | ✅✅         | S to L   |

✅✅ Confirmed    ✅ Probable    ❓ Possible    ☀️☀️☀️ Major    ☀️☀️ Moderate    ☀️ Minimal    S Short term    M Medium term    L Long term

## ? How do the impacts of climate change on natural environments affect health and wellbeing?

### Positive impacts / opportunities

- Nature based mitigation strategies can benefit health and wellbeing e.g. by the reduction of air pollutants, preventing floods, reducing heat impacts of climate change and increasing access to green and natural spaces

### Negative impacts

- Loss, disruption or damage to ecosystem services such as clean air and water
- Disruption to food production, security and supply
- Loss or damage to access to valued natural environments that provide benefits to physical, mental and social wellbeing and tackling inequalities

## 🌐 Pathways of impact arise from

- Higher temperatures
- Increased winter rainfall
- Reduced summer rainfall
- Water scarcity
- Extreme weather: rainfall/storms/wind
- Extreme weather: heat
- Flooding
- Sea level rise
- Psychosocial and behavioural factors

A biodiverse natural environment plays a fundamental role in human health and wellbeing including:

- Access to ecosystems services (See Box 1) such as clean water (Cook et al., 2019; Sandifer et al., 2015)
- Protection from environmental risks such as heat and flooding (Cook et al., 2019)
- Food supply and security (Cook et al., 2019; Bernstein, 2014)
- Physical, mental and spiritual health benefits derived from engagement with diverse natural habitats and with different species (Cook et al., 2019; Sandifer et al., 2015)
- The development of pharmacological treatments and biomedical sciences (Bernstein, 2014)
- Access to a microbial organisms supporting the development of a healthy immune system (Rook, 2013)

There is strong evidence that access to green and natural environments has a range of health and wellbeing benefits (Public Health England, 2020) including:

- Aid in recovery from illness
- Help with managing poor health
- Improved physical health
- Improved mental health and wellbeing
- Reduced levels of depression, anxiety, and fatigue
- Enhanced quality of life for both children and adults
- Community cohesion and reduced loneliness
- Mitigation of air pollution, excessive noise, heat and flooding

In addition, disadvantaged groups also appear to gain a larger health benefit and have reduced socioeconomic-related inequalities in health when living in greener communities (Public Health England, 2020).

**Box 1. What are ecosystem services?**

Ecosystem services are the “benefits that humans receive from nature” (Environmental Protection Agency, n.d.). The Environmental Protection Agency in the USA considers that there are seven broad categories of ecosystems goods and services:

- Clean Air
- Clean and Plentiful Water
- Natural Hazard Mitigation
- Climate Stabilisation
- Recreation, Culture, and Aesthetics
- Food, Fuel, and Materials
- Biodiversity Conservation

## The impacts of climate change on the natural environment

There is strong evidence that climate change is a major contributor to biodiversity loss, species redistribution and damage and loss of the natural environment. Risks to terrestrial and freshwater species and habitats from changing climatic conditions, extreme events, invasive non-native species, and new and emerging pests and diseases are identified as a high priority for action in the UK Climate Change Risk Assessment (CCC, 2021). Irreversible damage to the marine environment are projected under both the 2°C and 4°C warming scenarios in the UK (UK Climate Risk, 2021a) and higher water temperatures, reduced water availability and changing river flows could increase the degradation of freshwater habitats, and compromise the viability of some freshwater species (UK Climate Risk, 2021b).

The State of Natural Resources Report in Wales (Natural Resources Wales, 2020) highlights the following impacts of climate change on biodiversity in Wales:

- Climate change is driving species to move location
- Arctic-alpine species within mountain habitats could disappear from Wales as their habitats are lost
- Where coastal plants and wildlife cannot move inland, sea-level rise and increased land erosion could lead to widespread loss
- The ecosystem services these habitats provide - like flood defence and carbon dioxide removal - will also be lost
- The number and range of invasive non-native species is likely to increase with the changing climate

High temperatures, drought and water stress may increase animal morbidity and mortality (Animal and Plant Health Agency, 2022; Mbow et al., 2019). Climate changes also poses threats to pollinators that are essential for key crops and, therefore, food production (20% of the UK cropped area contains crops which are dependent on pollinator) (Welsh Government, 2018).

### Negative impacts on health and well-being

Negative impacts on health and wellbeing arising from climate change effects on the natural environment and biodiversity include:

- Loss, damage and disruption to ecosystem services such as clean air and water (see also Sections D5.2 and D5.5)
- Disruption to food production, security and supply (see Section D1)
- Loss or damage to access to valued natural environments that provide benefits to physical, mental and social wellbeing and tackling inequalities (Ints 7,9, 11, 13<sup>1</sup>) (see also Section D4 on mental wellbeing and D2.1 on physical activity).

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1 Evidence from stakeholders is referenced in the appraisal sections as W1 and W2 for insights from participatory workshops, and Int.1 etc for evidence from expert interviews.

## Opportunities to enhance health and well-being

In terms of opportunities, there are well recognised natural hazard mitigations and climate stabilisation interventions using ecosystem services that can help with prevention and mitigation of climate change impacts (See Box 2).

### Box 2: Example of natural hazard mitigations and climate stabilisation interventions using ecosystem services:

- In 2017, urban green and blue space in Great Britain removed 27,900 tonnes of 5 key air pollutants. The avoided health costs were estimated at £162.6 million, with 70% of the avoided costs due to the positive effects of urban woodland (Office for National Statistics, 2019; Public Health England, 2020).
- There is evidence that in an urban context greenspace is associated with heat reduction (van den Bosch and Ode Sang, 2017). Research indicates there is a 'park cool island' effect of between 1.5-3.5°C, with a stronger cooling effect for larger urban greenspace, and that shade-giving street trees also provide an important means of heat relief (Public Health England, 2020; Saaroni et al., 2018).
- Green infrastructure can help to prevent floods from occurring and reduce their severity when they do. Publicly accessible spaces that help to mitigate flooding, for example floodplains or wetlands, may contribute to health by providing opportunities for recreation (European Environment Agency, 2017; Public Health England, 2020).

## The triple challenge: cumulative impacts with COVID-19 and Brexit

The withdrawal of the UK from European Union ("Brexit") has triggered changes in the legislative and governance arrangements for environmental protection across the UK (Anthony, 2021; Green et al., 2019; Green et al., 2021). Whilst there is a strong policy and legislative framework in Wales for the sustainable management of natural resources and biodiversity (see Policy section below), independent governance arrangements remain interim (Welsh Government, 2021).



### Population groups affected

- **Whole population**



## Relevant statistics

- **Over 80% of the Welsh land area is utilised for agriculture** (State of Nature Partnership, 2019) **and 15% is used for forestry** (Natural Resources Wales, n.d.).
- **8% of species in Wales are threatened with extinction and there has been a 10% decline in average species distribution in Wales since 1970. 6% of this reduction has occurred since 2005** (State of Nature Partnership, 2019).
- **Woodland cover in Wales has quadrupled to 15% since a low point of 4% in 1918. Only 48% of woodlands in Wales are considered native and just 14% are classed as ancient and semi-natural** (State of Nature Partnership, 2019).
- **When surveyed in 2020/21, 54% of people aged over 16 years in Wales think that there has been a decrease in the variety of species in Wales (a rise from 33% in 2018/19)** (Welsh Government, 2022a).
- **63% of people aged over 16 years in Wales think that there will be a decrease in the variety of species in the future in Wales in 2020/21 (a rise from 45% in 2018/19)** (Welsh Government, 2022a).
- **71% of people aged over 16 in Wales found it very easy to walk to a local green space and 15% found it fairly easy in 2018/19** (Welsh Government, 2022a).
- **In 2018/19, 6% of people aged over 16 years in Wales found it very difficult to walk to a green space, and 4% responded that there were no green spaces available nearby** (Welsh Government, 2022a).
- **84% of people aged over 16 years in Wales report being fairly or very satisfied with the quality of local green space when surveyed in 2018/19** (Welsh Government, 2022a).



## Key Policy Documents

- **Prosperity for All: A Climate Conscious Wales** (Welsh Government, 2019)
- **Environment (Wales) Act 2016** (Welsh Government, 2016)
- **Biodiversity Duty** (Welsh Government, 2022b)
- **Area Statements** (NRW, n.d.)
- **Wales Nature Recovery Plan** (Welsh Government, 2015)
- **Wales Action Plan for Pollinators Review** (Welsh Government, 2018)
- **Sustainable Farming Scheme** (Welsh Government, 2022c)
- **Connected communities** (Welsh Government, 2020) recognises the importance of access to the outdoors in empowering local people and groups to use the natural environment to help tackle loneliness, social isolation and mental ill health and the need to improve the quality of our environment to help bring people together.

## Reference for this document

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