

Lake District Green Lanes Alliance

The environmental impact of off-road motor vehicles using green lanes in the Lake District. A summary of the scientific evidence

- 1 The Lake District is an area of great biodiversity.**
- 2 Off-road vehicles significantly contribute to erosion on unpaved roads.**
- 3 Off-road vehicles are high polluters with a detrimental impact on areas surrounding unsealed roads.**
- 4 Off-road vehicles on unsealed roads have a negative effect on biodiversity (habitat fragmentation, sedimentation, dust, noise, light).**
- 5 Climate change represents a substantial threat to the Lake District landscape, exacerbating the impact of green lane motoring.**
- 6 The special qualities of the Lake District landscape (harmonious beauty, opportunity for quiet enjoyment) are in conflict with the motorised use of unsealed roads for leisure purposes.**
- 7 Green Lanes in the Lake District: responsibility of the National Park Authority and Cumbria County Council to protect the environment.**

1 The Lake District is an area of great biodiversity

The areas of the Lake District where green lane driving takes place are covered by two of Natural England's National Character Area Profiles: 8 (Cumbria High Fells) and 19 (South Cumbria Low Fells). The LDNPA seems unsure about the number of green lanes (unsealed/unpaved roads) open to motor vehicles. Figures vary between: 75 ([LDNPA, 2019](#)) and 85 (given by LDNPA in an email in 2021). The overall length of these routes is 120.6km.)

The Cumbria High Fells contain "the most biologically diverse suite of upland habitats in England with internationally important fell habitats, rivers, lakes, unimproved grasslands, and native woodland". ([Natural England NCA 8, 2012](#)) The fells and valleys of the South Cumbria Low Fells are characterised by "extensive areas of semi-natural habitats of high visual and nature conservation importance, including internationally important mires, raised bogs and ancient woodland," The organic peat soils and peat surface horizons have an important role in regulating climate change. The extensive woodland provides significant carbon storage and sequestration. ([Natural England NCA 19, 2012](#)) Both areas are habitat for a number of endangered and vulnerable species, e.g. Curlew ([CBDB](#), Porter & Halliday, 2014).

Challenges for both areas include soil erosion through rainfall and visitor pressure; the need for enhancement of connectivity and habitat network; the enhancement of water catchments, rivers, lakes, tarns and reservoirs for nature conservation, including a reduction in the supply of sediment and the restoration and expansion of

native woodlands, trees and shrubs. ([Natural England NCA 8, 2012](#), [Natural England NCA 19, 2012](#))

For more detailed data on biodiversity see

[Cumbria Biodiversity Data Centre](#)

[DEFRA MAGIC map](#)

[NBN Atlas](#)

2 Off-road vehicles significantly contribute to erosion on unsealed roads

Off-road vehicles have been identified as one of the primary sources of soil erosion and compaction on unpaved roads ([Ouren et al., 2007](#)). Wheels of motor vehicles expose surface material to shear stresses, loosening particles and exposing them to erosion. If the dislodged soils are subjected to rainfall, they may be washed away, producing runoff and sedimentation ([Ngezahayo et al., 2019](#)).

Unsealed forest roads change the hydrological behaviour of hillslopes and are important source points for runoff generation. They can increase the hillslope-scale sediment production rates by up to four orders of magnitude relative to undisturbed conditions ([Jordán-López et al. 2009](#)).

A comparison between erosion and sedimentation on different types of unsealed road suggests closure to motor vehicles as an effective reduction strategy ([Marion et al., 2019](#)).

3 Off-road vehicles are high polluters likely to have a detrimental impact on areas surrounding unsealed roads

The most commonly used motor vehicles on Lake District green lanes are diesel-powered 4WDs and petrol-powered motorbikes. Vehicle emissions are linked to vehicle age and fuel type ([Ntziachristos & Samaras, 2019](#)) Among diesel vehicles the ones with an unknown Euro classification (frequently reported on Lake District green lanes) are the most polluting ([Ghaffarpasand et al., 2020](#))

Road grade and gradients have a marked effect on tailpipe emissions from motorcycles. For uphill road driving pollutant factors were shown to be above Euro 5 emission limits for even the most modern motorcycles ([Yang et al., 2021](#)).

Different forms of pollution decay at different rates, with many pollutants deposited in the immediate vicinity of roads ([Phillips et al., 2021](#)); trace element concentrations in the topsoil of the first 5 metres beside the road are heavily influenced by road traffic ([Werkenthin et al. 2014](#)), Other forms of pollution (noise, light) with different dispersion patterns affect wider areas. Noise from motorcycles elicited a significantly higher annoyance response than noise from other traffic, pointing to prohibition as a more effective prevention measure than setting limits on the number of motorcycles ([Lechner et al., 2020](#)).

Elevated levels of pollution occur on an estimated 94% of land in Britain, especially for NO₂ and particulate matters, with lower pollution levels mainly restricted to the uplands. Green lanes used by motor vehicles therefore play a significant part in spreading traffic pollution into remote upland regions such as those in the Lake

District where they are not needed for connectivity to the local road network and cannot be used by ordinary road vehicles ([Phillips et al., 2021](#)).

4 Off-road vehicles on unsealed roads have a negative impact on biodiversity

Off-road vehicles on unsealed roads are a cause of habitat fragmentation, loss of connectivity and barrier effects. These impacts were observed even on narrow tracks, which may disrupt the movement and dispersal of many wildlife species between and within habitats ([Ouren et al., 2007](#)).

Vehicular traffic is a source of noise and other stimuli with potential to disturb wildlife. Examples are lapwing and godwit populations which undergo density depressions linked to the presence of a road over distances varying from 200 to 2000m. an effect observed even near quiet rural roads ([Van der Zande et al., 1980](#)) and of relevance for the habitat of bird species in the Lake District such as curlew and lapwing.

Light pollution from vehicles has been reported on some green lanes in the Lake District. It is becoming an increasing problem because of the characteristics of modern vehicle headlights. As light from passing vehicles is experienced as a series of pulses, it is likely to have major biological impacts ([Gaston & Holt, 2018](#)).

Pollution in the form of noise, turbulence, dust and metals has been shown to affect pollinators in road verges, leading to lower pollinator densities, particularly within the first 2m where pollution is greatest ([Phillips et al., 2021](#)).

Roads (including unpaved forest tracks) are one of the determining factors limiting plant diversity in forests. The effect is at its maximum in the first 0-20 m forest-to-road segment and becomes mitigated after the 200 m threshold ([Marcantonio et al., 2013](#)).

There is evidence of the impacts on individual plant species from exposure to NO_x associated with vehicle emissions and that these are greatest within the first 50-100m from roads but may be discernible at greater distances. Vehicle emissions are also a source of metal contamination for vegetation close to roads ([Natural England, 2016](#)).

The Atlantic woodlands of the Lake District are an important habitat for lichens and bryophytes, many not found in other parts of Britain and Europe, some globally rare ([Plantlife, 2020](#)). Lichens are vulnerable to excess nitrogen deposition which reduces lichen abundance and increases the metabolism of sensitive species. This applies especially to regions with greater precipitation such as the Lake District ([Gutiérrez-Larruga et al., 2020](#)). Cumulative nitrogen deposition can lead to a cascade of soil chemical reactions that display widely through the environment ([Air pollution Information System](#)).

The negative impact of roads, including unsealed roads, on the ecosystem is adding urgency to the protection and creation of roadless areas. Roadless areas protect biodiversity and ecosystem services, and are of particular importance in the context of climate change ([Pсарalexi et al., 2017](#); [Selva et al., 2011](#)).

5 Climate change represents a substantial threat to the Lake District landscape

It is widely agreed that climate change will have a direct and dramatic impact on the Lake District and demands a radical and transformative response from the LDNPA. Although proportionately the contribution by off-road vehicles to the **causes** of climate change is small, it is not zero. Allowing them access to green lanes in remote areas of the upper fells sends the wrong signal about the LDNPA's commitment to tackle climate change. For this reason alone any policy on off-road motoring has to be part of the LDNPA's response to climate change. But off-road vehicles also greatly exacerbate the **effects** of climate change, particularly of more frequent weather events, e.g. through erosion (see 2 above).

The National Park Authority's Climate Change Adaptation Report assesses among other risks those to landscape character, plant and animal species, the special character of the National Park and the Outstanding Universal Value of the World Heritage Site. Because of increased rainfall, the report identifies a particular threat to footpaths and green lanes, where erosion and sedimentation could result in the loss of ecologically sensitive areas and landscape aesthetics ([LDNPA, 2021](#)). Among measures to minimise erosion Natural England recommends management of access ([Climate Change Adaptation Manual 2014](#)).

In its Smarter Travel Vision ([LDNPA, 2018](#)) the LDNPA states as one of its aims that visitors will choose to walk, cycle, travel by boat, rail or bus as the best way to discover the spectacular landscape.

A supporting paper for the Lake District Partnership Plan ([Climate Action – Achieving Net Zero and Adapting to Climate Change](#)) proposes that the Lake District could become a role model to inspire wider society to make positive change in their environmental impact.

A policy such as restricting motor vehicle access to green lanes could act as both a signal and a leverage point to bring about a wider transformation ([Riechers et al., 2021](#)). Conversely, any decision to allow motor vehicles access to green lanes is likely to signal the opposite: an unwillingness to put sustainability policies into practice.

6 The special qualities of the Lake District landscape (harmonious beauty, opportunity for quiet enjoyment) are in conflict with the use of unsealed roads by recreational motor vehicles.

Both the Special Qualities of the Lake District relating to its status as a National Park and its Outstanding Universal Value relating to its inscription as a World Heritage site are fully documented ([LDNPA website](#); [LDNPA Nomination Document for World Heritage status, 2016](#)). These documents, in addition to detailed Landscape Character Assessments ([LDNPA, 2021](#)) for all areas of the Lake District, show the central importance of the Lake District's harmonious landscape and tranquillity, defined by the CPRE as freedom from disturbance and both noise and visual intrusion ([CPRE, 2006](#)).

7 Green Lanes in the Lake District: legal powers of the LDNPA

The statutory purposes of National Parks are twofold:

- to conserve and enhance the natural beauty, wildlife and cultural heritage of National Parks; and

- to promote opportunities for the understanding and enjoyment of the special qualities of National Parks by the public ([National Parks England website](#)). If there is a conflict between those purposes, conservation should be given greater weight ([Environment Act Section 62](#)).

In 2006 National Parks were given powers to close unsealed roads to recreational motor vehicles using Traffic Regulation Orders (TROs). The purposes for making a TRO include “*the purpose of conserving or enhancing the natural beauty of the area, or of affording better opportunities for the public to enjoy the amenities of the area, or recreation or the study of nature in the area.*” ([RTRA 1984 Section 22A](#))

The UNESCO World Heritage Centre through its advisory body ICOMOS has issued two reports which both describe motor vehicles on green lanes as harmful to the Outstanding Universal Value ([ICOMOS, 2019a](#); [ICOMOS, 2019b](#)) and ask the LDNPA to put an end to this activity using its statutory powers.

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Effects of Nitrogen Deposition
on the Abundance and Metabolism
of Lichens: A Meta-analysis

Blanca Gutierrez-Larruga,¹ Belén Este´banez-Pe´rez,² and
Raúl Ochoa-Hueso^{3*}

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