NATIONAL TOURISM MONITORING PROGRAMME 2021-2025

ANNUAL RESULTS FOR 2022

KILLYKEEN FOREST PARK

for: **Fáilte Ireland**

88 – 95 Amiens Street

Dublin 1

D01 WR86

by: **CAAS Ltd.**

1st Floor,

24-26 Ormond Quay Upper

Dublin 7

February 2023

Document Control

	Author/Reviewer	Date
Prepared by	Andrew Torsney & Callum O'Regan	Various dates to 02 February 2023
Reviewed by	Conor Skehan & Maeve Walsh	02 February 2023
Status of this version	Draft	

Contents

Killykeen Forest Park – Interesting Finds

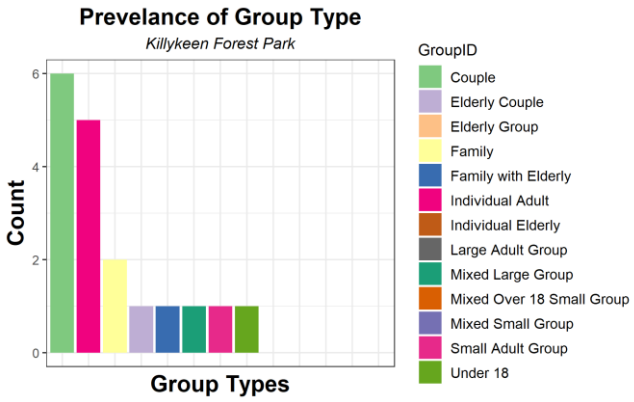
ECOLOGICAL HIGHLIGHTS

The woodland habitats of Killykeen and the surrounding area are perfect habitats for bat species such as the brown long eared bat to thrive as they require specific foraging habitat.

The site has a strong population of red squirrels and pine marten present. Moreover, due to the site's location along Lough Oughter, it also provides perfect habitat for otters, although no otter holts were recorded. Additionally, the site is known to host winter waders such as the scaup.

VISITOR NUMBERS AND DWELL TIME

- 49 people visited the site over 8 hours
- Average dwell time of 100 minutes



KEY RECOMMENDATIONS

- There is a strong bat population at Killykeen Forest Park and management practices to support strong invertebrate populations for foraging should be considered along with the installation of bat boxes.
- The site, in general, is well managed. However, an increase in interactive signage related to ecology and biodiversity should be considered that could increase visitor experiences at Killykeen Forest Park.

VISITOR INTERACTION & MANAGEMENT

- Visitor interactions on site well controlled with strong management practices in place.
- Majority of visitors did not read available signage.
- An increase of impacts from 0 to 9 was observed between the 2021 and 2022 survey, however, the majority of these impacts were deemed to be of low level.
- Most of the visitors to the site stayed for at least 100 minutes –given the nature of the site.
- Number of visitors to the site almost halved from 91 to 49 between the 2021 and 2022 surveys.

Highlights:

- Site provides excellent habitat for bat and other mammal species.
- Increase in number of impacts observed despite a large reduction in number of visitors.
- Site signage related to biodiversity is limited – missed opportunity for wildlife and habitats.

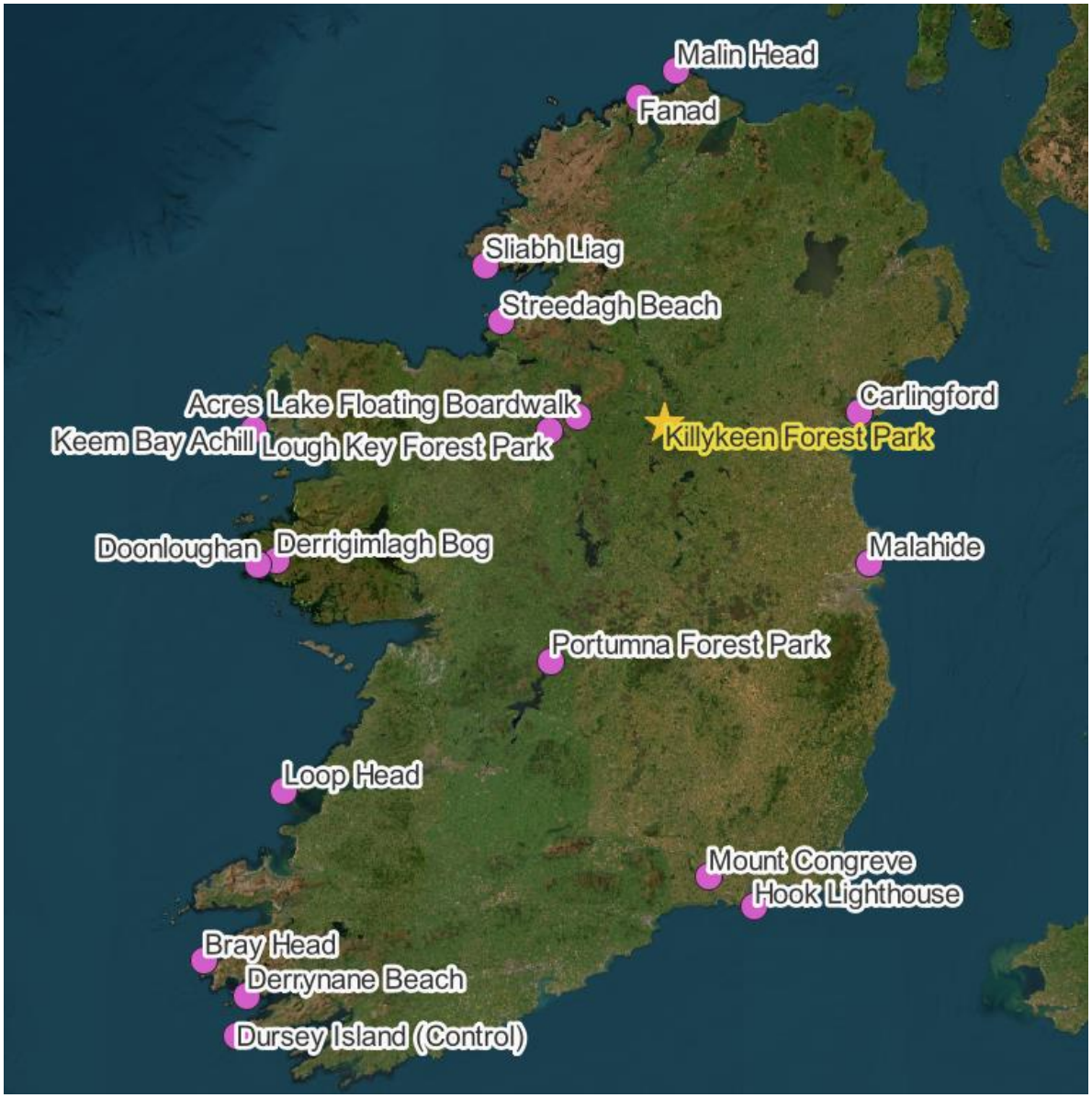


1 Killykeen Forest Park

1.1 Purpose & Outputs of the Programme

Building on the success of the Wild Atlantic Way (WAW) environmental monitoring programme which ran from 2015-2019 – Fáilte Ireland has decided to expand the programme to a national level. The programme will monitor 19 individual sites located in all of Fáilte Irelands regional areas; The Wild Atlantic Way, Irelands Hidden Heartlands, Irelands Ancient East and Dublin. The programme will run for 5 years from 2021-2025.

The sites that are included in the programme vary in type from inland forest parks, to coastal sites, to privately owned attractions and diverse urban locations - can be seen below.



The purpose of the programme is as follows:

- To gain more insight from an environmental perspective as to what is happening at a variety of sites where we encourage visitors to frequent,
- To gather information (visitor behaviour, movement, path and trail conditions, surveys for birds, flora etc) for each site over the course of 5 years,
- To understand if there are observable trends and/or observable variations amongst site types over a 5-year period,
- To note good & bad practice at sites in order to;

- Make recommendations where appropriate for site management which is intended will have sustainable benefits for the site, the visitor and the natural environment.

The Wild Atlantic Way Environmental Monitoring Programme allowed us to monitor the behaviour & movement of over 26,000 visitors, identify where there were stresses on the environment or potential future risks as well as good and bad practice.

This culminated in our ability to make useful recommendations to site owners and managers and ultimately to development a practical set of Guidelines for Visitor management (from Planning thorough to Site Operation).

It is hoped that we can build on the learnings of this previous programme and by engaging with site managers, to knowledge share, can enhance the information that we gather for each site chosen nationally for this new programme.

The key areas of focus within the data being gathered is to answer the following questions:

- How do the learning outcomes from the WAW monitoring compare when using repeat measures at fixed locations over a long period? Hence, what are the predictors of impact occurrence and severity?
- Following on from the WAW monitoring data – with the refined methods we aim to understand what activities cause which impact; and what are the factors which influence these activity choices in visitors?
- Understanding visitor movement patterns with respect to ranging behaviours – i.e., is there a distance threshold where impacts are less severe or negligible?
- Undertake pathway condition assessments to understand the relative sensitivities or tolerances of path types to visitor movements – taking note of habitat type and visitor numbers/load capacity.

These questions will be answered upon completion of the full suite of surveys and data collected annually over the course of the monitoring programme. However, each year will have annual interim reports to enable emerging findings and management recommendation to be identified and shared with the relevant stakeholders to support progressive management practices.

1.1.1 Looking Ahead

The National Tourism Monitoring Programme aims to assess and characterise visitor movements and impacts in 19 popular Failte Ireland tourism sites across Ireland within a 5-year period. This will be achieved through building on the methodologies and findings of the Wild Atlantic Way Environmental Monitoring Programme (2015-2019), by monitoring yearly trends in visitor numbers and movements during the high tourism season at each site. In addition to the annual visitor trend monitoring; visitor impact assessments, which examine visitor activity levels relative to condition assessments, will also be taken every two years for each site. At the end of the 5-year period, the resultant extensive data set will be analysed for long term trends and correlations between visitor numbers, visitor activity, and site condition assessments, at each site across the 5 years of the programme.

This monitoring programme will allow an examination of year-on-year shifts in visitor impact and trends, across each of Fáilte Ireland's regional areas; The Wild Atlantic Way, Irelands Hidden Heartlands, Irelands Ancient East and Dublin, resulting in an annual interim report for each year - while also assessing visitors trends, and changes in the condition of the each of the sites' habitats in relation to visitor trends, over a the entire 5-year period of the programme.

The long-term aim of the Monitoring Programme will be to inform local authorities and stakeholders to help in the design and implementation of methods that will encourage the sustainable management of visitor numbers and tourism activities, while also aiming to protect vulnerabilities of the local area's habitats in order to reduce environmental impact and enable more effective local conservation of each site.

1.2 Methods & Surveys

The following surveys were undertaken at Killykeen Forest Park:

1.2.1 Visitor Characterisation Survey

Visitor characterisation surveys were undertaken at each of the monitoring sites during the weekend period between June-August. The survey at Killykeen Forest Park was undertaken on the 26th of August 2022, with max temperatures reaching approximately 21.7° C, no rainfall and low levels of wind on the day[1]. These surveys followed an 8-hour time period recording samples of visitor behaviour of an many visitors on site as possible. Visitor movement patterns, demographic data and activities undertaken were recorded for all sampled visitors. Where activities had associated impacts, these were also recorded and the relevant severity was recorded using the same coding system as with the WAW monitoring (see Appendix I for details). It is important to note that the visitor characterisation surveys are indiscriminate between visitor s and local amenity use. It is also important to note that there was a lack of interaction with the subject matter of the surveys to ensure that there is no influence of the surveyor at all on the resultant data.

1.2.2 Ecological & Path Assessments

In addition to the visitor movement and behavioural records an ecological assessment and path network assessment was undertaken at each site. This consisted of mapping all tracks and trails – with records of hazards, notable damage etc. In addition to this, all habitats were mapped according to the Fossitt Habitat coding system while information on bird populations was gathered from National Biodiversity Centre Data.

1.3 Site Description of Killykeen Forest Park

Killykeen Forest Park (Figure 1.1), a Coillte managed site, hosts a 3km long loop walk that traverses the forest with views of Lough Oughter. The site is well-used is it is quite close to the town of Cavan. It contains habitats such as broadleaved and yew woodland along with tall herb swamps. The loop walk is surrounded by both the Lough Oughter SPA and Lough Oughter and Associated Lough SAC.

Plans have been announced to improve facilities at Killykeen Forest Park which includes the enhancement of a pedestrian bridge and other facilities. However, there have been no changes to site features between the 2021 and 2022 surveys conducted at Killykeen Forest Park.

Figure 1.1 Killykeen Forest Park

[1] Weather data gathered from closest available weather stations: https://www.met.ie/climate/available-data/historical-data

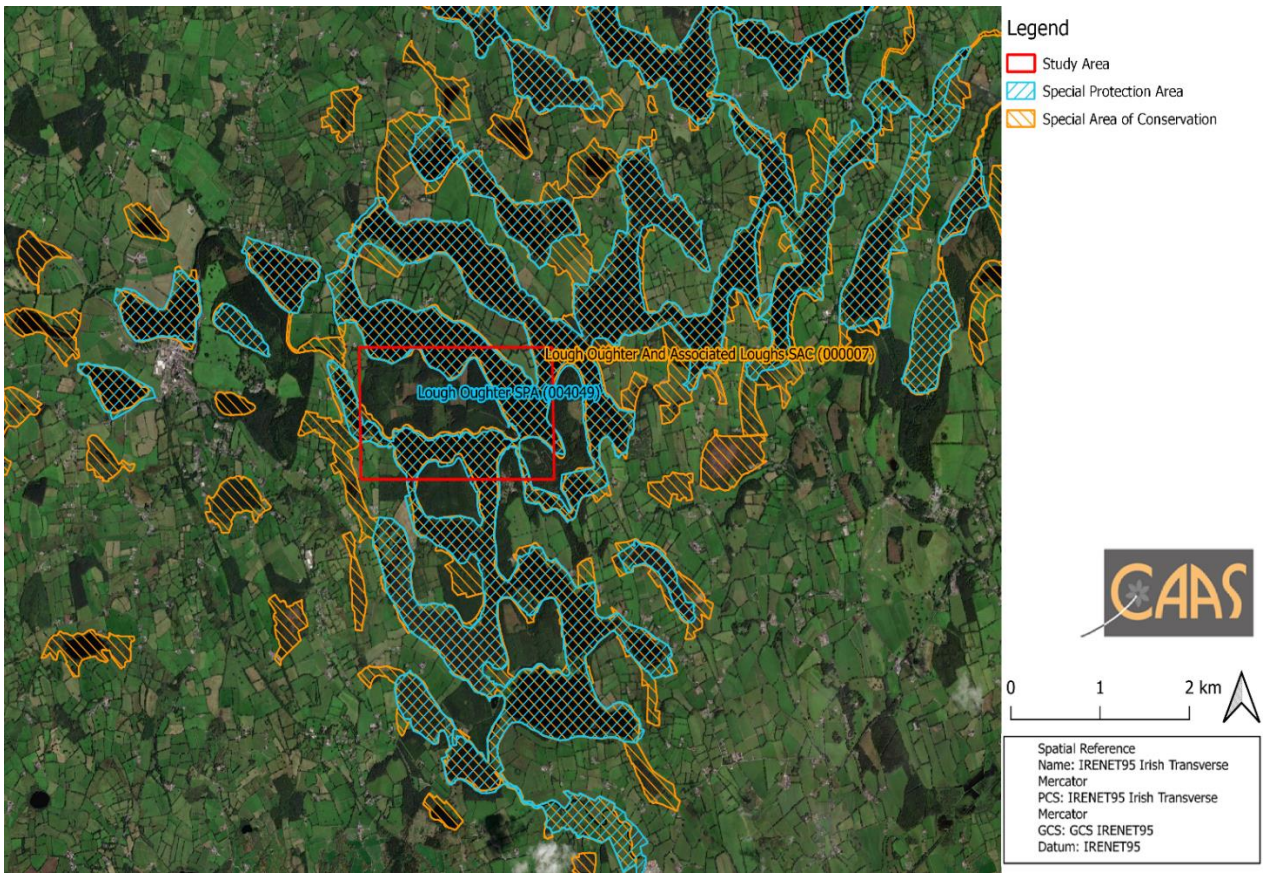


Figure 1.2 Study Area within Lough Oughter and Associated Loughs SAC

1.3.1 Critical Infrastructure

Table 1.1 Summary of Wastewater infrastructure at Killykeen Forest Park

Wastewater Treatment Plant (WWTP)	Irish Water Indication of Capacity	Comment
Toilet facilities are available on site No current WWTP on site at Killykeen Forest Park Nearest settlement with WWTP in Cavan (WWTP Reg #D0020)	Spare capacity available[2]	Current wastewater facilities are sufficient and current WWTP has sufficient capacity[3]

Table 1.2 Summary of Drinking Water infrastructure at Killykeen Forest Park

Drinking Water	Water Resource Name (WRZ)	Irish Water Indication of Capacity	Comment
Nearest serviced settlement to Killykeen Forest Park is Cavan	Cavan RWSS	Capacity available[4]	Current water supply is sufficient

[2] https://www.water.ie/connections/developer-services/capacity-registers/wastewater-treatment-capacity-register/cavan/
[3] https://www.cavancoco.ie/file-library/planning/development-plans/development-plan-2022-2028/adopted-written-statement-.pdf
[4] https://www.water.ie/connections/developer-services/capacity-registers/wastewater-treatment-capacity-register/cavan/

Table 1.3 Summary of Transport infrastructure at Killykeen Forest Park

Nearest Settlement	Current Transport Infrastructure	Comment
Cavan town	The site is located on the shores of Lough Oughter which is part of the River Erne system, accesible via L1512 Car parking facilities are available on site	Current transport infrastructure is sufficient

1.4 Pathways and Features Condition Results

1.4.1 Pathway Condition

The site has hard infrastructure access tracks through the forest – these are well managed and maintained. The trail edge close to the carparking area and bridge show signs of path widening for small sections where it is evident that visitors cut corners etc., or at the toilet facilities. This path is up to 2.5m in width at its widest point. There are no records of damage to the path with no substrate exposure.

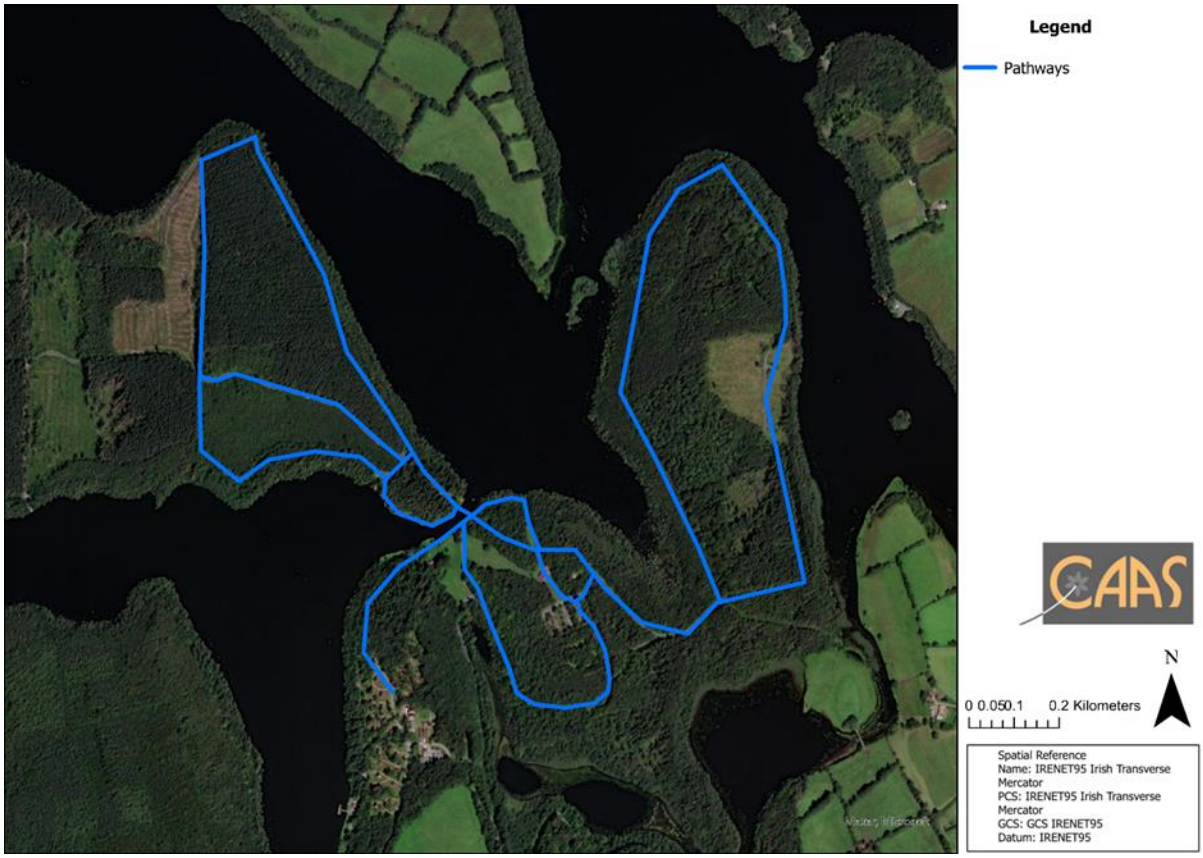


Figure 1.3 Pathways identified at Killykeen Forest Park

Figure 1.4 Pathway at Killykeen Forest Park

1.4.2 Features Condition

There are numerous signs at Killykeen Forest Park, these mainly pertain to trail maps which show the designated pathways throughout Killykeen Forest Park along with signage that cautions visitors on rules of the park itself (Figure 1.6). Despite the relatively high ecological and naturalistic value of Killykeen Forest Park itself, there is a lack of signage which relates to this. There are also multiple disused buildings close to the entrance of the park which may act as potential bat roosts.

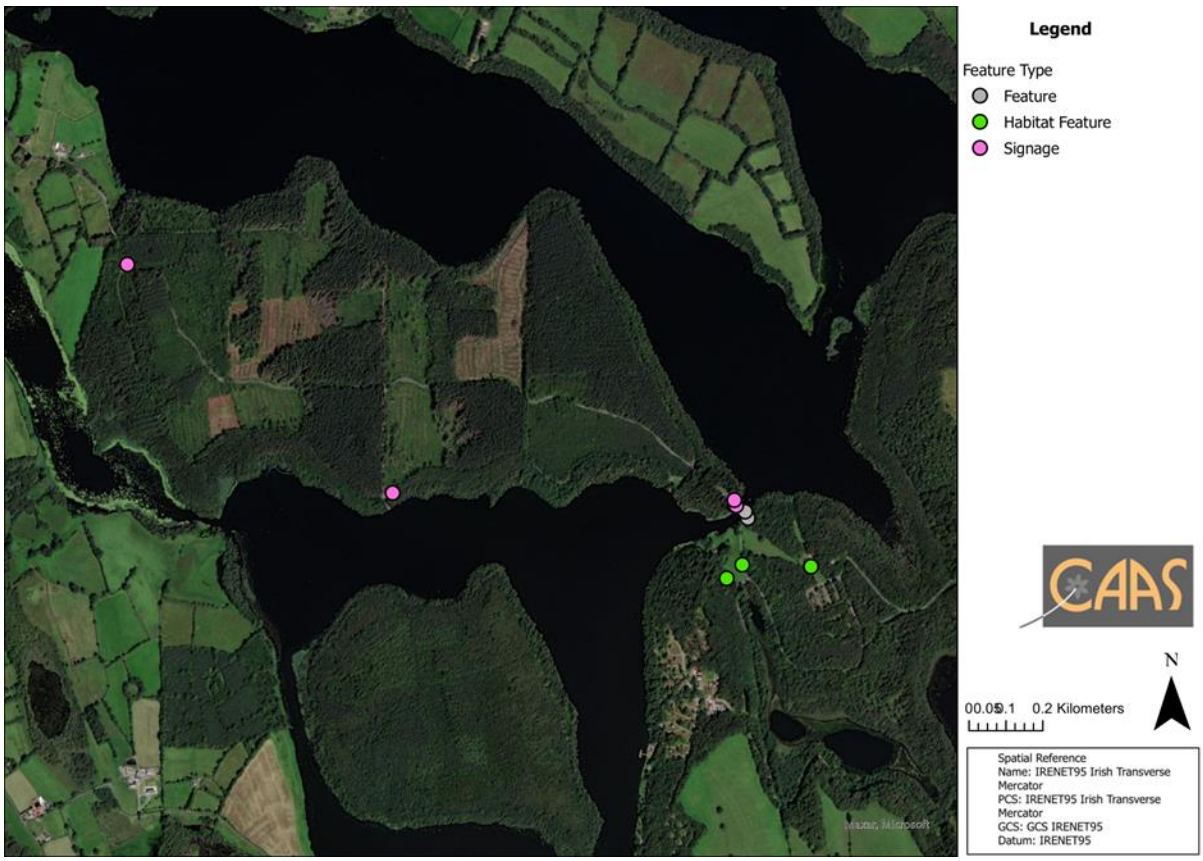


Figure 1.5 Features recorded at Killykeen Forest Park

Figure 1.6 Features at Killykeen Forest Park

1.4.3 Hazards

No hazards were noted or observed at Killykeen Forest Park from the hazard mapping.

1.5 Visitor Characterisation Survey

The visitor monitoring surveys resulted in a total of 49 visitors (which represents 18 group observations), a significant decrease from 91 visitors in 2021. The site is most popular amongst the couple group with the dominant mode of transport being car. The average dwell time for the site was 100 minutes, an increase from a 73-minute average dwell time in 2021; with the following activities undertaken during the survey (listed in order of occurrence rate):

Activity Type
Exploring off trail
Other
Dogwalking (off lead)
Picnicking

Activity Type
Sitting
Dogwalking (on lead)
Fishing
BBQing
Cycling
Scooter
Swimming

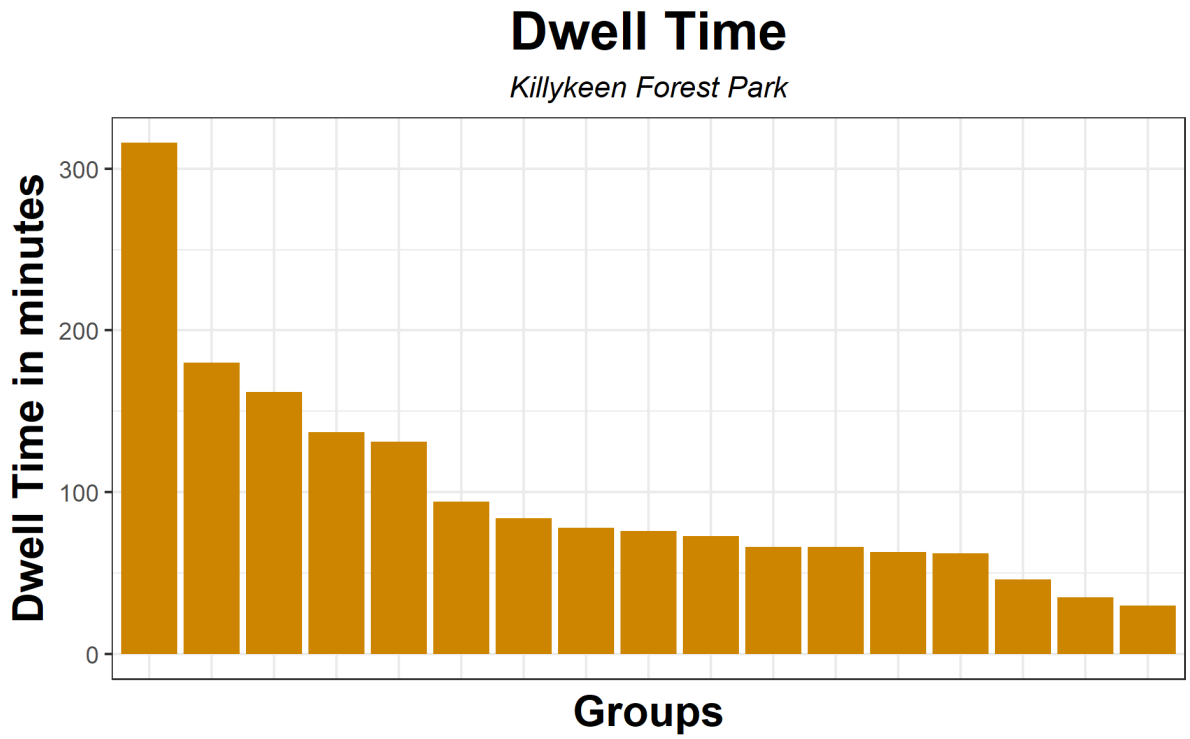


Figure 1.7 Duration of Time Spent at Killykeen Forest Park

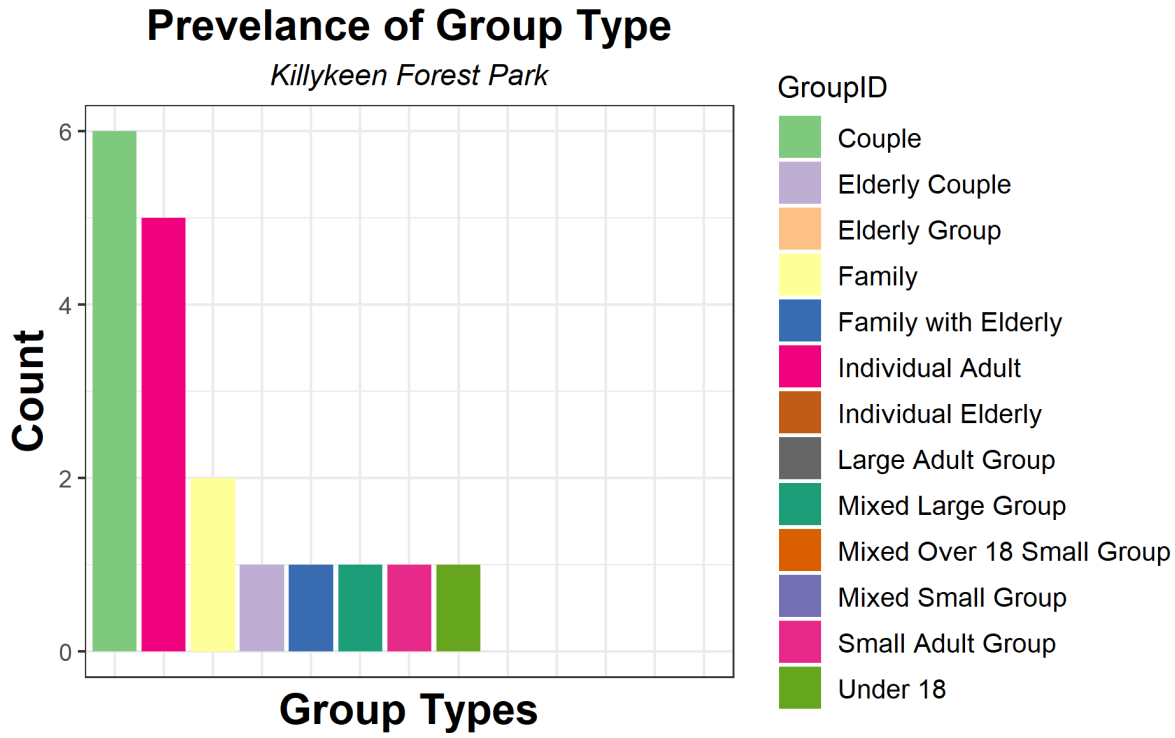


Figure 1.8 Groups of visitors that visited Killykeen Forest Park

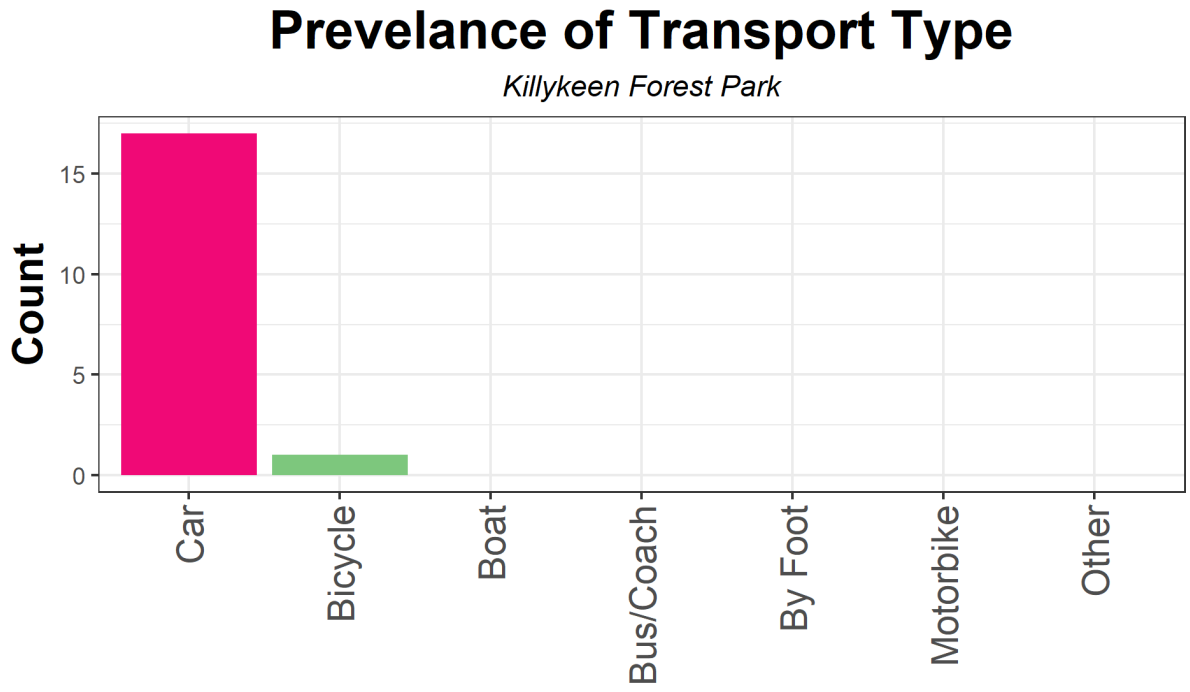


Figure 1.9 Mode of transport used to visit Killykeen Forest Park

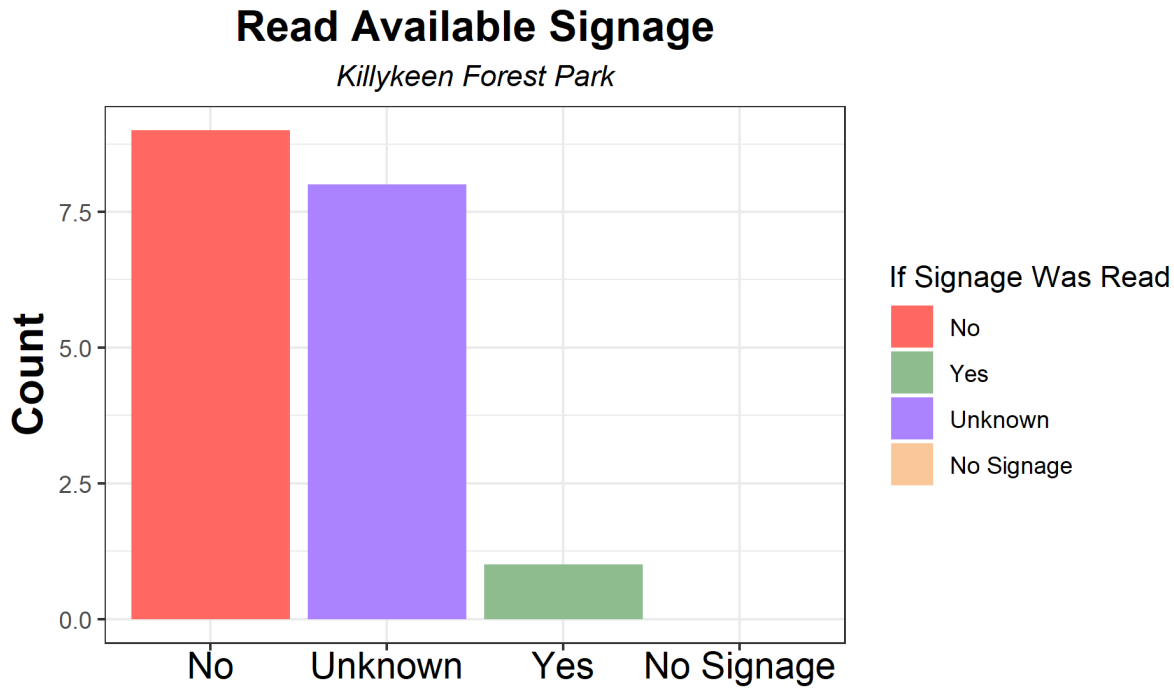


Figure 1.10 Use of Interpretive Material at Killykeen Forest Park

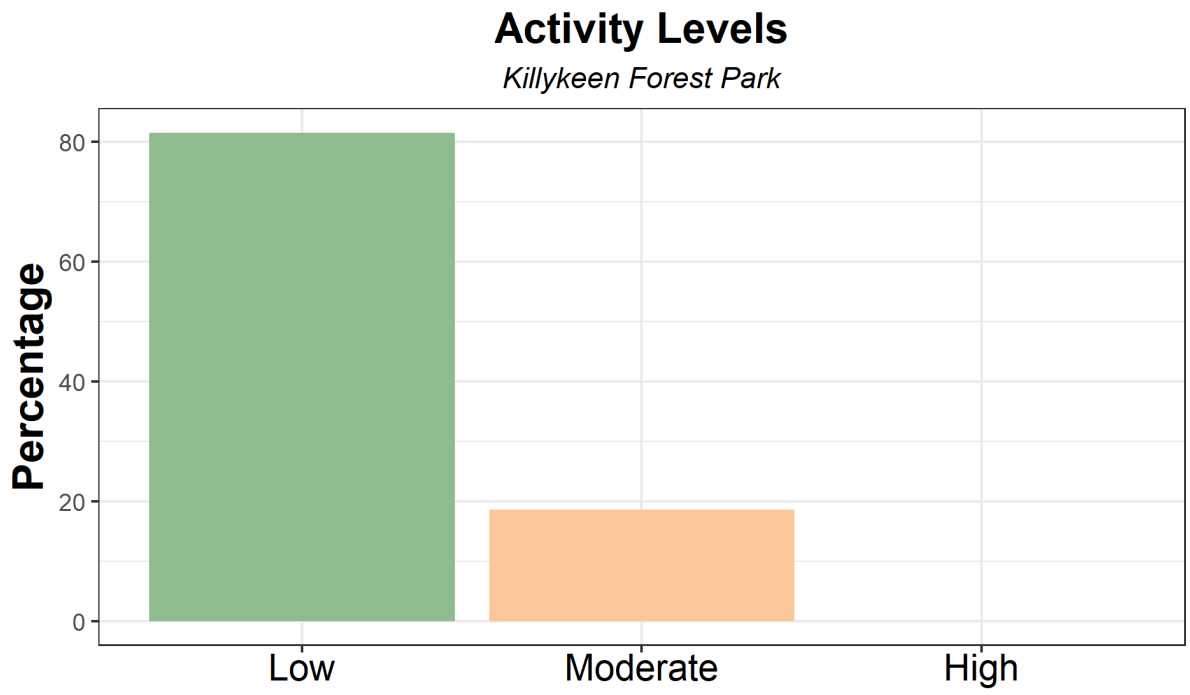


Figure 1.11 Categories of Activity Levels Observed at Killykeen Forest Park

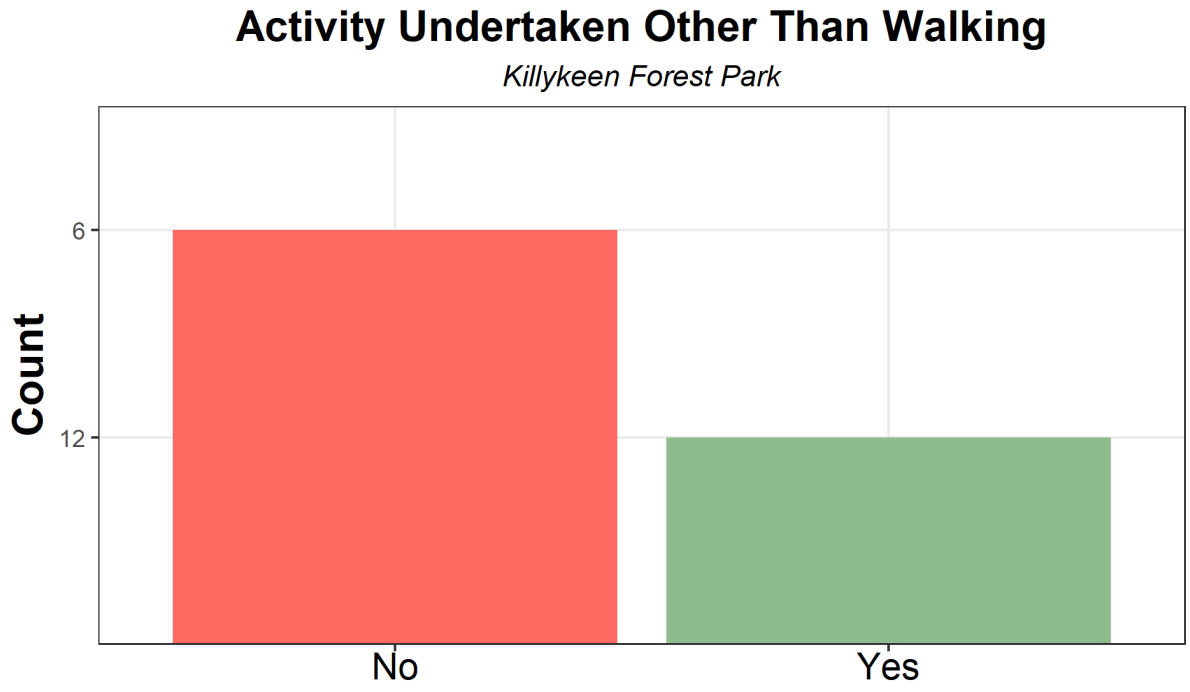


Figure 1.12 Activities undertaken other than walking

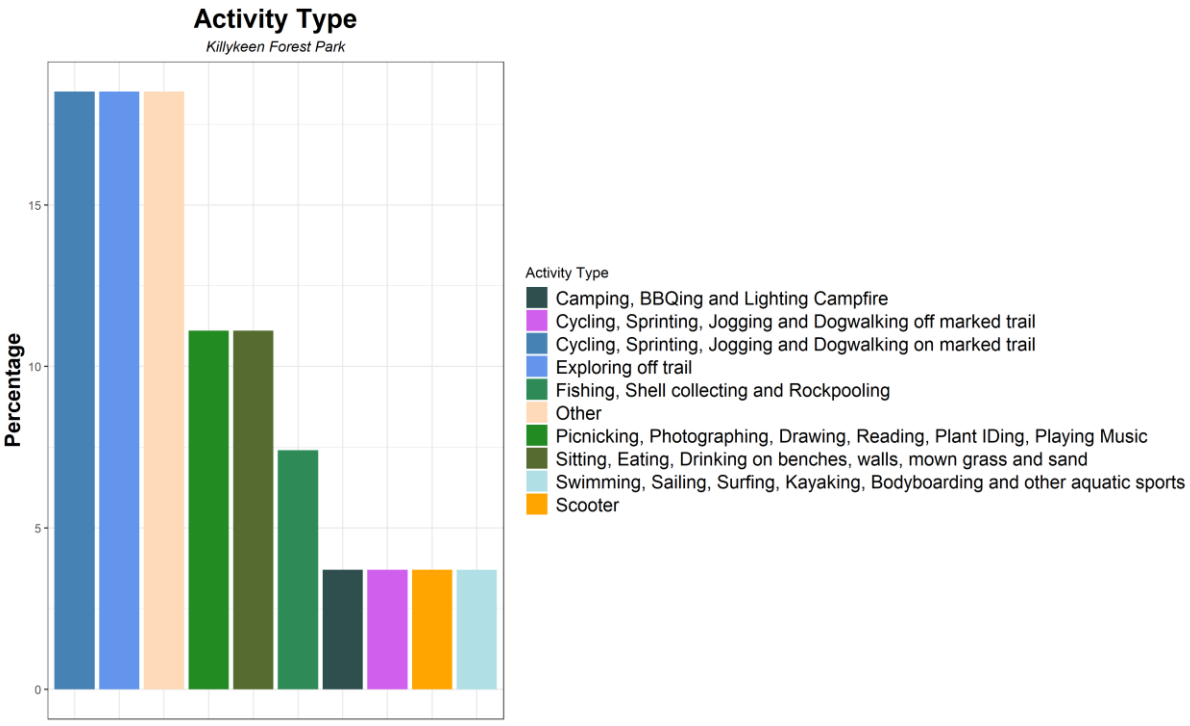


Figure 1.13 Range of Visitor Activities Observed at Killykeen Forest Park

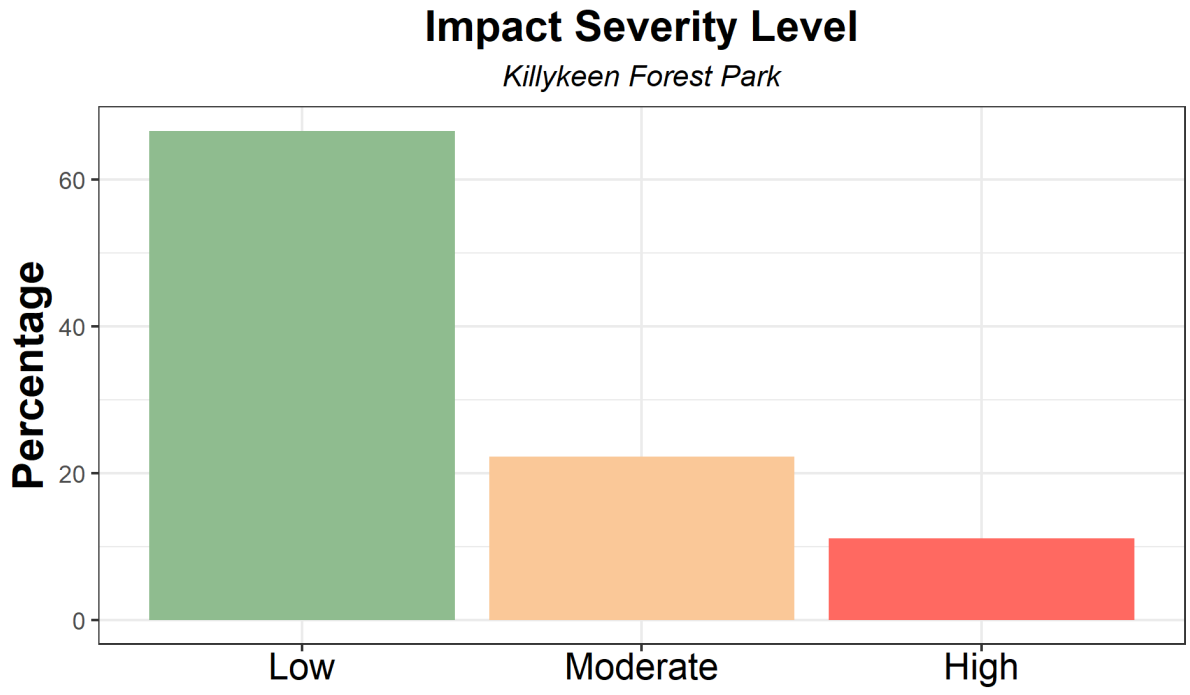


Figure 1.14 Categories of Environmental Impact Levels Observed at Killykeen Forest Park as a result of Visitor Activities[5]

[5] Impact severity was measures as a categorical variable which has a range of impact factors that are pre-determined; such as injuring, killing or taking wildlife as a severe impact (high) and temporary disturbance of wildlife being a low impact. These are explained fully in the method section above.

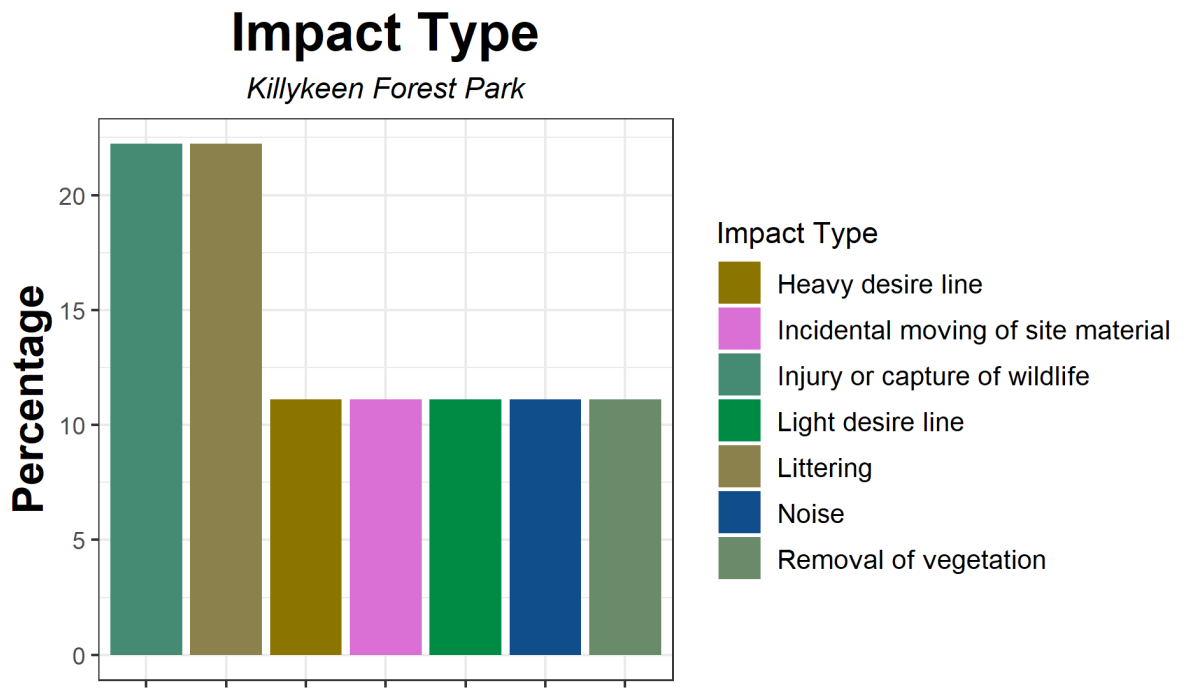


Figure 1.15 Range of Environmental Impacts Observed at Killykeen Forest Park

The environmental impacts that were observed and recorded used the same coding system as the Wild Atlantic Way Monitoring[6]. These impacts were recorded if a visitor's activity or movement resulted in one of the defined impacts noted in said coding system, which were categorised by severity level to the environment, ranging from light desire lines to disturbance of wildlife to burning of materials.

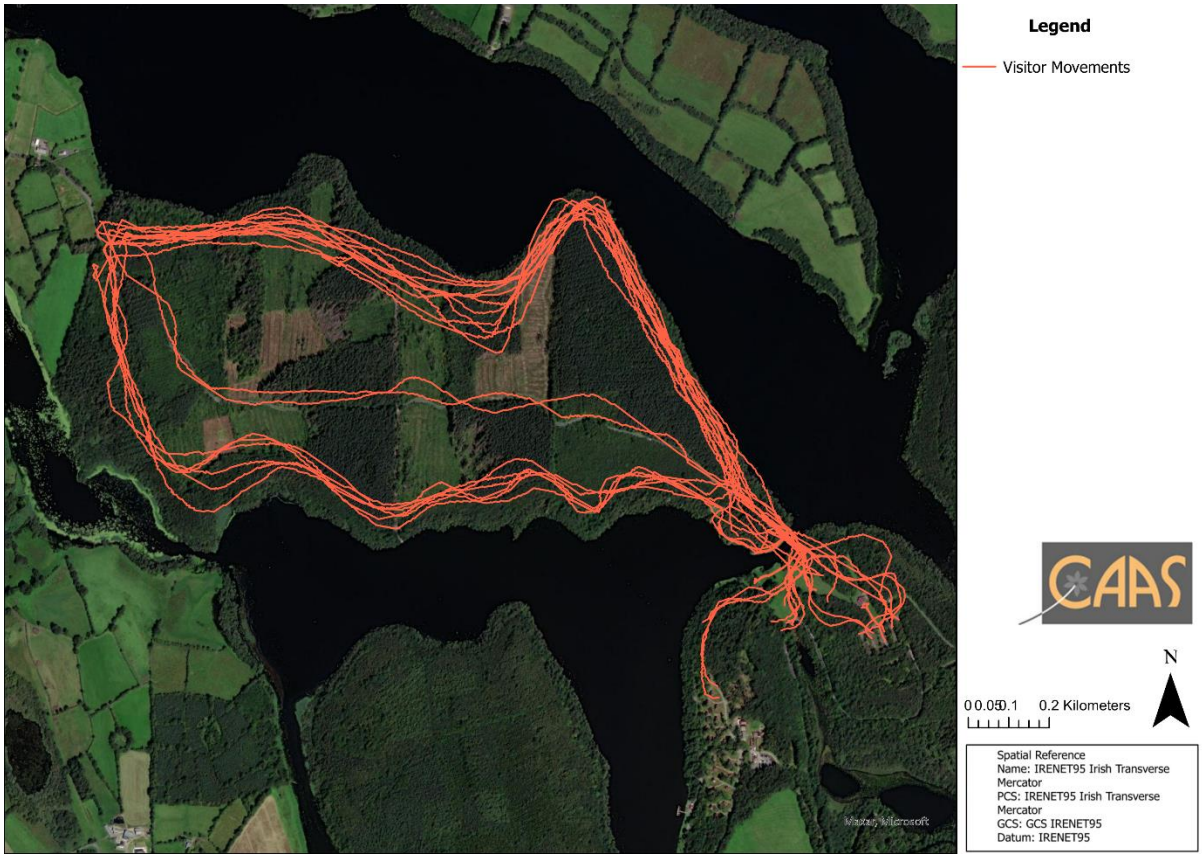


Figure 1.16 Visitor movement patterns at Killykeen Forest Park

[6] See Appendix I for more detail

Of the 18 groups recorded on site 67% of them undertook activities other than walking, an increase from 49% in 2021. These activities (identified above) resulted in 9 impacts being observed on site during the survey. Thus, 33 % of activities on site resulted in impacts on the environment. The impact severity levels varied with 67% of the impacts being low, 22% of impacts being moderate, and 11% of impacts being high severity. The impacts identified for the site were:

Impact Type	Count
Heavy desire line	1
Incidental moving of site material	1
Injury or capture of wildlife	2
Light desire line	1
Littering	2
Noise	1
Removal of vegetation	1

1.6 Comparison with Previous Survey Results

The data obtained has provided an opportunity to compare significant changes results with previous years. Where this occurs, this will be noted in the relevant sections.

The 2022 Visitor Characterisation Survey in Killykeen Forest Park produced a number of changes from the 2021 Visitor Characterisation Survey. Noted changes include;

- An increase was noted between the number of impacts observed from 2022 when compared to 2021;
- A decrease in percentage of activities (cycling, dog walking, jogging etc.) along marked trails along with an increase in percentage in exploring off trail; and,
- Reduction of visitors during the 8-hour survey by 46% to 49 visitors over 18 groups with dwell time reducing by 37%.

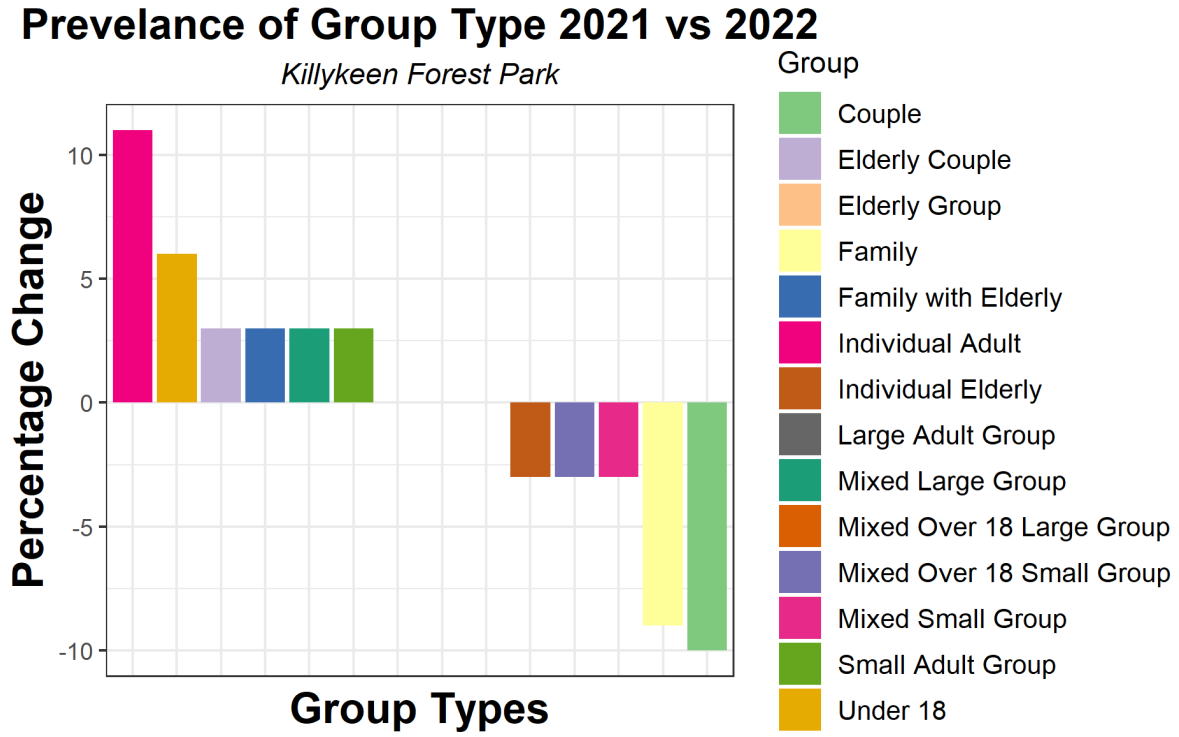


Figure 1.17 Percentage Change in groups of visitors that visited Killykeen Forest Park between 2021 and 2022

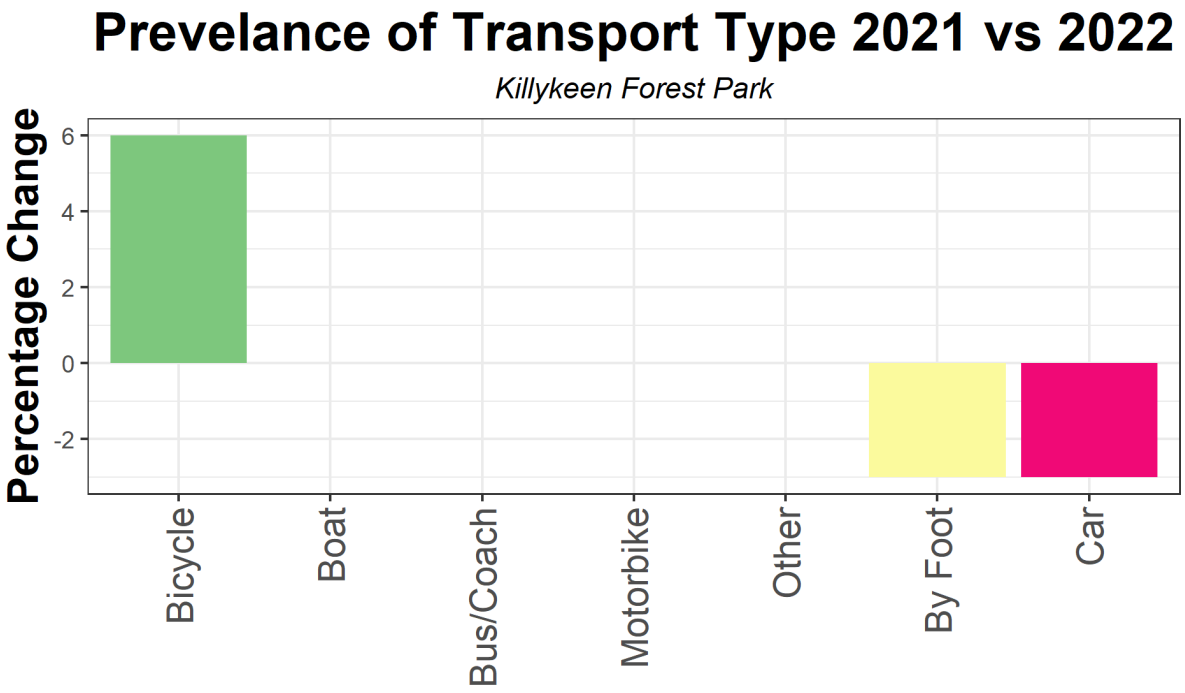


Figure 1.18 Percentage Change in mode of transport used to visit Killykeen Forest Park between 2021 and 2022

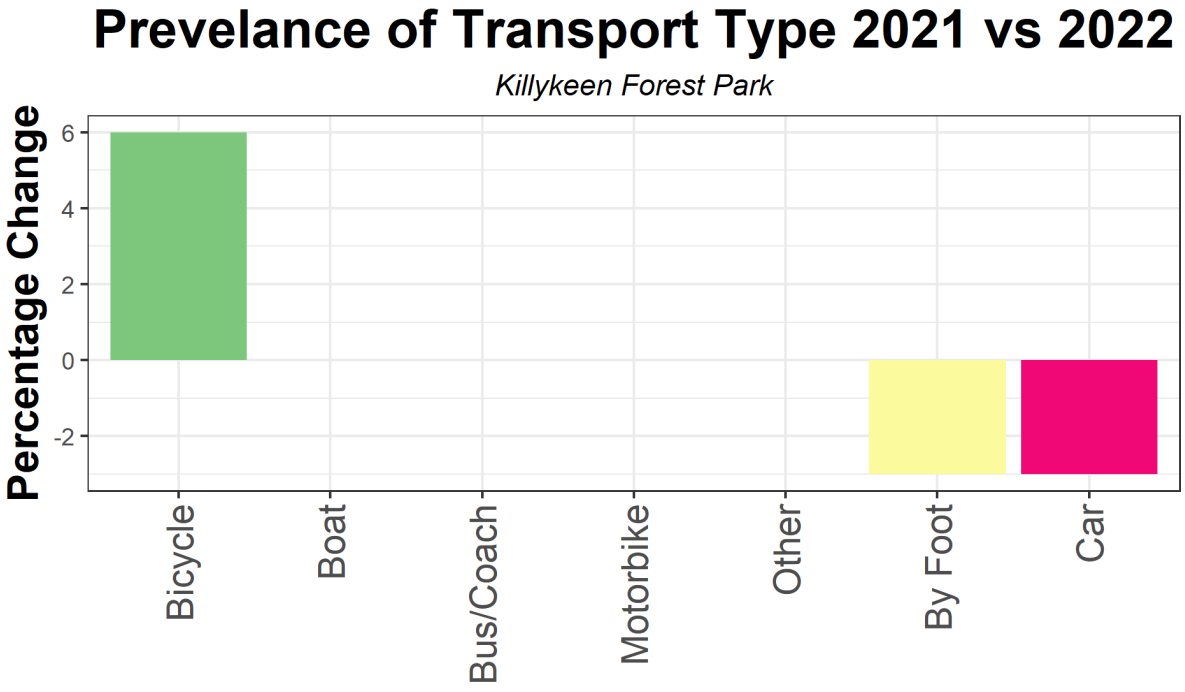


Figure 1.19 Percentage change in use of Interpretive Material at Killykeen Forest Park between 2021 and 2022

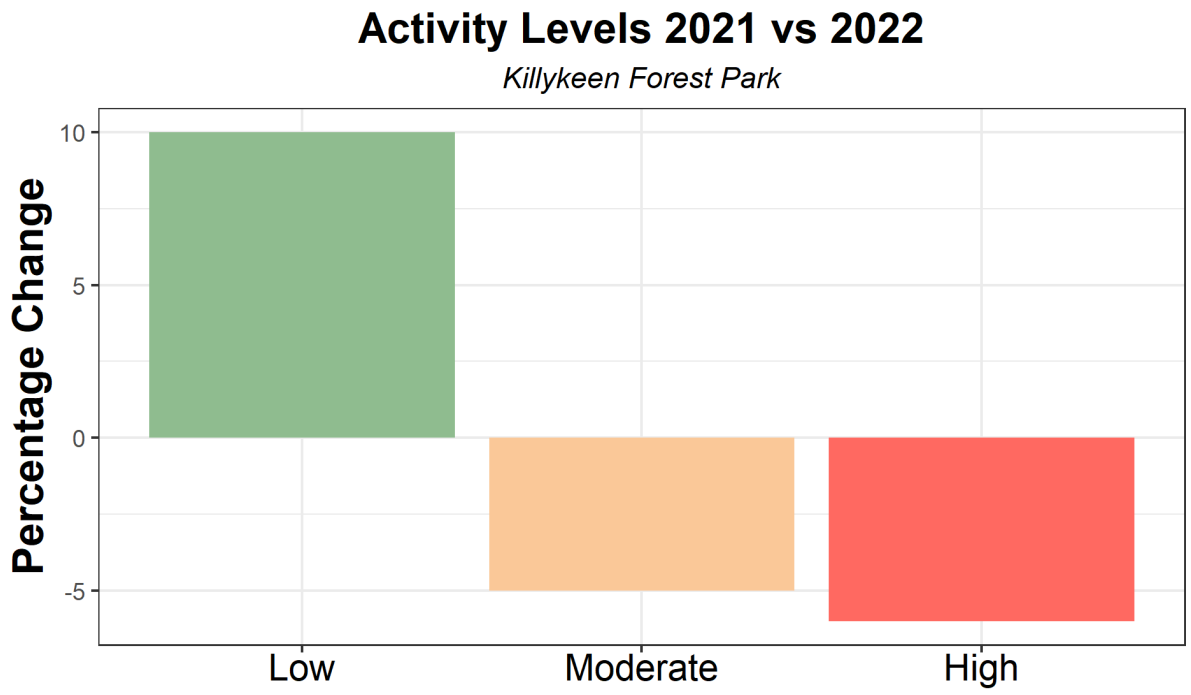


Figure 1.20 Percentage change in categories of Activity Levels Observed at Killykeen Forest Park between 2021 and 2022

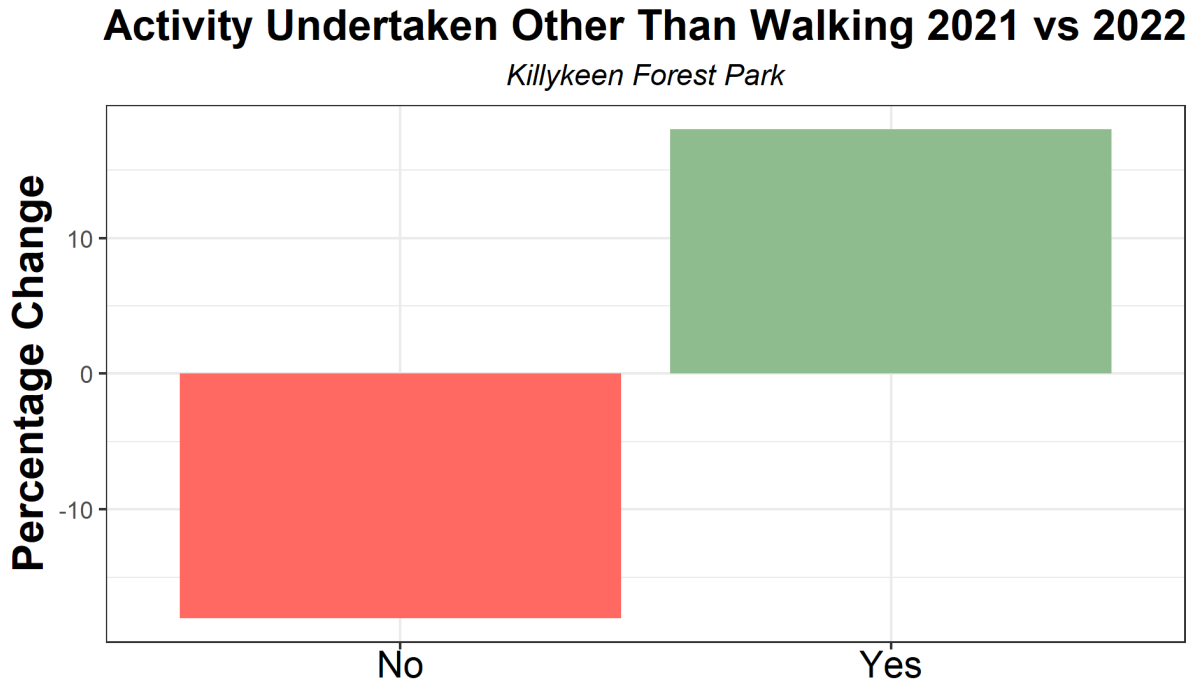


Figure 1.21 Percentage change in activities undertaken other than walking at Killykeen Forest Park between 2021 and 2022

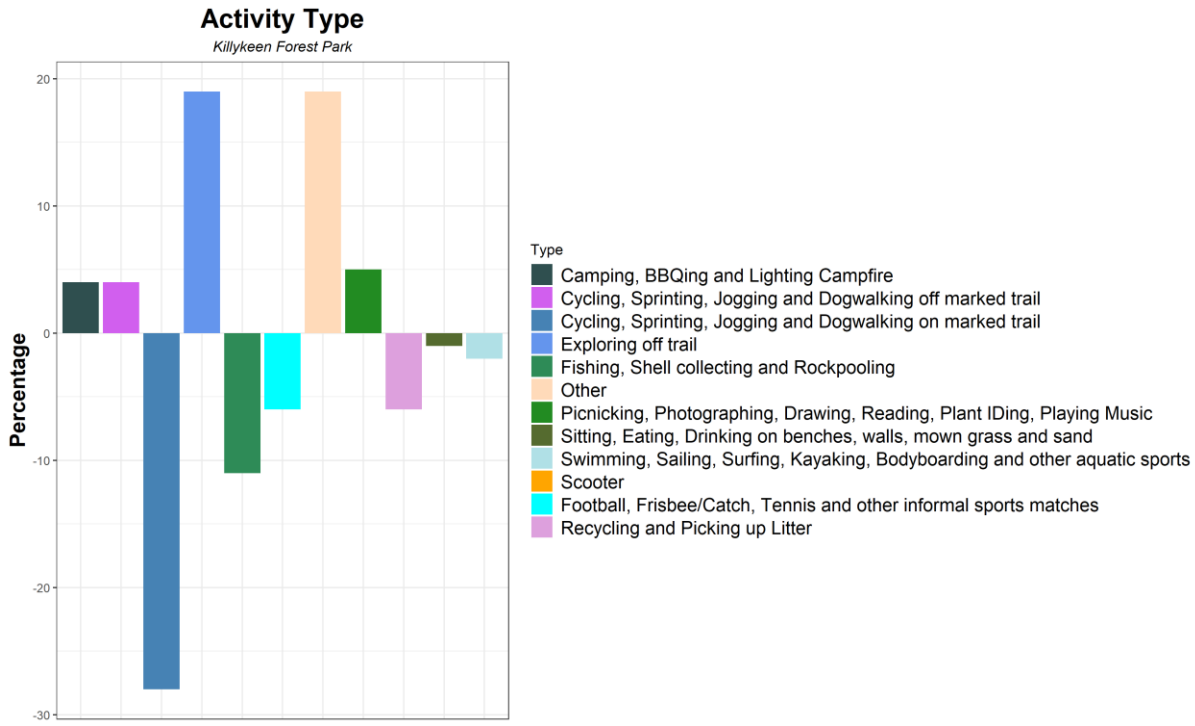


Figure 1.22 Percentage change in range of Visitor Activities Observed at Killykeen Forest Park between 2021 and 2022

Table 1.4 Summary of changes with previous survey results

Survey	Notable Differences	Comment
Visitor Dwell Time	• Overall average dwell time reduced by 37%	Less visitors combined with the survey taking place slightly later in the season compared to 2021 could lead to a reduced average dwell time
Prevalence of Group Type	• 10% decrease in couples • 11% increase in individual adults • 9% decrease in families	Slight changes in percentage of visitor group types could be attributed to the 2022 survey taking place slightly later in the season and a reduction in the number of visitors
Prevalence of Transport Type	• 6% increase in bike	Slight increase in percentage of visitors arriving to site by bike No other significant changes noted
Read Available Signage	• 34% decrease in signage read • Unknown increased by 35%	Significant decrease in percentage of visitors reading available signage on sites. However, this can be attributed to a large increase in unknown if signage was read
Activity Levels	• High activity levels decreased by 6% • Low activity levels increased by 10% • Moderate activity levels decreased by 5%	Slight increase in the percentage of visitors undertaking low level activities
Activity Undertaken Other Than Walking	• Activities undertaken other than walking increased by 18%	Moderate increase in the percentage of visitors undertaking activities other than walking

Activity Type	• Exploring off trail increased by 19% • Jogging, cycling, and dog walking etc. on marked trails decreased by 28% • Activities such as fishing etc., decreased by 11%	Significant decrease in percentage of visitors jogging etc., on marked trails and increase in percentage of visitors exploring off trail Decrease in percentage of activities related to fishing
Impact Severity Level	• No impacts were recorded in the 2021 survey	While no impacts were observed in 2021, 9 were observed in 2021 with the majority being of low impacts level
Impact Type	• No impacts were recorded in the 2021 survey	9 impacts were recorded during the 2022 survey when compared to 0 in the 2021 survey

1.7 Ecological Monitoring Results

1.7.1 Ecological Constraints

The species that reside in the habitats within Killykeen Forest Park are sensitive to aquaculture, pollution, anthropogenic disturbance and hydrological changes. The habitats these species reside in are known to be sensitive to hydrological changes, pollution, land use management and alien species.

Table 1.5 Designated sites within 2km of Killykeen Forest Park and relevant ecological receptors

Site Code	Site Name	Distance (km)	Site Type	Qualifying Feature
[000007]	Lough Oughter And Associated Loughs pNHA	0.00	pNHA	
[004049]	Lough Oughter SPALough Oughter Complex SPA	0.06	SPA	Wetland and Waterbirds [A999], Wigeon *(Anas penelope)* [A050], Whooper Swan *(Cygnus cygnus)* [A038], Great Crested Grebe *(Podiceps cristatus)* [A005]
[000007]	Lough Oughter and Associated Loughs SAC	0.08	SAC	Otter *(Lutra lutra)* [1355], Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation [3150], Bog woodland [91D0]

1.7.2 Habitat Descriptions

The habitats of Killykeen Forest Park are mainly made of up two woodland habitats, mixed broadleaved woodland (Fossitt Code WD1) and yew woodland (Fossitt Code WD3)

The trail edge close to the carparking area and bridge show signs of path widening for small sections where it is evident that visitors cut corners etc. Or at the toilet facilities. However, there is no damage to habitats identified due to this movement.

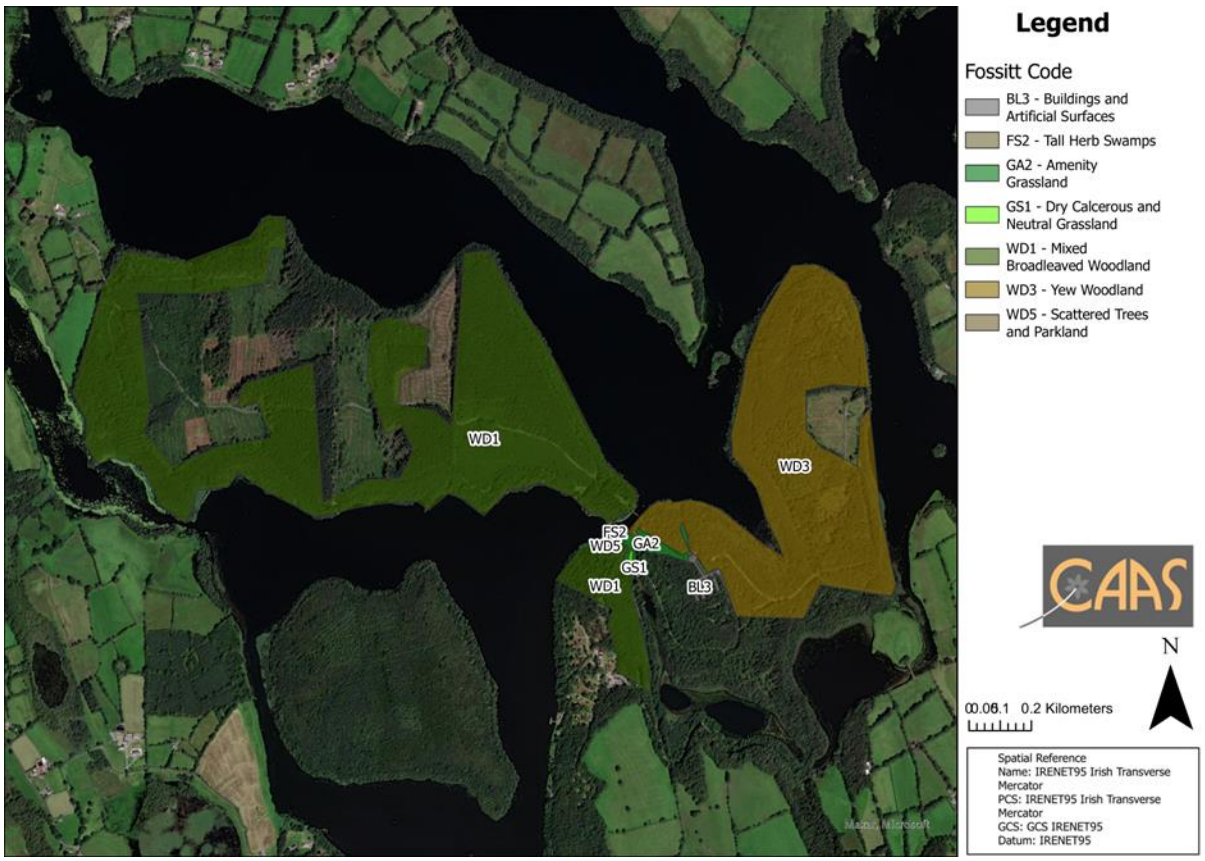


Figure 1.23 Habitats present at Killykeen Forest Park

1.7.3 Condition Assessment

Habitat condition assessments are an integral part of the National Tourism Monitoring Programme. They will allow an assessment of how habitat degradation due to human disturbance may relate to visitor monitoring data gathered at each of the 19 Failte Ireland sites for the duration of the programme.

Each habitat condition assessment will follow a rating scale, that has been designed specifically for this monitoring programme as a standardised, repeatable measurement for assessing habitat condition across all Failte Ireland sites (details on the full methodology are supplied in Appendix II of this report). In order to adequately capture possible changes to habitat condition at each site in relation to tourism activities, the habitat condition assessments will be conducted every second year of the 5-year monitoring programme. Carrying out this condition assessment every second year, creates a sufficient timescale for changes in site condition in relation to visitor movements and activities on site to become apparent, and therefore to be reflected in the resultant data.

The initial habitat condition assessments that will form the baseline for the programme's condition assessments for each of the 19 sites, were carried out in the inaugural year of this programme in 2021. The next year of habitat condition assessment will be conducted in 2023. Each assessments results will be detailed within their relevant year's interim report, with the overall analysis of trends in habitat condition in relation to visitor movements for every site reported in the final year of the monitoring programme in 2025.

1.7.4 NBDC Records of Birds

Killykeen Forest Park contains a variety of passerine and wader birds, in large part to both the woodland and lakeside habitat of the site.

Table 1.6 List of birds that have been recorded at NBDC Hectad[7] H30

Group	Common name	Scientific name	Number recorded
Bird	Arctic Tern	*Sterna paradisaea*	1
Bird	Barn Owl	*Tyto alba*	2
Bird	Barn Swallow	*Hirundo rustica*	18
Bird	Bewick's Swan	*Cygnus columbianus subsp. bewickii*	1
Bird	Black-billed Magpie	*Pica pica*	24
Bird	Black-headed Gull	*Larus ridibundus*	15
Bird	Blackcap	*Sylvia atricapilla*	17
Bird	Blue Tit	*Cyanistes caeruleus*	27
Bird	Canada Goose	*Branta canadensis*	7
Bird	Chaffinch	*Fringilla coelebs*	29
Bird	Coal Tit	*Periparus ater*	29
Bird	Common Blackbird	*Turdus merula*	28
Bird	Common Bullfinch	*Pyrrhula pyrrhula*	19
Bird	Common Buzzard	*Buteo buteo*	17
Bird	Common Chiffchaff	*Phylloscopus collybita*	16
Bird	Common Coot	*Fulica atra*	14
Bird	Common Cuckoo	*Cuculus canorus*	6
Bird	Common Goldeneye	*Bucephala clangula*	8
Bird	Common Grasshopper Warbler	*Locustella naevia*	4
Bird	Common Kestrel	*Falco tinnunculus*	7
Bird	Common Kingfisher	*Alcedo atthis*	5
Bird	Common Linnet	*Carduelis cannabina*	6
Bird	Common Moorhen	*Gallinula chloropus*	20
Bird	Common Pheasant	*Phasianus colchicus*	11
Bird	Common Pochard	*Aythya ferina*	3
Bird	Common Raven	*Corvus corax*	10
Bird	Common Redshank	*Tringa totanus*	1
Bird	Common Sandpiper	*Actitis hypoleucos*	1
Bird	Common Shelduck	*Tadorna tadorna*	1
Bird	Common Snipe	*Gallinago gallinago*	16
Bird	Common Starling	*Sturnus vulgaris*	15
Bird	Common Swift	*Apus apus*	3
Bird	Common Tern	*Sterna hirundo*	8
Bird	Common Whitethroat	*Sylvia communis*	6
Bird	Common Wood Pigeon	*Columba palumbus*	28
Bird	Corn Crake	*Crex crex*	1
Bird	Eurasian Collared Dove	*Streptopelia decaocto*	7
Bird	Eurasian Curlew	*Numenius arquata*	14
Bird	Eurasian Jackdaw	*Corvus monedula*	20
Bird	Eurasian Jay	*Garrulus glandarius*	13
Bird	Eurasian Siskin	*Carduelis spinus*	6
Bird	Eurasian Sparrowhawk	*Accipiter nisus*	11
Bird	Eurasian Teal	*Anas crecca*	10
Bird	Eurasian Treecreeper	*Certhia familiaris*	14
Bird	Eurasian Wigeon	*Anas penelope*	9
Bird	Eurasian Woodcock	*Scolopax rusticola*	8
Bird	European Golden Plover	*Pluvialis apricaria*	1
Bird	European Goldfinch	*Carduelis carduelis*	18
Bird	European Greenfinch	*Carduelis chloris*	11
Bird	European Robin	*Erithacus rubecula*	29
Bird	European Turtle Dove	*Streptopelia turtur*	1
Bird	Fieldfare	*Turdus pilaris*	4
Bird	Garden Warbler	*Sylvia borin*	6
Bird	Goldcrest	*Regulus regulus*	27
Bird	Goosander	*Mergus merganser*	1
Bird	Great Bittern	*Botaurus stellaris*	1
Bird	Great Black-backed Gull	*Larus marinus*	4
Bird	Great Cormorant	*Phalacrocorax carbo*	15

[7] 10km^2 grid

Group	Common name	Scientific name	Number recorded
Bird	Great Crested Grebe	*Podiceps cristatus*	23
Bird	Great Spotted Woodpecker	*Dendrocopos major*	2
Bird	Great Tit	*Parus major*	27
Bird	Greater White-fronted Goose	*Anser albifrons*	4
Bird	Greenland White-fronted Goose	*Anser albifrons subsp. flavirostris*	2
Bird	Grey Heron	*Ardea cinerea*	21
Bird	Grey Wagtail	*Motacilla cinerea*	13
Bird	Greylag Goose	*Anser anser*	2
Bird	Hedge Accentor	*Prunella modularis*	27
Bird	Hen Harrier	*Circus cyaneus*	3
Bird	Herring Gull	*Larus argentatus*	4
Bird	Hooded Crow	*Corvus cornix*	24
Bird	House Martin	*Delichon urbicum*	11
Bird	House Sparrow	*Passer domesticus*	14
Bird	Jack Snipe	*Lymnocryptes minimus*	1
Bird	Lesser Black-backed Gull	*Larus fuscus*	6
Bird	Lesser Redpoll	*Carduelis cabaret*	16
Bird	Little Egret	*Egretta garzetta*	3
Bird	Little Grebe	*Tachybaptus ruficollis*	9
Bird	Long-eared Owl	*Asio otus*	6
Bird	Long-tailed Tit	*Aegithalos caudatus*	19
Bird	Loxia	*Loxia*	1
Bird	Mallard	*Anas platyrhynchos*	19
Bird	Meadow Pipit	*Anthus pratensis*	14
Bird	Merlin	*Falco columbarius*	1
Bird	Mew Gull	*Larus canus*	2
Bird	Mistle Thrush	*Turdus viscivorus*	21
Bird	Mute Swan	*Cygnus olor*	21
Bird	Northern Lapwing	*Vanellus vanellus*	7
Bird	Northern Shoveler	*Anas clypeata*	2
Bird	Redwing	*Turdus iliacus*	8
Bird	Reed Bunting	*Emberiza schoeniclus*	19
Bird	Ring-necked Duck	*Aythya collaris*	1
Bird	Rock Pigeon	*Columba livia*	3
Bird	Rook	*Corvus frugilegus*	13
Bird	Sand Martin	*Riparia riparia*	1
Bird	Sedge Warbler	*Acrocephalus schoenobaenus*	10
Bird	Sky Lark	*Alauda arvensis*	9
Bird	Smew	*Mergellus albellus*	1
Bird	Song Thrush	*Turdus philomelos*	27
Bird	Spotted Flycatcher	*Muscicapa striata*	8
Bird	Stonechat	*Saxicola torquata*	4
Bird	Tufted Duck	*Aythya fuligula*	16
Bird	Water Rail	*Rallus aquaticus*	7
Bird	White Wagtail	*Motacilla alba*	21
Bird	Whooper Swan	*Cygnus cygnus*	12
Bird	Willow Warbler	*Phylloscopus trochilus*	20
Bird	Winter Wren	*Troglodytes troglodytes*	29
Bird	Yellowhammer	*Emberiza citrinella*	2

1.7.5 NBDC Records of Mammals

As the NBDC data shows, a large number of different terrestrial mammal species have been observed in the area. This includes a large number of bats, with brown long-eared bats being the most common species observed. A large number of badgers have also been recorded within the area along with other species such as red squirrels and hares.

Table 1.7 List of mammals that have been recorded at NBDC Hectad[8] H30

Group	Common name	Scientific name	Number Recorded
Terrestrial mammal	American Mink	*Mustela vison*	4
Terrestrial mammal	Brown Long-eared Bat	*Plecotus auritus*	29
Terrestrial mammal	Daubenton's Bat	*Myotis daubentonii*	5
Terrestrial mammal	Eastern Grey Squirrel	*Sciurus carolinensis*	5

[8] 10km^2 grid

Group	Common name	Scientific name	Number Recorded
Terrestrial mammal	Eurasian Badger	*Meles meles*	86
Terrestrial mammal	Eurasian Red Squirrel	*Sciurus vulgaris*	29
Terrestrial mammal	European Otter	*Lutra lutra*	8
Terrestrial mammal	European Rabbit	*Oryctolagus cuniculus*	1
Terrestrial mammal	Irish Hare	*Lepus timidus subsp. hibernicus*	15
Terrestrial mammal	Irish Stoat	*Mustela erminea subsp. hibernica*	3
Terrestrial mammal	Lesser Noctule	*Nyctalus leisleri*	11
Terrestrial mammal	Nathusius's Pipistrelle	*Pipistrellus nathusii*	6
Terrestrial mammal	Natterer's Bat	*Myotis nattereri*	3
Terrestrial mammal	Pine Marten	*Martes martes*	11
Terrestrial mammal	Pipistrelle	*Pipistrellus pipistrellus*	6
Terrestrial mammal	Red Fox	*Vulpes vulpes*	3
Terrestrial mammal	Soprano Pipistrelle	*Pipistrellus pygmaeus*	9
Terrestrial mammal	West European Hedgehog	*Erinaceus europaeus*	8

1.8 Recommendations

- There is a strong bat population at Killykeen Forest Park and management practices to support strong invertebrate populations for foraging should be considered along with the installation of bat boxes.
- The site, in general, is well managed. However, an increase in interactive signage related to ecology and biodiversity should be considered that could increase visitor experiences at Killykeen Forest Park.

Appendix I

Activities		
Category 1 Low Level		
Walking, running or cycling on paths, marked trails or hard surfaces		LA 1
Walking, running, cycling or playing in mown grass, managed grassland or level sand		LA 2
Sitting on benches, walls, mown grass, sand		LA 3
Swimming, sailing, surfing, kayaking in water		LA 4
Resting, reading, looking, picnicking, sightseeing, painting, photographing		LA 5
Vehicular movement on roads and parking areas		LA 6
Watching nature in hedges, woods, streams, pools and intertidal areas		LA 7
Category 2 Medium Level		
Powered movement through water		MA 1
Any movement leaving an existing trail or marked path		MA 2
Any movement leaving a trail through leafy vegetation		MA 3
Any movement leaving a trail through woody vegetation		MA 4
Climbing on walls, loose stones, sand, soil etc.		MA 5
Fishing		MA 6
Category 3 High Level		
Walking through wet/muddy soil		HA 1
Scrambling on steep or loose slopes		HA 2
Off road vehicular movement		HA 3
Disturbance of wildlife		HA 4
Deliberate building or moving or knocking site materials - parts of monuments, walls, stones, sand etc.		HA 5
Picking herbaceous vegetation		HA 6

Appendix I Activity and impact code index used for recording visitor behaviours on site

Category 1 Low Impact		
No identifiable effect		LIE 1
Desire lines or trails visible on grass and leafy vegetation		LIE 2
Temporary disturbance (including chasing and feeding) of insects, fish, amphibian, reptiles, insects, birds and mammals		LIE 3
Temporary change of character - due to the appearance or nature of activities (noise, crowds, etc.)		LIE 4
General/light littering		LIE 5
Category 2 Medium Impact		
Desire lines or tracks visible outside of existing trail or marked path		MIE 1
Trampling of herbaceous vegetation		MIE 2
Damage to woody vegetation		MIE 3
Incidentally moving or knocking site materials - parts of monuments, walls, stones, sand, rooted vegetation, flora, fauna etc.		MIE 4
Addition/alteration of site features, transient emissions, noise		MIE 5
Transient disturbance, emissions, noise		MIE 6
Disturbance of wildlife		MIE 7
Category 3 Severe Impact		
Direct interference with site material - parts of monuments, walls, stones, sand, rooted vegetation, flora, fauna etc.		SIE 1
Removal of material - parts of monuments, walls, stones, sand, rooted vegetation, flora, fauna etc.		SIE 2
Vandalism or graffiti		SIE 3
Destruction of structures, vegetation or fauna		SIE 4
Heavy littering or dumping quantities of waste		SIE 5
Burning materials or lighting a fire		SIE 6
Injuring, killing or taking wildlife		SIE 7

Appendix II

Habitat Condition Assessment Methodology

A rating scale has been designed for this monitoring programme as a standardised, repeatable measurement for assessing habitat condition across all sites[9]. For the purposes of this monitoring programme, habitat condition is assessed at every site by the surveyor examining four core criteria:

1. The extent to which habitat degradation (due to human activity), if any, is observed;
2. If habitat degradation is observed, the degree to which the impact is localised or widespread;
3. The potential ability for the habitat to recover (related to scale of degradation); and,
4. The requirement for intervention (related to the degree of the previous 3 elements).

For these assessments the term 'degradation' is taken to mean any change that reduces the long-term viability habitats and its qualifying interests [flora and fauna]. Degradation can include readily visible evidence of factors such as surface erosion or compaction, vegetation loss, crowd disturbance [noise], disturbance by pets, littering, burning or pollution.

Based on these four criteria, each site is walked along transects established by the principal pathways that are used for visitor access and movement through each site. At 100 metres intervals along the selected pathways, an assessment of habitat condition is made, using an established rating scale of 1 to 5; 1 being no impact and 5 being high impact. Each rating is then translated into a condition assessment, as displayed in Table II - 1 below.

These ratings are gathered for each site, and are then grouped; from which the mode is taken (i.e., the rating that occurs most frequently. This then recorded and reported as the resultant overall rating of the assessed habitat condition assessment for each site.

Table II-1 Habitat rating scale and condition assessment

Scale	Condition
1	No evidence of any habitat degradation observed.
2	Localised habitat degradation, but slight and capable of rapid recovery.
3	Widespread habitat degradation, but slight and capable of rapid recovery.
4	Localised habitat degradation, requiring intervention to allow full recovery.
5	Widespread habitat degradation, requiring intervention to allow full recovery.

[9] Note: Where possible, the same surveyor is used across multiple sites – but in some instances, different surveyors survey different sites. This can lead to a human variation in the assigning of the rating scale for impact. However, there will be sufficient repetition of the data through the several years of the monitoring programme to account for any variations in human interpretation on this scale.