RESULTS
OF
PILOT VISITOR OBSERVATION STUDIES
OF
ENVIRONMENTAL IMPACTS

AT THE

BURREN AND CLIFFS OF MOHER GEOPARK
CO. CLARE

for: **Burren and Cliffs of Moher Geopark**

On behalf of:

Fáilte Ireland

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1 Introduction

CAAS are assisting Fáilte Ireland in developing monitoring strategies to identify any environmental impacts of visitors at sites along the Wild Atlantic Way. Part of this work involves developing generic monitoring methodologies and templates that may be used across a range of sites and conditions.

As part of this work, CAAS are assisting the Burren and Cliffs of Moher Geopark to develop a survey methodology for assessing environmental impacts on identified demonstration sites within the Geopark in order to fulfil the requirements of the EU Life Project. There is a need for these methodologies to be repetitive for future surveying programmes and development of mitigation responses as required. To accompany this report, a set of guidelines shall be developed to advise this requirement.

Definition of Indicators

The development of monitoring strategies needs to be integrated with the identification and definition of indicators to ensure that these provide accurate information in an effective, efficient and easily replicated manner. It is anticipated that the combination of Observational and Quantitative evidence shall provide the basis for the definition of monitoring for site-specific vulnerabilities as well as overall indicators. The former can be used to guide specific project and management interventions, while the latter can be used to report on the sustainability of emerging use patterns on a larger over a longer time.

Development of Methods

In order to design effective monitoring methods, Pilot Visitor Observation Studies were carried out over a two day period at the Geopark LIFE Demonstration Sites in County Clare. These sites offered a full spectrum of types of circumstances that range from small spatially-concentrated areas, such as Poulnabrone, to large diffuse sites such as Fanore Beach or the Slieve Carron Nature Reserve. It also offered opportunities to study sites with existing management regimes that range from those that are complex and highly structured private enterprises such as Aillwee Cave to the simpler Carran Church site. On foot of the results from the Visitor Observation Study, an ecological assessment was carried out providing quantitative analysis to support the results.

1.1 Pilot Visitor Observation Studies

Pilot Visitor Observations were carried out over two days at sites where Millward Brown was also conducting Visitor Surveys (See Section 2.1 for outline of proposed methods).

The results have identified optimally effective observation methods of visitor use and behaviour that are suitable for use in a wide range of conditions. They can also be used to identify patterns of visitor activity, movement and behaviour.

This work has been assessed to identify and isolate what can:

- most efficiently be measured in future observation programmes (what to measure).
- provide the most reliable indicators to be used for future monitoring (what to measure).
- the most effective methodologies to be used for observation (how to measure).
- identify site-specific dynamics and pathways to guide the development of mitigation responses (how to measure).

1.2 Outcome of Observation and Ecological Study

It is anticipated that the Pilot Visitor Observations Studies will result in:

- A standardised Visitor Observation and Tracking Methodology for a range of site types
- An indication of extent of effect zones
- An indication of types of impacting activities
- An indication of general patterns of visitor activity, movement and behaviour at elected sites

This information provides evidence for the location, number, shape and extent of detailed ecological (quadrat) surveys that provides quantitative evidence of effects that can be compared to unaffected similar 'control' sites elsewhere. These surveys will also provide a basis for identifying the need and type of survey work to be carried out into lithic disturbance and/or wear and tear of monuments, walls, and pavement.

Preparation of Guidelines

Data on patterns of adverse environmental effects will form the basis for the development of evidence-based guidelines for use in the development and management of visitor sites. To facilitate early advice to the groups involved in the Burren and Cliffs of Moher Geopark and Wild Atlantic Way projects the guidelines will facilitate future monitoring and management of visitor sites.

1.3 Demonstration Sites

The chosen demonstration sites for the Burren and Cliffs of Moher Geopark Life Project vary in size and represent a range of environments ranging from rocky foreshore, a sandy beach, improved grassland and varying degrees of managed and unmanaged limestone pavement. The sites have various issues relating to visitor and environmental management.

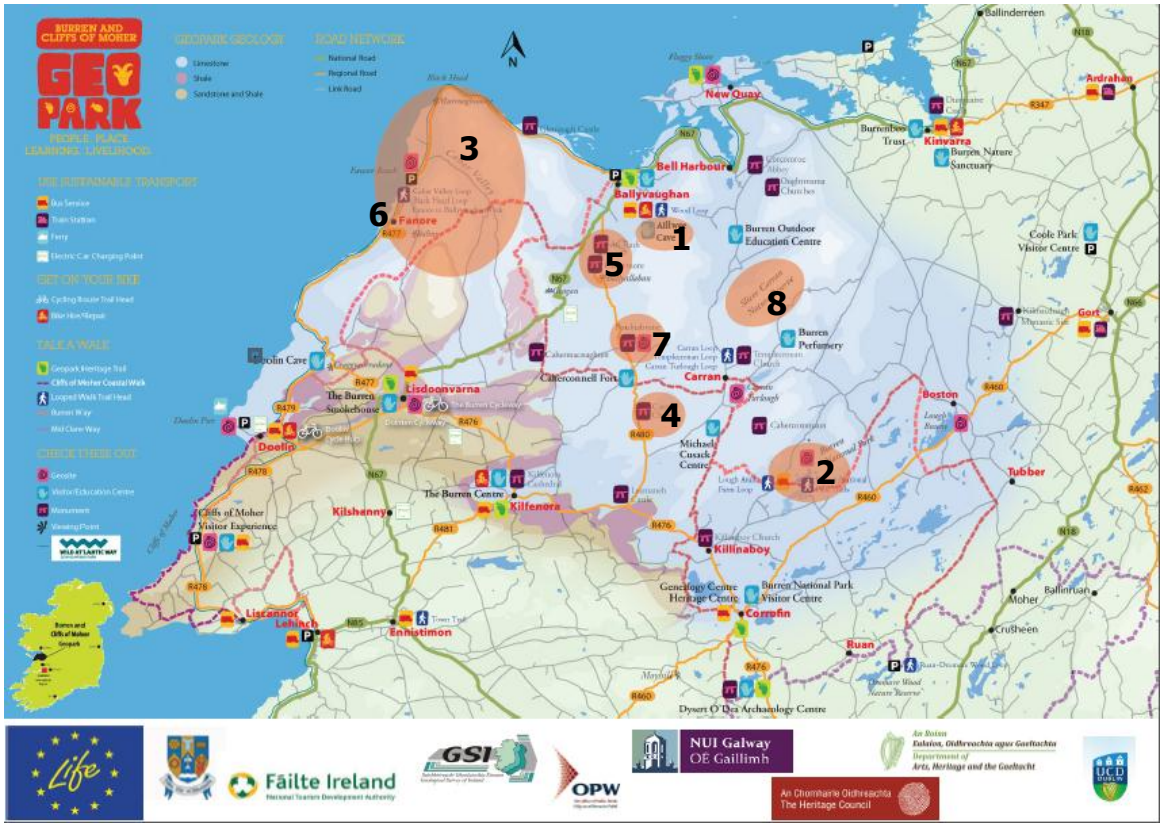


Figure 1.1 Location of Demonstration Sites (1 – 8) See text below for detailed descriptions of each

1.3.1 Aillwee Caves

The Aillwee Caves is a highly managed, privately owned site and has a visitor centre, parking facilities and other amenities. The site represents a managed limestone pavement. A high volume of people visit the site annually. Aillwee Caves is expected to represent the best practice management of all of the demonstration sites. The observation took place from a hiking trail behind the visitor centre. A number of steps lead up to an unestablished trail that allows visitors to climb up and enjoy spectacular views of the bay and the Burren landscape. This was where the surveyor was positioned (see Figure 1.2)

Figure 1.2 Aillwee Caves aerial view showing surveyor station in red

1.3.2 Blackhead

Blackhead extends along the coast from Ballyvaughan to Fanore. Blackhead Lighthouse is of specific interest to visitors and there is also an established layby further down the road with interpretative signage. The observation study took place at Blackhead Lighthouse and the next nearest layby south of the lighthouse (See Figure 1.3 and Figure 1.4). Blackhead is an example of a flaggy foreshore which is visible along stretches of the road (R477). A number of laybys have become established over recent years and the land has been purchased by Clare County Council for parking laybys along the R477. The land around Blackhead is owned by farmers in the Burren Farm Conservation Programme. There is an agreement in place that allows the public access for walking trails in the area.

This area experiences high volumes of pass through traffic with many stopping along the roadside. This results in traffic congestion and illegal parking. Another issue that has previously been identified is the building of 'mini-dolmens' on Blackhead and along the looped walking route.

Figure 1.3 Blackhead Lighthouse showing surveyor station in red

Figure 1.4 Blackhead Layby showing surveyor station in red

1.3.3 Burren National Park

Burren National Park is managed by the National Parks and Wildlife Service. The land is leased to farmers in the Burren Farm Conservation Programme and seven walking trails have been developed throughout the park. The area invites hikers and visitors who travel further into the site for academic and specialist interests. The National Park consists largely of unmanaged limestone pavement, unimproved limestone grasslands and hazel scrub.

The observation study took place from three locations on the site (Figure 1.5 and Figure 1.6). One surveyor observed from Gortaleck Crossroads where visitors parked and began their activities. This area can experience traffic congestion during busy periods. The second surveyor was located just off the road where three of the seven trails either begin or end. The third Surveyor was located further up the road at Mullaghmore. The road to this point is quite narrow and there is no established layby for parking. Hikers using the walking trail and visitors travelling further into the site come to this point as well as visitors arriving to view Mullaghmore Mountain which is a known landmark in the area.

Figure 1.5 Burren National Park aerial view showing surveyor station at Gortaleck Crossroads and trail head

Figure 1.6 Burren National Park aerial view showing surveyor station at Mullaghmore

1.3.4 Carran Church

Carran Church is a medieval church in Carran Village. The site is managed by Clare County Council and the surrounding lands of improved grassland are owned by a farmer in the Burren Farm Conservation Programme. Identified issues at the site include conservation of the building and issues surrounding access to the site from the road. The surveyor was positioned outside the walls of the church with a view of the road and entrance to the site (Figure 1.7).

Figure 1.7 Carran Church aerial view showing surveyor station in red

1.3.5 Cahermore/Án Rath

Both of these sites are managed by the Office of Public Works. They are both offset from the road near to the Aillwee Caves. Cahermore is a medieval stone fort and has a wooden viewing platform built inside the fort and interpretive signage outside the site. The fort is located on a sharp bend in the road and there is a small area for cars/buses to pull in.

Án Rath is located a short walking distance from Cahermore (approximately 500 metres). This is an earthen ring fort. The fort has experienced erosion along the top where visitors have walked on the surface. The Cahermore site was chosen for surveying as it had a layby outside the site and it was expected that the most footfall would arrive at this point. The surveyor was positioned at a station inside Cahermore stone fort out of view of information boards (Figure 1.7)

Figure 1.8 Cahermore aerial view showing surveyor station in red

1.3.6 Fanore Beach

Fanore Beach is a sandy beach with widespread dunes. The beach experiences high volumes of visitors both local and tourist during the high season. Fanore Dunes are owned in part by Clare County Council. There is a car park and toilet facilities at the site which are managed by Clare County Council. The beach is also lifeguard patrolled.

The dunes have experienced severe coastal erosion in recent years both from natural and human pressure. However, through careful intervention and management the dunes have recovered significantly in the last ten years.

Four surveyors were present at the site over two days. Two surveyors observed visitors in the car park, one surveyor observed the beach from the lifeguard hut as far as the River Caher while the fourth surveyor was stationed at the River Caher observing activities north of the beach (See Figure 1.9)

Figure 1.9 Fanore Beach aerial view showing location of surveyor stations

1.3.7 Poulnabrone

Poulnabrone is an iconic example of a portal tomb. This site is managed by the Office of Public Works and has a member of staff present throughout the high season. The surrounding land is owned by farmers in the Burren Farm Conservation Programme. The site consists of areas of improved grassland, bare limestone pavement which blend into unimproved grassland and limestone vegetation in areas which are less accessible to the public.

The site experiences high volumes of traffic with tour buses stopping off frequently. There is a car park at the site with bus parking. Established pathways with interpretive signage lead the public to the monument. Rope fencing surrounds the monument restricting the public from interacting directly with the monument.

Two surveyors observed visitors at the site over two days. One was stationed adjacent to the portal tomb noting visitor activity around the tomb. The second surveyor observed activities of visitors who left the main pathways and core movement areas and travelled further south away from the tomb (See Figure 1.10).

Figure 1.10 Poulnabrone aerial view showing surveyors station in red

1.3.8 Slieve Carran Nature Reserve

The Nature Reserve is managed by the National Parks and Wildlife Service. Visitors to the site include hikers and visitors travelling to the area for specialist and academic interests. Two walking trails have been established throughout the site. The nature reserve has large areas of unimproved limestone grasslands, extensive unmanaged limestone pavement, limestone vegetation and hazel scrub.

The observation took place from two locations at the site. The surveyors were located at stations at parking laybys at the beginning of the walking trails. Both had interpretative signage. However, one of the sites interpretive signs had been removed from the board.

Three surveyors observed the site for one day. One surveyor was present at the lower layby whereby one trail ended. Two surveyors were located at the main layby at Slieve Carran. One surveyor observed activities from the layby while the other observed visitors who extended along the trails up

Slieve Carran (Figure 1.11and Figure 1.12). The surveyor at the lower layby abandoned observation at the lower layby due to lack of activity at the site.

Figure 1.11 Slieve Carran Nature Reserve main layby showing two surveyor stations

Figure 1.12 Slieve Carran Nature Reserve layby showing surveyor station

2 Assessment of the results of Pilot Visitor Observations

The first phase of the completing the survey methodology involved undertaking a visitor observation study at each of the demonstrations sites identified within the Burren and Cliffs of Moher Geopark. The survey aimed to contribute to an understanding of the nature and significance of environmental impacts at each of the demonstration sites.

2.1 Methodology

Pilot Visitor Observations were carried out over two days at each of the Geopark LIFE Demonstration Sites. The aim was to identify optimally effective observation methods of visitor use and behaviour that could be suitable for use in a wide range of conditions and to contribute to an understanding of the nature and significance of environmental impacts caused by visitors at key sites.

1. An initial desk based study was undertaken of each site.
2. The survey materials were developed to include standardised observation sheets, maps and a briefing document. The survey materials were designed to be iterative while allowing for the individual site complexities to be integrated. (See Sample Sheet at Appendix 1)
3. The optimum onsite location to undertake the survey work was established using local knowledge and aerial photography.
4. Each site was visited and the survey stations were identified and confirmed as suitable on the day of the preliminary pilot survey. The optimum driving route to each of the sites was identified.
5. Surveyors were given a general brief and given sample surveys and keys to assist filling out observation sheets along with a briefing document (See Appendix 2).
6. Surveyors were briefed at each site on arrival at the observation post. This allowed individual site complexities to be highlighted before the survey commenced.
7. In the case of very busy sites e.g. Poulnabrone, surveyors were directed to observe activity of a random group of visitors and record their activities from arrival until departure. On departure, the next group of visitors entering the site was observed as before.
8. At larger sites or sites with high visitor numbers e.g. Aillwee Caves, a core survey area was chosen for the surveyor to concentrate observations on. This allowed the surveyor to observe activities and effects in a previously identified area of sensitivity.
9. An initial preliminary half day pilot visitor observation survey was carried out on 5th September 2014. Feedback was received from surveyors on the half day pilot survey and comments integrated into the plan for the following day.

10. The observational survey across all sites was carried out over the following two days.
11. Surveyors were present for at least one day at each site (See Table 2.1) and each made standardised records of the nature, duration and extent of activities by visitors.

Table 2.1 Surveyor Site Programme indicating numbers of surveyors on each site each day

Site	Friday 05/09/14	Saturday 06/09/14	Sunday 07/09/14
Blackhead		1	1
Fanore Beach	4		4
Aillwee Cave	1	1	1
Cahermore		1	
Poulnabrone	1	2	
Carran Church		1	
Burren National Park	3		3
Slieve Carron Nature Reserve		3	
Relief Surveyor	1	1	1
	10	**10**	**10**

2.2 Explanation of effects and activities and their categorisation

A list of general activities and effects was developed in advance of the survey to assist in the categorisation of visitor behaviour (See Table 2.4). These are generic to all sites but the list is non-exhaustive and can be expanded to meet individual site needs or emerging trends. Activities and effects were categorised depending on their severity to guide accurate information in an effective, efficient and easily replicated manner (See Table 2.2 and Table 2.3)

Table 2.2 Description of Activity Categorisation

Activities	
Low Level	Activity for which the site is intended
Medium Level	Activities, often incidental, depending on site management whereby the visitor engages in behaviour that may result in an effect
High Level	Activity where visitors engage in behaviour that is likely to have an effect on the site but may not be directly linked to a high impact

Table 2.3 Description of Effects Categorisation

Effects	
Low Impact	No impact or a discernible impact i.e. no significant, lasting damage is identified
Medium Impact	A short term, reversible effect that is intermittent but will have no significant, long-term impact
High Impact	Severe effect that has potential to have a significant, long-term, irreversible or permanent impact

Table 2.4 Activities and Effects by Category

Activities	Effects
Category 1 Low Level	**Category 1 Low Impact**
Walking on paths, mown grass or hard surfaces (including level sand)	None
Running, playing in mown grass or level sand	Non-noticeable wear and tear
Sitting on benches, mown grass, sand	Trails newly visible on grass and leafy vegetation
Swimming, sailing, surfing, kayaking in water	Temporary disturbance (including chasing and feeding) of insects, fish, amphibian, reptiles insects, birds and mammals
Resting, reading, looking, picnicking, sightseeing, painting, photographing	Temporary change of character - due to the appearance or nature of activities (noise, crowds, etc.)
Watching nature - in hedges, woods, streams, pools and intertidal areas	General/light littering
Category 2 Medium Level	**Category 2 Medium Impact**
Vehicular movement on roads and parking areas	Addition/alteration of site features
Powered movement through water	Heavy littering
Any movement through woody vegetation	Significant, deliberate disturbance of wildlife
Any movement leaving a trail through leafy vegetation	Removal of woody vegetation.
Climbing on walls, loose stones, sand, soil etc.	Incidentally moving or knocking site materials - parts of monuments, walls, stones, sand, rooted vegetation, flora, fauna etc.
Fishing	
Category 3 High Level	**Category 3 Severe Impact**
Walking through wet/muddy soil	Direct interference with site material - stones, rooted vegetation, fauna
Scrambling on steep or loose slopes	Removal of material - stones, rooted vegetation, fauna
Off road vehicular movement	Injuring, killing or taking wildlife
Any movement leaving a trail through woody vegetation	Destruction of structures, vegetation or fauna
Picking vegetation	Dumping
Deliberate building or moving or knocking site materials - parts of monuments, walls, stones, sand etc.	Vandalism or Graffiti
	Burning materials or lighting a fire

2.3 Initial Findings

Table 2.5 Overview of Survey Sample

Site	Male	Female	Total	Groups	Average Time
Aillwee Cave	59	55	114	20	00:33
Blackhead	61	55	116	43	00:38
Burren National Park	97	108	205	86	01:36
Cahermore	2	5	7	2	00:06
Carran Church	22	22	44	16	00:09
Fanore Beach	353	321	674	285	00:31
Poulnabrone	102	103	205	65	00:14
Slieve Carron Nature Reserve	33	23	56	12	01:26
Total	**729**	**692**	**1421**	**529**	**00:39**

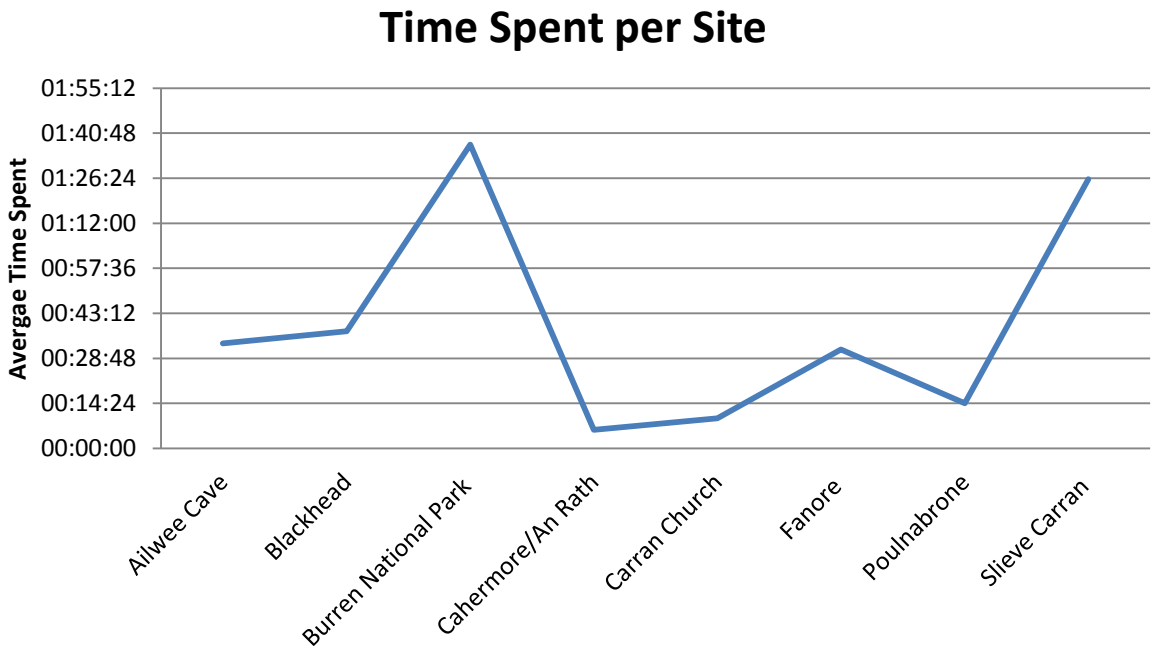


Figure 2.1 Average Time Spent by Visitors per Site

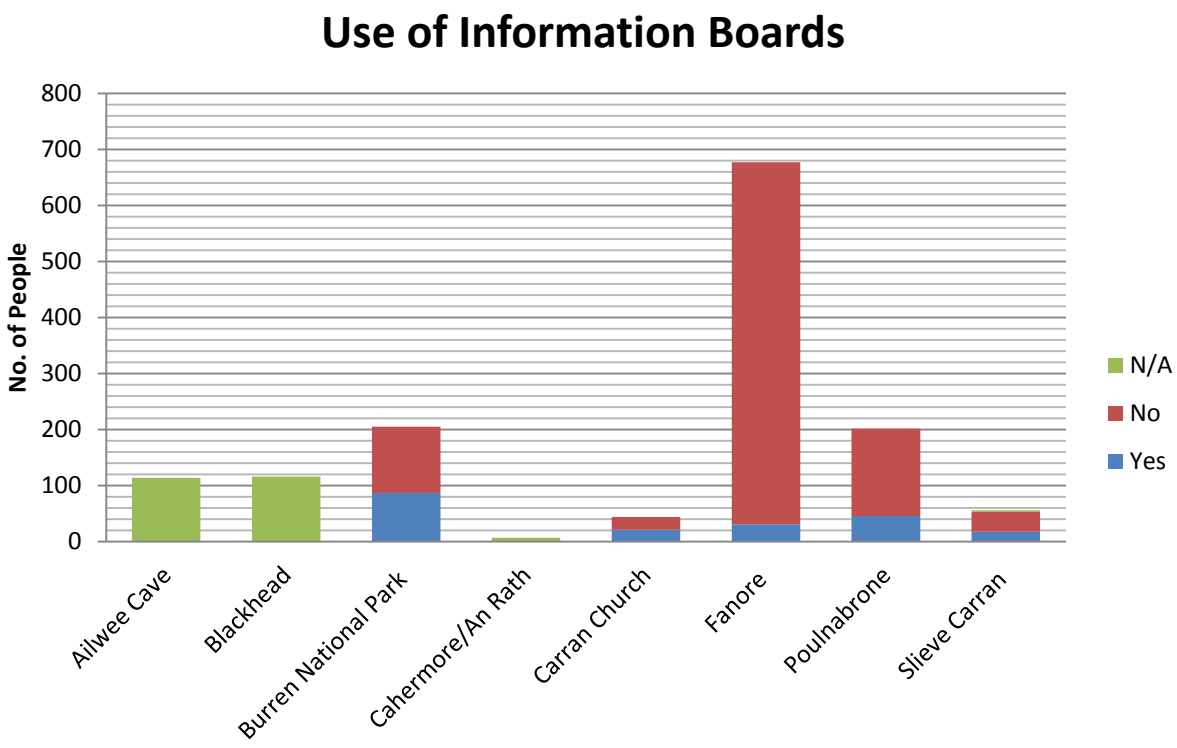


Figure 2.2 Use of Information Boards by Visitors at each Site[1]

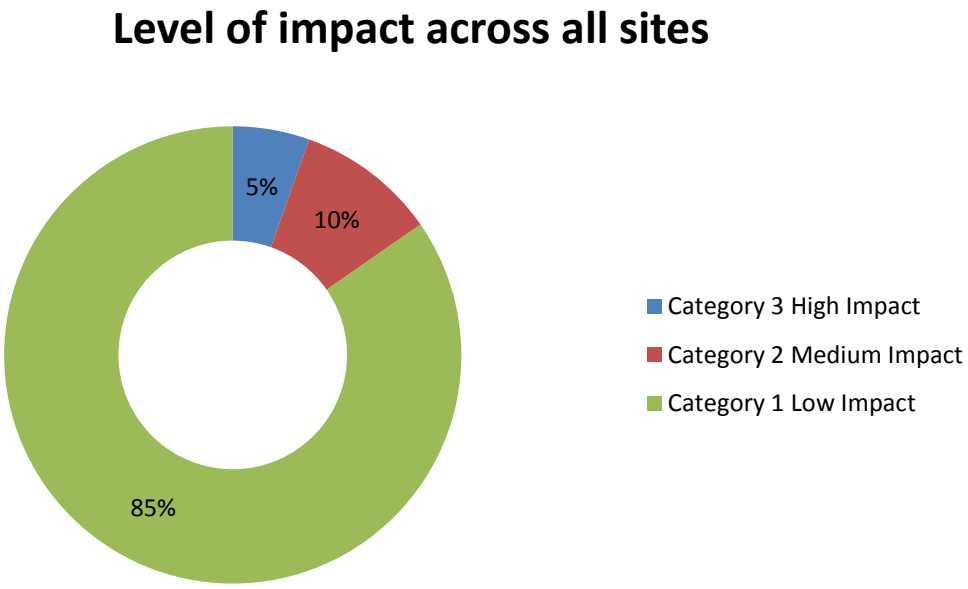


Figure 2.3 Level of Impact observed across all sites

[1] N/A means that there was no interpretative signage at the site or the surveyor was located at a station where interpretative signage was not visible

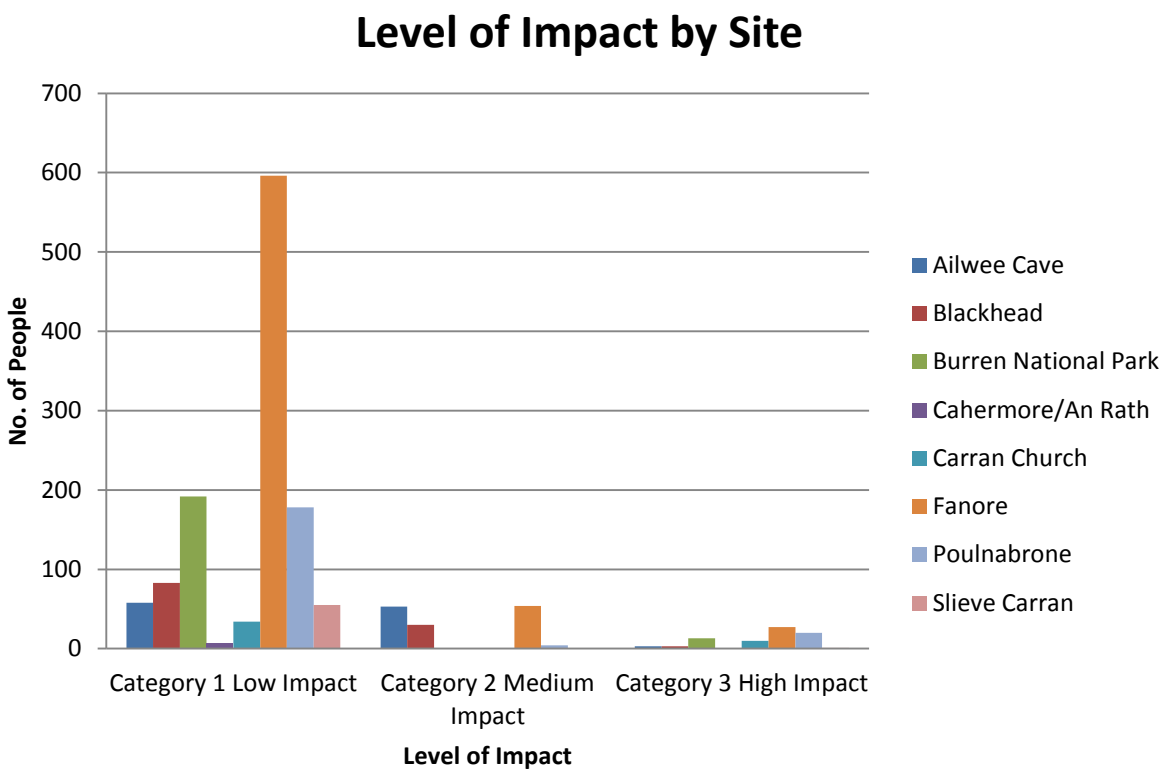


Figure 2.4 Level of Impact observed by Site

The level of impact was categorised depending on the severity of the effects observed. The effects were labelled depending on the effect observed ranging from none or a discernable impact to more severe effects such as the disturbance of wildlife and destruction of site materials. This was then categorised into low, medium or high impacts (See Section 2.2 for a detailed explanation). Overall, the level of impact observed was low.

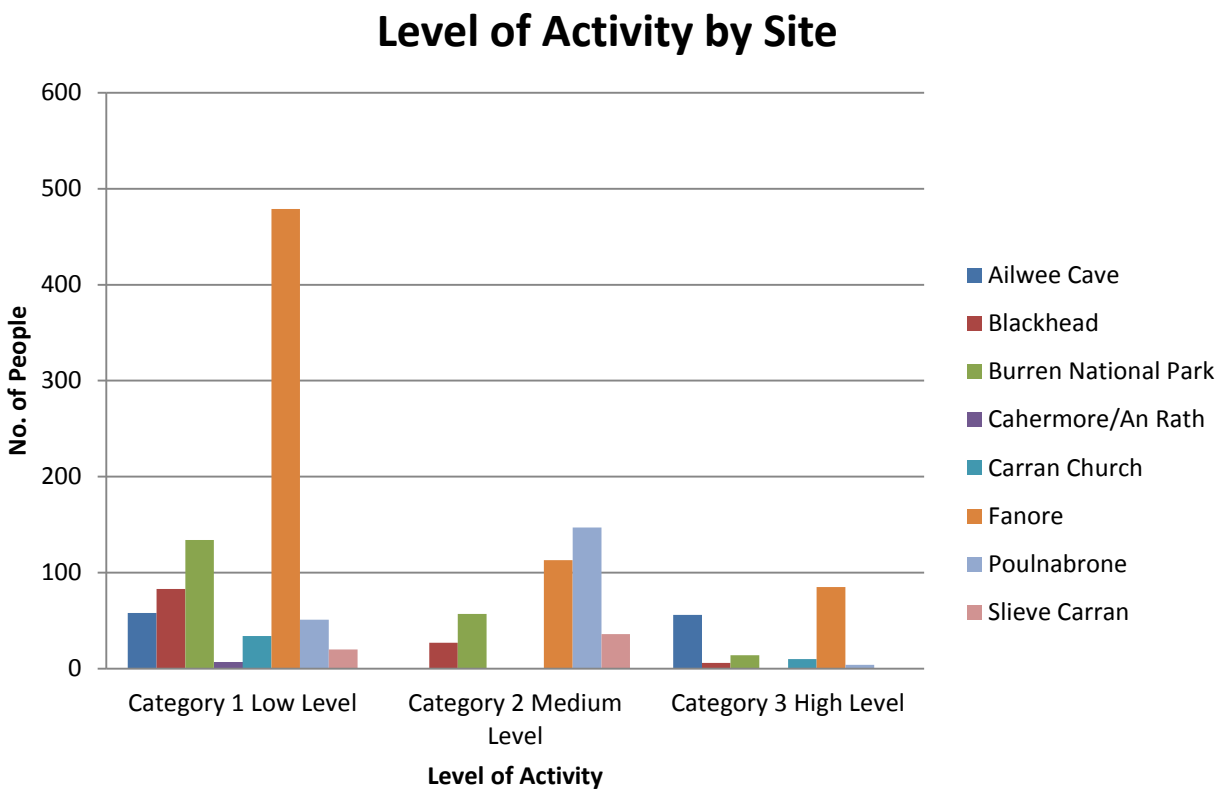


Figure 2.5 Level of Activity Observed by Site

Most activity observed was on a low level, largely walking on paths, sightseeing and photographing. The activities were categorised ranging from the lowest level e.g. walking on paths, mown grass etc. to high level e.g. deliberate moving, knock or building site materials. It should be noted that visitors who engaged in high level activities may not actually cause an observed impact or effect on the site.

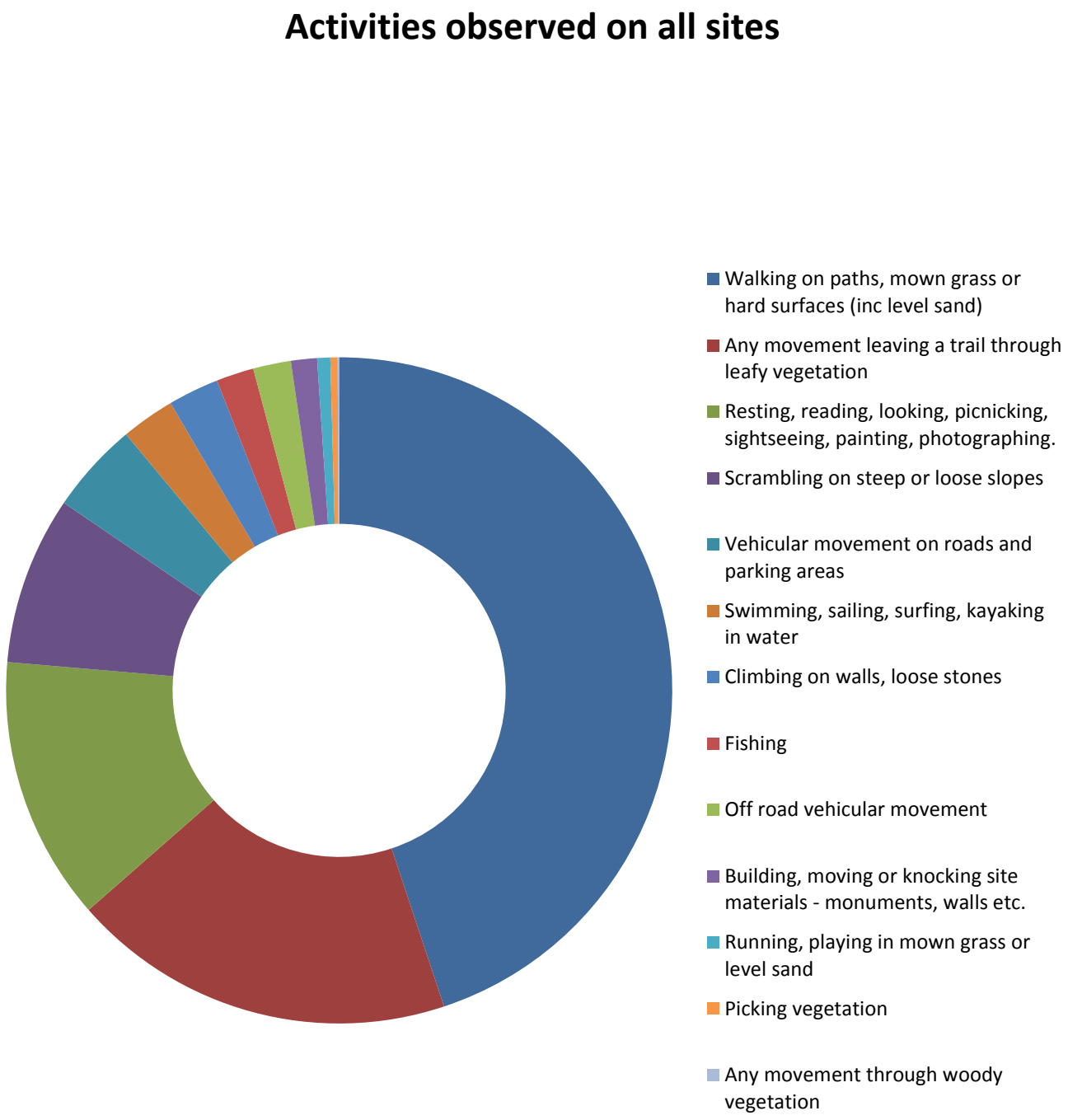


Figure 2.6 Activities recorded across all sites

Table 2.6 Breakdown of activities observed at all sites

Activities Observed	No. of People	% of People
Walking on paths, mown grass or hard surfaces (inc level sand)	638	45%
Any movement leaving a trail through leafy vegetation	265	19%
Resting, reading, looking, picnicking, sightseeing, painting, photographing.	182	13%
Scrambling on steep or loose slopes	116	8%
Vehicular movement on roads and parking areas	63	4%
Swimming, sailing, surfing, kayaking in water	37	3%
Climbing on walls, loose stones	35	2%
Fishing	26	2%
Off road vehicular movement	26	2%
Building, moving or knocking site materials - monuments, walls etc.	18	1%
Running, playing in mown grass or level sand	9	1%
Picking vegetation	5	>1%
Any movement through woody vegetation	1	>1%
Grand Total	**1421**	**100%**

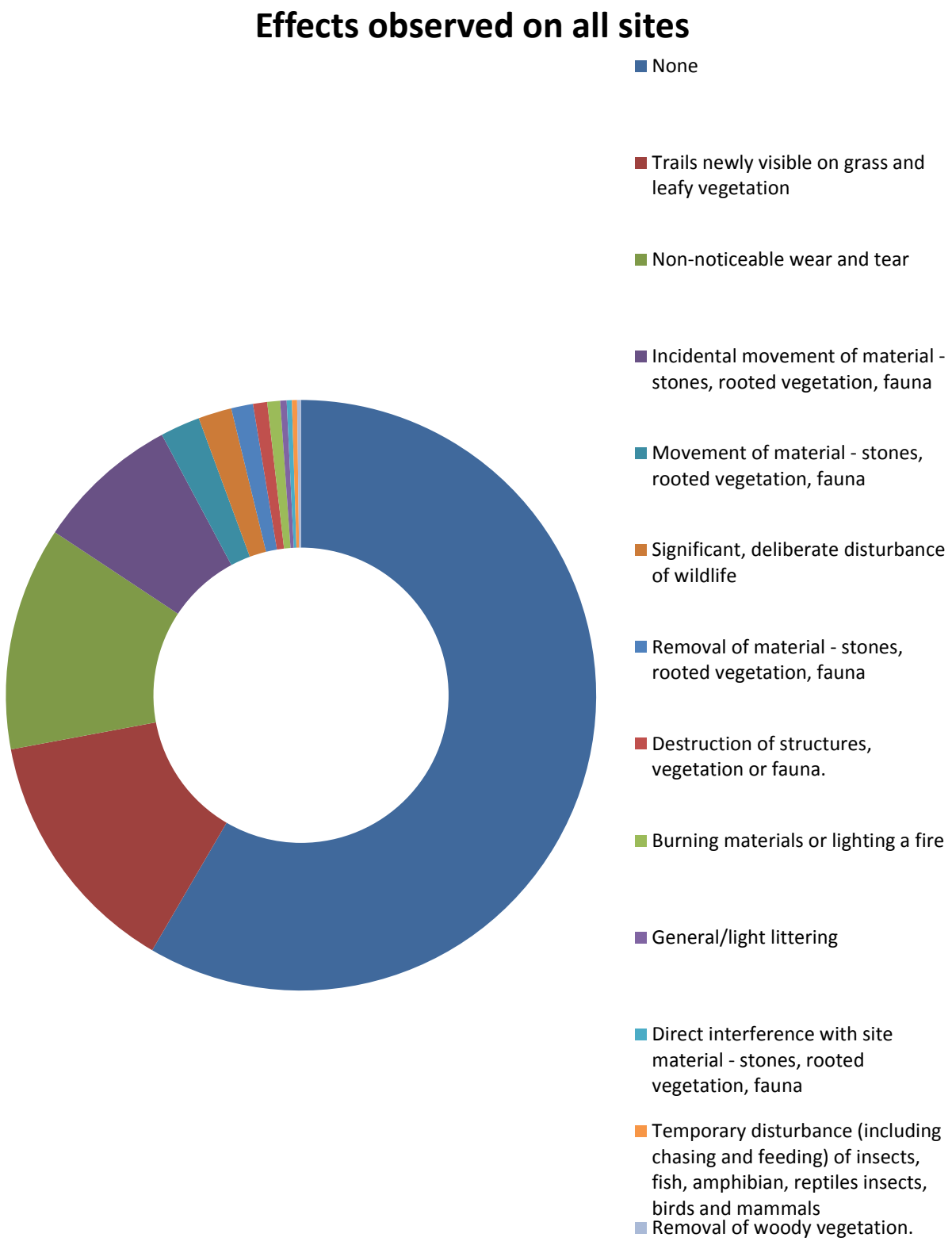


Figure 2.7 Range of Effects Observed across all site

Table 2.7 Breakdown of effects observed at all sites

Effects Observed	No. of People	% of People
None	830	58%
Trails newly visible on grass and leafy vegetation	194	14%
Non-noticeable wear and tear	174	12%
Incidental movement of material - stones, rooted vegetation, fauna	112	8%
Movement of material - stones, rooted vegetation, fauna	31	2%
Significant, deliberate disturbance of wildlife	26	2%
Removal of material - stones, rooted vegetation, fauna	17	1%
Destruction of structures, vegetation or fauna	11	1%
Burning materials or lighting a fire	10	1%
General/light littering	5	>1%
Direct interference with site material - stones, rooted vegetation, fauna	4	>1%
Temporary disturbance (including chasing and feeding) of insects, fish, amphibian, reptiles insects, birds and mammals	4	>1%
Removal of woody vegetation.	3	>1%
Grand Total	**1421**	**100%**

2.4 Movement Patterns Observed on Sites

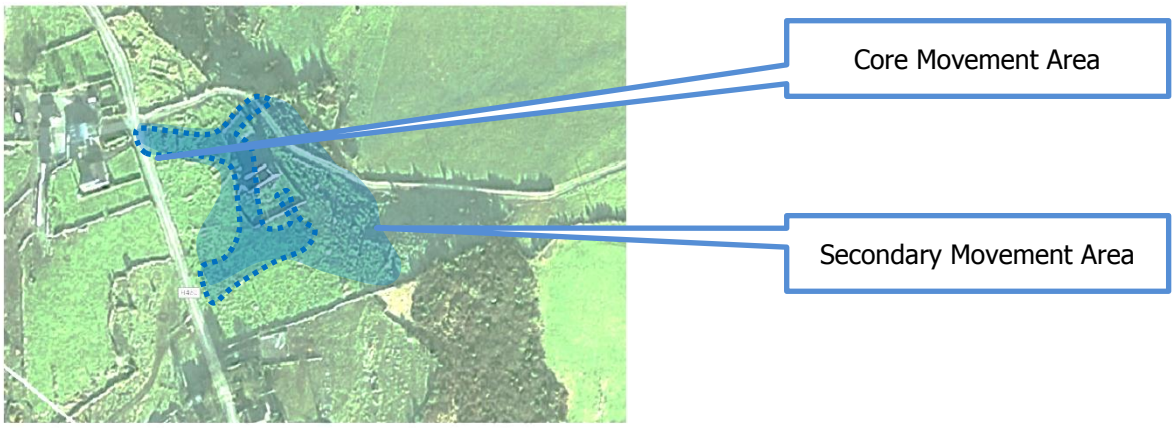


Figure 2.8 Sample of Observed Visitor Movement pattern (Carran Church) showing Core and Secondary Movement Areas.

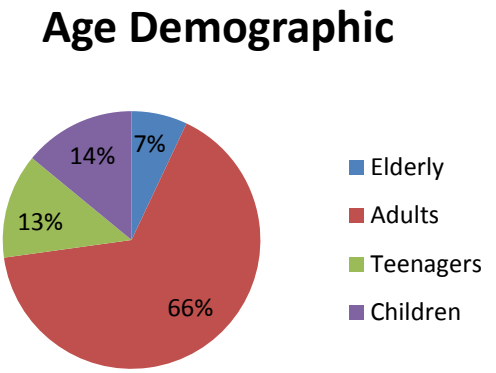
The pattern of movement of each visitor was observed and recorded on a sketch plan. The maps were combined to note the intensity of movement patterns that recurred at the same locations. A detailed breakdown of visitor movement per site is included in Section 4.

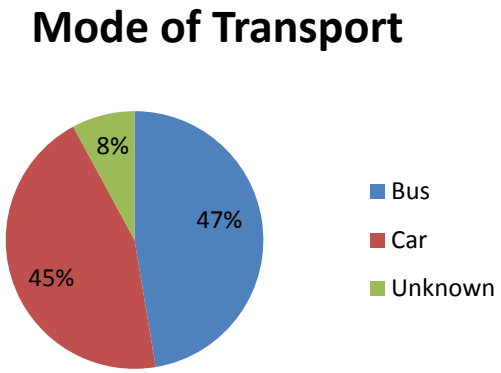
Generally two levels of activity were notes a 'Core Area' where the majority of visitors (95%+) moved and a 'Secondary Area' where occasional movement was observed by a very small proportion of visitors. At a small number of sites (Aillwee caves, Black Head Layby and Fanore Beach) there was a further level activity by a tiny proportion of visitors (usually only one visitor) that was recorded for completeness.

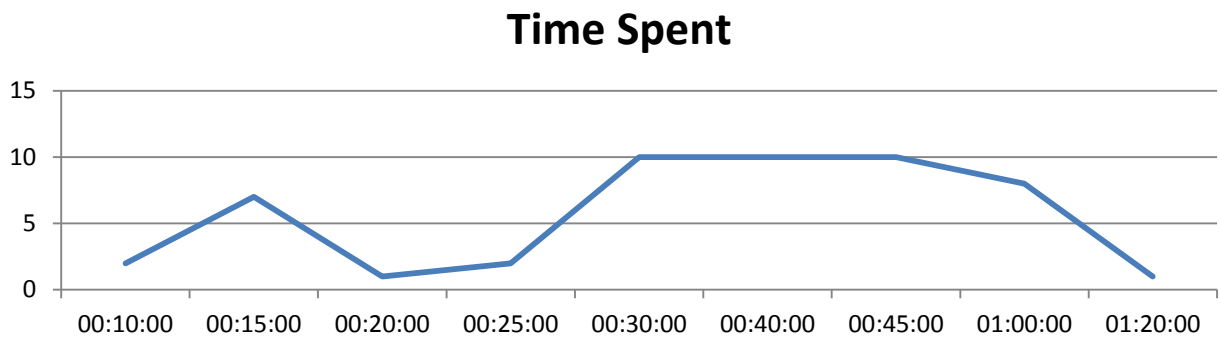
The shading that is superimposed over the aerial photographs illustrates where these patterns of movement occurred. The 'Core Movement Area' is indicated by an enclosing dotted line. These results have been used to direct the detailed ecological assessment which will examine the effects on vegetation in surfaces in core and secondary areas as well as in 'control area' where no visitor movement was recorded.

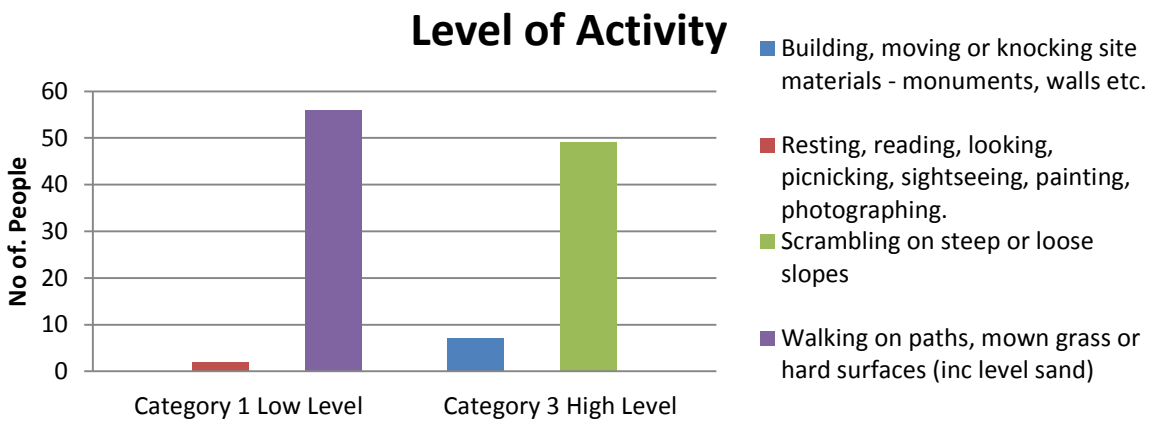
2.5 Aillwee Cave

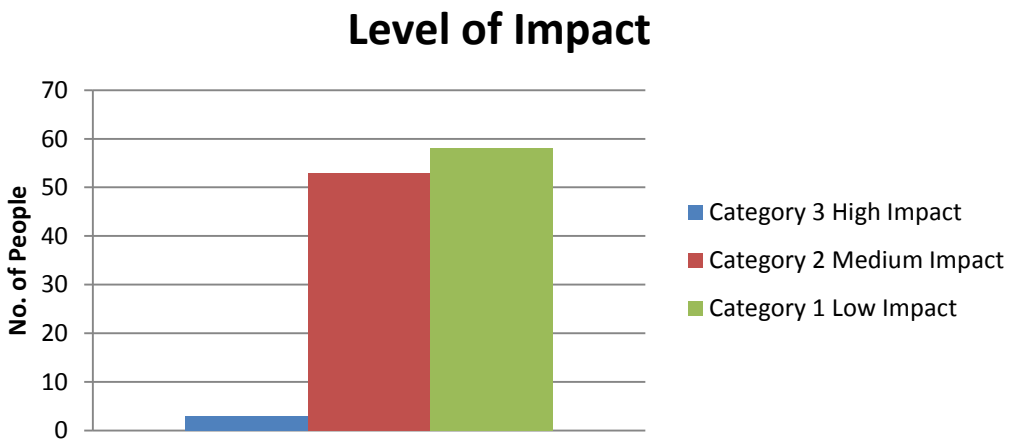
Aillwee Caves is a highly managed site with caves and limestone pavement. There is a hiking trail extending behind the visitor centre which allows visitors to climb up and view the Burren. Due to the high numbers of visitors at the site, the visitors who left perimeters of the managed area and extended into the hiking trail behind the caves were observed in their activities. A total of 114 visitors were observed during the study. One visitor was observed to leave the perimeters of the site and hike up the mountain with two dogs. There were no information boards or interpretative material visible to the surveyor at the survey station.

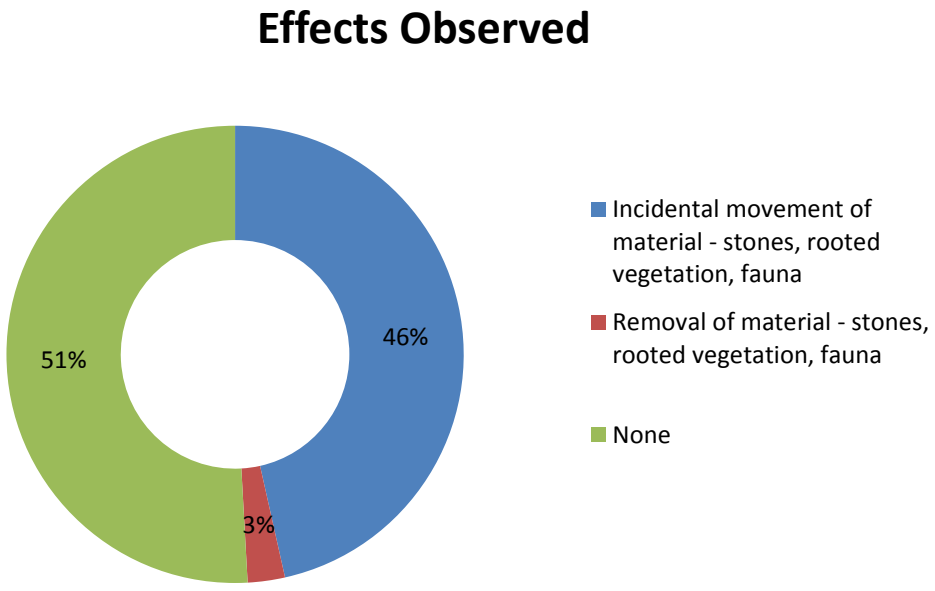






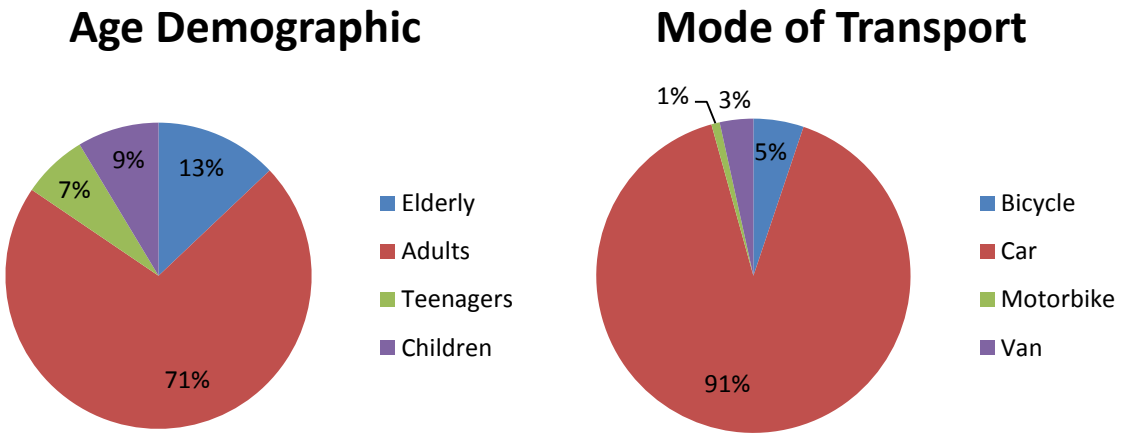

Level of Activity
No of. People
60
50
40
30
20
10
0
Category 1 Low Level
Category 3 High Level
Building, moving or knocking site materials - monuments, walls etc.
Resting, reading, looking, picnicking, sightseeing, painting, photographing.
Scrambling on steep or loose slopes
Walking on paths, mown grass or hard surfaces (inc level sand)

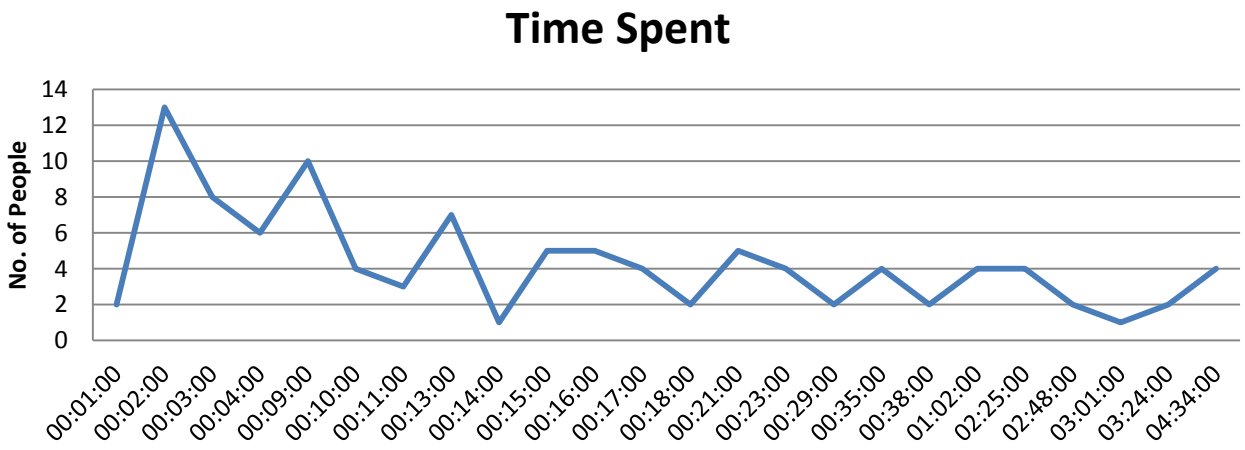

Level of Impact
No. of People
70
60
50
40
30
20
10
0
Category 3 High Impact
Category 2 Medium Impact
Category 1 Low Impact

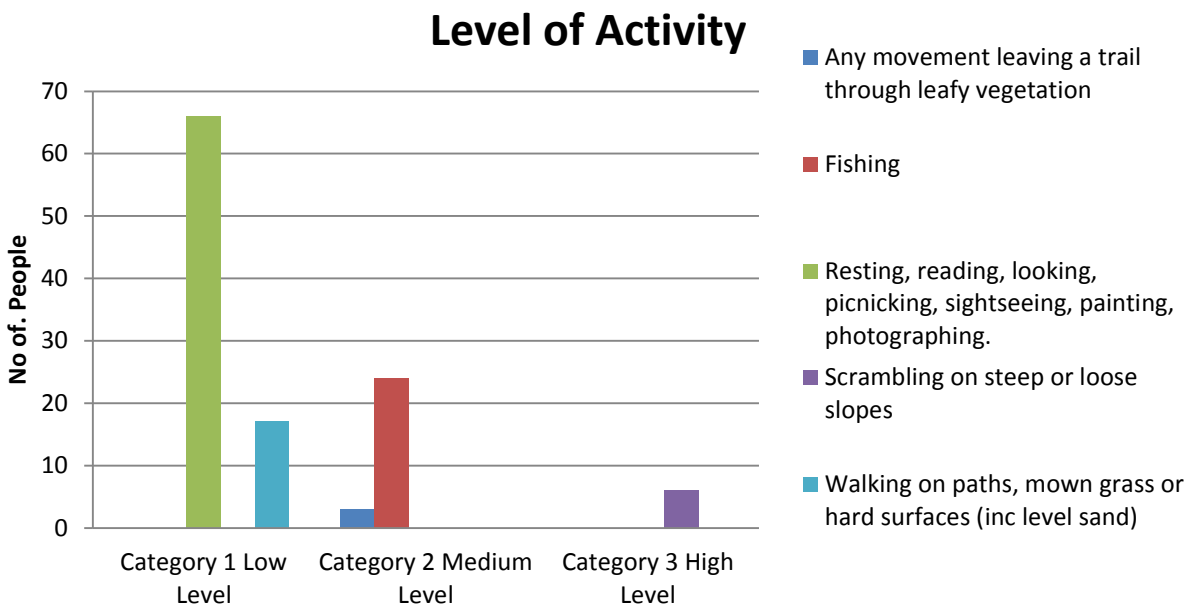

Effects Observed
46%
51%
3%
Incidental movement of material - stones, rooted vegetation, fauna
Removal of material - stones, rooted vegetation, fauna
None

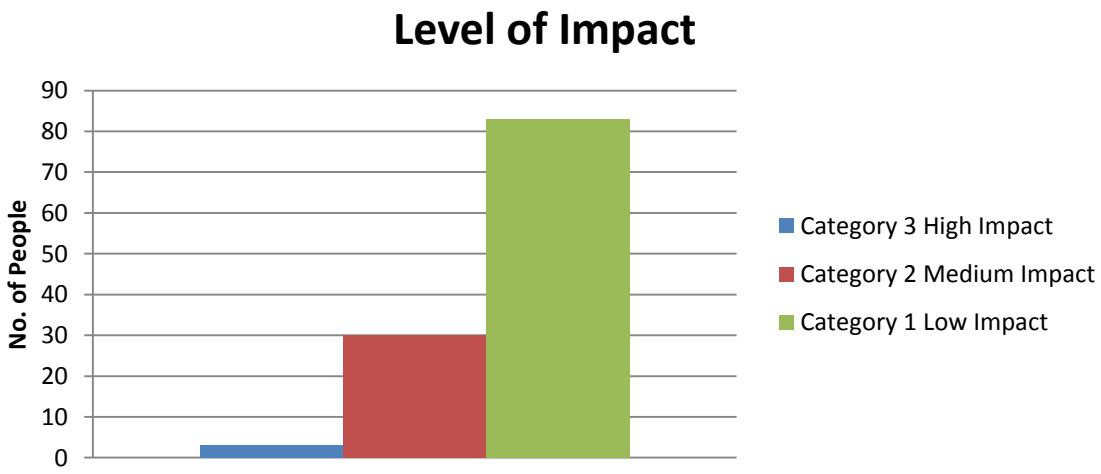
2.6 Blackhead

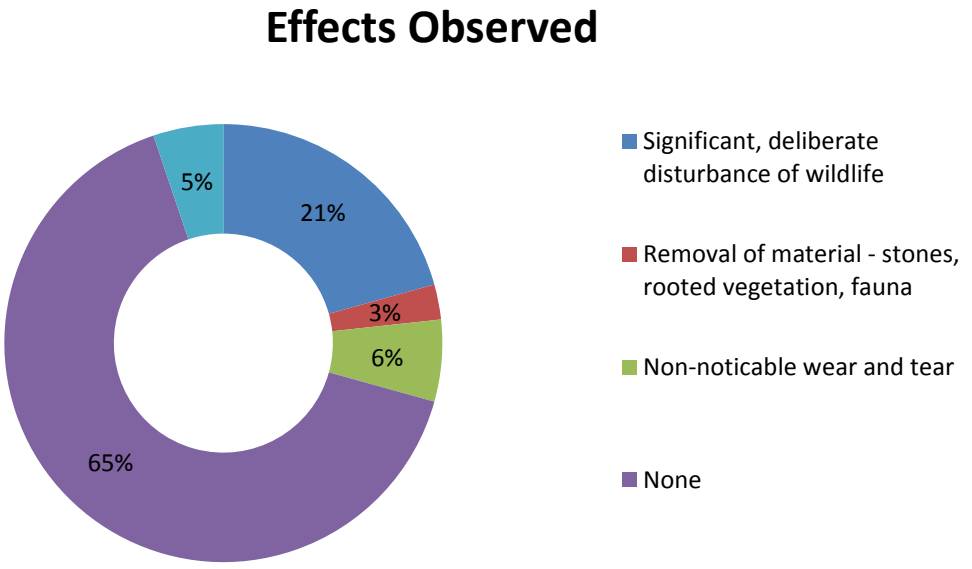
Blackhead is an area in the Burren which loops around the coast of Co. Clare along the R477. There is a lighthouse along the road and a number of small laybys. Blackhead also has a looped hiking trail. The survey was undertaken at Blackhead Lighthouse and the nearest layby approximately 500 metres south from the lighthouse in the direction of Fanore. Surveyors were present at each of the stations over two days and a total of 114 visitors were observed during the two day observation.





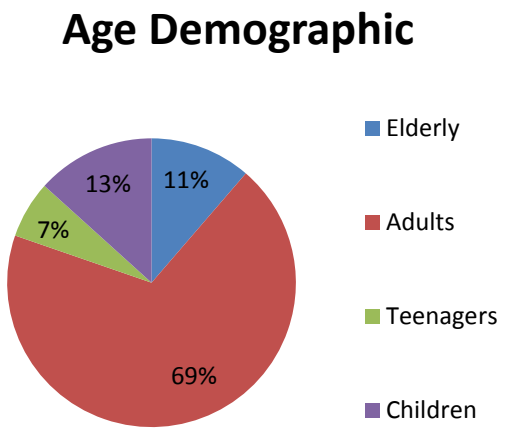

Level of Activity
No of. People
70
60
50
40
30
20
10
0
Category 1 Low Level
Category 2 Medium Level
Category 3 High Level
Any movement leaving a trail through leafy vegetation
Fishing
Resting, reading, looking, picnicking, sightseeing, painting, photographing.
Scrambling on steep or loose slopes
Walking on paths, mown grass or hard surfaces (inc level sand)

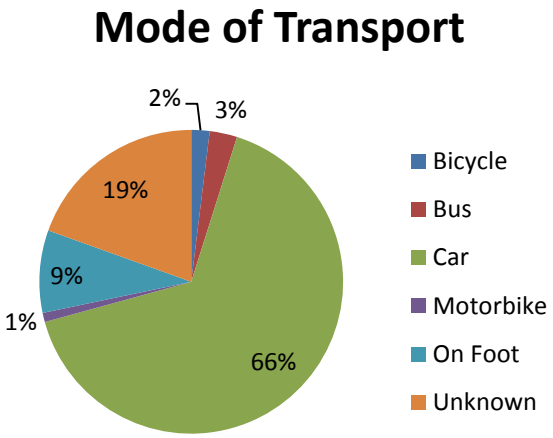

Level of Impact
No. of People
90
80
70
60
50
40
30
20
10
0
Category 3 High Impact
Category 2 Medium Impact
Category 1 Low Impact

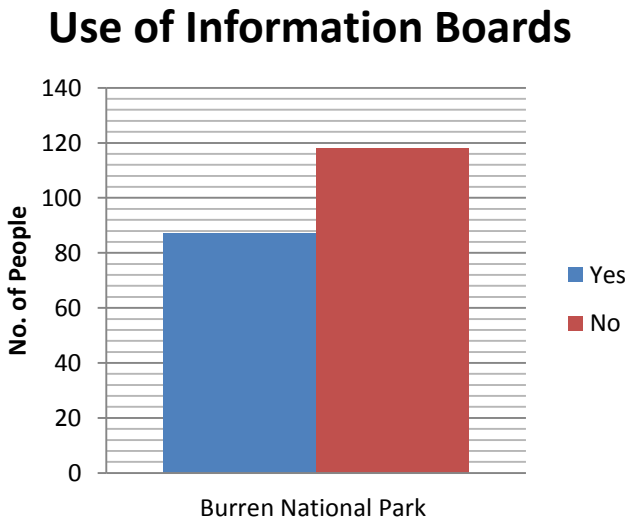

Effects Observed
5%
21%
3%
6%
65%
Significant, deliberate disturbance of wildlife
Removal of material - stones, rooted vegetation, fauna
Non-noticable wear and tear
None

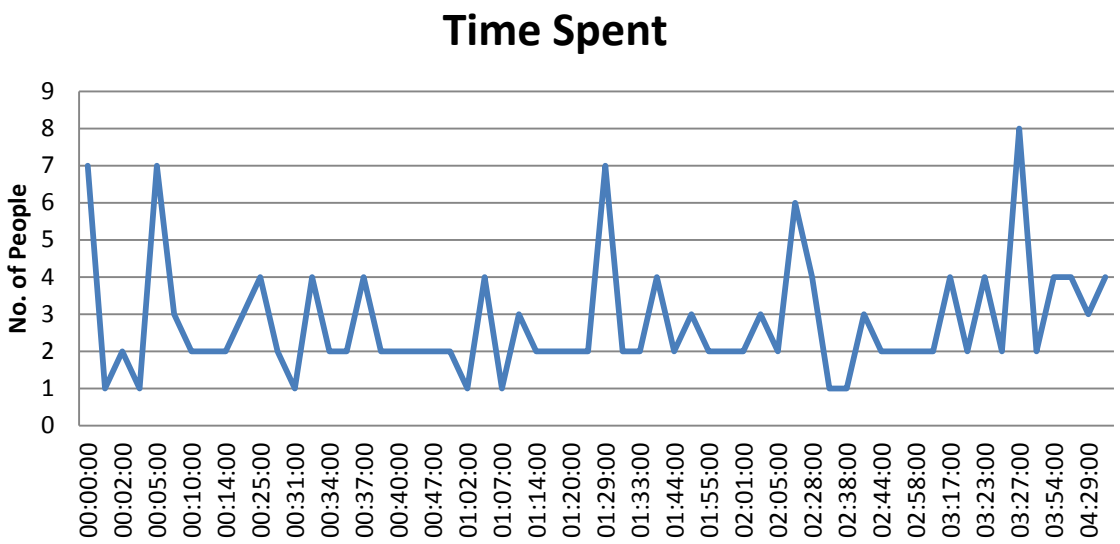
2.7 Burren National Park

Burren National Park has seven walking trails throughout the site. Five of these trails begin near to Gortaleck Crossroads. Three sites were observed over two days at the start of the various walking trails. One surveyor was present at the layby at Gortaleck Crossroads whereby cars parked to go hiking. There was an information board at this point. The second surveyor was located inside the entrance of a trail head whereby a number of trails either began or ended. There was an information board at the entrance from the road but this was not always visible to the surveyor. The third surveyor was present at the trail head at Mullaghmore. The surveyor could see the entrance to the trail, information boards and vehicles as they parked along the road. A total of 205 visitors were observed at the three sites during the study.








Time Spent
No. of People
9
8
7
6
5
4
3
2
1
0
00:00:00
00:02:00
00:05:00
00:10:00
00:14:00
00:25:00
00:31:00
00:34:00
00:37:00
00:40:00
00:47:00
01:02:00
01:07:00
01:14:00
01:20:00
01:29:00
01:33:00
01:44:00
01:55:00
02:01:00
02:05:00
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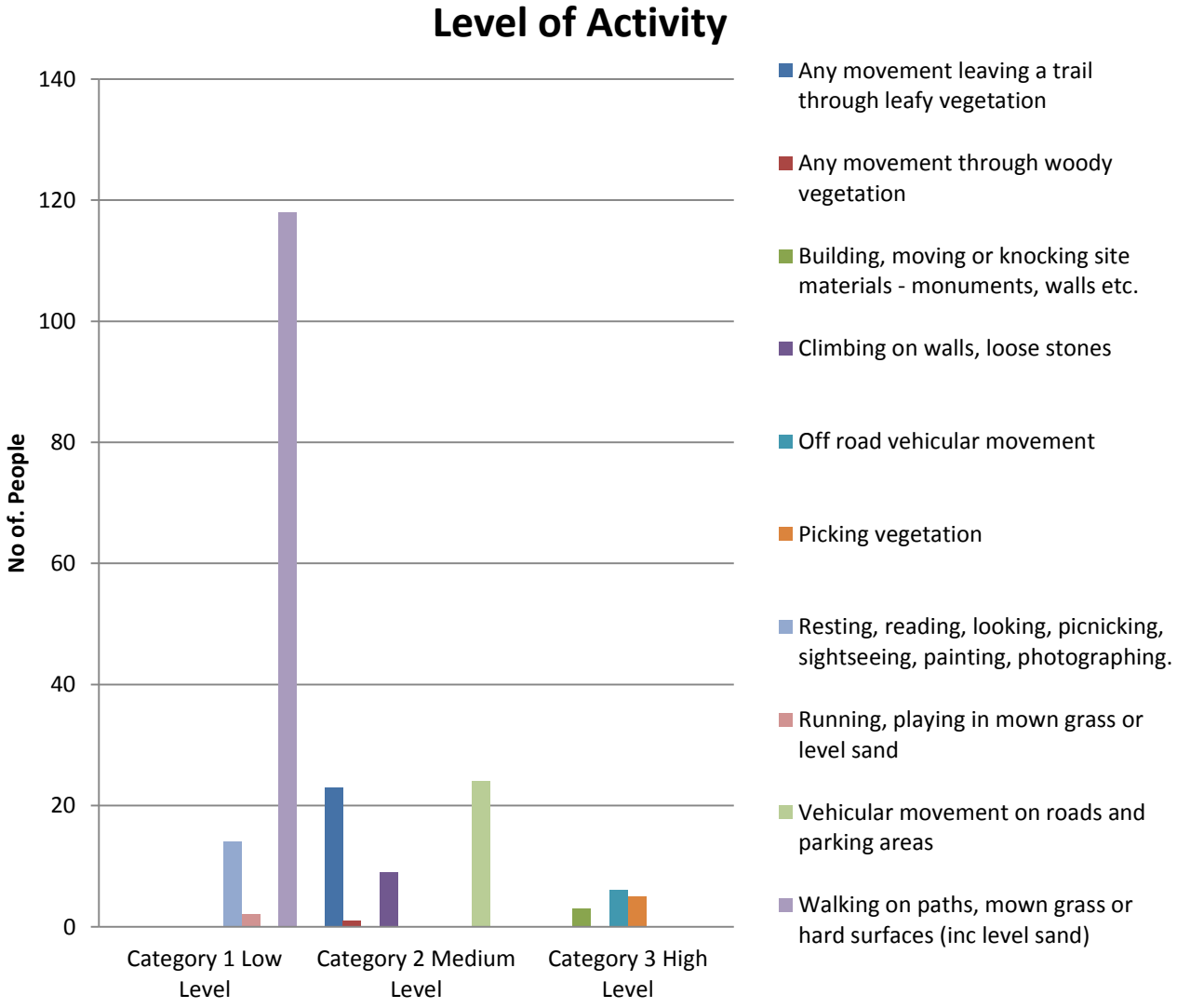
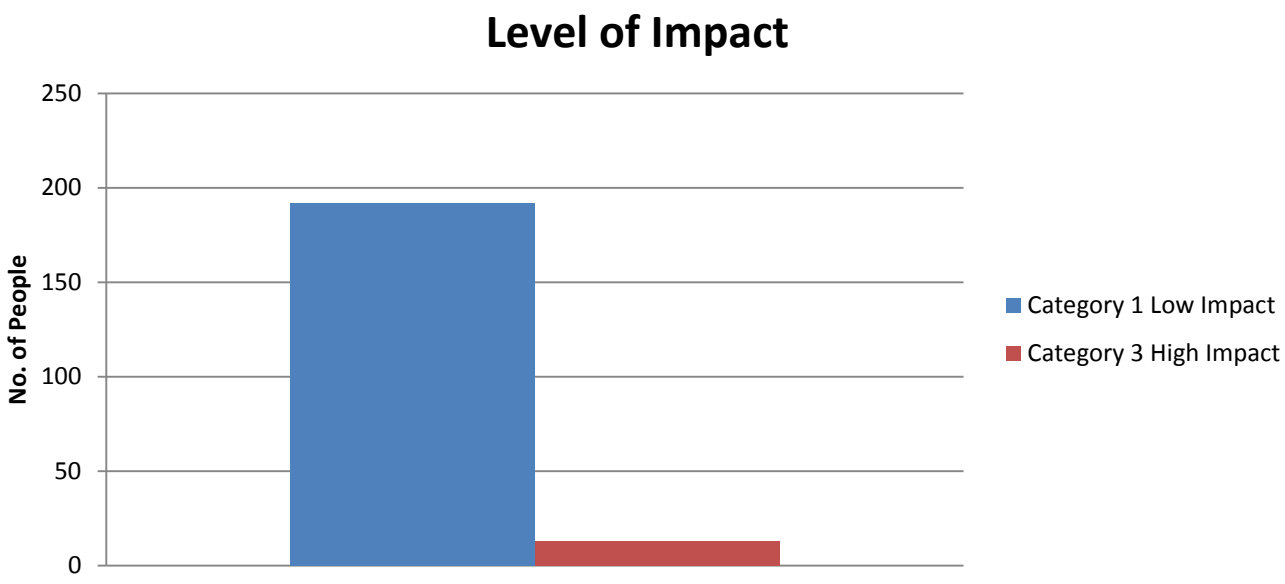
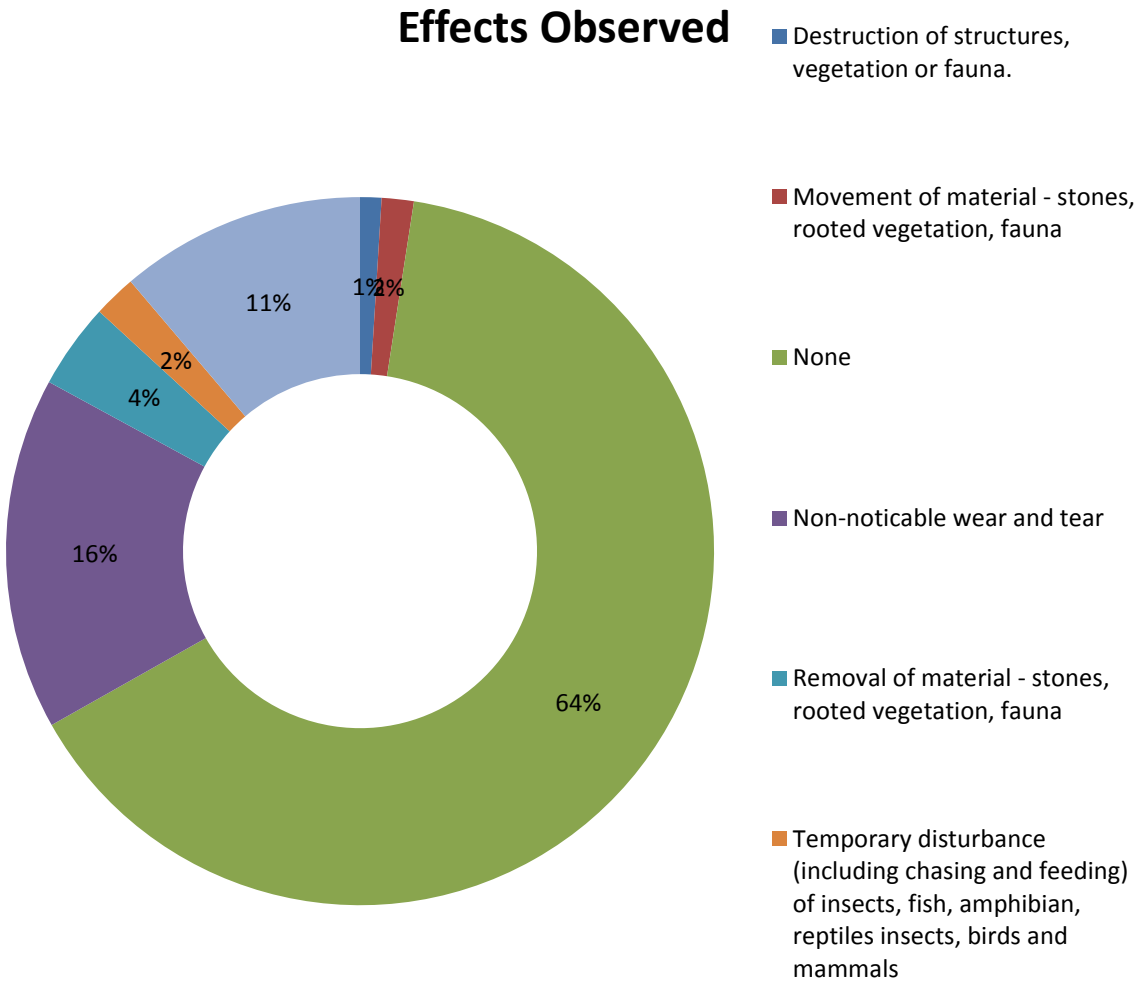
03:23:00
03:27:00
03:54:00
04:29:00

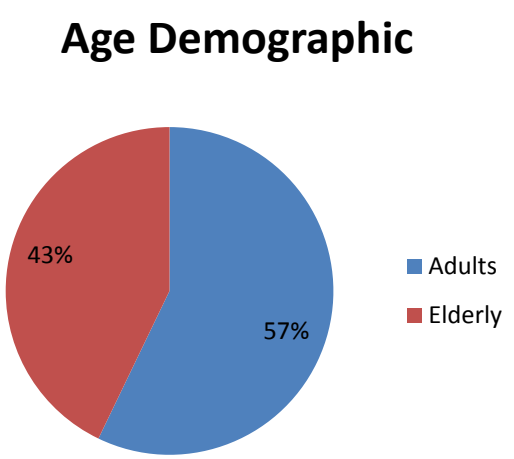

Level of Activity
No of. People
140
120
100
80
60
40
20
0
Category 1 Low Level
Category 2 Medium Level
Category 3 High Level
Any movement leaving a trail through leafy vegetation
Any movement through woody vegetation
Building, moving or knocking site materials - monuments, walls etc.
Climbing on walls, loose stones
Off road vehicular movement
Picking vegetation
Resting, reading, looking, picnicking, sightseeing, painting, photographing.
Running, playing in mown grass or level sand
Vehicular movement on roads and parking areas
Walking on paths, mown grass or hard surfaces (inc level sand)

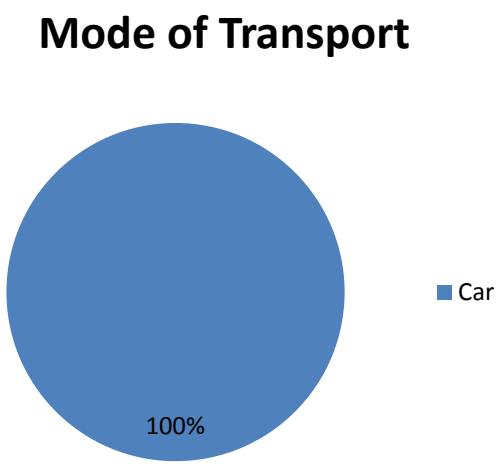

Level of Impact
No. of People
250
200
150
100
50
0
Category 1 Low Impact
Category 3 High Impact

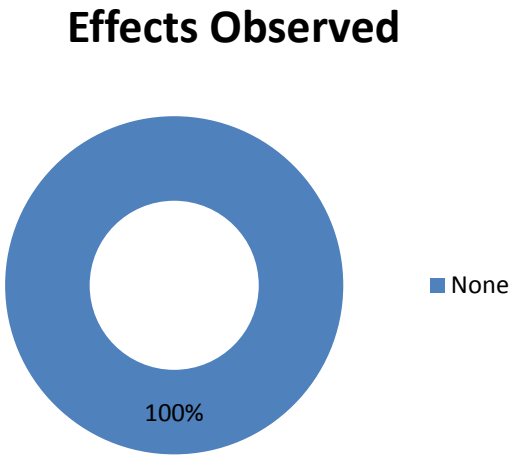

Effects Observed
1%
2%
64%
16%
4%
2%
11%
Destruction of structures, vegetation or fauna.
Movement of material - stones, rooted vegetation, fauna
None
Non-noticable wear and tear
Removal of material - stones, rooted vegetation, fauna
Temporary disturbance (including chasing and feeding) of insects, fish, amphibian, reptiles insects, birds and mammals

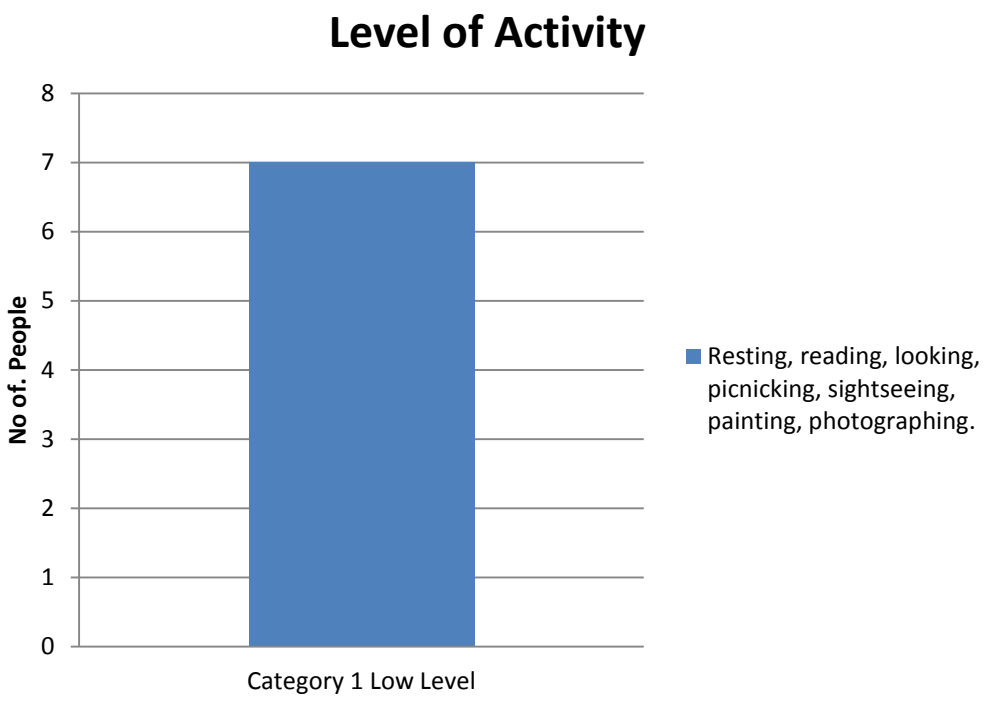
2.8 Cahermore

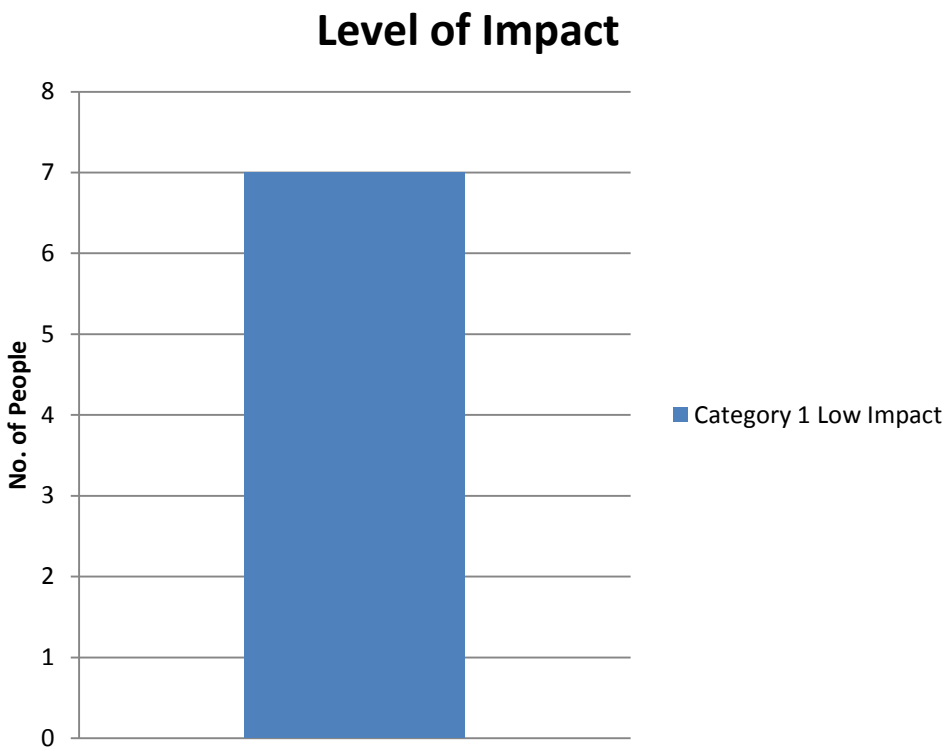
Cahermore and Án Rath are two demonstration sites located in close proximity to each other. Cahermore was chosen for surveying as it had a layby outside the site with information boards and it was expected that the most footfall would arrive at this point. The site also has a viewing platform. The surveyor was positioned at a station inside Cahermore stone fort out of view of information boards. 7 visitors were observed during the study, these were visitors that entered the site from the road.





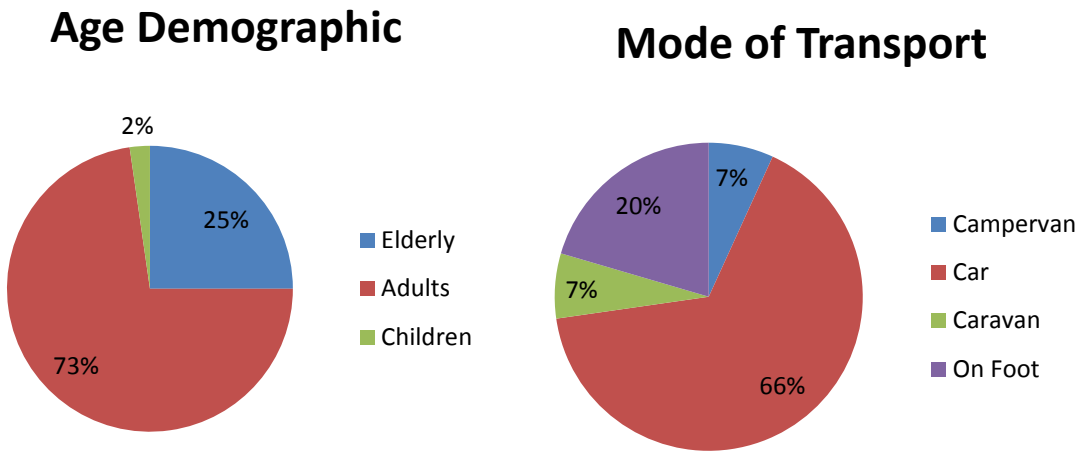


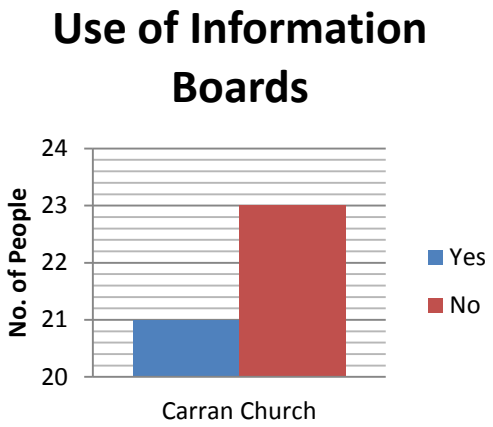

Level of Activity
No of. People
8
7
6
5
4
3
2
1
0
Category 1 Low Level
Resting, reading, looking, picnicking, sightseeing, painting, photographing.

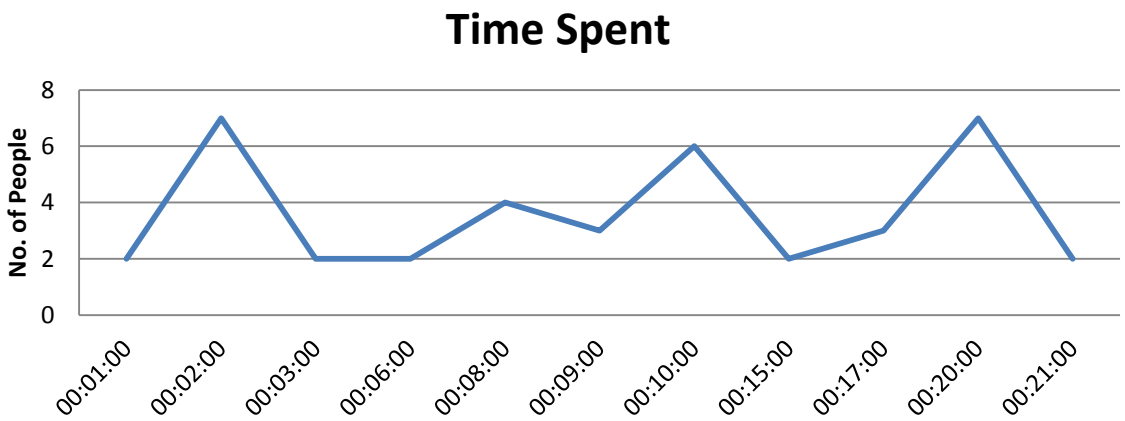

Level of Impact
No. of People
8
7
6
5
4
3
2
1
0
Category 1 Low Impact

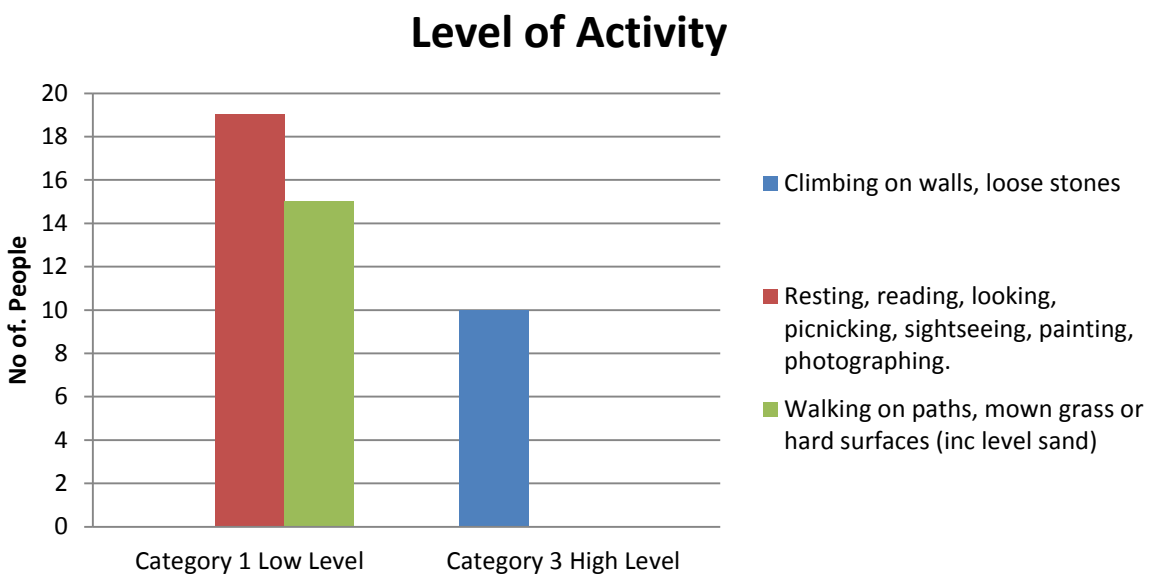
2.9 Carran Church

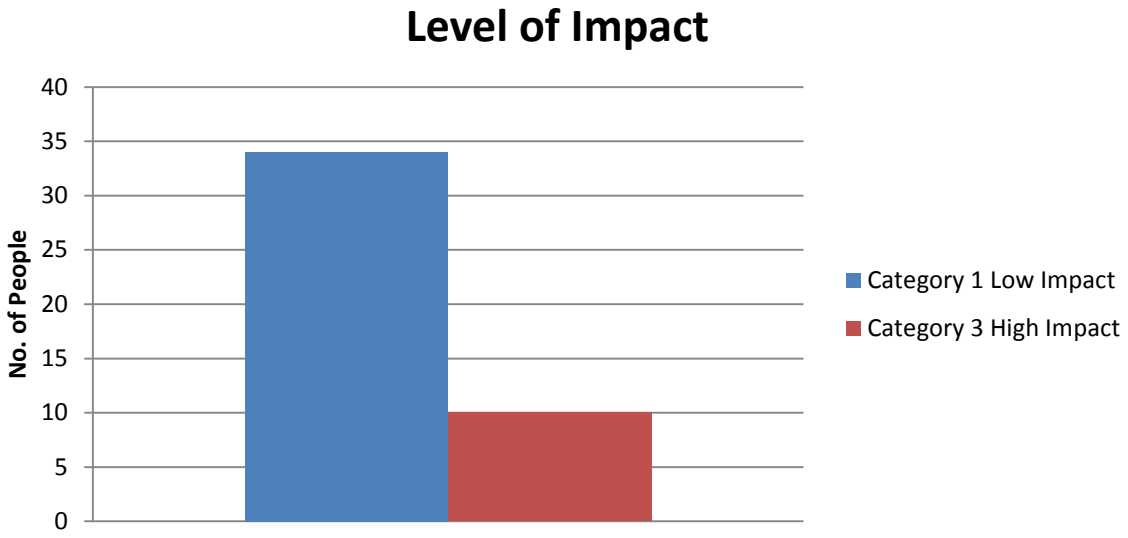
Carran Church is a medieval site in Carran. It is located along the R480 between Ballyvaughan and Caherconnell. The surveyor was present on the site for one full day and was positioned outside the walls of the church with a view of the road and entrance to the site. A total of 44 people were observed during the study. There was interpretative material available inside the boundary walls and the surveyor could see the layby where vehicles parked.

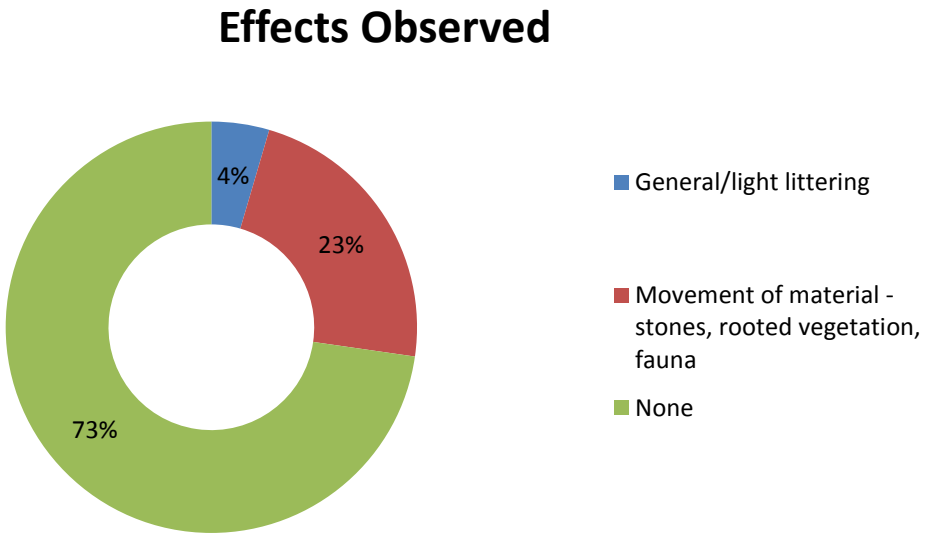






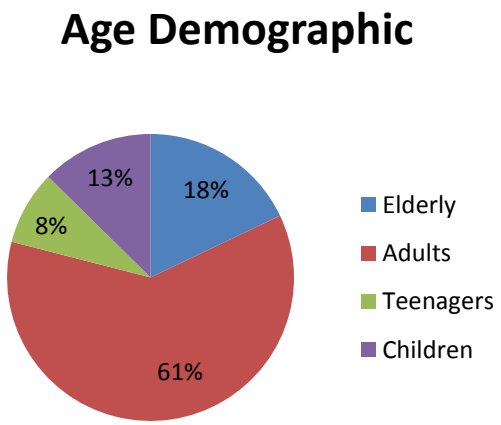

Level of Activity
No of. People
20
18
16
14
12
10
8
6
4
2
0
Category 1 Low Level
Category 3 High Level
Climbing on walls, loose stones
Resting, reading, looking, picnicking, sightseeing, painting, photographing.
Walking on paths, mown grass or hard surfaces (inc level sand)

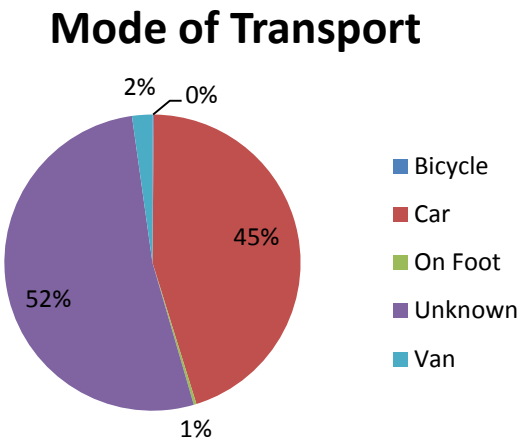

Level of Impact
No. of People
40
35
30
25
20
15
10
5
0
Category 1 Low Impact
Category 3 High Impact

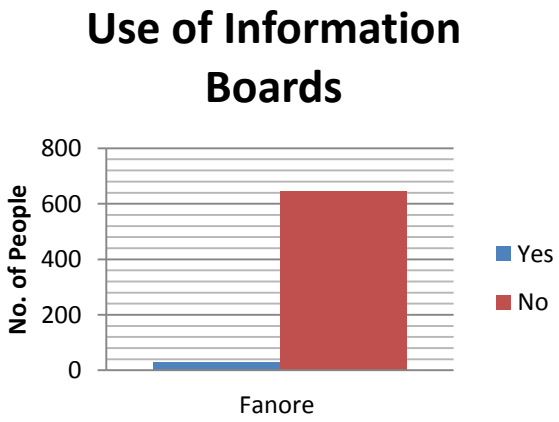

Effects Observed
4%
23%
73%
General/light littering
Movement of material - stones, rooted vegetation, fauna
None

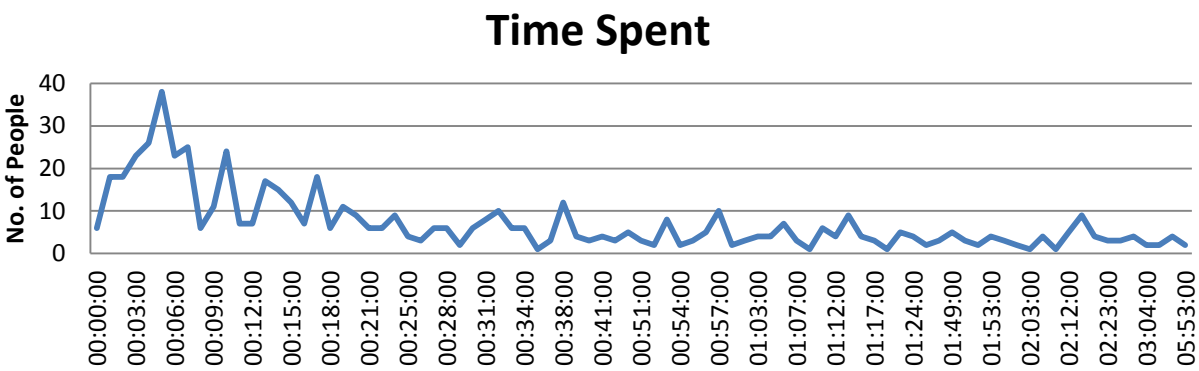
2.10 Fanore Beach

Fanore Beach and Dunes is an example of a sandy beach. The beach was the busiest of all the sites in terms of footfall of visitors (674 visitors were observed during the study) and attracted both tourists and locals. The site has a car park and toilet facilities as well as a bring bank for local recycling. There is a caravan park approximately 500 metres north of the beach and the residents have access to the beach from the dunes. Four surveyors were present at the site over two days. Two surveyors observed visitors in the car park, one surveyor observed the beach from the lifeguard hut as far as the River Caher while the fourth surveyor was stationed at the River Caher observing activities north of the beach.








Time Spent
No. of People
40
30
20
10
0
00:00:00
00:03:00
00:06:00
00:09:00
00:12:00
00:15:00
00:18:00
00:21:00
00:25:00
00:28:00
00:31:00
00:34:00
00:38:00
00:41:00
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01:03:00
01:07:00
01:12:00
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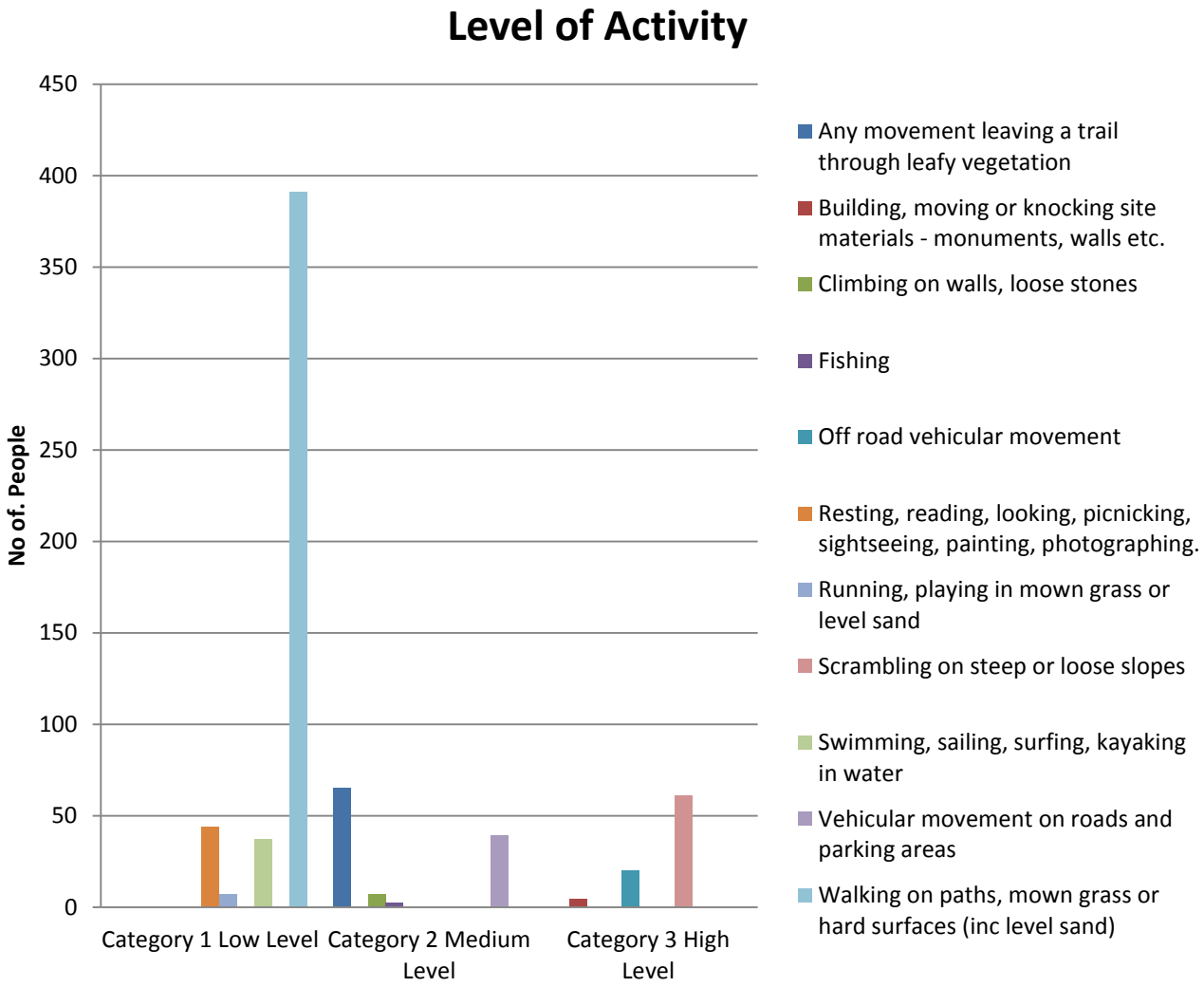
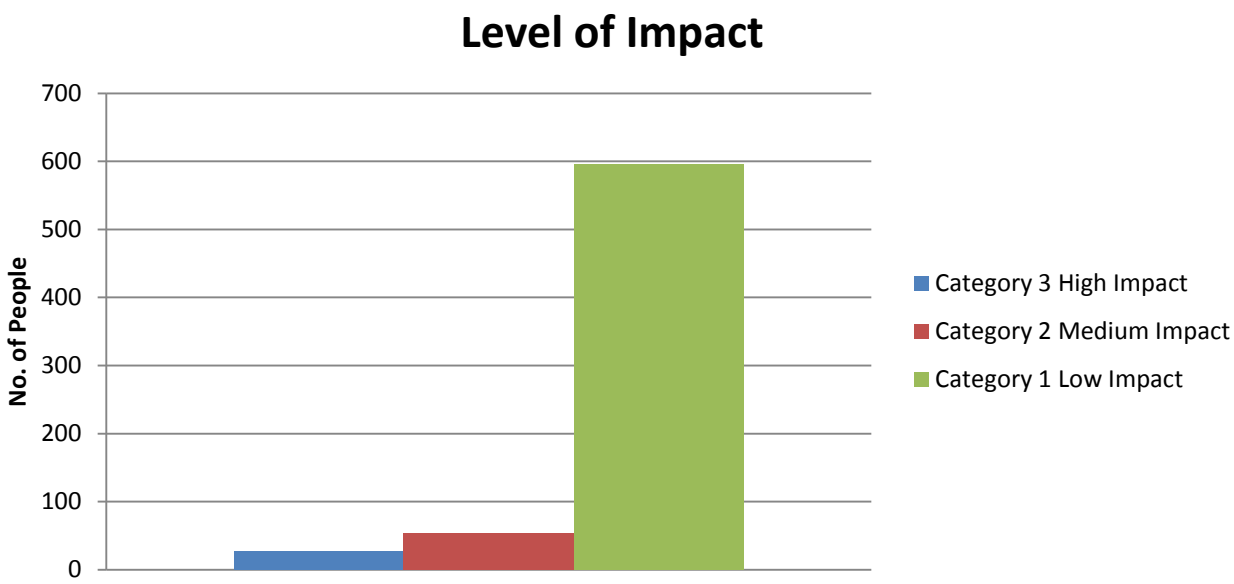
02:12:00
02:23:00
03:04:00
05:53:00


Level of Activity
No of. People
450
400
350
300
250
200
150
100
50
0
Category 1 Low Level
Category 2 Medium Level
Category 3 High Level
Any movement leaving a trail through leafy vegetation
Building, moving or knocking site materials - monuments, walls etc.
Climbing on walls, loose stones
Fishing
Off road vehicular movement
Resting, reading, looking, picnicking, sightseeing, painting, photographing.
Running, playing in mown grass or level sand
Scrambling on steep or loose slopes
Swimming, sailing, surfing, kayaking in water
Vehicular movement on roads and parking areas
Walking on paths, mown grass or hard surfaces (inc level sand)


Level of Impact
No. of People
700
600
500
400
300
200
100
0
Category 3 High Impact
Category 2 Medium Impact
Category 1 Low Impact

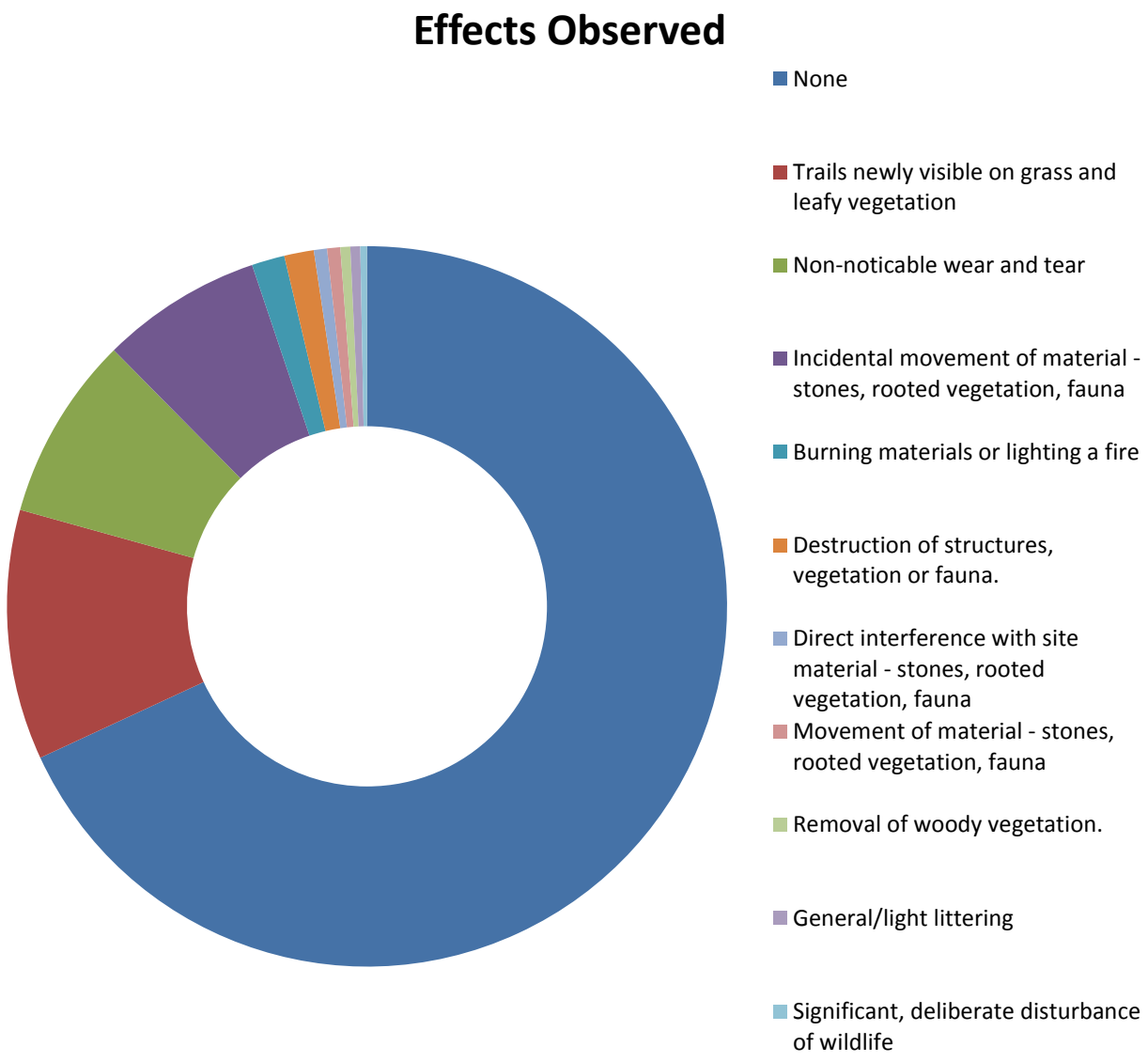
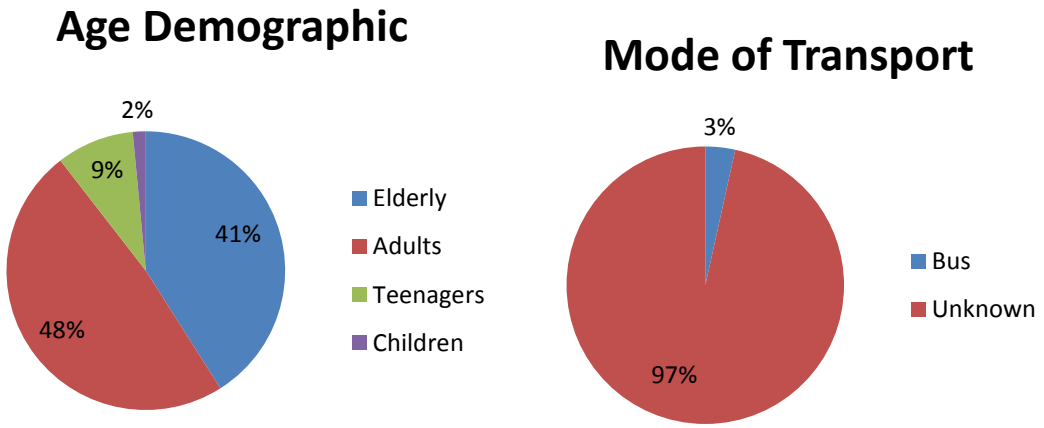


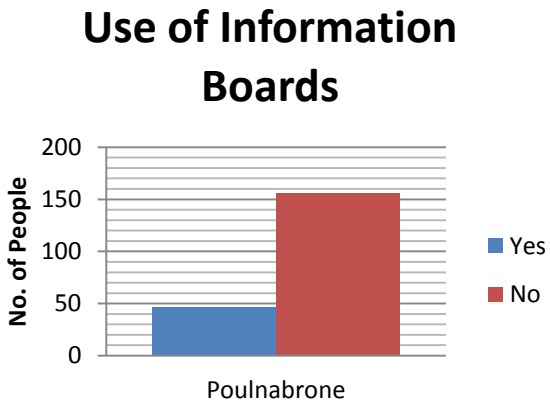
Table 2.8 Fanore Beach breakdown of effects observed

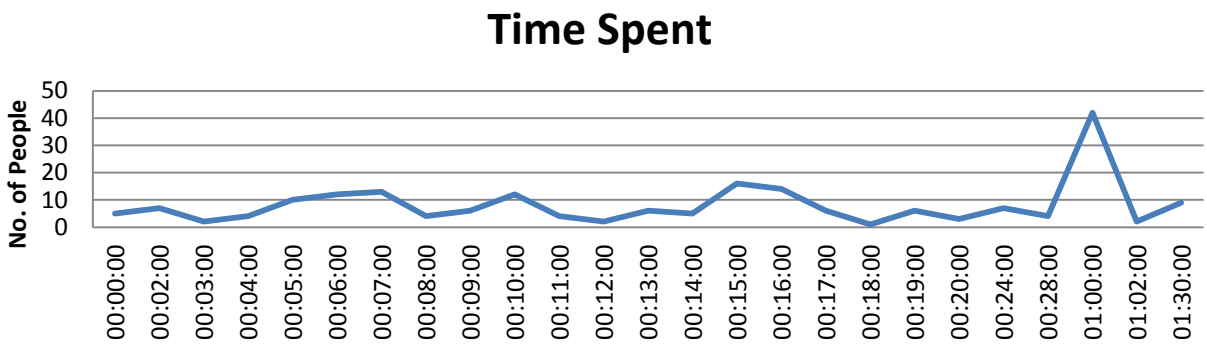
Effects Observed	Total Number of People	% of People
None	461	68%
Trails newly visible on grass and leafy vegetation	76	11%
Non-noticeable wear and tear	56	8%
Incidental movement of material - stones, rooted vegetation, fauna	49	7%
Burning materials or lighting a fire	10	1%
Destruction of structures, vegetation or fauna.	9	1%
Direct interference with site material - stones, rooted vegetation, fauna	4	1%
Movement of material - stones, rooted vegetation, fauna	4	1%
Removal of woody vegetation.	3	>1%
General/light littering	3	>1%
Significant, deliberate disturbance of wildlife	2	>1%
Grand Total	**677**	**100%**

2.11 Poulnabrone

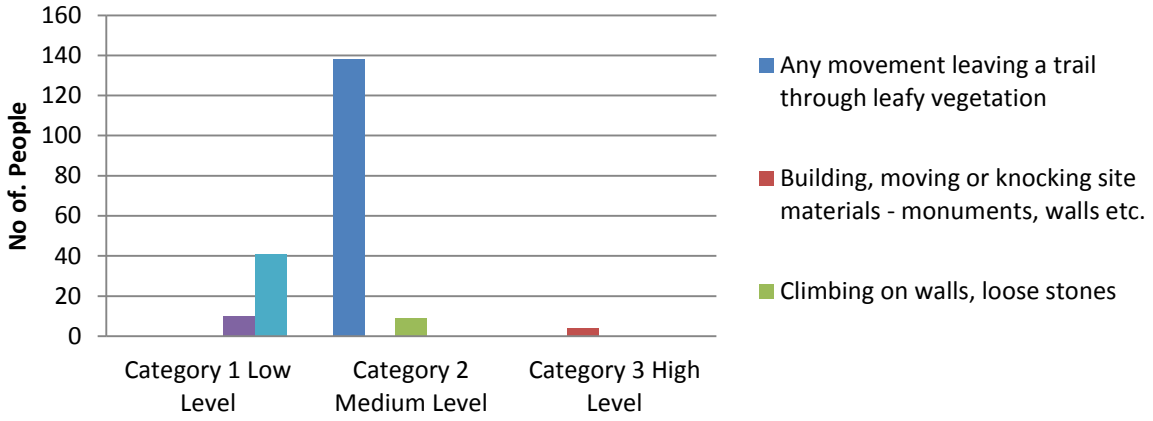
Polnabrone is a portal tomb that attracts a large volume of visitors. The site has car and bus parking facilities as well as a member of staff from the Office of Public Works present at the site. The areas accessible to the public range from improved grassland and pathways to limestone pavement and vegetation managed to varying degrees. There is interpretative signage at the site. Two surveyors observed the activities of 205 visitors at the site over two days. One was stationed adjacent to the portal tomb watching activities around the tomb. The second surveyor observed activities of visitors who left the main pathways and travelled further south away from the tomb.



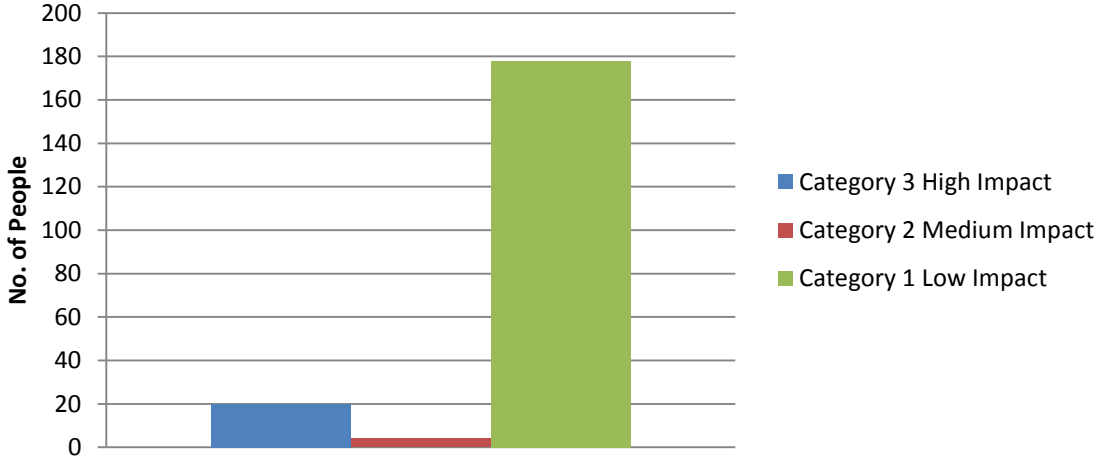




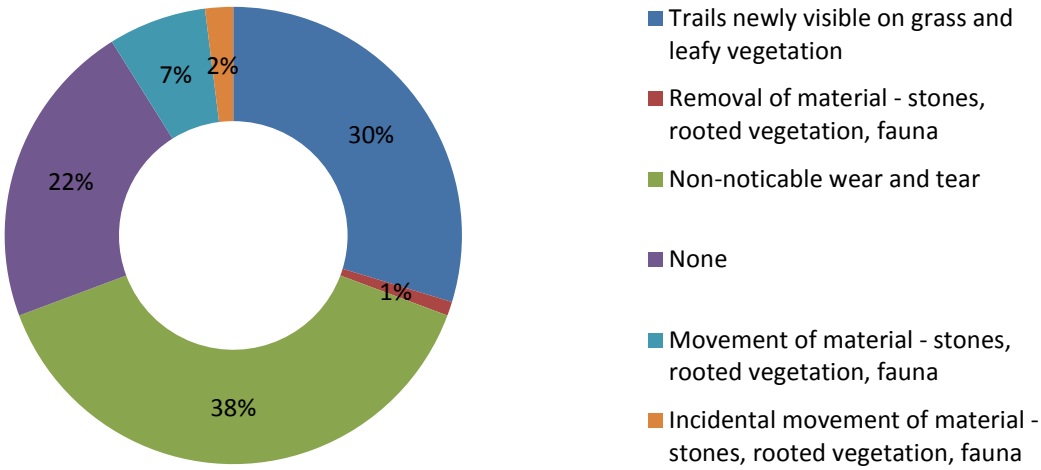
Level of Activity



Level of Impact

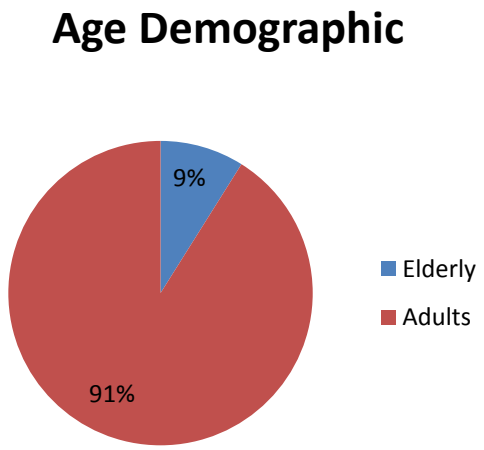


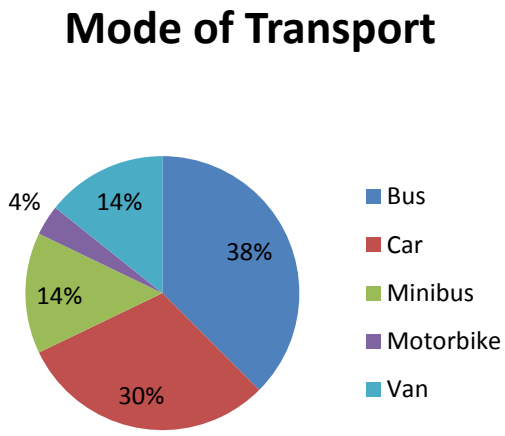
Effects Observed

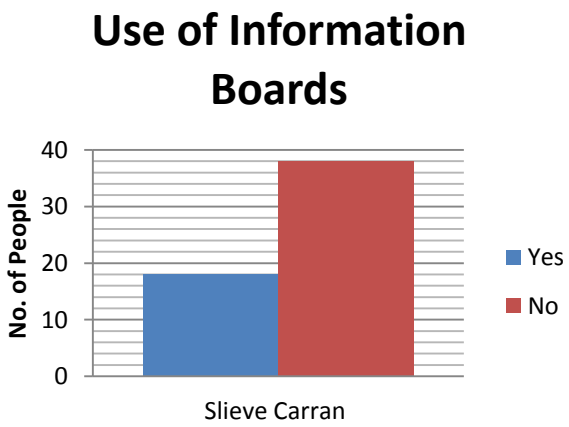


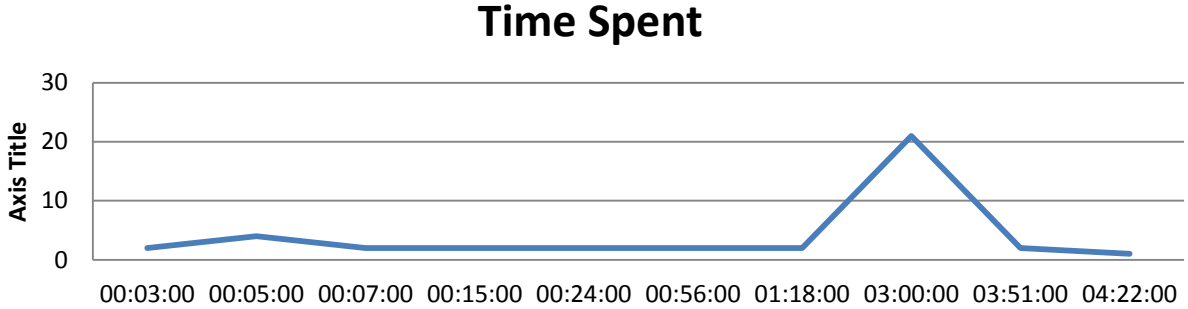
2.12 Slieve Carron Nature Reserve

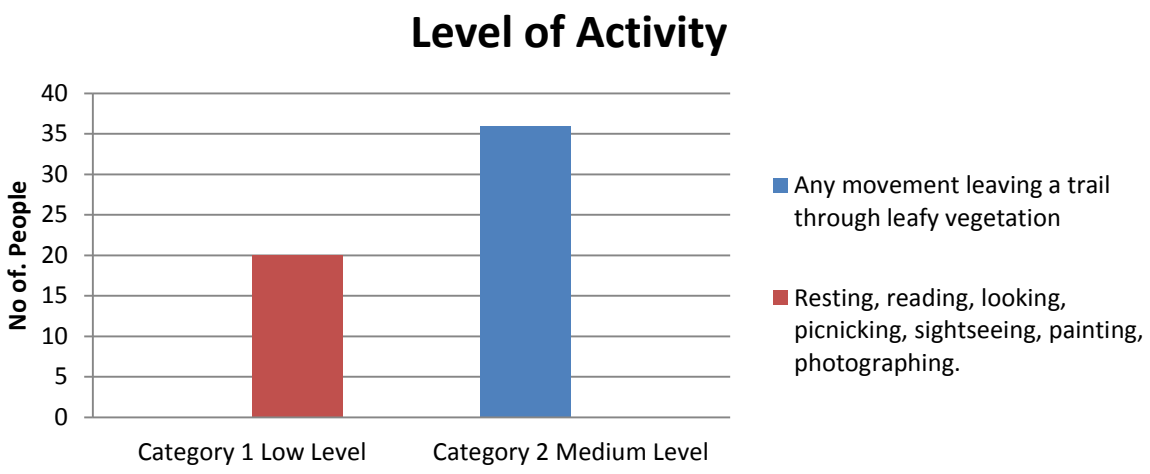
Slieve Carran Nature Reserve is part of the Burren National Park and hosts two of the seven walking trails. The area has unmanaged limestone pavement and limestone vegetation including an area of hazel scrub. Three surveyors observed the site for one day. Two surveyors were located at the main layby at Slieve Carran. One surveyor observed activities from the car park while the other observed visitors who extended along the trails up Slieve Carran. The third surveyor was present at the lower layby whereby one trail ended, however this observation was later abandoned due to inactivity. A total of 56 visitors were observed during the study at Slieve Carran.

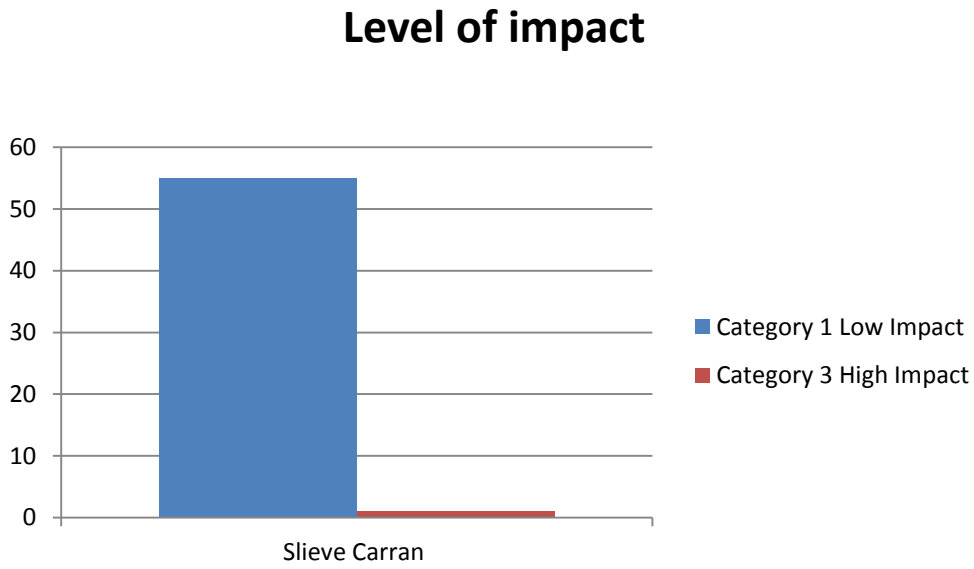


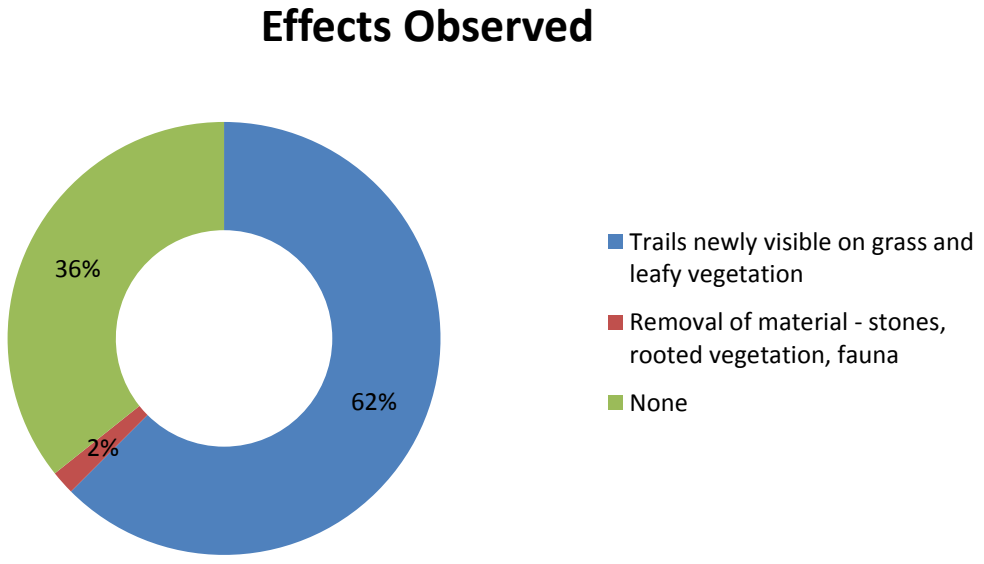







Level of Activity
No of. People
40
35
30
25
20
15
10
5
0
Category 1 Low Level
Category 2 Medium Level
Any movement leaving a trail through leafy vegetation
Resting, reading, looking, picnicking, sightseeing, painting, photographing.


Level of impact
60
50
40
30
20
10
0
Slieve Carran
Category 1 Low Impact
Category 3 High Impact


Effects Observed
36%
62%
2%
Trails newly visible on grass and leafy vegetation
Removal of material - stones, rooted vegetation, fauna
None

3 Ecological Survey Method

The second phase of the survey methodology involved undertaking an ecological study of each of the demonstration sites, guided by the results of the visitor observation. The following outlines the methodology for undertaking an ecological survey at each site:

1. Carry 1m^2 quadrat vegetation surveys randomly located within the red squares shown on the following aerial photographs (Figure 3.1 to Figure 3.10). The location of each quadrat shall be recorded by GPS and photographed.

2. Work should be carried out in accordance with a recognised standard surveying technique.[2]

3. Record the species, composition, and abundance encountered in each sample area using the DOMIN scale with nomenclature following Parnell and Curtis (2012).[3]

4. Record the condition of each quadrat using the 5 point scoring system outlined in Table 3.2 noting species, condition (grazed, trampled, broken stems, etc.) as well as noting soil condition (compacted, exposed) and other relevant factors such as evidence of effects such as litter.

5. Surveys are required in ten areas, the number vary with size and complexity of each site. In all a minimum of 100 quadrat surveys are required in the areas outlined in the red squares on the attached aerial photographs (Figure 3.1 to Figure 3.10). Squares with a 'C' are intended to be control sites as these are areas where no visitor activity was observed. The location and number of survey sites are as shown in Table 3.1 below.

   Table 3.1 Location and Number of Quadrats

Site	No. of Quadrats
Aillwee Cave	8
Blackhead 1	13
Blackhead 2	13
Burren National Park	14
Cahermore/Án Rath	4
Carran Church	5
Fanore Beach 1	21
Fanore Beach 2	5
Poulnabrone	7
Slieve Carran	10
Total	**100**

6. Present results of the surveys in report format detailing the methodology applied, the results of the quadrat surveys in a tabulated format by site with quadrat grid reference, species composition, abundance, condition index and notes on any specific issues arising. Include a brief overview of each site and present a summary of the results including a comparison between the core, secondary and control areas.

[2] NRA (2010) Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes

[3] Parnell, J., Curtis, T. 2012. Webb's an Irish Flora (8th edition). Cork University Press.

Table 3.2 Condition Index for assessment of habitat condition at sites

Ranking	Assessment	Description
1	Good	No evidence of any negative impact on habitats or other ecological features
2	Fair	Localised degree of negative impact, but slight and capable of rapid recovery
3	Doubtful	Widespread degree of negative impact, but slight and capable of rapid recovery
4	Poor	Localised negative impact, requiring intervention to allow full recovery
5	Bad	Widespread negative impact, requiring intervention to allow full recovery

3.1 Aillwee Cave

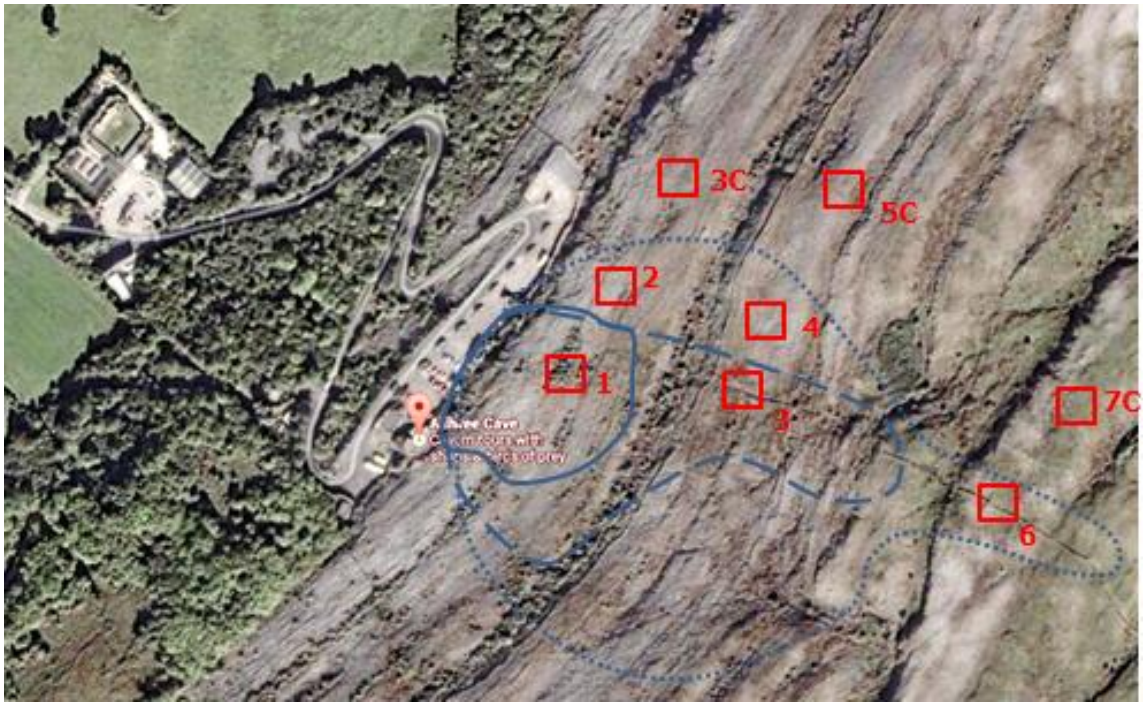


Figure 3.1 Aillwee Cave Quadrat Survey Plan

3.2 Blackhead

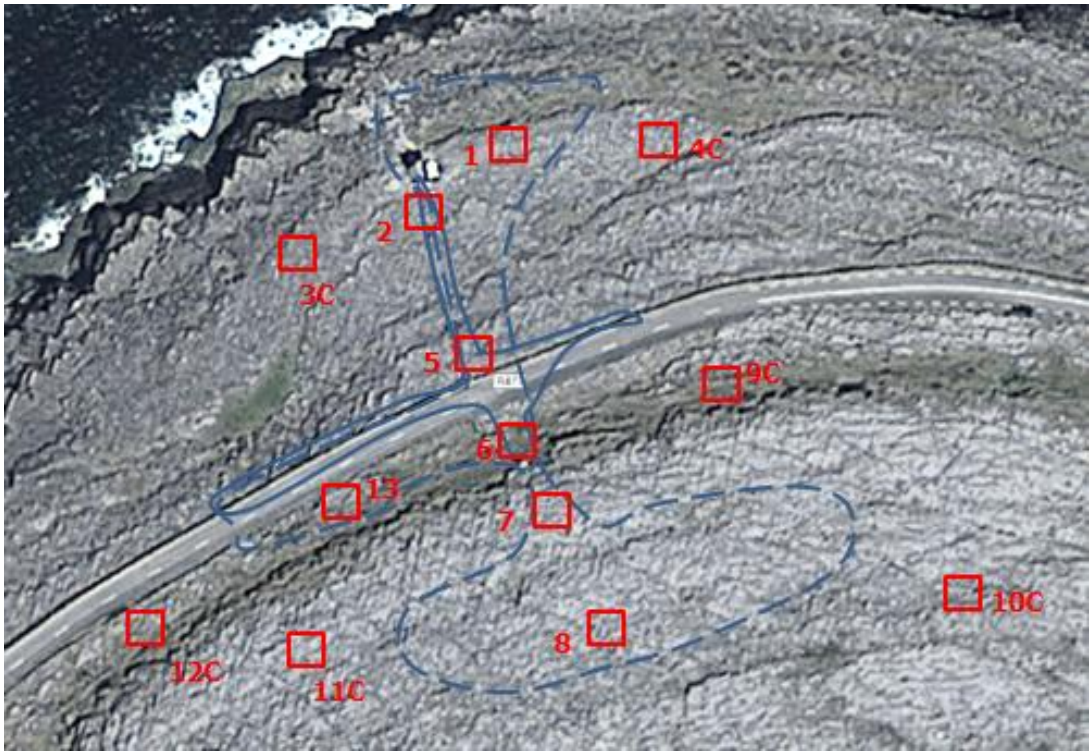


Figure 3.2 Blackhead Lighthouse Quadrat Survey Plan

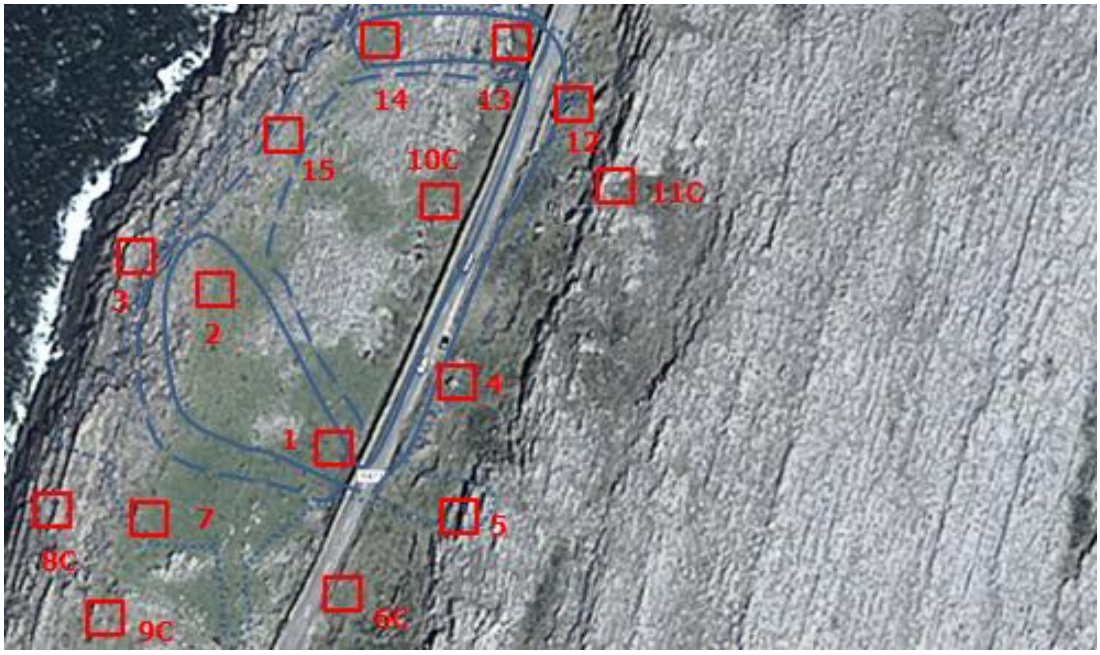


Figure 3.3 Blackhead Layby Quadrat Survey Plan

3.3 Burren National Park

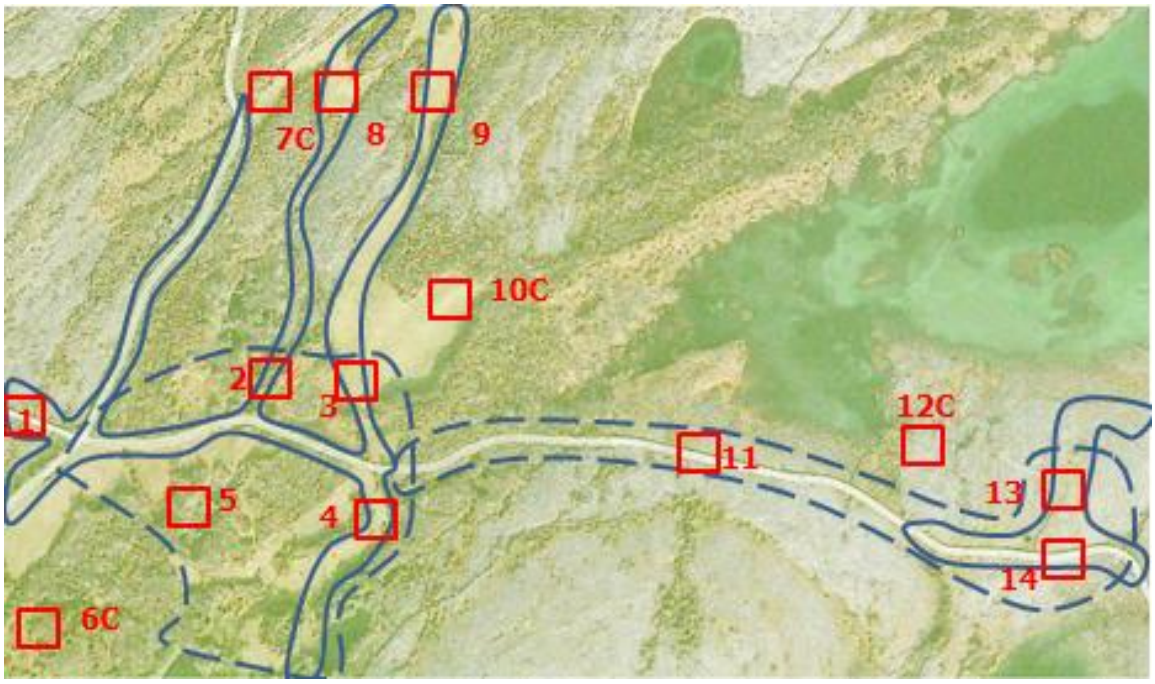


Figure 3.4 Burren National Park Quadrat Survey Plan

3.4 Cahermore

Figure 3.5 Cahermore Quadrat Survey Plan

3.5 Carran Church

Figure 3.6 Carran Church Quadrat Survey Plan

3.6 Fanore Beach

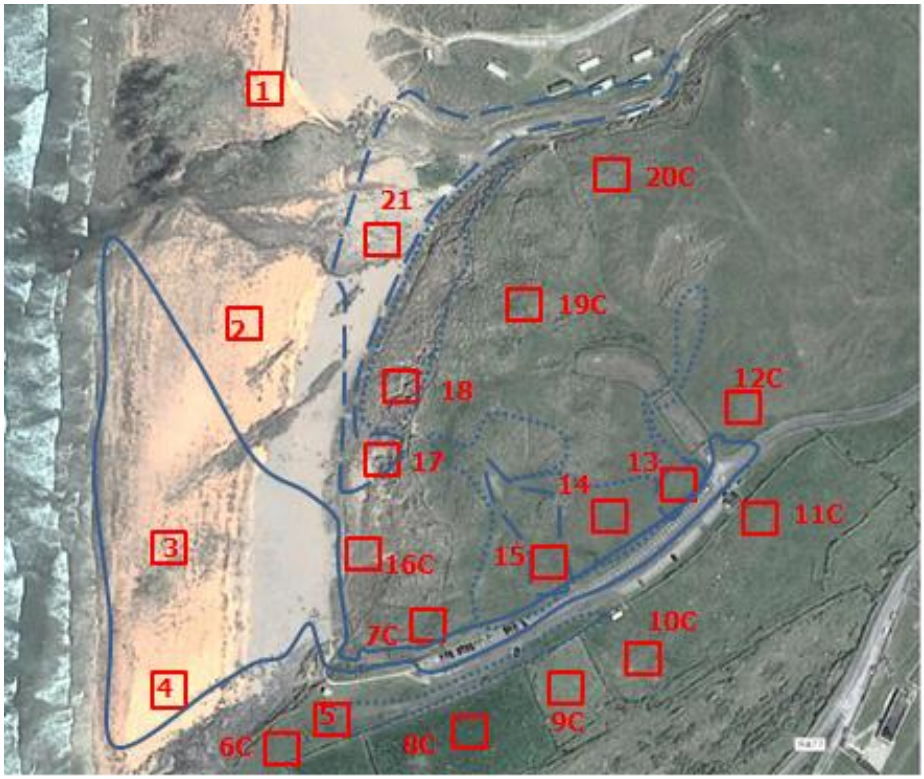


Figure 3.7 Fanore Beach Quadrat Survey Plan 1

Figure 3.8 Fanore Beach Quadrat Survey Plan 2

3.7 Poulnabrone

Figure 3.9 Poulnabrone Quadrat Survey Plan

3.8 Slieve Carran Nature Reserve

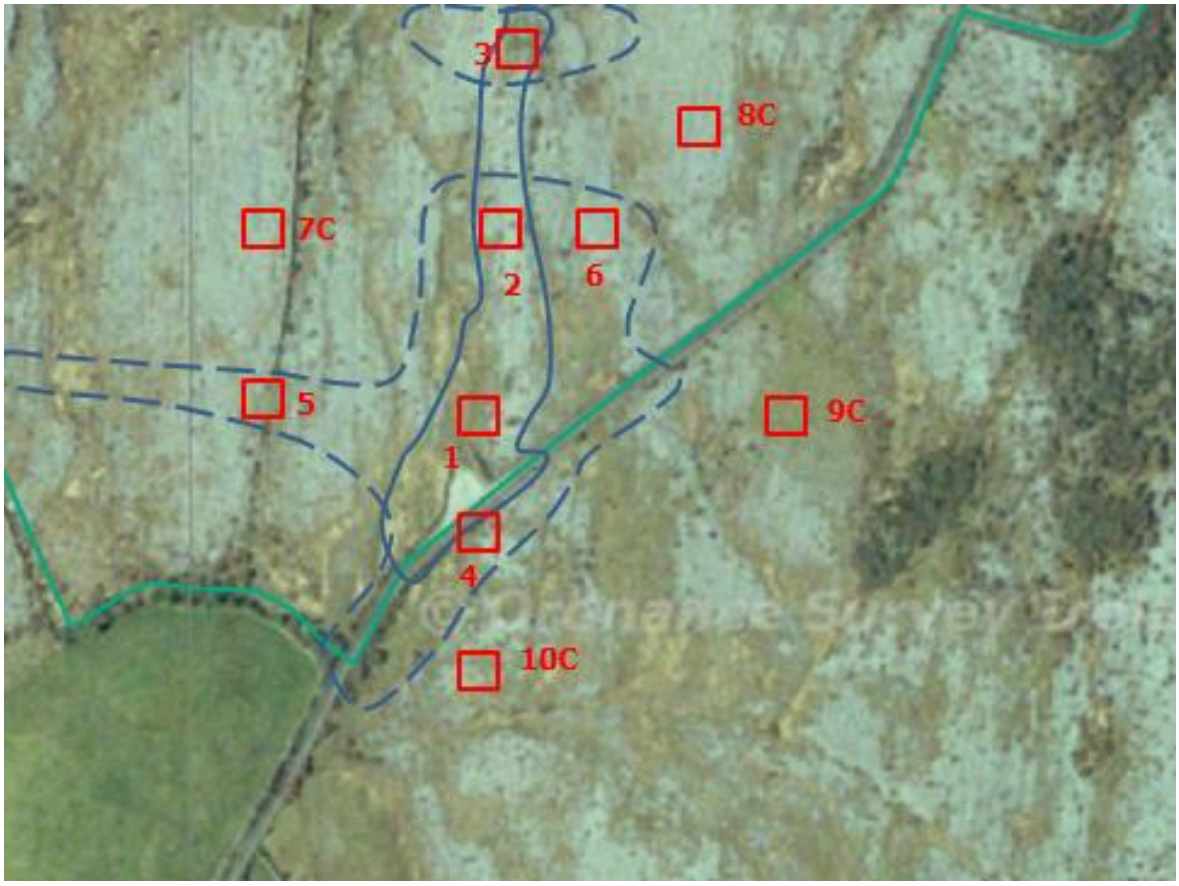


Figure 3.10 Slieve Carran Nature Reserve Quadrat Survey Plan

4 Site by Site Analysis

Transient short stay visitors were largely observed to be careful and aware of site sensitivities. The majority of visitors were primarily found to be sightseeing and photographing before moving on quickly. 77% of visitors across all sites engaged in low or medium level activities i.e. walking on paths, mown grass, hard surfaces and sand, resting, reading, looking, photographing (all low level activity) or moving through leafy vegetation by leaving the trail or where a trail wasn't established (medium level activity). In some instances, visitors were observed to show awareness of conservation for example directing children to respect the environment where their behaviour was evidentially caused harm e.g. picking rocks or vegetation.

Incidental movement of materials, such as accidentally knocking stones from walls was evident at some locations e.g. Carran Church, where visitors were observed climbing across stone walls to gain access to the site. However, as the sites became more managed, evidence of this became less apparent. Visitors spent the most time at locations where trails and looped walks were available such as Burren National Park (Average time spent 1:37 minutes) and Slieve Carran Nature Reserve (Average time spent 1:26 minutes). Cahermore/Án Rath recorded the least amount of visitors and time spent on the site (Average time spent 00:06 minutes). It was noted that many vehicles pulled up at the entrance of Cahermore for a short time before leaving and not entering the site.

Longer stay visitors, locals and site staff appeared to carry out more significant harm. This was especially evident in Fanore Beach where these types of visitors were observed to move away from the designated paths and into nearby fields, dune systems and further north of the beach. A total of 27% of visitors to Fanore Beach were profiled as locals or came down from the caravan park. 36% engaged in a high level activity and 6% of these caused a high level impact.

96% of visitors had low levels of discernable impacts on the sites. 4% of visitors across all sites had a high impact on the site. However, when this is further analysed (See Table 2.7) it emerged that not more than 4 visitors (0.28%) engaged in any measurable effects. Where impacts did occur they were not reported to give rise to any significant, long term adverse effects.

4.1 Aillwee Caves

Aillwee Caves is the most managed out of all the demonstration sites studied. The majority of visitors to the Aillwee Caves use the areas where there are amenities such as the visitor centre and coffee shops. Visitors who ascended the steps to the walkway behind the visitor centre were studied during the observation. The majority of visitors climbed up the steps and upon observing the steep incline and lack of marked pathway descended quickly. Some climbed up a short way to look at the view or take a photo and departed quickly. Figure 4.1 shows the movement patterns of visitors observed. The average time spent on site was 0:33 minutes. 46% of visitors caused incidental movement of stones or rooted vegetation as they climbed up the slope, this however had a discernible impact and no lasting damage was observed. One child was observed removing a rock from the area, this group of visitors represents 3% of all visitors to the site. Overall, the activities and effects observed during the study were not reported to result in any significant, long term adverse effects.

Figure 4.1 Aillwee Caves Observed Visitor Movement Pattern

4.2 Blackhead

Figure 4.2 Blackhead aerial view showing two survey locations

Figure 4.3 and Figure 4.4 show the observed movement pattern of visitors at both of the sites. 71% of the visitors to Blackhead Lighthouse and the nearby layby were adults and 94% of all visitors arrived by car or van. 64% engaged in walking on pathways or sightseeing activities. Some visitors were observed to climb over the gate or low wall and walked across the flaggy shore. The shore was a popular choice for families to stop and picnic.

The average time spent per group was 37 minutes, this included fishermen. 8% of visitors to the site were fishing, however, it cannot be confirmed that the fishermen actually caught fish and removed them from the water, therefore, the impact can be described as discernible. Those who were not

partaking in a fishing activity spent an average of 25 minutes at the site. The most significant impact observed was a visitor picking vegetation; the group represented 3% of all visitors to the site. Traffic congestion was identified as an issue. Each layby has the capacity to accommodate a maximum of one or two cars. One side of the road was completely blocked off during busy periods and buses in particular struggled to pass. This was evident for the entire stretch of the road around Blackhead.

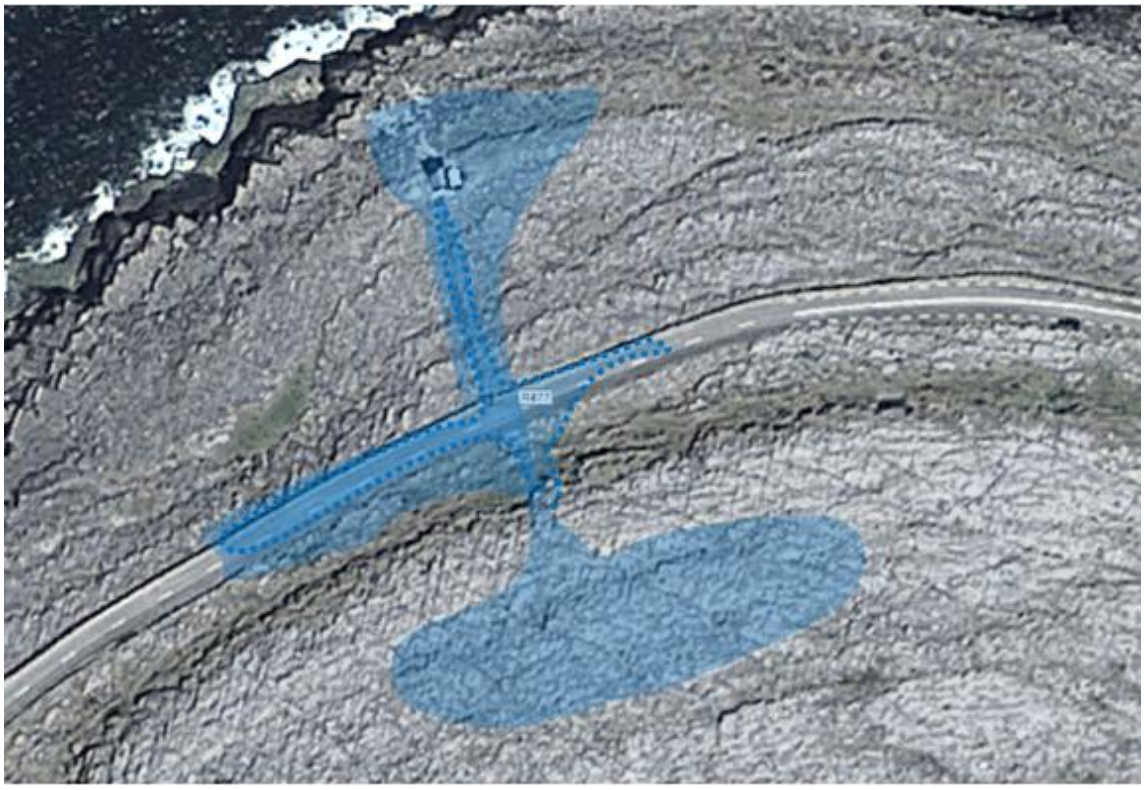


Figure 4.3 Blackhead Lighthouse Observed Visitor Movement Pattern

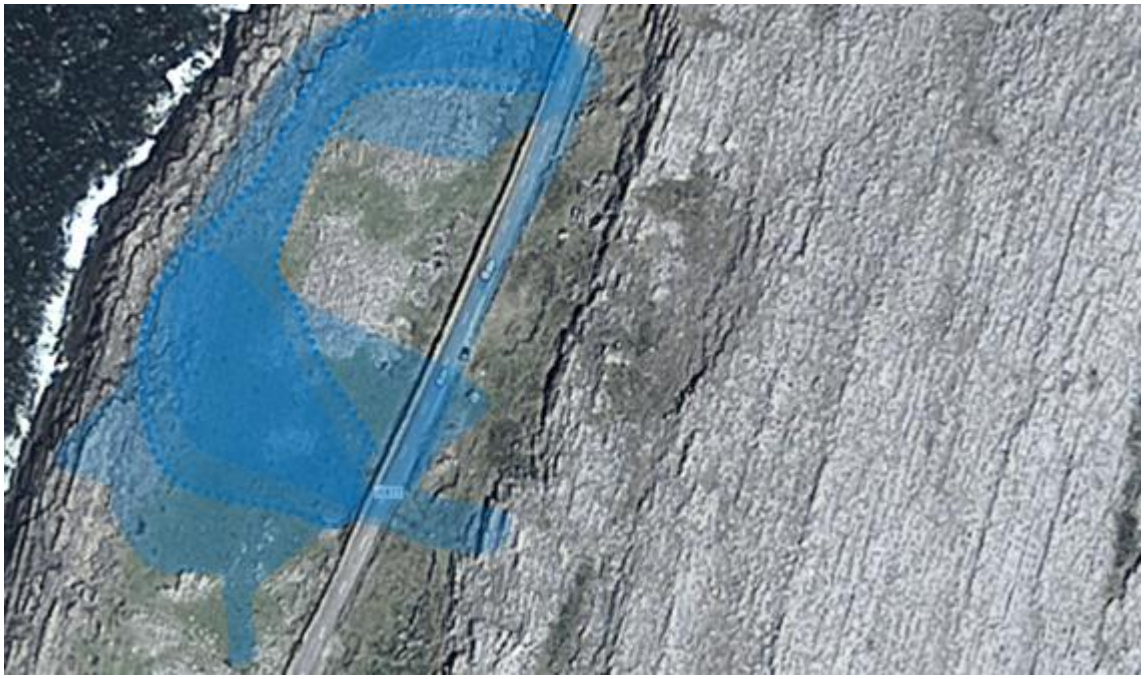


Figure 4.4 Blackhead Layby Observed Visitor Movement Pattern

4.3 Burren National Park

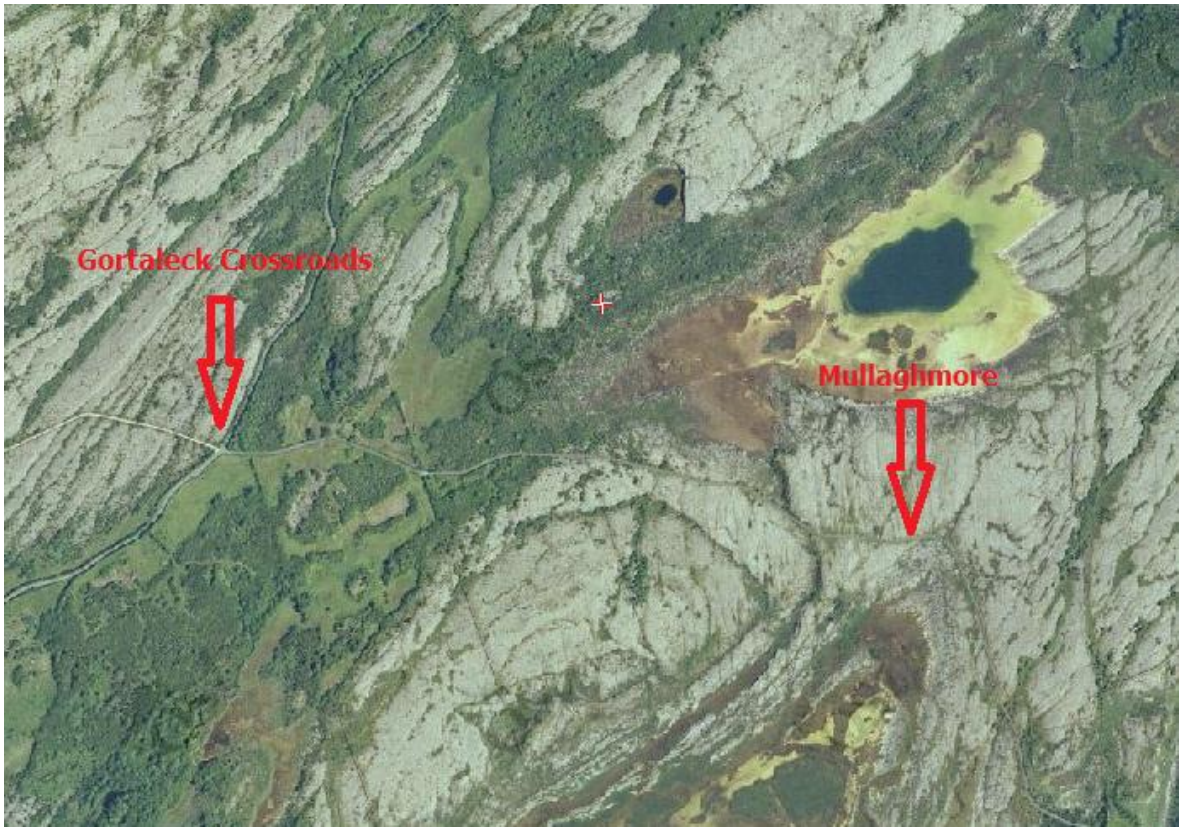


Figure 4.5 Burren National Park aerial view of three survey locations

The visitors to Burren National Park were observed to show an awareness of conservation. Where children were seen having an effect on the area, adults were seen to direct children to respect the area. 94% of visitors to the area were observed to have no discernible impact. Of the remaining 4%, the level of impact reported was high, however, on further analysis this represents visitors picking vegetation, hitting vegetation with a stick and the movement of rocks, all of which will have no significant, lasting effect on the site.

Road safety and parking was an issue during busy periods. Cars were forced to pull in on the verge and wheel marks on the vegetation was identified. Mullaghmore had a significant issue with parking; the road is narrow and it is difficult for cars to pull in and turn around safely. In some instance, a car was observed to park directly on the limestone pavement.

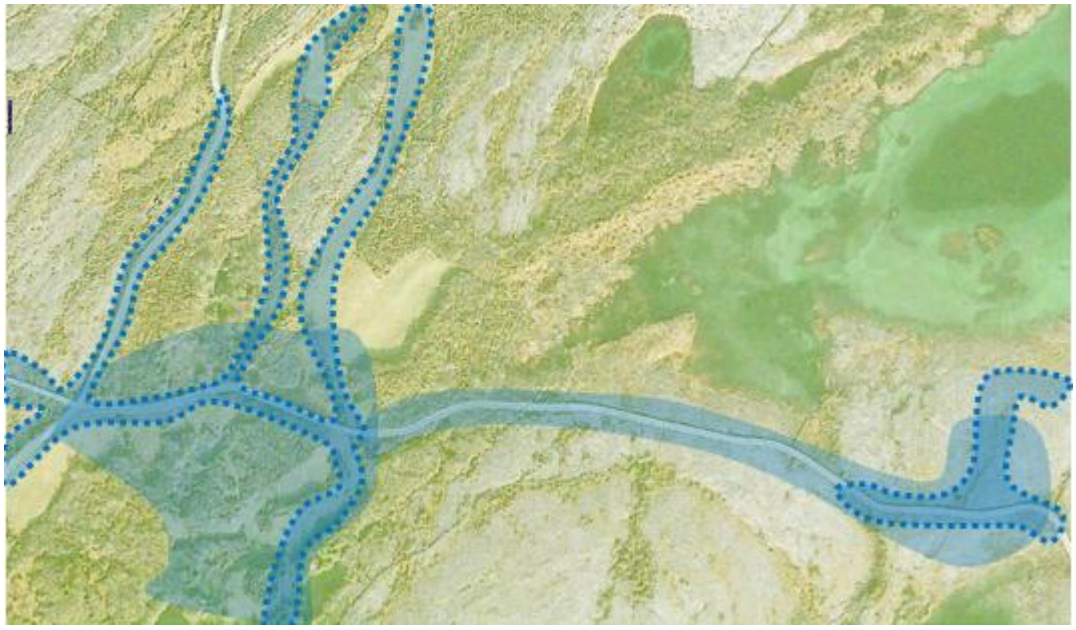


Figure 4.6 Burren National Park Observed Visitor Movement Pattern

Figure 4.6 shows the observed visitor movement around the Burren National Park study site. Visitors remained to a core movement area primarily and remained on trails and pathways where available. Visitors spent the most time at the Burren National Park (Average time spent 1:37 minutes). The area was quite remote and it was noted that most of the visitors appeared to be locals and groups of hikers or using the trails and looped walks or others using the site for specialist/academic interests.

4.4 Cahermore

Figure 4.7 Cahermore and Án Rath aerial view

Cahermore recorded the least amount of visitors overall. Of the small number of visitors that arrived at the site, no impacts were observed. Visitors to the site engaged in low level activities. The average time spent on the site was 00:06 minutes. This was also the least amount of time spent on all the sites. It was noted by the surveyor that many cars pulled in on the layby and drove off promptly not entering the site. It was also noted that visitors may not be aware of where the entrance to the site is.

Figure 4.8 Cahermore Observed Visitor Movement Pattern

4.5 Carran Church

Carran Church appears to receive passing visitors on their way to other sites around the Burren Geopark. Many visitors were recorded to not enter the site at all and simply look or take photographs from the road before departing quickly. Where visitors did enter the site, their movement patterns are shown on Figure 4.9. During busy times parking in the layby across the road appeared to cause an issue, especially if a bus stopped occupying most of the layby or obstructing part of the road. It is not clear where the entrance is to the site so many visitors either climb the stone wall or the gate. This resulted in incidental movement of materials as 23% of visitors at the site were observed to knock or dislodge stones from the walls when climbing across. The remaining 77% of visitors to the site had no impact on the site apart from one visitor been seen discarding a cigarette butt.

Figure 4.9 Carran Church Observed Visitor Movement Pattern

4.6 Fanore Beach

Fanore Beach attracted the highest volume visitors of all the sites. There are some management techniques in place with a car park and pathways to the beach in place. A range of activities were also observed at the site (see Section 1.3.6), however, 87% of visitors engaged in low and medium level activities. Of the high level activities reported, these included off road vehicular movement where cars were forced to park on the grass during busy periods and visitors or their pets scrambling through the loose sandy dunes. Children and dogs appeared to be the most likely to walk to dunes or scramble on the loose dune slopes. However, 94% of visitors to the site appeared to have no discernible impact on the site. A range of effects were observed for the remaining 6% (See Table 2.8) ranging from movement an interference with site materials to light littering.

A group of ten visitors were observed camping in the dunes. They were there on surveyor arrival to post and remained on site for some time. The group had lit a campfire overnight. They were observed to walk extensively over the dunes before collecting their rubbish and tents and leaving the camping area. It later appeared that two beach lifeguards were among the group of campers and later parked two vehicles on the grass beside the lifeguard station. The camping area was left relatively clean with some evidence of broken glass, litter and ashes from the fire left behind.

Few people walked to the northern end of the beach, these visitors often came down from the caravan park. The entrance to the beach from the caravan park was down through the dunes. However this area has been fenced off to create a boundary. A small number (2.5%) of visitors were observed gaining access to the site from the fields south of the lifeguard hut but no effects from this activity was noted.

Fanore Beach had the highest number of visitors and the highest level of Category 3 activity when compared to other sites (49%). This was also the case for Category 3 High Impact across all sites which represented 35% of Category 3 Impacts reported across all sites. However, overall this represents 1.9% of impact across all sites in all categories. It was noted that locals and longer stay visitors including those who came down from the caravan park appeared to be more familiar with the site and were more likely to travel across the site extensively and appeared to carry out the most damage.

Figure 4.10 Fanore Beach 1 Observed Visitor Movement Pattern

Figure 4.11 Fanore Beach 2 Observed Visitor Movement Pattern

4.7 Poulnabrone

Poulnabrone experiences a huge number of visitors. The site is well managed and there is OPW staff member present at the site during the high season. Most visitors were observed to stay on the designated pathways until it ended, at this point visitors scattered across an area of limestone pavement to and view the portal tomb more closely.

9% of visitors were observed moving site material, in all cases this was caused by incidental dislodging of rocks. It also appeared that visitors wandered out of the main zone of movement often to view a 'no entry' sign. It appeared that incidental movement of site materials was likely to occur at this point as the terrain because more uneven. One visitor was observed to walk extensively through vegetation west of the monument. The movement patterns of visitors to Poulnabrone are shown on Figure 4.12. Less than 1% of visitors to the site were observed picking or removing vegetation. Overall, 90% of visitors had no discernible impact on the site.

Figure 4.12 Poulnabrone Observed Visitor Movement Pattern

4.8 Slieve Carran Nature Reserve

Figure 4.13 Slieve Carran Nature Reserve aerial view of two laybys where surveyors were located

Slieve Carran attracts visitors for hiking or academic specialists. There is no clear path through the site, however, an unestablished trail is visible through the vegetation and most visitors appeared to follow this track (See Figure 4.14). One visitor was observed to leave this trail, walk over the bare limestone and pick vegetation. This group represented 2% of the survey sample. It appeared that most visitors to the site went hiking up Slieve Carron and did not return. No significant impacts were observed and it would appear that visitors to Slieve Carran were careful and aware of site sensitivities.

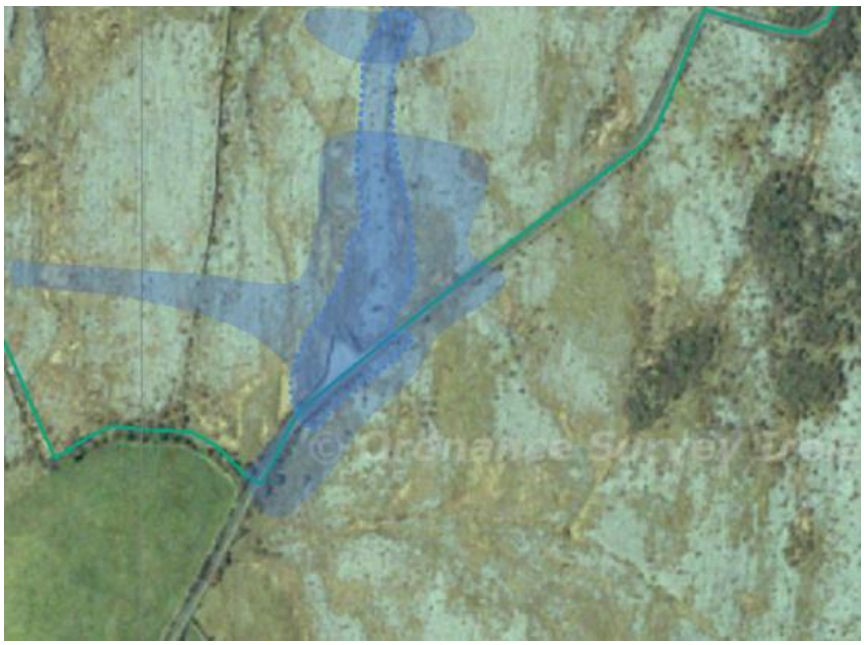


Figure 4.14 Slieve Carran Observed Visitor Movement Pattern

5 Conclusions

Table 5.1 Summary of Observed Visitor Activities across all sites

Activities Observed	No. of People	% of People
Walking on paths, mown grass or hard surfaces (inc level sand)	638	45%
Any movement leaving a trail through leafy vegetation	265	19%
Resting, reading, looking, picnicking, sightseeing, painting, photographing.	182	13%
Scrambling on steep or loose slopes	116	8%
Vehicular movement on roads and parking areas	63	4%
Swimming, sailing, surfing, kayaking in water	37	3%
Climbing on walls, loose stones	35	2%
Fishing	26	2%
Off road vehicular movement	26	2%
Building, moving or knocking site materials - monuments, walls etc.	18	1%
Running, playing in mown grass or level sand	9	1%
Picking vegetation	5	>1%
Any movement through woody vegetation	1	>1%
Grand Total	**1421**	**100%**

On the basis of the data collected it appears that the following conclusions can be drawn:

Visitors were careful and aware of site sensitivities, confined themselves to marked trails and obeyed signs and notices. There were very low levels of discernible impact from the majority (96%) of visitors. Impact that did occur were very minor and involved effects such as incidental movement of materials, e.g. accidentally knocking stones from walls or someone picking plants (observed by 5 people among over 1,400 visitors). As the sites became more managed, evidence of this became even less apparent, with visitors spending the most time at locations where trails and looped walks were available.

Road safety and parking was the issue during busy periods. Cars were forced to pull in on the verge with wheel marks on the vegetation was the most significant impact identified. On very sensitive sites, such as dunes, impacts were most likely to be caused by visiting children and dogs. Visitors generally exhibited high levels of awareness and care for the environment and on a number of occasions, were seen to direct children to respect the environment.

Based on these conclusions of the observation of over 1,400 visitors at 10 sites it appears that visitors:

- Demonstrate high levels of awareness and respect for environmental sensitivities.
- Give rise to very low level of effects all of which are readily reversible.
- Cause least/no impacts on sites with greater levels of management.

Preliminary evidence subject to detailed examination of ecological effects is that relatively high levels of visitors give rise to no significant, long-term adverse effects even on sensitive sites and that site management appears to mitigate any residual effects.

6 Recommendations

The Life Project supported a pilot survey of visitor behaviour and associated effects at selected sites within the Burren and Cliffs of Moher Geopark and provided evidence for the types of environmental effects that are likely to occur. The following recommendations provide general and site-specific recommendations for how to avoid or reduce environment effects arising from tourism

6.1 Recommendations for all sites

The most consistent evidence that emerged from the survey is that there is a direct co-relation between the degree of site management and the likelihood of environmental effects arising. Two of the sites (Poulnabrone and Aillwee Caves) were identified to have best practice management and as a result recorded the least amount of impacts.

Site management can range for intense management that includes site presence of personnel, through intermediate levels where there are site facilities that include signs and interpretative material to sites with no management.

The following are recommendations for all sites:

1. Site Selection and Design
   Wherever feasible visitors should only be directed to sites which have a management plan and management facilities. The needs for these will vary from site to site.

2. Pre-existing sites should be evaluated using guidelines provided to ensure that facilities are put in place to manage the effects of visitor numbers without causing more harm than the option of doing nothing which would cause effects to continue and worsen.

3. Provision of Site Facilities
   All sites should give careful consideration to the following issues:
   - Implementation of uniform signage
   - Clear signage to the entrances of all sites
   - Careful consideration when placing signage
   - Measures to improve traffic and parking issues
   - Discourage coach operators from recommending the construction of 'mini-dolmens' to visitors

6.2 Site-specific recommendations

Aillwee Caves

Example of best practice management

No recommendations required

Blackhead

Install measures to improve traffic and parking issues at laybys around Blackhead to prevent further incremental effects on road-side vegetation.

Burren National Park

Continue rotation of trails on an annual basis by NPWS Ranger

Introduce measures to discourage parking on limestone pavement to prevent further incremental effects on road-side vegetation.

Introduce measures to improve parking at Gortaleck Crossroads during busy periods to prevent further incremental effects on road-side vegetation.

Cahermore

Include the parking layby in future studies

Provide clear signage for entrance

Án Rath

Separate Án Rath from Cahermore as an individual demonstration site and include site in future studies

Provide clear signage for entrance

Carran Church

Provide clear signage for entrance from the road to Carran Church

Introduce measures to improve parking at layby across the road

Fanore Beach

Continue to implement and update existing visitor management strategy

Discourage Lifeguards from camping in dunes

Poulnabrone

Example of best practice management

Remove 'no entry' sign from limestone pavement

Slieve Carran Nature Reserve

Replace signage at lower layby.

Repeat observation study to see if visitor activity increases at lower lay-by.

Consult NPWS Ranger and use environmentally sound practices for marking trails like those used presently at the Burren Nation Park

Appendix 1: Example of Completed Survey Sheet

Name	Date	Site	Station
Sean. N	6/9/14	Poulnabrone	

Total No. of people	Gender		Age			
	M	F	Kids	Teens	Adults	Elderly
4	2	2		2	2	

Mode	Arrive	Depart	Direction	Distance
	13:44	13:59		

Activities

- walked from path across rocks around hole
- walked north across rocks and back down path to leave

Effects

Comments

- woman climbed up boulder at 'x' for picture
- children jumping on rocks

Appendix 2: Surveyor Briefing Sheet

Briefing Document

Surveyors should carry the briefing document to include phone numbers of all team members, the project coordinators and schedule of events at all times.

Please ensure you have submitted the following details:

- Names
- Contact numbers
- Email Address
- Contact name and number in case of emergency
- Address

Accommodation details: Clare's Rock Hostel, the Burren, Carran, Co. Clare (065) 708 9129 www.claresrock.com

Breakfast (cereal, toast etc.) will be provided. There are also kitchen facilities available.

Checklist before departure	
To be provided by us:	Essentials for you to bring:
Hi-Visibility Vest (to be worn at all times)	A raincoat and weather proof clothing
Maps	Mobile phone (Fully charged)
Survey Sheets	Contact Numbers
Briefing Document	Student ID
Clipboard	Lunch
Sheets of acetate (To keep notes dry)	Camp chair
Pens/pencils	Wellies
Binoculars (If required)	Sun factor
Plastic bags (for protection of maps, notebooks etc. in wet weather)	Camera (to take pictures of any damage you see happening)

Objectives

CAAS are assisting Failte Ireland and Clare County Council to develop monitoring Strategies – to identify any environmental impacts of visitors at sites along the Wild Atlantic way. Part of this work involves developing monitoring methodologies and templates.

In order to design effective monitoring methods it is proposed to carry out Pilot Visitor Observation Studies over a two day period at the Geopark LIFE Demonstration Sites in Co Clare.

These sites offer a full spectrum of types of circumstances that range from small spatially-concentrated areas – such as Poulnabrone – to large diffuse sites such as Fanore Beach or the Slieve

Carron Nature Reserve. It also offers opportunities to study sites with existing management regimes that range from those that are complex and highly structured, private enterprises – such as Aillwee Cave – to the simpler Carran Church site. The work will be carried out according to the attached programme:

Site	Friday 05/09/14	Saturday 06/09/16	Sunday 07/09/15
Blackhead		1	1
Fanore Beach	4		4
Aillwee Cave	1	1	1
Cahermore		1	
Poulnabrone	1	2	
Carran Church		1	
Burren National Park	3		3
Slieve Carron Nature Reserve		3	
Relief Surveyor	1	1	1
	10	**10**	**10**

Methods

Pilot Visitor Observations will be carried out over two days at Geopark LIFE Demonstration Sites – see map on next page.

These will be used to identify optimally effective observation methods of visitor use and behaviour – that will be suitable for use in a wide range of conditions.

The Observations are intended to identify patterns of visitor activity, movement and behaviour on selected sites. This will be achieved by Surveyors being present for a day at each site to make standardised records of the nature, duration and extent of activities by visitors.

The information will be recorded on standardised forms (see sample Sheets 1-3 attached below).

Site Access and Public Information

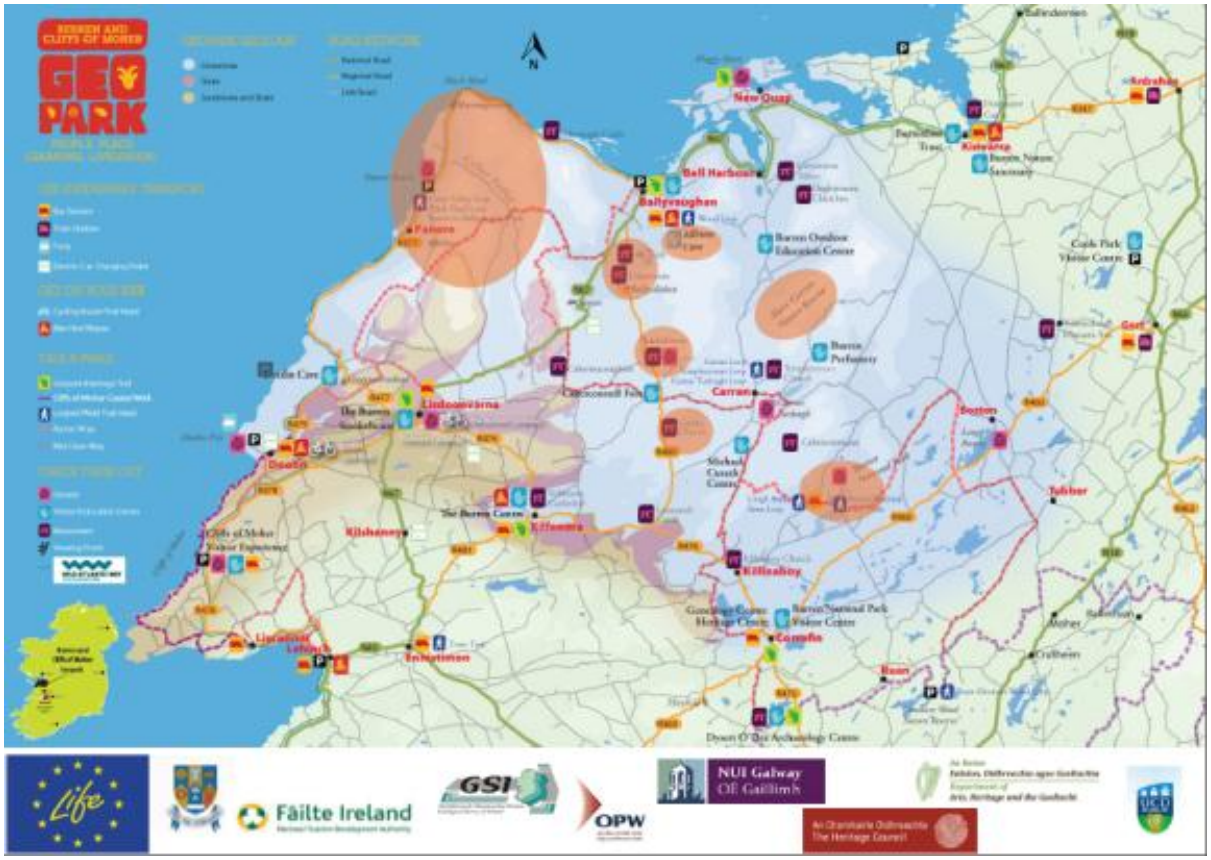
You are working with a company called CAAS on behalf of Failte Ireland and Clare County Council to develop monitoring strategies to help identify any environmental impacts of visitors at sites along the Wild Atlantic Way. Part of this work involves developing monitoring methodologies and templates.

It is important to let the public know what you are doing if they want to know. It is important to respect people's rights and employ good practice to raise awareness and perhaps generate goodwill towards the survey and conservation in general. You will have a letter stating the work you are doing, please also have your student ID to hand.

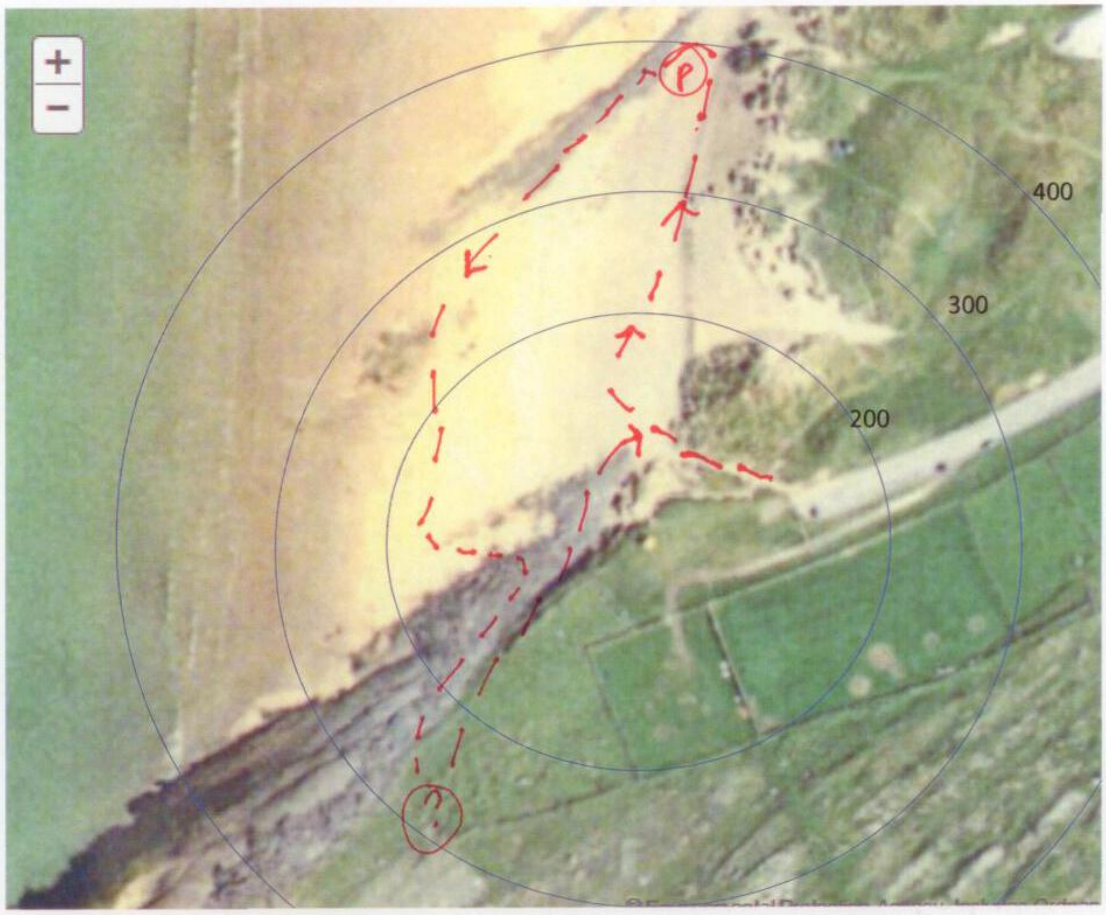
Contact Sinead immediately if any problems arise with the public or regarding access/permissions.

Communication

Surveyors should check in at regular intervals. Contact project coordinator if any problems arise at any stage. In the event of a surveyor being late to a meeting point in the field or at the end of the day and cannot be contacted by phone, their colleague should wait at the meeting point for at least an hour and contact the project coordinator. They should not go looking for the latecomer because they may put themselves in danger and there is also a likelihood of missing the latecomer if they return by a different route. It is vitally important to remain available for communication, so if there is no mobile phone reception at the meeting point, surveyors should move to a location with a better signal and leave a note or sign to show where they have gone.



Location map of Survey Sites (Salmon coloured ovals)



Site: Fenore
Surveyor 2
Station: Lifeguard Hut

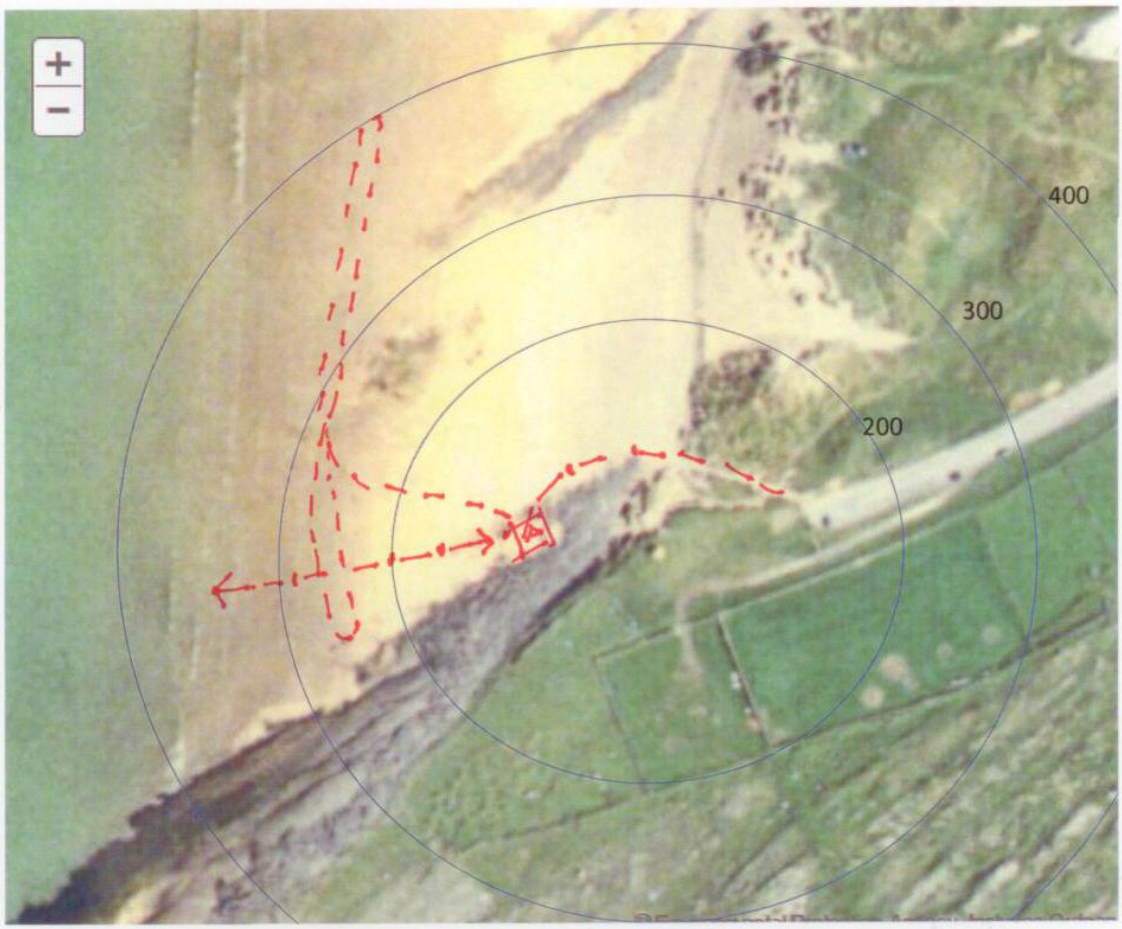
Site Number								
# 23	No.	Gender	Age	Mode	Arrive	Depart	Direction	Distance
	2	M/F	Adult	—	1430	15[illegible]		

Activities
WALKED AROUND - up to Rocks First. (400m)
- BACK, South (out of sight - 400 m)
- took photos at Rocks (P)

Effects
None

Comments None.

Sample Sheet One



→ 1 → 1 → 1 ADULTS
- - - DOG

Site: Fenore
Surveyor 2
Station: Lifeguard Hut

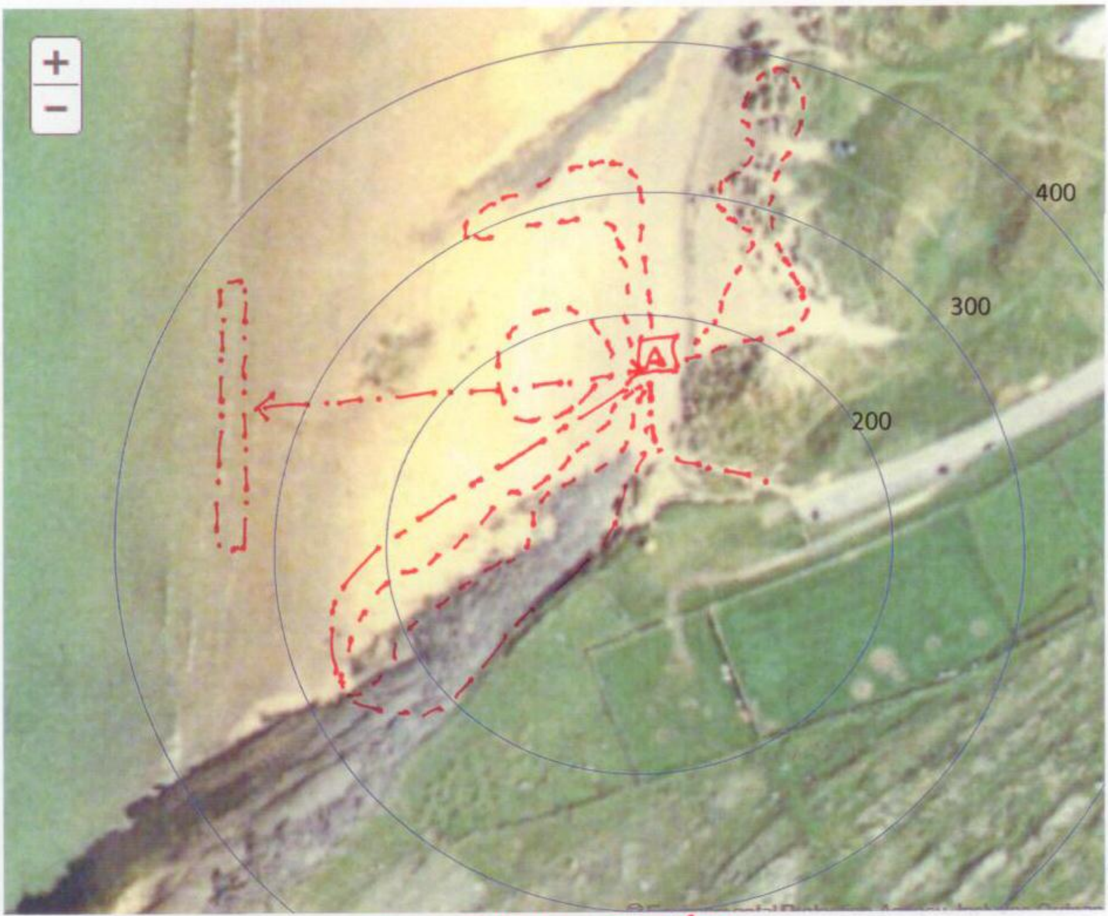
Site Number								
#	No.	Gender	Age	Mode	Arrive	Depart	Direction	Distance
	2	F	Adult	—	16⁰⁰	17³⁰	—	→

Activities
- SET up BLANKET at 'A'
- WENT for SWIM (15M)
- HAD picnic
- SUN BATHING / CHATTING 1h..

Effects
- DOG CHASES SEAGULLS up & DOWN SHORE
- DOG POOD on SAND - NO CLEAN UP
- GIRL 'B' BURIED RUBBISH in SAND

Comments

Sample Sheet Two



WHOLE FAMILY
KIDS
ADULTS ONLY.

Site: Fenore
Surveyor 2
Station: Lifeguard Hut

Site Number #	No.	Gender	Age	Mode	Arrive	Depart	Direction	Distance
23	4	2M2F	Adults+Kids	–	1330	1530	see map.	

Activities
Set up blanket at 'A'
Kids played on dune for an hour
All went to swim for 30 min
Kids explored rocks & fished w. nets 1hr.
Kids played with other kids 1hr.
All ate picnics

Effects
. Kids - caught fish at rockpools
. piled up sea weed & made 'castle'
. dug trenches in sand
. jumped off top of dune

Comments
Kids jumping on dunes caused small landslide, displaced portion of fence.

Sample Sheet Three

Key to filling out Observation Sheet

How many in the group? Are they male or female?

-Children
-Teenagers
-Adults
-Elderly

Note distances travelled –
- Into site
- Beyond site
- Beyond path
USE MAP

Name	Date	Site	Station

Total No. of people	Gender		Age			
	M	F	Kids	Teens	Adults	Elderly

Only applies in car park!
- Car?
-Bus?
-Motorbike?
-Bike?
-Walking
- Other?

Mode	Arrive	Depart	Direction	Distance

Clockwise
Anti-clockwise
Or
North, south, east, west
Or
Uphill/ downhill
Agree terms with Supervisor and use consistently.
USE MAP

Activities

Effects

Comments

Note time of entry and exit from your observation area.

-Walking,
-Climbing
-Sitting
-Picnicking
-Playing
-Filming,
-Photography
-Drawing,
-Writing
-Other (Specify)

Note in particular any interaction with site features
-Picking flowers
-Moving stones
-Catching wildlife
-Leaving litter
-Lighting fires
-Chasing animals
-Leaving gates open

USE MAP

Use this section only when interactions and effects occur for example:

'Two teens wandered off from main group and climbed onto the walls – dislodging loose stones'

Or

'The couple had a small bucket that they used to store the slips of flowering plants that they gathered'

Or

The campervan backed onto the grassy area while trying to turn – resulting in a muddy patch where the wheels spun on the wet grass'

USE MAP

Note any after-effects of interaction with site features
-visible vegetation marks
-Visible litter
-Visible footprints
-Visible tire-marks
-Visible disturbance of fences, walls, monuments, etc.

USE MAP

Activities	Effects
Category 1 Low Level	**Category 1 Low Impact**
Walking on paths, mown grass or hard surfaces (incl. level sand)	Trails newly visible on grass and leafy vegetation
Running, playing in mown grass or level sand	Temporary disturbance (including chasing and feeding) of insects, fish, amphibian, reptiles insects, birds and mammals
Sitting on benches, mown grass, sand	Temporary change of character - due to the appearance or nature of activities (noise, crowds, etc.)
Swimming, sailing, surfing, kayaking in water	General/light littering
Resting, reading, looking. Picnicking, sightseeing, painting, photographing.	
Watching nature - in hedges, woods, streams, pools and intertidal areas.	
Category 3 Medium Level	**Category 2 Medium Impact**
Vehicular movement on roads and parking areas	Addition/alteration of site features
Powered movement through water	Heavy littering
Any movement through woody vegetation	Significant, deliberate disturbance of wildlife
Any movement leaving a trail through leafy vegetation	Removal of woody vegetation.
Category 3 High Level	**Category 3 Severe Impact**
Walking through wet/muddy soil	Removal of material - stones, rooted vegetation, fauna,
Scrambling on steep or loose slopes	Injuring, killing or taking wildlife
Off road vehicular movement	Destruction of structures, vegetation or fauna.
Any movement leaving a trail through woody vegetation	Dumping
	Vandalism or Graffiti

Use this table to help fill out the 'Activities', 'Effects' and 'Comments' section of the survey sheets

Schedule of Events

Friday 05/09/14	
12:30	Surveyors meet at Hylands Burren Hotel, Ballyvaughan, Co. Clare (065) 7077037 for briefing session
14:00	Surveyors will take up stations at Observer Position
14:00-16:00	Supervisors will visit each site between to discuss progress and problems
18:00	Pre-pilot survey ends
19:00	Surveyors to meet at Cassidys Pub (Croide na Boirne, Carron, Co. Clare (065) 708 9109)
19:00-19:30	Post 'Pre-Pilot' meeting will be held with supervisors to finalise and adjust methods for the Survey. Please give supervisors all survey material at this point
Saturday 06/09/14	
08:00	Wake Up Call
08:30	Surveyors meet at in hostel communal area for briefing session
09:00	Surveyors leave hostel
09:00 - 10:30	Supervisors will visit each site between to confirm presence of all Surveyors
09:30	Surveyors will begin to observe Visitors and to record the information as per the Survey Sheet Supervisors will call each surveyor regularly to ensure well-being Supervisors will visit each Surveyor – to make provisions for toilet breaks, shelter
18:00	Survey ends
19:00-19:30	Surveyors to meet at Cassidys Pub, Carron to capture further 'lessons learned' – about methods and experience. Please give supervisors all survey material at this point
Sunday 07/09/14	
08:00	Wake Up Call
08:30	Surveyors meet at in hostel communal area for briefing session
09:00	Surveyors leave hostel
09:00 - 10:30	Supervisors will visit each site between to confirm presence of all Surveyors
09:30	Surveyors will begin to observe Visitors and to record the information as per the Survey Sheet Supervisors will call each surveyor regularly to ensure well-being Supervisors will visit each Surveyor – to make provisions for toilet breaks, shelter
18:00	Survey ends
19:00-19:30	Surveyors to meet at Cassidys Pub, Carron to capture further 'lessons learned' – about methods and experience. Please give supervisors all survey material at this point