



# Dursey Island Cable Car and Visitor Centre Response to Request for Further Information October 2020



Cork  
County Council  
Comhairle Contae Chorcaí



Fáilte Ireland  
National Tourism Development Authority

**ROD**  
ROUGHAN & O'DONOVAN





# **DURSEY ISLAND CABLE CAR AND VISITOR CENTRE**

## **Response to Request for Further Information**

**October 2020**

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# 1. INTRODUCTION

## 1.1 Terms of Reference

Roughan & O'Donovan Consulting Engineers ('ROD') have been engaged by Cork County Council ('CCC') to provide multidisciplinary consultancy services for the proposed Dursey Island Cable Car and Visitor Centre development ('the proposed development'), including engineering, architectural, landscaping, quantity surveying, cultural heritage, planning, environmental and tourism consultancy services.

## 1.2 Statement of Purpose

In September 2019, CCC submitted a planning application for the proposed development to An Board Pleanála ('the Board' hereafter). On the 6<sup>th</sup> of February 2020 the Board convened an Oral Hearing for the Compulsory Purchase Order (CPO). The Hearing was to deal with 2 submissions, both of which were withdrawn at the commencement of the Oral Hearing.

On the 19<sup>th</sup> of June 2020, the Board issued a request for further information ('RFI' hereafter) to CCC (see **Appendix A**) in relation to the Environmental Impact Statement (EIAR) and Natura Impact Statement (NIS) for the proposed development. The purpose of this document is to present the Applicant's (CCC's) responses to this RFI. The document has been prepared by ROD on behalf of CCC.

The preamble of the RFI states that:

*"... the Board is not satisfied, having regard to the precautionary principle, that the mitigation measures proposed to address the potential impact of increased visitor numbers on Dursey Island as well as within the designated Natura 2000 sites on the mainland will be sufficient to address any potential likely significant effects on qualifying interests within these designated sites.*

*In addition, while the Board acknowledges the potential of the proposed improvements works to the R572 regional road to address pedestrian and traffic safety issues, the projected significant increase in tourist numbers is also likely to have an impact on traffic on this route as well as car-parking capacity on the site, and these matters should be a key consideration in the preparation of a visitor management plan."*

The RFI goes on to outline five specific areas of concern which require further information in order to satisfy the Board.

It is the view of the authors that the responses presented in this document, which include additional mitigation measures and clarification in relation to pre-existing mitigation measures proposed under the scope of the EIAR and NIS for the proposed development, will demonstrate beyond all reasonable scientific doubt that the proposed development will not directly, indirectly or cumulatively give rise to effects on the Qualifying Interests of the Designated Natura 2000 Sites in question. The information supplied provides compelling and authoritative scientific evidence to support the conclusions of the EIAR and NIS for the proposed development.

## 2. QUERIES AND RESPONSES

Italicised text in boxes below is reproduced verbatim from the RFI. The text which follows each query constitutes the Project Team's response to the query in question.

*The Board hereby requires you to furnish the following further information in relation to the effects on the environment of the proposed development: -*

### 2.1 Query No. 1

*1) A more precise and evidence-based calculation of the seasonal availability of foraging areas for the Chough, based on the scale of suitable feeding habitat on Dursey Island, and the consequent numerical capacity of visitors and the mitigation measures that would be effective in addressing potential indirect impacts on the Chough bird species or its feeding habitat.*

#### 2.1.1 Introduction

As requested in the query above, this section (2.1) presents a more precise calculation of the monthly carrying capacity for Dursey Island, based on the availability of suitable foraging habitat for Red-billed Chough ('Chough', hereafter) during the breeding season. It also presents a more detailed discussion of the carrying capacity and sets out additional mitigation measures proposed to address the potential effects of human disturbance on foraging Chough.

At the outset, the following key points must be emphasised to put the carrying capacity, as calculated, into context. Each of these key points is discussed in greater detail in the following subsections but to summarise:

1. There is no evidence to indicate that human disturbance currently poses a conservation threat to the Dursey Island Chough population. Breeding bird surveys were carried out on behalf of the Applicant between March 2019 and March 2020 and no observations were made indicating that human disturbance was having a significant negative effect on the ability of foraging birds to obtain sufficient forage. A highly experienced ornithologist who has lived on Dursey Island since the early 1990s states that he has never observed evidence of human disturbance occurring at such a level as to pose a conservation threat on Dursey Island: "*In all my years on Dursey, I have never once seen any tourist do anything that I thought might pose a direct threat to the Choughs or any other wildlife*" (refer to **Appendix B**). Refer to Section 2.1.2 for more detailed discussion.
2. There is only one example of scientific research which has found evidence of human disturbance threatening the viability of a population of Chough (Keribiou *et al.*, 2009) (on the island of Ouessant (also called 'Ushant'), off the west coast of France) and that is the basis of the determination of the carrying capacity for Dursey Island. Other scientific research and evidence from similar sites in Ireland and (notably) Cornwall indicates that, on the contrary, this is a species which exhibits high levels of tolerance to disturbance from visitors, and which can flourish at popular outdoor recreation areas. In the Cornish case, the locations where Chough are most numerous are also the locations of the most popular tourist attractions along the Cornish coast, namely Lizard (Southerly) Point,

Kynance Cove and Land's End. Refer to Section 2.1.2 for more detailed discussion.

3. Nonetheless, in accordance with the precautionary principle (i.e. because the Keribiou *et al.* (2009) paper gives cause for concern in relation to the potential effects of increased visitors on the Chough population and because there are other ecological receptors on the island which may be negatively affected by increased levels of visitor footfall), it is considered appropriate to apply the only available scientific research basis to impose an absolute numerical limit on the number of visitors travelling to the island.
4. In order to limit absolute visitor numbers, a carrying capacity has been estimated on the basis of the best available information. The only case which provides a precedent for the calculation of a carrying capacity in relation to human disturbance of Chough is Keribiou *et al.* (2009). This longitudinal study used 8 years of data in relation to visitor numbers and juvenile Chough survival to estimate, using computer modelling, a sustainable number of visitors for the month of August – when Choughs on Ouessant were most sensitive to disturbance. This volume of longitudinal data is not available for the case at hand, meaning the modelling approach cannot be replicated. On the advice of national Chough expert, Mr. Mike Trewby, it was decided that the best approach would be to extrapolate a carrying capacity for Dursey Island from the Ouessant case, utilising the key constraining factor – the area of suitable foraging habitat – as a multiplier. A more refined version of this extrapolation has been carried out herein, yielding a carrying capacity of 11, 716, which – again, in a precautionary manner – will be applied to all months of the year. Refer to Sections 2.1.5 and 2.1.6 for more detailed explanation and discussion.
5. While it is acknowledged above that Ouessant and Dursey Island are quite different environments, it should be borne in mind that (i) this case provides the only precedent for the calculation of a carrying capacity in relation to human disturbance of Chough and (ii) a consideration of the differing contexts on the two islands clearly indicates that Ouessant is a much worse scenario in terms of Chough conservation. There are stark differences between Ouessant and Dursey which mean that the use of Ouessant as a basis for setting the carrying capacity for Dursey is precautionary. In summary:
  - a. Unlike Dursey Island, Ouessant is a highly developed island. The land mass is criss-crossed with roads and trails, has an airport and has significantly greater population.
  - b. The extent of Chough foraging habitat on Ouessant is limited to the coastal margins, where walking trails are ubiquitous whereas most of the island of Dursey is suitable for foraging Choughs.
  - c. Significantly, the Ouessant Choughs are largely limited to the habitats on the offshore island for foraging as the island is located approximately 18km from the mainland, whereas the Dursey Choughs have been observed regularly commuting back and forth between island and mainland, which is situated a mere 180 m away. Therefore, the available foraging habitat for the Dursey Choughs is greater than that available on the island alone.
  - d. The area of foraging habitat of greatest sensitivity for the chough on Dursey Island is located on the western tip of the island, an area where there are no defined paths, and which is situated at the greatest remove from the cable car. Extensive measures have been prescribed to protect this area, including establishment of a walking trail network which excludes this area,

signage and use of an island caretaker to guide walkers away from this area during the breeding season months.

Hence, because the carrying capacity as per Keribiou *et al.* (2009) has been developed for a worse scenario in terms of Chough conservation, it is considered that the extrapolated carrying capacity is a very conservative number when applied to Dursey Island. Refer to Section 2.1.8 for a more detailed explanation.

6. It is considered that the implementation of the monthly carrying capacity of 11,716 will prevent an ecologically unsustainable level of visitor disturbance on Dursey Island. However, it is acknowledged that the behaviour of visitors – in addition to their absolute numbers – is also a factor which should be addressed in order to minimise disturbance insofar as is practicable. Accordingly, a multi-faceted suite of mitigation measures aimed at minimising human disturbance on Dursey Island are set out. An additional mitigation measure is committed to by CCC whereby an island caretaker will be based on the island during the key breeding season months (June – September, inclusive) to discourage visitors from entering the most sensitive habitats at the western end of the island. This is the area of greatest sensitivity in terms of breeding and foraging Chough, and in combination with the signed loop walks which avoid this part of the island, conservative carrying capacity, and proposed visitor educational campaign, it is the authors' view that these measures will ensure the protection of these foraging habitats. The full set of mitigation measures in relation to human disturbance of Chough is listed in Section 2.1.9.
7. During pre-application consultations with the National Parks and Wildlife Service (NPWS) which included a site visit to Dursey Island, it was recommended that CCC engage with Mr. Mike Trewby (an ornithologist with special expertise on Chough) in terms of the approach to identifying a carrying capacity. The approach contained in this application has been developed and agreed with Mr. Trewby. Consequently in their submission to the Board in relation to the proposed development (**Appendix F**), the NPWS has upheld the conclusions of the EIAR and NIS that no adverse ecological effects will occur, provided specific additional measures were put in place to protect a Chough nest site in a derelict building from human disturbance:

*“Having undertaken a review of this proposal (including consideration of requirements of EU biodiversity Directives; and broader consideration of biodiversity), the Department’s view and recommendation is that it can see no biodiversity reason why this application cannot be granted, provided the mitigation, conservation measures and environmental controls set out in the reports and the one specified here [in relation to the nest site in the derelict building] are implemented.”*

Measures are outlined herein to protect the nest site in question.

8. Under the scope of the EIAR and NIS for the proposed development, CCC has committed to carrying out a programme of monitoring during the first ten years of the operation of the proposed development, including gathering data in relation to the Chough population, visitor numbers and use, climate and grazing regime. After these ten years of data have been gathered, the Council will review the data and intends to propose a new, bespoke carrying capacity for the island, calculated by a suitably qualified ecological professional on the basis of the longitudinal data gathered. If, at this future date, the Council wishes to propose the implementation of a new limit on visitor numbers, any such change (at that



time) would be the subject of a further application for planning permission to the Competent Authority, for which the necessary environmental assessments (including Appropriate Assessment) will be completed, as appropriate. Otherwise, the carrying capacity which is set out herein is to be regarded as a fixed monthly upper limit on visitor numbers to Dursey Island (subject to ABP approval and any modifications imposed). Refer to Section 2.1.11 for a more in-depth description of the proposed 10-year monitoring programme as it relates to Chough.

Note: Since the submission of the planning application for the proposed development, a submission on the proposed development in relation to Chough was received by CCC from Dr. Derek Scott, a retired ornithologist who has a residence on Dursey Island. Dr. Scott worked as a professional ornithologist for his entire career. He has had a part-time residence on Dursey Island since the early 1990s, and has been regularly visiting the area since 1977. As such, he may be regarded as a local expert. His submission is appended (**Appendix B**) and will be referred to throughout this RFI response.

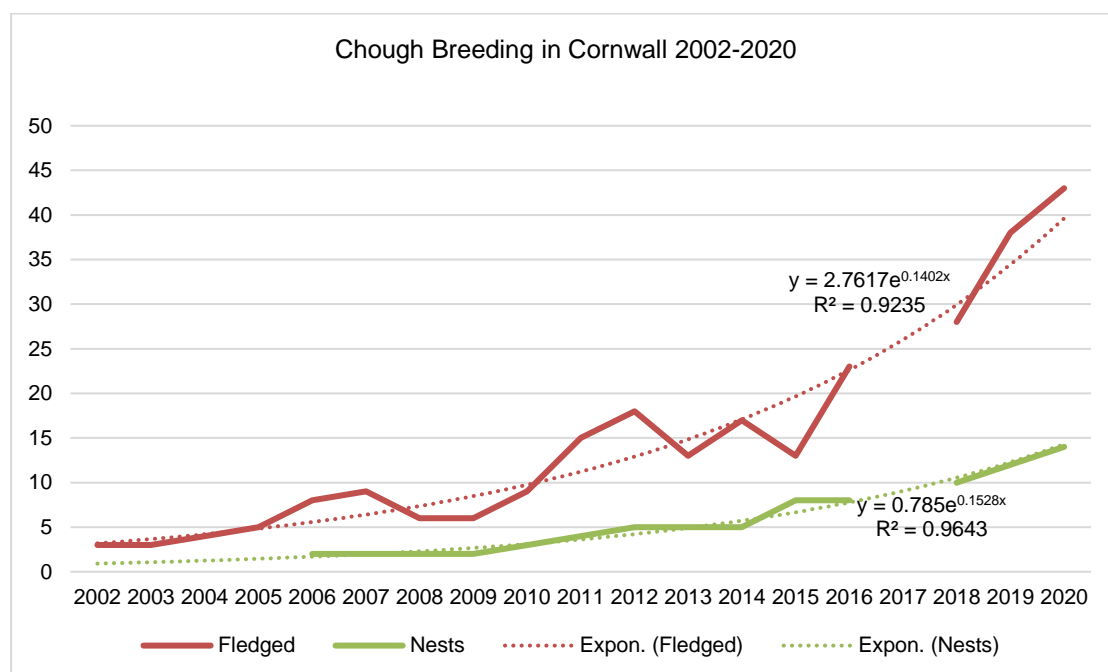
## 2.1.2 Lack of Data in Relation to the Impact of Human Disturbance on Chough

It is important to note that there is no direct evidence of human disturbance having an adverse impact on the viability of the population of Red-billed Chough on Dursey Island or the Beara Peninsula. Most of the scientific literature published on the subject to date would indicate that Choughs are quite tolerant of human disturbance (Bullock *et al.*, 1983; Jimenez *et al.*, 2011). Anecdotal evidence and surveys from visitor attractions in Ireland would support this conclusion (Wild Eye & Ecology Ireland, 2018; Phyllida White, pers. comm., 2019). The only academic research published to date which would indicate a detrimental effect of visitor numbers on Chough population viability is from Keribiou and co-authors (2009), perhaps indicating that human disturbance presents a threat to Chough at certain sites but not others. Furthermore, the case of the Cornish Choughs would indicate that Choughs and large numbers of visitors can coexist in outdoor recreational areas.

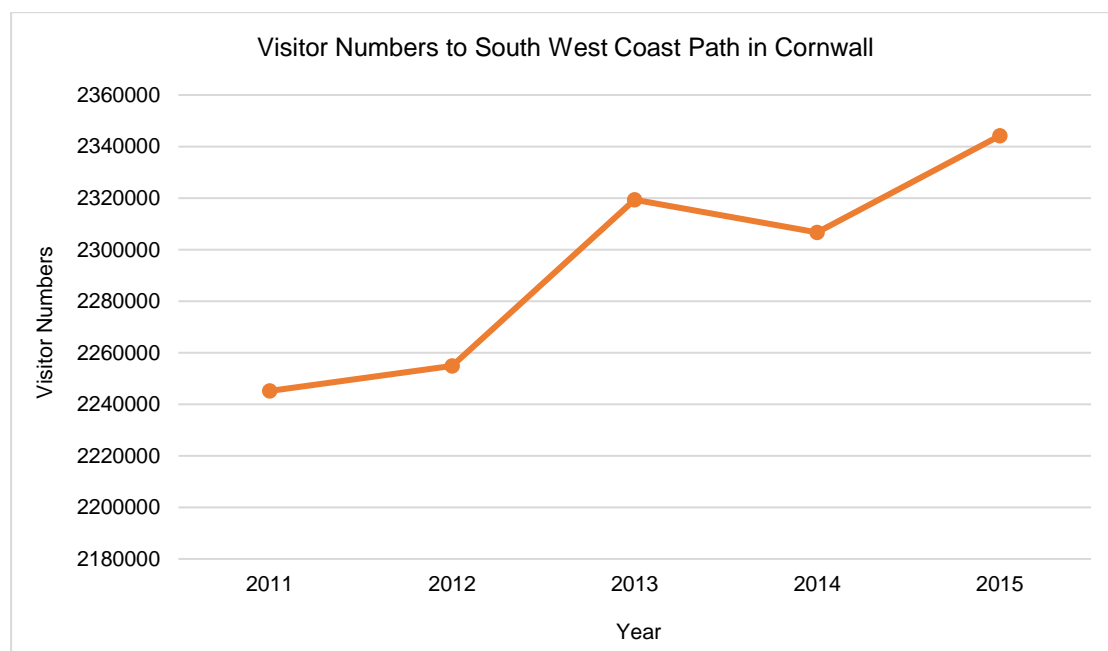
The natural recolonisation of the Cornish coast by Red-billed Chough provides evidence that human disturbance is not a significant threat to the long-term viability of Chough populations in all circumstances. Prior to 2001, Choughs had not bred in Cornwall since 1947 and had disappeared altogether by 1973 (Johnstone *et al.*, 2011; RSPB). However, in 2001, three Irish birds settled on the Lizard Peninsula and successfully bred the following year, fledging three young (Johnstone *et al.*, 2011; RSPB; Operation Chough). By 2006, the population had increased to six pairs, fledging 15 young (Johnstone *et al.*, 2011). By 2008, the population had begun to expand further into its historic range to the west (RSPB). Breeding success accelerated through the 2010s, with eight pairs fledging a record 23 young in 2016 (CBWPS, 2016). This record was exceeded successively in 2018 (10 pairs fledging 28 young) and 2019 (12 pairs fledging 38 young) (BirdGuides.com). The record was again broken in 2020, with 14 pairs fledging a total of 43 young (CBWPS, 2020).

Johnstone *et al.* (2011) noted the finding by Keribiou *et al.* (2009) that the survival of juvenile Choughs was influenced by chronic disturbance from humans at suitable foraging habitat. However, the authors also noted that it was at that time too early to tell whether or not the levels of human disturbance in Cornwall were likely to influence the survival of juveniles. Tourism is a feature along the entire length of the Cornish coast, along which the South West Coast Path walking trail runs. The most popular tourist attractions along the coast include Lizard (Southerly) Point, Kynance Cove and Land's End (Fig. 3). These locations are also where Choughs are most numerous. Former mines are also important tourist attractions in Cornwall, and Choughs have

been recorded nesting in these (Johnstone *et al.*, 2011). Monitoring data indicate that, in 2015, 2.3 million persons used the Cornwall section of the South West Coast Path (South West Research Company Ltd., 2016). During the period 2011 – 2015, visitor numbers on the coastal trail have remained high and are increasing over time (South West Research Company Ltd., 2013; 2014a; 2014b; 2015; 2016) (Fig. 2).



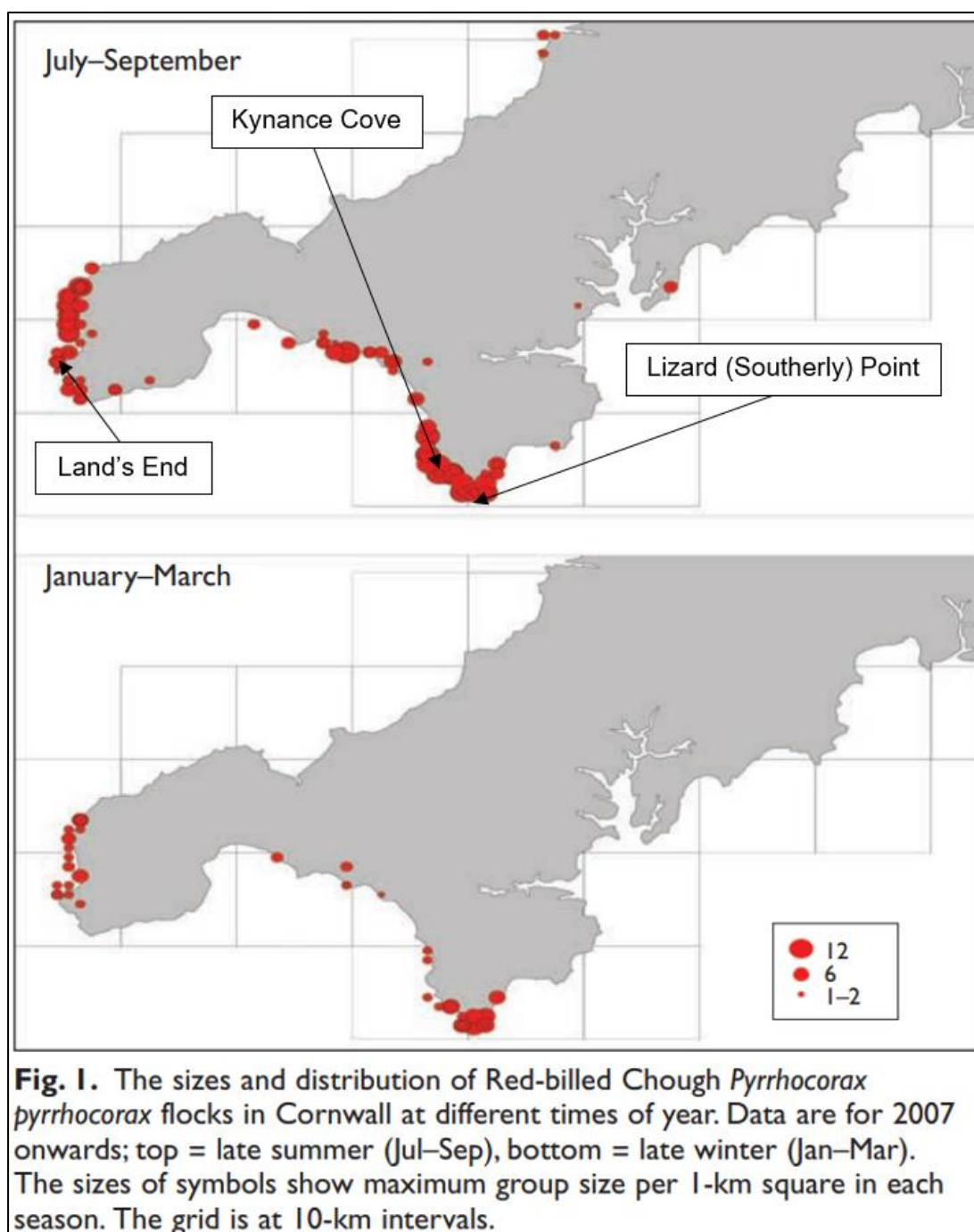
**Figure 1 Chough Breeding in Cornwall 2002 – 2020**



**Figure 2 Visitor numbers on Cornwall section of South West Coast Path, 2011 - 2015 (South West Research Company Ltd., 2013; 2014a; 2014b; 2015; 2016)**

Rylands *et al.* (2012) devised management strategies for Choughs and coastal biodiversity in Cornwall for the RSPB. The authors noted that the key factors influencing foraging success (and consequently survival of individual Choughs) are

invertebrate abundance and availability. They also noted that “*Disturbance to feeding Choughs is also a key factor at some sites* (pers. obs., Owen 1988, Kerbiriou et al 2007)” (emphasis added) but did not elaborate on this. The RSPB strategy focuses on the protection of nests from persecution, e.g. egg collecting, and the management of habitats (principally by grazing) to provide optimal foraging within a critical distance of nests. The control of visitor numbers does not form part of the strategy. As evidenced by Fig. 1, above, this strategy appears to have been successful.



**Figure 3** Chough Flocks in Cornwall 2007. (Johnstone et al. (2011); annotations for tourist attractions added)

It is also notable that both Johnstone *et al.* (2011) and Rylands *et al.* (2012) highlighted that the presence of Hottentot Fig, which is abundant at locations such as Lizard Point and is also present on Dursey, is detrimental to the suitability of habitat for foraging

Choughs. Under the scope of the mitigation measures for the proposed development, CCC has committed to implementing control efforts to address a single localised occurrence of this invasive species on Dursey Island:

*“CCC shall commit to undertaking treatment by a competent professional, in accordance with the recommended physical treatment set out in Appendix 7.1, with a view to eradicating the occurrence of hottentot-fig on Dursey Island prior to the commencement of operation of the proposed development (subject to agreement with the landowner). Monitoring shall be carried out by a competent professional for five years to ensure no re-growth occurs.” (EIAR, Chapter 7, p. 93)*

To summarise, the majority of evidence from the scientific literature and observations from other west coast locations in Ireland would indicate that Red-billed Chough can be quite tolerant to human disturbance (Bullock *et al.*, 1983; Jimenez *et al.*, 2011; Wild Eye & Ecology Ireland, 2018; Phyllida White, pers. comm., 2019) and, in fact, can breed highly successfully at locations with very high levels of visitor footfall (Johnstone *et al.*, 2011; Rylands *et al.*, 2012). There is only one scientific study which has identified human disturbance as a significant threat to the conservation status of a population of the species (Keribiou *et al.*, 2009). On balance, the evidence would seem to indicate that, overall, the Red-billed Chough is quite tolerant of the presence of visitors in outdoor recreation areas, but that, in certain cases, very high volumes of visitors during the breeding season may potentially pose a threat to the conservation status of a population. For this reason, in accordance with the precautionary principle, great care has been taken to ensure that visitors – by virtue of their numbers or behaviour – will not pose the risk of adverse effects on the resident population of Chough.

### **2.1.3 Lack of Longitudinal Data in Relation to the Dursey Chough Population Trend**

The most recent national Chough census was completed in 2002 / 03 and published in 2003 (Gray *et al.*, 2003). Since then, a systematic targeted survey of the Chough population in the study area had not been completed until the surveys carried out for the purposes of the EIAR and NIS for the proposed development (i.e. 2019). As stated in the BirdWatch Ireland objection to the proposed development:

*“All-Ireland Chough censuses have been carried according to recognised practice every ten years in Ireland and the UK since 1982. However, there has been no national census of the Chough population in Ireland since the 2002/2003 survey – 16 years ago. A survey should have been undertaken by the State in 2012/2013.”*

In the interim, local ornithologist Dr. Derek Scott, who owns a home on Dursey Island, has provided his own annual maximum Chough counts for Dursey Island during the period 1978 to 2019 to the Project Team (excluding 1980 – 1985) (see **Appendix B**). Derek Scott is a professional ornithologist (now retired) who has arguably spent more time observing the Dursey Choughs than any other person in recent times and, as such, it is considered highly likely that these counts present an accurate picture of the Chough population on Dursey Island during the period in question.

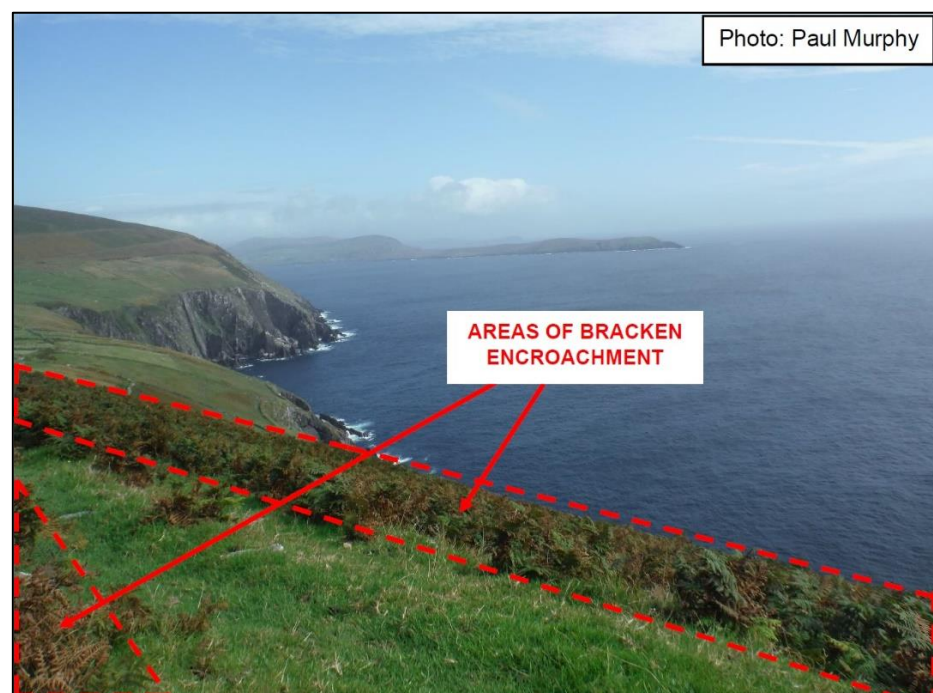
While the difference in absolute numbers of Choughs between the 2002 / 03 national census and the 2019 surveys might appear to indicate a medium-term decline, no conclusive judgement can be made in this respect on the basis of just two data points (refer to Section 2.1.2, above). Certainly, Dr. Scott's data would indicate significant variation in Chough numbers from one year to the next, and this variation may account for the difference between the 2002 / 03 and 2019 numbers.

#### 2.1.4 Other Potential Factors of Conservation Concern

There is reason to believe that other factors unrelated to visitor numbers or behaviours; namely land use change, availability of prey and climatic factors; may affect the Chough population in the study area – although, again, there is a dearth of longitudinal data. In terms of land use change, this has been identified as a key driver of population declines in the academic literature (Owen, 1988; Keribiou *et al.*, 1999; McCanch, 2010; Meyer, 2000; Mucklow & Croft, 2008; Rylands *et al.*, 2012). There is some evidence of destocking and subsequent bracken encroachment on Dursey Island. This is unlikely to present a significant threat at present. However, it is likely to pose an increasing threat over time, since total depopulation of the island (which has a year-round population of approx. 2 persons) is now an imminent possibility.



**Figure 4** Bracken encroachment on Dursey Island (1 of 2)



**Figure 5** Bracken encroachment on Dursey Island (2 of 2)



By improving the economic viability of habitation on Dursey Island, the proposed development may indirectly prevent depopulation (potentially promoting increased habitation) and, thereby, promote sustained grazing on the Island and (as a result) maintenance of suitable foraging habitat for Red-billed Chough.

Habitat management in the Beara Peninsula SPA falls under the remit of the NPWS and CCC is committed to working with the NPWS on an ongoing basis to facilitate any necessary management of the Beara Peninsula SPA, e.g. a Habitat Management Plan

Severe cold spells due to climate change has been identified as a potential conservation threat by Dr. Derek Scott (**Appendix B**):

*“... the most obvious cause of the sudden decline in numbers of breeding pairs in 2018 is increased mortality of adult birds during the exceptionally severe weather in early March 2018. Choughs thrive in West Beara because of the mild maritime climate (see Figure 4). The average minimum temperature in Tillickafinna in January, February and March is just under 5.0°, and frost is rare. Prior to 2018, much the worst cold spell since I began keeping records in 1994 was in late February and early March 2001, when the temperature fell below freezing on six nights in a row and fell to -3.0°C on the night of 28 February/1 March. However, there was no snow associated with this cold spell, and the Chough population remained high.*

*However, the “beast from the east” in early March 2018 produced heavy snowfall, and the temperature dropped to -6.0°C. The entire island was covered in deep snow for three or four days; an event almost unprecedented in living memory (see Figures 8 & 9). Choughs would have been unable to forage and, as it was approaching the end of winter, the birds would have been in poor condition and less able to cope with the harsh conditions than if these had occurred earlier in the winter. Tillickafinna resident [Name redacted] reports having found one dead Chough in the snow during this period.*

*This extremely severe weather in early March 2018 with prolonged snow cover seems to have hit the Choughs badly, as numbers were well down on previous years. No more than seven were recorded until the end of May. The highest counts in summer were 11 on 2 June, 12 on 29 June and 11 on 25 August. There were up to 12 in early September, 19 on 19 September, and up to 20 in October, but no more than 11 in November, and only eight in December. The maximum count of 20 in 2018 was the lowest since the late 1980s, when observer coverage was very poor.”*

Indeed, a longitudinal (20-year) study of the Islay Choughs by Reid *et al.* (2003) indicates that the success of breeding and fledging is influenced by variations in weather (temperature and rainfall):

*“Mean success was related to weather conditions prevailing during the months preceding breeding: parents fledged more offspring when the previous late summer had been warm and the preceding late winter had been dry. Thus, the quality of the breeding environment varied amongst years. Temporal variation in vertebrate productivity has been widely linked to variation in food availability (e.g. Brinkhof & Cave 1997; Bergallo & Magnusson 1999; Oro, Pradel & Lebreton 1999; Weimerskirch *et al.* 2001), and breeding success is likely to have varied in Choughs because weather affected foraging conditions... Choughs fledging in years when breeding conditions were good were more likely to survive their first and second years of life, to recruit to the breeding population, and subsequently to make more breeding attempts.” (p. 43)*

Dr. Scott also posits that prey availability may have reduced on the island in recent years (**Appendix B**):

*“Choughs are primarily insectivorous, with the larvae of crane flies (Tipulidae) being important in the diet. [...] Throughout the 2000s and early 2010s, crane flies were common to abundant on Dursey, and in one year could be said to have reached plague proportions [...]. When I was operating a moth trap regularly in my garden in 2005, 2006, 2007 and 2008, the catch of crane flies often exceeded that of all the moths combined. However, for unknown reasons, crane flies have been very scarce in recent years. This was particularly the case in 2018 and 2019, when even my neighbour [name redacted] commented on their scarcity. In the eleven weeks that I was in residence in Tillickafinna from late August to mid-November 2019, I saw only two crane flies (one in my garden and one in my house). If, as seems likely, crane fly larvae are important in the diet of Choughs on Dursey, the recent scarcity of crane flies might have hit the Choughs badly.”*

Indeed, research has identified increased use of avermectin (a broad-spectrum insecticide which acts on a number of invertebrate Orders, including Diptera (Strong, 1993)) to treat parasitic infections in livestock as a potential conservation threat to the species (McKay, 1996)), and this would provide a possible reason for reduced abundance of crane fly larvae on Dursey Island. Ivermectin (a popular avermectin-based drug) and other anti-parasitic agents are commonly used among sheep farmers in Ireland, to the point where resistance is becoming an issue (Teagasc, 2018). However, it should be noted that it is not known whether broad-spectrum insecticidal drugs are used by farmers on Dursey Island or, if this were the case, how prevalent or intensive their use is.

Dr. Scott, who has had a residence on the island since 1992, has observed the Choughs of Dursey Island for over 40 years (with a first visit to the island in the mid-1970s), and is of the view that the Dursey Red-billed Chough are tolerant of very high levels of human disturbance (**Appendix B**):

*“In all my years on Dursey, I have never once seen any tourist do anything that I thought might pose a direct threat to the Choughs or any other wildlife. Of the thousands of visitors crossing to the island in the cable car, only about 25% make it out all the way to the Tip, and those that do almost never stray far from the marked trails, with the notable exception of bird-watchers who roam widely over the island. Visitors walking along the main trails will doubtless inevitably flush the occasional group of foraging Choughs, but in my experience the birds soon settle again to resume foraging. When I surveyed the Chough population in 2002, all ten breeding sites were in crevices or caves in the cliffs, totally inaccessible to visitors...”*

*In my opinion, any suggestion that the recent apparent decline in Chough numbers on Dursey Island is directly linked to the recent increase in tourist numbers is nonsense. I very much doubt that the number of visitors coming to Dursey Island is ever likely to reach a level at which they will pose a threat to the Chough population, given that about three-quarters of visitors get no further west than Kilmichael.”*

### 2.1.5 The Carrying Capacity for Dursey Island – The Approach Explained

As explained in the previous sections, there is uncertainty regarding the impact of human disturbance on Red-billed Chough – in the scientific literature and for the case at hand. It cannot be stated conclusively that human disturbance is having a negative impact on the population on Dursey Island. However, evidence of a negative impact on Chough due to human disturbance does exist from one case study (Keribiou *et al.*, 2009). As such, in accordance with the precautionary principle, and because there are other ecological receptors which may be negatively affected by increased visitor

numbers, it is considered prudent to limit the absolute number of visitors to Dursey Island in a given time.

Advice was obtained on the matter from Mr Mike Trewby, ornithologist and expert on the ecology of Red-billed Chough. During an on-site meeting with the NPWS on the 9<sup>th</sup> of May 2019, it was recommended that Mr. Trewby be consulted in relation to Chough. Mr. Trewby is an experienced ornithologist and was one of the surveyors in the most recent national Chough survey (Gray *et al.*, 2003). Mr. Trewby was consulted on a number of occasions, and was of the opinion that a numerical carrying capacity should be established for Dursey Island based on the research of Keribiou *et al.* (2009). In this case, a limit on visitor numbers of 16,500 for the month of August was recommended by the authors, in order to ensure the long-term viability of the Chough population in question (*ibid*).

Based on a close reading of Keribiou *et al.* (2009) and correspondence with the lead author, Christian Keribiou, it was established that the carrying capacity recommended for the month of August for Ouessant Island was based on computer modelling using a large volume of data, gathered over 8 years in the field, in relation to visitor numbers in the month of August and juvenile monthly survival rates.

*“We assessed the effects of tourism on chough population viability using two types of population models. [...] Because tourism was shown to strongly affect August juvenile survival ... we modelled the expected August juvenile survival in year t as a function of the number of visitors in August (divided by 1000) the same year, using results from the most parsimonious model of capture–recapture of monthly juvenile survival. [...] Different scenarios for the variation of number of tourist ( $x_t$ ) through time were investigated to extrapolate the effects of tourism on population dynamics and viability.”* (Keribiou *et al.*, 2009; pp. 46 – 47)

The authors used this approach to estimate a numerical carrying capacity for the month of August for Ouessant of 16,500:

*“... we had survey monthly [sic] survival of young chough and found that young survival was correlated with number of tourist in August. Using this relationship we modelised a population dynamic with various scenarios [sic] of tourist trend/number and assess the maximum number of tourist that allow obtain a population growth rate greater [sic] than 1”* (Christian Keribiou, pers. comm., 09/06/2019)

The type of modelling applied in this case was possible because:

- i. The authors had a lot of data (8 years' worth) on visitor numbers and survival of juvenile Choughs; and
- ii. The authors found that there was a negative correlation between visitor numbers in August and survival of juveniles on Ouessant, i.e. *it was found that higher visitor numbers in August corresponded with reduced juvenile Chough survival, suggesting a negative impact in this case.* As stated by Keribiou above, the relationship between these two variables was subsequently modelled / projected under various scenarios to determine a maximum number of visitors in August which would allow a population growth rate that would sustain the population (>1).

Replication of this type of longitudinal study is not feasible for the case at hand, since (i) the same breadth of longitudinal data is not available and (ii) it is not necessarily the case that there is a statistically significant relationship between visitor numbers and juvenile survival rate in this case. The same modelling exercise applied to Dursey would only yield a carrying capacity if a negative correlation were to be identified

between monthly visitor numbers and monthly juvenile survival rates; i.e. if research on the Dursey population failed to identify a negative correlation between visitor numbers and juvenile Chough survival, it would not be possible to establish a numerical carrying capacity by modelling a non-existent relationship between these factors. Put simply, there is not enough data on the Dursey Chough population to allow this modelling exercise to be carried out.

As such, it was decided that the best approach would be to extrapolate a carrying capacity for Dursey Island on the basis of a comparison of the total areas of suitable Chough foraging habitat between Ouessant and Dursey Island, since the available area of foraging habitat is the key factor of concern in this case. As stated previously, this approach was developed in agreement with ornithologist Mr Mike Trewby, a national expert on Red-billed Chough.

A breakdown of the calculations used to extrapolate a carrying capacity (in the EIAR and NIS) are presented in the tables below. This yielded a monthly carrying capacity of 12,835 visitors.

**Table 1 Information used to calculate original numerical carrying capacity for Dursey Island in EIAR and NIS for proposed development**

Information Available	Figure	Source
Carrying capacity of Ouessant Island, France, for month of August	16,500 people	Keribiou <i>et al.</i> , 2009
Area of Ouessant Island	1541 ha = 15.4100 km <sup>2</sup>	Keribiou <i>et al.</i> , 2009
Area of chough foraging habitat on Ouessant Island	7.6875 km <sup>2</sup>	Keribiou <i>et al.</i> , 2009
Area of Dursey Island	5.9800 km <sup>2</sup>	Google Maps, 2019
Area of chough foraging habitat on Dursey Island	~ 5.9800 km <sup>2</sup>	2019 habitat mapping of Dursey Island

**Table 2 Extrapolation of original numerical carrying capacity for Dursey Island in terms of human disturbance of chough, following Keribiou *et al.* (2009), as per EIAR and NIS for proposed development**

Calculations
$\frac{7.6875}{5.9800} = 1.2855351171$ <p>→ Hence, Ouessant Island has 1.2855351171 times the area of chough foraging habitat of Dursey Island</p> $\frac{16,500}{1.2855351171} = 12,835.121950788$ <p>→ Hence, the monthly carrying capacity of Dursey Island = 12,835 people</p>

### 2.1.6 Calculation of a More Precise Carrying Capacity for Dursey Island

The calculation of the carrying capacity for Dursey Island set out in the EIAR and NIS for the proposed development, as described above, was based on the assertion (on the basis of habitat mapping and observations of foraging Choughs, that “*with the exception of roads, paths and artificial structures (which have a negligible area), the vast majority of land on the island [5.98km<sup>2</sup>] constitutes suitable foraging habitat*”

(EIAR, Chapter 7, p. 85). Upon further consideration in light of this RFI, it was decided that a more precise approach could be adopted to establish the total area of suitable Chough foraging habitat on Dursey Island.

Thus, for the purposes of this RFI, the Project Ecologist, Paul Murphy, has calculated the area of unsuitable habitat in terms of Choughs foraging during the breeding season, based on previously completed habitat mapping of the island and observations of foraging Choughs during the breeding season. The area of unsuitable habitat is primarily bare rock and cliffs, buildings and road / walking trails. It should be noted that within the areas of bare rock and cliffs, it is likely that there are pockets of soil and vegetation which provide Choughs with foraging opportunities but, at the macro- scale, this habitat is unsuitable for foraging Choughs. It should also be noted that the suitability of habitats on the island is variable, with the optimal foraging habitat being the short-sward grassland areas, of which the western end of the island boasts the greatest area, and, consequentially, which is most favoured by the Choughs for nesting and foraging.

The total area of unsuitable habitat calculated is 0.716641 km<sup>2</sup> out of a total of 6.175282 km<sup>2</sup>, meaning the total area of potential Chough foraging habitat is 5.458641 km<sup>2</sup>.

Using this area, a more precise monthly carrying capacity was extrapolated as detailed in Table 4, below, yielding a revised monthly carrying capacity of 11,716. It should be noted that (as discussed further in Section 2.1.8, below), the Dursey Choughs are not confined to the habitats on Dursey Island for foraging, and are regularly observed to commute back-and-forth between island and mainland. However, taking a precautionary approach, the areas of potential suitable habitat on the nearby mainland have not been factored into this calculation.

This new monthly carrying capacity of 11,716 shall replace that which was originally presented in the EIAR and NIS.

**Table 3 Information used to calculate more precise numerical carrying capacity for Dursey Island**

Information Available	Figure	Source
Carrying capacity of Ouessant Island, France, for month of August	16,500 people	Keribiou <i>et al.</i> , 2009
Total area of Ouessant Island	1541 ha = 15.4100 km <sup>2</sup>	Keribiou <i>et al.</i> , 2009
Area of chough foraging habitat on Ouessant Island	7.6875 km <sup>2</sup>	Keribiou <i>et al.</i> , 2009
Total area of Dursey Island	6.175282 km <sup>2</sup>	2020 revised Chough foraging habitat calculations
Area of chough foraging habitat on Dursey Island	5.458641 km <sup>2</sup>	2020 revised Chough foraging habitat calculations



**Table 4**      **Extrapolation of more precise numerical carrying capacity for Dursey Island in terms of human disturbance of chough, following Keribiou *et al.* (2009) and using new total area of foraging habitat**

Calculations
$\frac{7.6875}{5.458641} = 1.4083175648$ <p>→ Hence, Ouessant Island has 1.4083175648 times the area of chough foraging habitat of Dursey Island</p> $\frac{16,500}{1.4083175648} = 11,716.107511833$ <p>→ Hence, the monthly carrying capacity of Dursey Island = 11,716 people</p>

### 2.1.7 The Carrying Capacity as a Management Tool

It should be emphasised that the carrying capacity in this context is a *management tool* based on the best available information. The presence of people in outdoor recreational areas has effects – positive and negative – at all use levels, but entirely excluding people from nature is not a reasonable solution. In areas in which there is a high demand for recreation, and where visitor numbers could potentially reach harmful levels (such as Dursey Island), the management options are to (a) limit visitor numbers and / or (b) positively influence visitor behaviour such that adverse effects do not occur.

Both approaches have been adopted in this case. In terms of visitor numbers, the challenge is identifying an absolute visitor number which prevents the occurrence of adverse effects. The natural environment is inherently complex and there are multitudinous factors which may dictate what constitutes an ecologically sustainable level of use. As such, it is not possible to establish an ecological carrying capacity whose calculation factors in all of these myriad variables. Whether this is possible in any case is debatable.

Nor is it considered safe to establish a carrying capacity by scaling visitor numbers upwards over time, since ecological lag times may result in the undesirable scenario in which negative impacts of unsustainable visitor numbers do not manifest themselves in terms of measurable population- or habitat-level impacts until sustainable visitor numbers have already been surpassed.

According to the precautionary principle, the approach taken in this case has been to set a monthly carrying capacity which is (i) evidence-based insofar as possible (i.e. based on 8 years of data in relation to Chough breeding success and visitor numbers (Keribiou *et al.*, 2009) plus data from Dursey Island in relation to habitats and Choughs) and (ii) set at a conservative level for Dursey Island (i.e. set below what is likely to be the 'true' sustainable level of use).

Longitudinal monitoring will be undertaken by CCC from the commencement of operation of the proposed development and the results of this monitoring programme shall be the basis of an adaptive management approach, whereby additional restrictive measures / interventions may be implemented, if and as required.

### 2.1.8 Why is the Carrying Capacity Considered to be Conservative?

It is acknowledged that Ouessant and Dursey are different in many respects and do not allow for a like-for-like comparison. However, it is considered that the differences between the two cases make Ouessant a worse case than Dursey Island in terms of Chough conservation:

- As stated in the EIAR and NIS, given the greater accessibility to all parts of Ouessant and the severe braiding of the coastal paths (and consequent habitat loss and fragmentation), in contrast to the more limited and consolidated paths on Dursey, visitors to Ouessant have much more 'opportunity' to negatively impact on foraging Choughs than do visitors to Dursey.
- Disturbance levels on Ouessant are greater in general; the island has a well-developed road network and airport and Chough foraging habitat is limited to marginal coastal areas (see maps in **Appendix C**).
- As stated previously, the Chough population of Ouessant is largely geographically isolated from the mainland (*"Resighting data between Ouessant and the mainland coast (not shown) suggest that dispersal outside Ouessant is possible but occurs rarely (as in Reid et al. 2004)"* (Keribiou et al., 2009; p. 46), while the Choughs of Dursey Island have been observed to travel regularly between island and mainland – where additional foraging habitat is available to them.
- Furthermore, the surveys completed on behalf of CCC indicate that (i) the flush distance of the Dursey choughs is substantially lower than that of the Ouessant population (refer to Section 2.2, below), suggesting that the Dursey choughs may be more habituated to human disturbance; and (ii) a much smaller area of Dursey Island (approx. 22% at peak times) is subject to human disturbance than the equivalent area on Ouessant (approx. 97%).

**Table 5 Key differences between Dursey and Ouessant**

Source: Google Maps (2020) unless otherwise stated

Variable	Dursey Island	Ouessant Island
Total area	5.98 km <sup>2</sup>	15.41 km <sup>2</sup> (Keribiou et al., 2009)
Distance from mainland	0.18 km	18 km
Visitor numbers in August	~4,950 (cable car ticket sales data)	27,431 – 42,243 between 1998 and 2005 (Keribiou et al., 2009)
Area of Chough foraging habitat	5.4588 km <sup>2</sup> (2020 Chough habitat calculations)	7.6875 km <sup>2</sup> (2020 Chough habitat calculations)
% of Chough foraging habitat subject to disturbance at peak times	22% (2019 EIAR)	97% (2019 EIAR)

In his submission (**Appendix B**), Dr. Scott highlights a number of key differences between Dursey Island and Ouessant Island in terms of the nature and intensity of human disturbance:

*"The total number of day visitors visiting the island at the height of the tourist season in August varied from 27,431 to 42,243 during the period 1998 to 2005 (Keribiou et al. 2009). Thus there must be many days in summer when there are over 2,500 people on the island with easy access to almost every part of the island. Many if not most of the day visitors will gravitate to the 37.5 km coastal path which circumnavigates the island and passes through an estimated 97% of the main feeding habitat of the Choughs (Keribiou et al. 2009). According to Keribiou et al. (2009), the breeding population of Choughs on Ouessant has remained fairly stable at 10 to 13 pairs for the last 50 years, and averaged 12 pairs during the eight years of*

*their study (1998 to 2005). The mere fact that Ouessant continues to support a stable population of Choughs despite the extremely high human population density (at times exceeding 1.6 individuals per hectare, or 67 individuals for each km of coastal path) is surely testimony to the fact that the Red-billed Chough is tolerant of very high levels of human disturbance. [...]*

*One can assume that there is disturbance to Choughs on Ouessant throughout the day and almost throughout their foraging habitat. However, the situation on Dursey is completely different. The first cable car run of the day is at 09:30, and this is often taken up by islanders who have priority. Thus, the first visitors are unlikely to be on the island and heading off along the track much before 10:00. It is a 50-minute steady walk mostly uphill from the cable car to the point at the west end of the high cliffs, where the townland of Tilickafinna first becomes visible. I can see this point in the track from my veranda, and know from many years of observation, that the first hikers do not arrive here until about 11:00. It is then another 30-minute hike through Tilickafinna, up and over the Western Hill and down to the Tip. Most day visitors are heading back by mid-afternoon, and it is rare to see anyone heading back through Tilickafinna after 16.00. Thus, there will be no disturbance to foraging Chough near the Tip before about 11:30, and very little after 15:30. My own observations indicate that the Chough, like the great majority of other diurnal passerines on the planet, forages most actively in the three or four hours after sunrise and in the hour or two before sunset. I know for a fact that Choughs are early risers, as they are invariably one of the first birds I hear or see when I am out on my veranda to watch the sunrise.*

*During the height of the tourist season in July and August, the peak period for foraging in the morning will be long before the first visitors arrive at the Tip, while the peak period for foraging in the evening will be long after the last visitor has left. [...]*

*As stated in the EIA, the walking routes used by visitors on Dursey are largely situated inland, along the high elevation spine of the island and immediately south of it, while on Ouessant, there are cliff-side walking trails along the entire coastline. As such, a much greater proportion of Chough foraging habitat is affected by human disturbance on Ouessant (up to 97%) than on Dursey (22%). [...]*

*July and August are the warmest months of the year [...], but there are frequent prolonged periods of low cloud and mist, occasionally lasting for three or four days, and exceptionally for five days in a row. Low cloud, with a ceiling at about 400 feet, envelopes the island, and the main track from the gate at the west end of Kilmichael almost to the west wall (just east of Maoil Mhor) is in thick mist. My house, at 450 ft above sea level, is shrouded in thick mist, and can be for up to five days on end. Only the most dedicated visitors are going to walk all the way to the Tip in thick mist, and few, if any, are going to stray far from the track for fear of getting lost, Disturbance to Choughs on these days of thick mist would be minimal.*

*The frequency of periods of low cloud and mist has been increasing in recent years, and the 'season' of mist has been getting longer, with more periods of mist in spring and autumn. This is presumably linked to climate change. In the past, periods of mist were infrequent in September, but in 2019, there was thick mist at my house in Tilickafinna for at least half the day on a total of 14 days in the month of September (as compared with only five days in October)."*

The point which Dr. Scott makes in relation to the timing of Chough foraging activity also supports the assertion that Ouessant is a much worse scenario than Dursey in terms of Chough conservation. He points out that, on Dursey Island, in his years of experience, there is minimal overlap in the timing of highest levels of Chough foraging activity ("the three or four hours after sunrise and in the hour or two before sunset")

and the times when visitor numbers on the island (and particularly towards the western end of the island) are greatest.

The vast majority of visitors to Dursey Island are day-trippers and there are very limited opportunities for overnight stays, meaning most walkers do not arrive to the island until after 9:30 a.m. (when the first cable car departs), after which it would take approx. another hour to reach the western end of the island (i.e. earliest arrival at this point at 10:30a.m.), giving Choughs plenty of time to forage post-sunrise during the breeding season. During the evenings, the last cable car departs at 7:30 p.m. (Mon – Thurs) or 9:30 p.m. (Fri – Sun), meaning the last visitors on the island would need to be leaving the western end of the island at 6:30 p.m. (Mon – Thurs) and 8:30 p.m. at the absolute latest. There is greater scope for overlap in the evenings, particularly later in the breeding season, but the majority of visitors are not likely to stay on the island this late, or to linger at the extreme western end of the island this late in the day.

Ouessant, in comparison, is highly developed, with a multitude of overnight accommodations. A Google search on the 22<sup>nd</sup> of October 2020 showed up 11 hotels on the island (Note that this number may have been affected by the ongoing Covid-19 pandemic). Accordingly, it is much more likely that walkers on Ouessant would be found disturbing foraging Choughs during the morning or evening, when, according to Scott, the birds tend to be foraging most actively. As stated by Scott:

*“During the height of the tourist season in July and August, the peak period for foraging in the morning will be long before the first visitors arrive at the Tip, while the peak period for foraging in the evening will be long after the last visitor has left.”*

Therefore, for the host of reasons detailed above, limiting visitor numbers to the Ouessant carrying capacity (adjusted for the area of Chough habitat) is considered to be a very conservative approach consistent with the precautionary principle, which will be implemented to prevent harmful levels of visitor footfall and human disturbance on Dursey Island.

**Appendix C** presents aerial imagery for Ouessant and Dursey Island demonstrating the significant differences between the two in terms of development and extent of trails.



**Figure 7** View towards western end of Dursey Island from upland heathland, showing existing walking trail (right fore- and middle-ground) and road (left middle-ground), and enclosed fields (left middle-ground)



**Figure 8** View of western end of Dursey Island showing closely grazed grassland which provides optimal foraging habitat for Choughs

### **2.1.9 Summary of Mitigation Measures Proposed in Relation to Human Disturbance**

The monthly carrying capacity is the key mitigation measure to prevent harmful levels of human disturbance of foraging Choughs. It is considered that this measure provides a conservative carrying capacity for Dursey Island – in respect of human disturbance of Chough – and that this measure in isolation will prevent levels of human disturbance which could pose a significant threat to the viability of the Red-billed Chough in the study area.

However, it is acknowledged that the behaviour of visitors – in addition to their absolute numbers – is also a factor which should be addressed in order to minimise disturbance insofar as is practicable. Accordingly, in addition to this key measure to control the



absolute number of visitors, a number of additional measures have been prescribed which will serve to influence the behaviour of visitors on Dursey Island in a manner which minimises human disturbance of wildlife (including Chough) and visitor footfall in open habitat further.

All measures prescribed to prevent / minimise human disturbance of wildlife (include Chough) in the EIAR and NIS are listed below, as amended under the scope of this RFI (changes highlighted in red).

It should be pointed out that in their submission to ABP in relation to the proposed development, the NPWS were satisfied with the proposed schedule of mitigation, with the exception that they requested further measures specifically to protect one known Chough nest site in a derelict building on the island, and mitigation to this effect has been added below. As stated in their submission to the Board (**Appendix F**):

*“... the Department is of the view that this proposed development – provided it incorporates the conservation and mitigation measures proposed – will not adversely affect the integrity of a Natura 2000 site, and is unlikely to have a significant adverse effect on the biodiversity of Natura 2000 sites, other protected sites, protected species or biodiversity generally, subject to an additional precautionary mitigation measure... to guarantee this (potential) nest site is not subject to disturbance by visitors to the island... Having undertaken a review of this proposal (including consideration of requirements of EU biodiversity Directives; and broader consideration of biodiversity), the Department’s view and recommendation is that it can see no biodiversity reason why this application cannot be granted, provided the mitigation, conservation measures and environmental controls set out in the reports and the one specified here [in relation to the nest site in the derelict building] are implemented”.*

Since the submission of the planning application, CCC has consulted with Beara Walks, who manage the Beara Way walking route, and who have indicated that they will cooperate with and assist CCC in relation to the proposed new routing and management of walking trails on the island:

*“When the new cable car is completed we are willing to facilitate restricted access to the western tip of the island.”*

– John Murphy, Chairman of Beara Tourism Development Ltd.  
(pers. comm., 18/10/2020)

### Mitigation Measures in Relation to Human Disturbance:

Not including island residents/farmers, no more than ~~42,835~~ **11,716** persons shall be permitted to travel to Dursey Island in any month of the year during the operation of the proposed development. This numerical carrying capacity shall be implemented using a strictly enforced CCC ticketing system.

For clarification of the intended implementation of the carrying capacity, it should be further stipulated that:

- i. The carrying capacity is a fixed\* *upper limit* on visitor numbers, intended to prevent unsustainable levels of human disturbance arising on Dursey Island during the breeding season, when visitor numbers tend to be at their highest. It is not to be understood as a ticket sales target and it is likely that, as a result of seasonal reductions in demand, there will be months in the year in which this upper limit is not reached.
- ii. The carrying capacity applies to all months of the year.
- iii. The carrying capacity applies to calendar months (i.e. January, February, March, etc.) as opposed to four-week / 30-day periods.
- iv. In circumstances in which the cable car is closed to visitors for one week (7 days) or more out of a given calendar month, the monthly carrying capacity will be correspondingly scaled down on the basis of the number of days of the month in which it will operate. Since the original carrying capacity in Keribiou *et al.* (2009) was recommended for the month of August, which has 31 days, the carrying capacity should be divided by 31 (= 378) and multiplied by the number of days in the month in which the cable car will operate. For example, if the cable car were to be closed to visitors for 10 days in June, the corresponding scaled down carrying capacity for the month would be 7,560 (= 378 × 20). This exercise should only be carried out in circumstances in which the cable car will be closed to visitors for a total of 7 or more days out of a given calendar month.

\* Under the scope of the EIAR and NIS for the proposed development, CCC has committed to carrying out a programme of monitoring during the first ten years of the operation of the proposed development, including gathering data in relation to the Chough population, visitor numbers and use, climate and grazing regime. After these ten years of data have been gathered, the Council currently intends to propose a new, bespoke carrying capacity for the island, calculated by a suitably qualified ecological professional on the basis of the longitudinal data gathered. If, at this future date, the Council intends to propose the implementation of this new limit on visitor numbers, it will be the subject of a separate application for planning permission to the Competent Authority, for which environmental assessments (including AA) will be completed, as appropriate. Otherwise, the carrying capacity which is set out herein is to be regarded as a fixed monthly upper limit on visitor numbers to Dursey Island.

Three looped, waymarked walking trails (as set out in Fig. 9) shall be formalised on Dursey Island prior to the commencement of the operation of the proposed development. This approach is widely used in outdoor recreation areas (Slaymaker, 2017). According to the National Trails Office (NTO) 'Guide to Planning and Developing Recreational Trails in Ireland', (2012, p.4), "Developing recreational trails is a very effective way of managing recreational activity in the outdoors and protecting the natural environment". Indeed, research indicates that walkers tend to stick to established paths, even when they have the 'right to roam' (Keirle & Stephens, 2004; Synge, 2004; Kuba *et al.*, 2018).

Formalisation of these trails shall not involve the creation of new paths, but rather the formal waymarking of routes on existing roads and paths. Formalisation of these paths shall involve the following:

1. Placement of suitably spaced colour-coded waymarker posts of recycled plastic, featuring directional arrows, at appropriate locations along the existing routes set out in Fig. 9;
2. Erection of a mapboard at a clearly visible location at the trailhead (i.e. on CCC lands near the island-side cable car station) displaying a map of colour-coded routes with:
  - i. approximate length (km),

### Mitigation Measures in Relation to Human Disturbance:

- ii. duration (hours/minutes),
  - iii. a conservative estimate of difficulty level from 'Easy' to 'Moderate' to 'Strenuous' to 'Very Difficult' (according to the NTO guidelines, '*Classification and Grading for Recreational Trails*' (2008)), and
  - iv. a message instructing walkers to stay on the trails (according to the recommendations set out in Section 2.1.10, below).;
3. Erection of 'minimum impact behaviour' (MIB) signage at key sensitive locations for chough and/or habitat conservation along trails. Research from Portugal has shown that erection of such signage can effectively reduce the impact of human disturbance on breeding little tern (*Sterna albifrons*), with a 34-fold greater likelihood of breeding success at nest sites with such protective measures in place (Medeiros *et al.*, 2007). At a minimum, this MIB signage shall include:
- i. a note on the trailhead mapboard instructing visitors to stay on the trails; and
  - ii. a sign at the western end of the Tillickafinna/Signal Tower Loop instructing walkers not to venture any further westward onto the chough 'hotspot'. The design of this signage shall be in accordance with the recommendations set out in Section 2.1.10, '*Design of Outdoor Signage*'.

Research conducted on Bear Island, Maryland, U.S.A. (Hockett *et al.*, 2010), found that principle reasons for visitors to leave the established trail were:

- i. to view and/or photograph a scenic vista;
- ii. to pass other walkers on the trail;
- iii. to avoid challenging trail conditions; and also
- iv. because of poor waymarking.

Accordingly, trails should offer opportunities for scenic vistas/photos, should be well marked and should not be too challenging. The direction of all three looped trails shall be anticlockwise, with walkers travelling along the established off-road trails on the outbound journey, and returning to the trailhead via the public road on the return journey. Travelling in this direction, walkers undertaking the Tillickafinna/Signal Tower Loop will have had plenty of 'photo opportunities', and will have completed the most strenuous portion of the trail (the 'high route') by the time they reach Tillickafinna and, for these reasons, may feel less inclined to venture further westward. As stated previously, formalisation of these trails shall not involve the creation of any new paths but rather, will serve to encourage walkers to stay on existing, established paths/roads, and provide options for walkers of varying abilities. Provision of complete (and conservative) information on the nature and duration of routes, coupled with the provision of two shorter options, may discourage certain walkers from attempting the full loop and travelling to the western end of the island. Any existing signage which contradicts these trails shall be removed, as required. CCC shall be responsible for the maintenance of these trails for the duration of the operation of the proposed development.

Additionally, an existing informal walking trail on Crow Head shall be more clearly marked using recycled plastic waymarkers. However, no sign (or other indicator which might draw attention to the walk) should be erected. Responses to the visitor survey indicate that this is not a very popular walk and no undue attention should be drawn to it. Instead, efforts **will** be made to control the movements of those few walkers who do venture onto the headland. This approach is supported by success elsewhere. In the Hohe Tauern National Park in Austria, for example "*Staff have found that without a trail, people wander in all directions, but if there is a clear and unmistakable path, nearly all stick to it*" (Synge, 2004). CCC shall be responsible for the maintenance of this trail.

During the months of June – September (inclusive), an island caretaker will be stationed at the westernmost point of the proposed new network of trails shown in Fig. 9, below (location marked with a star). Fundamentally, the role of this caretaker will be to discourage visitors from travelling further westward. They will engage with walkers who appear to be headed towards the western end of the island, generally advising them that:

### Mitigation Measures in Relation to Human Disturbance:

- They are working on behalf of CCC;
- The area westward is a hotspot for foraging and breeding Red-billed Chough, a protected species of bird;
- Choughs are sensitive to human disturbance at this time of year; and that
- CCC have changed the walking routes on the island to protect the birds and they would appreciate if visitors would refrain from walking further westward and, instead, stick to the signposted trails.

For walkers who are intent on heading westward, the caretaker will advise such persons to stay clear of birds and refrain from disruptive behaviours. The caretaker should be of suitable qualifications and character such that they can engage with visitors in a personable and persuasive manner, while also being able to talk confidently about wildlife on the island (particularly Chough).

An education campaign shall be launched to inform visitors of the sensitivity of (i) species (i.e. choughs and ground-nesting bird species) to human disturbance and (ii) habitats to degradation as a result of visitor footfall. The objective of the campaign is to discourage visitors from wandering off the established walking routes on the island, particularly at sensitive locations for chough (i.e. at the western end of the island and potential roost sites). The campaign shall have the following characteristics:

- It shall be three-tiered in that it will be featured in:
  1. Exhibition materials in the Visitor Centre;
  2. An audiovisual presentation in the outbound journey of the cable cars; and
  3. Outdoor signage on Dursey Island.
- The educational materials used shall be aesthetically pleasing and emotionally engaging to encourage buy-in from visitors. The design of outdoor signage shall be in accordance with the recommendations set out in Section 2.1.10.

All outdoor signage shall be designed for the exposed and corrosive nature of the site.

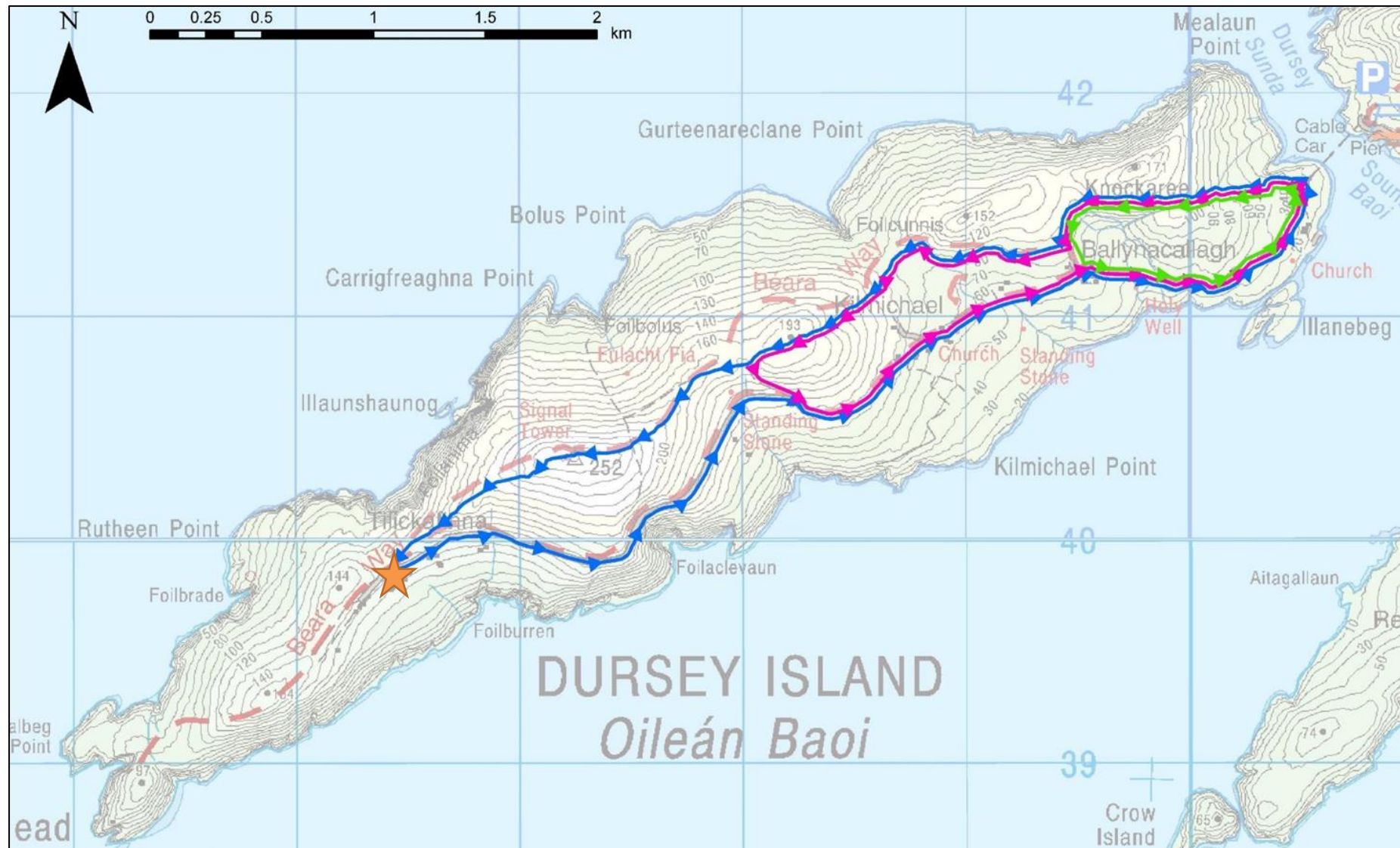
Not including guide dogs, pets and/or working dogs of island residents and farmers, dogs shall be prohibited from travelling to Dursey Island. This restriction will be clearly displayed on the Dursey Island Cable Car and Visitor Centre website and promotional materials.

Not including bicycles for the personal use of island residents/farmers, visitors shall be prohibited from bringing bicycles to the island in the cable cars. This restriction will be clearly displayed on the Dursey Island Cable Car and Visitor Centre website and promotional materials.

Proposed mitigation measure for protection of Chough nest site in derelict building, subject to agreement with NPWS and landowner (see Section 2.3, below):

The doors and windows of the ground floor only will be sealed using architecturally sensitive wood panelling, such that visitors cannot enter the building; with the exception of one ground floor door, which will be sealed with a locked door, for which the landowner will have the key. The door in question will be timber, mute in colour and in keeping with the vernacular architecture of the area. These works will be carried out outside of the nesting / breeding months (i.e. no works during period February – September) and will be supervised by the Project Ecologist, to ensure that no wildlife are disturbed by the works.





**Figure 9** Three waymarked loop walks for Dursey Island. Ballynacallagh Loop (green) = 2.7km; Kilnichael Loop (pink) = 6km; Tillickafinna/Signal Tower Loop (blue) = 10km. Orange star = proposed location of breeding season island caretaker



### 2.1.10 Design of Outdoor Signage and Visitor Educational Campaign

This guidance is based on desk research on the published literature in relation to the efficacy of pro-environmental messaging and signage in outdoor recreational areas. It has been developed further since the EIAR and NIS were submitted to ABP.

In order to promote pro-environmental behaviour among visitors to Dursey Island, it is considered appropriate to implement a visitor education campaign. A literature review on the subject indicates that such educational campaigns can be effective in prompting pro-environmental behaviour among outdoor recreationists (Marion & Reid, 2007).

The environmental education campaign for visitors to Dursey Island shall have the principal objective of getting visitors to voluntarily stick to the proposed network of waymarked trails described above. It shall use different types of media in different contexts, communicated to the visitor at different points during their visit. It shall be a three-tiered campaign, in that it will feature educational media in:

1. The Visitor Centre;
2. The cable car itself; as well as
3. The natural environment on Dursey Island.

On Dursey Island, the need for strategically placed 'minimum impact behaviour' (MIB) signage shall be carefully balanced with the approach of minimum intervention on the island, and care shall be taken to limit the number and visual intrusiveness of signage such that the visual character of the site is not adversely affected and visitors are not bombarded with too much information.

Research indicates that MIB signage can be effective in promoting pro-environmental behaviour (Baltes & Hayward, 1976; Reiter & Samuel, 1980; Durdan *et al.*, 1985; Austin *et al.*, 1993; Sussman & Gifford, 2012; Meis & Kashima, 2017; Parker *et al.*, 2018), including in natural recreation areas (McCool & Cole, 2000; Duncan & Martin, 2002; Bradford & McIntyre, 2007; Medeiros *et al.*, 2007; Hockett *et al.*, 2010). Research from Portugal, for instance, has shown that erection of such signage can effectively reduce the impact of human disturbance on breeding little tern (*Sterna albifrons*), with a 34-fold greater likelihood of breeding success at nest sites with such protective measures in place (Medeiros *et al.*, 2007). It has also been found that the majority of hikers (between 74 – 85%) stop to read trailside signs, regardless of sex or educational level (Cole, 1998; McCool & Cole, 2000).

However, in addition to capturing the attention of walkers, trailside signs need to present a persuasive message. Various factors can influence the effectiveness of outdoor signage in promoting desirable behaviour. The following message characteristics have been linked to effectiveness:

- Use of a clear behavioural recommendation (e.g. 'stop here', 'stay on the trail') (Meis & Kashima, 2017);
- Concise messaging (Cole *et al.*, 1997; McCool & Cole, 2000);
- Inclusion of a persuasive explanation as to the reason for the recommendation being made (e.g. 'this is a chough hotspot', 'this area is being managed for chough', 'chough are sensitive to human disturbance', 'this habitat supports native wildlife') (Ham, 1992; Gramann *et al.*, 1995; Duncan & Martin, 2002; Bradford & McIntyre, 2007; Marion & Reid, 2007);
- Use of a positive, encouraging tone (Winter *et al.*, 2000);
- Use of a moral / ethical argument (Daniels & Marion, 2005; Marion & Reid, 2007);
- Avoidance of 'plea' type messages (Cole, 1998; Bradford & McIntyre, 2007); and

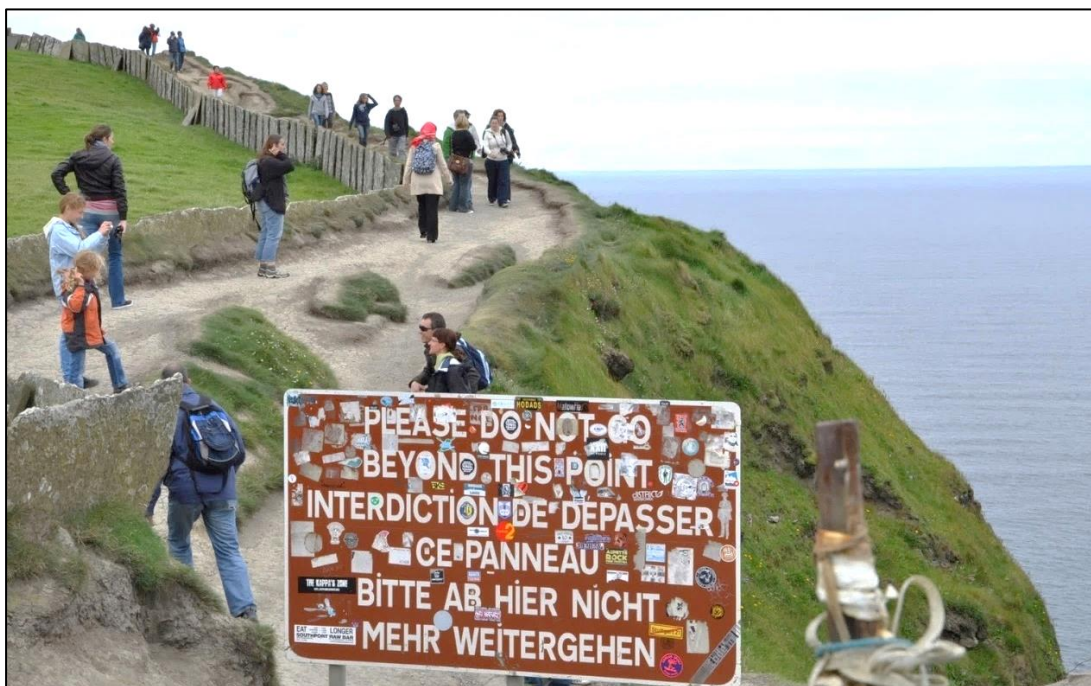
- Avoidance of overly simple statements (Ham, 1992).

In short, signage will be used which tells the walker *what* to do, tells them *why* they should do it, and encourages them to *feel good* about doing it.

Fig. 10 provides a good example of outdoor signage for natural recreation areas. Signage on Dursey Island could follow a similar format to these – and should avoid the approach shown in Fig. 11. Signage will be graphic and emotionally engaging and avoid the 'official', authoritarian style exhibited in Fig. 11.



**Figure 10** Example of signage which is simple and to-the-point but, critically, provides a practical and moral rationale for the recommended behaviour. Source: Stonehouse Designs



**Figure 11** Example of ineffective signage at the Cliffs of Moher, Co. Clare. This sign is overly simple and does not make a rational or ethical argument for the recommended behaviour.

It is important that the message used is persuasive in a general sense but also in terms of the typical 'type' of visitor to the island. Because of its rather isolated location, on the western tip of a peninsula on the west coast of Ireland, it may be assumed that the site attracts a relatively low proportion of casual, happenstance visitors. On the

contrary, the site is popular among walkers and nature enthusiasts, groups which may be assumed to largely exhibit positive attitudes with respect to environmental conservation, and to engage in relatively a lot of outdoor recreation activities in a given year (i.e. 'experienced visitors'). Indeed, during the breeding bird surveys which were carried out to inform the EIAR for the cable car re-development, surveyors reported seeing very little deliberately ecologically harmful behaviour (the exceptions being two instances of littering).

Furthermore, of all of the visitors

to Dursey Island, the subset who complete the entirety of the existing loop walk (approx. 10 km, plus a climb to a high point of approx. 250 m), are likely to be predominantly more experienced walkers with an interest in the natural environment. Research has found that 'experienced visitors' (i.e. those who visit a higher number of natural recreation areas in a year) are more likely to attend to trailside signs (Mc Cool & Cole, 2000). Thus, it may be considered likely that, if outdoor signage is placed in an obvious location on Dursey Island, it will be read by the majority of walkers. It is also considered that the typical 'type' of visitor to Dursey Island is likely to be susceptible to pro-environmental messages regarding habitats and wildlife.

Non-native English-speaking European nationalities (particularly Germans) constitute a significant cohort of site visitors (Germans being the second largest group after Irish). For this reason, signage will include German and French translations of the key message(s).

All outdoor signage shall be designed for the exposed and corrosive nature of the site.

In terms of the educational media to be employed in the Visitor Centre and cable car, there are more options for the types of media which can be employed. Research indicates that person-to-person communication (e.g. from an employee), and visitor-activated audiovisual presentations have been effective (Fazio, 1979). It is important that the message conveyed to visitors regarding appropriate behaviour while on the island is consistent, regardless of the media / source.

### 2.1.11 Monitoring

This section details the proposed monitoring programme insofar as it relates to human disturbance and Chough. Text in **red** indicates where changes / additions have been made since the submission of the planning application.

In order to support environmentally sustainable development and management of future developments on the west coast – particularly of tourism and recreation-related developments – **and to inform adaptive visitor management**, CCC shall commit to implementing a 10-year monitoring scheme at the site of the proposed development, including the following:

1. Monitoring of visitor movements and activities in the vicinity of the proposed development, involving the following methods:
  - Trail counters shall be installed at suitable locations on walking trails on Dursey Island, on the Garinish Loop walk and on the walk at Crow Head. On Dursey Island, a trail counter shall be placed at an appropriate location on the western end of the island, so as to record approximately how many visitors leave the established trail (disregarding the MIB sign) to wander onto this key area for chough. CCC shall be responsible for the maintenance of these counters.

- A visitor survey shall be carried out on an annual basis, to establish approximately how visitors respond to MIB signage, what proportion of visitors follow each of the three looped trails, and what proportion of visitors remain on established trails and vice versa.
2. The conservation status of the Dursey Island chough population shall be monitored on an annual basis (during the breeding season). The monitoring programme in question shall, at a minimum, involve the measurement (by a suitably qualified and competent ecologist) of the following parameters:
    - Number of breeding pairs (confirmed, probable and possible);
    - Locations of nest sites; and
    - Productivity of population.
  3. The conservation status of the habitats on Dursey Island shall be monitored on an annual basis. The monitoring programme in question shall, at a minimum, involve identification (by a suitably qualified and competent ecologist) of any areas where the ecological integrity of habitats is being negatively affected by land use (especially grazing regime) and/or any other pressures/threats.

In addition to the above-listed metrics which CCC have committed to monitoring under the scope of the EIAR and NIS for the proposed development, it has also been decided in the interim that climate (precipitation and air temperature, at a minimum) will also be monitored during the first 10 years of operation. The objective of this addition is to establish whether there appears to be a relationship between climatic factors (e.g. the occurrence of extreme weather events, as suggested by Dr. Scott) and any metric in relation to the Chough population.

The data gathered as a result of all monitoring undertaken shall be shared with Fáilte Ireland so that it can feed into their WAW Environmental Surveying and Monitoring Programme, and can inform the development and management of similar/related developments, plans and projects. Information will also be shared with NPWS and, upon request, and as appropriate, with research institutions and state authorities. Results of monitoring shall be analysed and conclusions drawn in terms of management implications for developments of a similar nature/environmental context and for visitor management at the cable car site and on Dursey Island.

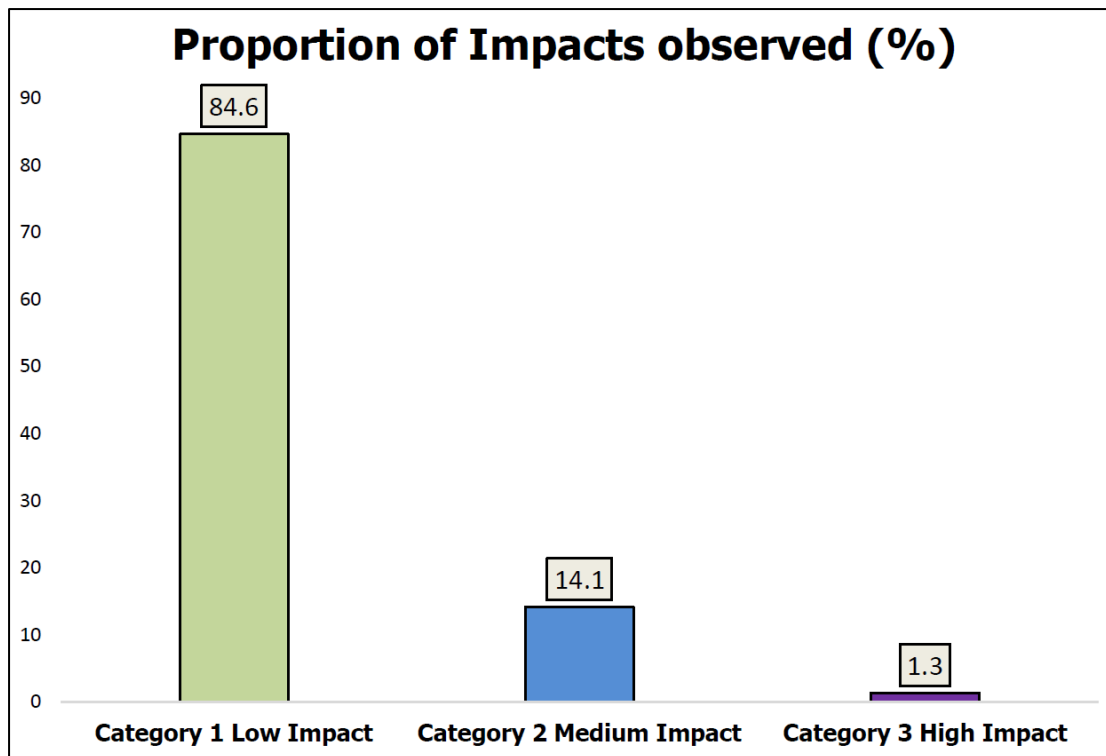
CCC are committed to continuing monitoring for as long as is necessary to ensure tourism at the location of the proposed development and on Dursey Island is managed in an environmentally sustainable manner. When the 10-year monitoring period described above is drawing to a close, CCC will consider (on the basis of the results on the ongoing monitoring) what metrics will need to be monitored beyond the 10-year period.

As stated above, using the results of the 10-year monitoring programme, the Council currently intends to propose a new, bespoke carrying capacity for the island, calculated by a suitably qualified ecological professional on the basis of the longitudinal data gathered. If, at this future date, the Council intends to propose the implementation of this new limit on visitor numbers, it will be the subject of a separate application for planning permission to the Competent Authority, for which environmental assessments (including AA) will be completed, as appropriate. Otherwise, the carrying capacity which is set out herein (of 11,716 per month) is to be regarded as a fixed monthly upper limit on visitor numbers to Dursey Island.

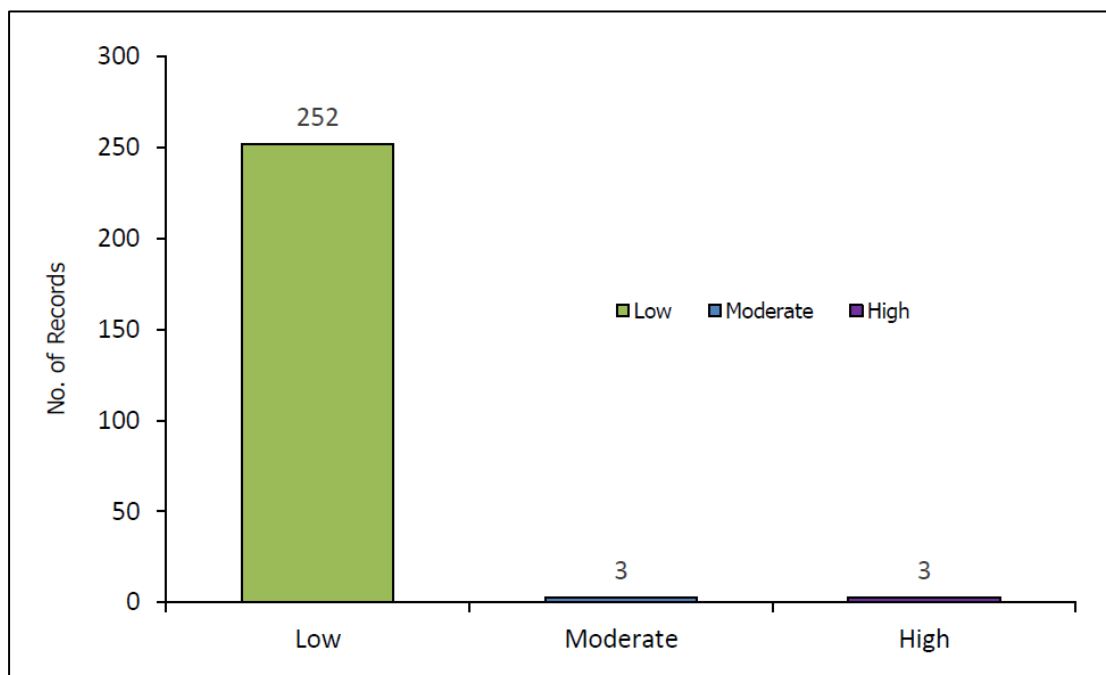
#### **2.1.12 Note on Newly Published WAW Monitoring Programme Data**

It is worth noting that a recent draft summary report analysing visitor behaviour data as part of the Fáilte Ireland Wild Atlantic Way monitoring programme between 2015 and 2019 (CAAS, 2020a), has found that the vast majority of visitors to such sites do not engage in harmful behaviour. This trend was even more pronounced at the cable car site (CAAS, 2020b), where only 2% of visitors engaged in behaviour considered to be moderately or highly environmentally harmful. It should be noted that these data relate to the mainland side of the site in the vicinity of the cable car only and data have not been collected on Dursey Island for the purposes of the Wild Atlantic Way monitoring programme.

A suite of mitigation measures have been set out herein which address visitor *numbers* and visitor *behaviour* so as to minimise human disturbance on Dursey Island such that significant negative impacts on Red-billed Chough will not arise as a result of the proposed development.



**Figure 12** Overall level of environmental impacts observed across all sites  
(Source: CAAS, 2020a)



**Figure 13** Categories of environmental impact levels observed at cable car site (mainland only) in 2019 (Source: CAAS, 2020b)



## 2.2 Query No. 2

2) *Additional scientific evidence and information on flush distance calculations used in respect of Dursey Island, and any implications on available foraging areas on the island and consequent visitor capacity.*

Flush distance is defined as “the distance at which a foraging bird or flock will fly off when approached [i.e. disturbed] by a person or group of persons” (Keribiou et al., 2009; p. 658). During breeding bird surveys in 2019, flush distances of Red-billed Choughs were recorded in the study area by the surveyors. Whenever flushing of one or more Choughs was observed (either as a result of take-offs caused unintentionally by visitors walking towards the Choughs or triggered by a member of the research team), the following data were noted:

- i. source of disturbance (i.e. surveyor or visitor),
- ii. number of birds flushed,
- iii. flush distance to the nearest 5 m (estimated visually) and
- iv. subsequent behaviour of bird(s).

Between 25<sup>th</sup> May and 18<sup>th</sup> July 2019, 49 instances of flushing were recorded in the study area. These data, which were included in Appendix 7.4 of the EIAR, indicated an average flush distance of 31.6 m (N = 47; min. = 10 m; max. = 150 m; median = 30 m). Note that two of the records were excluded from the calculations as it was considered that they indicated inaccurately low flush distances and would have resulted in a distortion of the average flush distance. The exclusion of these two records from the calculation thus resulted in a greater (i.e. more precautionary) average flush distance.

Additional surveys carried out on behalf of Cork County Council between August 2019 and March 2020 support the findings of the environmental assessments in relation to flush distance of Choughs. Table 5, below, presents all of the Chough flush distance records made by the surveyors on behalf of Cork County Council between May 2019 and March 2020. Table 6 presents summary statistics of the data.

**Table 5 Chough flush distances in study area (May 2019 – March 2020)**

Date	Flush distance (m)	No. birds	Disturber	Notes
03/06/2019	40	4	Surveyors	
03/06/2019	40	1	Surveyors	
18/06/2019	5*	12	Surveyors	*Surveyor obscured from view of birds until that distance. Excluded from analysis.
18/06/2019	2*	2	Surveyors	*One of disturbed birds froze rather than flushing. Excluded from analysis.
30/05/2019	150	2	Surveyors	
31/05/2019	40	1	Surveyors	
31/05/2019	25	9	Surveyors	
31/05/2019	45	10	Surveyors	
31/05/2019	25	2	Surveyors	

Date	Flush distance (m)	No. birds	Disturber	Notes
11/06/2019	10	2	Surveyors	
11/06/2019	20	2	Surveyors	
19/06/2019	80	2	Surveyors	
21/06/2019	30	2	Surveyors	
24/06/2019	25	1	Surveyors	
24/06/2019	35	3	Surveyors	
24/06/2019	30	6	Surveyors	
25/05/2019	40	5	Surveyors	
25/06/2019	25	7	Surveyors	
25/06/2019	25	5	Surveyors	
26/06/2019	25	3	Surveyors	
28/06/2019	50	4	Surveyors	
01/07/2019	40	5	Surveyors	
04/07/2019	25	2	Surveyors	
05/07/2019	12	6	Surveyors	
11/07/2019	10	3	Surveyors	One chough foraging 10m for observers simply alarm called, did not take flight as surveyors passed on the path
11/07/2019	10	5	Surveyors	
11/07/2019	20	2	Surveyors	
12/07/2019	20	4	Surveyors	
15/07/2019	15	12	Surveyors	
18/07/2019	20	1	Surveyors	
18/07/2019	25	5	Surveyors	
03/06/2019	30	2	Tourists	
03/06/2019	50	5	Tourists	
01/07/2019	30	6	Tourists	
01/07/2019	30	6	Tourists	
01/07/2019	30	6	Tourists	
01/07/2019	30	8	Tourists	
01/07/2019	35	8	Tourists	
02/07/2019	35	2	Tourists	
02/07/2019	45	16	Tourists	
02/07/2019	25	3	Tourists	
02/07/2019	30	5	Tourists	
02/07/2019	10	2	Tourists	
08/07/2019	30	9	Tourists	
08/07/2019	15	7	Tourists	
08/07/2019	15	7	Tourists	

Date	Flush distance (m)	No. birds	Disturber	Notes
10/07/2019	25	6	Tourists	
10/07/2019	30	20	Tourists	
11/07/2019	35	4	Tourists	
15/08/2019	20	2	Surveyor	
11/09/2019	30	8	Surveyor	
29/12/2019	40	2	Surveyor	
29/12/2019	20	2	Surveyor	
29/12/2019	30	1	Surveyor	
29/12/2019	40	2	Surveyor	
17/01/2020	30	4	Surveyor	
17/01/2020	30	1	Surveyor	
17/01/2020	20	2	Surveyor	
17/01/2020	20	2	Surveyor	
17/01/2020	20	2	Surveyor	
30/01/2020	20	1	Surveyor	
30/01/2020	30	1	Surveyor	
30/01/2020	20	1	Surveyor	
08/02/2020	30	2	Surveyor	
08/02/2020	40	22	Surveyor	
08/02/2020	20	5	Surveyor	
21/02/2020	40	8	Surveyor	
21/02/2020	30	9	Surveyor	
11/03/2020	30	6	Surveyor	
11/03/2020	20	2	Surveyor	
11/03/2020	30	2	Surveyor	

**Table 6 Chough flush distance summary statistics (May 2019 – March 2020)**

<b>N</b>	69
<b>Max.</b>	150 m
<b>Min.</b>	10 m
<b>Mean</b>	30.4 m
<b>Median</b>	30 m
<b>Standard deviation</b>	18.5 m

As stated in the post-breeding (August–November 2019) survey report: “Observations of behaviour of foraging Choughs in response to visitor disturbance has been recorded during all survey efforts on Dursey Island and on the Garinish and Crowe Head areas with an average flush distance estimated at 30 metres. Flush distances range from 25-40m for tourists though surveyors can sometimes get within 10–15m of some Chough

*family groups before they take flight, and as noted above, a pair of Choughs were observed in August foraging within c20m of 12 tourists waiting for the cable car. Personal observations during all survey work recorded birds typically becoming vigilant at c30m with flushing to flight at c20m. Prior to taking flight if disturbed, the nearest bird typically adopts an erect posture prior to giving an alarm call before the whole group takes off. Birds may resettle nearby or fly several hundred meters before alighting” (refer to **Appendix D**).*

Winter bird surveys carried out on behalf of CCC between December 2019 and March 2020 (refer to **Appendix E**) recorded a further 20 instances of flushing of Choughs (to nearest 10 m), indicating an average flush distance of 28 m (N = 20; min. = 20 m; max. = 40 m; median = 30 m), or a combined average of 30.4 m when data are pooled with those from the previous surveys (N = 69; min. = 10 m; max. = 150 m; median = 30 m; SD = 18.5 m).

The flush distance data collected to date (between May 2019 and March 2020) support the findings of the EIAR and NIS for the proposed development, indicating that the average flush distance of Choughs in the study area is ~ 30 m. In the EIAR and NIS, a 50 m buffer (30 m flush distance plus a precautionary 20 m buffer<sup>1</sup>) was applied to the existing network of trails on Dursey Island, to estimate that ~ 22% of Chough foraging habitat could be subject to human disturbance at peak times, assuming visitors are distributed along trails throughout the island (Fig. 13).



**Figure 14** 50m human disturbance buffer on existing trails on Dursey Island (as per EIAR and NIS)

As stated previously, this is substantially less than the equivalent extent of disturbance on Ouessant Island which, according to Keribiou *et al.* (2009) is as high as 97% of suitable foraging habitat at peak times. These findings support the conclusion that the numerical carrying capacity is very conservative, since it has been extrapolated from a scenario which is less favourable in terms of Chough conservation.

<sup>1</sup> The 20 m buffer is greater than the 18.5 m standard deviation for the flush distance records and, thus, is an appropriately scaled precautionary buffer.

## 2.3 Query No. 3

3) *Specific details of how the Chough nesting site in a derelict building on the island will be protected, in line with the recommendation from the Department of Culture, Heritage and the Gaeltacht.*

In the NPWS (DCHG) submission, dated 24<sup>th</sup> of October 2019 (**Appendix F**), no specific measures have been recommended, but it is stated that measures “*should be put in place to guarantee this (potential) nest site is not subject to disturbance by visitors to the island*”.

The derelict building in question is in a walled field on private property, and set back from the existing trail by approx. 70 m. It is not easily accessible, and a walker would have to go out of their way to access the site. Correspondence with local ornithologist Dr. Derek Scott indicates that the existence of the nest site in question is known to a small number of birdwatchers, who have (as reported by Dr. Scott) occasionally looked in on the nest site in the past.

Photos of the site have not been included here (in order to protect the nest site in question) but photos can be made available to the Board upon request, and the location of the nest site in question has been shared with the NPWS previously.

The Project Ecologist, Paul Murphy, has proposed the following protective measure for the nest site in question:

Subject to agreement with the NPWS and the landowner in question, the doors and windows of the ground floor only will be sealed using architecturally sensitive wood panelling, such that visitors cannot enter the building. These works will be carried out outside of the nesting / breeding months (i.e. no works during period February – September). To ensure that no wildlife are disturbed by the works, the building will be surveyed by the Project Ecologist, prior to commencement of works.

This measure would prevent visitors from accessing the building and, thereby, coming within close range of the nest, but would not prevent the pair of birds in question from accessing the nest via the upstairs windows.

CCC have consulted with the landowner in question, who has indicated that they are happy for the above-described mitigation measure to be implemented, with the exception that one of the ground floor doors be sealed with a locked door for which the landowner would have the key. CCC and the Project Ecologist are in agreement with this change. The door in question will be timber, mute in colour and in keeping with the vernacular architecture of the area.

## 2.4 Query No. 4

4) *The preparation of a visitor management plan to control and manage visitor numbers accessing Dursey Island, to support the delivery of responsible and sustainable tourism, to manage potential traffic and parking issues during peak holiday season, and to conserve an ecologically sensitive environment. The plan should describe the process for determining, and managing, maximum capacity for visitors both to the island and to the mainland visitor centre on a monthly, weekly and daily basis as appropriate.*

A Visitor Management Plan has been developed and is included as **Appendix G**. This Plan has been developed specifically to address the RFI query (4), as set out above, and it is the intention of CCC to develop the document further, in consultation with the relevant stakeholders. However, the objectives and actions committed to in the version in **Appendix G** will be maintained (subject to approval and / or any additional conditions of the Board) such that the finalised Visitor Management Plan will afford a greater (and not a lesser) level of protection in relation to visitors in the area.

The capacity of the island has been determined with the aim of preventing harmful levels of human disturbance of Chough, at no more than 11,716 visitors per month. The capacity of the mainland visitor centre at peak times during the peak season is also determined by the capacity on the approach along the R572 from Bealbarnish Gap to the Visitor Centre.

It is anticipated that 80% of the visitors to the mainland site will make the trip across the new cable car to the island. Therefore, the Visitor Management Plan aims to ensure that no more than 14,645 visitors per month during the peak season are permitted at the Visitor Centre. Considering the existing spread of visitors during peak season it is anticipated that the busiest days will see 20% more visitors than the average day during the peak season. It is therefore proposed to limit the visitor numbers during the peak season, through visitor management measures, to 586 visitors per day. Based on an average vehicle occupancy of 2.4 persons and an average visit duration of 3 hours, the peak demand for cars based on the current visitor arrival profiles is estimated at 90 vehicles during the peak seasons and peak times. The proposed visitor management measures will restrict the number of visitors that can access the site at busy times and will result in a better spread of visitor arrivals during the day. The proposed visitor centre car park on the mainland will be increased from 70 spaces to 100 spaces. It is not desirable to provide any additional car parking spaces on site, due to site constraints including biodiversity and landscape. This increase in car parking will accommodate the peak parking demand.

The busiest hour would see approximately one-eighth of the daily traffic arriving or departing, equating to a peak of 60 two-way vehicles per hour. The total daily traffic at peak season on the R572 at the visitor centre entrance is 480 two-way. This represents an increase in traffic of only 15% per day during peak season compared to current traffic numbers, and this is reflected in the modest road improvement measures that are proposed along the R572.

In summary the peak season visitor numbers that are to be controlled by the Visitor Management Plan is as follows:

- 11,716 visitors to Dursey Island per month;
- 14,645 visitors to the mainland Visitor Centre per month;



- 3,380 visitors to the mainland Visitor Centre per week;
- 586 visitors to the mainland Visitor Centre per day;
- 240 vehicles to the mainland Visitor Centre per day; and
- 60 vehicles to the mainland Visitor Centre per hour.

The proposed visitor management measures are designed so that visitor numbers are controlled at peak times and to ensure a more even spread of visitors throughout the season and during the day to reduce the sharp peak periods. This will ensure that both the approach road capacity and the proposed car parking capacity and that the capacity of the island to accommodate visitors will be managed. The measures for ensuring that visitor and traffic numbers are restricted to the limits outlined above include:

- Development of a bespoke, web-based portal with an integrated reservations system for the Dursey Island Cable Car and Visitor Centre to ensure an even and economically sustainable distribution of visitors numbers throughout the days, weeks, months and seasons, and to ensure the car parking facilities can meet visitor demand;
- marketing of events, school tours seasonal activity outside of the peak months;
- Advertising of essential pre-booking;
- Availability of discount price tickets for off-peak times, and
- The provision of real time car park information at strategic locations and restricting travel times for the cable car. This will include automatic traffic counters at the Visitor Centre car park, which will be linked to real-time Variable Message Signage (VMS) located around the Beara Peninsula to inform drivers when the site is at capacity.

## 2.5 Query No. 5








5) *Additional information, including appropriately scaled cross-section and longitudinal drawings, regarding the provision of waste water treatment systems proposed for the mainland and island sites, and in particular, how the large sand filter proposed on the mainland site will be constructed within the sloped topography of the site, and how sufficient subsoil beneath the gravel distribution layer on the island site will be provided to meet the Environmental Protection Agency Code of Practice guidance.*

The following additional information has been provided as **Appendix H**:

- Drawing DCCVC-ROD-GEN-SW\_AE-DR-CH-10.3 - Longitudinal Section Through Proposed Mainland Waste Water Gravity Sewer Network.
- Drawing DCCVC-ROD-GEN-SW\_AE-DR-CH-10.4 - Longitudinal Section Through Proposed Mainland Waste Water Rising Main Sewer Network.
- Drawing DCCVC-ROD-GEN-SW\_AE-DR-CH-10.5 & DCCVC-ROD-GEN-SW\_AE-DR-CH-10.6 - Cross Sections through Mainland Site Tertiary Treatment System.
- Drawing DCCVC-ROD-GEN-SW\_AE-DR-CH-10.7 - Longitudinal Section Through Proposed Island Waste Water Network.
- Drawing DCCVC-ROD-GEN-SW\_AE-DR-CH-10.8 - Cross Section Through Island Site Tertiary Treatment System.
- Drawing DCCVC-ROD-GEN-SW\_AE-DR-CH-10.9 - Proprietary Primary and Secondary Treatment System.

Drawing no. DCCVC-ROD-GEN-SW\_AE-DR-CH-10.5 and DCCVC-ROD-GEN-SW\_AE-DR-CH-10.6 illustrate how the proposed sand polishing filter on the mainland site will be constructed within the sloped topography of the site. The tertiary treatment percolation area has been carefully positioned in a natural hollow so as to minimize its prominence. The formation level was selected to balance a number of parameters including prominence of the mound, extent of excavation required, and the preservation of the existing soil beneath the gravel distribution layers. The findings of the ground investigation indicate that there is typically a 1m deep layer of soil cover at the proposed sand filter location with gravel extending to 2.5m below existing ground level. The top surface will be planted with vegetation species mix to match surrounding grass sward and flora species composition.

Drawing no. DCCVC-ROD-GEN-SW\_AE-DR-CH-10.8 illustrates how sufficient subsoil will be provided beneath the gravel distribution layer on the island site to meet the Environmental Protection Agency Code of Practice guidance. The findings of the ground investigation indicate that there is 700mm deep layer of soil cover on the island sand filter location (shown in figure 14 below). The proposed sand filter gravel distribution layer will extend 300mm below existing ground level. Therefore, there will be 400mm subsoil beneath the proposed sand filter system which is in accordance with EPA Guidance (>300mm).

		Priority Geotechnical Ltd. Tel: 021 4631600 Fax: 021 4638690 www.prioritygeotechnical.ie				Drilled By: AK Logged By: OD		Borehole No. <b>RC03</b> Sheet 1 of 2			
Project Name: Dursey Island Cable Car & Visitor Centre			Project No. P19033		Co-ords: 50544E - 41652N			Hole Type Rotary cored			
Location: Dursey Island, Co. Cork.					Level: 18.05m OD			Scale 1:50			
Client: Cork County Council					Dates: 08/04/2019			09/04/2019			
Well	Water Strike (m)	Depth (m)	Type /Fs (min, max, avg)	Coring (%)			Depth (m) / Fl (m)	Level (mOD)	Legend	Stratum Description	
				TCR	SCR	RQD					
		0 (50 for 6mm/6 for 0mm) (C) 0.70 - 1.50					0.70	17.35		Open hole boring. Driller described: Peat with weathered rock.	
				94	94	44	2/m			Lithology: Weak to medium strong, purple, SILTSTONE.  Weathering: Slightly weathered with minor clay infill and oxidation discoloration.	1
		1.50 - 3.00	130mm 700mm 400mm	100	100	20	5/m			Fractures: Main set dips 70 to 80 degrees, close to medium, planar to undulate smooth. Minor set dips 45 degrees, medium to wide, stepped rough.	2
		3.00 - 4.60	320mm 800mm 420mm	100	100	49	4/m				3
											4

**Figure 15** Extract from borehole log at location of island sand filter. Log indicates 0.7m of soil cover.

It is evident from walking the site that the underlying rock level is highly variable with extensive rock outcrops visible throughout. Although the system has been sited to avoid outcropping rock, it is inevitable that some local excavation through rock and backfill with suitable soil material will be necessary to achieve the required depths.

Table 7 below, summarises additional elements of the sand filters design and their compliance with the EPA code of practice.

**Table 7** Sand Filter Design Compliance with EPA Code of Practice

Sand Filter Characteristic	EPA Code of practice Requirements	Design
Minimum sand thickness	0.7–0.9 m	Graduated sand filters to be 0.9m thick.
Sand Layers & Sand grain sizes	A number of beds of graded sand. D10 range from 0.7 to 1.0 mm Uniformity coefficients (D60/D10) less than 4	Sand graded in a minimum of three distinct layers. Grading and sand grain size to be specified in accordance with EPA Code of practice at detailed design stage.
Gravel distribution layer	250 mm of washed gravel	Minimum of 300mm thick gravel distribution layers
Pumping system	Pumps should be installed in a separate pumping chamber and only suitable wastewater treatment	Pumps located in separate chambers. Pumps specified in

<b>Sand Filter Characteristic</b>	<b>EPA Code of practice Requirements</b>	<b>Design</b>
	pumps with a minimum free passage of 10 mm should be used	accordance with EPA Code of practice at detailed design stage.
Side sealing for mound system	Topsoil on the top and the vertical sides should be protected by a geotextile	Geotextile seal in accordance with EPA Code of practice
Soil Cover	Geotextile over the gravel distribution layer and 300 mm topsoil over geotextile	Minimum of 300mm thick soil cover over geotextile and gravel layer.
Venting	Both distribution gravel and drain filter gravel are vented.	Venting arrangement to be specified in accordance with EPA Code of practice at detailed design stage.

### **3. CONCLUSION**

It is the view of the authors that the Applicant has demonstrated, beyond all reasonable scientific doubt, that the proposed development will not directly, indirectly or cumulatively, give rise to effects on the Qualifying Interests within the relevant Designated Natura 2000 Sites.

Further information, comprising revised calculations, new survey data, and longitudinal data from other sites with the same Qualifying Interest (Chough) has been supplied to support the originally supplied conclusions. The information supplied provides compelling and authoritative scientific evidence to support these conclusions.

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