

Puffin Recruitment at the Wick.

Background

Although Puffin numbers on Skomer are increasing there remain concerns over disturbance and breeding success/numbers at the Wick. Anecdotal evidence also suggests that numbers of Puffins at the Wick are falling. In 2014 a productivity study site was set up at the Wick. This was continued in 2015 and both years showed that productivity was reasonably high at the Wick (0.63 and 0.69) when compared with the undisturbed study site on the Isthmus in North Haven (0.53 and 0.66).

The maximum spring count of Puffins at the Wick has actually decreased over the last two years from 2,006 in 2014 to 1,339 in 2015 and although this is only two years data, it also suggests a fall in numbers of Puffins at the Wick. One possible reason for this could be a reduction in recruitment at the Wick. One concern is that while the adult puffins at the Wick are used to visitors on the path, young birds might be less inclined to breed at the Wick due to visitor pressure. Obviously we hope this is not the case, but it is worth investigating since questions are raised regarding the best management of the island, whether the island should be allowing more, or less day trippers on each day and how to manage visitors at the Wick.

In order to study this I attempted to set up a photographic aging study to look at the demographics within the Puffin population at the Wick and in North Haven. Firstly I read Mike P. Harris' recent, and very informative, report published in 'Seabird' (the journal of the seabird group, volume 27 (2014), 22-40). I then borrowed the Skomer Island camera lens, and set about taking photos of puffins at the Wick, and in North Haven (where the visitor pressure is far lower) to collect the required data.



Figure 1 none of the photos of this Puffin allowed an age to be determined and thus has a photo quality rating of 1 was applied.

Methods

The puffins were aged as first-year, second-year, third-year, young adult or old adult. Age was determined using the number of grooves on the outer region of the beak described in Mike P. Harris' report. Photos were taken opportunistically, making the odd trip purely for the purpose, but for the most part photos were taken whenever a spare minute could be found in either colony. In order to

minimise duplication, photos were taken systematically through a group of Puffins, and any new puffin to land within the group would be ignored. If a group was very active and moving around a lot then the group would either be avoided, or one or two individuals would be selected to follow through the group. Multiple photos of each individual were taken in order to build up a profile of the bird. Additionally photos of both sides of each bird's bill were taken where possible. Between photographing different birds a photo of the floor was taken in order to break up the sequence. Later, when analysing the photos on the computer, these photos were used to distinguish between birds and each bird was assigned an individual day number (letter of the alphabet). Each photo was given a caption with the letters of the birds in the photo, and a working spreadsheet was updated with the date of the photo, where it was taken, the individual day number, and a list of all the photos that each individual was in (highlighting the best quality ones). Each set of photos was graded with an image quality from 1-5 (see figure 1) in order to provide the option of filtering out poorer quality photos later on. The photos were then analysed to decide on the number of groves present on the beak, with the options of trace, <1, 1, 1½, 2, 2½, 3 or more.



Figure 2 this photo is not sharp enough to give a clear age grading, and has a photo quality rating of 2

Table 1. The categorization used to grade the photosets of each Puffin in terms of quality and clarity, and ability to confidently age the bird.

1	Poor quality photo, aging unreliable if not impossible	Figure 1
2	Okay photos, aging possible with uncertainty +/- ½ a grove.	Figure 2
3	Decent photos, aging reliable	Figure 3
4	Good quality photos, aging accurate	Figure 4
5	Great quality photos, aging possible with 100% certainty	Figure 5



Figure 3 this photo is clear enough to confidently age the bird as an old adult, but it is not extremely sharp. Photo quality grade 3.

Results

As of the end of June, 2,967 photos had been taken, which translated to 639 aged Puffins. Of these, 454 were quality categories 3 or above. If the lower quality photos (grade two) were included the sample size across April, May and June increased to 571. Given the decent sample size, the decision was made to exclude these extra photos in order to aim for quality over quantity in the dataset.



Figure 4 this photo shows the beak nicely in focus and enables confident aging. Photo quality grade 4.

In April the sample size was low and all photos taken were at the Wick. All birds photographed were adults bar one three year old bird. In May 150 usable quality profiles were taken, all of which were adults. In May more time was spent at the Wick conducting occupancy watches for the Puffin productivity study, and this skew in the effort was reflected in the data with 113 of these Puffins being at the Wick, and only 36 from North Haven. In June Immature Puffins began showing up on the island, with the first on the 2nd of June. In June 281 Puffins were aged across the island, with 68 at the Wick, 191 at North Haven, and 22 from the research path near the Wick (an area far from the

path and with very low disturbance, arguably lower than at North Haven). Overall in June 68% of the Puffins profiled were adult, 1% (3 individuals) were first year birds, and 31% were immature. At the Wick the percentage breakdown of first year to immature to adult birds was 1%, 26%, 72% respectively and 1%, 31%, 68% in North Haven. At first glance this seems like potentially an interesting difference, but when the quality rated "2" profiles were included the percentages become closer together with the Wick percentages barely changing, but the North Haven sample size increasing to 230 birds, with the percentage breakdown becoming 1%, 28%, 71%. Based on this my aim in July was to continue data collection, making more of a concerted effort to keep track of my sample sizes in order to keep them as even as possible, taking into account the photos which aren't used due to poor quality.



Figure 5 An example of a quality grade 5 photo, with the beak in sharp focus it is possible to see even the slight indent of a third groove developing. This bird has 2.5 groves in its bill indicating it is an old adult.

A useful checking mechanism early on in the study was provided by a colour ringed bird I managed to photograph on the 14th May in North Haven. I focused on this bird and managed to get sufficient photos of it to rate its quality "4". Using my normal aging methods the bird had three grooves in its bill making it an old adult. Based on the ringing records (this bird having a green colour ring on its left leg and a BTO on its right leg I was able to find out from Ros (the UoG Field Worker) that this bird was ringed as a chick in 1992.



Figure 6 This colour ringed puffin was ringed on the island as a chick in 1992.

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