CUMBRIAN WHITE-TAILED EAGLE PROJECT

Population Viability Analysis

Will a reintroduced white-tailed eagle population survive?

To understand whether reintroduced white-tailed eagles would survive in the long term, over 100 years, a computer modelling method known as population viability analysis (PVA) was used. This method predicts whether a population will be successful after its reintroduction into a landscape. It estimates population size and growth, likelihood of extinction and genetic diversity (required for healthy animal populations) into the future. The PVA method used data from other white-tailed eagle populations across the UK, Ireland and mainland Europe. This data includes breeding systems (long-term monogamy), ages of when individuals start breeding, number of successful young hatched per year, and number of deaths.

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The modelling assessed different options for reintroduction, including releasing different numbers of birds over five years. These different options were tested to see which would give the best outcome for white-tailed eagles in Cumbria.

Initially, results suggested that the best option for reintroduction was to release 56 birds over five years. This involves releasing eight birds in year one, and 12 birds each year for four following years. If this option was followed, a white-tailed eagle population could grow each year, reaching around 110 individuals after 100 years. The population would also have a probability of extinction (risk of death for population) of 13.9%, and a good level of genetic diversity.

However, to be confident that the white-tailed eagles will survive and be healthy in the long term, the extinction probability should be below 10%. Therefore, more work was done to see whether releasing more than 56 birds over five years would reduce the extinction probability to below 10%. More models were tested, increasing the numbers of birds released over five years to 58, 60, 62, 64 and 66. The population size and growth under each of these options can be seen in Figure 1.

It was found that when releasing 66 birds over five years (year one: six birds; next four years: 15 birds per year) the extinction probability drops below 10%. When 66 birds are released over five years, there is an 8.1% chance of the population going extinct over 100 years, and the population will grow to around 134 individuals, represented by the blue line in Figure 1.

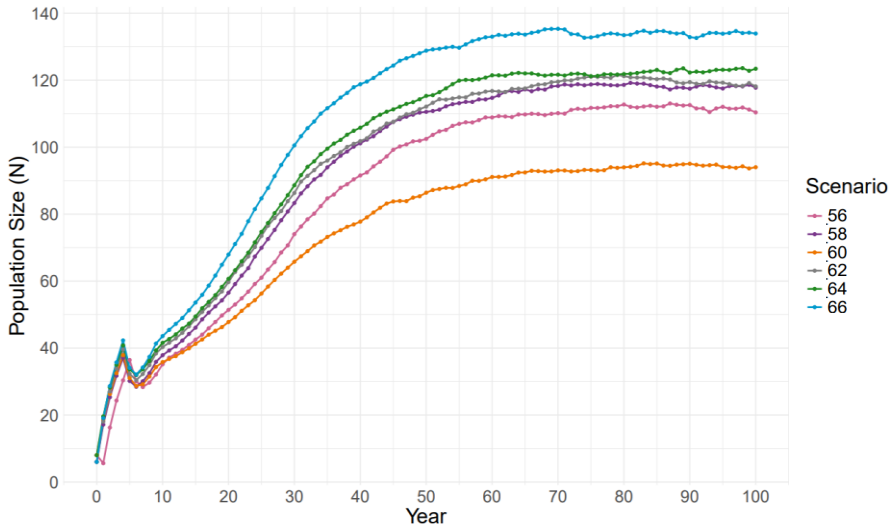

Figure 1. Population size (N) over 100 years under models releasing 56, 58, 60, 62, 64 and 66 white-tailed eagles over a five-year period.

This research shows that any reintroduction plan for white-tailed eagles in Cumbria should aim to release a minimum of 66 birds over five years to be confident that a population will survive in the long term.

What are the biggest threats to a reintroduced white-tailed eagle population?

Computer models also considered factors that may threaten a population. Threats were identified by looking at other white-tailed eagle populations across the UK and Europe. We considered the impacts of these threats on the survival of white-tailed eagles over 100 years. These included possible causes of death (lethal collisions with wind turbines and power lines, killing by humans, and disease) and permanent dispersal (individuals leaving the population to live elsewhere).

Of these four threats, it was found that persecution (the disturbing, harming, and killing) had the most severe negative impact on a white-tailed eagle population. That is why we have chosen to meet and discuss, learn and understand from the communities who could be sharing the beautiful Cumbrian landscape with this spectacular bird, how to support any potential future successful reintroductions, sensitively and appropriately.