Assessment of the Red squirrel (Sciurus vulgaris) population on the Howth peninsula 2017.

A report to Fingal County Council.

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Table of contents:

1. Introduction 3

2. Methods 4

3. Results 7

4. Discussion 9

Acknowledgements 11

References 12

Appendices 13

Introduction:

The grey squirrel (*Sciurus carolinensis*) was first reported on the Howth peninsula in 2007. Three were removed in 2008 and there were no more reported until 2012. During 2013 another three grey squirrels were removed from private gardens. This was the start of the establishment of the grey squirrel population. This year saw the removal of 38 grey squirrels from the Howth peninsula. This is the largest amount that the author removed from a study area in ten years. It is not known when red squirrels (*Sciurus vulgaris*) first became established on the Howth peninsula, but the woodland was established from the mid-19th century onwards (McBrierty 1981). Reports from family of workers on the Howth castle said that red squirrels came to the window of the cottage in the 1960s. The study of the current population of red squirrels started in 2008 and has continued until present day. After 2012, the grey squirrel continued to expand its range across the peninsula and as the number of greys increased there was a notable decline in reported red squirrel sightings. During the trapping assessment of the red squirrels in 2017/2018, only two males were captured. A population is considered extinct when there is only one sex left. As there is no red squirrel population in the area surrounding the peninsula that can naturally recolonise the population on the Howth peninsula, it will not recover.

Methods:

Red Squirrel Project Howth Head, Co Dublin

There were eight trapping sessions during 2017 and early 2018, the first trapping session started in June after permission from the landowner was granted. The pre-baiting period started in May and this was followed by the first trapping session from June 19th to 30th. With poor results for red squirrel's the next trapping session was from 18th to 30thJuly. The pre-baiting continued over this period. In the hope of finding more red squirrels, the trapping continued into August from the 1st to the 3rd and then from the 21st to the 29th Aug All grey squirrels captured during these sessions were removed. All trapping was completed under licence from National Parks and Wildlife Services (NPWS).

By the end of August, there was still a poor result in terms of the number of red squirrels captured. It was decided to move the trapping to different woodlots in the hope of finding some female Red squirrels.

Squirrels were trapped using standard wire mesh cage traps with baseboard and nest box attached (see figure 1). The door mechanism is triggered by a pedal mechanism towards the rear of the trap. The nest box provides the squirrel with a place to hide out of view and out of any adverse weather conditions. Traps were placed securely to selected trees at approximately 3 meters above ground level. The nest boxes were filled with hay and the traps baited with peanuts. Once set, traps were checked at regular intervals throughout the day (dawn to dusk) and any trapped squirrels processed immediately upon discovery.

Figure 1: Red squirrel trap.

Squirrels were taken from the traps by means of a modified Koprowski cloth handling cone (see figure 2a; Koprowski 2002). Handling time was kept to a minimum. Squirrels were typically only handled for between 10 and 15 minutes, the minimum time taken to take body measurements and attach/implant tags (ear-tags and PIT tags). The handling cone is specially designed to allow access to various body parts while keeping the squirrel securely restrained (see figure 2b). Measurements taken included body weight (measured to nearest 5g using a Pesola spring balance) and hind foot/leg length. The reproductive status was also assessed using standard criteria (Wauters and Dhondt 1989; Wauters *et al.* 2000).

PIT tags and ear tags were attached using the opening in the handling cone (see figure 2c, d). PIT tags used were manufactured by Biomark Ltd. and are the smallest type currently available (Biomark tag type: TXP148511B, 8.5mm X 2.12mm, 134.2kHz ISO, 0.067g). Ear tags were manufactured by the National Tag and Band Company, USA and are the smallest available (tag style: 1005-1, 7mm X 2mm, self-piercing plain monel tag).

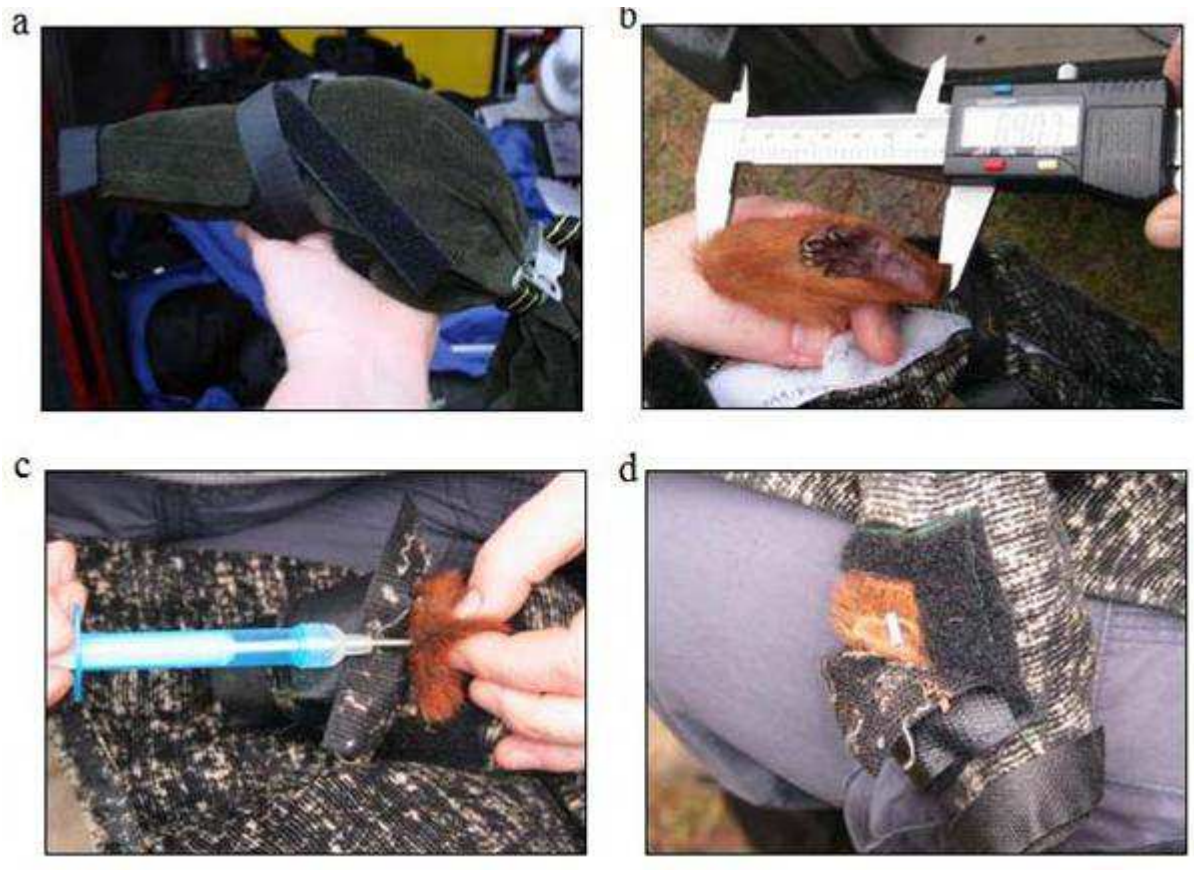

Figure 2: (a) Krowproski cloth handling cone containing a squirrel, (b) access to hind leg for measurement, (c) inserting of PIT tag, (d) ear tag *in situ*.

Trapping in local gardens where grey squirrels are sighted was encouraged during the trapping in the woodland. Outside these times, traps were provided to residents that requested them. The residents

that had traps were instructed to set the trap when they sighted a squirrel and then contact the author and to let him know that they had set the trap.

As there was a very poor result in trapping red squirrels no school was contacted about the Red Squirrel Ambassador programme. There was one community information talk given at the start of the project in the Marine Hotel in Sutton. Two presentations were given to the SAAO Committee, one to explain the project at the start and the results of the project were presented at the second meeting..

Results:

Only two male red squirrels were captured during the study see table 1. These were captured in the woods that surround the Deer park hotel and Muck rock. There were no red squirrels captured in the woodlots that surround the castle.

Table 1: Red squirrels captured during the 2017 study on the Howth peninsula

Red squirrels in Howth 2017

Date	*Species*	*Sex*	*Age*	*Location*	*Ear*	*PIT*	*Weight (g)*	*Leg length (mm)*
22/06/2017	Sciurus vulgaris	Male	Adult	Ring of pines Muck Rock	142	46337	325	70.39
22/06/2017	Sciurus vulgaris	Male	Adult	Muck Rock, East of Hotel	143	46324	335	72.1
03/08/2017	Sciurus vulgaris	Male	Adult	Ring of pines Muck Rock	142	46337	330	70.39
22/08/2017	Sciurus vulgaris	Male	Adult	East side of Muck Rock	143	46324	327	72.1
29/09/2017	Sciurus vulgaris	Male	Adult	East side of Muck Rock	143	46324	330	72.1

During this study, there were 38 grey squirrels removed from the Howth peninsula. Of the greys, captured and removed 61% of the population were male and 71% were juveniles. This was an establishing population of grey squirrels. The seven grey squirrels captured in January and February 2018 were all sub-adults from the previous summer. Four of these animals were garden captures on St Fintan's Rd.

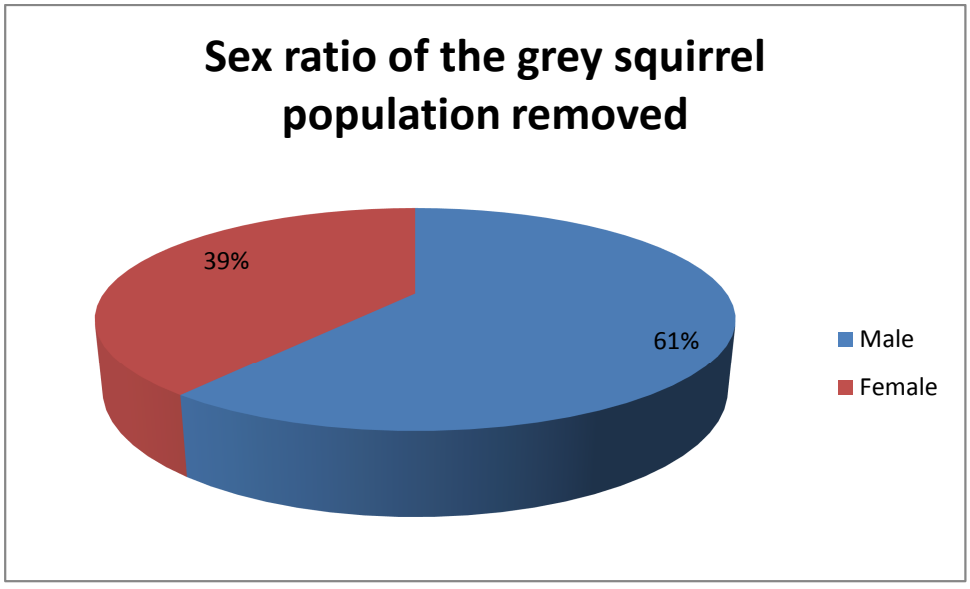

Figure 3: The sex ratio of all grey squirrels captured and removed in 2017 and early 2018.

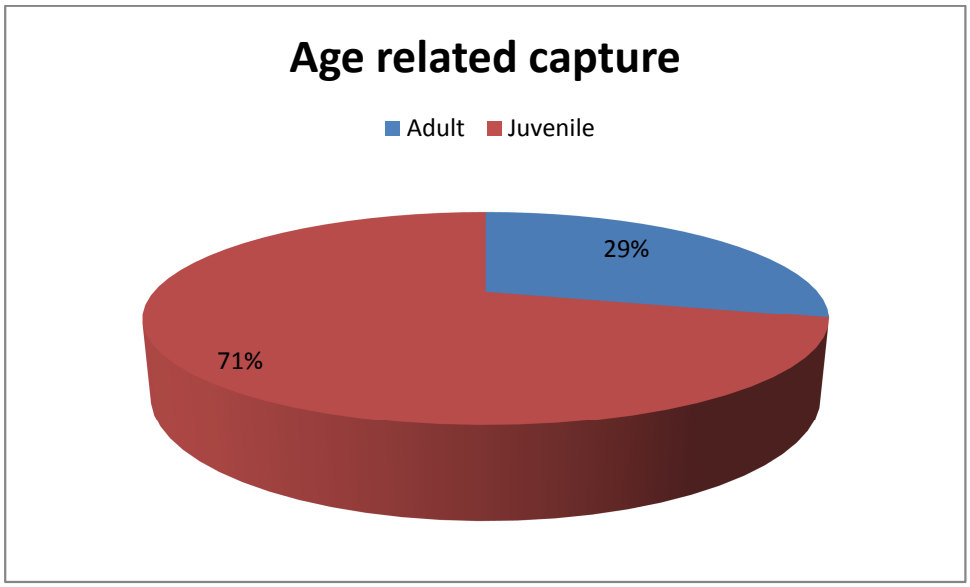

Figure 4: The age relationship of all the grey squirrels captured during the study. Juveniles include the sub-adult animals that are on in breeding condition.

Discussion

The historical presence of red squirrels in many Dublin parks indicates that the population/species requirements were being met and a preliminary study indicated that the disappearance of red squirrels from many of the Dublin urban parks coincided with the establishment of grey squirrels within these parks (Madigan 2007). Previous studies indicate that red squirrels disappear from an area anytime between 5 and 16 years after the appearance of grey squirrels (Reynolds 1985; Skelcher 1997). Of the two areas in Dublin where red squirrels are still known to be present, grey squirrels were first seen in 2005 in Killiney Hill Park (Madigan 2007) and in 2007 on the Howth peninsula. The control of the grey squirrels in these areas started in 2008 and is still ongoing at present.

The red squirrel population on the Howth peninsula was one of the last strong hold in Dublin city. There were twenty-one red squirrels marked in the Deer Park site between 2008 and 2010. During 2011 another eight new individuals were marked. The captured females showed signs of breeding activity, but it was not known if recruitment of new individuals will be enough to offset mortality within the population. Between the distance sampling and trapping in 2011 the estimated size of the population of red squirrels in Howth was approximately 25 individuals. Deaths related to road crossings have been observed in Howth / Sutton area. The loss of even a few extra individuals could mean the difference between survival and extinction.

The red squirrels that were captured or retrieved during 2013 had not been captured before and would be considered new recruits into the population. Death related road crossings were observed again this year. Of the four red squirrels reported in 2013, two were dead. During 2014, no controls were put in place and only one garden on the Balkill road had red squirrels traps placed to help remove grey squirrels and monitor red squirrels. This was completed on a voluntary basis. One red male was captured and tagged during 2014 and three greys were removed from the Balkill road garden. During 2015 the recruitment of two new individuals into the red squirrel population was recorded There was no assessment during 2016 on the Howth peninsula.

During 2017, the search for the red squirrels started during June in four woodlots. Grace O'Malley woods, Howth Castle woods (Muck Rock), Bin Eadar GAA woods and Red Rock Woods. In the Grace O Malley woods there was one male juvenile grey squirrel removed early in the first week of trapping. During early July the traps in this wood were destroyed, there were no more signs of fresh feeding so these traps were not replaced. No squirrels were captured in the Bin Eader GAA woods. The traps here were also damaged during July. In Red Rock Woods, three grey squirrels were captured and removed. These were all males one adult and two Juveniles. There were no red squirrels captured in Red Rock Woods.

Two male Red squirrels were captured and tagged in Howth Castle woods (Muck rock) in the first session in June. In the hope of finding more red squirrels, trapping was conducted in July, August, and September but only the two male's red squirrels were recaptured. During this time, seventeen grey squirrels were removed (ten juvenile and seven adults). There were also three grey squirrels removed from a garden on St Fintan's rd.

In a bid to find, more red squirrels the traps were moved to another five sites around the Howth Castle estate during October (see figure 5). These sites were trapped during November, December 2017, January, and February 2018. No more red squirrels were captured at these sites. There were 10 more grey squirrels removed from the woods and another four from the garden at St Fintan's rd.

The trapping finished in February 2018 with only two male red squirrels had been captured all year. This means that the red squirrel population cannot survive on the Howth peninsula. There are no red squirrel population in a close enough proximity to re-populate the peninsula. Any further work to re-introduce red squirrels would need to follow the IUCN Guidelines for Reintroductions and Other Conservation Translocations (See Appendix figure 7 & 8). It would also be very important that there is a corridor to facilitate the natural re-establishment of the red squirrel population, which currently does not exist.

Acknowledgements:

I would like to thank Fingal County Council for their support through this study. The National Parks and Wildlife Service for providing the Licence to complete this study and the volunteers that placed traps in their gardens.

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Appendix

Figure 5: Woodlots where trapping of red and grey squirrel was completed during 2017 and early 2018.

Figure 6: the red dots show the gardens that volunteered to place traps for red and grey squirrels during the study.

Figure 7: The translocation spectrum

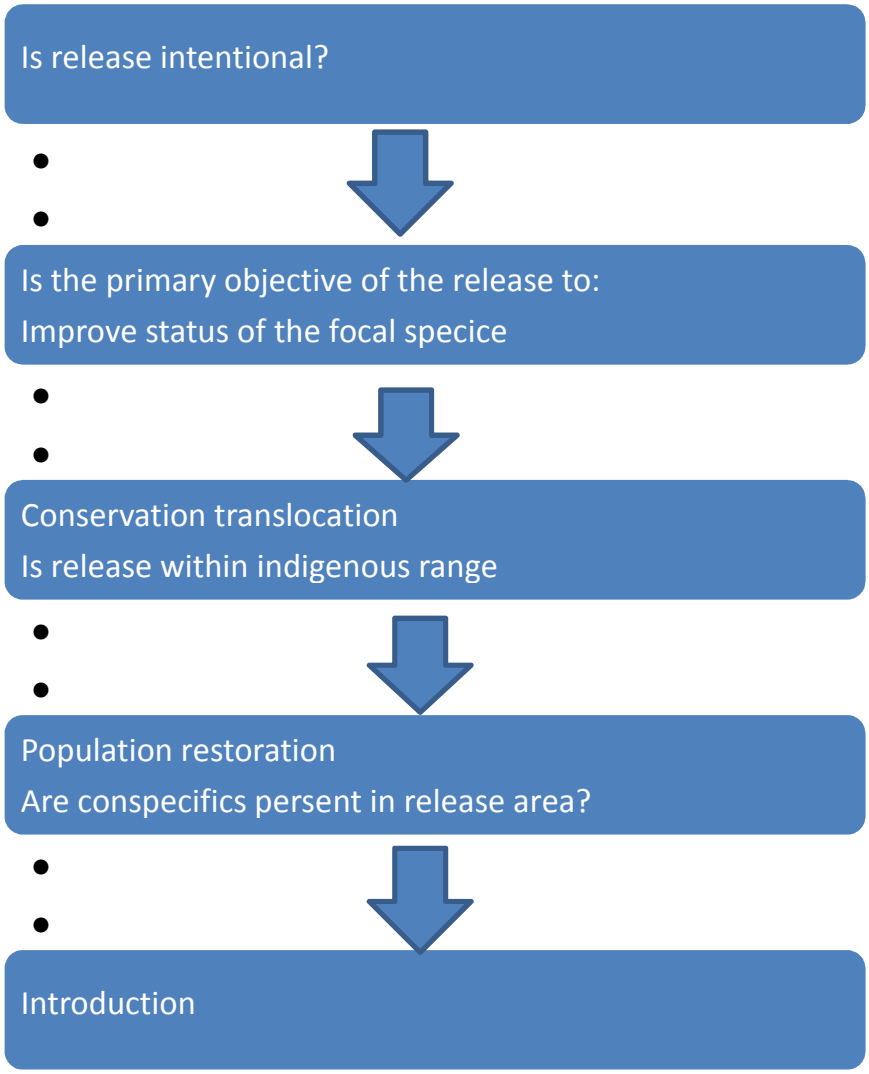

Figure 8: The conservation translocation cycle.