ANNEX 1 - Species Distribution

Presence/absence survey

The Ulster Wildlife led presence/ absence surveying 2016-20 directly follows from the survey work conducted by Dr Dave Tosh in 2014/2015.

Sightings which were gathered by camera trapping in 2020 followed the protocol used during the 2017/18/19 surveying. Survey participants were asked to place camera traps and squirrel feeders in forests for 7-14+ days using the following protocol (initial surveying protocol advised leaving the cameras in pace for 7-14 days. However, this was subsequently revised to require the equipment to be left in situ for at least 14 days):

1. Find two trees that are no more than 5m apart (5 to 7 paces).
2. Attach feeder to south facing side of tree at head height.
3. Ensure the feeder contains sunflower seeds/peanuts and that it is no more than half full.
4. Put sunflower seeds/peanuts on the ledge of squirrel feeder, on the roof and on the ground around the feeder.
5. Attach camera to a tree opposite the feeder also at head height. Ensure that camera is north facing to stop sunlight from obscuring any images.
6. Attach camera to tree using webbing first. Then attach using cable ties.
7. Ensure feeder can be seen by camera. Do this by either putting a stick where the camera lens is and checking the direction it is pointing or take a photo from the lens of the camera trap with a camera/phone.
8. Once camera is attached to tree securely, switch the camera on.
The bait provided for the feeders was a mix of sunflower seeds and peanuts. No additional attractants were used on feeders.

For the reports from the presence/absence surveys see the Ulster Wildlife website - https://www.ulsterwildlife.org/red-squirrels

- Red squirrel

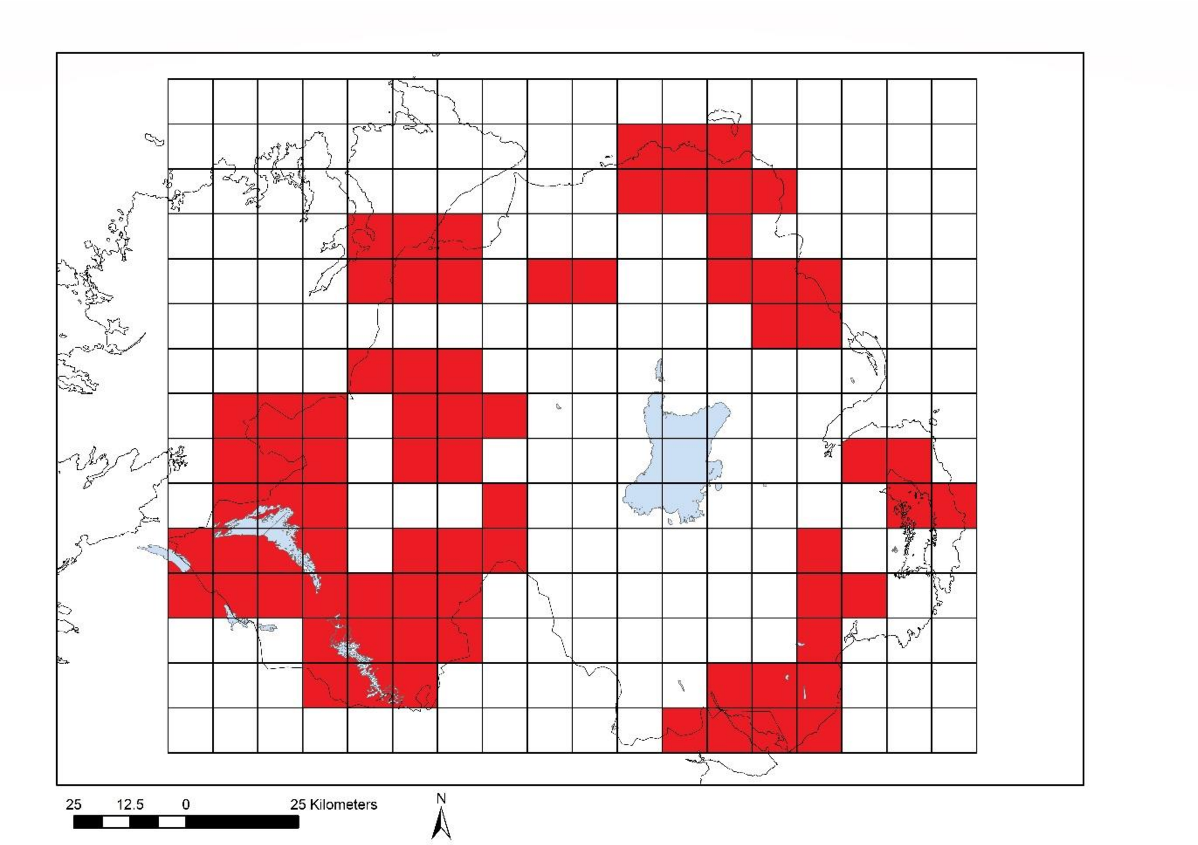


Figure 6: The $10km^2$ squares in which red squirrels have occurred during Ulster Wildlife led camera trapping surveys 2017-20.

The data clearly illustrates that red squirrels are distributed across the six counties. In total red squirrels have been recorded in 75 $10km^2$ at least once during 2017-20 surveying. In the west, in Co. Fermanagh & western Co. Tyrone red squirrels occur in the majority of $10km^2$ squares and this is clearly a stronghold for the species. Elsewhere, it is apparent that red squirrels are widespread across much of south/ mid Co. Down as well as north/ mid Antrim. In the northwest, red squirrels appear to be largely restricted to the Derry City area but have also been recorded in upland forests in the east of the county. It also appears that the Lough Neagh basin remains an area without significant (or potentially any) red squirrel populations.

- Grey squirrel

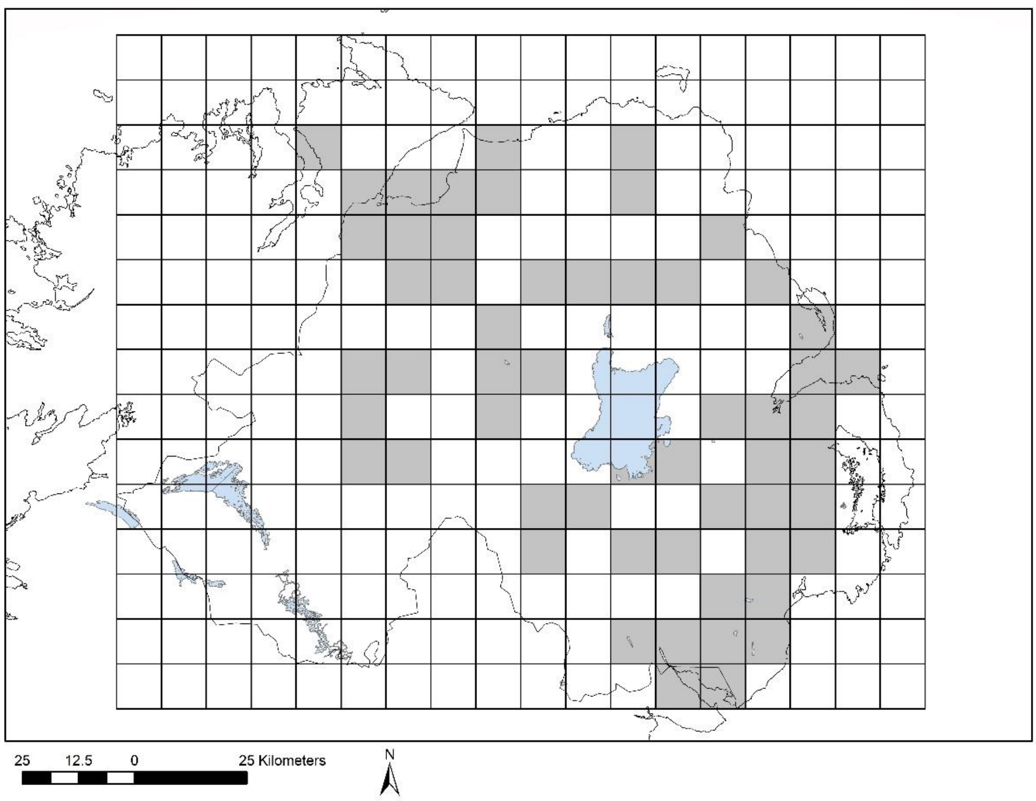


Figure 7: The 10km^2 squares in which grey squirrels have occurred during Ulster Wildlife led camera trapping surveys 2017-20.

Grey squirrels have been recorded across five counties during surveying with no greys been recorded in Fermanagh during any of the 2017-20 surveys. In total grey squirrels have been recorded in 55 10km^2 squares across the four years (considerably fewer 10km^2 squares than red squirrels 75 or pine marten 79). Areas with greys recorded in all years include squares in south Down, north Armagh, Omagh, Belfast, Derry, north Down and mid Ulster.

- Pine marten

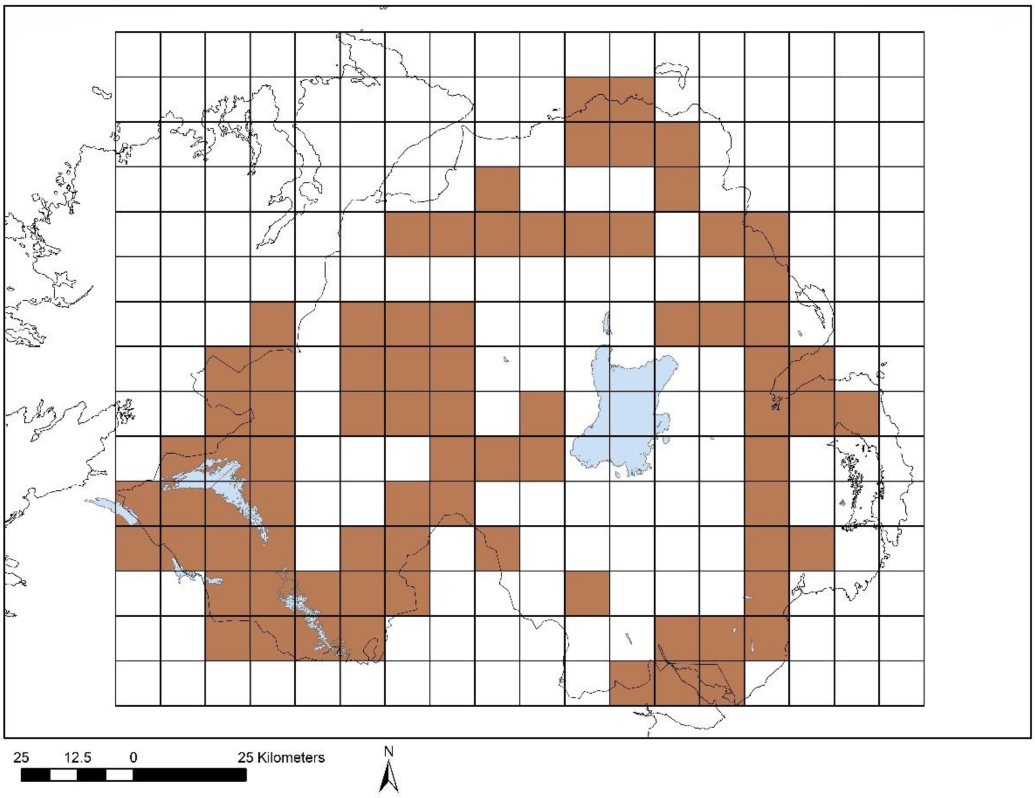
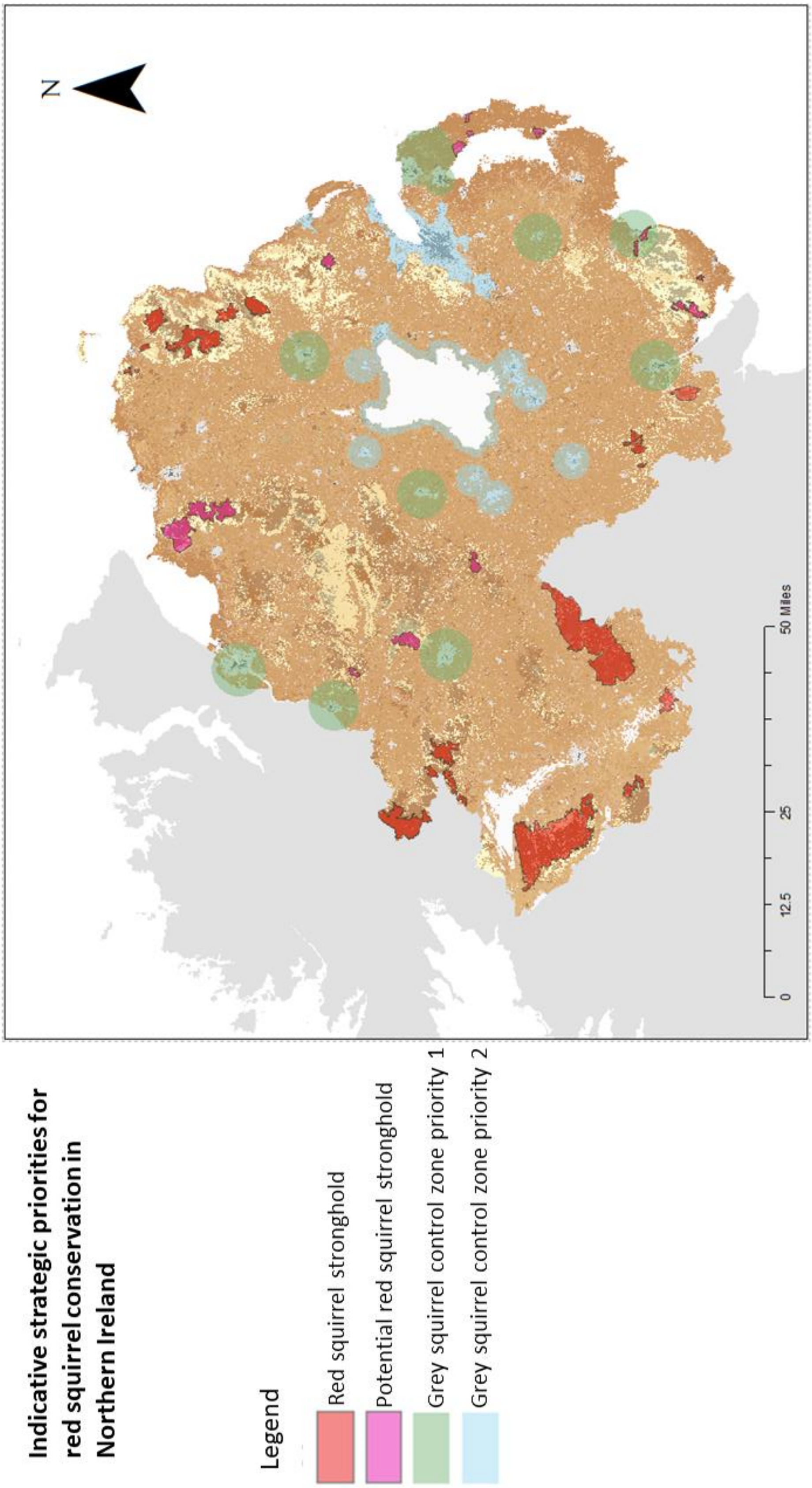


Figure 8: The 10km^2 squares in which pine marten have occurred during Ulster Wildlife led camera trapping surveys 2017-20.

The combined map showing pine marten records in Figure 8 indicates that pine marten are widespread throughout NI. Pine marten have been recorded in 79 10km^2 squares across all six counties during the 2017-20 surveys. They appear to be the most widespread of the target species (although only marginally more so than red squirrels), with greys squirrel apparently having a considerably more localised contemporary distribution.

ANNEX 2 – Indicative Strategic Properties for Red Squirrel Conservation in Northern Ireland



ANNEX 3 – Nature Recovery Network Modelling

Habitat suitability and functional connectivity of native red (*Sciurus vulgaris*) and invasive grey squirrels (*Sciurus carolinensis*) in Northern Ireland for the Nature Recovery Network

Joshua P. Twining

Materials and methods

This study was undertaken in two broad phases: 1) using single-species occupancy models to determine habitat suitability and identify strongholds, 2) using circuit theory to estimate functional connectivity between populations of squirrels to prescribe future focus of conservation efforts regarding habitat and species management on a regional scale.

Habitat suitability models

<u>Occurrence data</u>

A citizen science survey was conducted documenting the presence of red and grey squirrels in 2015 at 332 sites throughout Northern Ireland using camera traps and feeders (Twining *et al.* 2020).

<u>Environmental covariates</u>

Six biophysical variables were identified as potentially important predictors of red and grey squirrels' occurrence in Northern Ireland. The variables were generated for each 1km^2 cell. Values were derived from GIS shape files supplied for the Land Cover Maps 2015 (LCM, 2015). Prior to model building, the presence of multi-collinearity amongst variables was assessed, if correlation was discovered between variables ($r > 0.6$), a randomly selected variable would be removed (Zuur *et al.* 2009). No evidence of multi-collinearity was observed. Addition of variables not considered to be biologically relevant can lead to aberrant and misleading results, due to over-parameterisation of models.

Table 1. Habitat covariates used in occupancy models. All values were extrapolated from Land Cover Maps 2015 (LCM, 2015)

Covariate	Description
Built	Proportion of built up areas and gardens both urban and suburban.
Broadleaf	Proportion of broadleaved and mixed woodlands.
Coniferous	Proportion of coniferous woodland.
Heath and Bog	Proportion of dwarf shrub heath (heather and heather grassland) and bog.
River	All freshwater rivers and streams (km).
Grasslands	Proportion of arable, neutral, improved, and acid grasslands.

Single species occupancy models

We estimated red squirrel and grey squirrel occupancy (ψ) throughout the region of Northern Ireland using likelihood-based occupancy models (MacKenzie *et al.* 2002). For each deployment, species detections were coded binomially (0 = no detection of target species, 1 = detection of target species). Records were transformed into detection histories for each site (X_i), which were used with a product, multinomial, likelihood model to estimate occupancy parameters as follows (Mackenzie *et al.* 2018):

Equation 1:

$$L(p_i \mid n_i , y_i) = \binom{n}{y_i} p_1^{y1}\, p_2^{y2} p_3^{y3} \ldots p_7^{y7}$$

Where P_i the probability of encounter history i, n is the number of sites sampled, y is the frequency of each type of encounter history.

We ran analyses using PRESENCE 12.26, for each model we used 7 – 10 sampling occasions, one for each 24-hour period of continuous sampling. The occupancy models were produced using a 2-step approach (Sarmento *et al.* 2011). Initially we determined detection probabilities keeping occupancy constant (i.e. ψ (.), p(covariate)). This incorporation of relevant covariates on detectability ensured that heterogeneity in detection was not incorrectly interpreted as changes in occurrence. We then used the best fitting model for detection probabilities and analysed a set of *a priori* models integrating the six covariates to explain observed patterns of occupancy. We ranked candidate using Akaike Information Criterion (AIC) and corrected for sample size by calculating Akaike weights (ΔAIC; Burnham *et al.* 2011). Those models with ΔAIC values < 2 when compared with the most parsimonious model were classified as robust. The selected models allowed the calculation of the average estimates of occupancy and detection probabilities. We used habitat covariate data present for all of Northern Ireland to extrapolate to predicted probability of occupancy values for all 14,402 km^2 of Northern Ireland for both red and grey squirrels.

Functional connectivity models

Occurrence data

Red and grey squirrel occurrence records for this aspect of the study were collated by combining data collected in 2020 by a camera trap survey at 177 sites using the approach described in Twining *et al.* (2020) with occurrence records for both species in Northern Ireland acquired from Northern Ireland's Centre for Environmental Data and Recording (CEDaR) from 2019 and 2020. These records were supplemented with additional records from the most recent all-Ireland squirrel survey (Lawton *et al.* 2019). This resulted in 304 and 272 spatially independent records for red squirrels and grey squirrels respectively.

Resistance-based connectivity models

Movement and gene flow amongst animal populations in a region is only possible when there are transposable elements through a landscape, similar to current flow in electrical networks which increases when there are more pathways, movement amongst wildlife populations increases with more connecting pathways (McRae, 2006). These theoretical similarities mean that algorithms developed to model connectivity between electrical nodes have been readily adapted to model connectivity across landscapes and serve as models for animal movement (McRae *et al.* 2008). The applicability of circuit theory to accurately predict ecological connectivity has been demonstrated using both genetic and biologging data (Adams *et al.* 2016; McClure *et al.* 2016), and is being widely adopted.

We used circuit theory to produce estimates of functional connectivity of red and grey squirrels in Northern Ireland using resistance-based connectivity models (Wade *et al.* 2015). The potential movement of red and grey squirrels within a landscape is determined by heterogeneity of environmental and habitat characteristics, and the species association with these different covariates. Thus, species-specific resistance surfaces were produced to represent the degree to which habitat features within the landscape impedes or facilitates species movement (Adriaensen *et al.* 2003). Outputs of habitat suitability models could not be directly applied as indices of movement due to confounding effects of species interactions e.g. predation (Twining *et al.* 2020a; 2020b) and disease-mediated competition (Tompkins *et al.* 2003). Therefore, current literature and expert opinion was used to identify and rank environmental characteristics based on how resistant they are to squirrel movement (See Table 2 & 3, White *et al.* 2016; Twining *et al.* 2020). As the goal of this project was to model connectivity for the species at a regional scale, a relatively coarse scale (1km^2) was adopted. Once raster resistance layers were calculated for each environmental covariate, they were combined to create a single multi-variate resistance raster for each species (See Fig. 1). This multi-variate resistance raster alongside the occurrence data were inputted in Circuitscape (V. 4.0.5) to produce functional connectivity models.

Table 2. Ranking and resistance of environmental covariates included in functional connectivity analyses for red squirrel in ascending order.

Habitat type	**Suitability classification**	**Rank**	**Resistance score**
Coniferous	Suitable	1	1
Broadleaf	Suitable	1	1
Urban-Suburban	Unsuitable	2	500
Heath and Bog	Avoided	3	750
Grasslands	Strongly avoided	4	1000
Inland water and lakes	Barrier	5	9999

Table 3. Ranking and resistance of environmental covariates included in functional connectivity analyses for grey squirrel in ascending order.

Habitat type	**Suitability classification**	**Rank**	**Resistance score**
Broadleaf	Suitable	1	1
Coniferous	Suitable	2	5
Urban-Suburban	Limited suitability	3	250
Heath and Bog	Avoided	4	750
Grasslands	Strongly avoided	5	1000
Inland water and lakes	Barrier	6	9999

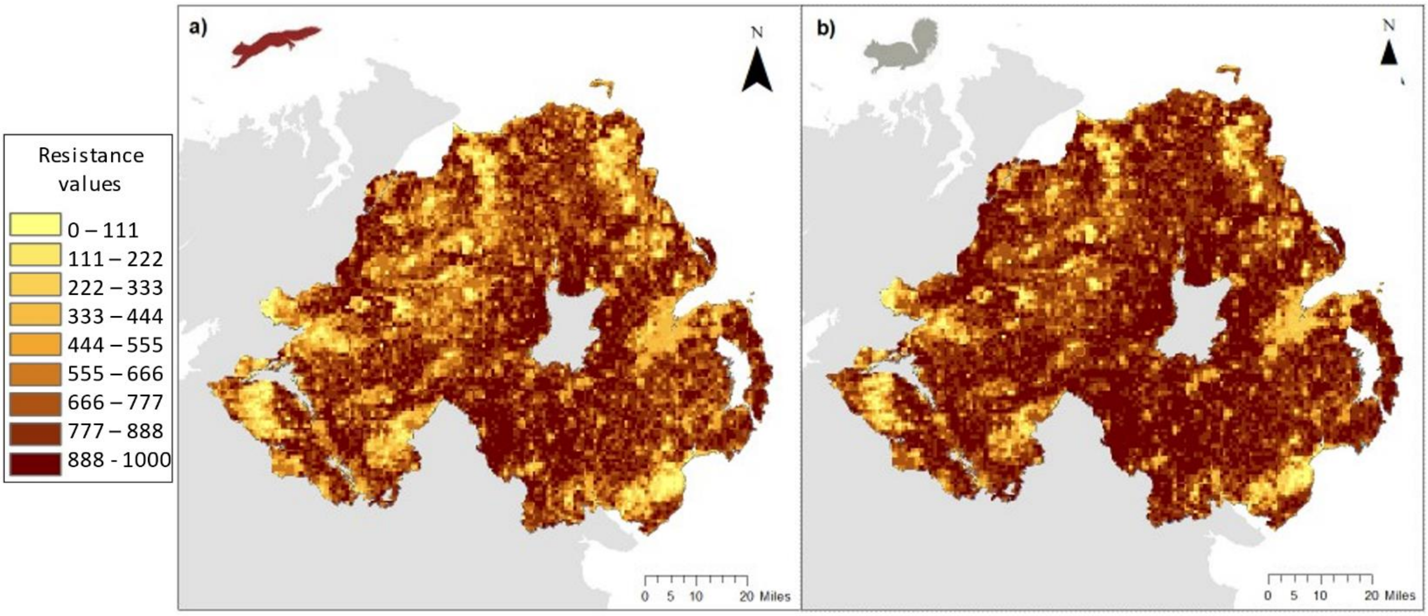


Figure 1. Resistance layers at a $1km^2$ square spatial scale for a) red squirrels and b) grey squirrels for the entire region of Northern Ireland

Results

Habitat suitability models

The models with the lowest AIC were selected as the most robust models to produce heat maps displaying the species distribution and habitat suitability of red and grey squirrels throughout Northern Ireland (See Table 4 for model selection). Figures 2 and 3 use heat maps to show predictive outputs from the models. Each map represents the distribution of predicted probabilities of occurrence for the species across the entire region of Northern Ireland at 1km2 spatial resolution. Grey squirrels are predicted to have the highest probability of occupancy (ψ = 0.84–0.99) in urban and suburban areas throughout Northern Ireland (Figure 2), with areas adjacent to urban centres also having a high, albeit slightly lower probability of occupancy (ψ = 0.44–0.62). Grey squirrels have the lowest probability of occupancy in large coniferous plantation blocks which make up the majority of forest cover in Northern Ireland ($\psi \leq 0.01$). In reverse of this pattern, the red squirrels shows the highest probability of occupancy in the same coniferous forest blocks avoided by the grey squirrel (Figure 3, ψ = 0.66–0.88), with high albeit reduced probability of occurrence in native broadleaf woodlands (0.35 – 0.66).The lowest probability of occupancy for red squirrels was in urban and suburban areas (ψ = 0.01 – 0.03), with interstitial habitats surrounding urban centres dominated by agricultural land use also showing very low probability of occurrence for red squirrels (ψ < 0.1).

Table 4. Comparison of models exploring land cover metrics on occupancy of the red squirrel and the grey squirrel. Only models with ΔAIC <2 are shown.

Model	-2logL	No. parameters	AIC	ΔAIC	AICwt
Red squirrel					
ψ (Coniferous, Built, Heath, Grassland), p(Broadleaf, Built, Coniferous)	555.99	7	569.99	0.00	0.3685
ψ (Coniferous, Heath, Grassland), p(Broadleaf, Built, Coniferous)	559.33	6	571.33	1.34	0.1886
ψ (Coniferous, Built, Broadleaf, Heath, Grassland), p(Broadleaf, Built, Coniferous)	555.66	8	571.66	1.67	0.1599
ψ (Coniferous, Built, People, Heath, Grassland), p(Broadleaf, Built, Coniferous)	555.95	8	571.95	1.96	0.1383
Grey squirrel					
ψ (Built, Coniferous), p(Broadleaf, Coniferous, People)	861.10	5	871.10	0.00	0.247
ψ (Built, Coniferous, Heath), p(Broadleaf, Coniferous, People)	859.98	6	971.98	0.64	0.159
ψ (Built, Coniferous, Grassland), p(Broadleaf, Coniferous, People)	860.03	6	872.03	0.93	0.155

ψ (Built, Coniferous, Grassland, Heath), p(Broadleaf, Coniferous, People)	858.30	7	872.30	1.20	0.136
ψ (Built, Coniferous, River), p(Broadleaf, Coniferous, People)	860.83	6	872.83	1.73	0.104
ψ (Built, Coniferous, Broadleaf), p(Broadleaf, Coniferous, People)	860.95	6	872.95	1.85	0.098

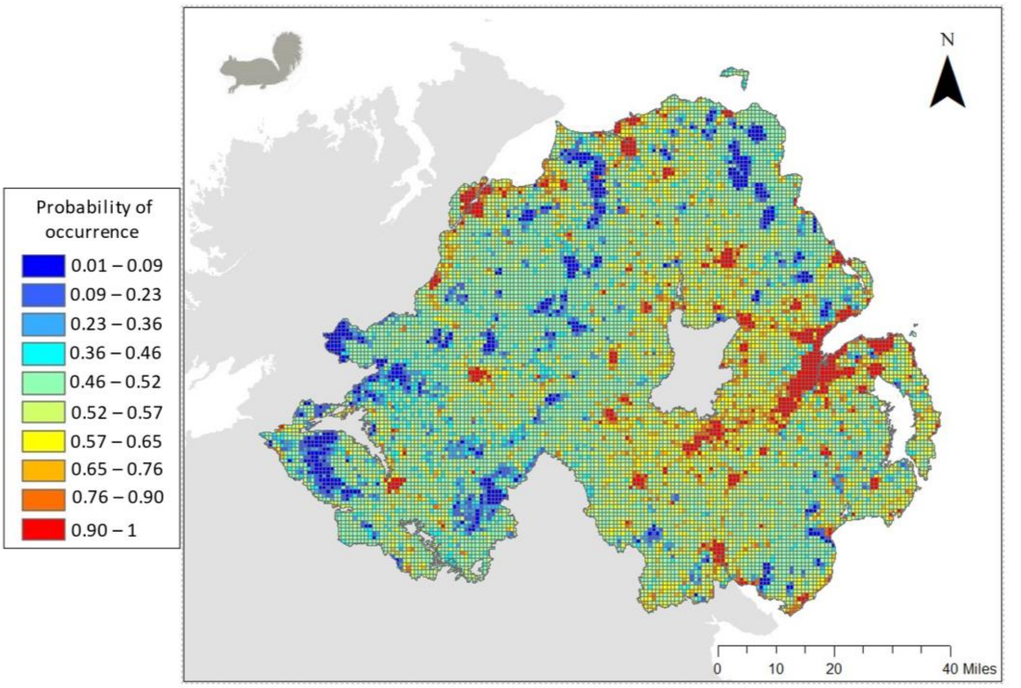


Figure 2. Predicted probability of occurrence of the grey squirrel based on single species occupancy models extrapolated to 14,402 km^2 grids in Northern Ireland based on best rated occupancy models from 332 sampling sites.

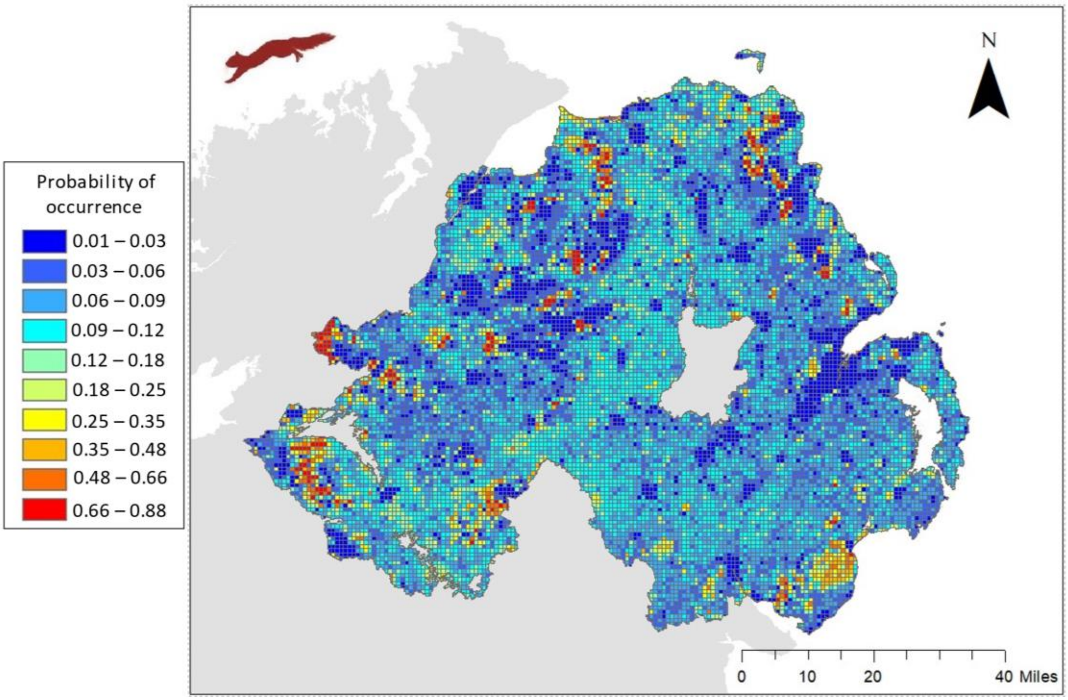


Figure 3. Predicted probability of occurrence of the red squirrel based on single species occupancy models extrapolated to 14,402 km^2 grids in Northern Ireland based on best rated occupancy models from 332 sampling sites.

Functional connectivity models

The two maps produced by the resistance-based connectivity models show highly varied degrees of functional connectivity between the two sciurid species throughout their distributions in Northern Ireland.

The grey squirrel analysis reveals there are is very high connectivity between populations stretching from the northern edge of the Ards Peninsula, through the Lagan Valley, North Armagh and around the perimeter of Lough Neagh, resembling a single large interconnected population. On the other hand, the populations in Counties Derry and Tyrone through Omagh have limited functional connectivity. There is almost no functional connectivity throughout all of Fermanagh, South Armagh, the Northern tip of the Glens of Antrim and the south of the Ards Peninsula (Figure 4).

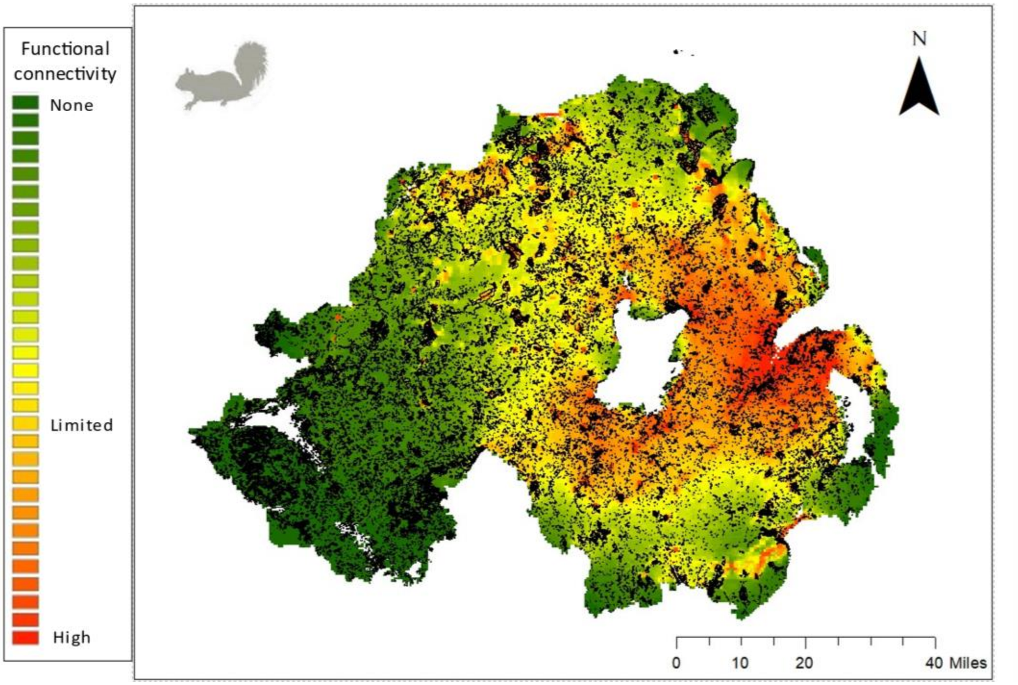


Figure 4. Estimated functional connectivity for grey squirrels throughout the entire region of Northern Ireland based on resistance-based connectivity models of 272 spatially independent records. Black shows forest cover in the region.

The red squirrel model demonstrates the presence of multiple meta-populations which have high intra-populational connectivity, for example in Fermanagh, the Glens of Antrim, and the Mournes however limited – no connectivity between the populations on a landscape scale (Figure 5.).

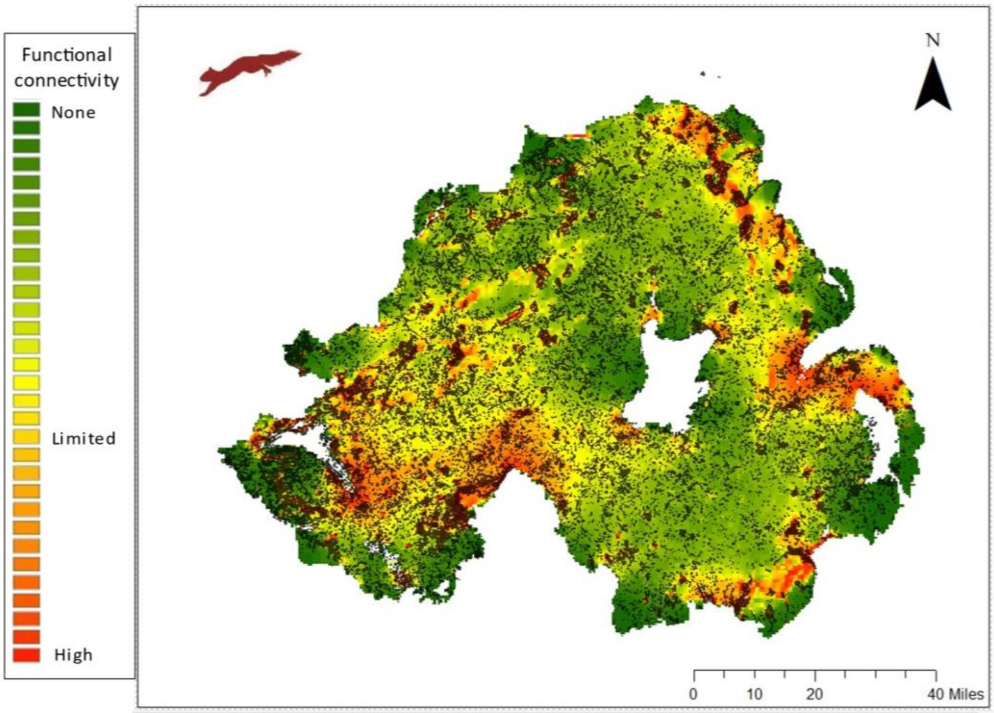


Figure 5. Estimated functional connectivity for red squirrels throughout the entire region of Northern Ireland based on resistance-based connectivity models of 304 spatially independent records. Black shows forest cover in the region.

Red squirrel stronghold identification

To ensure longevity and natural protection of red squirrel populations stronghold designations should be based on a combination of factors: 1) high habitat suitability and functional connectivity for reds; 2) low functional connectivity and suitability for greys; 3) geographic features that will assist in defence and monitoring of future invasion e.g. mountains, peninsulas. There are obvious choices throughout Fermanagh (Big Dog complex; Mullaghfad complex; Lough Navar complex), West Tyrone (Killeter complex), South Armagh (Ring of Gullion complex), and in Glens of Antrim (Clare Wood, Glenariff, Glenarm, Ballypatrick Forest, Ballycastle Forest). There are additionally potential options in the Ards Peninsula, the Mournes and the Foyle catchment, however these would require concentrated grey squirrel control and removal to ensure success and persistence as red strongholds.

Landscape management for red squirrels

Due to results demonstrating the lack of connectivity between the metapopulations across the region, forest corridor planning is crucial to maintain gene flow and health of red squirrel populations in Northern Ireland. Corridors across areas of low habitat suitability and grey squirrel occurrence should be prioritised, with the recognition that increasing connectivity for red squirrels, will increase the transmissibility of the landscape for grey squirrels, facilitating future invasion. It is also important to recognise on the other hand, that it will also enable great occurrence of the pine marten which is reversing the replacement of native by invasive squirrels (Sheehy *et al.* 2018; Twining *et al.* 2020a). An initial focus on provision of forest corridors in the south of the region could provide benefits for red squirrels without any recognisable risk of grey utilisation. For example, using native coniferous species (*Pinus sylvestris)* to connect Fermanagh populations and the South Armagh populations. The Ards Peninsula also represents Northern Irelands most easily defendable landmass, despite its proximity to the main source population of grey squirrels. Its natural features: having a narrow entrance, and being long and thin makes long- term monitoring and control very plausible. Once control operations in the Derry control zone has been completed (see below) then a focus could be made to provide similar corridors between the numerous fragmented patches of forests throughout the west, connecting populations from Fermanagh, through Tyrone, into Derry and round to the Glens of Antrim. Use of native coniferous species in this, would maintain high suitability for red squirrels and the European pine marten, along with native woodland regeneration and healthy hedgerow management.

Grey squirrel control priority zones

Initial priority should be given to locations of high habitat suitability, but low functional connectivity with the main connected population, or locations which will provide maximum benefits to red squirrel populations due to geographic features acting as natural barriers as detailed above. Additionally, given the on-going recovery of the pine marten, and its demonstrated role in providing biological control of the grey squirrel, human led efforts are better focused on the urban refuges provided by towns and cities that are avoided by the recovering predator (Twining *et al.* 2020a), and will otherwise serve as source populations in the future. Initial focus on Cookstown and the surrounding area on the west coast of Lough Neagh, Derry and the surrounding area, Ballymena and the surrounding area, Randalstown and the surrounding area, North Armagh e.g. Craigavon and Portadown and the surrounding area and finally the North of the Ards Peninsula and the North Mournes. If sufficient funds and support can be propagated to attempt complete eradication of grey squirrels, control must be focused in four key locations to avoid immediate reinvasion of controlled zones: 1) North Down: Bangor and Newtownards; 2) Belfast through the Lagan Valley; 3) the Foyle catchment and 4) North Armagh and the perimeter of Lough Neagh.

References

Adams, R.V., Lazerte, S.E., Otter, K.A. and Burg, T.M., 2016. Influence of landscape features on the microgeographic genetic structure of a resident songbird. *Heredity*, **117**: 63-72.

Adriaensen, F., J.P. Chardon, G. De Blust, E. Swinnen, S. Villalba, H. Gulinck, and E. Matthysen. (2003). The application of “least-cost” modelling as a functional landscape model. *Landscape and Urban Planning*. **64**: 233–247

Burnham, K., D. Anderson, K. Huyvaert. (2011). AIC model selection and multimodel inference in behavioural ecology: some background, observations, and comparisons. *Behavioral Ecology and Sociobiology,* **65**:23–35.

MacKenzie, D.I., Nichols, J.D., Lachman, G.B., Droege, S., Royle, A., Langtimm, C.A. (2002). Estimating site occupancy rates when detection probabilities are less than one. *Ecology*, **83**(8): 2248 - 2255.

MacKenzie, D.I. (2005). Was it there? Dealing with imperfect detection for species presence/absence data. *Australian & New Zealand Journal of Statistics*, **47**: 65 – 74.

MacKenzie, D. I., Nichols, J. D., Royle, J. A., Pollock, K. H., Bailey, L., & Hines, J. E. (2018). Occupancy estimation and modelling: Inferring patterns and dynamics of species occurrence, 2nd edition. San Diego, CA: Academic Press

McClure, M.L., Hansen, A.J. and Inman, R.M. (2016). Connecting models to movements: testing connectivity model predictions against empirical migration and dispersal data. *Landscape Ecology*, doi: 10.1007/s10980-016-0347-0.

McRae, B. H. (2006). Isolation by resistance. Evolution, 60(8), 1551-1561.

McRae, B.H., Dickson, B.G., Keitt, T.H. and Shah, V.B., 2008. Using circuit theory to model connectivity in ecology, evolution, and conservation. Ecology, 89(10), pp.2712-2724.

Sarmento, P., J. Cruz, C. Eira, and C. Fonseca. (2011). Modeling the occupancy of sympatric carnivorans in a Mediterranean ecosystem. *European Journal of Wildlife Research,* **57**:119–131.

Sheehy, E., Lawton, C. (2014). Population crash in an invasive species following the recovery of a native predator: the case of the American grey squirrel and the European pine marten in Ireland. *Biodiversity Conservation,* **23**: 753-774.

Sheehy, E., Sutherland, C., O'Reilly, C., Lambin, X. (2018). The enemy of my enemy is my friend: native pine marten recovery reverses the decline of the red squirrel by suppressing grey squirrel populations*. Proceedings of the Royal Society B*, **285**: http://doi.org/10.1098/rspb.2017.2603

Tompkins, D.M., Sainsbury, A.W., Nettleton, P., Buxton, D., Gurnell, J. (2002). Parapoxvirus causes a deleterious disease in red squirrels associated with UK population declines. *Proceedings of the Royal Society B*, **269**(1490): 529 – 533.

Twining, J.P**.,** Montgomery, W.I., Tosh, D.G. (2020). The dynamics of pine marten predation on red and grey squirrels. *Mammalian Biology,* **100**: 285 – 293.

Twining, J.P., Montgomery, W.I., Tosh, D.G. (2021). Declining invasive grey squirrel populations may persist in refugia as native predator recovery reverses squirrel species replacement*. Journal of Applied Ecology,* **58**: 248—260.

Wade, Alisa A., McKelvey, Kevin S.; Schwartz, Michael K. (2015). Resistance-surface-based wildlife conservation connectivity modeling: Summary of efforts in the United States and guide for practitioners. Gen. Tech. Rep. RMRS-GTR-333. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 93 p.

White, A., Lurz, P.W., Bryce, J., Tonkin, M., Ramoo, K., Bamforth, L., Jarrott, A., Boots, M. (2016). Modelling disease spread in real landscapes: Squirrelpox spread in Southern Scotland as a case study. *Hystrix*, **27(**1), doi:10.4404/hystrix-27.1-11657.

Zuur, A. F., Leno, E.N., Walker, N.J., Saveliev, A.A., Smith, G.M. (2009). Mixed effects models and extensions in ecology with R. Springer, New York

ANNEX 4 – Consultation and Responses

A series of consultation questions were sent out in 2020 to the NI Squirrel Forum (including all the volunteer Red Squirrel Groups) and a number of other stakeholders. Below are the questions that asked, and a summary of the responses.

<u>Questions and responses:</u>

1. What do you think are the priorities for red squirrel conservation in your group's area?

- Need to maintain specific areas of operation as grey squirrel or achieve local grey squirrel free status.
- Landscape scale mixed trees species/ mixed habitats. Habitat connection.

2. What do you think are the priorities for red squirrel conservation in NI and/or island-wide?

- All-Ireland approach needed.
- Maintenance of strongholds.
- Support for volunteer groups.
- Role for volunteer/professional control.
- Encourage pine marten as key facet of red squirrel conservation, but not allow complacency re role of pine marten everywhere and recognise conflict issues.
- Public engagement including regarding control but also other aspects such as trail camera surveying.

3. What do you think your group's role/ role of groups generally should be?

- Raising awareness of red squirrel conservation and highlighting the problem with grey squirrels (holding events such as walks, talks, feeder box making).
- Control grey squirrel as required.
- Support public engagement events.

4. What obstacles do you see to effective red squirrel conservation?

- Lack of funding and resources.
- Overreliance on volunteers – difficulties of recruitment/ retention/ time commitment.
- Wood management – broadleaved focus for the future, need to be aware of risk of GS increase.

5. Is there is any support/ development that your group may require to enhance your existing red squirrel conservation efforts?

- Funding - a continued need for resources.
- Wider involvement of local community groups, eNGOs, farming organisations.
- Priority areas – focus for control efforts.
- Support for more research (genetics, disease, contraception, role of pine marten, impact of releases).

ANNEX 5 – Northern Ireland Squirrel Forum

The Northern Ireland Squirrel Forum (NISF) https://www.daera-ni.gov.uk/articles/what-northern-ireland-squirrel-forum-nisf is chaired by the Northern Ireland Environment Agency (NIEA) and has representation from:

- The Department of Agriculture, Environment and Rural Affairs (DAERA)
- Forest Service
- Biodiversity Officers from local councils
- Ulster Wildlife
- The National Trust
- The Mournes Heritage Trust
- Belfast Zoo
- Queens University Belfast (QUB)
- The Strangford and Lecale Partnership
- Abercorn Estates Ltd.
- Shanescastle Estate Company Ltd.
- Montalto Estate
- Mourne Park Estate
- Scottish Woodlands
- The British Association for Shooting and Conservation (BASC)
- The Scottish Association for Country Sports

- The local squirrel groups:
    - The Glens Red Squirrel Group
    - Tollymore Red Squirrel Group
    - Fermanagh Red Squirrel Group
    - Slieve Gullion and Cooley Red Squirrel Group
    - The North West Red Squirrel Group
    - Ards Red Squirrel Group
    - North Down Red Squirrel and Pine Marten Group
    - West Tyrone Red Squirrel Group
    - Sliabh Beagh and Clogher Valley
    - Ballygally Biodiversity Group
    - The Heart of Down Red Squirrel Group
    - Rostrevor Red Squirrel Group
    - Binevenagh Red Squirrel Group
    - Mid-Ulster Red Squirrel Group

Figure 9: The Red Squirrel Community Groups of Northern Ireland (2022).