

Red Squirrels United SciuriouslyLIFE

Helping to secure the
future of red squirrels
in the UK

Layman's Report – a full project overview

LIFE14 NAT/UK/000467



Why

The Eurasian red squirrel (*Sciurus vulgaris*) is found across much of Europe and northern Asia and has been present in the UK since the end of the last ice age, 10,000 years ago. Once widespread across the whole of the UK, their numbers have declined drastically over the last century and it is estimated that there are now only approximately 140,000 left in the wild with the majority population found in Scotland. Globally, the International Union for Conservation of Nature (IUCN) classes the red squirrel as a species of 'Least Concern' because of

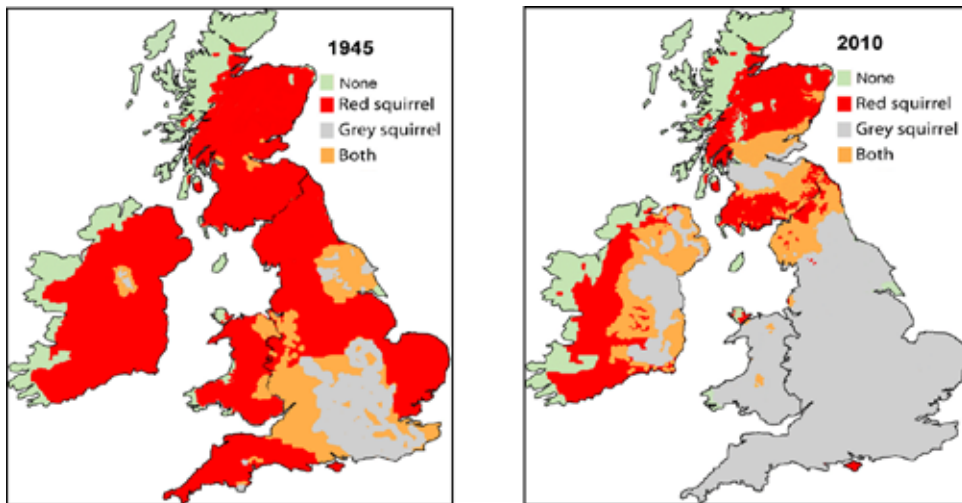
its number across its entire Eurasian range. However, the red squirrel is classed as 'Endangered' in England and Wales and overall in Great Britain on the Regional Red List status for Great Britain due to declining populations. The red squirrel is a nationally protected species under The Wildlife and Countryside Act 1981.

Many scientific studies show that the introduction of the eastern grey squirrel (*Sciurus carolinensis*) from North America has been the major

factor in the red squirrels decline over the past century. Introduced by the Victorians, the first record of them escaping and establishing a wild population was in 1876. They were introduced to Ireland in 1911. Since then, they have spread across most of the UK displacing the red squirrel.

The larger grey squirrel competes with the red squirrel for food and shelter. They can live in higher densities and reduce food availability for the red squirrel. Over time this reduces red squirrel breeding and survival rates and decreases red squirrel populations. Grey squirrels also carry squirrelpox virus which is generally harmless to them but almost always fatal when transmitted to red squirrels who die within 1-2 weeks of being infected with the disease. Where squirrelpox is present in the grey squirrel population, evidence has shown that red squirrels disappear from woodlands up to 25 times faster than by competition from grey squirrels alone.

Grey squirrels also cause significant damage to woodlands across the UK through bark stripping increasing the risk of disease and tree mortality. Grey squirrels are classed as an invasive alien species (IAS) in the UK because of their ability to negatively disrupt species and native ecosystems and are listed on the EU Invasive Alien Species of Union concern.



Red and grey squirrel distribution in the British Isles in 1945 and 2010. Copyright RSST

Figure 1: Grey squirrels have largely displaced red squirrels across the UK in the last 100 years



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What

Red squirrel conservation has been going on for many years in the UK but Red Squirrels United represented the first opportunity to draw together some of these initiatives in a UK wide network. Funded through EU LIFE and the National Lottery Heritage Fund, Red Squirrels United was a £3 million, four year multi-partnership programme running from 2016-2020. Red Squirrels United worked to safeguard red squirrel populations in nine key areas across England, Northern Ireland and Wales, drawing together conservationists, community groups, researchers and academics.

Red Squirrels United aimed to:

- **Tackle barriers to IAS colonisation prevention** through the development of early warning and rapid response approaches across rural, urban and island landscapes
- **Maximise the impact of grey squirrel control or eradication** through strategic landscape scale approaches and ecological monitoring
- **Build community resilience** through increasing and strengthening awareness, engagement and community-led conservation action
- **Aid the development of comprehensive IAS management frameworks** facilitating knowledge sharing, lesson learning and best practice across the IAS community in the UK and Europe, and informing long term management plans for red and grey squirrels

Where

Red Squirrels United operated across nine key areas representing highly diverse landscapes in England, Northern Ireland and Wales including rural areas, remote upland forests, mountains, urban centres, coastal areas and islands.

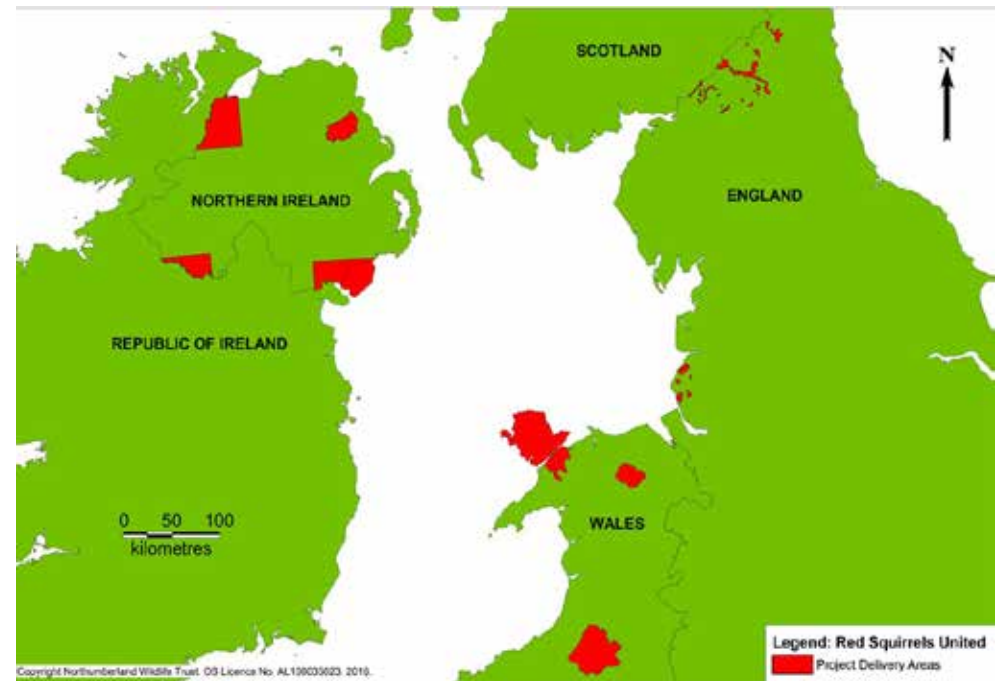


Figure 2: Red Squirrels United worked across nine areas in England, Northern Ireland and Wales representing highly diverse landscapes

Key achievements



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- An independent evaluation conducted by Ecological Research Services found that Red Squirrels United generated total benefits to red squirrel conservation of £11.5 million over the lifetime of the project based on impacts on ecology, volunteers and tourism
- A call for amendments to the 1967 Forestry Act resulted in the Welsh government committing to review forestry legislation
- Eight red squirrel community groups were created or revitalised across England, Northern Ireland and Wales
- Volunteers contributed more than 44,000 hours over the lifetime of the programme with an equivalent value of £865,000
- Red Squirrels United delivered more than 700 training and community events engaging over 50,000 people
- 96% of the early warning and rapid response system monitoring was delivered by community members in northern England in 2019 exceeding the project target of 75%
- 2019 monitoring results indicated red squirrel populations in coastal reserve woodlands in Merseyside had returned to 90% of 2002 levels (red squirrels were decimated by a squirrelpox outbreak in 2008) with the highest ever numbers of red squirrels recorded in autumn 2018 at Ainsdale Nature Reserve
- Successful red squirrel reintroductions to Silent Valley, Northern Ireland and Clocaenog Forest, north Wales
- Grey squirrels are now scarce in the Mourne Mountains in Northern Ireland
- Red squirrels were spotted in Snowdonia National Park in 2018 for the first time in 50 years
- Red squirrels were caught on camera in the northern Irfon Forest, mid Wales in 2018. These are the first known records of red squirrels in this forest for more than 20 years
- Red Squirrels United achieved strong local, regional and national media coverage throughout the lifetime of the project and featured on national television programmes such as BBC Countryfile and BBC Springwatch

How

Tackling barriers to IAS colonisation prevention

It has been shown that where grey squirrels are detected, acting quickly offers the best chance of protecting the red squirrel populations. Early warning systems are critical for detecting incursion by grey squirrels and for monitoring the general health of red squirrel populations in the area. Red Squirrels United established community led early warning systems and rapid response procedures across all project areas.

Monitoring for red and grey squirrels

In northern England, conservation action focussed on the Kielder red squirrel stronghold complex (Kielder, Kidland and Uswayford forests). Human population density is very low in these remote forests and motion sensing cameras (camera traps) were the primary mechanism for early warning focussing on 52 sites identified as key points for grey squirrel incursion around the fringes of the forest. In total 595 monitoring surveys were completed, 433 of

which were managed by volunteers. In July 2019 a figure of 96% volunteer delivery was achieved, surpassing the target of 75%.

The early warning system monitoring proved successful in detecting both red and grey squirrels, helping to inform local grey squirrel management strategy. However, frequent detection of grey squirrels, in multiple locations around large expanses of forest and limited ranger resources meant that rapid, effective response to all grey squirrel sightings was very challenging. To resolve this, the team at Northumberland Wildlife Trust:

- Encouraged volunteers engaged in early warning monitoring to reactively undertake grey squirrel control following detection in the area
- Incentivised local red squirrel community groups by providing financial support
- Delivered talks in the local community in partnership with local squirrel volunteers to raise awareness of the issues

Preventing grey squirrel colonisation

County Fermanagh hosts the largest red squirrel population in Northern Ireland with very low numbers of grey squirrels. However, this stronghold was vulnerable to incursion by grey squirrels and prior to Red Squirrels United, no systems were in place to detect and remove them. A community based early warning and rapid response system was established through Ulster Wildlife, working across border boundaries with the Republic of Ireland. Ulster Wildlife also facilitated the creation of a red squirrel community group in the Republic of Ireland. Three grey squirrels were removed during the project and strategic surveying was setup at key locations led by the local community groups.



Figure 3: Camera traps were a vital part of early warning systems

Maintaining grey squirrel free areas

The island of Anglesey was declared grey squirrel free in 2013 following an intensive campaign to remove them. Maintaining the island as grey squirrel free was critical and a community based early warning system consisting of a network of more than 230 garden and woodland feeding stations was established across the island to detect grey squirrel incursions and to monitor general visual health of red squirrel populations. Camera traps were also installed at key mainland and island habitats adjacent to the Menai Strait and a public information campaign included publication of an ebook, *'Red squirrels in my garden: Guidance and tips to help encourage and*

conserve local populations.' on grey squirrel detection and characteristics of diseases found in red squirrels. Two grey squirrels were detected through the early warning system in 2017 and immediately removed by Red Squirrels Trust Wales.

Squirreldox virus

Rapid response isn't just about responding to grey squirrel incursion. Responding rapidly to potential disease outbreaks among the red squirrel population is also critical. During the autumn of 2017, squirreldox was detected in red squirrels in Gwynedd woodlands close to the Menai Strait. These were the first cases recorded in wild red squirrels in Wales (previous cases, identified in the mid 1990's, were in



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Figure 5: Squirreldox virus can decimate red squirrel populations

red squirrels that had been released into the wild). Red Squirrels Trust Wales carried out significant public and media outreach and stopped all use of feeders in Anglesey and Gwynedd. Clear guidance was issued on how to monitor the red squirrel population, the signs of the virus and important steps needed to prevent it spreading. In many cases public and garden squirrel feeding stations were removed. A total of three confirmed cases of squirreldox were recorded in Gwynedd with no squirreldox cases recorded on Anglesey.

In the coastal reserve woodlands of Formby National Nature Reserve and Formby town in north Merseyside, sporadic cases of squirreldox virus

occurred from Autumn 2018 through to December 2019. Despite this, red squirrel populations in the coastal reserve woodlands remained stable throughout the project with spring 2019 survey monitoring results indicating that the population had returned to 90% of 2002 levels (a squirreldox outbreak in 2008 decimated red squirrel populations). During a squirreldox outbreak it can be hard to locate the carcasses and any that remain in the environment can continue to be a source of infection. Disease outbreaks may not even be detected in more remote areas or in low density red squirrel populations unless carcasses are found.



© Pixabay

Figure 4: Grey and red squirrels can cross the Menai Bridge to access Anglesey or the mainland

Detection dogs

Most people are familiar with detection dogs being used by the police and military to detect drugs and explosives, but they can also be used in wildlife conservation management. This is becoming increasingly popular and Lancashire Wildlife Trust's Max, is the first fully trained detection dog trained to sniff out deceased red squirrels in the UK. Depending on the terrain, dogs can search an area up to the size of a football pitch in less than an hour and possess more than 220 million olfactory receptors in their nose. Humans only have five million olfactory receptors meaning dogs can search an area far more quickly and efficiently than a person enabling carcasses to be removed quickly from the environment. Improved detection methods for the removal of squirrelpox infected carcasses may have a significant influence on reducing the spread of the disease. This approach has proved popular and further detection dogs have been trained in Northern Ireland.

The efficiency of dog verses human was put to the test in 2019 when Lancashire Wildlife Trust teamed up with a student at Edge Hill University to compare the efficiency of conservation detection dogs and humans for finding red squirrel carcasses. Volunteers and detection dog Max participated in timed trails in two different woodland types (one with dense vegetation, one with less vegetation) to compare the speed and effectiveness of human and dog in finding a squirrel decoy. On average, the volunteers located the decoy faster than the dog within densely vegetated woodland whereas the dog was faster in woodland with less vegetation. However, overall the dog was more effective at finding the decoy. The next stage of this project will evaluate the cost effectiveness of using conservation dogs over volunteer teams, to improve future red squirrel detection methods and squirrelpox virus outbreak management.



Figure 6: Max searching for the squirrel decoy



Figure 7: Overall, the dog was more effective at finding the decoy than people

Maximising the impact of grey squirrel control or eradication

To safeguard red squirrel populations across Red Squirrels United project areas, proactive grey squirrel population management was undertaken to keep grey squirrels away from areas inhabited by red squirrels. Working in tandem with local community groups, strategic approaches were focused on key incursion points such as woodland corridors and river valleys as grey squirrels often migrate along these routes.

Two project areas, the Mourne Mountains in Northern Ireland and an area in northern Gwynedd in North Wales, aimed to completely remove grey squirrels from the landscape. Both these areas were selected because of their ability to be defended from further incursions and contain coastal and mountain boundaries. In the Mournes, red squirrels were reintroduced into Silent Valley in 2017 and grey squirrels were removed to enable this population to expand across the area. Community groups in the area established a strong early warning and rapid response system and will address any potential grey squirrel incursions post project. The red squirrels in Silent Valley are

thriving and bred in 2019 with six red squirrel kittens observed at three separate locations.

Complete removal of grey squirrels from the north Gwynedd area was not achieved although grey squirrel populations were suppressed. Following research indicating that pine marten (*Martes martes*) suppress grey squirrel populations through predation, Red Squirrels

Trust Wales explored the potential for re-introducing pine martens into the landscape. Following an intensive screening process to assess habitat suitability and extensive community consultation, Red Squirrels Trust Wales will release captive bred pine martens into the landscape in 2020. Anglesey was maintained as free from grey squirrels and no squirrelpox outbreaks occurred in island red squirrels. Red squirrels continued to

migrate across the mainland and in 2018, red squirrels were spotted in Snowdonia National Park for the first time in 50 years!



Figure 8: Silent Valley in the Mournes

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Ecological Monitoring

Monitoring for presence or absence of red and grey squirrels took place across all project areas including standardised surveys that were conducted quarterly, six monthly or annually. The majority of these were conducted by volunteers and community groups. Overall red squirrel populations remained stable across all project areas with some increases in red squirrel distribution and abundance in areas across Northern Ireland, North Wales and Merseyside. Due to increasing red squirrel range and distribution across the whole of Ireland, red squirrels were reclassified as a species of 'Least Concern' from 'Near Threatened' on the Irish Red List for Terrestrial Mammals in 2019.

Newcastle University reviewed the conservation work carried out by Red Squirrels United to evaluate the different approaches taken across the project. Control strategies differed across project areas reflecting the different grey squirrel densities and management objectives (see figure 9). The spatial distribution of control activity and successful grey squirrel removal rates also varied between different landscapes. In North Wales,

where grey squirrel densities were highest, intensive control was carried out with high trapping densities and multiple rangers. In Kielder and Merseyside the management objective was to suppress populations of grey squirrel to minimise impacts on the red squirrel populations and the limited resource available for trapping was targeted to specific areas. The spatial distribution of grey squirrel captures from Kielder and North Wales during the project can be seen in figure 10. In Northern Ireland the control activity was responsive and focussed on detecting and removing specific individuals as the overall density of grey squirrels was much lower. This approach was successful but resource intensive and involved a mix of camera traps, feeders, localised trapping and shooting. The data gathered throughout the project allow Newcastle University to evaluate approaches and make recommendations for future invasive species control programmes.

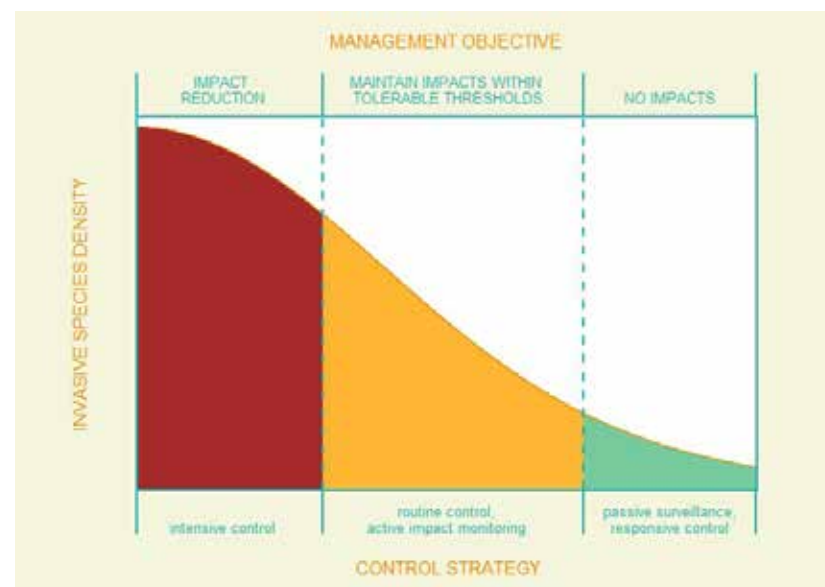


Figure 9: Control strategies differed across project areas reflecting differences in landscape and objectives

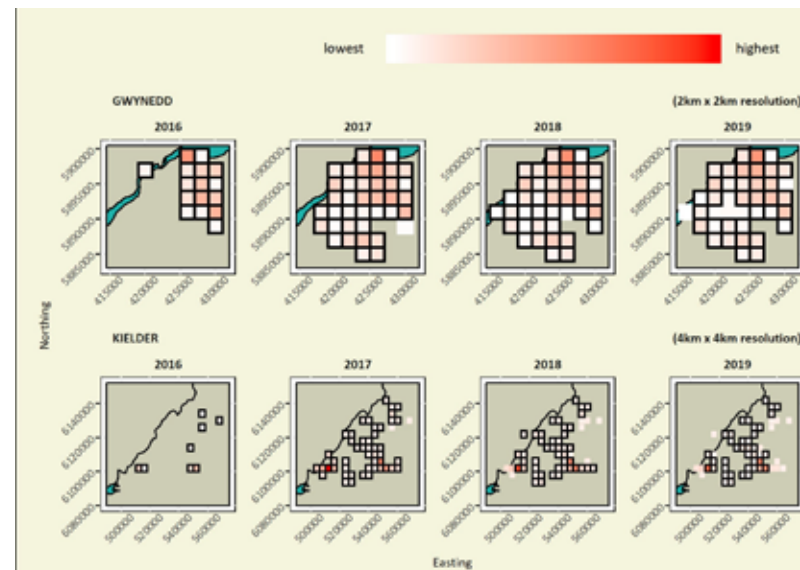


Figure 10: Spatial distribution of grey squirrel captures from Kielder and North Wales

Build Community resilience

Through the Red Squirrels United project, seven new red squirrel community groups were established across Northern and the Republic of Ireland, England and Wales with an eighth revitalised and constituted. The groups were developed with the aim of supporting red squirrel populations, detecting and controlling grey squirrel populations and wider community engagement. Community managed trap loan schemes were established or expanded in Merseyside, Northern Ireland and mid-Wales increasing grey squirrel management that will continue post project.

Red Squirrels United provided training and support and developed resources to support community groups and increase public engagement. Resources included best practice guides, videos and webinars. The project also worked to engage the broader community and raise awareness of the issues facing red squirrels in the UK through community and school talks, project newsletters, blogs, media coverage and social media outreach using Facebook and Twitter (both channels had more than 1,000 followers). All resources, webinars, newsletters

and blogs can be found at www.redsquirrelsunited.org.uk

Social attitudes towards red squirrel conservation

Throughout the project, Forest Research evaluated public attitudes to red and grey squirrels and assessed whether these had changed in response to Red Squirrels United. Responses from a 2015 nationwide survey (3,758 respondents) and a more targeted 2019 survey in Red Squirrel United's delivery areas (1,000 respondents) demonstrated a heightened appreciation for red squirrels in the latter. Similarly, those in the delivery areas were found to be significantly less likely to agree that it is desirable to see grey squirrels in a) gardens, b) parks and c), the wider countryside. In addition, those residing in the delivery areas demonstrated greater knowledge and acceptance of different grey squirrel control methods.



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Figure 11: Red Squirrels United delivered over 700 training and community events

Aiding the development of comprehensive IAS management frameworks

A key element of Red Squirrels United was bringing partners and stakeholders together from across the UK and Europe to look at evolving management techniques for grey squirrel management, red squirrel conservation and IAS lesson learning, knowledge transfer and best practice.

Knowledge Fairs

Red Squirrels United hosted four annual Knowledge Fairs bringing together conservationists, government bodies, community groups, academics and researchers from across the

UK and Europe. These two-day residential events represented excellent opportunities to share latest developments and new approaches across the IAS sector, facilitated knowledge sharing and lesson learning, offered fantastic opportunities for networking and brokered many connections across community groups and the broader IAS Sector. More than 400 people attended the Fairs over the lifetime of the project and feedback was very positive with many welcoming the opportunity for sharing best practice and wider collaboration across the sector.

Policy engagement

Red Squirrels United directly supported the implementation of key IAS policies and provided inputs to several UK Government consultations on IAS Management. Project responses highlighted relevant approaches and methodology regarding grey squirrel management which directly supported and underpinned the EU regulation (1143/2014) on Invasive Alien Species. The project made a significant contribution to the development of the England Red Squirrel Action Plan currently

being drafted and Red Squirrel United project partners supported Red Squirrels Trust Wales call for amendments to the 1967 Forestry Act asking that conditions to protect flora and fauna be added for forestry operations. This followed several instances of tree felling taking place in areas that contained red squirrel populations, some of which would have been breeding at the time of felling. The Welsh Government made a firm commitment to review forestry legislation, but the English government show no sign of following suit at the time of writing.

Engagement with broader IAS sector

Red Squirrels United liaised with many other IAS projects across the UK, Europe and internationally disseminating key project outputs, sharing experience and methodologies and contributing to European IAS management frameworks.



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Figures 12 and 13: The Knowledge Fairs represented important opportunities for sector wide collaboration



Red Squirrels United Legacy

- Significant contributions to IAS management frameworks in UK and Europe
- Stable or increased red squirrel populations across all project areas
- Grey squirrels removed from the Mourne Mountains in Northern Ireland and suppressed across other project areas
- Eight new or revitalised self-sufficient red squirrel community groups and increased membership of existing community groups
- Community led early warning and rapid response systems in place across project areas
- Community managed trap loan schemes in Northern Ireland, Merseyside and mid Wales
- Better understanding of the scale of threat to red squirrels in remote forests, and stronger working partnerships to collectively address this threat post project
- Detection dogs trained in Merseyside and Northern Ireland to detect dead red squirrels
- Accessible resources and publications sharing knowledge and promoting best practice

AfterLIFE – what next?

Red Squirrels United has made a significant contribution to red squirrel conservation and IAS management. Communities have been strengthened through engagement with the project; and the effort to conserve red squirrels and manage grey squirrels has been significantly enhanced. But it doesn't stop there – red squirrels continue to need help.

Building on the momentum and taking lessons learnt, improved methodologies and new approaches generated through Red Squirrels United project partners will continue to work on red squirrel conservation through the following activities:

- Red Squirrels United website will remain live and access to resources maintained for next five years
- Red squirrel officer employed in Ulster Wildlife in Northern Ireland to maintain support and guidance to red squirrel community groups
- Funding secured from the National Lottery Heritage Fund for a further three years by the Wildlife Trust for South and West Wales building on existing project work, expanding the project area and further investigating what fragile red squirrel populations need in mid-Wales, in order for them to thrive
- Northumberland Wildlife Trust will continue to monitor red squirrels, grey squirrels and pine martens in the Kielder stronghold and continue to work with red squirrel community groups to undertake grey squirrel management



- Northumberland, Cumbria and Lancashire Wildlife Trusts have come together as a partnership and are seeking further funding to build on the work generated through Red Squirrels United and the Red Squirrels Northern England programme. This project will focus on stronger cross border working with Scotland, refinement of the early warning and rapid response system, increase resources for grey squirrel management, engage with a broader demographic audience, increase community engagement and trial new and innovative technologies
- The Lancashire Wildlife Trust red squirrel officer will carry on providing support to the Red Alert group as they continue to expand the urban trap loan scheme and develop a community engagement programme. The red squirrel ranger will continue to support the work of the Red Alert group through woodland grey squirrel management
- Red Squirrels Trust Wales will release captive bred pine martens into Gwynedd in 2020. They will be monitored to established how successfully they are integrating into the wild and predating on grey squirrels
- Red Squirrels Trust Wales in partnership with Natural Resource Wales and the Clocaenog Red Squirrels Trust have been granted development funding from the National Lottery Heritage Fund to develop a project protecting red squirrels and pine martens across four counties in North Wales
- 'Newcastle University will use the data collected on control strategies and methodologies throughout the project to inform future Invasive Alien Species Management programmes



Who are we?

Red Squirrels United, coordinated by The Wildlife Trusts, is a partnership of organisations from Wales, England and Northern Ireland, including:

- The Wildlife Trusts
- Northumberland Wildlife Trust
- The Wildlife Trust for Lancashire, Manchester and North Merseyside
- Red Squirrels Trust Wales
- The Wildlife Trust of South and West Wales
- Ulster Wildlife
- Newcastle University
- Forest Research.

Who did we work with?

We worked alongside a range of community groups and organisation including landowners, estate managers, farmers and volunteers. We also worked closely with Saving Scotland's Red Squirrels and the UK Squirrel Accord to ensure a joined-up approach to red squirrel conservation was taken across the whole of the UK.



How to get involved

If you are interested in volunteering or would like to learn more about the project areas, please contact the following partner organisations:

- The Wildlife Trusts: enquiry@wildlifetrusts.org
- Northumberland Wildlife Trust: red.squirrels@northwt.org.uk
- The Wildlife Trust for Lancashire, Manchester and North Merseyside: red.squirrel@lancswt.org.uk
- Red Squirrels Trust Wales: angleseysquirrels@hotmail.co.uk
- The Wildlife Trust of South and West Wales: info@welshwildlife.org
- Ulster Wildlife: redsquirrels@ulsterwildlife.org

