7 Conclusions

The grey squirrel has spread dramatically over the past ten years and is now present in twenty-six of the thirty-two counties on the island. Although there have been few sightings west of the river Shannon so far, there is a real possibility that the grey squirrel will eventually penetrate into woodlands in east Galway, east Clare and across county Roscommon. Counties Cork, Kerry and Limerick are also at risk in terms of spread.

The CRISIS project has demonstrated that that the grey squirrel represents a serious threat to both the conservation of the red squirrel in Ireland and to the future of the emerging broadleaved estate. Substantial public funds have been invested in broadleaf planting over the last two decades and much of this is now at risk because of its susceptibility to bark stripping by grey squirrels. Although beech and sycamore appear to be the species mostly at risk to damage from bark stripping, the project team came across a number of oak woodlands that have been destroyed in recent years by grey squirrels with up to 85 percent of the trees being written off. Experience in Britain has shown that a wide range of other species are also at risk particularly when grey squirrel numbers are allowed to go unchecked. Damage typically occurs in the spring when the trees are between fifteen and twenty years old and diameters at breast height in the order of 10 to 20 centimetres. Susceptible woodlands include both new plantations of broadleaves and in particular broadleaf trees planted in or beside existing woodlands, for example under the Woodland Improvement Schemes or the Native Woodland Scheme. The more dominant and vigorous trees are usually the first to be attacked with the tops breaking off after a number of years.

The project has confirmed that it will be difficult from a practical viewpoint to totally eradicate grey squirrels from the whole island. Although good progress has been made in East Anglia and Northumberland in Britain in this regard in recent years, the larger landmass in Ireland would add greatly to the associated difficulties of ensuring all animals are removed. The only possibility may rest with the development of an immunocontraceptive that is species specific. In other words it would not adversely affect the fertility of other species including red squirrels. Such a development will be difficult and expensive and appears to have a timeframe of at least ten years.

It is worth reiterating several of the key points from the Mammal Society’s Invasive Mammal Symposium in 2006, namely; bounty systems can be successful, but may be vulnerable to exploitation when only applied on a state-wide (as opposed to island-wide) basis - i.e. animals

culled beyond a state or country border may be translocated to claim extra bounties. Furthermore, control is not the same as eradication; controlling resident animals is not the same as dealing with dispersing itinerant animals. Also, control for tree protection is not the same as for red squirrel conservation. Finally, immunocontraception, if successful, would probably still need to be applied in combination with initial lethal control to maximize efficiency.

Eradication at local level, or at least reduction in the numbers of grey squirrels to a number where bark stripping is unlikely to take place, seems a much more practical proposition. The results from CRISIS show that operationally squirrel numbers can be greatly reduced using a number of approaches including cage trapping, shooting and warfarin poisoning. However, numbers will likely return to former levels within a year unless the woodland owner is vigilant and continues to monitor his/her woodland on a regular basis and is prepared to take control action when needed. Cooperation between adjoining woodland owners is also highly desirable in this regard.

Trapping and shooting, although more expensive than warfarin poisoning, present less complications for application on a regional or nationwide basis. Cage trapping is easily executed and highly effective but traps when active must be visited at least once every twenty-four hours. Killing the grey squirrel once it is trapped is an integral part of this method, which some people may not be prepared to do. Shooting is also highly effective as a control method; the involvement of local gun clubs in the pursuance of the grey squirrel as a vermin species may present an ideal solution.

Working with warfarin poisoning as a control option, although common in Britain, presents two main difficulties. Firstly, the treated bait is difficult to work with in a wet climate and secondly, the danger of possible secondary effects on other species, notably the red squirrel and the pine marten. Anecdotal evidence suggests that the latter may be a natural predator for grey squirrels and because of this its status as a protected species should be enhanced and encouraged. Grey squirrels are rarely seen nowadays in parts of Cavan and Monaghan compared to the 1970’s and 1980’s while sightings of pine martens are common in those counties. There are also indications in some regions, including parts of the Slieve Bloom Mountains and some woodlands around Tullamore, that red squirrels may be returning, having been displaced over the last twenty years by invading grey squirrels.

Although none of the control measures tested during the CRISIS project will eradicate grey squirrels totally from an area there is strong evidence that numbers can be reduced

significantly and that stripping of bark will be greatly reduced if not eliminated completely. Constant vigilance by woodland owners is essential in order to ensure that squirrel numbers do not get out of hand and that where it does action follows quickly in relation to containing numbers and minimizing risk of damage from bark stripping. Squirrel numbers can escalate rapidly over a number of months. Grey squirrels typically give birth to three or four young, and can breed twice a year. If conditions are favourable in relation to weather and there is an abundant food supply, it is feasible that a population of two can increase to ten within a year. Such exponential increase in the population density may result in increased competition for resources, which can lead to more bark stripping. Control during the breeding season (January to May) will result in the most efficient control of the population, as it will minimize recruitment of young squirrels; animals are also easiest to control during these periods as natural food resources are limited and squirrels will be drawn to any bait set out in traps or feeders.

The results from the squirrel survey carried out in 2007 clearly illustrate that grey squirrels have been displacing the native red squirrel in recent decades. If action is not taken to control the spread of the former it is likely that red squirrels will become critically endangered in the eastern half of Ireland within 30 years. The situation west of the River Shannon is more complex as the habitat there is less suitable for grey squirrels; consequently competitive replacement of red squirrels by grey squirrels will be slower in this region. The Species Action Plan for the Red Squirrel produced in 2007 by NPWS represents a significant step insofar as conservation of the red squirrel is concerned. However, its success will ultimately depend on the implementation of effective actions related to controlling the spread of the grey squirrel and these have financial implications for the forestry sector.

The project team believes that the protection of broadleaf woodland from grey squirrels and the conservation of red squirrels, while related, must be considered and dealt with separately. The control of grey squirrel populations on a local level will certainly protect young broadleaf woodlands, it will only form part of a more extensive scheme to conserve and protect the red squirrel.

A multi-disciplinary approach will be required to protect the red squirrel and all major stakeholders must accept some responsibility in this regard. For instance NPWS should initiate a nationwide pox monitoring scheme through their network of Conservation Officers; Coillte may be required to adjust harvesting protocols in areas deemed to be of particular importance to the red squirrel, with efforts being made to reduce clear-felling in favour of continuous cover systems; the Forest Service should consider amending some aspects of

forest policy, particularly in relation to planting schemes, to ensure the general woodland habitat of the country provides less advantage to grey squirrels (and consequently is less at risk from damage). The current policy on broadleaf planting generally favours grey squirrels; consideration should be given to ensuring a mix of species more in line with the requirements of the red squirrel. These species include Norway spruce and Scots pine, together with a mix of smaller-seeded broadleaves such as ash and alder; planting of large-seeded broadleaves such as oak and hazel in areas of red and grey squirrel overlap should be avoided. The Forestry Inspectors and Teagasc Farm Forestry Advisors also have a role in ensuring that woodland owners continually monitor their woodlands and include tree species complimentary to the needs of the red squirrel.

A significant proportion of the Irish red squirrel population is now confined to the predominantly coniferous plantations owned by Coillte. These differ both in species composition and habitat type to many of the privately owned broadleaf woodlands established with Forest Service funding over the last two decades.

Conservation and control schemes in Coillte and private woodlands are subject to a number of variables including:

- Habitat structure; many coniferous plantations may be quite isolated with few dispersal corridors to connect them; this effects both gene flow between red squirrel populations and the ability of grey squirrels to colonise these areas

- Tree species makeup; red squirrels are less disadvantaged in predominantly coniferous plantations compared to broadleaf plantations; this may be offset by increased broadleaf planting in or near coniferous sites which can allow greys to colonise such areas more easily

- Broadleaf plantations are more at risk from grey squirrel damage; coniferous plantations are far less affected although both red and grey squirrels can cause damage in the latter species, particularly pine species

- Geographical differences in the current tree species makeup of the country; more coniferous plantations are found in the west of the country compared to the east. This dichotomy in habitat types in the east and west

of the country is mirrored by the distributions of the two squirrel species, with more reds being found in the west than the east, and vice-versa for greys.

Activating woodland owners in relation to the danger of the grey squirrel and the raising of public awareness generally to the plight of the red squirrel are seen as key elements in any strategy moving forward from the CRISIS project. The results from the project clearly illustrate that the public in general are greatly interested in squirrels and sympathetic to the bleak future facing red squirrels unless action is taken on controlling the grey squirrel. Equally many woodland owners have yet to experience the devastation that the grey squirrel can cause to broadleaf trees and of the actions needed in order to ensure their investment and assets are protected.

It is also worthy of note that squirrel populations do not recognize the division of the island of Ireland between two governments. Ideally any effective conservation and management programme for red and grey squirrels in the Republic of Ireland should be done with the knowledge and cooperation of the Northern Irish Forest Service and EHSNI. This is of particular importance for woodlands located in the border counties. Furthermore, different legislation may apply in the two jurisdictions; for example, warfarin is not permitted for use in grey squirrel control in Northern Ireland while there is no legislation at present preventing its use in the Republic of Ireland.