

**Brief to the Directorate Committee**

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**Red squirrel introduction? - The issues, legislation and policy**

**Background**

The Department receives letters from the public whenever the plight of red squirrels in England is in the newspapers. There is an interest in and love of this species, which occasionally gets raised with our MHKs. Mr Crookall requested a brief on issues relating to the introduction of red squirrels to the Isle of Man, and the result of this discussion will also be reported to two recent correspondents. I have also received correspondence from a Northumberland resident interested in the potential of a refuge on the IoM. The basis of the public's interest in this appears to be twofold: to preserve British red squirrels and because the species is well-liked (people like the look of them). However, it is not a native species on the IoM (there is no evidence of them having lived here), therefore such an expensive project as an introduction cannot be funded from government wildlife conservation funds whilst native species are under severe threat. However, the department's statutory role is also in considering licence applications for squirrel importation (Destructive Imported Animals Act) and to introduce a species to the wild (Wildlife Act), so this paper addresses the issues that would arise if the Department were to receive such an application.

**Legal position**

The Importation or keeping of red squirrels was prohibited in 1952 and renewed under the 1994 Order of the Destructive Imported Animals Act 1963 due to its destructive habits and non-native status. It is an offence to turn such animals loose, even if imported and kept under licence. A sanctioned introduction would require the removal of this species from this legislation, or amendment of the legislation. It would be wise to retain controls on importation to prevent animals of uncontrolled origin (genetics) or disease status from being brought in and affecting any future Manx population, if the protection of the British race is of concern.

It is also an offence, under the Wildlife Act 1990, to release this species into the wild except under licence, as it is not an established species on the IoM. If a population were to be introduced then consideration should be given to protecting the aims and investment of such a project through the Wildlife Act (Schedule 5 and/or 8).

I have consulted the Agriculture Directorate regarding animal health restrictions on the translocation of red squirrels from the UK to the Isle of Man, but there are none with regard to notifiable diseases.

**Licensing policy on introductions**

The DAFF adopted the following criteria in 1992, based on the criteria of the International Union for the Conservation of Nature (IUCN).

1. Introduction of wild species will be licensed only under specific circumstances;
  - a) where the species can be shown to have lived formerly on the Isle of Man or where there is strong evidence for believing that it must have done so.
  - b) where the species is unlikely to re-colonise naturally and the cause of the species extinction is known to have been by human agency, and that cause has been removed.Or
  - c) Where there is a strong conservation element in the proposal.
2. Any scheme must also be broadly in line with IUCN criteria such that, in appropriate circumstances, any or all of the below items may apply. Any licence issued will specify which:
  - i) Ecological considerations
    - a) An assessment of the potential environmental impact must be made and no disruptive consequences on the ecosystem foreseen.
    - b) Habitat suitable for extensive release must be available
    - c) The ecology of the species and the proposed release site(s) must be understood.
    - d) A source of stock, which is as close as possible to the original, must be identified. The animals obtained must be disease-free and from a source population unaffected by their removal.

## ii) Economic considerations

- a) the release will take place under an overall agreed plan indicating where the necessary funds will come from, what monitoring will be undertaken and what the success indicators will be.
- b) A contingency plan will specify steps to be taken should success indicators not be attained. Eradication of the species must be feasible.
- c) The risk to human life and property must be minimal and the attitudes of local people must not be negative.
- d) Relevant legislation must be reviewed with a view to the protection of the introduced species if necessary.

The Wildlife Committee has previously considered the introduction of red squirrels in the light of this policy and following consultations with a number of highly-respected mammalogists in the UK, the conclusion has been that the criteria have not been met, for the following reasons: it is not considered native (1a) and there is serious doubt that sufficient habitat of suitable quality exists for the long term survival of a population (2ib).

There is no evidence of any squirrel having lived on the Isle of Man, so a strong *conservation* argument would be required (1c) under the present policy. The habitat availability issue is, however, ripe for review and a full assessment would be necessary for licence consideration. An assessment of impact on other species, habitats and interests would also be required. An acceptable source of stock and a release and monitoring plan will be required. These should all form part of a project plan to be provided with any application, and forming the basis of a public consultation.

The Appendix contains relevant excerpts from the IUCN Guidelines of 2000 that relate to intentional introductions of alien species. In 2003 the Joint Nature Conservation Committee published guidance<sup>1</sup> for the UK jurisdictions on translocations.

## Purpose

Careful consideration should be given to the reasons for introduction and this has been greatly lacking so far. No application has been received to undertake an introduction, only letters suggesting that it should be done, presumably at the taxpayers' expense, in order to 'save the red squirrel'. It is clear that this species gets the degree of public discussion and support that it receives, due to a high cuteness factor. If an introduction is to 'improve the human environment' or aid tourism then this should be overt and a change in policy would be required to allow it. If it is for conservation reasons then particular requirements become necessary, taking account of the threat to the British subspecies, but the wide distribution of the species as a whole.

## Issues

### *Status*

The red squirrel is categorised as of Least Concern by the IUCN<sup>2</sup>, with regard to the species as a whole. It is hunted for fur in some countries. It has a wide range across Europe and Asia. Its survival is not under threat. However, 17 subspecies are recognised<sup>3</sup>, of which the subspecies *Sciurus vulgaris leucourus* Kerr 1792 is only found in Britain and Ireland and is under threat, particularly in England. However, introductions have affected the genotypes of British red squirrels, which is a topic of research interest.



Range map<sup>2</sup>

### *Is the loss of British red squirrels an issue for the IoM?*

Red squirrels are not native to the IoM so their conservation is not a responsibility held by the IoM government, whereas other threatened species are. Squirrels are therefore not a funding priority for the DEFA.

However, the IoM is in a position to help the UK government if the latter wish this and funding is available, and it is clear that there would be considerable public support for a well-organised project. If an introduction is for conservation purposes then it must be only for the British subspecies. If it were done to aid the conservation work in the UK, then this should be under the auspices of the UK Biodiversity Action Plan.

The current UKBAP target is the maintenance of the current populations. The BAP has included an objective to re-establish populations, but has never aimed to introduce squirrels to new sites as safe havens, where they have not previously been recorded, which raises a different set of issues. If this at some time became necessary, it might then be late to identify a population considered to be of the British subspecies and to

produce a disease-free founder group to introduce. However, the countries involved have islands within their jurisdictions that currently hold red squirrel populations (Isle of Wight, Brownsea Island and Furzey Islands, Anglesey (has a bridge connection though), Jersey (introduced), Bute and Arran) and also plans for the maintenance and protection of strongholds on the British mainland. Other sites are also available, such as Mull, and the report of the European Squirrel Initiative (2004)<sup>11</sup> notes various other islands with potential, including the IoM.

#### *Can the British subspecies be sourced?*

The British subspecies was described in 1792 but *S.v.vulgaris* has been introduced to the UK from Scandinavia as early as 1793 and *S.v.fuscoater* from Western Europe in about 1860 and 1910<sup>4</sup>. There does not seem to be a subspecies 'type specimen' and the British Museum material contains apparently British Scandinavian genotypes. We cannot, therefore, say for sure exactly what is the British subspecies genotype but it is described as easily distinguished from the other types, having ear tufts and tail that bleach to a milky white during the summer. This is now rare amongst British red squirrels<sup>13</sup> and genetic research shows that most remaining populations have continental ancestry, many with a recent Scandinavian ancestry that may be gaining predominance due to a competitive advantage in spruce plantations<sup>14</sup>. Lowe and Gardiner<sup>15</sup> compared pelts with skull characters and concluded that perhaps the described British red squirrel is a sport rather than a subspecies, though the accepted taxonomy has not changed. However, in the west of Cumbria there remains a population with the coat characteristics described for the British subspecies<sup>14</sup>. Peter Lurz advises that it would be difficult to identify a true British subspecies, though they know that there are unique genotypes in the west of Cumbria and there may also be some in the north of Scotland.

#### *Availability of habitat*

This relates to the likelihood of success and to the welfare of introduced animals. An assessment based on advice from mammalogists in the 1990s concluded that the habitat was not suitable, however, I consider this matter ripe for review. A report recently suggested areas of refuge within the British Isles and the Isle of Man is considered as a site 'which could support high populations of introduced red squirrels'<sup>11</sup>. A summary of tree species areas and age classes is given, but a proper assessment of the resource against the habitat requirements of squirrels would be necessary. Areas of suitable woodlands, the degree of fragmentation and the age of conifer stands with respect to cone-bearing age, would all be relevant aspects. In correspondence with a Manx resident, the Red Squirrel Survival Trust have offered to survey the IoM to determine whether it could sustain a population of red squirrels.

#### *Damage to economic interests (Forestry/bulbs/nuts)*

Experience in the UK suggests that red squirrels are far less damaging than greys. Whereas greys can damage tree shoots and buds and peel bark, take bulbs and damage fruit tree buds, 'red squirrels are not regarded as a serious menace to forestry, except perhaps on coniferous plantations'<sup>8</sup>. However reds and greys are both prohibited on the IoM due to their damaging behaviour. With regard to Forestry, Peter Lurz (a UK expert) advises that bark stripping only occurs in reds in the UK where there is a high density of squirrels, and is a springtime issue. A recent review of reds, in 2005 (American Society of Mammalogists), states that 'occasionally European red squirrels have caused economic bark-stripping damage to conifer plantation forest between May and July in Britain especially when densities .. approach 2 individuals/ha. Ring-barking, which results in dieback and wind-snap, and crown damage also occur'. May and June are the main problem months and the issue is exacerbated if the weather is dry and other sources of water unavailable<sup>16</sup>. Good photographs and descriptions of damage are available<sup>7</sup>. Scots, Corsican and lodgepole pine, European larch and Norway spruce have been damaged<sup>4</sup>. Young trees of 15-40 years are singled out (Scots pines of 4-6" dbh)<sup>16</sup>. Poplar and birch trees were also damaged in the nineteenth century but this has not been reported recently<sup>7</sup>. Where damage heals over, wood may only be found to be faulty when discarded at the mill. Tree damage 'may be considerable at the local level'<sup>4</sup>, though 'today the damage that occurs is overshadowed by the more widespread damage caused by grey squirrels'<sup>7</sup>.

Bark and shoot damage in forestry plantations is the only issue generally noted as serious with regard to the reds, though they 'do a certain amount of harm to agriculture, but its depredations are never really serious for the farmer'<sup>9</sup>. 'Locally these squirrels may be a nuisance to seed orchards and horticultural crops'<sup>3, 4</sup>. Nut growers would be wary of any squirrel: foraging for ripe hazelnuts in the UK is not easy, though greys are usually to blame these days. Reds are not renowned for damage to plant bulbs, as the greys are. To take account of both potential nuisance and economic interests, a public consultation is appropriate during any licence consideration.

#### *One-way*

Unless they are unsuccessful and die out it could be almost very difficult and very expensive to remove an introduced population if problems occurred. We would need to be confident that the introduction is wanted in the long term before proceeding.

#### *Monitoring*

A monitoring plan is essential for the well-being of the animals, for the protection of other interests, to determine whether an introduction is successful and whether further introductions may be necessary to sustain a population and to guide management practice.

### *Funds*

The Red Squirrel Survival Trust may be interested in funding a project but they wouldn't run it. The Manx Wildlife Trust have mentioned previously that there is an interest from private individuals in squirrel introduction.

### *Experience of introduction*

Experience can be very important in guiding introductions towards success. On the IoM the red grouse and grey partridge populations result from successful introductions attempts but attempts to introduce the black grouse failed. There is experience of introducing red squirrels in the UK (NW Scotland and Anglesey, though the latter had a small population of reds remaining beforehand) which should be sought before putting forward any plan. The Wildlife Park is interested in becoming involved in local conservation work and might offer to help with breeding and monitoring though the possibility of introducing squirrels has not been discussed with them.

### *Disease transmission*

Squirrels carry a variety of diseases. It is important that they do not bring in disease that may hamper an introduction project, in an already stressful situation, and that their potential to spread animal diseases is taken into consideration. Tony Sainsbury of the Institute of Zoology may be able to advise in this regard. Health screening prior to importation would be wise. A squirrel pox free group would be required. Grey squirrels carry it but it does not kill them: red squirrels can catch it and it usually does, often within 2 weeks, so a holding period may suffice, prior to translocation. This is now considered to be a major factor in the decline of British red squirrels. In 2008, 525 red squirrel carcasses were tested but no virus was found in 8 of those exposed to the pox virus (seropositive)<sup>10</sup>, providing new hope for conservation in situ through alternative conservation strategies. However, resistant populations do not appear to be forming, possibly due to the low densities of resistant red squirrels and the high densities of resistant greys that form a reservoir of the virus and may compete with the reds. Epidemic coccidiosis has been reported in Scandinavia and the following have also been identified: *Enterobius* nematodes, pasteurellosis, *Trichopyton* ringworm and *Microsporum*, parainfluenza and viruses of the encephalomyocarditis group.

### *Risks from other (illegal) introductions*

A grey squirrel was released illegally in the Isle of Man in 2004, sex unknown. The releaser was prosecuted but the animal was not found. I have received reports of sightings but none recently. They have lived for up to 12.5 years (females) and 9 years (males) in the wild in North Carolina, but over 20 years in captivity. Its sex, reproductive status and disease status were unknown. It may still survive, hindering potential for any red squirrel introduction, which should avoid the Glen Helen area, the site of the last report. I have also received reports of both red and grey squirrels from various parts of the island. Some were clearly stoats but others seemed more convincing. None have been verified but I can't rule out the possibility that people may attempt their own (illegal) introductions with very small numbers of animals that may be difficult to observe and have a low likelihood of success. If there are squirrels on the IoM, this could prevent the possibility of an attempt to do anything on the basis of conservation.

### *Rodenticides*

Squirrels are at risk from the use of rodenticides in the countryside. A strategy to minimise losses must be considered when planning any introduction.

### *Habitat Management*

If squirrels were to be introduced then woodland provision, connection and management across the island should receive consideration if the introduction were to be a success.

### *Predation of birds*

Squirrels will take bird eggs and chicks<sup>3</sup>, though Gurnell and Hare<sup>4</sup> state 'No evidence that they are significant predators of birds' eggs or nestlings', which they state again for greys. A recent paper<sup>5</sup> contained an analysis of whether grey squirrels depress woodland bird populations in England and whether there is a relationship between grey squirrel numbers and nest failure. Five negative and 7 positive relationships were obtained and the conclusion was that grey squirrels are unlikely to have driven population declines of woodland birds in recent years, though they could not exclude the possibility that a small number of species, most showing population increases, have been depressed to some degree at sites where a greater number of grey squirrels are present. The most convincing evidence was for a negative effect on blackbird and collared dove populations, both species on the increase in recent years. Woodland surveys<sup>6</sup> showed greater declines in populations of hawfinches and lesser spotted woodpeckers where grey squirrels were commonest, but these are not Manx species. I am not aware of similar analyses for red squirrels. They may take some eggs but there is certainly no current evidence of effects on bird populations. The island has few truly woodland specialist birds, possibly due to the historical lack of woodland, though the great-spotted woodpecker has arrived and

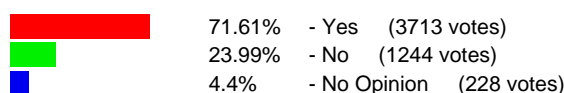
there are treecreepers, redpoll and a number of tits, thrushes and warblers. Bearing in mind the general hatred of certain members of the crow family amongst the public, a public consultation would be useful.

#### *Other impacts*

An impact assessment will be necessary for any licence application, but we should also be mindful that islands are particularly prone to *unpredictable* effects of introducing species, because there are not necessarily the predators and competitors present that they interact with in their home environment, and there are sometimes unfilled niches available too. A degree of 'ecological release' could therefore occur. This issue is highlighted on the website of the Convention on Biological Diversity. Predators include wild cats, pine martins, owls and other raptors<sup>16, 4</sup> are natural predators in Britain, and though there are many feral and domestic cats on the IoM (important predators on Jersey), and some of the British raptor species, there are no martins. However, there is no direct evidence that predation significantly affects red squirrel numbers, with starvation, cold weather and parasitic diseases also taking a toll<sup>4</sup>.

#### *Public consultation*

A consultation is recommended if a licence application were to be received, even though there has been a recent Manx Radio vote on 'Should red squirrels be introduced to the Isle of Man?', with results as follows:



The full facts and intricacies of this issue are rarely put before the general public, though the Manx Wildlife Trust posted a summary of the issue from both sides of the argument on their web pages in 2005, which can still be viewed<sup>12</sup>. A proper gauge of public feeling can only be considered *following the provision of relevant information, with the facts at hand*. It may therefore be useful to provide the public with up to date facts about this issue by publishing a note locally, based on this paper. Forestry and agricultural views will be necessary beforehand.

## **Conclusion**

Under current policy, introduction would only be considered for conservation purposes (i.e. to help prevent the extinction of the *British* subspecies of the red squirrel). This raises the issue of what a British red squirrel is and whether we could identify it, which is under academic enquiry, but may never be conclusive. If an introduction were contemplated then populations considered *closest* to being of ancient British origin should be used and there are populations that might fulfil such a requirement. However, we should bear in mind that it may never be possible to identify a red squirrel of purely British origin.

However, it is likely that anyone pushing for red squirrel introduction will be doing so for different reasons. Any other reason would require a change of policy. The Wildlife Committee should be consulted regarding the introduction of any alien or before changing our criteria or exempting any case.

Introduction would require a change to the Destructive Imported Animals Act, to allow release, and also a licence under the Wildlife Act.

There are conditions under which I would consider such an introduction potentially beneficial to the 'British red squirrel', as a contribution to international wildlife conservation and at the request of the UK government, however, UK agencies are not considering the IoM at present. When discussing this issue participants should be very clear in their own heads what their reason for introduction is, and how that relates to wildlife conservation on the IoM and elsewhere.

A major consideration in introductions is whether the benefits outweigh the problems. In my view, from the conservation perspective, this depends whether we could realistically aid the British subspecies.

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**Appendix: Excerpt from the IUCN Guidelines for the Prevention of Biodiversity Loss caused by Alien Invasive Species (as approved by 51st Meeting of Council, February 2000)**

**5. PREVENTION AND INTRODUCTIONS**

**5.1 Guiding Principles**

- Vulnerable ecosystems should be accorded the highest priority for action, especially for prevention initiatives, and particularly when significant biodiversity values are at risk. Vulnerable ecosystems include islands and isolated ecosystems such as lakes and other freshwater ecosystems, cloud forests, coastal habitats and mountain ecosystems.
- Since the impacts on biological diversity of many alien species are unpredictable, any intentional introductions and efforts to identify and prevent unintentional introductions should be based on the precautionary principle.
- In the context of alien species, unless there is a reasonable likelihood that an introduction will be harmless, it should be treated as likely to be harmful.
- Intentional introductions should only take place with authorisation from the relevant agency or authority. Authorisation should require comprehensive evaluations based on biodiversity considerations (ecosystem, species, genome). Unauthorised introductions should be prevented.
- The intentional introduction of an alien species should only be permitted if the positive effects on the environment outweigh the actual and potential adverse effects. This principle is particularly important when applied to isolated habitats and ecosystems, such as islands, fresh water systems or centres of endemism.
- The intentional introduction of an alien species should not be permitted if experience elsewhere indicates that the probable result will be the extinction or significant loss of biological diversity.
- The intentional introduction of an alien species should only be considered if no native species is considered suitable for the purposes for which the introduction is being made.

**5.3 Intentional Introductions – Recommended Actions**

3. Give utmost importance to effective evaluation and decision-making processes. Carry out an environment impact assessment and risk assessment as part of the evaluation process before coming to a decision on introducing an alien species. (See Appendix)
4. Require the intending importer to provide the burden of proof that a proposed introduction will not adversely affect biological diversity.
5. Include consultation with relevant organisations within government, with NGOs and, in appropriate circumstances, with neighbouring countries, in the evaluation process.
6. Where relevant, require that specific experimental trials (e.g. to test the food preferences or infectivity of alien species) be conducted as part of the assessment process. Such trials are often required for biological control proposals and appropriate protocols for such trials should be developed and followed.
7. Ensure that the evaluation process allows for the likely environmental impacts, risks, costs (direct and indirect, monetary and non-monetary) benefits, and alternatives, to have been identified and assessed by the biosecurity authority in the importing country. This authority is then in a position to decide if the likely benefits outweigh the possible disadvantages. The public release of an interim

decision, along with related information, should be made with time for submissions from interested parties before the biosecurity agency makes a final decision.

12. Ensure that provisions are in place, including the ability to take rapid and effective action to eradicate or control, in the event that an unauthorised introduction occurs, or that an authorised introduction of an alien species unexpectedly or accidentally results in a potential threat of biological invasion. (See Sections 6 and 9.)

## **Appendix**

### **1. Environmental Impact Assessment (EIA)**

Generic questions in the EIA process concerning impacts a proposed introduced species may have on the environment should include the following:

- Does the proposed introduction have a history of becoming invasive in other places? If yes, it is likely to do so again and should not be considered for introduction.
- What is the probability of the alien species increasing in numbers and causing damage, especially to the ecosystem into which it would be introduced?
- Given its mode of dispersal, what is the probability the alien species would spread and invade other habitats?
- What are the likely impacts of natural cycles of biological and climatic variability on the proposed introduction? (Fire, drought and flood can substantially affect the behaviour of alien plants.)
- What is the potential for the alien species to genetically swamp or pollute the gene pool of native species through interbreeding?
- Could the alien species interbreed with a native species to produce a new species of aggressive polyploid invasive?
- Is the alien species host to diseases or parasites communicable to native flora or fauna, humans, crops, or domestic animals in the proposed area for introduction?

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- What is the probability that the proposed introduction could threaten the continued existence or stability of populations of native species, whether as a predator, as a competitor for food, cover, or in any other way?
- If the proposed introduction is into a contained area(s) with no intention of release, what is the probability of a release happening accidentally?
- What are the possible negative impacts of any of the above outcomes on human welfare, health or economic activity?

### **2. Risk Assessment**

This refers to an approach that seeks to identify the relevant risks associated with a proposed introduction and to assess each of those risks. Assessing risk means looking at the size and nature of the potential adverse effects of a proposed introduction as well as the likelihood of them happening. It should identify effective means to reduce the risks and examine alternatives to the proposed introduction. The proposed importer often does a risk assessment as a requirement by the decision-making authority.