

Biological Translocations: a Conservation Policy for Britain

Consultation Draft

**Joint Nature Conservation Committee on behalf of
The Countryside Council for Wales, English Nature and Scottish Natural Heritage**

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on behalf of the Inter-agency Translocations Working Group

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1. Executive summary

2. **Preamble.** In response to the launch of the Convention on Biological Diversity at the Rio 'Earth Summit', Target 36 of *Biodiversity the UK Action Plan* is to “Update and publicise guidelines on translocations, re-establishments, introductions and re-stocking”. The primary objective of the present paper is to establish a policy framework, and appropriate procedures, to manage the diverse activities relating to biological translocations. Genetically modified organisms (GMOs) are not considered in the paper.

3. **Introduction.** Previous initiatives on biological translocations in Britain focus attention on three main themes and associated aims:

- The impacts of **non-native species** upon Britain’s characteristic biodiversity (noting that there are also significant economic losses caused by non-native species), with the aim of minimising damage and proceeding by consultation with other interests;
- The translocation of **native species** for conservation or other objectives, with the aim of improving consistency by adopting the 1995 IUCN Guidelines;
- **Habitat translocations** for mitigating damaging developments or as part of restoration schemes, with the aim of highlighting that this should not be regarded as a substitute for *in situ* conservation.

4. **International considerations** give a wider geographical and legislative context to the draft translocations policy. Based on existing UK obligations under international agreements and conventions **it is recommended that the statutory conservation agencies should adopt the 1995 IUCN Guidelines for re-introductions to guide future species translocations carried out for conservation purposes.**

5. **Future data collection** and mechanisms for **reporting to Government** considers options for obtaining improved information on biological translocations in Britain and how such information should be reviewed and reported. Faster discovery and reporting of non-native species is a priority for the future to enable critical decisions to be taken in time.

6. Consideration of the **roles and responsibilities suggests that a body or forum be established or identified to lead and co-ordinate future actions relating to biological translocations in GB.**

7. Assessment of the structure of a **translocations policy for the GB statutory conservation agencies** identifies the separate but mutually supportive elements that should be included in a policy aimed towards conserving Britain's heritage of biodiversity by safeguarding native species and protecting biotopes. These elements are important components of each of the three main themes of this consultation paper.

8-11. Translocation of non-native species into Britain draws attention to the evidence of global losses of biodiversity due to translocation of species beyond their native range. Two general principles relate to the effects of deliberate or accidental translocations of non-native species: first, **prevention is better than cure**, which is a consequence of the second, **the outcomes of translocating species beyond their native ranges are highly unpredictable.** Four guiding principles are proposed to tackle invasion of non-native species:

- **Non-native species should not be deliberately introduced into Britain and released into the wild without a detailed prior risk assessment**, which includes careful analysis to ensure that there is no risk of damage to native biodiversity arising from their establishment in Britain;
- A **Code of Practice** should be developed for those proposing to release non-native species, or to keep them in conditions which are not fully contained;
- **Improved surveillance and other preventative measures should be taken to reduce the number of unintentional introductions;**
- For those non-native species already established in Britain, **a review should assess the current and potential future damage that they (may) cause to native biodiversity (or to other interests and concerns).**

The measures needed to improve legislation for tackling problems arising from invasive non-native species include two recommendations from JNCC to DETR in December 1999 as part of advice on the effectiveness of species protection legislation, namely:

- **Section 14 of the Wildlife and Countryside Act, 1981 should be amended to make it an offence to release, allow to escape, or cause to grow in the wild, any plant or micro-organism which is not ordinarily resident in, or a regular visitor to, Great Britain in a wild state. Provided such action was not undertaken recklessly, we would exempt from this provision plants grown for agriculture, horticulture, forestry or in gardens and micro-organisms used for specified purposes (for example, medicine, veterinary medicine, brewing and food processing).**
- **We would propose that Schedule 9 Part II be made available for listing of specified micro-organisms (as well as plants), where such listing is necessary for protecting the environment, and that the sale of plants and micro-organisms listed on Schedule 9 Part II be prohibited except under licence.**

12-15. Translocation of native species in Britain recognises the differences of view on the use of translocations for conservation purposes. **Adoption of both the 1995 IUCN Guidelines (see Annex 2) and a process for evaluating and undertaking species translocations for conservation purposes (see Annex 1) by the statutory conservation agencies, is a first step towards greater consistency in conservation practice.** Six general principles apply to the intentional translocation of native species, including non-native individuals of native species (15.2). The translocation of certain native species beyond their previous range in Britain, for example to off-shore islands, has caused significant problems. These problems need to be addressed by new, more effective measures in future.

The ranges of species alter naturally over time and such changes may increase in future due to climate change. **It is accepted that climate change is likely to result in some species colonising Britain from continental Europe without direct human assistance.** This process of adding to our flora and fauna, as well as changing distributions within Britain, has always occurred, but may be accelerated by climate change. Intervening against such range changes is generally inappropriate and ineffective.

16-19. Translocation of habitats in Britain notes the increase in proposals for these translocations in relation to developments and the differences of view that exist between

conservationists and developers. Existing wildlife legislation does not cover habitat translocations, and planning decisions have both allowed and rejected proposals within SSSIs. Based on available evidence, **the statutory conservation agencies consider that translocation of habitats is never an acceptable alternative to *in situ* conservation.** However, in some circumstances, habitat translocation can form part of a scheme designed to restore the characteristic biodiversity of damaged or degraded sites. There is the need to agree who should develop guidelines for habitat translocations and oversee their implementation.

2. Preamble

- 2.1 **The ‘Earth Summit’ at Rio de Janeiro in June 1992 was a major event in the development of environmental awareness globally.** An important result of the summit was the launch of the Convention on Biological Diversity, signed by over 150 countries. In response to the Convention, the United Kingdom published *Biodiversity the UK Action Plan* in January 1994, which contained accounts of UK biodiversity and included 59 targets (generally referred to as “the 59 steps”). Under the heading of *Species*, target 36 states the aim “Update and publicise guidelines on translocations, re-establishments, introductions and re-stocking”. The Joint Nature Conservation Committee, in conjunction with the Countryside Council for Wales, English Nature and Scottish Natural Heritage, has prepared this consultation paper *Biological Translocations: a Conservation Policy for Britain* as a step towards fulfilling this responsibility.
- 2.2 Conservation of our characteristic biodiversity is often a complex and even controversial undertaking. **One of the most difficult and disputed topics has been translocation of species,** under which broad heading can be included many human activities. **The primary objective of this consultation paper *Biological Translocations: a Conservation Policy for Britain* is to establish a policy framework and appropriate procedures to manage these diverse activities.** This consultation paper has been drafted from the perspective of conserving our characteristic biodiversity for future generations, though it is recognised that there are other commercial and land-managing interests that have legitimate concerns over policy guidelines and legislation in this area. The paper does not consider the development or release of genetically modified organisms (GMOs), which have been the subject of separate legislation and policy considerations in Britain, as well as being the subject of a position statement by the statutory conservation agencies.
- 2.3 Translocations can be undertaken for many reasons; they can be used as part of recovery programmes designed to ensure the survival of threatened species (such as the lady’s slipper orchid in England), or they can be undertaken for other reasons which may lead to problems for native flora and fauna. **The establishment of invasive non-native species, accidentally or via deliberate introductions, has resulted in the decline of indigenous species.** For example, the spread of the grey squirrel is believed to have led to a substantial reduction in range and status of the red squirrel throughout much of England, Scotland and Wales. The introduction of plants such as Japanese knotweed and rhododendrons by gardeners, and of non-native freshwater fish (including grass carp and wels catfish) for angling or aquaculture, have led to problems for native species in the areas where these species are established. Preventing future invasions of damaging species, limiting the spread of those non-native species which have already become established in Great Britain, promoting sensible guidelines for carrying out species translocations for conservation and other purposes, and removing the threats posed by habitat translocations to conservation sites, will all make vital contributions to sustaining our

biodiversity in future. This paper *Biological Translocations: a Conservation Policy for Britain* explains what is needed, and suggests how necessary improvements in practice can be achieved, in co-operation with other interests affected by translocations of living organisms.

3 Introduction

- 3.1 In 1979 A Working Group on Introductions, set up by the UK Committee for International Nature Conservation, reported (Anon, 1979); its report is often referred to as the *Linn Report* after the Chairman of the Working Group (Ian Linn). Subsequently, Wildlife Link commissioned a report which included conservation guidelines for species introductions and re-introductions (Stubbs, 1988 *Towards an Introductions Policy*). The NCC then considered an internal Board Paper drafted by the Chief Scientist Directorate in 1990 which made a number of policy recommendations, though these were not publicised externally.
- 3.2 The current initiative by the statutory conservation agencies began in 1995 when a review on translocations was commissioned from ITE. The outcome of this review has been published by Bullock *et al* (1997). Also in 1995, JNCC hosted with the BOU a conference on 'Feral and Introduced Birds', whose papers were published as Holmes and Simons (1995). In 1996, the Joint Nature Conservation Committee agreed that translocations are a strategic priority for biodiversity conservation, and that a consistent policy approach should be developed on behalf of the statutory conservation agencies in GB. In 1997, an Inter-agency Translocations Working Group was established to review current policy and practice, and to consider how these may be improved. The outcome of the discussions of this Translocations Working Group, together with a synopsis of recent reviews of translocations, is presented here. Detailed technical background is not included and only selected key references are cited in order to simplify presentation. The selected references, notably Bullock *et al* (1997), include more technical information, as well as published accounts of policy and practice in relation to translocations. In due course, after appropriate consultations and revisions, it is intended that the proposals in this paper will be submitted for incorporation as part of Government policy for protecting the environment.
- 3.3 The terms used in this paper are defined by Bullock *et al* (1997) and are listed as Annex 3. This paper discusses **three main themes** which provide the basis for proposals for a translocations policy, initially for the statutory conservation agencies.
 - i. **First, the impacts of non-native (alien) species upon Britain's characteristic biodiversity.** The recommendations seek to reduce the impacts of non-native species on indigenous, characteristic biodiversity. **The aim is to minimise damage, whether this results from deliberate or unintentional introductions of non-native species, through the adoption of preventive and ameliorative measures.** The different sectoral interests (biodiversity conservation, agriculture, forestry,

aquaculture, industry and the general public) affected by the spread of non-native species should be consulted when these issues are considered. Although it is beyond the scope of this paper to consider the economic effects of non-native species in Britain, it should be noted that there have been significant economic losses resulting from the establishment of birds (e.g. Canada geese), mammals (e.g. grey squirrel, coypu and rabbit) and plants (e.g. Japanese knotweed). Although we do not have estimates of these costs in Britain, they will be substantial, if not as great as those estimated for the United States (see 8.1 below).

- ii. **Second, the translocation of native species (including the reintroduction of former native species now extinct in Great Britain) for conservation purposes or for other objectives.** The paper contains a process (Annex 1) intended to achieve greater consistency of approach when considering proposals to translocate native species for biodiversity conservation, or for other purposes. Because there are many different views on this subject, the **Translocations Working Group decided to recommend the adoption of internationally approved guidelines, prepared under the auspices of IUCN** (see Annex 2). These provide a policy framework for the statutory conservation agencies and others to address these issues more consistently in future, as well as being an agreed international standard.
- iii. **Third, habitat translocations, whether undertaken in order to mitigate damaging developments, or as part of restoration schemes.** The translocation of assemblages of species (often including the substrates on which they occur) is here termed *habitat translocation*. **Habitat translocation is not regarded by the statutory conservation agencies as an acceptable substitute for *in situ* conservation, because there is evidence that it does not work.** However, in some circumstances, habitat translocation can contribute to a restoration scheme.

- 3.4 In order to agree what action to take when non-native species are damaging the UK's characteristic biodiversity, or when habitat translocation is put forward as allowing development to proceed with acceptable consequences for biodiversity, **rapid decision-taking procedures are needed, which at the same time allow different interest groups to put forward their views.** These procedures should be thorough enough to allow all pertinent views to be heard, while at the same time allowing rapid and authoritative decisions to be made when needed. It is essential to ensure that the necessary decisions can be taken quickly, to avoid invasive species reaching high population levels that will prevent effective suppression or eradication measures subsequently. Thus, in addition to proposing a translocations policy for the statutory conservation agencies, this paper also considers briefly how that policy could be implemented in ways which are likely to command support from a wide variety of other legitimate interests.

4. International considerations

- 4.1 **There has been considerable international concern regarding the impact of non-native species translocations upon native biodiversity and upon the economics of farming, forestry and aquaculture** (IUCN 1987, 1995). In many cases, islands have had their native flora and fauna extensively disrupted by non-native species, with native plants out-competed by non-native species and native animals reduced or eradicated by non-native predators, pests and pathogens etc. Great Britain has been one source of plants and animals which has caused these problems, particularly for New Zealand, where it has been estimated that about 60% of all plant and animal species are now non-native in origin, with many of them now causing serious conservation problems. Thus, **it is suggested that there is a need to consider how species translocations from Great Britain may cause problems elsewhere.** The risks from our flora and fauna should be based upon the evidence of British species that have caused problems hitherto. The Bern Convention has promoted discussions on problem non-native species and the Standing Committee passed a resolution (Recommendation 77) concerning the control of non-native vertebrates that threaten native biodiversity. These issues should also be considered in conjunction with other members of the European Union, in order to ensure a consistent approach across Europe. The spread of certain species across continental Europe should be assessed, so that if and when some of these species arrive in Britain, appropriate action can be taken. Indications that a species is causing problems in adjacent countries may give early warning of potential difficulties here, and hence the need for enhanced surveillance or other measures. Sharing knowledge and best practice with other European countries (and globally) will also be a good investment for the future.
- 4.2 **It is recommended that the statutory conservation agencies should adopt formally the 1995 IUCN Guidelines for re-introductions** (Annex 2) as an authoritative source of information on species translocations for conservation purposes and that Britain should follow the steps included in these *Guidelines* to ensure the sound conduct of proposed reintroduction projects. The conservation agencies should participate in the future refinement and development of these *Guidelines*, within the constraints of available staff time and other resources.
- 4.3 **It should be noted that the UK is bound by international agreements and conventions which include sections relating to translocations;** notably Article 22 of the Habitats Directive, Article 11 of the Birds Directive, the Convention on Biological Diversity, the Ramsar Convention, the African Eurasian Waterbirds Agreement, the Bonn Convention on Migratory Species, the Helsinki Ministerial Conference on Forestry and the Bern Convention.
- 4.4 **Article 22 of the Habitats Directive states:** "In implementing the provisions of this Directive, Member States shall:

- (a) study the desirability of re-introducing species in Annex IV that are native to their territory where this might contribute to their conservation, provided that an investigation, also taking into account experience in other Member States or elsewhere, has established that such re-introduction contributes effectively to re-establishing these species at a favourable conservation status and that it takes place only after proper consultation of the public concerned;
- (b) ensure that the deliberate introduction into the wild of any species which is not native to their territory is regulated so as not to prejudice natural habitats within their natural range or the wild native fauna and flora and, if they consider it necessary, prohibit such introduction. The results of the assessment undertaken shall be forwarded to the committee for information;
- (c) promote education and general information on the need to protect species of wild fauna and flora and to conserve their habitats and natural habitats."

4.5 **Article 11 of the Birds Directive states:** "Member States shall see that any introduction of species of bird which do not occur naturally in the wild state in the European territory of the Member States does not prejudice the local flora and fauna. In this connection, they shall consult the Commission."

4.6 **Article 8, paragraph (h), of the Convention on Biological Diversity states** that countries are required to "Prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species". At the fifth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice in Montreal (January-February 2000) a detailed draft recommendation on "Alien Species: guiding principles for the prevention, introduction and mitigation of impacts" was submitted by the chair of the working group. The contents of this draft, if adopted, would strengthen the case for additional measures to be taken in Britain to deal with non-native species that are damaging biodiversity.

5. **Future data collection for translocated species and habitats, and mechanisms for reporting to Government**

5.1 **Until now there has not been a clear and generally agreed mechanism for collecting data on translocated species**, though there has been a number of attempts to compile data for selected species and habitats translocations in Britain. The *IUCN Guidelines for re-introductions* (Annex 2) identify a range of requirements for collecting data before, during and after carrying out species translocations for conservation purposes. Collecting these data, and making full use of the resulting information, is essential in order to learn from past activities and to take future decisions with the help of a more extensive body of facts.

- 5.2 **Species and habitats translocations should be systematically recorded and the results made available for review and reporting by the statutory conservation agencies.** In the short term this could be carried out most probably by the Biological Records Centre (in the Centre for Ecology and Hydrology), or possibly by another suitable contractor; in the medium term it could be a reporting element within the National Biodiversity Network, bringing together local and national recording initiatives. The data collection protocols for recording translocations of native species and of habitats need to be agreed by those organisations who authorise, fund or otherwise support these activities for conservation or other purposes. These protocols will need to be explicit with respect to who is responsible for recording and reporting each type of translocation, so that a rigorous and consistent approach is maintained to assessing the outcomes of these initiatives. The extensive use of non-native species in agriculture and forestry will require careful consideration of what translocations are appropriate to record by these industries. This should be the subject of separate consideration, perhaps within the scope of the 2001 DEFRA Review of Non-native Species Policy.
- 5.3 **Following a British Ornithologists' Union/JNCC initiative, the UK ornithological recording community now routinely carries out surveillance of non-native birds in the UK and these data are reported annually by the relevant schemes.** This provides information on the occurrence and spread of non-native birds. **Similar initiatives for other taxa should be promoted actively by JNCC and the Country Agencies,** through their support for the Biological Records Centre and the National Biodiversity Network. Recording the arrival and spread of non-natives species is more difficult than documenting the results of deliberate translocations (referred to in 5.2 above). Fortunately, many naturalists involved with biological recording are interested in finding new arrivals for our fauna and flora, and with suitable encouragement and support via the National Biodiversity Network they will remain keen and vigilant in carrying out these tasks. Consideration should be given to ways in which reporting new arrivals of non-native species can be speeded up to avoid delays that will prevent effective eradication or suppression measures subsequently. The use of the Internet to report discoveries to recorders, and to encourage others to look for particular species, is one promising means of achieving quicker detection of potentially damaging species.
- 5.4 Legally protected species (except birds) are reviewed every five years (via the Quinquennial Review of Schedules 5 and 8 of the Wildlife and Countryside Act, 1981). **There is merit in considering the establishment of a similar rolling review process for species (and possibly habitats) translocations.** This would concentrate upon the effects of established non-native species on biodiversity and economic concerns, and would ensure that the issues are not allowed to lie unattended. The role could be discharged by the new body mentioned in paragraph 6.1 (below), with a remit to include all taxa (animals, plants, fungi and micro-organisms).

- 5.5 If a review process were established, then reports by the statutory conservation agencies and others would be timetabled into the review process, with the supply of data and information sought by contracts and other mechanisms which are used for biodiversity reporting.

6. Roles and responsibilities

- 6.1 **Hitherto, one of the main obstacles to tackling translocations issues effectively in Britain has been the lack of a properly funded organisation, or forum, bringing together relevant bodies, to lead and co-ordinate the necessary actions.** One option is to establish a new organisation, or forum, to bring together DEFRA, Scottish Executive, National Assembly for Wales, the GB statutory conservation organisations and environment agencies and Forestry Commission to ensure that required actions are taken nationally and locally. Alternatively, an existing organisation could be charged with leading and co-ordinating policy and practical work on biological translocations in Britain. Either way, representatives of local government, NGOs and commercial interests would need to be involved with and contribute to the work of the lead organisation to ensure engagement of these sectors. A key objective would be to obtain agreement on the proposed eradication or control of non-native species where this is agreed to be both desirable and feasible and to prevent further damaging invasions. The options for establishing a co-ordinating body could be discussed as part of the DEFRA Review of Non-native Species Policy begun in 2001. The body is likely to be advisory in function with executive powers exercised by the Government Department(s) identified in the enabling legislation.

7. Structure of a translocations policy for the GB statutory conservation agencies

- 7.1 **It is recommended** that a credible translocation policy for the GB statutory conservation agencies should contribute to the conservation of Britain's heritage of biodiversity by:
- i. **Safeguarding native species**, including their genetic integrity and diversity, their distribution and status, and their interactions with other species, by avoiding damage due to invasions by non-native species resulting from human activities and the irresponsible release of native species.
 - ii. **Protecting the full range of GB biotopes**, and their characteristic assemblages or communities, *in situ* and preventing damage due to invasion by non-native species resulting from human activities and the irresponsible release of native species.
- 7.2 In order to succeed in conserving biodiversity, the **translocations policy should consist of a number of separate but mutually supportive elements, which together address the key issues on invasive non-native species, on**

species translocations for biodiversity conservation or other purposes, and on habitat translocations. These elements are:

- i. A set of **general principles** for dealing with all kinds of translocations, based upon a **precautionary approach** and designed to prevent damage to biodiversity through the establishment and spread of invasive species, through inappropriate translocation of native species, or through attempts to move habitats to mitigate development proposals.
- ii. Essential **amendments to current legislation** to regulate those activities (such as the establishment of plants, known to be invasive in other countries, via planting in gardens), which require to be tightly controlled to prevent future losses of native biodiversity.
- iii. The establishment of an **agreed process and mechanism** for assessing both benefits and likely risks of translocations, involving, where necessary, consultation with the different sectoral interests.
- iv. An agreement on the **roles and responsibilities** of the various statutory organisations that deal with translocations, so that future action is decisive and properly co-ordinated between the different interests concerned.
- v. An improved process for **collecting data** on the status, distribution and ecological effects of introduced species, translocated native species and habitats translocations.
- vi. **Regular reports to Government** on the impacts of introduced species and what is being done to mitigate these impacts.

The suggested content of each of these elements is outlined below for each of the three themes. There are special issues for marine, freshwater and terrestrial ecosystems that need to be taken into account when developing the policy further, but these are not discussed in detail within this draft.

Translocation of non-native species into Britain

8. Introduction

- 8.1 The deliberate and accidental **translocation of species beyond their native range is a major cause of loss of characteristic biodiversity throughout the world** (IUCN, 1997). In Britain, although the problems have been less severe than in many other countries, there have been adverse effects upon native species due to the introduction of non-native species. There have also been major economic impacts from the translocations of species outside their native range, with weeds and animal pests causing damage to agriculture, forestry, aquaculture and other sectors (Williamson, 1996). The costs of these impacts have been estimated to total \$97 billion hitherto for 79 major bioinvasions to the United States (Bright, 1998). The growth in international trade and commerce has led to increasing translocation of species between countries and continents, both deliberately (for example, as with the horticultural trade) and unintentionally (for instance, insects within passenger aircraft, or marine organisms on ships or within their ballast water). While deliberate translocations can be regulated and controlled, at least to some degree, unintentional translocations can be much harder to prevent even with rigorous inspection and quarantine procedures. Bullock *et al* (1997), in an extensive review commissioned by JNCC, brought together the factual background to species translocations into and within Britain. It should be noted that some migratory species occur in Britain for only part of the year (for example some birds and butterflies). These are regarded here as being native species, which can be further categorised as **native - non-breeding** (for wintering birds that do not breed in Britain) or **native - breeding** (for summer birds and butterflies that breed in Britain but do not remain here all year).
- 8.2 It is outside the scope of this paper to summarise the extensive literature on non-native species translocations and their consequences for biodiversity. However, **two general principles** are worth stating to establish a context for deliberate or accidental translocations (resulting from human activities) to build upon here. First, *prevention is better than cure*; eradicating or suppressing populations of non-native species is often impossible and certainly more expensive, has uncertain outcomes, and typically has undesirable side effects, compared with the preferred choice of preventing establishments in the first place. Second, *it is hard to predict the outcomes of translocating species beyond their native ranges*. While the characteristics of invasive and troublesome species have been reasonably well defined, this has not hitherto enabled accurate predictions of the results of translocating a species to a defined location. It follows from these two principles that, from the perspective of conserving biodiversity, **a precautionary approach is essential when examining how to handle issues of translocating species beyond their native ranges**. As mentioned in 12.2 (below) the ranges of many species change naturally over time, and attempting to resist such changes is generally inappropriate and likely to be futile.
- 8.3 There has been, and is, much international work progressing currently on the **prevention and management of invading non-native species**. The SCOPE

(Scientific Committee on Problems of the Environment) international programme on the ecology of biological invasions ran for about 10 years from 1982. The background to this project and the publications which it generated are summarised by Williamson (1996). More recently, there have been a number of international meetings (for example, the Norway/United Nations conference on alien species at Trondheim in July 1996 and the World Conservation Congress Workshop on alien invasive species at Montreal in October 1996). There is a newsletter, *Aliens*, which is prepared under the auspices of the Invasive Species Specialist Group of the IUCN Species Survival Commission. Recently, the Global Environment Facility of the World Bank has allocated funds to the Global Invasive Species Programme (GISP) co-ordinated by SCOPE. This programme will run for over two years and comprises meetings and publications on invasive species and their impacts. Keeping up with, and participating in, these developments, as well as being aware of relevant information in the extensive literature, is currently beyond the capacity of the statutory conservation agencies. The best that can be achieved at present is to participate in a small selection of the key events and thereby seek to maintain dialogue with others and to influence major decisions. Ideally, the more accessible literature and other sources should be scanned for news of ideas and findings relevant to conserving UK biodiversity.

9. Background to some key issues

- 9.1 **The use of non-native species in farming, forestry, aquaculture and for recreational purposes has increased in Britain during this century** (Bullock *et al*, 1997). Species may be imported because they grow faster (offering increased economic returns), because they feed on and suppress other species (biological control species), or simply because people like them (pets and many garden plants). Thus, those concerned about the effects of translocations upon native biodiversity need to take into account the views and actions of other interests who wish to continue to import and release non-native species. Inevitably, there will continue to be conflicts of view between proponents for importation and release of non-native species and those seeking to conserve indigenous biodiversity.
- 9.2 **Once non-native species are established in Britain, many people regard them with approval and even affection.** The grey squirrel is a favourite animal in urban parks and suburban gardens where few other mammals are seen, while sycamore and rhododendron are plants which many would think of as characteristic and desirable species in both town and country areas where they occur. For those wishing to conserve the red squirrel, the grey squirrel is a problem species, at least in some areas, while characteristic plant communities can be invaded and greatly modified by species such as sycamore and rhododendron. Therefore, different people may regard the same non-native species with opposing views and emotions according to their personal or business interests. As a consequence, there are a number of competing perspectives which challenge or support the views held by conservationists. In turn, this leads to a strong political dimension for the debates on alternative

responses and courses of action which could be taken when non-native species become invasive and jeopardise biodiversity and other interests.

10. A short account of domestic legislation concerning translocations of non-native species

10.1 **Current legislation is summarised by NCC (1990), Department of the Environment (1997) and Bullock *et al* (1997).** The Wildlife and Countryside Act 1981 is the principal legislation regulating the release into Great Britain of non-native species. Section 14(1) of the Act makes it an offence to release (except under licence) any animal species not normally resident in or not a regular visitor to Great Britain, or to release those non-native animals which have become established in the wild and are listed on Schedule 9 Part 1 of the Act. The release of non-native plants is not regulated by the Act except for those established non-native plants listed on Schedule 9 Part 2. Thus, **there is no legal mechanism for preventing the release of non-native plants unless they are already causing significant problems** (although in theory any plant species can be added to Schedule 9 Part 1). This is a serious shortcoming with the existing legislation. The legislation is also limited in that it contains no specific provisions in relation to organisms other than animals and plants (e.g. fungi or micro-organisms).

10.2 Other legislation relates to:

- i. keeping or releasing certain non-native fish (Import of Live Fish Acts (Scotland 1978, England and Wales 1980);
- ii. release of fish into inland waters (Salmon and Freshwater Fisheries Act 1975; Salmon Act 1986);
- iii. the control or eradication of non-native pest mammals (Destructive Imported Animals Act 1932);
- iv. control of imported plant pests or pathogens (Plant Health Act 1967) or animal pathogens (Animal Health Act 1981);
- v. control of imports of threatened non-native species (Endangered Species (Import and Export Act) 1976 and EEC Regulation 3626 regarding the Convention on International Trade in Endangered Species (CITES)).

10.3 Non-native animals cannot be released for biological control purposes unless a licence has been granted under the Wildlife and Countryside Act 1981 (but this does not apply to micro-organisms). Some biological control agents may be considered as pesticides under the Food and Environmental Protection Act 1985. Pesticide controls under the Control of Pesticides Regulations 1986 apply only to viruses, bacteria, protozoa, mycoplasmas and fungi. The Plant Protection Products Regulations 1995, which will progressively replace the Control of Pesticides Regulations 1986 for many products, are also restricted to micro-organisms and chemicals. Tighter controls over the importation of non-

native micro-organisms for biological control are needed, notwithstanding the difficulty of identifying and defining native and non-native taxa in this context. The DEFRA Review of Non-native Species Policy, initiated in 2001, provides a welcome opportunity to consider the scope of current legislation and its effectiveness and enforcement.

11. Policy on non-native species

Principles

11.1 Four guiding principles are proposed:

- i. **Non-native species should not be deliberately introduced into Britain and released into the wild without an appropriate prior risk assessment**, which includes careful analysis to ensure that there is no risk of damage to native biodiversity arising from their establishment in Britain. In each case, the statutory conservation agencies should continue to be consulted about such proposals at each stage of the evaluation and risk assessment process. While it will not be possible to prevent all invasive non-native species from becoming established in Britain, it is realistic to prevent the intentional importation and release of species known to have caused significant problems elsewhere. The burden of proof to demonstrate that the introduced species will not cause problems should lie with the proponent(s) of the translocation, with a precautionary approach leading to the refusal of permission for importation and release of non-native species where there is doubt about the outcome. The same principle of prior risk assessment should apply to British species translocated beyond their current native geographical range, for example to off-shore islands (see 13.3 below).
- ii. A **Code of Practice** should be developed for those proposing to release non-native species, or to keep them in conditions which are not fully contained. The development of this code should involve the participation of both the biodiversity conservation and other sectors concerned with, or affected by, the release of non-native species. This code will need to include provisions for conducting rigorous and impartial risk assessments to inform the process for future licensing or prohibition of such releases. The code will need to be widely disseminated to those sectors involved with non-native species and should be promoted widely to the different target audiences. This will require a co-ordinated campaign to launch and publicise the code and this campaign should be established with the widest possible support. It is essential to ensure that every precaution is taken to guard against possible damaging consequences from the establishment of non-native species. The majority of non-native plants have become established in Britain as escapes from gardens where they have been grown in cultivation. Therefore, the code should include measures to reduce the number of future escapes of non-native plants that are likely to cause problems. This might include restrictions upon growing plants, which,

from previous experience, have become invasive in countries with similar conditions to Britain. This code should also take account of the requirements of the international agreements listed under section 4 (above) and of the provision of the *IUCN Guidelines for re-introductions* (Annex 2). The code will need to be underpinned by improved legislation to reduce the risks from the most damaging non-native species, as summarised in sections 11.2-11.6 below.

- iii. **Improved surveillance and other preventative measures should be taken to reduce the number of unintentional introductions** resulting from species being imported in containers with goods, in material with multiple cryptic species present (such as in soils with horticultural products), or in bulk containers (such as ballast tanks on ships). The Government organisations responsible for carrying out such surveillance, including DEFRA and the Customs authorities, will first need to be involved in a review of the options and costs for improving detection of introductions.
- iv. For those non-native species already established in Britain, **a review should assess the current and potential future damage that they (may) cause to native biodiversity (or to other interests and concerns)**. Such a review will need to be carried out in stages, with an initial scoping phase to agree the basis for the judgements and the data and information required to support the assessments. This review will need to take into account the likely effects of changing land use and climate change upon the ranges of non-native species in Britain. Scottish Natural Heritage have carried out an audit review of non-native species in Scotland (Welch *et al* (2001)), which summarises the number of species known to have become established and the problems that they have caused. This approach should be extended to the rest of Britain for all plants and animals where sufficient data are available. Based on an agreed assessment procedure, these non-native species should then be placed into one of the following categories:
 - a. species for which there are no current significant impacts on native species and a low risk of future damage; for these species no action need be taken except to maintain surveillance on their distribution, status and impacts on other species;
 - b. species for which there are no current significant impacts on native species but a high risk of future damage; for these species interested parties should be consulted on the acceptability of eradication and the cost of an eradication programme should be estimated; a decision on this should be agreed via a body to be established (see paragraph 6.1);
 - c. species which have caused significant current impacts on native species in GB, or elsewhere, and which pose a risk of continuing future damage; for these species eradication or control (including

containment within defined areas) should be proposed to all interested parties and the cost of an eradication or control programme estimated; a final decision on the action to be taken should be agreed via the body proposed in paragraph 6.1. Such decisions must be taken in ways that are democratically accountable and after due consultation with those interests affected by proposals to eradicate or control these problem non-native species. Experience in Britain and elsewhere suggests that once non-native species are well established it is very difficult and expensive to eradicate them. Reducing the spread of these species by suitable controls, and mitigating their worst effects, are likely to be the only affordable and realistic measures proposed in most cases. In some cases biocontrol, using specific natural enemies imported for the purpose, may be possible; however, this option needs to be taken up only after careful prior evaluation because there have been cases abroad where biocontrol introductions have caused substantial damage themselves.

Legislation

11.2 In support of the foregoing principles, the current legislation needs to be strengthened so as to achieve:

- i. A strict regulation on the introduction (and hence establishment) of non-native species (including plants and micro-organisms) into Great Britain. [The instigation of the European single market and moves to extend global free trade may pose problems for drafting effective legislation. This is part of a wider international problem that potentially could constrain new laws designed to reduce the impacts of invasive non-native species.]
- ii. Provision for reducing the spread of problem non-native species already established in Great Britain.
- iii. Provision for eradicating those non-native species which could cause, or are causing, significant damage to characteristic biodiversity or to economic interests.

11.3 To achieve stricter controls on introductions of non-native species, the existing legislation (primarily section 14 of the Wildlife and Countryside Act) needs to be amended to include:

- i. a requirement on those individuals or organisations keeping non-native animals to take adequate measures to prevent their escape or release into the environment;
- ii. an extension to other non-native species, including plants, fungi and micro-organisms, similar controls as those that apply to non-native animals (see 11.4 below for recommendations, including exemptions);

- iii. an extension of the present controls for plants to make it an offence to sell, to plant (including in gardens), cause to grow, or release into the environment plants likely to become established in the wild in Great Britain and are likely to cause damage to native biodiversity. There should be placed upon a competent authority the requirement to compile and maintain a list of such plant species.

11.4 In the JNCC advice to DEFRA on the Effectiveness of Species Protection Legislation (JNCC, 2000) the following two recommendations address issues concerning invasive non-native species (recommendation numbers as in the original advice):

Recommendation 5: Section 14 of the Wildlife and Countryside Act, 1981 should be amended to make it an offence to release, allow to escape, or cause to grow in the wild, any plant or micro-organism which is not ordinarily resident in, or a regular visitor to, Great Britain in a wild state. Provided such action was not undertaken recklessly, we would exempt from this provision plants grown for agriculture, horticulture, forestry or in gardens and micro-organisms used for specified purposes (for example, medicine, veterinary medicine, brewing and food processing).

Recommendation 6: We would propose that Schedule 9 Part II be made available for listing of specified micro-organisms (as well as plants), where such listing is necessary for protecting the environment, and that the sale of plants and micro-organisms listed on Schedule 9 Part II be prohibited except under licence.

These two recommendations were made in the light of the experience of the statutory conservation agencies in the operation of Part I of the Wildlife and Countryside Act, 1981. Recommendation 5 would give increased control of the release of non-native plants and micro-organisms (which has been lacking compared with animals). Recommendation 6 would prevent the sale of those problem species listed on Schedule 9 Part II, except under licence. There needs to be consideration regarding the adequacy of current Control of Pesticides Regulations (COPR) and Plant Protection Products Regulations (PPPR) for safeguarding native characteristic biodiversity with respect to the use of biopesticides containing micro-organisms. Current risk assessments involve a full consideration of the effects of any micro-organism for the proposed field of use, within which the risks of introduction of non-native microbial pesticides are recognised. Nevertheless, discussions between the regulatory bodies and the statutory conservation agencies would be worthwhile to examine the issues of concern for biodiversity conservation.

11.5 **To reduce the spread of, or to eradicate, problem non-native species that are already established, there is a need for enabling legislation.** The purpose of this legislation will be to enable the eradication or suppression of established non-native species. The legislation will need to identify the competent authority responsible for enforcement, after the necessary

consultation has been completed. The legislation should include a requirement for the owner/occupier of land to eradicate the problem species concerned and/or to co-operate with persons authorised to take such actions. Further work is needed to agree how the precautionary principle should be applied when evaluating whether eradication or suppression measures are to be taken against a species. There is a balance to be struck between deploying limited resources against the most significant species already causing problems versus the need to take early action against species (while deleterious effects may only become apparent some time after establishment).

11.6 Legislation to reduce the spread, or to eradicate, problem non-native species would need to be enforced carefully and sensitively. It will need:

- i. a mechanism for agreeing the appropriate course of action in each case;
- ii. the necessary resources available to the competent authority responsible for taking action.

A procedure for benefit, risk and damage assessment

11.7 A procedure for benefit, risk and damage assessment for the introduction of non-native species should be developed and agreed between all the interested and concerned organisations. This procedure should include the following aspects:

- i. The use of agreed criteria for assessing benefits, risks and damage, including possible impacts on native biodiversity (at the genetic, population and community levels).
- ii. An agreed procedure for evaluating assessments, and deciding upon rapid action in relation to problem species.

Translocation of native species in Britain

12. Introduction

- 12.1 **Species translocations can form a valuable part of species recovery programmes**, which are aimed at reversing historical declines in the status of species of conservation significance. However, the role of translocations in conserving species is a matter of lively debate, with a range of views within the statutory conservation agencies (and elsewhere) on when and where such activities are acceptable and desirable. The choices include whether to use translocations at an early stage or as a last resort in species recovery programmes, and whether to employ translocations in preference to awaiting range expansion in response to positive management for the species concerned. The Inter-agency Translocations Sub-Group which met on 8 February 1999 recommended that a process based upon the published *IUCN Guidelines for re-introductions* (1995) be adopted formally by the statutory conservation agencies, and that they should then be applied to consider each case on its merits (see Annex 1 for the process and Annex 2 for the IUCN Guidelines).
- 12.2 In addition to human-mediated translocations, the **ranges of species alter naturally over time in response to environmental changes, evolutionary processes and catastrophic events**. Some of these natural range changes are gradual and continuous, while others are sudden and abrupt. Such rapid changes may become more frequent if current trends and predictions for climate change are accurate. Human activities have resulted in more species being dispersed and over greater distances. In practice, many of these translocations (whether deliberate or unintentional), can be difficult to distinguish from unassisted dispersal. It is generally agreed within the statutory conservation agencies that natural range changes should be accepted as part of the normal functioning of ecological systems, and that intervening against range changes, on the grounds of biodiversity conservation, is almost always not appropriate and likely to be ineffective. With increasing evidence that climate change is occurring, there is the probability that more species will be changing their ranges in future. This includes species not yet found in Britain, that will arrive here from continental Europe, either by natural dispersal or with human assistance (deliberate or unintentional).

13. Background to some key issues

- 13.1 **Many native species are translocated during the course of normal agricultural, horticultural and silvicultural operations**. These activities have been prevalent for many centuries and have led to changed distributions of many native species including hedgerow shrubs and woodland trees. For some tree species, such as Scots pine or oaks planted to regenerate woodlands, it has long been argued that using local provenance stock is preferable on grounds of retaining desirable characteristics for forestry and conservation reasons.
- 13.2 **There has also been considerable concern regarding the importation of non-native individuals of native species** which may (at least in part) be

regulated by Section 14 of the Wildlife and Countryside Act if they are regarded as being not of "a kind" ordinarily resident in Britain. Different populations of the same species may have different gene frequencies and these genetic differences may be expressed as visible characters (colour, size etc) or in their developmental (such as time of reproduction) or ecological (such as host plant associations) attributes. It is these genetic differences that underlie concerns about translocating individuals from other countries into Britain, or between different parts of Britain. There has been a conflict between the provisions of the Wildlife and Countryside Act in preventing the importation of non-native individuals of native species and European law designed to ensure free trade and movement of goods and services within the European Union. However a recent judgement of the European Court of Justice in 1998, concerning the importation of honeybees into Denmark, established that trade regulations can be over-ruled by national conservation law. The *Flora Locale* project, which has received support from English Nature, has sought to raise awareness of issues concerning importation of non-native seeds of native plants and to develop policies to sustain local characteristics of wildflowers. Continued support for this project will help to influence practices in areas such as landscaping for major transport and industrial schemes (as well as for habitat restoration and creation) which require large amounts of seed of native plants. There is a need to encourage the development of large scale production of native and local provenance seed for habitat restoration and creation projects to avoid the current shortfalls that lead to the importation of seeds from elsewhere. Concerns about genetic differences between individuals derived from native and non-native populations of the same species, or between populations in different parts of Britain, are not confined to wildflowers because there is increasing awareness of the significance of genetic differences between different populations of the same species. More widespread use of the term biodiversity, which encompasses the full range of the variety of life, from that found within species (genetic variation) to assemblages of species in association with their environment (biomes), has led to greater attention to the extent of genetic differences that have evolved within species. This genetic diversity can also be considered at different scales, including the degree of genetic variation within a population, between different populations and within the species as a whole. Different species have their own characteristic patterns of genetic variation, which will change over time through evolution and through changes in the range and abundance of individual species. These patterns will also be affected by human activities, including translocations carried out for a variety of reasons. As we learn more about these patterns of genetic variation, and how they affect the survival of populations and of species themselves, genetic factors will come to be investigated in greater detail as part of evaluating translocations for conservation and other purposes. Bullock *et al* (1997) review current knowledge of genetic factors in relation to biological translocations, from which it is apparent that these factors interact with others in complex ways according to the species concerned. It is beyond the scope of this paper to propose policies to address genetic factors in relation to translocations; this is a task for a future initiative to address in detail, taking into account our current state of knowledge.

- 13.3 **Some native species have caused severe problems for characteristic biodiversity when translocated beyond their native range.** An example that illustrates the severity of the impacts that this kind of translocation can cause is the introduction of the hedgehog to the Outer Hebrides. While hedgehogs are native on the mainland, they had never colonised the islands off the coast of Scotland where there are large populations of nesting birds. Since hedgehogs were deliberately introduced to South Uist in 1974, their numbers have increased considerably, they have colonised other nearby islands and they are now major predators of the eggs of ground-nesting birds, notably waders. This predation has been sufficient to cause substantial declines in the numbers of the most susceptible species such as dunlin. These problems are much better prevented than tackled after the introduction has taken place (both to avoid damage to species such as waders and because control or eradication are very expensive and difficult). Urgent consideration needs to be given to putting in place effective measures to prevent such damaging translocations in future. Possible measures include new legislation (although this would be difficult to draft and hard to enforce), combined with publicity initiatives designed to raise public awareness of the problems caused by beyond range introductions to discourage them in future (though determined individuals might still persist with these activities). Further work is required to look at the best options for reducing translocation of native species beyond their native ranges, particularly of predators into fragile island habitats.
14. **A short account of domestic legislation concerning translocations of native species**
- 14.1 **Legislation relating to the reintroduction of species which were formerly native, but are now extinct in Great Britain, is the same as for non-native species.**
- 14.2 Apart from legislation concerning protected species, animal welfare and to control weeds, **translocation of native species currently extant in Great Britain is not subject to significant legal controls or constraints.** Translocation of wild species included on Schedules 5 and 8 of the Wildlife and Countryside Act, 1981 and Schedules 2 and 4 of the Habitat Regulations, 1994 requires a licence from the relevant Country Agency. The regulation of those activities which result in the translocation of native species is generally best dealt with by codes of practice. The exception to the preferred regulation of these activities by code of practice relates to the translocation of species beyond their native range, which is discussed in 13.3 above. Because of the need to prevent damaging introductions to ecologically vulnerable islands, stricter controls may need to be based upon new legislation to be effective in future.
15. **Policy and supporting procedures relating to native species**
- 15.1 In this section, the **policy for native species comprises three main elements;** these relate to:

- i. **Species which have lived in the wild in Great Britain in historical times but are now extinct in Great Britain.** The translocation of individuals of such species into Great Britain would constitute a reintroduction. Example species include the wolf (last recorded in Scotland in 1740), the black-veined white butterfly (last recorded in England in 1923) and summer lady's-tresses (last recorded in England in 1959). All of these species currently occur in continental Europe, but no longer survive in Britain.
- ii. **Species which are native to Great Britain (i.e. they are not believed to have been introduced) and which still occur here,** but for which it is now proposed to translocate individuals of the species **beyond** the current or recent historic range (defined here as post 1600). An example would be the translocation of mammal species, such as hedgehog, onto islands where they have not been recorded hitherto, such as the Outer Hebrides (the consequences of which are discussed above in section 13.3). Another example would be to translocate buckthorn bushes to Scotland (this plant currently only occurs as far north as Cumbria in northern England).
- iii. **Species native to Great Britain** (i.e. they are not believed to have been introduced) and which still occur here, but where there is a proposal to translocate individuals of the species **within** its current or recent historic range (post 1600). Examples would be to translocate dormouse, natterjack toad or lady's slipper orchid to sites within counties where they occurred formerly.

Principles

- 15.2 In relation to the native species referred to under paragraph 15.1 above, the 1995 *IUCN Guidelines for Re-introductions* have been endorsed by the statutory conservation agencies, from which the following principles shall apply:
- i. **Species translocations should not damage donor populations.**
 - ii. **Species translocations should not damage species or communities at recipient sites,** either of populations of other species or distinctive genotypes of other populations of the same species.
 - iii. **Species translocations should be undertaken in ways that pay attention to, and safeguard the welfare of,** the organisms to be translocated.
 - iv. **Species translocations should be assessed using the standard procedure and criteria** as defined under paragraph 15.4 and in Annexes 1 and 2 below.

- v. **The intentional translocation of threatened native species within their current or recent historic range will be assessed case by case**, using the process described in Annex 1; such proposals are likely to be considered more favourably than translocations beyond their range, providing that they are not predicted to damage donor populations and that there is evidence that they will not compromise local characteristic biodiversity at recipient sites.
- vi. **Intentional re-introductions and the translocation of native species beyond their current or recent historic range will be assessed case by case**, using the process described in Annex 1; the predicted effects on donor populations, and particularly the evidence that they will not damage local characteristic biodiversity at recipient sites, will be key factors in the standard assessment process.
- vii. **Guidelines need to be agreed to deal with the relocation of populations of species threatened by developments that have been approved**, with the process described in Annex 1 offering initial guidance on some key points. These relocation guidelines should be developed in conjunction with those organisations currently involved with species relocations, taking into account the experience gained hitherto from licensed relocations of protected species.

Legislation

- 15.3 **In relation to species which have lived in the wild in Great Britain in historic times but which are now extinct, the recommendations set out in paragraph 11.1 shall apply to these species as if they were non-natives.** Thus, any of these species that are candidates for reintroduction will be subject to an appropriate risk assessment process.

A procedure for benefit, risk and damage assessment

- 15.4 The process outlined in Annexes 1 and 2 shall be applied to re-introductions and to the translocation of other native species beyond their current or recent range. In relation to the translocation of native species within their current or recent range the same process shall be applied if the species are Species of Conservation Concern (identified by the UKBAP process and the JNCC Species Status project). The process for whereby the statutory conservation agencies would administer this procedure and ensure that the guidelines are followed will be examined in detail after the principles of this approach have been consulted upon with other organisations and individuals.

Translocation of habitats in Britain

16. Introduction

16.1 **The practice of habitat translocation has increased recently in Britain**, often in response to development proposals affecting sites of known or potential importance for wildlife. Habitat translocation is here defined as the movement of assemblages of species (usually including the substrates on which they occur) from their original site to a new location. There are circumstances where translocations of individual species may require the associated movement of other species and associated substrate material, but the scale of habitat translocation will typically be much larger in terms of the range of species and amount of substrate to be moved. The available evidence indicates that such habitat translocations have not been successful in maintaining the characteristic biodiversity of the assemblage that is moved, and so the practice is regarded as damaging by statutory and voluntary conservation organisations. This was the clear view which emerged from the discussion at the June 1997 Joint Committee meeting and from the meetings of the Inter-agency Translocations Working Group. In some circumstances, habitat translocation may assist with the restoration of damaged or degraded areas, or with establishing links between fragmented habitats, though special safeguards are necessary to prevent damage to donor sites and other undesirable outcomes. Bullock *et al* (1997) summarise much of the factual background to habitat translocations in Britain, while Jefferson *et al* (1999) review in detail the experience relating to translocation within a grassland site in Devon (Brocks Farm).

17. Background to some key issues

17.1 Habitat translocations have been proposed as offering a solution when an area recognised as of importance for wildlife is threatened by development. From the point of view of a developer, habitat translocation is an attractive solution because it can be cheaper and more convenient to move the habitat than to proceed with the development elsewhere. **Thus transport, housing and industrial development interests are greatly affected by policies and practices concerning habitat translocation.** The response by conservationists to habitat translocation is most strongly negative for those sites which are of high conservation interest (internationally important or of SSSI quality) for their habitats and species. Even for sites of more local interest, opposition to habitat translocation is strong from conservationists because of the poor track record of sustaining the original quality of translocated habitats, coupled with their dislocation from their ecological and historical context. This has resulted in strongly opposing views between conservationists on the one hand and developers on the other.

18. A short account of domestic legislation concerning habitat translocations

18.1 **Existing wildlife legislation does not contain provisions for habitat translocations.** There have been planning inquiries concerning SSSIs where habitat translocation has been proposed by developers as a means of moving the conservation interest and hence allowing a development to proceed. In some

cases such translocation has occurred. However, a recent judgement regarding Brocks Farm SSSI, Devon, the Planning Inspector found in favour of English Nature and against a proposal to move an area of grassland from within the SSSI (see Jefferson *et al* (1999)). However, although this is a welcome decision, it does not preclude other future planning inquiries finding in favour of proposals which will permit habitat translocation to proceed in mitigation for a planned development. An agreed policy for the statutory conservation agencies stating that habitat translocations are not an acceptable substitute for *in situ* conservation, combined with mounting evidence of the failure of habitat translocations generally, will greatly strengthen the case against translocating habitats from within SSSIs and elsewhere.

19. Policy in relation to habitat translocations

- 19.1 **The translocation of habitats is considered by the statutory conservation agencies never to be an acceptable alternative to *in situ* conservation.** Translocation of habitats cannot reproduce the essential environmental conditions and the wider spatial processes, for example, migration, grazing and predation, which determine the composition of the original plant and animal communities. The available evidence shows that species in translocated habitats change their relative abundance over time, as well as being separated from their ecological, historical and cultural context. Thus, the intrinsic conservation value of translocated habitats is not sustained after the disruptions caused by their removal, transport and placement on a new site. Bullock *et al* (1997) review much of the available evidence and cite references that demonstrate the problems with habitat translocations. For these reasons SSSIs should not be subjected to translocation in whole or in part, and in other areas where there is significant wildlife interest (which should be defined in terms of the species or habitats present, possibly those identified as priority species and habitats by UKBAP) there should be a strong presumption against translocation of habitats. Habitat translocation is expensive to undertake and should be viewed only as a measure of last resort to mitigate damaging developments. Where habitat translocations are undertaken to mitigate the effects of developments, or to increase (or decrease) the biodiversity of an area, monitoring the results (paid for by the proponents of the proposal) must take place in order to assess the nature and extent of the changes which take place within the area translocated, for example, in the abundance of different species. For monitoring to be effective, there must be detailed studies prior to translocation as well as for several years afterwards. The length of time that monitoring is required will depend upon the habitat and species involved and to an extent upon the results of the monitoring (for example, upon the speed and kind of ecological changes observed).
- 19.2 **Habitat translocation can be a part of schemes designed to restore the characteristic biodiversity of damaged or degraded sites,** though because of the wide (and largely undocumented) range of species likely to be involved, such techniques are less precise and less predictable than well-planned species translocations. These methods also carry the risk of damaging donor sites and so should only be approved after thorough assessments have been made of the

losses and gains involved. As with 19.1 (above), SSSIs should never be translocated (in whole or in part), and there should be a strong presumption against translocating habitats from other areas with significant wildlife interest. There needs to be wider discussion and debate concerning the use of habitat translocation for biodiversity restoration, as well as agreement as to how guidelines should be developed and which organisations should be responsible for ensuring that the guidelines and best practice are adhered to.

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ANNEX 1: A PROCESS FOR EVALUATING AND UNDERTAKING SPECIES TRANSLOCATIONS FOR CONSERVATION PURPOSES

The steps outlined for this process will need to be elaborated and transformed into agreed procedures for adoption by the statutory conservation agencies after the principles have been consulted upon and agreed. This process is based upon the *IUCN Guidelines for re-introductions* (1995), which it is recommended should be adopted in full as the technical basis for implementing translocations policy in GB. These Guidelines are attached at Annex 2.

1. Evaluation

- 1.1 The *purpose(s)* of the proposed translocation will be considered. For example, is it part of a recognised UKBAP project or species recovery programme? Is it to rescue populations from potential threats or damaging developments? Is it for research or educational purposes? The purposes(s) of the translocation should comprise part of a conservation programme recognised by the statutory conservation agencies as beneficial to the species being considered for a conservation translocation.
- 1.2 Prior to embarking on a species translocation, the following points should be considered:
 - i. Has an appropriate survey established the current status of the species at the candidate recipient site(s)?
 - ii. Are the reasons known for the previous decline and local extinction of the species?
 - iii. Is there potential for natural range expansion to result in the colonisation of the candidate recipient site(s) over a known timescale?
 - iv. Could habitat restoration and management lead to the recovery of the species without the use of translocations?
- 1.3 *Agreed criteria* for evaluating proposed conservation translocations include:
 - i. there should be good evidence that the species is absent from the proposed release site(s) before the initial translocation;
 - ii. the release site(s) proposed for establishment should be within the historic range (post 1600, to take account of the first documentation of species distributions in Britain) of the species;
 - iii. understanding of the reasons for the original decline and disappearance of the species considered for translocation and their reduction or elimination from the site(s) proposed for establishment of the species;

- iv. consideration of the outcome of any previous translocations of the species involved, either in GB or elsewhere;
 - v. consultation with other organisations and individuals who may be interested in or affected by the proposed translocation project;
 - vi. an assessment of the benefits to the species concerned arising from the proposed translocation (over both short and long timescales);
 - vii. consideration of any possible harmful effects to donor populations;
 - viii. assessment of any possible harm to other species or habitats at the proposed recipient sites;
 - ix. the fit with other conservation objectives of the statutory agency concerned;
 - x. the likely chances of success of the proposed translocation;
 - xi. availability of earmarked funds to complete the planned translocation and subsequent monitoring;
 - xii. use of the most appropriate donor stock, taking into account the ecology, behaviour and genetic constitution of the species.
- 1.4 The use of a *scoring system* could be considered to give weight to the listed criteria and to assist with evaluating candidate species for conservation translocations. Where translocations involve more than one country or there are broader policy issues involved, the JNCC can be a forum for discussing options and agreeing decisions.

2. Preparation

- 2.1 If a decision has been made to proceed with a conservation translocation (which should be via the management process agreed within the agency concerned and with consultations being part of the normal procedures for species covered by UKBAP Action Plans), sufficient time should be allowed to:
- i. obtain necessary approval from other organisations or landowners and resolve any differences of view;
 - ii. communicate and discuss with other conservation organisations (statutory and voluntary) the project plans for the proposed translocation;
 - iii. bring together the specialist skills required (from the conservation agency and elsewhere) to complete the project;
 - iv. itemise and obtain the equipment needed;

- v. plan obtaining, handling and releasing the individuals to be obtained from donor populations.

3. Translocation

3.1 This comprises:

- i. obtaining the most suitable stock for translocation;
- ii. any captive breeding or propagation programme needed to increase numbers to be released;
- iii. screening for any disease organisms and deciding whether dependent species (such as parasites or disease organisms) should be included in the translocation;
- iv. transport and release of the species according to agreed protocols to ensure the welfare and viability of the species concerned;
- v. recording and documenting the activities of the project at each stage in sufficient detail to allow others not involved with the project to repeat the work in future.

4. Post translocation

4.1 Establishing appropriate monitoring for the species concerned is required in order to assess the outcome of the translocation. This monitoring will need to be continued for a sufficiently long period (in relation to the lifespan of the species involved) so as to be able to measure the population performance over several generations. Resources to undertake this monitoring should be available to the organisation(s) proposing and undertaking the translocation at the inception of the programme and for an agreed duration to assess the outcome of the translocation. Biological records of all translocations should be deposited with the appropriate Biological Records Centre National Recording Scheme(s) and Local Records Centre.

4.2 The results from the monitoring should:

- i. inform decisions over future translocation proposals for the species concerned;
- ii. be deposited with the relevant conservation agency and where appropriate be published in suitable scientific and conservation journals;
- iii. be communicated to other conservation organisations and where appropriate to the media and wider public.

ANNEX 2: IUCN GUIDELINES FOR RE-INTRODUCTIONS

IUCN - THE WORLD CONSERVATION UNION

**Re-introduction Specialist Group
Species Survival Commission**

GUIDELINES FOR RE-INTRODUCTIONS (as approved by 41st Meeting of Council, May 1995)

INTRODUCTION

These policy guidelines have been drafted by the Re-introduction Specialist Group of the IUCN's Species Survival Commission¹, in response to the increasing occurrence of re-introduction projects worldwide, and consequently, to the growing need for specific policy guidelines to help ensure that the re-introductions achieve their intended conservation benefit, and do not cause adverse side-effects of greater impact. Although IUCN developed a Position Statement on the Translocation of Living Organisms in 1987, more detailed guidelines were felt to be essential in providing more comprehensive coverage of the various factors involved in re-introduction exercises.

These Guidelines are intended to act as a guide for procedures useful to re-introduction programmes and do not represent an inflexible code of conduct. Many of the points are more relevant to re-introductions using captive-bred individuals than to translocations of wild species. Others are especially relevant to globally endangered species with limited numbers of founders. Each re-introduction proposal should be rigorously reviewed on its individual merits. It should be noted that re-introduction is **always** a very lengthy, complex **and expensive** process.

Re-introductions or translocations of species for short-term, sporting or commercial purposes - where there is no intention to establish a viable population - are a different issue and beyond the scope of these guidelines. These include fishing and hunting activities.

This document **has been written to encompass the full range of plant and animal taxa and is therefore general**. It will be regularly revised. Handbooks for re-introducing individual groups of animals and plants will be developed in future.

CONTEXT

The increasing number of re-introductions and translocations led to the establishment of the IUCN Species Survival Commission's Re-introduction Specialist Group. A priority of the Group has been to update IUCN's 1987 Position Statement on the Translocation of Living Organisms, in consultation with IUCN's other Commissions.

It is important that the Guidelines are implemented in the context of IUCN's broader policies pertaining to biodiversity conservation and sustainable management of natural resources. The philosophy for environmental conservation and management of IUCN and other conservation

bodies is stated in key documents such as "Caring for the Earth" and the "Global Biodiversity Strategy," which cover the broad themes of the need for approaches with community involvement and participation in sustainable natural resource conservation, an overall enhanced quality of human life and the need to conserve and, where necessary, restore ecosystems. With regard to the latter, the re-introduction of a species is one specific instance of restoration where, in general, only this species is missing. Full restoration of an array of plant and animal species has rarely been tried to date.

Restoration of single species of plants and animals is becoming more frequent around the world. Some succeed, many fail. As this form of ecological management is increasingly common, it is a priority for the Species Survival Commission's Re-introduction Specialist Group to develop guidelines so that re-introductions are both justifiable and likely to succeed, and that the conservation world can learn from each initiative, whether successful or not. It is hoped that these Guidelines, based on extensive review of case-histories and wide consultation across a range of disciplines will introduce more rigour into the concepts, design, feasibility and implementation of re-introduction despite the wide diversity of species and conditions involved.

Thus, the priority has been to develop guidelines that are of direct, practical assistance to those planning, approving or carrying out re-introductions. The primary audience of these Guidelines is, therefore, the practitioners (usually managers or scientists), rather than decision-makers in governments. Guidelines directed towards the latter group would inevitably have to go into greater depth on legal and policy issues.

1. DEFINITION OF TERMS

- a) "**Re-introduction**": an attempt to establish a species² in an area which was once part of its historical range, but from which it has been **extirpated** or become extinct³. ("Re-establishment" is a synonym, but implies that the re-introduction has been successful).
- b) "**Translocation**": deliberate and mediated movement of wild individuals to an existing population of conspecifics.
- c) "**Re-enforcement/Supplementation**": addition of individuals to an existing population of conspecifics.
- d) "**Conservation/Benign Introductions**": an attempt to establish a species, for the purpose of conservation, outside its recorded distribution but within an appropriate habitat and eco-geographical area. **This is a feasible conservation tool only when there is no remaining area left within a species' historic range.**

2. AIMS AND OBJECTIVES OF RE-INTRODUCTION

- a) **Aims:** The principal aim of any re-introduction should be to establish a viable, free-ranging population in the wild, of a species, subspecies or race, which has become

globally or locally extinct, or extirpated, in the wild. It should be re-introduced within the species' former natural habitat and range and should require minimal long-term management.

- b) **Objectives:** The objectives of a re-introduction may include: to enhance the long-term survival of a species; to re-establish a keystone species (in the ecological or cultural sense) in an ecosystem; to maintain and/or restore natural biodiversity; to provide long-term economic benefits to the local and/or national economy; to promote conservation awareness, or a combination of these.

3. MULTIDISCIPLINARY APPROACH

A re-introduction requires a multidisciplinary approach involving a team of persons drawn from a variety of backgrounds. As well as government personnel, they may include persons from governmental natural resource management agencies, non-governmental organizations, funding bodies, universities, veterinary institutions, zoos (and private animal breeders) and/or botanic gardens, with a full range of suitable expertise. Team leaders should be responsible for coordination between the various bodies and provision should be made for publicity and public education about the project.

4. PRE-PROJECT ACTIVITIES

4a. BIOLOGICAL

(i) Feasibility study and background research

- An assessment should be made of the taxonomic status of individuals to be re-introduced. They should preferably be of the same subspecies or race as those which were extirpated, unless adequate numbers are not available. An investigation of historical information about the loss and fate of individuals from the re-introduction area, as well as molecular genetic studies, should be undertaken in case of doubt as to individuals' taxonomic status. A study of genetic variation within and between populations of this and related taxa can also be helpful. Special care is needed when the population has long been extinct.
- Detailed studies should be made of the status and biology of wild populations (if they exist) to determine the species' critical needs. For animals, this would include descriptions of habitat preferences, intraspecific variation and adaptations to local ecological conditions, social behaviour, group composition, home range size, shelter and food requirements, foraging and feeding behaviour, predators and diseases. For migratory species, studies should include the potential migratory areas. For plants, it would include biotic and abiotic habitat requirements, dispersal mechanisms, reproductive biology, symbiotic relationships (e.g. with mycorrhizae, pollinators), insect pests and diseases. Overall, a firm knowledge of the natural history of the species in question is crucial to the entire re-introduction scheme.

- The species, if any, that has filled the void created by the loss of the species concerned, should be determined; an understanding of the effect the re-introduced species will have on the ecosystem is important for ascertaining the success of the re-introduced population.
- The build-up of the released population should be modelled under various sets of conditions, in order to specify the optimal number and composition of individuals to be released per year and the numbers of years necessary to promote establishment of a viable population.
- A Population and Habitat Viability Analysis will aid in identifying significant environmental and population variables and assessing their potential interactions, which would guide long-term population management.

(ii) Previous Re-introductions

- Thorough research into previous re-introductions of the same or similar species and wide-ranging contacts with persons having relevant expertise should be conducted prior to and while developing the re-introduction protocol.

(iii) Choice of release site and type

- The site should be within the historic range of the species. For an initial re-enforcement there should be few remnant wild individuals. For a re-introduction, there should be no remnant population to prevent disease spread, social disruption and introduction of alien genes. In some circumstances, a re-introduction or re-enforcement may have to be made into an area which is fenced or otherwise delimited, but it should be within the species' former natural habitat and range.
- A conservation/benign introduction should be undertaken only as a last resort when no opportunities for re-introduction into the original site or range exist and only when a significant contribution to the conservation of the species will result.
- The re-introduction area should have assured, long-term protection (whether formal or otherwise).

(iv) Evaluation of re-introduction site

- Availability of suitable habitat: re-introductions should only take place where the habitat and landscape requirements of the species are satisfied, and likely to be sustained for the foreseeable future. The possibility of natural habitat change since extirpation must be considered. Likewise, a change in the legal/political or cultural environment since the species' extirpation needs to be ascertained and evaluated as a possible constraint. The area should have sufficient carrying capacity to sustain growth of the re-introduced population and support a viable (self-sustaining) population in the long run.
- Identification and elimination, or reduction to a sufficient level, of previous causes of decline: could include disease; over-hunting; over-collection; pollution; poisoning; competition with or predation by introduced species; habitat loss; adverse effects of

earlier research or management programmes; competition with domestic livestock, which may be seasonal.

- Where the release site has undergone substantial degradation caused by human activity, a habitat restoration programme should be initiated before the re-introduction is carried out.

(v) **Availability of suitable release stock**

- It is desirable that source animals come from wild populations. If there is a choice of wild populations to supply founder stock for translocation, the source population should ideally be closely related genetically to the original native stock and show similar ecological characteristics (morphology, physiology, behaviour, habitat preference) to the original sub-population.
- Removal of individuals for re-introduction must not endanger the captive stock population or the wild source population. Stock must be guaranteed available on a regular and predictable basis, meeting specifications of the project protocol.
- Individuals should only be removed from a wild population after the effects of translocation on the donor population have been assessed, and after it is guaranteed that these effects will not be negative.
- If captive or artificially propagated stock is to be used, it must be from a population which has been soundly managed both demographically and genetically, according to the principles of contemporary conservation biology.
- Re-introductions should not be carried out merely because captive stocks exist, nor solely as a means of disposing of surplus stock.
- Prospective release stock, including stock that is a gift between governments, must be subjected to a thorough veterinary screening process *before* shipment from original source. Any animals found to be infected or which test positive for non-endemic or contagious pathogens with a potential impact on population levels, must be removed from the consignment, and the uninfected, negative remainder must be placed in strict quarantine for a suitable period before retest. If clear after retesting, the animals may be placed for shipment.
- Since infection with serious disease can be acquired *during* shipment, especially if this is intercontinental, great care must be taken to minimise this risk.
- Stock must meet all health regulations prescribed by the veterinary authorities of the recipient country and adequate provisions must be made for quarantine if necessary.

vi) **Release of captive stock**

- Most species of mammals and birds rely heavily on individual experience and learning as juveniles for their survival; they should be given the opportunity to acquire the necessary information to enable survival in the wild through training in their captive environment; a

captive bred individual's probability of survival should approximate that of a wild counterpart.

- Care should be taken to ensure that potentially dangerous captive-bred animals (such as large carnivores or primates) are not so confident in the presence of humans that they might be a danger to local inhabitants and/or their livestock.

4b. SOCIO-ECONOMIC AND LEGAL REQUIREMENTS

- Re-introductions are generally long-term projects that require the commitment of long-term financial and political support.
- Socio-economic studies should be made to assess impacts, costs and benefits of the re-introduction programme to local human populations.
- A thorough assessment of attitudes of local people to the proposed project is necessary to ensure long-term protection of the re-introduced population, especially if the cause of species' decline was due to human factors (e.g. over-hunting, over-collection, loss or alteration of habitat). The programme should be fully understood, accepted and supported by local communities.
- Where the security of the re-introduced population is at risk from human activities, measures should be taken to minimise these in the re-introduction area. If these measures are inadequate, the re-introduction should be abandoned or alternative release areas sought.
- The policy of the country to re-introductions and to the species concerned should be assessed. This might include checking existing provincial, national and international legislation and regulations, and provision of new measures and required permits as necessary.
- Re-introduction must take place with the full permission and involvement of all relevant government agencies of the recipient or host country. This is particularly important in re-introductions in border areas, or involving more than one state or when a re-introduced population can expand into other states, provinces or territories.
- If the species poses potential risk to life or property, these risks should be minimised and adequate provision made for compensation where necessary; where all other solutions fail, removal or destruction of the released individual should be considered. In the case of migratory/mobile species, provisions should be made for crossing of international/state boundaries.

5. PLANNING, PREPARATION AND RELEASE STAGES

- Approval of relevant government agencies and land owners, and coordination with national and international conservation organizations.

- Construction of a multidisciplinary team with access to expert technical advice for all phases of the programme.
- Identification of short- and long-term success indicators and prediction of programme duration, in the context of agreed aims and objectives.
- Securing adequate funding for all programme phases.
- Design of pre- and post-release monitoring programme so that each re-introduction is a carefully designed experiment, with the capability to test methodology with scientifically collected data. Monitoring the health of individuals, as well as the survival, is important; intervention may be necessary if the situation proves unforeseeably favourable.
- Appropriate health and genetic screening of release stock, including stock that is a gift between governments. Health screening of closely related species in the re-introduction area.
- If release stock is wild-caught, care must be taken to ensure that: a) the stock is free from infectious or contagious pathogens and parasites *before* shipment and b) the stock will not be exposed to vectors of disease agents which may be present at the release site (and absent at the source site) and to which it may have no acquired immunity.
- If vaccination prior to release, against local endemic or epidemic diseases of wild stock or domestic livestock at the release site, is deemed appropriate, this must be carried out during the "Preparation Stage" so as to allow sufficient time for the development of the required immunity.
- Appropriate veterinary or horticultural measures as required to ensure health of released stock throughout the programme. This is to include adequate quarantine arrangements, especially where founder stock travels far or crosses international boundaries to the release site.
- Development of transport plans for delivery of stock to the country and site of re-introduction, with special emphasis on ways to minimise stress on the individuals during transport.
- Determination of release strategy (acclimatization of release stock to release area; behavioural training - including hunting and feeding; group composition, number, release patterns and techniques; timing).
- Establishment of policies on interventions (see below).
- Development of conservation education for long-term support; professional training of individuals involved in the long-term programme; public relations through the mass media and in local community; involvement where possible of local people in the programme.

- The welfare of animals for release is of paramount concern through all these stages.

6. POST-RELEASE ACTIVITIES

- Post-release monitoring is required of all (or a sample of) individuals. This most vital aspect may be by direct (e.g. tagging, telemetry) or indirect (e.g. spoor, informants) methods as suitable.
- Demographic, ecological and behavioural studies of released stock must be undertaken.
- Study of processes of long-term adaptation by individuals and the population.
- Collection and investigation of mortalities.
- Interventions (e.g. supplemental feeding; veterinary aid; horticultural aid) when necessary.
- Decisions for revision, rescheduling, or discontinuation of programme where necessary.
- Habitat protection or restoration to continue where necessary.
- Continuing public relations activities, including education and mass media coverage.
- Evaluation of cost-effectiveness and success of re-introduction techniques.
- Regular publication in scientific and popular literature.

(1) Guidelines for determining procedures for disposal of species confiscated in trade are being developed separately by IUCN.

(2) The taxonomic unit referred to throughout the document is species; it may be a lower taxonomic unit (e.g. sub-species or race) as long as it can be unambiguously defined.

(3) A taxon is Extinct when there is no reasonable doubt that the last individual has died.

ANNEX 3: DEFINITIONS OF TERMS USED

The definitions of the terms used are taken verbatim from Bullock *et al* (1997), with comments or additions where appropriate [*in italics*].

Taxonomic, ecological and genetic units

- Organism** **A single living individual of any of the five kingdoms** - Animalia, Plantae, Fungi, Protista or Monera - in any life-stage (i.e. including seeds, spores, fertilised eggs, etc. and gametes). We will not use this term in the ambiguous taxonomic sense used in previous definitions.
- Genotype** **The genetic constitution of an organism.** One can talk of genotypes for specific characters - e.g. blood types in humans or Mendel's smooth and wrinkled peas - and of the overall genotype for all of the characteristics of an individual. Although different individuals of a species may have the same genotype for a specific character, each individual produced as a result of sexual reproduction (and therefore genetic recombination) has a different overall genotype from all other individuals of that species. For this reason it is inappropriate to talk of native and non-native or local and non-local genotypes when discussing translocations. A group of organisms does not have single genotypes that can be designated native or non-native. It is more accurate to talk of populations and races in this context.
- Population** **A group of organisms, all of one species, within a particular geographical area.** Populations may occur naturally or as a result of human activity, e.g. in domestication or captivity or as crops or plantations. Populations of a species are distinguished by their genetic isolation from each other, i.e. there is little or no exchange of genes ('gene flow') among populations and each population forms a separate 'gene pool'. Where populations are widely separated (e.g. several kilometres or even several hundred kilometres apart) gene flow can be taken to be insignificant. There may be some gene flow between adjacent populations (e.g. metapopulations), but this is much less than the gene flow within each population. Where the species reproduces sexually the population is therefore, simply a group of interbreeding organisms. Where reproduction is asexual such gene flow does not occur. However, single populations of both types are taken to consist of a single gene pool and, in practice, populations are distinguished as being groups of individuals of a species geographically or ecologically separated from other groups of that species. Ecological separation covers those situations where populations co-occur but gene flow is restricted, e.g. where the populations breed at different times of the year.

The population therefore forms a genetic unit which one can describe by its gene frequencies and even the mean genotype for particular characters, and these can be used to determine genetic differences between populations. It

is scientifically correct to talk of native and non-native populations (rather than genotypes) of a species when considering translocations.

Race

One or more populations of a species showing genetic differentiation from other populations of that species. Although populations are more or less genetically isolated the genetic differences among them may not be large. However, where the genetic differentiation is large such that there are clear morphological, ecological or physiological differences the populations may be called different races. Such differentiation usually occurs through geographic separation and one race may consist of many populations in a particular region. Race is a broad term and we use it to encompass any taxonomic or genetic unit below a species; i.e. it is an infraspecific taxon. Thus, it incorporates **sub-species** (a rather arbitrary allocation of a Latin name to a race of a species, see Allaby 1994), **ecotype** (where genetic adaptation to particular environmental conditions has occurred; e.g. metal-tolerant plant ecotypes), **variety** (essentially a synonym of race), **cultivar** (a race produced by horticultural or agricultural techniques) and **strain** (a race with only small differences from others).

Genetically modified organism (GMO) **An organism modified by an artificial technique of genetic modification which is then capable of either replication or transfer of the inserted genetic material to other organisms** (ACRE 1993). The modification may be either direct - organisms modified by molecular techniques - or indirect - the offspring of these directly modified organisms. Therefore, this definition excludes organisms in which genetic material has been altered: 1. through natural mating or natural recombination (thus including conventional breeding), 2. by mutagenesis, or 3. by cell fusion (plants only).

Synonyms: Genetically engineered organism, Genetically manipulated organism, Transgenic organism.

The status of a species or race

Extinct

The CITES criterion for extinction over the whole world is that **a species is not definitely located in the wild during last 50 years**. Within an area (site, region, country, etc.) a species can be judged to be extinct after extensive searches have found no living individuals after a defined period of years. The IUCN Red List Categories document defines this as 'when there is no reasonable doubt that the last individual has died' (IUCN 1994). A supplementary Red List term is '**extinct in the wild**', meaning the situation when a species is known to survive only in cultivation, in captivity or in a naturalised population(s) well outside of the past geographical range of the species.

Native

A species or race which occurs naturally in an area. Technically this includes any species or race whose dispersal into an area has occurred independently of human activity and could have occurred at any time,

Synonyms: Non-indigenous, Alien, Exotic.

Feral **An organism which has been kept in domestication, captivity (animals) or cultivation (plants) but which, after escape or release, now lives in the wild state.** This also applies to descendants of such released or escaped organisms. A feral population is one consisting of such organisms.

Concerning translocation

Translocation **A general term for the transfer by human agency of any organism(s) from one place to another** (based on NCC 1990).

Donor site **Site from which translocated organism(s) originates.** 'Donor population' can be used in the same sense.

Recipient site **Site where translocated organism(s) is released.**

Synonym: Release site, Receptor site.

The wild **Any conditions in which organisms can disperse to other sites or can breed with individuals from other populations** (e.g. by dispersal of pollen, or visitation by these individuals from other populations) (based on NCC 1990). Thus, this can include natural conditions and semi-natural and agricultural land, gardens, ponds and open glasshouses, but excludes sealed laboratories and glasshouses. The precise definition depends on the species involved. Fish in a garden pond with no water outlets (and not liable to flooding) may not be in the wild, but winged insects or wind-pollinated plants in the same pond are in the wild.

The NCC (1990) definition is 'any circumstance in which organisms can freely breed and disperse.' The added criterion that the organisms can freely breed is not necessary - it is sufficient that the organisms can disperse.

A wild animal, plant or other organism is one occurring in the wild.

Introduction **The deliberate or accidental release of an organism(s) into the wild in areas (e.g. country, region, site, etc.) where the species or race is not native.** The term applies to translocations within the UK or into the UK from other countries (development of NCC, 1990 and IUCN, 1995 guidelines). The term also applies to the release of GMOs into the wild.

Reintroduction **The deliberate or accidental release of a living organism(s) into the wild to areas (e.g. country, region, site, etc.) where the species or race was native but has become extinct** (based on NCC, 1990) (GMOs are excluded from this definition). Where a species is reintroduced the race may be non-native. This case may therefore be described as the

introduction of a race as well as the reintroduction of a species. Reintroduction is sometimes termed as 're-establishment' and some people prefer the latter, but the former is the term used by the IUCN. We have a different definition for re-establishment (see below).

Relocation **A type of translocation where an organism(s) is transferred away from the donor site because that site is under threat** (based on NCC, 1990). The species is generally absent from the recipient site. If the species does already exist at the recipient site, the relocation also results in a supplementation.

Synonym: Rescue translocation.

Establishment **The formation of a self-sustaining population of the translocated species, race or GMO**, i.e. some of the organisms survive to produce offspring. Another definition requires only that some organisms survive. The former definition can be termed 'permanent establishment' and the latter can be 'temporary establishment'.

Re-establishment **Where a reintroduction results in establishment.**

Captive breeding **The managed breeding in captivity of animals of a species or race which usually occurs in wild populations** (i.e. non-domesticated species or races). These animals have been captured from the wild or are the descendants of captured individuals.

Additional references for Annex 3

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