IUCN Guidelines

for

Reintroductions

and

Other Conservation Translocations

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Guidelines for Reintroductions and Other Conservation Translocations

Executive summary

Conservation translocation is the deliberate movement of organisms from one site for release in another. It must be intended to yield a measurable conservation benefit at the levels of a population, species or ecosystem, and not only provide benefit to translocated individuals.

Conservation translocations (**Figure 1**) consist of (i) reinforcement and reintroduction *within* a species' indigenous range, and (ii) conservation introductions, comprising assisted colonisation and ecological replacement, *outside* indigenous range.

Translocation is an effective conservation tool but its use either on its own or in conjunction with other conservation solutions needs rigorous justification. Feasibility assessment should include a balance of the conservation benefits against the costs and risks of both the translocation and alternative conservation actions.

Risks in a translocation are multiple, affecting in many ways the focal species, their associated communities and ecosystem functions in both source and destination areas; there are also risks around human concerns. Any proposed translocation should have a comprehensive risk assessment with a level of effort appropriate to the situation. Where risk is high and/or uncertainty remains about risks and their impacts, a translocation should not proceed.

Translocations of organisms outside of their indigenous range are considered to be especially high risk given the numerous examples of species released outside their indigenous ranges subsequently becoming invasive, often with massively adverse impacts.

Any translocation will impact and be impacted by human interests. Social, economic and political factors must be integral to translocation feasibility and design. These factors will also influence implementation and often require an effective, multi-disciplinary team, with technical and social expertise representing all interests.

Design and implementation of conservation translocations should follow the standard stages of project design and management, including gathering baseline information and analysis of threats, and iterative rounds of monitoring and management adjustment once the translocation is underway (**Figure 2**). This ensures that process and progress are recorded; changes in translocation objectives or management regime can then be justified, and outcomes can be determined objectively. Finally, translocations should be fully documented, and their outcomes made publicly and suitably available to inform future conservation planning.

Guidelines

Section 1: Introduction and scope of Guidelines

These Guidelines are designed to be applicable to the full spectrum of conservation translocations. They are based on principle rather than example. Throughout the Guidelines there are references to accompanying Annexes that give further detail.

The background and rationale for developing these Guidelines are described in **Annex 1.**

Translocation is the human-mediated movement of living organisms[1] from one area, with release in another. These Guidelines focus on conservation translocations, namely a translocation that yields quantifiable conservation benefit. For this purpose the beneficiaries should be the populations of the translocated species, or the ecosystems that it occupies. Situations in which there is benefit only to the translocated individuals do not meet this requirement.

Conservation through intervention is now common, but with increasing evidence and appreciation of the risks. Consequently, any conservation translocation must be justified, with development of clear objectives, identification and assessment of risks, and with measures of performance. These Guidelines are designed to provide guidance on the justification, design and implementation of any conservation translocation. But, they should not be construed as promoting conservation translocation over any other form of conservation action, and specific elements should not be selected in isolation to justify a translocation.

These Guidelines are a response to the present era of accelerating ecological change: there are increasing and acute pressures on much of the world's biodiversity due to loss of habitats and reduction in their quality, biological invasions, and climate change. The latter is the main force behind the proposition to move organisms deliberately outside their indigenous ranges (defined in **Section 2**), an exercise of greater potential risks than a reinforcement or reintroduction. While such 'assisted colonisation' is controversial, it is expected to be increasingly used in future biodiversity conservation.

Because of such anticipated developments, these Guidelines emphasise the need to consider the alternatives to translocation, to appreciate uncertainty of ecological knowledge, and to understand the risks behind any translocation. Many conservation translocations are long-term commitments, and every case is an opportunity to research the challenges for establishing populations, in order to increase the success rate of these interventions.

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[1] 'organism' refers to a species, subspecies or lower taxon, and includes any part, gametes, seeds, eggs, or propagules of such species that might survive and subsequently reproduce (After: Convention on Biological Diversity Decision VI/23 http://www.cbd.int/decision/cop/?id=7197).

Section 2: Definitions and classification

Figure 1 shows a typology of conservation translocations, based on the following definitions. **Annex 2** provides further details.

***Translocation** is the human-mediated movement of living organisms from one area, with release[2] in another.*

Translocation is therefore the overarching term. Translocations may move living organisms from the wild or from captive origins. Translocations can be accidental (e.g. stowaways) or intentional. Intentional translocations can address a variety of motivations, including for reducing population size, for welfare, political, commercial or recreational interests, or for conservation objectives.

***Conservation Translocation** is the intentional movement and release of a living organism where the primary objective is a conservation benefit: this will usually comprise improving the conservation status of the focal species locally or globally, and/or restoring natural ecosystem functions or processes.*

A translocation involves releasing organisms. *Release* here specifically excludes the act of placing organisms into conditions that, for management purposes, differ significantly from those experienced by these organisms in their natural habitats. These differences may include the density under which individuals are kept, their sex ratio and group size, breeding system, environmental conditions, dependence on provisioning and, consequently, the selection pressures imposed.

Conservation translocations can entail releases either within or outside the species' *indigenous range*. The indigenous range of a species is the known or inferred distribution generated from historical (written or verbal) records, or physical evidence of the species' occurrence. Where direct evidence is inadequate to confirm previous occupancy, the existence of suitable habitat within ecologically appropriate proximity to proven range may be taken as adequate evidence of previous occupation.

1. Population Restoration is any conservation translocation to within indigenous range, and comprises two activities:

a. ***Reinforcement** is the intentional movement and release of an organism into an existing population of conspecifics.*

Reinforcement aims to enhance population viability, for instance by increasing population size, by increasing genetic diversity, or by increasing the representation of specific demographic groups or stages.

[Synonyms: Augmentation; Supplementation; Re-stocking; Enhancement (plants only)]

b. ***Reintroduction** is the intentional movement and release of an organism inside its indigenous range from which it has disappeared.*

Reintroduction aims to re-establish a viable population of the focal species within its indigenous range.

[2] 'release' is applicable here to individuals of any taxon.

***2. Conservation Introduction** is the intentional movement and release of an organism outside its indigenous range.*

Two types of Conservation Introduction are recognised:

*a. **Assisted Colonisation** is the intentional movement and release of an organism outside its indigenous range to avoid extinction of populations of the focal species.*

This is carried out primarily where protection from current or likely future threats in current range is deemed less feasible than at alternative sites.

The term includes a wide spectrum of operations, from those involving the movement of organisms into areas that are both far from current range and separated by non-habitat areas, to those involving small range extensions into contiguous areas.

[Synonyms: Benign Introduction; Assisted Migration; Managed Relocation]

*b. **Ecological Replacement** is the intentional movement and release of an organism outside its indigenous range to perform a specific ecological function.*

This is used to re-establish an ecological function lost through extinction, and will often involve the most suitable existing sub-species, or a close relative of the extinct species within the same genus[3].

[Synonyms: Taxon Substitution; Ecological Substitutes/Proxies/Surrogates; Subspecific Substitution, Analogue Species]

Section 3: Deciding when translocation is an acceptable option

1. A conservation translocation has intended conservation benefit, but it also carries risks to ecological, social and economic interests (**Annex 3.1**).

2. There should generally be strong evidence that the threat(s) that caused any previous extinction have been correctly identified and removed or sufficiently reduced (**Annex 3.2**).

3. Assessment of any translocation proposal should include identification of potential benefits and potential negative impacts, covering ecological, social and economic aspects. This will be simpler for a reinforcement or reintroduction within indigenous range compared to any translocation outside indigenous range.

4. Global evidence shows that introductions of species outside their indigenous range can frequently cause extreme, negative impacts that can be ecological, social or economic, are often difficult to foresee, and can become evident only long after the introduction.

5. Conservation translocations outside indigenous range may, therefore, bring potentially high risks that are often difficult or impossible to predict with accuracy.

6. Hence, although risk analysis around a translocation should be proportional to the presumed risks (**Guidelines Section 6**), justifying a conservation introduction requires an especially high level of

[3] An organism might be released into indigenous range to perform an ecological function, but this would be considered a reintroduction.

confidence over the organisms' performance after release, including over the long-term, with reassurance on its acceptability from the perspective of the release area's ecology, and the social and economic interests of its human communities.

7. In any decision on whether to translocate or not, the absolute level of risk must be balanced against the scale of expected benefits.

8. Where a high degree of uncertainty remains or it is not possible to assess reliably that a conservation introduction presents low risks, it should not proceed, and alternative conservation solutions should be sought (**Annex 3.3**).

Section 4: Planning a translocation

4.1 Goals, Objectives and Actions.

1. Every conservation translocation should have clearly defined goals.

2. Any conservation translocation should follow a logical process from initial concept to design, feasibility and risk assessment, decision-making, implementation, monitoring, adjustment and evaluation.

3. Planning for a conservation translocation can usefully follow the Species Survival Commission's approach to conservation planning for species[4], requiring specification of a goal, objectives and actions. Reference to the commonly observed phases of translocated population development may aid planning (**Annex 4**).

4. Progress reviews are encouraged at all stages, so that the goal(s) is reached through a cyclical process (**Figure 2**), which allows adjustment in objectives or in time frames based on observed progress (**Guidelines Section 8**).

5. A **Goal** is a statement of the intended result of the conservation translocation. It should articulate the intended conservation benefit, and will often be expressed in terms of the desired size and number of populations that will achieve the required conservation benefit either locally or globally, all within an overall time frame.

6. There may be more than one goal, although clarity of purpose may suffer as goals increase in number.

7. **Objectives** detail how the goal(s) will be realised; they should be clear and specific and ensure they address all identified or presumed current threats to the species.

8. **Actions** are precise statements of what should be done to meet the objectives; they should be capable of measurement, have time schedules attached, indicate the resources needed and who is responsible and accountable for their implementation. Actions are the elements against which translocation progress will be monitored and assessed (**Guidelines Section 8**).

[4] http://cmsdata.iucn.org/downloads/scshandbook_2_12_08_compressed.pdf

4.2 Monitoring programme design

Monitoring the course of a translocation is an essential activity (**Guidelines Section 8**). It should be considered as an integral part of translocation design, not to be merely added on at a later stage.

The effort invested in developing realistic goals and objectives is the starting point for a monitoring programme; its design should reflect the phases of translocated population development (**Annex 4**) and answer at least the following:

- What evidence will measure progress towards meeting translocation objectives and, ultimately, success or failure?
- What data should be collected, where and when, to provide this evidence, and what methods and protocols should be used?
- Who will collect the data, analyse it and ensure safe keeping?
- Who will be responsible for disseminating monitoring information to relevant parties?

4.3 Exit strategy

Not all translocations proceed according to plan. There will be a point at which investing further resources is no longer justified, despite any prior management adjustments. The decision to discontinue is defensible if translocation design includes indicators of lack of success and the tolerable limits of their duration, or if undesired and unacceptable consequences have occurred. An exit strategy should be an integral part of any translocation plan. Having a strategy in place allows an orderly and justifiable exit.

Section 5: Feasibility and Design

The primary focus of translocation planning will be the desired performance of the focal species in terms of either its population performance, behaviour and / or its ecological roles after translocation. However, the design of the proposed translocation will be subject to both opportunities and constraints, and all will influence the feasibility of the proposed operation. Feasibility assessment should cover the full range of relevant biological and non-biological factors.

5.1 Biological feasibility

5.1.1 Basic biological knowledge

1. Necessary knowledge of any translocation candidate species should include its biotic and abiotic habitat needs, its inter-specific relationships and critical dependencies, and its basic biology. (**Annex 5.1**). Where knowledge is limited, the best available information should be used, and further subsequent information used to confirm or adjust management.

2. Information from the candidate or closely-related species can be used to construct models of alternative translocation scenarios and outcomes; even simple models can help effective decision-making (**Annex 5.2**).

5.1.2 Habitat

Matching habitat suitability and availability to the needs of candidate species is central to feasibility and design. There are many aspects covered in greater detail in **Annex 5.3**. Essential points are:

1. While reintroduction into indigenous range is always preferable, previous indigenous range may no longer be suitable habitat depending on ecological dynamics during the extinction period,

2. The last place in which a species/population was found may not be the best habitat for returning the species,

3. Suitable habitat should meet the candidate species' total biotic and abiotic needs through space and time and for all life stages. In addition, habitat suitability should include assurance that the release of organisms, and their subsequent movements, are compatible with permitted land-uses in the affected areas.

4. The ecological roles of translocated species at destination sites should be assessed thoroughly, as part of risk assessment (**Guidelines Section 6**); the risk of unintended and undesirable impacts will generally be least in population reinforcements and greatest in translocations outside indigenous range.

5.1.3 Climate requirements (Annex 5.4)

1. The climate at destination site should be suitable for the foreseeable future. Bio-climate envelope models can be used to assess the likelihood of the climate changing beyond the species' limits of tolerance, and therefore for identifying suitable destination sites under future climate regimes.

5.1.4 Founders

Founder source and availability

1. Founders can be either from a captive or wild source.

2. Founders should show characteristics based on genetic provenance, and of morphology, physiology and behaviour that are assessed as appropriate through comparison with the original or any remaining wild populations.

3. The potential negative effects of removing individuals from wild or captive populations should be assessed; where captive or propagated populations are sources, the holding institutions should ensure that their collection plans, institutionally and regionally, are designed to support such removals for conservation translocations.

4. Captive or propagated individuals should be from populations with appropriate demographic, genetic, welfare and health management, and behaviour.

Taxon substitution

In some cases the original species or sub-species may have become extinct both in the wild and in captivity; a similar, related species or sub-species can be substituted as an ecological replacement, provided the substitution is based on objective criteria such as phylogenetic closeness, similarity in appearance, ecology and behaviour to the extinct form.

*Genetic considerations (**Annex 5.5**)*

1. Founder selection should aim to provide adequate genetic diversity.

2. Source populations physically closer to, or from habitats that are similar to, the destination may be more genetically suited to destination conditions.

3. If founders from widely separate populations or areas are mixed, there may be genetic incompatibilities.

4. Conservation introductions may justify more radical sourcing strategies of deliberately mixing multiple founder populations to maximise diversity among individuals and hence increase the likelihood of some translocated individuals or their offspring thriving under novel conditions.

5. Genetic considerations in founder selection will be case-specific. If a translocation starts with a wide genetic base, a sufficiently large number of individuals, and subsequent differential performance or mortality is acceptable (and will be monitored), then the genetics of founder selection are unlikely to constrain feasibility of a conservation translocation.

5.1.5 Animal welfare

1. Conservation translocations should whenever possible adhere to internationally accepted standards for welfare, but should comply with the legislation, regulations and policies in both the source and release areas.
2. Every effort should be made to reduce stress or suffering.
3. Stress in translocated animals may occur during capture, handling, transport and holding, including through confining unfamiliar individuals in close proximity, both up to and after release.
4. Stresses may be quite different for captive-born and wild-caught animals; in particular, intended "soft release" strategies may increase stress in wild-caught animals by prolonging their captivity.
5. Animals in source populations may suffer stress if the removal of individuals disrupts established social relationships.
6. An exit strategy may require removal of individuals of the translocated species, especially in the case of a conservation introduction; the acceptability of removal should be assessed before starting the translocation,

5.1.6 Disease and parasite considerations

1. The management of disease and known pathogen transfer is important, both to maximise the health of translocated organisms and to minimise the risk of introducing a new pathogen to the destination area. Further detail on these aspects is given in **Annex 5.6**.

2. While it is neither possible nor desirable for organisms to be "parasite and disease free", many organisms are non-pathogenic until co-infection or co-factors, or spill-over between host species create conditions that promote pathogenicity. In particular, as host immune conditions may determine an organism's pathogenicity, it is important to consider whether the translocated organisms are likely to cope with new pathogens and stresses encountered at the destination site.

3. The level of attention to disease and parasite issues around translocated organisms and their destination communities should be proportional to the potential risks and benefits identified in each translocation situation (**Guidelines Section 6**); the IUCN Guide to Wildlife Disease Risk Assessment[5] provides a model process.

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[5] web address to be added.

4. Quarantine before release, as a means of prevention of disease or pathogen introduction, is a basic precaution for most translocations; its use should be assessed on a case-by-case basis as it may cause unacceptable stress; conversely, stress may usefully bring out latent infections.

5. Pathogenicity may be promoted by the stress of unfamiliar or unnatural conditions of confinement, especially during the translocation process.

6. If reasonable precautions are taken and appropriate prophylaxis applied, with stress minimised in the process, there is rarely cause to consider translocation unfeasible due to disease and parasites.

5.2 Social feasibility

1. Any conservation translocation proposal should be developed within national and regional conservation infrastructure, recognizing the mandate of existing agencies, legal and policy frameworks, national biodiversity action plans or existing species recovery plans.

2. Human communities in or around a release area will have legitimate interests in any translocation. These interests will be varied, and community attitudes can be extreme and internally contradictory. Consequently, translocation planning should accommodate the socio-economic circumstances, community attitudes and values, motivations and expectations, behaviours and behavioural change, and the anticipated costs and benefits of the translocation. Understanding these is the basis for developing public relations activities to orient the public in favour of a translocation.

3. Mechanisms for communication, engagement and problem-solving between the public (especially key individuals most likely to be affected by or concerned about the translocation) and translocation managers should be established well in advance of any release.

4. No organisms should be removed or released without adequate/conditional measures that address the concerns of relevant interested parties (including local/indigenous communities); this includes any removal as part of an exit strategy.

5. If extinction in the proposed destination area occurred long ago, or if conservation introductions are being considered, local communities may have no connection to species unknown to them, and hence oppose their release. In such cases, special effort to counter such attitudes should be made well in advance of any release.

6. Successful translocations may yield economic opportunities, such as through ecotourism, but negative economic impacts may also occur; the design and implementation stages should acknowledge the potential for negative impacts on affected parties or for community opposition; where possible, sustainable economic opportunities should be established for local communities, and especially where communities/regions are challenged economically.

7. Some species are subject to multiple conservation translocations: in these situations, inter-project, inter-regional or international communication and collaboration are encouraged in the interests of making best use of resources and experiences for attaining translocation goals and effective conservation.

8. Organisational aspects can also be critical for translocation success: where multiple bodies, such as government agencies, non-government organisations, informal interest groups (some of which may oppose a translocation) all have statutory or legitimate interests in a translocation, it is essential that mechanisms exist for all parties to play suitable and constructive roles. This may require establishment of special teams working outside formal, bureaucratic hierarchies that can guide, oversee and respond swiftly and effectively as management issues arise.

9. The multiple parties involved in most translocations have their own mandates, priorities and agendas; unless these are aligned through effective facilitation and leadership, unproductive conflict may fatally undermine translocation implementation or success.

10. A successful translocation can contribute to a general ethical obligation to conserve species and ecosystems; but the conservation gain from the translocation should be balanced against the obligation to avoid collateral harm to other species, ecosystems or human interests; this is especially important in the case of a conservation introduction.

5.3 Regulatory compliance

A conservation translocation may need to meet regulatory requirements at any or all of international, national, regional or sub-regional levels. This may in include consideration of the compatibility of permitted and non-permitted land-uses in areas either proposed for a release or where released organisms might subsequently move to.

In any country, different agencies may be responsible for proposal evaluation, importation or release licensing, or certifying compliance. A translocation programme may have requirements to report regularly to such agencies on progress and compliance.

International movement of organisms

Such movement of organisms will need to comply with international requirements. For example, the movement of individuals of any species that is on CITES Appendix I, II or III must comply with CITES requirements.

In addition, regulators will need to consider whether permits and agreements are required under the Nagoya Protocol in order to deal with benefits arising from the use of genetic resources and/or traditional knowledge.

Legislation for species being moved outside their indigenous range

Many countries have formal legislation restricting the capture and/or collection of species within their jurisdiction. Additionally, many countries have formal legislation restricting the release of alien species, and this may apply to the release of organisms in their native country but outside their indigenous range.

Permission to release organisms

Irrespective of any permission to import organisms, any conservation translocation should have been granted the appropriate government licence to release organisms.

Cross-border movements

Where organisms are either transported across jurisdictional or formally-recognised tribal boundaries before release, or are likely to move across such boundaries following release, translocation design should be compatible with the permissive and regulatory requirements of all affected jurisdictions.

National and international veterinary and phyto-sanitary requirements

Where there is any international movement of organisms, compliance with the World Organisation for Animal Health[6] standards for animal movement and those of the International Plant Protection Convention[7] may facilitate importation permits.

National requirements for plant and animal health before release should be met. The importation of wild species that are implicated as vectors of human or domestic animal disease may be subject to particular regulation and control by national authorities.

5.4 Resource availability

1. Effective translocation management will be truly multi-disciplinary, with strong emphasis on incorporating social skill sets as well as biological/technical expertise.

2. Under normal circumstances, a translocation should not proceed without assurance of funding for all essential activities over an adequate period of time; the latter should be determined by reference to the schedules laid down in **Guidelines Section 4**.

3. Funding agencies should be aware that rational changes to a translocation plan during implementation are normal, and budgets should be flexible enough to accommodate such changes.

Section 6: Risk assessment

1. Any translocation bears risks that it will not achieve its objectives and/or will cause unintended damage. Consequently, the full array of possible hazards both during a translocation and after release of organisms should be assessed in advance. **Annex 6.1** contains fuller detail.

2. It should be emphasised that any translocation outside indigenous range carries further risks, due to: (1) lack of certainty over ecological relationships and an inability to predict ecological outcomes, and (2) the record of species moved outside their indigenous ranges that have become invasive aliens, often with extreme adverse impacts on native biodiversity, ecological services or human economic interests.

3. Risk is the probability of a risk factor occurring, combined with the severity of its impact. Individual risks will generally increase as the following increase in scale:

1. The duration of any extinction period,
2. The extent of ecological change during any extinction period,
3. The degree of critical dependence of the focal species on others,
4. The number of species to be translocated,
5. The genetic differences between the original form and the translocated individuals,
6. The potential negative impacts on human interests,
7. The probability of unacceptable ecological impacts,
8. Whether the translocation is into or outside indigenous range.

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[6] http://www.oie.int/

[7] https://www.ippc.int/

The total risk landscape will be determined by:

1. The number of risk factors occurring,
2. Uncertainty over the occurrence of each risk factor,
3. Uncertainty over the severity of its impacts,
4. Ignorance of other possible risks factors,
5. The level of competence of those responsible for implementation,
6. The cumulative effects of all occurring risks,
7. The extent to which these risks interact.

4. The extent of risk assessment should be proportional to the level of identified risk. Where data are poor, risk assessment may only be qualitative, but it is necessary as lack of data does not indicate absence of risk. Conclusions from the risk assessment and feasibility study should determine whether a translocation should proceed or not.

5. Where possible, formal methods for making decisions based on best evidence should be used. As a general principle, where substantial uncertainty about the risks of a translocation outside indigenous range remain, such a translocation should not be undertaken.

6. The main categories of risk around a translocation are:

- *Risk to source populations*: except under rare circumstances, removing individuals for translocation should not endanger the source population (**Annex 6.2**).

- *Ecological risk*: a translocated species may have major impacts (whether desirable/undesirable, intended /not intended) at its destination on other species, and on ecosystem functions; its own performance may not be the same as at its origin; evidence shows that risks are greater for a translocation outside a species' indigenous range, and adverse impacts may not appear for many years (**Annex 6.3**).

- *Disease risk*: as no translocated organisms can be entirely free of infection with micro-organisms or parasites, with consequent risk of their spread, disease risk assessment should start at the planning stage, with its depth in proportion to the estimated likelihood of occurrence and severity of impact of any prospective pathogen (**Annex 6.4**), and should be reviewed periodically through implementation.

- *Associated invasion risk*: separate from the risk of pathogen introduction, translocation design should be mindful of the wider biosecurity of the release area: care should be taken that potentially invasive species are not accidentally released with individuals of the focal species (**Annex 6.5**). This is a particular risk when translocating aquatic or island organisms.

- *Gene escape*: gene exchange between translocated individuals and residents is one purpose of a reinforcement; however, when historically isolated populations are mixed, or where organisms are moved outside their indigenous range, and there is a risk of hybridisation with closely-related species or sub-species, this may possibly result in lower fitness of offspring and/or loss of species integrity (**Annex 6.6**). This should be included in a risk assessment.

- *Socio-economic risks*: these include the risk of direct, harmful impacts on people and their livelihoods from released organisms, and more indirect, ecological impacts that negatively affect ecosystem services (**Annex 6.7**); translocations outside indigenous range have greater likelihood of negative socio-economic impacts and, hence, adverse public attitudes.

- *Financial risks*: while there should be some level of assurance of funding for the anticipated life of any translocation, there should be awareness of the possible need for funding to discontinue the translocation or to apply remedial funding to any damage caused by the translocated species (**Annex 6.8**).

7. It should also be noted that the risks from conservation action, or inaction, change with time. For example, if a translocation from a relatively numerous population is contemplated, the major risk is to the destination ecosystem; as the size of the source population declines, the risk to this population increases while for that of the destination remains the same; hence, the overall risk of the translocation not delivering conservation benefit is increased by not taking action in good time.

Section 7: Release and Implementation

1. Implementation of a conservation introduction extends beyond the release of organisms. A translocation, including one to a highly suitable area, can fail due to a poorly-designed release. Implementation should therefore take into account the aspects covered in **Guidelines Sections 4, 5, 6 and 8**, and particularly those that include legal requirements, public engagement, habitat management, sourcing and releasing organisms, interventions and post-release monitoring.

2. As released individuals become established in their destination area, emphasis will shift to population monitoring and adjustment of management based on monitoring results.

7.1 Selecting release sites and areas

A release site should:

- Meet all practical needs for effective release with least stress for the released organisms,
- Enable released organisms to exploit the surrounding release area quickly.
- Be suitable for media and public awareness needs, and any community involvement.

A release area should:

- Meet all the species' biotic and abiotic requirements,
- Be appropriate habitat for the life stage released and all life stages of the species,
- Be adequate for all seasonal habitat needs,
- Be large enough to meet the required conservation benefit,
- Have adequate connectivity to suitable habitat if that habitat is fragmented.
- Be adequately isolated from sub-optimal or non-habitat areas which might be sink areas for the population,

7.2 Release strategy

Many aspects of the translocated organisms' biology are relevant to the release strategy. These are explored in detail in **Annex 7**, but the following are central:

- The life stage and season of release should be optimised with respect to the species' natural dispersal age or season, considering whether dispersal after release is to be encouraged or discouraged.

- The age/size, sex composition and social relationships of founders may be optimised for establishment and the population growth rate stated in the objectives.
- Translocation success increases with the numbers of individuals released (which is often enhanced through multiple release events across more than one year), but this needs to be balanced against impacts on source populations.
- Releases, either simultaneously or sequentially, at multiple sites may serve to spread out the released organisms, with several potential benefits.
- Minimising stress during capture, handling, transport and pre-release management will enhance post-release performance.
- Various management interventions and support before and after release can enhance performance.

Section 8: Monitoring and continuing management

8.1 Monitoring

1. Translocation management is a cyclical process of implementation, monitoring, feedback and adjustment of both biological and non-biological aspects until goals are met or the translocation is deemed unsuccessful (**Figure 2**).
2. Despite thorough translocation design and modelling, inherent uncertainty and risk will lead to both expected and unexpected situations.
3. The monitoring programme (**Guidelines Section 4.3**) is the means to measure the performance of released organisms against objectives, to assess their impacts, and provide the basis for adjusting objectives or adapting management regimes or activating an exit strategy. Adequate resources for monitoring should be part of financial feasibility and commitment.
4. Pre-release baseline ecological data add great value to subsequent monitoring information (**Annex 8.1**).
5. Monitoring should identify new threats to the translocated population which were not part of translocation design.
6. The intensity and duration of monitoring of source and translocated populations should be appropriate to each situation.
7. In addition to refining any ongoing translocation, the conclusions from monitoring may guide other translocations.
8. **Annex 8.2** covers the essential elements of post-release monitoring in greater detail:

- *Demographic performance*

Key aspects for any translocation should include monitoring of population growth and/or spread; more intensive monitoring to estimate individual survival, reproduction and dispersal may be needed depending on circumstances.

- *Behavioural Monitoring*

Monitoring the behaviour of translocated individuals can be a valuable, early indicator of translocation progress; but its value depends on comparative data from either comparable natural populations or the same individuals before removal from their source population.

- *Ecological monitoring*

Where a translocation is designed to create or restore an ecological function, progress towards such objectives should be assessed; any ecological impacts arising from a translocation should be assessed and determination made as to whether these are beneficial, benign or harmful, potentially enabling rational changes in management.

- *Genetic monitoring*

Where genetic issues are identified as being critical to the success of a translocation, monitoring can be used to assess genetic diversity in establishing populations or the effects of reinforcement or other management.

- *Health and mortality monitoring*

This assesses the extent that an establishing population is experiencing disease, or adverse welfare conditions or mortality, as a basis for identifying underlying causes.

- *Social, cultural and economic monitoring*

Participation in monitoring may be a practical means of engaging the interest and support of local communities, and can be used to assess attitudes towards the translocation, and any benefits and costs, direct and indirect, arising.

8.2 Continuing management (Annex 8.3)

1. Some translocations require management over many years; monitoring results provide the basis for either continuing or changing management regimes (Figure 4). They also provide the justification for any change in translocation objectives or time schedules (**Guidelines Section 4**).

2. Learning from translocation outcomes can be improved through application of more formal adaptive management approaches, whereby alternative models are defined in advance and are tested through monitoring. This process means that the models used to decide management are based on the best possible evidence.

Section 9: Dissemination of information (Annex 9)

Regular reporting and dissemination of information should start from the intention to translocate and throughout subsequent progress. It serves many purposes both for each conservation translocation and collectively:

1. To create awareness and support for the translocation in key affected parties,
2. To meet any statutory requirements,
3. To contribute to the body of information on, and understanding of, translocations; collaborative efforts to develop translocation science are helped when reports are published in peer-reviewed journals (as an objective indicator of high quality), and include well-documented but unsuccessful translocations or methods as well as successful ones ,

4. The means of dissemination are many (for example through conventional print, radio and film media, through mechanisms such as participatory appraisal and planning, and increasingly through internet-based communications such as virtual presence meetings, and social networks). The media, formats and languages used should all be appropriate for the target audience.

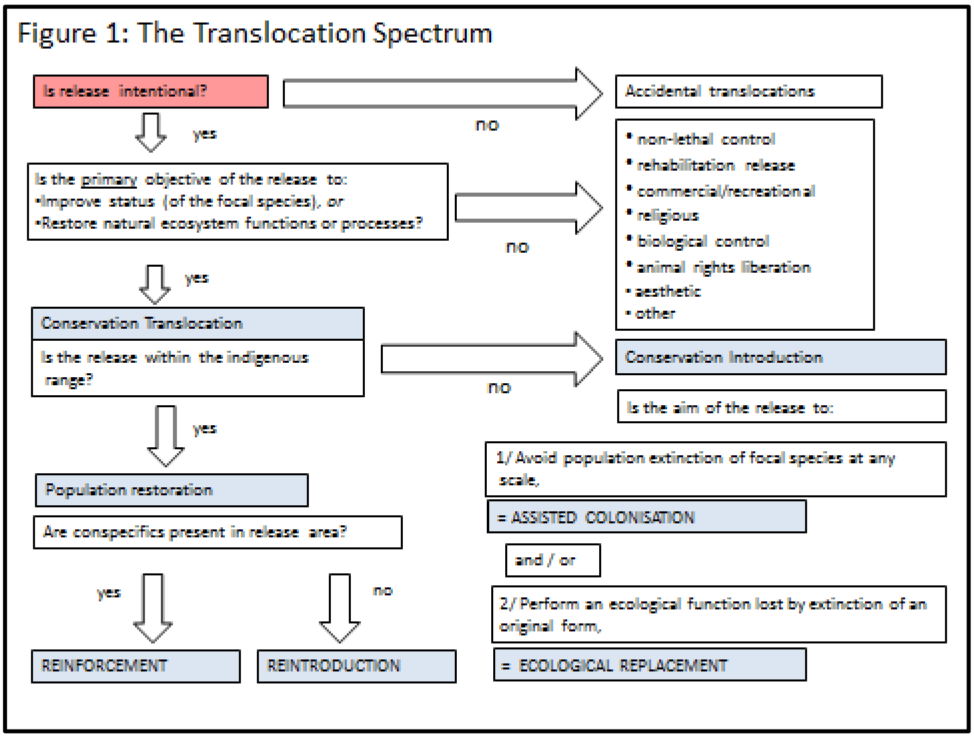
Figure 1: The Translocation Spectrum
Is release intentional?
no
Accidental translocations
yes
Is the primary objective of the release to:
•Improve status (of the focal species), or
•Restore natural ecosystem functions or processes?
no
• non-lethal control
• rehabilitation release
• commercial/recreational
• religious
• biological control
• animal rights liberation
• aesthetic
• other
yes
Conservation Translocation
Is the release within the indigenous range?
no
Conservation Introduction
Is the aim of the release to:
yes
1/ Avoid population extinction of focal species at any scale,
= ASSISTED COLONISATION
and / or
2/ Perform an ecological function lost by extinction of an original form,
= ECOLOGICAL REPLACEMENT
Population restoration
Are conspecifics present in release area?
yes
no
REINFORCEMENT
REINTRODUCTION

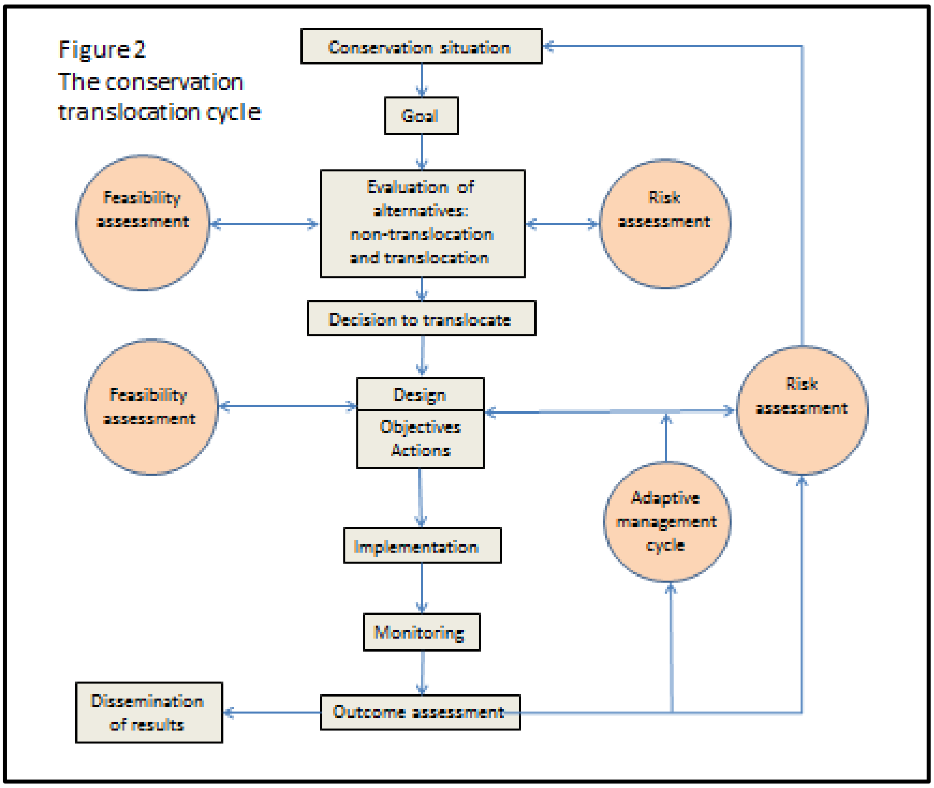
Figure 2
The conservation translocation cycle
Conservation situation
Goal
Feasibility assessment
Evaluation of alternatives: non-translocation and translocation
Risk assessment
Decision to translocate
Feasibility assessment
Design
Objectives
Actions
Risk assessment
Adaptive management cycle
Implementation
Monitoring
Dissemination of results
Outcome assessment