AGREEMENT ON THE CONSERVATION OF AFRICAN-EURASIAN MIGRATORY WATERBIRDS

Doc: AEWA/MOP 5.36
Agenda item: 23
Original: English

Date: 10 April 2012

5th SESSION OF THE MEETING OF THE PARTIES

14 – 18 May 2012, La Rochelle, France

"Migratory waterbirds and people - sharing wetlands"

DRAFT GUIDELINES FOR THE TRANSLOCATION OF WATERBIRDS FOR CONSERVATION PURPOSES: COMPLEMENTING THE IUCN GUIDELINES

Introduction

Amongst other things, MOP4 requested the Technical Committee (TC), through Resolution 4.4, to:

1. Develop supplementary guidance for the re-establishment of waterbirds drawing from data and information compiled in the AEWA Review on the Re-establishment of Waterbirds, and *inter alia* including simple check-lists of necessary activities to guide conservation practitioners;

2. Develop a reporting structure, including a standard set of evaluation criteria, to encourage practitioners to provide detailed information about each project stage, and to make this information widely accessible.

These tasks were included in the Technical Committee work plan for 2009-2012. At the first Meeting of the Technical Committee during the past inter-sessional period (9th Meeting of the Technical Committee, 20-23 April 2009, Zagreb, Croatia), the TC decided that these tasks will require external support and should be outsourced, funding permitting.

Funds were only made available in mid-2011 through a voluntary contribution provided by the Federal Office for the Environment of Switzerland. After a call for tenders, the compilation of the guidelines and development of reporting structure were commissioned to the Wildfowl and Wetlands Trust.

The guidelines and accompanying reporting structure were reviewed, commented and approved by the TC by correspondence. In addition, the draft guidelines were consulted with members of the IUCN/SSC Re-introduction Specialist Group and other re-introduction specialists.

The Standing Committee approved the submission of the draft guidelines to MOP5.

Action requested from the Meeting of the Parties

The Meeting of the Parties is invited to review and approve these guidelines as Conservation Guidelines in the sense of Article IV of the Agreement (draft Resolution AEWA/MOP5 DR10 *Revision and Adoption of Conservation Guidelines*).

Draft Guidelines for the Translocation of Waterbirds for Conservation Purposes: Complementing the IUCN Guidelines

Produced by

Wildfowl & Wetlands Trust (WWT)

Funded by

The Federal Office for the Environment (FOEN) of the Swiss Confederation

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Office for the Environment FOEN

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Suggested citation
Lee R., Cranswick P.A., Cromie R.L., Hilton G.M., Jarrett N.S. & B. Hughes. 2012. AEWA Guidelines for the Translocation of Waterbirds for Conservation Purposes: Complementing the IUCN Guidelines. AEWA Technical Series No. XX.

Acknowledgements
The production of these guidelines was greatly facilitated by drawing on the *IUCN Guidelines for Re-introductions* (IUCN 1998) as well as translocation guidelines prepared for specific taxa. The following two documents were particularly influential and served as models for these guidelines:

Guidelines for the Re-introduction of Galliformes for Conservation Purposes
Edited by the World Pheasant Association and the IUCN-SSC Re-introduction Specialist Group.
Published in 2009 by the IUCN in Gland, Switzerland and by the World Pheasant Association in Newcastle-upon-Tyne, UK. (WPA & IUCN-SSC RSG 2009).

Best-practice Guidelines for the Re-introduction of Great Apes
Edited by Benjamin Beck, Kristina Walkup, Michelle Rodrigues, Steve Unwin, Dominic Travis and Tara Stoinski (Series editor: E.A. Williamson). Published in 2007 by IUCN in Gland, Switzerland in collaboration with the Center for Applied Biodiversity Science at Conservation International. (Beck *et al.* 2007).

We are extremely grateful to the authors, editors and publishers of these documents for preparing such comprehensive and informative guidelines that can in part be applied to other taxa and used as a model in the preparation of further taxa-specific translocation guidelines.

We are grateful to Jelena Kralj, David Stroud, John Harradine and Mark Stanley Price for commenting on the draft of these guidelines, and we are also grateful to WWT volunteer, Gillian Dinsmore, for her assistance compiling the inventory of existing translocation guidance documents (see Appendix I).

We are also grateful to the Directorate for Nature Management, Norway (DN), and the Secretariat of the African-Eurasian Waterbird Agreement (AEWA). The sections in these guidelines on justification and feasibility were informed by work prepared for and funded by DN and facilitated by AEWA, *Feasibility Study for a Re-introduction/Supplementation Programme for the Lesser White-fronted Goose* Anser erythropus *in Norway* (Lee *et al.* 2010).

Milestones in production of the guidelines

- The draft of these guidelines was submitted to the AEWA Technical Committee (TC) in Feburary 2012. The comments were used to prepare this final version and the draft was approved by the AEWA TC at the end of Febuary 2012.

- The draft of these guidelines was also submitted to a selection of members of the IUCN/SSC Re-introduction Specialist Group and other re-introduction specialists, including Philip McGowan, Chris Bowden, Mark Stanley Price, Pritpal Soorae and Philip Seddon, and the comments received were used to prepare this final version.

- In April 2012, the AEWA Standing Committee approved the submission of the draft guidelines to the 5th Session of the Meeting of the Parties to AEWA, 14-18 May 2012 in La Rochelle, France.

Note on revision of IUCN re-introduction guidelines

The IUCN *Guidelines for Re-introductions* (www.iucnsscrsg.org/download/English.pdf; IUCN 1998), prepared by the IUCN-SSC Re-introduction Specialist Group, were approved by IUCN's Council in 1995 and published in 1998. These guidelines were short and practical in focus, have proved incredibly useful to guiding the re-introduction process, and have been cited perhaps more than any other conservation policy guidelines (Mark Stanley Price, pers comm.).

In 2010, IUCN established the Task Force on Moving Plants and Animals for Conservation Purposes, composed of members from the IUCN-SSC Re-introduction and Invasive Species Specialist Groups, to update the 1998 guidelines. The need for revision was due to the major ecological changes and increased pressures on biodiversity that had occurred over the last two decades, in particular climate change.

At the time of writing these guidelines, the IUCN revision was in draft form (due for final publication in late 2012). The major difference between the 1998 guidelines and the draft 2012 guidelines is the attention given to 'conservation introductions,' the intentional movement and release of an organism outside its historic range. The draft further recognises two types of conservation introduction: 'assisted colonisation,' the intentional movement and release of an organism outside its historic range when protection from current or likely future threats in the historic range is deemed less feasible than at other sites; and 'ecological replacement,' the intentional transport and release outside its historic range of an organism to perform a specific ecological function lost through extinction of other taxa.

These guidelines do not fully address the issue of conservation introductions, but as outlined in Section 1.2, focuses on translocating waterbirds for the purposes of re-establishing or reinforcing a species in its historic range. If a translocation is being considered outside of the historic range, extreme caution should be taken and consultations made as widely as possible. When published, the revised IUCN guidelines, the *IUCN Guidelines on Re-introduction and Other Conservation Translocations* (in prep 2012) will provide useful advice.

The second most significant change in the revised guidelines is the focus on risk analysis as a tool for determining whether or not a tranlocation should go ahead. This approach is greatly welcomed and referenced in Section 3.4 of these guidelines.

Due to the fact that the IUCN revision is not complete at the time of writing these guidelines, it is not possible to fully address the issues raised by them and these guidelines still draw heavily on the 1998 edition, the IUCN *Guidelines for Re-introductions* (IUCN 1998). This is, however, not seen as detrimental to these guidelines as most of the 1998 edition remains relevant and, in any case, a large part of the revised guidelines is beyond the scope of these guidelines, which aim to provide practical advice to practioners rather than policy and scientific advice.

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SUMMARY

Translocation has received increased attention as a conservation tool over the last two decades resulting in an increase in translocation projects worldwide aiming to re-establish extinct or depleted wild populations (IUCN 1998). The *Guidelines for the translocation of waterbirds for conservation purposes: complementing the IUCN guidelines* have been developed to provide guiding principles for the translocation of waterbirds for conservation purposes, expanding on the generic guidelines provided by the *IUCN Guidelines for Re-introductions* (IUCN 1998). These guidelines provide information on determining the aims and objectives of a translocation, assessing justification and feasibility, the planning process, project implementation, assessing success and reporting outcomes.

While translocation techniques are improving continuously and for some species have clearly represented the difference between survival and extinction in the short-term, translocation projects are still associated with numerous problems and consequently still have a low success rate. Problems that are significant include (1) difficulty establishing self-sustaining captive populations, (2) poor success in release attempts, (3) high costs, (4) introgression of alien DNA, (5) pre-emption of other conservation measures, (6) disease outbreaks and (7) maintaining administrative continuity.

For these reasons, translocation projects should not be undertaken lightly, and should only be conducted as part of wider conservation programmes. Effective integration between any translocation efforts and wider conservation efforts for existing wild populations should be sought wherever possible. It is vital that anyone considering a translocation project understands that translocation projects, almost without exception, are long-term, are expensive, require a multi-disciplinary team with a wide range of expertise, and can carry significant risks to wild populations. And perhaps most importantly, if a translocation does not occur as part of a wider conservation programme, it is very unlikely to have any long-term positive outcomes for the target species.

Prior to any planning or implementation, it is essential that a justification assessment is conducted to determine if the project is needed and appropriate. The assessment should consider the following key questions:

1. Is the species/population extinct or facing a high risk of extinction/extirpation in the wild? Or has the species/population undergone a significant decline and is currently in a depleted state in a particular area, either in terms of distribution or numbers?
2. Are existing conservation measures insufficient for recovery within a reasonable timescale?
3. Would the project's benefits outweigh potential costs and negative impacts?
4. Could the desired outcomes be achieved by an alternative, less expensive method, *i.e.* would the project be cost-effective?
5. Would the project's aims and objectives be in line with existing, relevant conservation plans and policies, particularly the *IUCN Guidelines for Re-introductions* (IUCN 1998) and any existing conservation Action Plans or other conservation initiatives?

If a project is considered justified, a comprehensive feasible assessment should be conducted to determine if the project has a reasonable chance of success based on available knowledge, skills, attitudes and resources. The assessment should consider the following key questions:

Biological, environmental and technical considerations

- Is a suitable source of birds available?
- If required, are captive breeding and rearing techniques for the species known?
- Are transport and release techniques for the species known?
- Is suitable habitat available in which to release the animals?
- Have the previous causes of decline been sufficiently reduced or eliminated?
- Is there sufficient knowledge of the species' natural history?

Socio-economic, political and legal considerations

- Does stakeholder support exist?
- Will the project conform to relevant laws and regulations?

Resource considerations

- Are sufficient financial resources available?
- Are sufficient technical resources available?

Following the decision to proceed with a translocation project, important planning and preparation activities should be completed:

- Construction of a multi-disciplinary team;
- Securing long-term political and financial support, and obtaining required licences and permits;
- Background research on biological and technical aspects such as capture, captive breeding and rearing (if required), release techniques, disease risks and health management;
- Careful and thorough project planning and budgeting; and
- Preparation of required facilities, sourcing equipment and training personnel;
- Establishment of a captive breeding population, if required; and
- Initiation of habitat management and engagement activities.

Pre-release and release activities include sourcing and preparing birds for release, releasing birds according to a carefully designed release strategy, as well as ongoing habitat management and engagement activities.

A translocation project is not complete upon the release of birds – a range of post-release activities are required, including interventions as necessary, monitoring, assessment of outcomes and evaluation of success, and reporting. These activities should be factored into project planning and budgeting.

Lessons learned from all the stages and activities in a translocation project should be carefully assessed and used to develop and improve on project plans and techniques. Lessons learned should be shared as widely as possible to inform future translocations of the target species and related species as well as the conservation community as a whole.

1 INTRODUCTION

1.1 DEFINITION OF TERMS

The terminology associated with re-introduction, and other related activities, has been used inconsistently in the past resulting in some confusion. In these guidelines we follow the original terminology outlined in the *IUCN Position Statement on the Translocation of Living Organisms* (IUCN 1987) and recommended by Armstrong & Seddon (2008):

- Translocation: any human facilitated movement of living organisms from one area to another.

Three types of translocation are recognised and defined as follows.

- Introduction: movement of an organism outside its historically known native range.
- Re-introduction: intentional movement of an organism into a part of its native range from which it has disappeared or become extirpated in historic times.
- Supplementation: movement of individuals to build-up an existing population.

As noted by Armstrong & Seddon (2008), these definitions are clear, simple and workable, with translocation providing a useful all-encompassing term and the other terms being mutually exclusive. The above definitions are not in line with the *IUCN Re-introduction Guidelines* (IUCN 1998) which restricted the term 'translocation' to direct movement of wild individuals from one wild area to another. This meant that it partially overlapped with all of the other terms and there was no general term that could be used to describe all types of movements (Armstrong & Seddon 2008).

In these guidelines, the term 'target species' is used to refer to any target taxon so may include subspecies, population or subpopulation levels.

1.2 CONTEXT AND SCOPE OF THESE GUIDELINES

The African-Eurasian Waterbird Agreement (AEWA) entered into force in 1999 and focuses on the conservation of 235 waterbird species in 117 Range States in Africa, Europe, and parts of Canada, Central Asia and the Middle East. AEWA calls on its Parties to engage in a wide range of conservation actions including, when appropriate, the use of translocation to re-establish species in their former ranges.

While translocation has proven useful and even key to the conservation of a number of species, few projects have resulted in self-sustaining populations (Beck *et al*. 1994, Lee & Hughes 2008). In an attempt to improve success, the *IUCN Guidelines for Re-introductions* (IUCN 1998) were published in 1998 providing specific policy guidelines for translocation projects. These guidelines are now well-accepted and have proven influential in highlighting the range of issues practitioners must consider.

In 2005, complying with Paragraph 7.4 of the AEWA Action Plan, the Agreement Secretariat, in coordination with the Technical Committee, Standing Committee and the Parties, commissioned the Wildfowl & Wetlands Trust (WWT) to prepare a review of waterbird re-establishment projects in the Agreement area (cited as Lee & Hughes 2008). The review was submitted to AEWA's fourth Meeting of Parties (MOP4; Meeting Document 4.11) after approval by the Technical Committee at its 8th meeting in March 2008 and endorsement by the Standing Committee at its 5th meeting in June 2008.

The review made a number of conclusions relating to improving the success of waterbird translocation projects, including (1) compliance with the *IUCN Guidelines for Re-introductions* (IUCN 1998) is associated with higher levels of success, (2) a range of specific factors appear to be particularly key to success and (3) there is a need for standardised evaluation criteria (Lee & Hughes 2008). Recognising that the IUCN guidelines were written to encompass the full range of plant and animal taxa and are therefore general, the review recommended that specific guidelines for translocating waterbirds be developed. The review further recommended, *inter alia*, that a standard set of evaluation criteria and a reporting structure be developed by the AEWA Technical Committee in liaison and consultation with appropriate experts and reported to AEWA Contracting Parties. The conclusions and recommendations from the review served as a basis for AEWA Resolution 4.4.

In Paragraph 2 of Resolution 4.4, the Meeting of Parties requested the Technical Committee to develop "supplementary guidance for the re-establishment of waterbirds" and to "develop a reporting structure, including a standard set of evaluation criteria, to encourage practitioners to provide detailed information about each project stage and to make this information widely accessible".

As per Paragraph 2 of Resolution 4.4, this document, *Guidelines for the translocation of waterbirds for conservation purposes: complementing the IUCN guidelines*, presents specific guidelines for waterbird translocation projects expanding on the generic guidelines provided by the *IUCN Guidelines for Re-introductions* (IUCN 1998). These guidelines provide information on determining the aims and objectives of a translocation, assessing justification and feasibility, the planning process, project implementation, assessing success using standardised criteria and reporting outcomes, including a framework for reporting to AEWA.

These guidelines address the translocation of all waterbird species as identified in Annex II of the AEWA Action Plan. Annex II covers a diverse range of waterbirds from 28 families and as such it should be recognised than these guidelines may require further adaptation in the case of individual species and situations. Nevertheless, the fundamental requirements for effective translocation projects are often the same regardless of the target species and as such these guidelines may also be of use to projects targeting non-waterbird species.

Translocation projects can have a wide range of objectives, including for example the supplementation of game stock. This document focuses on translocations for conservation purposes and as such is aimed at those considering translocating waterbirds for the purposes of re-establishing or reinforcing a species in its historic range and therefore improving its conservation status. It is based on current IUCN guidance – both the *IUCN Guidelines for Re-introductions* (IUCN 1998) and taxa specific guidance documents, in particular WPA & IUCN-SSC RSG (2009) and Beck *et al.* (2007) – and scientific literature and expert opinion.

1.3 AIMS AND OBJECTIVES OF THESE GUIDELINES

The aim of these guidelines is to increase the effectiveness and efficiency of translocation as a tool for the conservation of waterbirds by:

i) Outlining the key issues when considering a translocation and explaining why these issues are important;
ii) Providing guidance on when a translocation for conservation purposes may be justified and when it may not;
iii) Providing guidance on when a translocation for conservation purposes may be considered feasible and when it may not;
iv) Providing guidance that is specific to waterbirds for key steps in the translocation process;
v) Providing a reporting structure for waterbird translocation projects;
vi) Providing guidance on evaluating the success of waterbird translocation projects; and
vii) Providing a list of existing translocation guidance and other relevant sources of information;

These guidelines should be read in conjunction with the generic guidelines for translocations - the *IUCN Guidelines for Re-introductions* (IUCN 1998).

1.4 CONSIDERING A TRANSLOCATION

Paragraph 2.4 of AEWA's Annex 3 (Action Plan) reads "Parties shall exercise the greatest care when re-establishing populations listed in Table 1 into parts of their traditional range where they no longer exist. They shall endeavour to develop and follow a detailed re-establishment plan based on appropriate scientific studies. Re-establishment plans should constitute an integral part of national and, where appropriate, international single species action plans. A re-establishment plan should include assessment of the impact on the environment and shall be made widely available. Parties shall inform the Agreement secretariat, in advance, of all re-establishment projects for populations listed in Table 1."

While translocation techniques are improving continuously and for some species have clearly represented the difference between survival and extinction in the short-term, translocation projects are still associated with numerous problems and consequently still have a low success rate. Problems that are significant include (1) difficulty establishing self-sustaining captive populations, (2) poor success in release attempts, (3) high costs, (4) introgression of alien DNA, (5) pre-emption of other conservation measures, (6) disease outbreaks and (7) maintaining administrative continuity.

For these reasons, translocation projects should not be undertaken lightly, and should only be conducted as part of wider conservation programmes. Effective integration between any translocation efforts and wider conservation efforts for existing wild populations should be sought wherever possible. It is important that a comprehensive justification and feasibility study is conducted prior to any planning or implementation as recommended in the *IUCN Guidelines for Re-introductions* (IUCN 1998) and the AEWA Review of Waterbird Re-establishments (Lee & Hughes 2008).

It is vital that anyone considering a translocation project understands that translocation projects, almost without exception, are long-term, are expensive, require a multi-disciplinary team with a wide range of expertise, and can carry significant risks to wild populations. And perhaps most importantly, if a translocation does not occur as part of a wider conservation programme, it is very unlikely to have any long-term positive outcomes for the target species.

The decision to proceed with a translocation project is a complex one, based on many considerations. The key questions can perhaps be resolved as: is it justified, is it feasible, what methods should be used, when should it be done, and how much does it cost? The issues to be addressed in order to answer these questions are necessarily interrelated, while political, practical and biological considerations may provide conflicting viewpoints. The following key issues and risks should be factored into decision-making:

- **Previous causes of decline.** For translocation to result in a long-term increase in a population, the previous causes of decline must have been eliminated or reduced to a sufficient level. Otherwise, in most cases, translocation alone will not change the population trend; it will simply boost the number of individuals on a temporary basis. A translocation alone will not change the trend of a declining population. We also acknowledge that it may be impossible to determine previous causes of decline, especially if the extinction period has been long and environmental factors have changed during this time; hence, some translocations may legitimately be done on an experimental basis and scale to try to identify current (and by implication previous) threat factors.
- **Migration**. Translocations of migratory species are particularly complex, and establishing migratory habit in released birds can pose a significant challenge. There can be no guarantee that released birds will use traditional sites, and whilst measures can be taken to increase the chances of this, the possibility that released birds could use an alternative migratory route and non-traditional breeding, staging and/or wintering sites should be considered. In certain circumstances, it may be appropriate to use non-traditional sites, however, this approach should be taken with extreme caution and the justification for any such proposed translocation assessed on a case-by-case basis.
- **International cooperation**. Translocations requiring migration will often involve birds using more than one Range State during their annual cycle. As a result, international cooperation will be required and many of the measures required in the Range State of release will be needed in other Range States, *e.g.* post-release monitoring, habitat restoration and protection, and public-awareness activities.

- **Timescale and urgency**. Timescale is an important factor to consider, particularly for a supplementation where releases may be required urgently in order to maintain a species in an area while the previous causes of decline are being addressed.
- **Establishing a captive breeding population.** Establishing a captive breeding population with birds from a wild population may pose some risk to that wild population – this should be investigated using Population Viability Analysis (PVA) before birds or eggs are taken from the wild. Maintaining a captive breeding population requires careful health, demographic and genetic management and strict biosecurity procedures.
- **Socio-economic, political and legal aspects.** Socio-economic, political and legal aspects are critical to the implementation and outcomes of translocation projects. The importance of such aspects is often underestimated despite the fact that current species declines and extinction problems are often the result of socio-economic and political drivers. Many translocation projects overlook these factors and concentrate on the biological and technical considerations, which has been suggested as the reason many projects fail (Reading *et al*. 1991). Thus, it is vital that these elements are given careful consideration. Measures may be required to gain the support of local communities, organisations, government agencies and other stakeholders. Long-term financial and political support has been shown to be one of the most important factors in the success of a translocation project (Lee & Hughes 2008).
- **Programme phases.** Following the completion of pre-project activities (background research, justification and feasibility assessments, and decision making), there are three basic stages in a translocation project: the planning & preparation stage, the pre-release & release stage, and the post-release stage. It is important to remember that a project is not complete upon the release of birds. A range of post-release activities are required, including monitoring, assessment of outcomes, reporting and interventions as necessary. These activities should be factored into project planning and budgeting.

1.5 KEY ISSUES, ACTIVITIES AND PLANS

In order to ensure that a potential translocation project is thoroughly planned, the key issues, activities and plans required are listed in Table 1-1 and Figure 1-1 below. These elaborate on the *IUCN Re-introduction Guidelines* (IUCN 1998) and are designed to provide guidance on issues that relate directly to waterbirds.

In Table 1-1 under the heading 'Further information' is the number of the section in these guidelines where guidance on that specific topic can be found.

Table 1-1. Key issues, activities and plans for waterbird translocation projects.

	Further information
PRE-PROJECT ACTIVITIES	
Key activities to complete prior to any project planning or implementation:	
1. Background research.	
2. Justification assessment: A translocation will usually only be considered justified if the following apply: a. The species/population is extinct, facing a high risk of extinction/extirpation in the wild, or has undergone a significant decline in a particular area, either in terms of distribution or numbers; b. Existing conservation measures are insufficient for recovery within a reasonable timescale; c. The project's predicted benefits will outweigh potential costs and negative impacts; d. The desired outcomes could not be achieved by an alternative, less expensive method, *i.e.* the project would be cost-effective; and e. The projects aims and objectives are in line with existing conservation plans and policies, particularly the *IUCN Guidelines for Re-introductions* (IUCN 1998) and any existing conservation Action Plans or other conservation initiatives.	3.3
3. Feasibility assessment A translocation will usually only be considered feasible if the following apply: a. A suitable source of release stock is available; b. If required, captive breeding and rearing techniques for the species are known; c. Release techniques for the species are known; d. Suitable habitat is available in which to release the animals; e. The previous causes of decline have been sufficiently reduced or eliminated; f. There is sufficient knowledge of the species' natural history; g. Stakeholder support exists; h. The project conforms to relevant laws and regulations; i. There are sufficient financial resources available; and j. There are sufficient technical resources available.	3.4
4. Decision making – based on findings from the above, should the translocation project go ahead?	3.5
Key plans/documents required: justification assessment and feasibility assessment	

	Further information
PLANNING AND PREPARATION STAGE Key aspects of this stage of a translocation project include: 1. Construction of a multi-disciplinary team; 2. Securing political and financial support; 3. Development of a project plan, including as appropriate: - Setting targets - Identification of appropriate release sites - Disease Risk Assessment - Health management and biosecurity plan - Wild capture/egg collection plan - Captive management plan - Habitat management plan - Release and transport plan - Interventions policy - Post-release monitoring strategy - Community and stakeholder engagement plan - Budgeting - Effective timing and duration planning 4. Preparing required facilities, sourcing equipment and training; 5. Establishment of a captive breeding population, if required; and 6. Habitat management and engagement activities. *Key plans/documents required: project plan, including or accompanied by a Disease Risk Assessment*	4.1 4.2 4.3 4.3.1 4.3.2 4.3.3 4.3.4 4.3.5 4.3.6 4.3.7 4.3.8 4.3.9 4.3.10 4.3.11 4.3.12 4.3.13 4.4
PRE-RELEASE AND RELEASE STAGE Key aspects of this stage of a translocation project include: 1. Licensing requirements; 2. Sourcing birds for release – *e.g.* wild bird capture, egg collection, captive breeding; 3. Preparing birds for release – *e.g.* rearing and selecting birds for release, marking; 4. Release; and 5. Ongoing habitat management and engagement activities. *Key plans/documents required: relevant licenses and permits*	5.1 5.2 5.3 5.4
POST-RELEASE STAGE Key aspects of this stage of a translocation project include: 1. Interventions as appropriate; 2. Post-release monitoring; 3. Reporting and publications; 4. Evaluation of success; and 5. On-going habitat management and engagement activities. *Key plans/documents required: annual project reports, final report, publications in scientific and popular literature, and case-study submitted to the IUCN-SSC Re-introduction Specialist Group (RSG)*	6.1 6.2 6.3 6.4

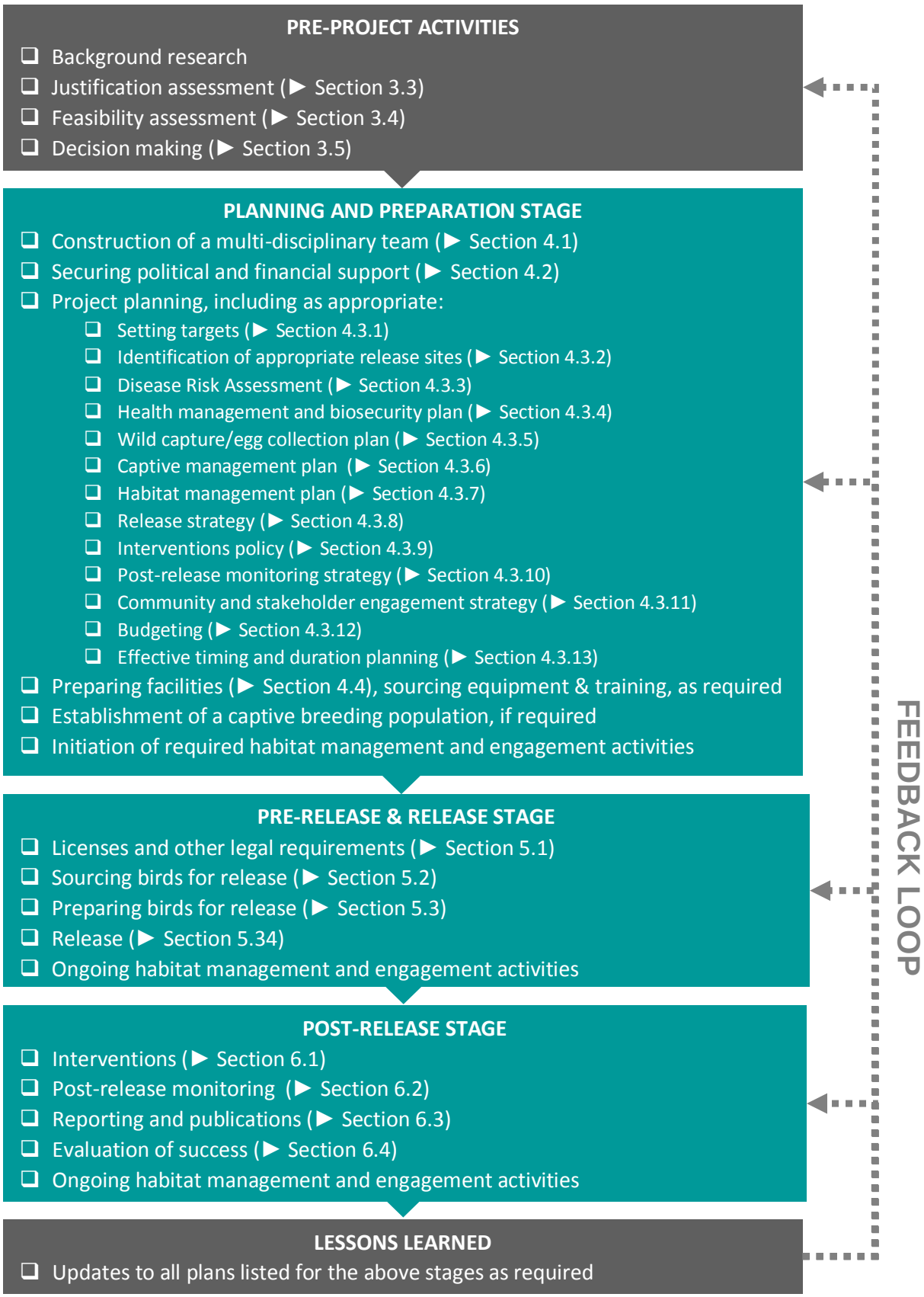

Figure 1-1. Flowchart of the key stages of a translocation project and checklists of the key activities required as part of each stage.

2 PRECAUTIONARY APPROACH

With the translocation of waterbirds as with any translocation, there is always a level of risk to the released individuals, source populations (wild or captive) which supply birds for release, wild populations of the target species if they exist, wild populations of other species and the release environments, including any activities these environments may support, *e.g.* agriculture, tourism and other activities related to livelihoods.

Consequently, a precautionary approach should guide all translocation efforts:

Translocation should not endanger wild waterbird populations by threat of infectious disease, unintended hybridization, disruption of established migratory routes, over-crowding, resource competition or the re-allocation of resources away from conservation measures for wild populations. Translocation should not endanger populations of other native taxa or the ecological integrity of the area in which they live. The conservation of the target species as a whole and its habitats must take precedence and translocations must only occur as part of a wider conservation programme. [1]

[1] Adapted from the 'Precautionary Principle' section of the *Best Practice Guidelines for the Re-introduction of Great Apes* (Beck *et al*. 2007).

3 PRE-PROJECT ACTIVITIES

3.1 INTRODUCTION

As with any new project which may require a large financial investment and/or a long-term time commitment, it is vital that all translocation projects are clearly justified and demonstrated to be feasible before any planning or preparation takes place. Poorly justified translocation projects will often fail to secure long-term financial and political support (two factors identified as key to success) and are less likely to gain public support. Projects which begin without an assessment of feasibility are likely to encounter unforeseen problems leading to higher levels of failure than those that begin with a comprehensive feasibility assessment.

Existing translocation guidance often recommends that translocation projects begin with a 'feasibility study'. Clear guidelines for completing such a study, however, are rare and as a result feasibility studies vary dramatically in scope and purpose between projects and often resemble project plans rather than true assessments of feasibility. Formal assessments of justification are usually absent from feasibility studies and are rarely addressed in existing translocation guidance.

It is strongly recommended that all proposed translocation projects begin first with a justification assessment and, if considered justified, a feasibility assessment. It may be practical to report on or publish both of these assessments within a single 'feasibility study,' but the distinct objectives of these very different assessments should be clearly addressed separately.

The following sections provide guidance on determining aims and objectives, completing justification and feasibility assessments, and using the results in decision making.

KEY MESSAGE

Determining whether or not a translocation project should go ahead requires two assessments:

- Justification assessment (is the project necessary?)
- Feasibility assessment (does the project stand a reasonable chance of success?)

3.2 DEFINING THE AIMS AND OBJECTIVES OF A PROJECT

Before assessing justification and feasibility, the aims and objectives of the proposed translocation should be clearly identified.

According to the IUCN *Guidelines for Re-introductions* (IUCN 1998), the principal aim of a translocation project for any species should be to improve the conservation status of the species in the wild, and objectives may include: 1) enhancing the long-term survival of the species in the wild; 2) maintaining or re-establishing a keystone species (in the ecological or cultural sense); 3) maintaining or restoring natural biodiversity; 4) providing long-term economic benefits to the local and/or national economy; and/or 5) promoting conservation awareness.

As such, any waterbird translocation for conservation purposes should have the principal aim of contributing towards the overall conservation status of the target species or population, and therefore biodiversity conservation as a whole. Specific species level targets for waterbirds can be found in International Single Species Action Plans and through the IUCN Red List.

The objectives should clearly indicate how this aim will be achieved. For example, a proposed translocation project for the Lesser White-fronted Goose *Anser erythropus* (LWfG) in Norway aimed to improve the conservation status of the Fennoscandian population of LWfG using traditional migratory routes. This aim was to be achieved by the following primary objective: enhancing the long-term survival of the Norwegian LWfG population by supplementing the existing depleted population and/or re-introducing birds should the population be extirpated. In addition, the project would help maintain a keystone species (in the cultural sense), maintain natural biodiversity in Norway and other range countries, and provide a number of opportunities for promoting conservation awareness.

See Case study 4-1 for the aims, objectives and targets of a re-introduction project for the Eurasian Crane *Grus grus* in the UK (the 'Great Crane Project').

3.3 JUSTIFICATION ASSESSMENT

A justification assessment for a translocation project is a generic and high-level process to determine if there is a need for translocation. It should address the conservation need as well as whether the benefits of such a project would outweigh potential costs and negative impacts, including the allocation of resources away from other conservation measures.

Translocation projects may be considered justified if (1) there is a clear conservation need for translocation; (2) negative impacts would not be significant and would not outweigh potential benefits; (3) the project would be cost-effective; and (4) the project would be in line with relevant conservation plans and policies. Negative impacts could include impacts on wild and source populations, the ecosystem, local communities and other stakeholders, and attitudes towards the target species or conservation as a whole. If such impacts are likely and would be significant, serious thought must be given to whether these negative impacts would outweigh potential benefits. Secondary benefits should be considered, particularly how the project could contribute to addressing conservation needs not directly linked to translocation. For example, well-run translocation projects often include monitoring, habitat restoration and conservation awareness activities, which could benefit existing populations of the target species or other species.

Based on these requirements, a justification assessment should address the following key questions:

Conservation needs

- Is the species/population extinct or facing a high risk of extinction/extirpation in the wild? Or has the species/population undergone a significant decline and is currently in a depleted state in a particular area, either in terms of distribution or numbers?
- Are existing conservation measures insufficient for recovery within a reasonable timescale?

Benefits, costs and impacts

- Would the project's benefits outweigh potential negative impacts?
    - What would be the primary and secondary benefits of the project and would they contribute to addressing the established conservation needs of the target species or other species?
    - Would there be any negative impacts on existing wild populations, if present; the environment; local communities and other stakeholders; or public, political and/or organisational attitudes?
- Could the desired outcomes be achieved by an alternative, less expensive method, *i.e.* would the project be cost-effective, or by an alternative method associated with less risk?

Policy requirements

- Would the project's aims and objectives be in line with existing, relevant conservation plans and policies, particularly the *IUCN Guidelines for Re-introductions* (IUCN 1998) and any existing Action Plans or other conservation initiatives?

The answers to these questions should be considered sequentially as illustrated in Figure 3-1, which presents a flowchart to aid decision-making.

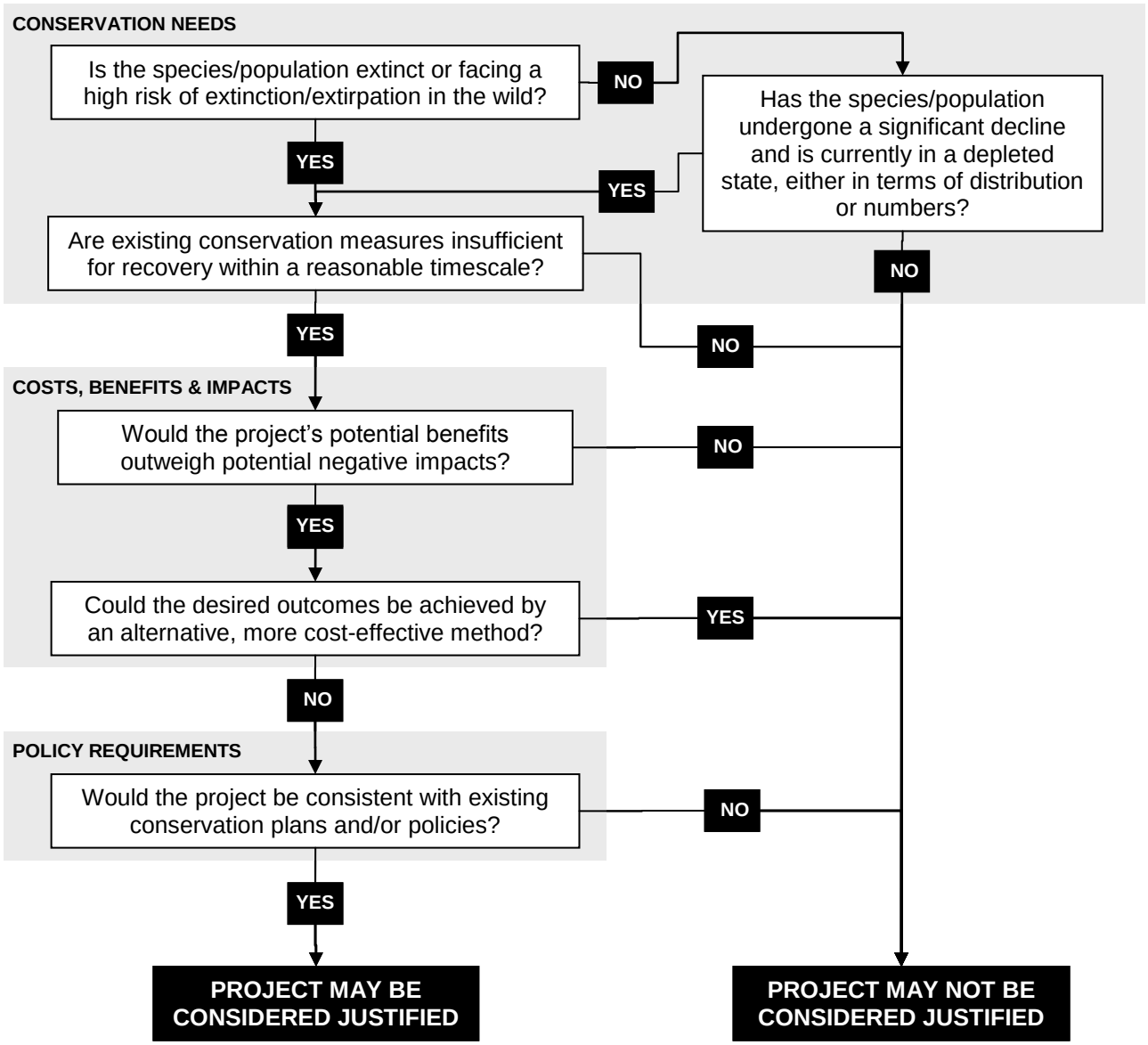

Figure 3-1. Decision flowchart for assessing the justification of a proposed translocation project.

3.3.1 Suggested format for a justification assessment

BACKROUND

- Give context for the proposed translocation: why is it being considered?
- Clearly describe which species/population is the target and in what area.
- State the proposed aim and objectives of the translocation.

CONSERVATION NEEDS

- Clearly describe the target species' status in the wild at global and local level.
- Describe past and current conservation measures in place for the species and their outcomes.
- Population modelling – in the case of a supplementation, to determine the potential effects of a translocation on the long-term future of an existing wild population in comparison with other conservation measures.

BENEFITS, COSTS AND IMPACTS

- Describe the predicted benefits of the projects, including both direct and indirect benefits.
- Describe any potential negative impacts, including those on existing wild populations of the target species and other species, the environment, local communities and stakeholders, and attitudes.
- Provide an assessment of cost-effectiveness – compare predicted costs for a translocation project with predicted costs for other conservation measures.

POLICY REQUIREMENTS

- Describe how the proposed translocation project would contribute to the objectives of existing conservation initiatives (*e.g.* Single Species Action Plans) and meet the requirements of national and international policies regarding translocation (*e.g.* the *IUCN Guidelines for Re-introductions*).

FLOWCHART ANALYSIS AND CONCLUSIONS

- Using the information gathered in the previous sections, complete an assessment of the key justification questions as presented in the translocation justification flowchart (Figure 3-1).
- Draw conclusions on the justification for the proposed translocation.

KEY MESSAGE

A justification assessment should address the key question of whether or not a translocation is needed considering the conservation needs of the target species, benefits versus potential costs and negative impacts, cost-effectiveness and the requirements of existing policies and conservation plans and initiatives. The potential allocation of resources away from other conservation measures should be carefully considered.

3.4 FEASIBILITY ASSESSMENT

A feasibility assessment aims to determine, to the best available knowledge, if a proposed translocation project is practically possible, considering biological, environmental and technical factors; socio-economic, political and legal factors; resource requirements; and time constraints. A feasibility assessment should also include a full analysis of the risks associated with the project and highlight which project areas may be associated with the highest levels of risk.

The *IUCN Guidelines for Re-introductions* (IUCN 1998) clearly outlines the factors that should be considered when undertaking a translocation project, and a number of comprehensive scientific reviews (*e.g.* Sarrazin & Barbault 1996, Seddon *et al*. 2007, Reading *et al*. 1991) as well as the *AEWA Review of Waterbird Re-establishments* (Lee & Hughes 2008) have determined the factors most associated with success. From these sources, it is possible to identify 10 key questions to address when assessing feasibility:

Biological, environmental and technical considerations

1. Is there sufficient knowledge of the species' natural history?
2. If required, are captive breeding and rearing techniques for the species known?
3. Is there sufficient knowledge of release techniques for the species?
4. Is suitable habitat available in which to release the birds?
5. Have the previous causes of decline been sufficiently reduced or eliminated?
6. Is a suitable source of birds available?

Socio-economic, political and legal considerations

7. Does stakeholder support exist?
8. Will the project conform to relevant laws and regulations?

Resource considerations

9. Are sufficient financial resources available?
10. Are sufficient technical resources available?

As the objectives of translocation projects can vary greatly (from establishing viable self-sustaining populations in the long-term to reducing the risk of extinction in the short-term), the objectives must be taken into account when assessing feasibility. For example, it may be feasible to maintain a migratory species in its current range through supplementation while the causes of decline are being addressed, but not feasible to re-establish a self-sustaining migratory population of a species that is extinct in the wild.

It is also vital to consider the timescale within which a translocation project might need to occur and the potential problems associated with limited time. Where a species or population is facing a high risk of extinction in the wild, there is often the need to act quickly to establish a captive population to preserve genetic diversity, and/or supplement the existing wild population to preserve ecological characteristics, such as a learned migratory route. Where a species or population has already become extinct in the wild or has been extirpated from a particular area, there are often fewer time constraints, but according to the *IUCN Guidelines for Re-introductions* (IUCN 1998), 'special care is needed when the population has long been extinct.'

The answers to the key feasibility questions should be converted to a score indicating the degree to which each criterion is fulfilled by the proposed project (see Section 3.4.1).

3.4.1 Assessing the key feasibility criteria using a standardised scoring system

The 10 key feasibility criteria should be scored from zero to five with a score of five indicating complete fulfilment of a criterion, four indicating sufficient fulfilment, three indicating some fulfilment but that there may be significant associated difficulties, and any score below three indicating insufficient fulfilment.

For a project to be considered feasible, it is suggested that each criterion should achieve a score of at least four. A project scoring three on some criteria but above on all others may be considered feasible assuming the identified problems can be overcome (*e.g.* through further research or experimental trials), and a project scoring two or below on any criterion should not be considered feasible without further evaluation.

Criteria should be scored according to the following guide:

- **0** No fulfilment, and based on current knowledge it is not possible to address the deficit in knowledge, skills, resources and/or support required.
- **1** No fulfilment, but it may be possible to address the deficit.
- **2** Partial fulfilment, but it may be possible to address the deficit.
- **3** Partial fulfilment, but it is possible to address the deficit.
- **4** Complete fulfilment, but based on assumptions.
- **5** Complete fulfilment.

For example, the following scenarios would achieve the following scores for question two: are captive breeding techniques known?

Scenario	Score
All efforts to breed the species and similar species in captivity have failed. No captive populations of the species or similar species currently exist.	**0**
All efforts to breed the species and similar species in captivity have failed. Captive populations of the species or similar species currently exist with which captive breeding techniques could be trialled.	**1**
Efforts to breed the species and/or similar species in captivity have shown limited success. Captive populations of the species or similar species currently exist with which captive breeding techniques could be trialled.	**2**
The species has not been recorded as breeding in captivity, but similar species breed in captivity. The experience and skills required for similar species are available within the project team.	**3**
The species is known to breed well in captivity and the experience and skills required are available (*i.e.* the practitioners with the experience and skills have offered assistance) but are not present within the project team.	**4**
The species is known to breed well in captivity and the experience and skills required are available within the project team.	**5**

Although subjective, these scores can be used to aid decision-making in determining to what degree a translocation project is feasible and which areas, if any, require further attention/special care.

See Table 3-1 for a standardised format for presenting the criteria, the scores and a brief explanation of each score.

Table 3-1. Standardised format for assessing the key feasibility criteria for a translocation project.

Key feasibility criteria	Score	Explanation
BIOLOGICAL, ENVIRONMENTAL AND TECHNICAL CONSIDERATIONS		
1. Is there sufficient knowledge of the species' natural history?	0–5	
2. If required, are captive breeding and rearing techniques for the species known?	0–5	
3. Are transport and release techniques for the species known?	0–5	
4. Is suitable habitat available in which to release the animals?	0–5	
5. Have the previous causes of decline been eliminated or sufficiently reduced?	0–5	
6. Is a suitable source of animals available?	0–5	
SOCIO-ECONOMIC, POLITICAL AND LEGAL CONSIDERATIONS		
7. Does stakeholder support exist?	0–5	
8. Will the project conform to relevant laws and regulations?	0–5	
RESOURCE CONSIDERATIONS		
9. Are sufficient financial resources available?	0–5	
10. Are sufficient technical resources available?	0–5	

3.4.2 Suggested format for a feasibility assessment

BACKROUND

- Give context for the proposed translocation: why is it being considered?
- Clearly describe which species/population is the target and in what area
- State the proposed aim and objectives of the translocation

BIOLOGICAL, ENVIRONMENTAL AND TECHNICAL CONSIDERATIONS

A. Natural history of the species

- Summarise and describe the amount of information available about the target species: current and historical population status, distribution, trends and threats, life cycle, distribution and movements including migration patterns, habitat requirements, diet and feeding requirements, breeding biology and behaviour, social behaviour, predators, and diseases to which the species is susceptible.
- It is not necessary to include a comprehensive description of the species if this exists in other published sources but clear reference to these sources should be made with a summary of the information available. If published sources do not exist, any existing data and information about the species and its habitats should be included in an annex, with a summary and reference to the annex in this section.
- Where information on a particular target species is lacking, knowledge of closely-related waterbird species should be included if available. For example, when assessing the feasibility of establishing a captive population of Madagascar Pochard *Aythya innotata*, knowledge of the closely-related Ferruginous Duck *Aythya nyroca* was used.
- Knowledge gaps should be clearly identified.

B. Causes of decline

- Detail the current state of knowledge on why the target species has declined or been extirpated.
- Describe how the causes of decline have been addressed.
- Detail past, current and planned conservation measures for the species and their outcomes or predicted outcomes.

C. Habitat availability

- Describe the habitat available for a released population, include ecological status, protection status, and a summary of other species present.
- Describe food availability in the potential release habitat, including the identity and abundance of potential prey species, and describe how a translocation could impact these prey species.
- Describe known or predicted interactions with other species present in the habitat, *e.g.* predation and competition, and how a translocation could impact these species.
- In the case of migratory waterbirds, be sure to cover areas used throughout the life cycle: wintering sites, staging sites, moult sites and breeding sites, as appropriate.
- Describe any habitat restoration or creation activities needed.
- Identify potential release sites and describe their suitability (see Section 4.3.2 for criteria).

D. Potential sources of animals

- Describe the options available for sourcing animals for release, *i.e.* potential wild source populations (describe taxonomic and conservation status), existing captive populations (describe taxonomic and health status), and/or the possibility of establishing a new captive population (describe how this could be established and from what source).
- Using population modelling, describe the effect of taking birds from any potential wild source

population(s). The conservation benefits of taking birds should be greater than any negative impacts on the wild source population.

- Detail the numbers of birds that could be available and on what schedule.

E. Captive breeding and rearing techniques, if applicable

- Summarise and describe the amount of information available on breeding and rearing the target species, or similar species, including health management and 'rearing for release' (see Section 5.3.1).
- If available, provide examples of past or existing captive populations that have been managed successfully.
- List the husbandry and health management resources that exist for the target species or similar species.
- Knowledge gaps should be clearly identified.

F. Transport and release techniques

- Summarise and describe the amount of information available on transporting and releasing the target species, or similar species.
- Provide a comprehensive list of past and current translocation projects, for the target species or similar species, detailing the transport and release techniques used and their results.
- Identify the release methods most appropriate for the target species and describe how they could be used – consider release timings and locations, and the age at which birds should be released.
- List any guidance resources on transport and release for the target species or similar species.
- Knowledge gaps should be clearly identified.

G. Population modelling

- A PVA should be produced to guide decisions on determining:
  1. The target size for the released population, *e.g.* the size at which the population could become self-sustaining, or the target size for the supplemented population (existing population plus released population), *e.g.* the size at which extinction risk will have been significantly reduced.
  2. The numbers of birds to release and over what schedule to best achieve the target size. For example, better results may be produced by releasing large numbers of birds over a short period of time (*e.g.* 50 birds per year for three years) or smaller numbers of birds over a longer period (*e.g.* 20 birds per year for 20 years).

SOCIO-ECONOMIC, POLITICAL AND LEGAL CONSIDERATIONS

A. Stakeholder support

- Provide a comprehensive list of all stakeholders (those that have an interest in the project – individuals, organisations and agencies that are directly involved in the project, whose interests may be affected by the project, or who may have a positive or negative influence on the project).
- Describe any potential impacts, both positive and negative, the proposed translocation project could have on the stakeholders.
- Describe the attitudes of the stakeholders towards the proposed translocation project – where possible, conduct an opinion poll.

B. Community support

- Describe any local human communities in or near the areas that released birds might use. In the case of migratory species, be sure to include communities in or near wintering sites, breeding sites, moult sites and staging sites.

- Describe the attitudes of these communities towards the proposed translocation project – where possible, conduct an opinion poll.

C. Political support

- List the government ministries and/or agencies relevant to the proposed project – include the local/municipal level, regional/provincial level, national level and international level (*e.g.* the European Union).
- In the case of migratory species, be sure to consider all countries which the released population will be expected to use throughout the annual-cycle.
- Describe the support available from the ministries/agencies identified.

D. Organisational support

- Describe the support available from other organisations. For example, the support of a zoo may be beneficial if a captive breeding population is required to supply birds for release, or the support of a local ornithological society may be beneficial if a volunteer network of birdwatchers is required for post-release monitoring.

E. Laws and regulations

- Detail the laws and regulations relevant to the proposed translocation (from local to international level) and describe how the translocation will meet them.
- In the case of migratory species, be sure to consider the laws and regulations of all countries that the released population will be expected to use throughout the annual-cycle.
- In the case of both migratory and non-migratory species, be sure to consider the laws and regulations of all countries that the released population has a reasonable chance of using, *e.g.* through erratic movements or natural population expansion.

TIMESCALE AND URGENCY

- Provide an indicative schedule indicating when the key activities of the project should occur.
- Where a translocation aims to re-introduce a species to an area from which it has been extirpated, there are often few time constraints, but according to the *IUCN Guidelines for Re-introductions* (IUCN 1998), 'special care is needed when the population has long been extinct.'
- Where a translocation aims to supplement an existing population, time constraints are often a vital part of assessing feasibility. Where a species or population is facing a high risk of extinction in the wild, there is often the need to act quickly to establish a captive population to preserve genetic diversity, and/or supplement the existing wild population to preserve ecological characteristics, such as a migratory route.

RISK ASSESSMENT

- Drawing on information provided in the preceding sections, a risk assessment should carefully consider all of the hazards associated with the proposed project, the likelihood of each hazard occurring, the severity of its impacts and measures that could be taken to mitigate risk.
- As well as risks to project success, the risks to the wider environment should also be carefully assessed, including those to the source populations (captive or wild), any wild populations of the target species and other species, and the release environments including any activities these may support, *e.g.* agriculture, tourism, and other activities related to livelihoods.
- Consideration should be given to the potential invasiveness of the target species and generally how an established population of the target species might expand.

- The assessment should clearly explain areas of uncertainty and should be undertaken at an appropriate geographic scale, *i.e.* should cover the expected range of the released population not just the potential release site(s), and time scale, *i.e.* within reason, should cover the long-term future of the release population not just the duration of the project.

KEY CRITERIA ASSESSMENT AND CONCLUSIONS

- Using the information gathered in the previous sections including the results of the risk assessment, complete an assessment of the key feasibility criteria (Table 3-1) scoring each criterion and providing a rationale for each score.
- As described in Section 3.4.1 for a project to be considered feasible, it is suggested that each criterion should achieve a score of at least four. A project scoring three on some criteria but four or above on others may be considered feasible assuming the identified problems can be overcome (*e.g.* through further research or experimental trials), and a project scoring two or below on any criterion should not be considered feasible without further evaluation. Although subjective, these scores can be used to aid decision-making in determining to what degree a translocation project is feasible and which areas, if any, could be particularly problematic.
- Identify the project areas most likely to cause problems/limit success and suggest methods to overcome these problems.
- Discuss the results of the risk assessment both in terms of risks to and from the project and determine whether or not the associated risks are acceptable and can be managed.
- Draw conclusions on the feasibility of the proposed translocation.

3.4.3 Biological, environmental and technical considerations

3.4.3.1 Is there sufficient knowledge of the species' natural history?

When assessing the feasibility of a translocation project, it is fundamental that all available knowledge of the target species is collated both for wild and captive populations. Translocation projects have a better chance of success when the critical needs of the species are well understood and planning is informed by a comprehensive body of knowledge. This should include:

- Current and historical population status, trends and threats;
- Life cycle;
- Distribution and movements, including migration patterns;
- Habitat requirements, including diet and feeding requirements;
- Breeding biology and behaviour;
- Social behaviour;
- Predators and predator avoidance behaviour;
- Diseases (both infectious and non-infectious) to which the species is susceptible (in the wild and captivity); and
- Past translocation attempts – including detailed methods and outcomes.

It is inevitable that even basic knowledge will be lacking for some species, particularly threatened species, but every effort should be made to gather as much information as possible. Where information is lacking, it may be useful to study closely-related waterbird species.

3.4.3.2 Have the previous causes of decline been eliminated or sufficiently reduced?

Causes of declines of waterbirds are typically human-driven and are often partial or full destruction or alteration of habitats, unsustainable harvesting, pollution, and introduction of invasive alien species. Other factors such as disease and predation have also proven important.

For a translocation to result in a long-term population increase, the previous causes of decline must have been eliminated or reduced to a sufficient level. Otherwise, in most cases, translocation efforts alone will not result in any permanent gains, but will simply boost the number of individuals on a temporary basis.

There is little value in beginning translocation when the previous causes of decline are still operating – the released population will suffer the same fate as the original population. Here elimination or sufficient reduction of the causes of decline is vital. There may be exceptions, however, where a translocation project could secure funding for habitat restoration, site protection or other conservation measures that could address the previous causes of decline in parallel with, for example, establishing a captive breeding programme.

In the case of supplementation, the issue is more complex. Supplementation usually occurs where a population size has been greatly reduced and natural re-growth is not expected to occur within a reasonable time scale. In this case, again elimination or sufficient reduction of the causes of decline is vital. But supplementation can, however, be useful in some situations where the causes of decline are still operating, in order to maintain a population while the causes of decline can be addressed. For example, there is little evidence that the causes of decline have been eliminated for the population of Lesser White-fronted Goose breeding in Norway yet supplementation has been recommended for this population. If the population were to become extinct, the migratory route would be lost. Thus boosting the population in the short-term will serve to maintain the migratory route even if long-term population increase cannot be achieved until the causes of decline have been eliminated or sufficiently reduced.

3.4.3.3 Is a suitable source of animals available?

The initial source of birds for a translocation can be provided by an existing wild population of appropriate genetic status, or an existing captive population that has been carefully managed both genetically and demographically. As the complete history and therefore genetic status of captive populations is sometimes unknown, even where a captive population exists it is often necessary to establish a new captive population from a known wild source.

The key considerations when determining the suitability of a source of waterbirds for translocation are:

- Sourcing birds for translocation should not threaten the long-term viability of the source population (wild or captive) – population modelling should be done to determine the effects of removing birds from the source population.
- The source population should be of appropriate taxonomic status, ideally the same sub-species or race as that which was extirpated or is to be supplemented. Genetic studies should be made of remaining populations of the target species, including captive populations when wild populations are difficult to sample or are no longer present. Where a species has been extirpated or is extinct in the wild, specimens found in museums and other skin collections should be investigated. Difficulties in determining suitable taxonomic status will arise when a population has been long extinct. Whenever genetic status presents uncertainty, expert advice should be sought from conservation geneticists (see Section 5.3.2.2).
- The source population should be of appropriate disease status, *i.e.* free of diseases that may pose a significant risk to the translocation project, in particular Newcastle disease and avian influenza (for further information on assessing disease risk see Section 4.3.3).
- The source population should be able to supply adequate numbers of birds for release on a regular and predictable basis, meeting the specifications of the project PVA (see Part G of Section 3.4.2).
- Special care should be taken when considering using birds from a captive population that has been in captivity for more than three to four generations. Populations long held in captivity present increased risks of domestication, inbreeding and hybridisation.

Case study 3-1. Evidence of hybridisation found in the captive populations of Lesser White-fronted Geese *Anser erythropus* used to supply birds for release in Sweden between 1981 and 1999.

To supply birds for release in Sweden between 1981 and 1999, large captive populations of Lesser White-fronted Geese *Anser erythropus* (LWfG) were built up in Sweden and Finland. These populations were housed at the Öster-Malma Hunting and Wildlife Management School in Nyköping, Sweden; Nordens Ark Trust in Sweden; a farm on the isle of Hailuoto on the west coast of Finland; and Hämeenkoski farm in southern Finland.

While a proportion of the birds which founded the Öster-Malma collection was wild-caught in Fennoscandia and therefore of known wild origin, the majority of birds introduced into these collections were from existing captive collections of unknown wild origin and with a long history of captive breeding.

Genetic analysis of blood taken from 15 birds in the Hailuoto collection in 1993 showed that four individuals (one of which had originated directly from the Öster-Malma collection) had mitochondrial DNA (mtDNA) typical of the Greater White-fronted Goose *Anser albifrons* (Andersson 2005). While the exact origin of this mtDNA has not been determined, the most probable explanation for its presence in the Hailuoto LWfG is that hybridisation between the two species occurred at some point in captivity.

Translocation projects using a wild source of birds will still require at least some period of captivity, ranging from a short period of transportation between wild areas to long-term captivity through the establishment of a new captive breeding population. Translocation projects using a wild source of birds may involve:

- Direct movement between wild areas – juveniles and/or adults are captured in one wild area and transported to and released directly into another wild area, often requiring a period of captivity both for transport and while birds acclimatise to their release location (short-term captivity);
- Rearing for release – juveniles and/or eggs are taken from the wild and reared in captivity until the age of release (usually age of fledging). When birds are released at or near the location of egg collection/capture this is termed 'head-starting' (medium-term captivity); or
- Establishment of a new captive breeding population – birds/eggs are taken from the wild to found a new captive breeding population of which subsequent generations will be reared for release and released (long-term captivity). In general, capturing wild adult birds to establish a captive population is not recommended as adult birds can require many years to settle in captivity and breed. Capturing juvenile birds can produce better results, but generally egg collection and hatching birds in captivity is the best method for establishing a captive breeding population.

Each source of birds has its own advantages and disadvantages and the suitability of each source should be assessed considering the life-cycle and behavioural characteristics of the target species and the translocation objectives (*e.g.* establishment of a migratory or resident population). For example, some species are highly susceptible to stress during transport, and therefore the direct movement method may not be suitable and hatching and rearing birds at the release site may be required. Some species will not exist in adequate numbers in the wild to allow for regular collection and in these cases, it will be necessary to establish a captive breeding population.

Box 3-1. Recommendations from the *IUCN Guidelines for Re-introductions* (IUCN 1998) on source populations.

- The source population should ideally be closely related genetically to the original native stock and show similar ecological characteristics.
- Removal of individuals must not endanger the captive stock population or the wild source population.
- 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 stock is to be used, it must be from a population which has been soundly managed both demographically and genetically.

Figure 3-2 illustrates how different source populations can be used to produce birds for release and the relative amount of time required in captivity for the different options.

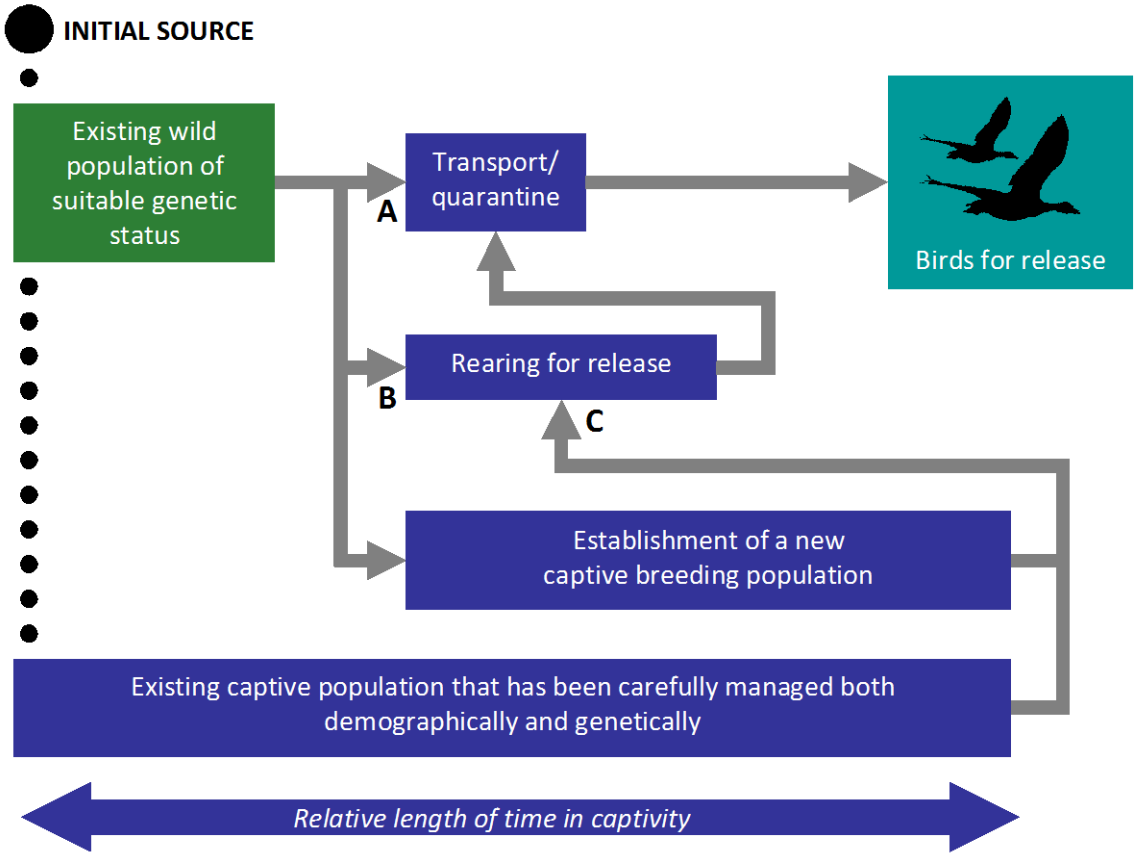

Figure 3-2. Diagram showing how initial wild and captive sources of birds can be used to produce birds for release and the relative amount of time required in captivity for the different options: (A) juvenile or adult birds are moved directly between two wild areas with only short-term captivity for transport and quarantine as required, (B) eggs or juveniles are removed from the wild and reared in captivity until age of release, and (C) juveniles are taken from a captive breeding population and reared for release.

Wild source – direct movement from one wild area to another

Moving wild birds directly from one wild area to another has been used successfully to translocate threatened birds, *e.g.* Black Robin *Petroica traverse* and Northern Brown Kiwi *Apteryx mantelli*. The movement process (catching, handling, confining, transferring and releasing into an unfamiliar environment) has, however, been associated with a number of problems, including reduced breeding success, rapid dispersal from the release

area and low survival. These effects will vary depending on the target species and age of the birds moved – as adults, juveniles or eggs.

Direct movement of wild birds is most suitable for birds that do not rely on phase-sensitive learning to develop habitat and site preferences; that are resident in an area, *i.e.* birds which do not normally move or migrate long-distances; and that can be found, caught, transported and released relatively easily with a minimum amount of stress.

Characteristics of species that generally do not fit the profile of a species suitable for direct movement from one wild area to another:

- *Long-distant migration.* Species that regularly move long-distances are more likely to disperse from the release area if they are capable of flight when released. Birds are likely to be stressed when released and want to move away from the source of their stress. It may be possible to overcome this problem by releasing flightless adult (moulting or wing-clipped) or juvenile birds, or holding the birds in a netted enclosure at the release site where they can settle and acclimatise to their new environment.
- *Learning plays a role in site selection.* For some species, site selection is thought to be influenced by where birds learn to fly and the sites that are encountered on migration. For these species, adult birds which have been translocated to a new breeding area may not return to this area the following breeding-season, but rather return to their original breeding grounds. Moving flightless juvenile birds may overcome this site selection problem.
- *Difficult to catch reasonable numbers.* For a translocation to be successful, a regular supply of birds must be available. If birds are to be moved directly from a wild area it must be possible to reliably catch adequate numbers. Species that are difficult to catch – low density in the wild, inhabit difficult-to-reach areas, capture methods are unreliable – are therefore unlikely to be suitable candidates for direct movement.
- *Difficult to move within a reasonable time-scale*. One of the main advantages of direct movement is the relatively small amount of time required in captivity. For a species to be suitable for direct movement, it must be possible to capture, move and release the individuals within a short time period. If birds would have to be collected from remote areas without efficient travel links or would require quarantine periods before entering the country of release, consideration should be given to whether or not the species is suitable for direct movement.

In addition, the source population must be capable of supporting regular removals of birds/eggs as evidenced by population modelling.

Table 3-2. A summary of the main advantages and disadvantages associated with direct movement of birds from a wild source population.

Advantages	Disadvantages
▪ Relatively short period of time required in captivity so limited risk of domestication effects or adaptation to captivity, and reduced risk of acquiring diseases associated with captivity, *i.e.* diseases associated with artificially high density, artificial diet and substrates, contact with humans and other captive species, etc. ▪ Birds will have fledged in the wild so will have naturally acquired the necessary survival skills	▪ Increased risk of dispersal from the release site ▪ Increased stress on the birds from capture and transport ▪ If conditions at the capture site are different to those at the release site, birds survival skills may be inadequate for local conditions ▪ The project will be dependent on the ability to capture and transport adequate numbers of birds within a reasonable time-scale, which can be difficult to predict and guarantee for wild birds

Wild source – rearing for release, including head-starting

Taking eggs and/or juveniles from a wild population and rearing in captivity before release is only suitable when the source population can support regular collections of birds/eggs as evidenced by population modelling, and rearing techniques for the species are known – these techniques must ensure birds acquire all necessary survival skills and avoid becoming accustomed to humans or human infrastructure (see Section 5.3.1).

Rearing for release is often suitable when a healthy wild population can supply birds but direct movement of adult or juvenile birds is unlikely to be successful due to the characteristics of the species, *e.g.* juveniles require extended parental-care and/or adults will disperse quickly from the release site.

Rearing for release can be useful for species that have low fledging success in the wild, *e.g.* due to nest site disturbance or artificially high predation rates. Where artificial incubation, hatching and hand-rearing techniques have proven to have higher success rates than natural incubation, hatching and rearing, the rearing for release method can be used to head-start birds and therefore increase the numbers of birds fledged in any given year. This method of translocation is termed head-starting and has been used successfully for Black Stilt *Himantopus novaezelandiae* translocation in New Zealand and Piping Plover *Charadrius melodus* translocation in North America.

Table 3-3. A summary of the main advantages and disadvantages associated with the rearing for release method using birds from a wild source population.

Advantages	Disadvantages
▪ Relatively short period of time required in captivity so limited risk of domestication effects or adaptation to captivity, and reduced risk of acquiring diseases associated with captivity, *i.e.* diseases associated with artificially high density, artificial diet and substrates, contact with humans and other captive species, etc. ▪ If techniques are reliable and successful, can produce more fledglings than would have survived in the wild	▪ The project will be dependent on the ability to capture/collect/transport adequate numbers of juveniles/eggs within a reasonable time-scale, which can be difficult to predict and guarantee for wild birds ▪ Depending on the species, significant behavioural training may be required to ensure released birds have adequate survival skills ▪ If birds are being head-started in large groups, disease risk may be increased as a result of artificially high population densities either pre- or post-release

Captive or wild source – releasing birds from a captive breeding population

Using a captive breeding population (whether existing or newly established from a wild source) can provide a more predictable and regular supply of birds than methods that require regular capture/collection from the wild. Captive breeding techniques are well-established for a range of waterbird species and captive-bred birds have been used successfully to translocate bird populations in the past, e.g. Lesser White-fronted Goose and White-headed Duck *Oxyura leucocephala*.

The main disadvantage of using captive-bred birds compared to direct movement of wild birds is the need to ensure captive-bred birds are given the opportunity to learn the necessary survival skills. Rearing for release should be considered as a separate process from rearing birds which will remain in a captive breeding situation and accordingly separate rearing facilities may be required. Just as with the wild source rear for release method discussed above, special steps would need to be taken to ensure birds for release imprint on or become conditioned to appropriate items (*e.g.* adult birds of the same species, the release site and natural food types), do not imprint on or become conditioned to humans or human infrastructure (*e.g.* buildings and vehicles), and learn survival skills such as predator avoidance (see Section 5.3.1). Such steps are not required for birds which will remain in captivity, and it is in fact often beneficial for these birds to become conditioned

to human infrastructure and develop preferences for an artificial diet. Rearing for release techniques have been successfully demonstrated for geese and cranes.

Table 3-4. A summary of the main advantages and disadvantages associated with releasing captive-bred birds.

Advantages	Disadvantages
▪ If captive breeding techniques are reliable and successful, large numbers of birds for release can often be produced ▪ The project will not be dependent on regular capture/collection/ transport from the wild	▪ Relatively long period of time required in captivity so increased risk of domestication effects or adaptation to captivity ▪ Depending on the species, significant behavioural training may be required to ensure released birds have adequate survival skills ▪ Relatively more expensive and time-consuming than methods not requiring captive breeding ▪ Increased risk of acquiring diseases associated with captivity, *i.e.* diseases associated with artificially high density, artificial diet and substrates, contact with humans and other captive species, etc.

3.4.3.4 Are captive breeding and rearing techniques for the species known, if required?

If a translocation project requires captive breeding or rearing, it is beneficial if techniques are well-known and their efficiency established. It is often the case that threatened species are not present in captivity or not present in high numbers and may never have been bred in captivity. When this is case, techniques used for similar species should be investigated.

As a first step in answering the above question, the existence of techniques should be demonstrated (*e.g.* evidence of existing or past captive breeding populations) but it is also essential that the project team has access to these techniques and the skills and experience required to execute them. The expertise required for captive breeding and rearing should not be underestimated. Captive breeding and rearing experts should be a key part of the project team.

3.4.3.5 Are release techniques for the species known?

Release techniques for waterbirds vary greatly depending on the species for the release, the release site and the release objectives (*e.g.* establishment of the migratory or non-migratory populations).

The majority of successful releases involve "soft-release" techniques – *i.e.* housing birds temporarily at a release site, allowing them time to acclimatise to conditions at the release site, before opening the release enclosure and allowing the birds to disperse naturally. Different species, however, will require different release enclosure designs, lengths of time for acclimatization, interventions immediately after release, and behavioural training.

In addition, a range of specialised release techniques can be used for waterbirds, including:

- Releasing birds into wild flocks of migratory conspecifics or other similar species that use the desired migratory route, called 'direct release' or 'direct autumn release'. This technique has been used in the past for translocations of migratory cranes and geese.
- Releasing birds that are imprinted on a type of vehicle (*e.g.* a micro-light aircraft) and leading them on migration. This technique has been used for migratory cranes, geese and swans.
- Housing a captive breeding population of flight-restrained birds (*e.g.* pinioned, feather-clipped) in an open-roofed aviary allowing their offspring to disperse naturally. This technique has been used successfully for ducks.

The feasibility assessment should examine all past translocations of the target species and similar species and clearly describe the release techniques used and their outcomes.

3.4.3.6 Is suitable habitat available in which to release animals?

For birds to have a chance of survival after release, there must be adequate habitat at their release site where the critical needs of the species can be met, and for a migratory species there must also be suitable habitat available at staging and wintering sites. This habitat should not be at carrying capacity in terms of the target species or other species that may occupy the same or a similar ecological niche (although it is acknowledged that carrying capacity can be difficult to determine or estimate), should have assured long-term protection, and should be within the historic range of the species, with some exceptions. Where a translocation outside the historic range is considered, the *IUCN Guidelines on Re-introduction and Other Conservation Translocations* (in prep 2012) should be consulted.

Box 3-2. Recommendations from the *IUCN Guidelines for Re-introductions* (IUCN 1998) on habitat.

- The release area should satisfy the habitat and landscape requirements of the species.
- The release 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.
- Previous causes of decline should have been identified and eliminated or reduced to a sufficient level.
- A habitat restoration programme should be initiated before the re-introduction is carried out.
- Site should be within the historic range of the species. In some circumstances, a re-introduction or supplementation 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.
- The re-introduction area should have assured long-term protection (whether formal or otherwise).

3.4.4 Socio-economic, political and legal considerations

The socio-economic, political and legal aspects of a translocation project are critical to its implementation and outcomes. Many translocation projects overlook these factors and concentrate on biological and technical considerations, which has been suggested as the reason many projects fail (Reading *et al*. 1991). Current species declines and extinction problems are often the result of socio-economic and political drivers. Thus it is vital that these factors are addressed as part of translocation projects.

A systematic examination of socio-economic, political and legal aspects is necessary to understand the values, attitudes, perceptions, and laws and regulations of the people, organisations and nations involved and that could potentially influence a translocation project.

Box 3-3. Recommendations from the *IUCN Guidelines for Re-introductions* (IUCN 1998) on socio-economic, political and legal considerations.

- 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**.

3.4.4.1 <u>Does stakeholder support exist?</u>

Stakeholders are all those that have an interest in the project. They are individuals, organisations and agencies that are directly involved in the project, whose interests may be affected by the project, or who may have a positive or negative influence on the project.

All stakeholders should be identified and efforts made to determine their attitudes towards the proposed translocation project. Tools that can be used to determine stakeholder support include questionnaire surveys, interviews and public opinion polls.
Stakeholders may include:

- Local communities, including farmers, hunters and local schools
- General public
- Funding agencies
- Practitioners of other species recovery projects
- Scientific community
- National governments
- National and international non-governmental organisations
- International treaties and their secretariats, *e.g.* AEWA, CMS, Ramsar, CBD
- IUCN-SSC Re-introduction Specialist Group

3.4.4.2 **Will the project conform to relevant laws and regulations?**

The translocation policy of the source country, the release country and any country the birds may use on migration or otherwise (*e.g.* through erratic movements or natural population expansion) should be examined. This should include checking existing regional, national and international legislation and regulations.

Government agencies responsible for the environment and wildlife should be consulted.

3.4.5 Resource considerations

3.4.5.1 Are sufficient financial resources available?

Well-executed translocation projects, almost without exception, require significant financial resources over a number of years. As part of a feasibility assessment, an indicative budget should be prepared (see Section 4.3.12) and potential funding sources determined. While it is often not possible to secure guaranteed funding before a project plan is produced, the feasibility assessment should clearly describe how long-term funding could be secured.

Administrative discontinuity has been a significant problem for translocation projects in the past. The priorities of funding bodies may change over time and the likelihood of this should be considered as part of a feasibility assessment, particularly where a government agency is identified as the primary funder.

To reduce the risk of administrative discontinuity causing the loss of a significant proportion of funding, it is recommended that more than one funding source is used.

3.4.5.2 Are sufficient technical resources available?

Translocation projects are multi-disciplinary requiring a wide-range of expertise from captive breeding and veterinary care to habitat management and community engagement (see Section 4.1). A feasibility assessment should identify the technical expertise required and determine how that expertise can be made accessible to the project.

Having multiple organisational partners in a translocation project will broaden available technical expertise. If expertise in a particular area is unlikely to exist within the project team or project partners, gaps can be filled through personnel training, links with relevant individuals and organisations, and hiring contractors or consultants.

KEY MESSAGE

The feasibility of a proposed translocation project depends on 10 key criteria. These should be thoroughly assessed based on available knowledge.

1. Is a suitable source of animals available?
2. If required, are captive breeding and rearing techniques for the species known?
3. Are release techniques for the species known?
4. Is a suitable habitat available in which to release the animals?
5. Have the previous causes of decline been sufficiently reduced or eliminated?
6. Is there sufficient knowledge of the species' natural history?
7. Does stakeholder support exist?
8. Will the project conform to relevant laws and regulations?
9. Are sufficient financial resources available?
10. Are sufficient technical resources available?

3.5 DECISION MAKING

The decision to proceed with a translocation project is a complex one, based on many considerations. While the results of a justification assessment should be unambiguous – either the proposed project is justified or not justified – the results of a feasibility assessment are often less clear, requiring a degree of interpretation particularly regarding acceptable levels of risk. Political, practical and biological considerations may provide conflicting viewpoints and it may be difficult to determine the extent of available financial resources before fundraising activities have begun.

A final decision should only be made after rigorous evaluation of the key problem areas and risks highlighted in the feasibility assessment. Practitioners are urged to seek independent advice and evaluation of feasibility assessment results from conservation bodies experienced in translocation, *e.g.* the IUCN-SSC RSG, and groups knowledgeable of the target species, *e.g.* the relevant IUCN-SSC/Wetlands International waterbird Specialist Group (SG).

4 PLANNING AND PREPARATION STAGE

4.1 CONSTRUCTION OF A MULTI-DISCIPLINARY TEAM

The first step in a translocation project should be the construction of a multi-disciplinary team containing a wide range of expertise and experience. The following areas of expertise should be included:

- Bird capture and transportation
- Bird captive management (aviculture), including breeding and rearing, if required
- Bird transport and release
- Bird health management
- Bird research, especially monitoring
- Local knowledge
- Field skills in the relevant areas/habitats
- Habitat and land management
- Data management
- Fundraising
- Public awareness and communications
- Project management

It is recommended that the project team includes members from more than one organisation, as this will provide access to a wider range of skills and experience. Once links are made, it is best practice to outline the responsibilities of each organisation in a Memorandum of Understanding between organisations.

Considering the complexity of translocation projects, effective project management is particularly vital and communication is imperative throughout all levels of the project. Regular contact between project team members is recommended. An efficient method of managing communication is to form a project group responsible for decision-making (*e.g.* 'Strategic Planning Group' as below) and project area sub-groups which meet on a regular basis to review and evaluate work in-progress and future actions. The composition of these groups may differ between projects, but below is a suggested format that has proved successful:

- **Strategic Planning Group**

  Responsible for making the key decisions required throughout the project's duration. The group should contain the lead staff member from each organisation involved in the project and ideally these personnel should be budget holders, *i.e.* able to make financial decisions on behalf of their respective organisations.

- **Implementation Sub-group**

  Responsible for the implementation of the technical aspects of the project plan as approved by the Strategic Planning Sub-group. The group should contain the project team members in charge of the various technical project areas: captive breeding/rearing, release, habitat management, post-release monitoring, etc.

- **Community and Stakeholder Engagement Sub-group**

  Responsible for the implementation of the 'Community and Stakeholder Engagement Strategy' (see Section 4.3.11) as approved by the Strategic Planning Sub-group.

- **Communications and Fundraising Sub-group**

  Responsible for raising the funds needed for the project and marketing and disseminating the results. As these activities are inter-linked, a single Communications and Fundraising Sub-group is preferable

to separate groups for these functions. Representation on this group by technical experts responsible for implementing the project is essential.

A dedicated Project Manager should be appointed to run the project and ensure effective integration between the sub-groups.

If possible, local teams should be established at both the source and release areas to provide effective coordination and smooth operation of day-to-day activities. Each local team should have a designated leader.

To further extend the skills and knowledge of the project team, relationships should be sought with experienced individuals and/or organisations that, while not able to be a permanent part of the project team, can provide advice as required. Representatives from outside the project team who should be consulted regularly (WPA & IUCN-SSC RSG 2009) include:

- Specialists in the target species;
- Translocation specialists;
- Conservation breeding specialists;
- Local community representatives;
- Government representatives for policy and legislation;
- Government representatives on ecological issues;
- Veterinarians and other animal health advisors, if not part of the project team;
- Land managers, if not part of the project team;
- Funding agent(s);
- Administrative and financial mangers (accountants); and
- Others as required, for example specialists in the plant communities that will support the released population.

4.2 SECURING POLITICAL AND FINANCIAL SUPPORT

As translocations are generally long-term projects there will be a need for long-term political and financial support.

Consultation with relevant legislative agencies should begin before planning or implementation begins in earnest. It is essential that any translocation project satisfies all relevant political agencies, at local, regional, national and international levels as required, so that the project fulfils legislative demands and licensing practicalities do not hinder later stages of the project. Political support will also improve the chances of obtaining financial support and allow for the evaluation of the project to be carried out openly and honestly, therefore being more thorough and useful to all involved (WPA & IUCN-SSC RSG 2009).

Each country will have its own policies on translocation and biodiversity conservation more broadly. National policies and even local/regional policies within a single country may vary dramatically. Reconciling the different, and sometimes contradictory, demands of policies and politics can be a difficult task. This is particularly relevant when projects span regional/national borders as will be the case with translocations of migratory species (WPA & IUCN-SSC RSG 2009).

The project plan should clearly identify what licenses and permits are required and when they should be applied for. It is vital that all required licenses and permits are acquired well in advance of planned activities so that they do not delay crucial parts of the project. It is useful, if possible, to establish good working relationships with the relevant licensing bodies in order to make the licensing process as smooth as possible.

To identify required licenses and permits, the translocation policy of the source country, the release country and any country the birds may use on migration should be examined, including checking existing regional, national and international legislation and regulations. In addition, the legal status of the species to be translocated and the legal status of the land at the source site, the release site, and any sites the birds may use on migration or otherwise must be considered during the planning stage. If a project requires the transport of birds across international borders, this should also include checking regulations of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). CITES is an international trade treaty that regulates international trade in endangered species. Import and export licenses must be obtained for listed species.

Financial support should be secured for all project phases, ideally prior to the start of the project. Potential funding bodies include government agencies, academic research funds, non-governmental organisations, foundations and private/corporate sponsorships. Funding applications to these bodies should be made as soon as the required project plans and budgets are available (see Section 4.3).

4.3 PROJECT PLANNING

4.3.1 Setting targets

A translocation plan should set-out clearly defined targets for each project stage.

These targets will be specific to each context and should directly contribute to achieving the overall aim and objectives of the project (see Section 3.2). The targets should be specific, measurable, attainable, realistic and timely (SMART), should cover all project areas (*e.g.* captive breeding, survival of released birds and public awareness), and should cover the project's full duration (short-, medium- and long-term). While a long-term target will provide overall focus for the project, short- and medium-term targets (*e.g.* captive breeding goals, annual survival targets) are useful for allowing project success to be tracked and guiding future decision making.

Case study 4-1. Summary of the aims, objectives and targets of a re-introduction project for the Eurasian Crane *Grus grus* in the UK (the 'Great Crane Project').

AIM

Improve the conservation status of the Eurasian Crane *Grus grus* in the UK.

OBJECTIVES

- To establish a new self-sustaining breeding population of cranes in Somerset, and ultimately to restore cranes to suitable habitats in all parts of the UK.
- To deliver a high-profile 'flagship' project that will successfully engage the public, landowners and other interested parties with cranes and wetland conservation through use of this totemic species as an emblem of rural eco-tourism.
- To capitalize on the level of landowner engagement and background support to create more wetland habitat outside the SSSI network in Somerset.

TARGETS (not an exhaustive list)

- Build rearing facilities at WWT Slimbridge and release facilities on the Somerset Levels and Moors to accommodate 24 cranes per year.
- Manage and create habitat on the Somerset Levels and Moors to provide optimum conditions for resident and breeding cranes – by 2015, secure provision for the safe breeding of at least 10 pairs of cranes at currently favourable sites and establish new, suitable breeding habitat for at least 10 pairs of cranes at currently unfavourable sites.
- Harvest up to 30 eggs a year from 2010 to 2014 from wild crane populations in Germany.
- Hatch and rear a minimum of 100 crane chicks between 2010 and 2014.
- Release a minimum of 100 juvenile cranes between 2010 and 2014 on the Somerset Levels and Moors.
- Achieve a survival rate to adulthood of 50% for released cranes.
- By 2025, achieve a breeding population of at least 20 pairs, plus sufficient juveniles to maintain the population.
- Publicise the project in WWT, PCT and RSPB publications and in the national and regional press.
- Enable members of the public to see and appreciate cranes in the wild as well as at WWT centres and at Pensthorpe in Norfolk.
- Engage local school groups in the project increasing awareness amongst local school children of the importance of the Somerset Levels and Moors and wetland conservation in general.

It is vital that the targets are made clear at the start and throughout the project for the following reasons (WPA & IUCN-SSC RSG 2009):

1. Clear targets demonstrate background knowledge and planning, and are a necessary element in applying for funding;
2. Well-defined targets provide focus for all personnel and organisations involved, so that energy and emphasis remain focussed on the main purpose of the translocation; and
3. Targets provide a framework for assessing the success of each phase of the overall project.

When setting targets, remember to include:

- Fundraising targets, *e.g.* amount of funds secured by a particular date;
- Habitat management targets, *e.g.* number of hectares restored to habitat suitable for the target species, proportion of key sites given national and/or international protection;
- Sourcing targets, *e.g.* number of eggs or birds collected from the source population each year;
- Captive breeding/rearing targets, *e.g.* number of birds bred each year, number of birds successfully reared to fledging or release age each year, total number of birds released;
- Release and post-release targets:
  - Survival of founders, *e.g.* what % survived to a particular life stage;
  - Breeding by founders, *e.g.* evidence of breeding and/or productivity;
  - Breeding by subsequent generations, *i.e.* long-term persistence;
  - Habitat usage, *e.g.* dispersal range; and
  - Population viability, *e.g.* reduction in extinction risk according to PVA.
- Community and stakeholder engagement targets, *e.g.* number of local schools engaged with the project, number of people reached through websites and social networking, proportion of stakeholders supportive of the project.

It is strongly recommended that targets for the numbers of birds released and the demographics of the released population (*e.g.* population size and growth rate, breeding success, etc.) should be based on a PVA. The project PVA, and therefore targets, should be updated throughout the project as experience is gained and demographic information gathered on the released population.

4.3.2 Identification of appropriate release sites

According to the *IUCN Guidelines for Re-introductions* (IUCN 1998) the release area for a translocation should be within the historic range of the species (where appropriate habitat still exists), and ideally have assured, long-term protection, whether formal or otherwise. In exceptional circumstances it may be necessary to consider release sites outside of the historic range. In such cases, the *IUCN Guidelines on Re-introduction and Other Conservation Translocations* (in prep 2012) should be consulted.

Assessing the quality of the available habitat is critical and in many cases habitat management activities are required before birds can be released. High connectivity with the surrounding landscape, or large areas of contiguous habitat, is usually far more preferable than releasing birds into isolated patches that may be too small to sustain viable populations and that have little potential for natural population expansion through dispersal (WPA & IUCN-SSC RSG 2009).

Once areas that satisfy the species' critical needs have been identified, the choice of specific release sites will depend upon the practicalities of releasing the birds and being able to reliably monitor them through post-release monitoring and conduct any interventions that may be necessary. Consideration should also be given to public access – it may be beneficial to choose a release site with no public access to avoid human disturbance, or conversely it may be beneficial to choose a site that allows for good public access to provide

viewing opportunities and therefore increased public awareness. There should also be some degree of control over public access to release sites.

Overall, there are the following requirements for release sites:

Ecological considerations

- Location within the species' historical range[2];
- Sufficiently large area of typical habitat to allow for population expansion;
- Comprise adequate habitat for various activities (*e.g.* roosting, feeding, nesting, establishment of nesting/breeding territories, and brood-rearing); and
- Location within an area that does not have high predator density or high density of other hazards, such as disease, power lines or hunting pressure.

Logistical considerations

- Provision for good communication links;
- Secure for project staff;
- Unaffected or not significantly affected by human disturbance; and
- Able to facilitate appropriate post-release monitoring.

4.3.3 Disease risk assessment

Every translocation project should be accompanied by a comprehensive Disease Risk Assessment aimed at summarizing the risks to wild source populations, captive populations, the released population and any species present in the release area or likely to encounter the released population in other areas. The major aspects of any disease risk assessment include the identification of disease risks and the identification of measures to reduce these disease risks.

The potential for transmission of diseases is increased during translocations as birds are moved from one area to another and therefore may transport pathogens to areas previously free of that pathogen; birds are often held in captivity and/or transported in artificially high densities facilitating increased disease transmission; birds held in captivity or transported, even for a short period of time, may be exposed to pathogens for which they have little or no immunological experience; birds held in captivity or transported may be under increased levels of stress; and releasing birds to the wild may put at risk conspecifics or other taxa, including domestic livestock. In addition, the risk of zoonotic disease transmission is increased as birds and people are often in repeated, close contact during the translocation process.

There are many established protocols for moving birds between captive facilities around the world, and into captive facilities from the wild (*e.g.* see the OIE Terrestrial Animal Health Code). In these cases, veterinary protocols are relatively tried and tested with clear understanding of how birds should be kept, and the quarantine and monitoring standards required. In contrast, there are no standard protocols for releasing birds into the wild. In these cases, there is considerably more uncertainty and variables to consider.

The main questions that should be considered as part of a Disease Risk Assessment are:

1. What adverse health events (diseases) are important and how would such events be encountered/introduced/spread? (hazard identification)
2. How likely is it that the event (disease introduction and/or spread, death, illness, etc.) will occur? (risk assessment)
3. What can be done to decrease the likelihood of an adverse outcome? What can be done to reduce the consequences if it happens anyway? (risk management)

[2] There may be exceptions to this requirement. Where translocating a species outside of its historic range is being considering, the *IUCN Guidelines on Re-introduction and Other Conservation Translocations* (in prep 2012) should be consulted.

Each of these questions needs to be considered for the wild source population, any captive populations (whether a long-term breeding population or a population held in captivity for short-term rearing or transport), the released population and populations of conspecifics or other taxa, including domestic livestock, that may encounter individuals from the released population. The explanatory and supporting documentation of the disease risk assessment should be completely transparent and include a discussion of the uncertainty surrounding the conclusions (Beck *et al.* 2007).

The process of Disease Risk Assessment is based on two basic assumptions. Firstly, that there is no such thing as zero risk – the goal is to identify and mitigate as many risks as possible, but all risk cannot be eliminated. Secondly, since health and disease information is constantly changing and there may be many gaps in knowledge about aspects of wildlife health, assessments should be conducted specifically for each translocation and should be up-dated continually. The first version of the assessment should assist project team members to design and conduct a disease surveillance and monitoring programme (quarantine and pre-release checks) that will, in turn, produce results required to conduct further assessments for additional movements and releases (Beck *et al.* 2007).

Many risk analysis frameworks follow the generic risk analysis process covered by the World Organisation for Animal Health (OIE). A new disease risk analysis package is currently being prepared by IUCN-SSC Specialist Groups – Wildlife Health, Conservation Breeding and Reintroduction. This risk analysis package is focussed on wildlife and informed by an international network of stakeholders (including wildlife veterinarians, epidemiologists, ecologists, modellers and biologists). This package will build on and extend the Conservation Breeding Specialist Group's 2005 publication on disease risk, 'Animal Movements and Disease Risk: A Workbook' (can be downloaded at www.cbsg.org/cbsg/risk/). Since 1992, the IUCN Conservation Breeding Specialist Group has also conducted a series of workshops, gathering input from experts around the world, aimed at developing a series of easy-to-use risk assessment tools for both captive and wild settings.

It is recommended that Disease Risk Assessments be produced by organisations with significant expertise in bird health and disease, and risk analysis. Thus, the translocation project team may need to commission such an assessment from an outside organisation. This should be factored into project budgeting.

4.3.4 Health management and biosecurity plan

Based on the results of the Disease Risk Assessment, a health management and biosecurity plan should be produced considering the following topics:

- Disease surveillance – what diseases should be screened for, on what schedule and by what method (*e.g.* blood samples, swabs, faecal samples, etc.), and how should the overall condition of birds be assessed (*e.g.* visual checks, weighing);
- *Post mortem* examination requirements, including how and where these will be conducted and the diagnostic laboratory investigation requirements;
- Biosecurity protocols (see Section 4.3.4.1);
- Protocols for the collection and dispatch of biological samples;
- Measures required to maintain health while birds are in captivity (whether short or long-term) – *e.g.* measures to reduce risk of flight injuries, stress, foot problems like 'bumblefoot', foreign body ingestion; and
- Measures required to maintain health of released birds – these should be included in the interventions policy (see Section 4.3.9).

4.3.4.1 **Biosecurity**

While birds are held in captivity (whether long-term, as in the case of a captive breeding population, or for short-term transport), it is essential that strict biosecurity measures are put in place to minimise the risks of disease introduction to and release from captivity.

Biosecurity protocols should be produced for each captive situation, *e.g.* initial quarantine after collection from the wild or transport from another captive facility, holding in a captive breeding or captive-rearing facilities, transport to release site, holding at the release site.

Components of a captive bird biosecurity protocol include:

- Structural requirements of the holding facilities/equipment – *e.g.* perimeter fencing, double-door system, double netting on aviaries, materials that can be disinfected (removal or sealing of wood), use of a 'biosecurity portal' for disinfection before entering and when leaving a facility, etc;
- Staff hygiene:
  - Training requirements – all staff should receive training on biosecurity issues;
  - Personal hygiene – clothing and footwear requirements, hand-washing, minimising contact with other captive/wild birds; and
  - Procedures for entering and leaving a facility/area.
- Visitor hygiene:
  - Visitor log book;
  - Clear indication of who will and who won't be allowed to enter the facility/area, including the conditions they will be expected to meet to gain access;
  - Personal hygiene – see above; and
  - Procedures for entering and leaving a facility/area.
- Equipment – describe what equipment will be allowed on site and how it will be disinfected, as a general rule a captive facility/area should have a dedicated set of equipment that is not taken on and off site;
- Waste disposal;
- Deliveries – describe how delivery vehicles will be disinfected and what precautions should be taken when receiving deliveries of food, substrates, etc;
- Signage requirements – *e.g.* 'no unauthorized entry' signs; and
- Other disease management measures – *e.g.* the use of insect electrocuters to reduce potential invertebrate disease vectors, removal of any rotting vegetation to reduce aspergillosis risk.

4.3.5 Wild capture/egg collection plan

If a wild source of birds or eggs is required either to establish a captive breeding population or to directly provide birds for release, a detailed plan should be made for the capture or collection operations, often complex and risky processes that require a great deal of expertise as well as careful planning.
In general, capturing wild adult birds to establish a captive population is not recommended as adult birds can require many years to settle in captivity and breed. Capturing juvenile birds can produce better results, but generally egg collection and hatching birds in captivity is the best method for establishing a captive breeding population.

When catching birds or collecting eggs, the welfare of the birds/eggs is crucial throughout all stages. Many waterbird species will have a different habitat and set of behavioural traits across the annual-cycle, so capture and collection techniques should be sensitive to these and tailored to each species, situation and time of year.
Many capture techniques have been developed for waterbirds. Most live capture techniques utilise bait, decoys, recorded calls or lures to attract birds to capture sites, but a few active techniques in which the catchers actually pursue the bird have been developed and may be useful in some situations (FAO 2007). A

guidance document produced by the Food & Agriculture Organization (FAO) on field techniques for avian influenza sampling (FAO 2007) describes a variety of waterbird capture techniques and many of these could be applied to catching waterbirds for translocation.

A bird capture plan should cover the following topics:

- Capture parameters, including:
  - Numbers of birds to be taken in total and from each location or brood,
  - Desired age and sex ratio of birds to be captured and how these will be assessed,
  - Minimising stress to wild conspecifics, and
  - Maximising the genetic variation of birds captured, *e.g.* capturing across as wide a population range as practically possible;
- Licensing requirements;
- Catching schedule;
- Practical description of the chosen capture technique(s);
- Description of the capture location(s) with information on how the species uses the location at the planned time of capture, including behavioural traits;
- Personnel requirements – the capture team should include a good working knowledge of the species in the capture area and the capture technique(s) to be used;
- Equipment and facilities requirements – birds will need to be placed quickly in a quiet, dark environment that is neither too hot or too cold, and safely transported;
- Food, water and veterinary care requirements; and
- Travel plans – considering how both birds and people will be transported.

An egg collection plan should cover the following topics:

- Collection parameters, including:
  - Numbers of eggs to be taken in total and from each nest,
  - Incubation stage of eggs to be collected and how this will be assessed,
  - Maximising the potential for relaying in wild nests, and
  - Maximising the genetic variation of eggs collected, *e.g.* collecting across as wide a population range as practically possible and not collecting from the same nest/parents in subsequent years if possible;
- Licensing requirements;
- Collecting schedule;
- Description of the collection location(s) with information on *e.g.* how the species uses the location at the planned time of collection, how nest sites are located, and predators in the area which may be attracted to nests by scent trails left by project personnel;
- Personnel requirements – the collection team should include a good working knowledge of the species in the collection area including nesting locations, knowledge of the incubation requirements of the species (*e.g.* temperature and humidity required at each stage of incubation, incubation length), practical skills in nest finding and observation so that nests can be located and approached without trampling or attracting predators to the target nests or others nearby, and expertise in egg handling, determining incubation stage, incubation and hatching;
- Equipment and facilities requirements – at least initially, eggs will need to be transported in portable incubators that can be run without mains electricity;
- Food, water, veterinary care and holding requirements in case eggs hatch before being transported to rearing facilities; and
- Travel plans – considering how both eggs and people will be transported.

When planning egg collection it is important to consider the stage at which eggs should be collected. Eggs collected later in incubation generally have a better chance of successful hatching by artificial incubation than

eggs collected early in incubation. Other pressures, however, may require eggs to be collected early in incubation, *e.g.* nest predation and trampling risks.

4.3.6 Captive management plan

Where a translocation requires a captive population as a source of birds, either a captive breeding population or a captive-reared population (*i.e.* eggs or juvenile birds sourced from the wild with birds reared in captivity until time of release) it is vital that a captive management plan is produced.

A captive management plan for a captive breeding population should:

- Indicate breeding targets for the population, including both numbers of birds required for release and numbers of birds required to maintain the captive breeding population. PVA is recommended for determining targets. It is important that removing birds for release does not endanger the viability of the captive population;
- Indicate release targets – the numbers of birds available for release and on what schedule, this is not simply the numbers of birds bred, but the numbers of birds that reach the age of release and are suitable for release (see Section 5.3.1);
- Describe the basic requirements of the captive breeding population:
  - Housing and environment requirements;
  - Nutrition and feeding requirements:
  - Capture, handling and transport requirements;
  - Health, veterinary care and biosecurity requirements;
  - Pest and predator control requirements;
  - Quarantine and isolation requirements; and
  - Record keeping requirements.
- Provide key practical protocols for:
  - Artificial incubation and hatching;
  - Rearing birds for the captive population and for release (see Section 5.2.2);
  - Managing behaviour;
  - Managing breeding;
  - Managing health; and
  - Maintaining biosecurity (see Section 4.3.4.1).

A captive management plan for a captive-reared population should:

- Indicate release targets – the numbers of birds available for release and on what schedule, this is the numbers of birds that reach the age of release and are suitable for release (see Section 5.3.1);
- Describe the basic requirements of the captive-reared population:
  - Housing and environment requirements;
  - Nutrition and feeding requirements;
  - Capture, handling and transport requirements;
  - Health, veterinary care and biosecurity requirements;
  - Pest and predator control requirements;
  - Quarantine and isolation requirements; and
  - Record keeping requirements.
- Provide key practical protocols for:
  - Artificial incubation and hatching;
  - Rearing birds for release (see Section 5.2.2); and
  - Managing behaviour;
  - Managing health; and

- Maintaining biosecurity (see Section 4.3.4.1).

To ensure high standards of captive management, a husbandry manual should be compiled by consultation with experienced captive waterbird managers. Husbandry standards will ensure the targets of the captive breeding/rearing programme are underpinned by the highest possible animal welfare standards where these are considered in terms of the 'five freedoms/provisions of animal welfare' (see Box 4-1).

Box 4-1. The five freedoms/provisions of animal welfare.

1. *Provision of food and water*: Food and water will be presented to maintain the birds' full health and vigour and in a manner and frequency commensurate with the species' natural behaviour as well as its seasonal nutritional requirements.
2. *Provision of a suitable environment*. An environment consistent with the species' biological requirements will be provided including shelter from rain, heat, cold and shade as appropriate, while ensuring hygienic conditions.
3. *Provision of animal healthcare*. Accommodation will be designed to minimise the risk of injury and allow birds to get away from each other. Curative and preventive veterinary medicine will be provided through rapid diagnosis and treatment of illness. Every effort will be made to provide a correct diet and suitably hygienic environment from which pathogens are excluded or controlled.
4. *Provision of an opportunity to express most normal behaviour*. The birds will be allowed the opportunity to express most normal behaviours by providing sufficient space and environmental enrichment.
5. *Provision of protection from fear and distress*. Birds will be managed in compatible numbers and sex ratios to allow for as much normal behaviour as possible, and provided with areas of escape from aggressive encounters. Enclosures will be predator proof to ensure birds' safety.

A husbandry manual should consider the following topics:

1. **Housing and environment requirements**
   a. Aviary design and construction
   b. Ponds, water systems and vegetation
   c. Shelter and furnishings
   d. Feeding areas
   e. Aviary maintenance
   f. Predator and pest control measures
2. **Health management**
   a. Minimising stressors
   b. Environmental hygiene
   c. Health assessment
   d. Diagnosis and treatment
   e. Isolation and rehabilitation
   f. Known health issues
   g. Death and *post mortem* examination
3. **Nutrition and feeding requirements**
   a. Natural diet
   b. Adult captive diet and supplements
   c. Seasonal variation in feeding requirements
   d. Food storage and presentation
   e. Rearing diet
   f. Presentation of chick food
   g. Nutrient composition of formulated diets
4. **Capture, handling and transport requirements**
   a. Capture and handling
   b. Transport requirements
5. **Behaviour management**
   a. General behaviour in captivity
   b. Compatibility and introduction techniques
6. **Breeding management**
   a. Reproductive cycle
   b. Pair formation and nesting requirements
   c. Clutch size and laying
   d. Egg weights and measurements
   e. Natural incubation
   f. Parental care
   g. Genetic and demographic management
7. **Artificial incubation**
   a. Incubation facilities
   b. Egg collection, cleaning and storage
   c. Incubation parameters
   d. Monitoring embryo development
   e. Hatching
8. **Hand-rearing**
9. **Rearing for release**
   a. Insights from experimental research and previous bird translocations
   b. Rearing facility requirements
   c. Criteria for selecting birds for release
   d. Behavioural training requirements
10. **Quarantine and isolation procedures**
11. **Record keeping standards**
    a. Identification marks
    b. Sexing methods
    c. Individual records, including medical records
    d. Daily logs

4.3.7 Habitat management plan

For a translocation to have been considered feasible (see Section 3.4) suitable habitat should be available to support the released population and allow for natural population expansion through dispersal.

In most cases, however, further improvements to available habitat will be required to maximize the chances of success. At the very least, measures will be needed to ensure that the existing quality and extent of habitat remains. It is important to remember that habitat loss or modification may well have been a primary cause of the species' decline/extinction and therefore habitat management will be a key part of the project (WPA & IUCN-SSC RSG 2009).

The condition of available habitat is key to the success of a translocation and most successful translocations are all preceded by intensive habitat management. Habitat management in favour of the released species may be required for many years prior to any release of birds. It is strongly recommended that birds are not released into sub-optimal habitats in terms of either quantity or quality (WPA & IUCN-SSC RSG 2009), unless there is an exceptional reason for doing so.

A habitat management plan should clearly describe the ecological characteristics of the habitat required by the released population taking into account the annual cycle, life-cycle and critical needs of the species. For migratory species, it is vital that the habitat required at breeding sites, staging sites and wintering sites are all considered.

The management plan should detail the measures required to protect, monitor, maintain and restore required habitat as appropriate. Monitoring habitat conditions should be integrated into the overall post-release monitoring programme and spatial modelling (*i.e.* GIS) used to provide insights into areas of optimal habitat (WPA & IUCN-SSC RSG 2009). Wherever possible, available habitat should be extended.

The effects of habitat management on other species must be taken into account.

4.3.8 Release strategy

Release techniques for waterbirds vary greatly depending on the species for the release, the release site and the release objectives (*e.g.* establishment of a migratory or non-migratory population). An experimental approach is sometimes required and pilot releases may be necessary.

The release strategy should be carefully planned in consultation with experienced translocation practitioners and should be specific to the species, the release site and the practical context of the project. The strategy should be modified and improved as experience is gained.

The following key considerations should be taken into account when planning a release:

- **Acclimatisation/accustomisation**
  Birds should be given an opportunity to acclimatise to their release site. The amount of time required will vary for each species, but birds should be given enough time to settle after the stress of transportation, and to become accustomed to available food sources and weather conditions. Acclimatisation is often best achieved in a large flight pen.
- **Soft release vs. hard release**

  A "soft release" refers to a release where birds are introduced to the wild situation gradually – this may involve holding them in a flight pen at the release site for a number of weeks, opening the flight pen but allowing/encouraging them to return to roost, providing ample supplementary food after release, and access to veterinary interventions if necessary. A "hard release" refers to a release where birds are released into the wild without a post-release period of interventions. As a general rule, the softer the release the better the survival chances of the birds, however there are exceptions and research should be conducted into specific release techniques used for the target species and/or closely related species. There is some overlap between the concepts of acclimatisation and soft vs. hard release, however it is

important to recognise that they are distinct. For example, birds may be given a long acclimatisation period in a flight aviary at a release site but if on opening the release aviary they are given no further support (*i.e.* no access to flight aviary, no supplementary feeding, no veterinary interventions) this would be considered a relatively hard release despite the length of the acclimatisation period.

- **Time of year**

  Birds should be released at the time of year that maximises their chances of survival. Consideration should be given to seasonal climate and weather conditions, food abundance, habitat conditions, predator and human activity, and seasonal disease occurrence. Timing of release is particularly important for migratory species. If releasing migratory birds that do not require instruction to migrate appropriately, fledged birds should be released at a breeding site before the end of the breeding season. If releasing migratory birds that require instruction (*e.g.* swans, geese, cranes) from conspecifics, birds should be released at a time and location that allows them to join wild birds. If releasing birds that require human-led migration, birds should be released at a desired breeding site near the end of the breeding season and led on migration following appropriate migration timing but also taking into consideration the practical limitations of the human-led method (*e.g.* the speed and maximum flight durations of micro-light aircraft).

- **Number of releases required**

  As determined by project PVA.

- **Number of birds per release**

  It is vital that enough individual birds are available for the translocation project – as determined by project PVA. If there are not enough birds then success will be much more difficult to achieve. For example, a translocation project for White-headed Duck in Hungary was severely limited by the small numbers of birds available (Bajomi 2006).

- **Size and composition of groups released**

  Particularly important for social species where the success of each release will depend in large part on these factors. The ideal size and composition of groups released is highly species and situation specific and therefore no generic guidelines can be given. Some species will have the highest chances of survival if released in one large social group whereas others may benefit from being released in smaller family-sized groups or even as pairs or lone birds. As well as size, group composition can be important – groups may have higher chances of survival if they contain a mixture of behaviour types, *e.g.* a mixture of dominant and submissive birds. Where released birds are expected to join wild conspecifics, consideration should also be given to the strength of bonds between released birds, *e.g.* in the US, Sandhill Cranes *Grus canadensis* are intentionally released in small unbonded groups (no more than four or five individuals) which increases the chances that they will seek interactions with wild conspecifics (Nagendran *et al*. 1996).

- **Release location**

  The release location within the release site (see Section 4.3.2) should be chosen carefully. It should be accessible by the release team and be free of hazards to which newly released birds will be particularly vulnerable. The release location will differ depending on the release objectives, *e.g.* if released birds need to join conspecifics, the release location should be chosen to maximise the chances of conspecifics coming into contact with released birds. Short-term habitat management measures at the release location may be required.

- **Release facilities/structures**

  Depending on the species and type of release, facilities/structures may be required to temporarily house birds at the release site (see Section 4.4). In most cases, large flight pens are appropriate. Facilities will require predator proofing, may require 24-hour guarding, *e.g.* in areas used by bears or other large animals that could gain access to a release enclosure, and may require security measures against human intruders, where vandalism or theft is a possibility. Consideration should also be given to weather conditions and ensuring the structures are not at risk of flooding or collapse in high winds. If birds are capable of flight, they may be at risk of injury by collision within the release enclosure. This risk should be carefully managed – flight restraint (*e.g.* feather-clipping or wing brailing) may be necessary, but

careful consideration should be given to how flight restraint methods may affect birds post-release. For example, wing brailing can sometimes cause temporary wrist stiffness and a degree of flight impairment following removal of the brail. As a result, wing brailling in generally not used for migratory cranes but is used for cranes released into resident populations (Nagendran *et al*. 1996).

- **Selection of birds for release**

  Birds for release should be chosen according to established criteria, including physical and behavioural condition (see Section 5.3.1).

- **Health of released birds**

  Birds should undergo a final pre-release veterinary examination.

- **Transportation**

  Protocols should be established for transporting birds to the release site to minimise risks of injury and stress, and comply with all relevant legislation on the movement of animals.

- **Predator control**

  Many waterbirds have evolved as prey species and most self-sustaining populations must be able to co-exist with predators. Where predator densities are artificially high, however, predator control measures may be required as birds will be particularly vulnerable to predators just after release and at vulnerable times of the life-cycle (*e.g.* during moult). Predator control should only proceed where legal and when all required licences have been obtained. Consideration should also be given to the acceptability of predator control in general and particular predator control methods to the general public and other stakeholders.

- **Other interventions**, *e.g.* provision of water and supplementary feeding post-release (see Section 4.3.9).

4.3.9 Interventions policy

As part of project planning a clear interventions policy should be produced describing measures that will be taken to support birds after release. The policy should address interventions required if release outcomes progress as expected (*e.g.* birds may require supplementary feeding for a given period as part of a soft release and while they become familiar with natural food sources) and / or if outcomes are unfavourable (*e.g.* if birds become ill or are injured, will they be taken back into captivity?).

Interventions may include:

- Supplementary feeding;
- Provision of a shelter or aviary that the birds can use and that will provide predator protection;
- Veterinary care;
- Removal to captivity or euthanasia – both in the case of danger to the bird through illness or injury and in the case of danger to the public or other wild populations;
- Vegetation and landscape management;
- Behavioural training – *e.g.* scaring birds from dangerous areas or predators; and
- Predator control.

Regardless of how expertly a translocation is conducted, there is always the chance that an unforeseen situation will arise that may require drastic action. The interventions policy should clearly establish what measures should and shouldn't be taken to keep the translocation progressing as planned and/or avoid harm to other wild populations or humans. It is recommended that a number of scenarios are planned for, *e.g.* birds do not use natural food sources at their release site for a prolonged period; the majority of birds lose condition/become ill significantly limiting their chances of survival; birds leave the release site unexpectedly and begin using unsuitable habitat with high human disturbance, high predator risk or other threats; migratory species do not leave the release area as expected and stay at the release site over winter or at another unsuitable time of year; birds become a threat to humans in the area, as a result of unexpected behaviour traits.

It is important that the interventions policy establishes a clear and pre-agreed decision-making process that in extreme scenarios includes provisions for rescheduling or even discontinuing the project.

As a general rule, interventions should aim to maximize the survival of released birds (although not to the detriment of humans or wild populations), *e.g.* supplementary feed should be provided for as long as needed. The ultimate success of a translocation usually depends on the breeding of the released population and it is the next generation of birds that will form the true beginning of a re-established wild population. It is this generation that will be reared in the wild and hopefully acquire a full suite of natural behaviours. Thus it is imperative that all acceptable measures are taken to get the released population to breeding age and facilitate breeding.

At the planning stage, it is important to consider interventions that may be required at different stages of the life-cycle. Different levels and types of interventions may be required during the wintering season, the breeding season and migration and at times of moult, particularly if the species becomes flightless during moult.

4.3.10 Post-release monitoring strategy

Monitoring and documenting the post-release phase is one of the most important components of a translocation project, and one which is often neglected. Monitoring allows for assessment of project outcomes and progress towards targets, refinement of techniques, and helps determine conservation priorities for the translocated population.

The period between release into the wild and the establishment of a self-sustaining population is as crucial and challenging as the initial collection, breeding, rearing and release of the birds. It is therefore vital that habitat use by the released animals, diet, threats in the release area, the effectiveness of post-release management actions and the impact of pre-release activities on subsequent success are all understood and can feed back into refined management decisions.

Monitoring and documentation also allows accountability to funding and regulatory agencies and to the conservation community and can inform translocations of other related species.

The translocated population should be monitored for an extended period, preferably until a self-sustaining population has been established, and the post-release activities, habitat changes, and socio-economic and legal changes that may influence the population should also be monitored and documented. The *IUCN Guidelines for Re-introductions* (IUCN 1998) calls for demographic, ecological and behavioural studies, as well as mortality investigations and studies of long-term adaptation, but does not indicate standards for such activities.

Figure 4-1. Automatic feeder used to provide supplementary food to a re-introduced population of Eurasian Cranes *Grus grus* in the UK. Notice the decoy crane to the left of the feeder used to attract birds to the feeder.

Relatively intensive monitoring is typically required for at least 3-5 years, depending on the species. The intensity of monitoring, however, may decrease over time. For example, it may be appropriate to monitor a re-introduced migratory goose population using satellite-telemetry for the first three years of the project, but following documentation of migratory route and successful reproduction, monitoring might then change to breeding surveys and counts at staging and wintering sites.

It is critical to determine clear objectives for monitoring that are derived from the project targets (see Section 4.3.1) and the defined indicators of

translocation success (see Section 6.4). This will then determine the specific data that needs to be collected in order to meet these stated objectives.

In the short-term, the health and behaviour of birds should be closely monitored as the immediate priority; in the long-term, information is required on the birds' adaptation to the wild environment and population viability (WPA & IUCN-SSC RSG 2009). This should include investigation of demography (survival, reproductive output and its components, and emigration); disease/health status; causes of morbidity and mortality; habitat use and diet; movements; behaviour; and social interactions. Where a species is known to disperse over large distances or otherwise be difficult to locate within an environment, the monitoring strategy should take this into account.

A post-release monitoring programme should be led by a specialist in bird monitoring and research, and should be designed with specific objectives and standardised data collection methods. It is important that data collection over time is consistent which can be a challenge for long-term projects. The precision and accuracy of the data gathered should also be assessed wherever possible. The funding required for long-term post-release monitoring should be budgeted for and planning should consider the personnel resources required. Post-release monitoring equipment may include vehicles (and their associated expenses), optics such as binoculars and telescopes, radio/satellite tags and the associated equipment (*e.g.* radio receivers), data download costs, and laboratory and other field equipment, such as microscopes and sampling equipment required for health screening, etc.

See Sutherland *et al.* (2010) for further guidance on the required standards for monitoring and documenting bird translocations. These standards were designed to assist practitioners and researchers in collecting the necessary post-release data to allow project outcomes to be assessed effectively and consistently.

4.3.11 Community and stakeholder engagement strategy

In many situations, especially where direct human causes have been implicated in the decline of a species, a translocation project, as well as other conservation measures, will not be effective in the long-term without a rigorous community and stakeholder engagement programme. Thus a community and stakeholder engagement plan should be a key part of the initial project plan.

Community and stakeholder engagement plans should include, as appropriate:

- Workshops involving stakeholders to discuss real/possible / perceived problems and solutions;
- Establishment of communication mechanisms for distributing information to stakeholders (*e.g.* production of a website, use of social networking tools, distribution of leaflets, construction of an information centre, creation of a nature trail and/or designated viewing areas) and receiving/gathering information from stakeholders.
- Work with local schools (*e.g.* presentations to school groups, provision of educational materials/lesson plans, special viewing events from school groups, establishment of bird-watching clubs for school children, naming competitions) and/or other local groups such as nature clubs, ornithological societies, and hunting and farming groups; and
- Other publications or visual education materials to convey why the local communities and other stakeholders are important in the success of the translocation project and, vice versa, why the target species and associated habitats are important to the local communities/stakeholders.

A crucial point in communication is to consider what the message is and who the target audience is. Each target audience may need to be approached differently to gain maximum benefit and to communicate in an appropriate fashion. Examples of potential stakeholders and target groups, and various communication tools, are listed below.

Stakeholder/target groups:

- Local communities, including farmers, hunters and local schools
- General public
- Funding agencies
- Practitioners of other species recovery projects
- Scientific community
- National governments
- National and international non-governmental organisations
- International treaties/conventions /agreements and their secretariats, *e.g.* AEWA
- IUCN-SSC Re-introduction Specialist Group

Communication tools:

- Workshops and other interactive events
- Leaflets
- Information centres or other physical areas providing information such as nature trails and viewing areas
- Nature clubs and field camps
- Visual education materials, such as posters, t-shirts or species sculptures/models
- E-mails, including email discussion groups
- Articles – in scientific as well as popular literature, *e.g.* birding magazines, newspapers
- Presentations at scientific conferences, workshops or other meetings
- Press releases and press conferences
- Special publications, *e.g.* manuals
- TV and radio interviews
- Websites and social networking

4.3.12 Budgeting and fundraising

Conducted correctly, a translocation project is, almost without exception, an expensive and long-term conservation measure. To ensure that the project runs efficiently and with the best chance of success, it is important that the budget is detailed and accurate, that the project partners and funders are committed to all financial requirements, and that fundraising efforts are coordinated between project partners.

It is sometimes helpful to prepare the budget for different phases of the project separately, *e.g.* planning and preparation, pre-release and release, and post-release. Budgeting should cover the full predicted duration of the project (see Section 4.3.13).

Costs are highly variable between projects relative to the number of staff and facilities required (whether or not a captive breeding population is required), the release strategy, and the post-release monitoring strategy. Very few case studies report the cost of translocation projects (Fischer & Lindenmayer, 2000 as cited in WPA & IUCN-SSC RSG 2009).

When compiling a budget, remember to include:

- All phases of the project, including post-release monitoring over several years;
- Running costs and overheads, *e.g.* salaries, electricity, water;
- Transportation costs;
- Any equipment required for specialist activities, *e.g.* research equipment such as binoculars and microscopes;
- Costs associated with licensing, *e.g.* refurbishments may be required to facilities to allow them to meet licensing requirements to receive wild birds;
- Costs associated with the long-term management of a captive breeding population that may require housing after releases have finished;
- Professional fees, *e.g.* veterinary and laboratory analysis costs.
- Administration and management costs;
- Community and stakeholder support activities;

- The analysis of data and production of reports, research papers and other communications, including translation costs if required; and
- Contingency funds.

4.3.13 Effective timing and duration of programme

The expected duration of the project should be indicated by the project PVA wherever possible. A PVA, however, will often have to assume that the best-possible methods are used, so in some cases it may be necessary to adjust timings based on real world situations (WPA & IUCN-SSC RSG 2009). Almost every translocation project will involve an element of experimentation and learning, and as a result, techniques may change either advancing the project or requiring a longer-duration. This information should be used to re-run the PVA to provide new estimates of release outcomes and duration.

Generally, there a number of basic elements to consider when planning timings and duration:

- The availability of birds for release – birds should be available in adequate numbers on a regular basis, from either a wild or captive source, and birds may only be available for release at a certain time each year;
- Desired age of birds for release – the survival prospects of birds may be increased at different ages, *e.g.* newly fledged birds may be more likely to join wild conspecifics, but older birds may be stronger and better able to survive in the wild;
- The time required to develop any rearing or release techniques not already known – an experimentation phase is often required;
- The life history traits of the species – *e.g.* age at first breeding, number of offspring produced, migration and moult timings, whether monogamous or polygamous;
- Migratory patterns and locations – *e.g.* for migratory species the timing of release is vital and must give the released population the best chance of undertaking a migration that matches conspecifics or historical data on migration timings;
- Seasonality of habitats – *e.g.* some habitats change significantly according to the time of year and this may affect the dispersal and survival rates of released birds. It is often appropriate to time a release to match the most productive time for a habitat when the birds will have most success locating food sources; and
- Release strategy – whether soft or hard and how much time is required for birds to acclimatise to their new environment before they can be expected to survive without human intervention or to join wild conspecifics.

For example, one strategy with Eurasian Cranes is to collect eggs from the wild in April, rear birds until they are approximately three months old and beginning to develop flight abilities, house them for two to three weeks in a flight pen at their release site, and release them in late August. This strategy has the following advantages:

1. Birds are held in captivity for a relatively short period of time (significantly less than one annual-cycle) which limits the chances of adaptation to captivity;
2. Birds are given a soft release with adequate time to acclimatise to their surroundings; and
3. Birds are released at a time when the habitat is very productive and therefore locating natural food sources is relatively easy - when the habitat is less productive (during winter) the birds have had chance to familiarise themselves with the habitat and explore various food sources.

A more complicated strategy, concerns a recommended release strategy for the Lesser White-fronted Goose in Norway. As the Lesser White-fronted Goose is migratory and still persists in small numbers in Norway during the breeding season, it was recommended that the population be supplemented by releasing newly fledged birds at a key staging site near the Norwegian breeding grounds. As the staging site is used by the wild population for a relatively short period of time each autumn, the timing of release was crucial. The survival of released birds depended completely on the birds being able to join the wild population on migration.

4.4 POSSIBLE FACILITY REQUIREMENTS

The facilities required for a translocation will vary greatly depending on the source of birds, rearing requirements and the release strategy. The following facilities may be required:

- **Breeding facility**

  A facility to house the captive breeding population. Depending on its location, a breeding facility would usually require indoor and outdoor enclosures as well as supporting rooms/areas for the activities required to care for the birds, *e.g.* a kitchen for food preparation, isolation areas for sick birds. The facility should be large enough to permanently house the maximum expected size of the breeding population, and should be specially designed to facilitate breeding – different waterbird species will require specific conditions. The facility should be predator-proof and biosecure. Consideration should also be given to housing a captive breeding population in more than one facility to reduce the risk of the entire population being affected by a disease outbreak or other catastrophic event.

- **Rearing facility**

  A facility for housing birds being reared for release. It is vital that the design of this facility considers the rearing requirements, *i.e.* the need for birds to gain survival skills and in some cases avoid direct contact with humans. The facility should be predator-proof and biosecure.

- **Release facility**

  A facility for holding birds prior to release while they acclimatise to their release environment and potentially while waiting for wild conspecifics to approach the release site. This facility may be relatively temporary and consist simply of a netted pen at the release site. Again, this facility should be predator-proof and biosecure.

In some cases the roles of two or all of the above may be served by one facility.

The locations of these facilities should be carefully considered and included in the project plan. The location of the rearing and release facilities could be particularly important depending on the chosen release strategy. For migratory species, it is often appropriate to locate the rearing and/or release facility near the desired breeding grounds of the released population.

The breeding facility can be located far from the proposed release site and even outside of the release country. This may be required when the country of release lacks the skills and experience required to maintain a captive breeding population, or when the country of release experiences harsh winters in which it is difficult to maintain a captive population – often an issue with translocations of migratory species that breed in the Arctic and winter much further south. The advantages of locating the breeding facility within the release country, however, are reduced distance over which the birds or eggs would need to be transported between breeding and rearing/release facilities, and it is sometimes easier to gain political, financial and public support for projects conducted in-country.

5 PRE-RELEASE AND RELEASE STAGE

5.1 LICENCES AND OTHER LEGAL REQUIREMENTS

As described in Section 3.4.4.2, translocations must adhere to the relevant legislation and regulations of the release country and other countries the species may use, *e.g.* on migration. Many translocation activities require specific licences and permits, for example:

- Capture of wild birds;
- Removing birds/eggs from the wild – *i.e.* permission to remove birds from the wild may be separate to a licence allowing personnel to simply catch birds. For example, in the UK a ringing permit is required to capture wild birds but separate permission is required to take birds from the wild;
- Import and export of birds/eggs, including CITES permits for CITES listed species;
- Quarantine of birds/eggs;
- Movement between facilities;
- Transport and release of birds;
- Collection, analysis and/or transport of biological materials – *e.g.* blood samples or swabs collected from birds as part of quarantine or pre-release disease screening; and
- Predator and pest control activities.

It is vital that all required licences and permits are acquired well in advance of planned activities so that they do not delay crucial parts of the project, however be aware that most licences have an expiry period so timing should be careful planned. It is also worth noting that, in some countries such as Russia, licences are needed from both national and regional administrations.

5.2 SOURCING BIRDS FOR RELEASE

The project plan should clearly indicate how birds will be sourced and previous preparation activities should have put in place all the relevant requirements to allow for birds to be sourced on a regular basis:

- If required, a captive breeding population should have been established and should be producing an adequate number of birds to regularly supply birds for release as well as maintain the demographics of the captive population;
- The required facilities should have been built, which may include breeding facilities, rearing facilities and/or release facilities (see Section 4.4);
- The required equipment should have been purchased; and
- Personnel should have been trained in the techniques required for the rearing, transport and release of birds into the wild, as well as post-release techniques, including monitoring and interventions.

5.2.1 Catching wild birds/collecting eggs

If a wild source is to be used, the wild capture/egg collection plan (see Section 4.3.5) should be implemented. The timing of catching/collection is vital and must take into account the location, physiological condition and behavioural traits of the wild source population as well as the planned release schedule. It is often necessary for team members to be present at the capture/collection location well in advance of catching/collecting in order to maximise chances of successful capture/collection, which usually depends on a detailed knowledge of the species' use of the source area.

Ideally, a local team should be based in the source area to provide key information about the species' habits, behaviours and habitat use at the source site.

It is important to remember that when catching birds or collecting eggs, the welfare of the birds/eggs is crucial throughout all stages, and significant expertise is required for catching/collecting to be successful.
The following principles should be followed to ensure birds are captured/eggs are collected correctly, safely and with minimum disturbance (adapted from FAO 2007):

- Wild bird capture and egg collection is strictly controlled in most countries – those engaged in

Figure 5-1. Collecting eggs of the Critically Endangered Spoon-billed Sandpiper in Russia's Far East to start a conservation breeding programme for the species. Photos © Martin McGill/WWT.

capture/collection activities should always be aware of and comply with local and national laws regarding these activities and obtain all the required local, regional and national permits well in advance;

- Capture techniques that expose birds to high risk of injury should be avoided;
- Personnel conducting capture/collection efforts should take measures to avoid disturbing non-target birds at breeding sites or enhancing vulnerability to nest site predation following human intrusion;
- Monitor weather forecasts prior to conducting capture efforts to ensure birds are not captured during weather conditions when they may be at increased risk of hypothermia or hyperthermia;
- Always have a sufficient number of experienced personnel available before undertaking any capture/collection operation;
- Ensure the required equipment is available and in good working order, *e.g.* traps, nets, incubators, etc;
- Ensure the team has good local knowledge of the target species;
- If unmanned traps/nets are being used, these should be checked at appropriate time intervals; birds should not remain in traps any longer than is necessary. Appropriate time interval depends on species, capture technique and weather conditions, and could be as short as 15 minutes; and
- Ensure traps that are not being used are closed/dismantled.

5.2.2 Sourcing birds from a captive population

As described in Section 3.4.3.3, birds should only be sourced from captive populations previously identified as suitable, *i.e.* that are of known and appropriate taxonomic status; that are well-managed demographically and genetically; that are free of disease that pose a risk as per the requirements of the Disease Risk Assessment (see Section 4.3.3); that are housed in facilities with good biosecurity and disease surveillance standards; and that are producing adequate numbers of birds, both to supply birds for release and maintain the breeding population. Removing birds from the captive population for release should not threaten the long-term viability of the captive population.

If birds are to be moved from a breeding facility to a rearing or release facility, particularly if this involves crossing national borders, licenses may be required and should be investigated and acquired well in advance of transportation.

5.3 PREPARING BIRDS FOR RELEASE

5.3.1 Rearing for release

Rearing waterbirds for release as part of a translocation project for conservation purposes is distinctly different from rearing birds for other purposes, such as to form part of a captive breeding population or for supplementing a game population (WPA & IUCN-SSC RSG 2009).

Birds must be reared to maximize their chances of survival in the wild. Depending on the species, rearing birds for release will require varying amounts of behavioural training and avoidance of attachment to humans and human facilities, structures, vehicles, etc ('human infrastructure'). Species that rely heavily on learning to gain survival skills will require the most complex rearing. For example, well-established rearing techniques for cranes require the birds to not hear or see a human, have only minimal exposure to human infrastructure, require that survival skills such as predator avoidance be taught, and where migration is required, in some cases birds must be imprinted on a mode of transport (*e.g.* micro-light aircraft).

Rearing techniques that avoid human contact are becoming increasingly refined and successful (*e.g.* Scherzinger 2003 as cited in WPA & IUCN-SSC RSG 2009).

There are many aspects of the rearing process that must be carefully considered before the project sources birds for release, and an in-depth knowledge of how the target species acquires survival skills is required in order to design appropriate rearing techniques. Aspects to consider include:

- Method of incubation – *e.g.* by parent, surrogate/foster bird, or artificial;
- Whether chicks are reared with parent birds, surrogate/foster birds or hand-reared by humans;
- Methods to ensure that birds do not become attached to humans or human infrastructure, and may therefore be more likely to seek out such things after release; and
- Methods to ensure birds acquire the necessary survival skills/behaviours for life in the wild (see Section 5.3.1.1).

5.3.1.1 Behavioural training

Although a released individual's probability of survival should approximate that of a wild conspecific (IUCN 1998), it may not because of unfamiliarity with habitats, predators, weather conditions, natural food sources, etc. as well as the fact that released birds are often under increased stress. It may be possible, however, to increase the survival rate of the released birds above that of wild conspecifics through careful habitat management and interventions underpinned by well-designed post-release monitoring, and translocation projects should always aim for maximum survival of released birds.

Accordingly, it is important that each bird has the highest possible chance of survival. This will depend at least in part on the behavioural responses that the individual makes to a wide variety of cues in the release environment (WPA & IUCN-SSC RSG 2009). Important behavioural responses include:

- Appropriate vigilance techniques;
- Identification of predators and appropriate reactions to them (*e.g.* alarm calls, avoidance);
- Choosing the correct habitat types;
- Choosing the correct food items;
- Interacting with conspecifics; and
- Breeding behaviour patterns, often including pair bonding, nest site selection, establishment of breeding territories, nest building, incubation, etc..

Many waterbird species rely heavily on individual experience and learning as juveniles for their survival – hence they should be given the opportunity to acquire the necessary information to enable survival in the wild through training in their captive environment (including familiarisation with natural foods and predators). Behavioural training is a complex process and care must be taken not to habituate birds to the training

situations, *i.e.* if predator exposure is carried out too often or does not elicit the required fear response, captive birds could actually become more comfortable with the predator (WPA & IUCN-SSC RSG 2009).

Successful rearing for release techniques are well developed for some waterbird species. For example, translocation projects for cranes in Somerset, UK, that use large outdoor enclosures with natural vegetation, ensure minimal, if any, human contact, and use trained dogs to elicit the fear response required for fox encounters have produced captive-reared cranes that behave appropriately and have good rates of survival in the wild.

Figure 5-2. The costume-rearing method used to rear Eurasian Cranes for release in the UK as part of the Great Crane Project (www.thegreatcraneproject.org.uk).

5.3.2 Selection of birds for release

Not all birds reared in captivity or sourced from a wild population will be suitable for release. As well as satisfying the requirements of health and genetic screening (see Sections 5.3.2.1 & 5.3.2.2), birds should be in good physical condition and behaving appropriately. Birds in poor physical condition, as a result of illness, injury or deformity, may attract predators threatening other released birds. Birds behaving inappropriately may also be an attraction for predators, may enter unsuitable areas such as farms or parks causing problems with local communities or stakeholders, or may disperse unexpectedly from the release area encouraging other released birds to also disperse.

5.3.2.1 Health screening of birds for release

Prior to release, birds should be screened for diseases identified by the Disease Risk Assessment (see Section 4.3.3) as posing a risk to wild populations or other interests such as domestic livestock. At release, birds should be healthy and not carrying any disease pathogens that could threaten wild populations.

The veterinary/animal health personnel involved with the project should obtain and review all available information concerning the health of the birds to be released, the source population and the wild population if present. This information should exist in the Disease Risk Assessment, the results of disease surveillance and monitoring work and the animal health records. The veterinary/animal health personnel should conduct a screening programme involving the collection of blood samples, faecal samples, tracheal swabs, buccal swabs, or other samples as appropriate. The screening results should be reviewed by the veterinarian, in consultation with relevant government agencies as appropriate, and a decision made as to the suitability of birds for release. The Disease Risk Assessment should include a list of diseases which are prohibited in released birds (*e.g.* notifiable diseases), diseases which are very high risk in released birds, and should also include a list of diseases that, if found at acceptable levels, will not prohibit release.

Vaccination against Newcastle disease and avian influenza is generally not recommended and in many countries vaccinated birds can not be released. Clear guidance on these diseases should be sort from the appropriate animal health authorities and be part of the Disease Risk Assessment process (see Section 4.3.3). Birds testing positive for any form of avian influenza or Newcastle disease must not be released.

Complete individual medical records should be kept. Recognised medical record keeping systems may be useful for this purpose, *e.g.* the Medical Animal Records Keeping System (MedARKS) and, in future, the Zoological Information Management System (ZIMS). *Post mortem* examinations should be carried out on all birds that die, whether pre-release or post-release, by a qualified avian pathologist. *Post mortem* results should be clearly documented and samples stored for future reference as required.

Figure 5-3. Collecting blood samples from a crane pre-release.

The time required to conduct the health screening, including collecting and shipping samples, and receiving and interpreting laboratory results (which can take some time) should be factored into release planning. Veterinary and laboratory analysis costs can be significant and must be factored into project budgeting.

As appropriate and as suggested in the DRA, veterinary treatments can be given prior to release, *e.g.* treatment for endo and ectoparasites, understanding that the release process is likely to be stressful and inapparent infections may become overt clinical disease under these conditions.

5.3.2.2 Genetic screening of birds for release

Genetic techniques are powerful tools for identifying species, sub-species and, in some cases, races. To varying degrees, these techniques can be used to evaluate genetic variability and detect hybrids in captive populations. However, the genetic relationships between many waterbird species and especially sub-species are still unclear and therefore it is not always possible to accurately identify genetic differences between birds

that have the same taxonomic status as wild populations and those that may carry genes of other species or sub-species. For example, in the case of the Lesser White-fronted Goose translocation project that released birds in Sweden between 1981 and 1999, it was possible to identify individual geese which carry particular genes from the Greater White-fronted Goose *Anser albifrons* but it was not possible to definitively determine if an individual bird did not carry any Greater White-fronted Goose genes.

Before birds are sourced, either from captivity or the wild, it is vital that the taxonomic status required is determined and methods for determining the taxonomic status are established. A clear framework for what genetic results will mean for a project should be agreed so that resources and time are not wasted on tests which do not produce meaningful results.

Where birds/eggs are collected from the wild, genetic screening will probably be unnecessary as the birds are from a known taxonomic source. Care should be taken, however, to consider whether or not the source population has the same taxonomic status as the birds historically or currently occurring in the release area. Below the sub-species level, populations may have developed local adaptations that are important for survival in specific habitats.

Where birds/eggs are sourced from captive populations where there is any doubt about the original source of the population, extreme care should be taken when considering using these birds for release and genetic screening is essential. In these cases it's important to remember, however, that genetic screening may not be able to determine the hybrid status of the species/sub-species/population in question. Some waterbird species have been in captivity for many decades, particularly in Europe, and without strict demographic management, there can be no guarantees that hybridization has not occurred at some point in the past. Hybrids can exist undetected in captive populations without any obvious morphological signs. Wildfowl are particularly prone to hybridization in captivity as they are often kept in multi-species flocks and readily hybridise.

As a general rule, where there is any doubt about the wild origins or the hybridization status of a captive population, it should NOT be used for translocations, except in exceptional circumstances.

Monitoring the genetic variability of captive birds and their offspring can be helpful in establishing breeding pairs which are least related, thus increasing the genetic variability of the captive offspring to be released. It is important that captive populations of waterbirds are managed to maximize genetic variability and minimise inbreeding. However, it has been demonstrated, for example in the case of the Laysan Teal *Anas laysanensis*, that birds from captive populations with a very limited number of founders can produce viable offspring with no obvious signs of reduced survival in the wild (Kear 1977).

Conservation genetics is an extremely complex and specialist field. Advice from specialists in conservation genetics should be sought whenever questions or uncertainties arise.

5.3.3 Transport and holding conditions

Unless reared at the release location, birds for release will need to be transported to the release site and will often need to be held at the release site for a period of acclimatization.

The main concern with transport is the welfare of the birds. Transport methods should ensure birds are not injured during transport, not exposed to disease, and not unduly stressed – all of which will reduce chances of survival after release. Depending on the distance transported, transport will require specially designed carrying crates/boxes/cages (conforming to International Air Transport Association [IATA] regulations if to be transported by air), and adequate provision of food, water and veterinary care for the journey.
When transport could be particularly hazardous and/or involve unknown factors, it is recommended that transport methods are tested prior to the movement of birds. One method for testing transportation conditions is to transport dummy carrying crates containing instrumentation that records vital information, such as maximum and minimum temperatures and levels of movement.

Generally, the following should be considered when transporting birds:

- Design of transport crates/boxes/cages – birds should have enough space to stand up and turn around;

- Density of birds in transport crates/boxes/cages – depending on the birds' social system, they may benefit from being transported in pairs or groups but care should be taken to avoid over-crowding;
- Amount of food, water and veterinary care required;
- Mode of transport – the advantages and disadvantages of short transport times (*e.g.* by air) should be weighed against long transport times but perhaps smoother journeys with more access to the birds (*e.g.* by road);
- Maximum and minimum temperatures during transport;
- Time of day for transport – *e.g.* transport at night or early in the morning may be required where high temperatures during other periods of the day could cause the birds to overheat during transport;
- Exposure to disease risks during transport – *e.g.* close proximity to other animals in the animal-cargo section of an airplane;
- Likelihood of injury during transport – especially important when transporting flighted or long-legged waterbirds;
- Movement during transport – *e.g.* rough handling or turbulence sometimes experienced during air travel;
- Human disturbance and handling should be kept to a minimum;
- Species-specific concerns – *e.g.* some species are especially prone to transport-induced stress, some are prone to hyperthermia, and long-legged species are prone to leg injuries; and
- Travel across borders – when transport is required across regional/national borders, periods of quarantine may be required that may pose risks to the birds and should be carefully planned for.

Holding methods at the release site will vary greatly depending on the species released and the release strategy. For hard releases, only a minimum amount of holding may be required and welfare may be the only concern, whereas for soft releases, extended holding in flight pens will be required and as well as welfare, the acquisition of survival skills and acclimatization will be important. For extended periods of holding, it is recommended that enclosures are large and there is limited disturbance from humans. Birds should be regularly monitored to check for any problems and legislation sometimes requires that birds are inspected by a veterinarian before release.

5.3.4 Individual marking

In order to determine the fates of released birds, it is essential that all birds are individually marked. Methods of marking will vary greatly depending on the species released and the requirements of the post-release monitoring strategy. When choosing marking methods, it is important to consider how each method will affect the welfare of the bird and might limit survival and/or breeding.

Marking methods should meet as many of the following criteria as possible (Fair *et al*. 2010):

- The bird should experience no significant long-term hindrance or irritation;
- It should be possible to apply the mark easily and within a reasonable time-scale;
- If the mark requires visual identification in the field, the marking code (digits or colours) should be readily visible and distinguishable;
- The mark should persist on the bird until post-release monitoring objectives have been fulfilled;
- The bird should suffer no adverse effects on its behaviour, survival, or social life; and
- Careful records should be made of all aspects of the marking procedure.

When selecting a marking method give special consideration to the adverse effects associated with each method, the type of data generated and the acceptability of each method for the translocation project (*e.g.* while a marking method may present no significant risk to individual birds, it may cause concern among members of the public observing the birds).

As an absolute minimum, birds should receive a uniquely coded, permanent metal leg ring. These will at least allow for the identification of any dead birds that are found.

Additional individual marking techniques include:

- Coloured leg rings;
- Coloured leg flags;
- Neck collars;
- Nasal discs and saddles;
- Patagial (wing) tags;
- Dyes/paints; and
- Radio/satellite transmitters using a variety of different attachment techniques.

Some of the marking techniques listed have been associated with some degree of negative impact on marked birds, including physical injuries, feather and skin damage, reduced survival, reduced breeding success, altered social systems, and generally altered behaviour patterns (see Fair *et al*. 2010 for a review of marking techniques and impacts). In light of these potential negative impacts, extreme care should be taken in selecting marking methods.

Radio and satellite transmitters can be particularly useful marking methods in translocation projects. Both of these methods allow for birds to be located when difficult to see in the field, at considerable distances and without undue disturbance. While radio-tracking relies on birds not undertaking unusual movements, satellite tracking can be used to locate birds even if they disperse great distances from the release site. Satellite tracking can also provide a wealth of detailed information on habitat usage and even behaviour patterns. Both methods, but particularly satellite tracking, are expensive and require specially trained personnel to fit the tags. The dimensions and weight of radio/satellite tags are important considerations and personnel should follow established guidelines for the target species. Attachment design is also crucial and often species specific.

If birds are to be marked with more than conventional metal and colour rings, it is recommended that birds are marked at least one to two weeks before release to allow them to adjust to carrying the marks, to allow personnel to closely observe how birds react to the marks and to allow for easy capture in case adjustments are needed. Bird handling skills are vital at the marking stage to ensure birds are not injured or unduly stressed during the process.

5.4 RELEASE

Release should proceed as prescribed in the release strategy (see Section 4.3.8).

Most release strategies will involve a period of at least two to three weeks of acclimatization when birds are held in release enclosures – *e.g.* large flight pens – at the release location. This can be a dangerous time for the birds:

- The birds may have been injured during transport to the release enclosure and the associated handling;
- If they are capable of flight, they may be at risk of injury by collision within the release enclosure. This risk should be carefully managed – flight restraint (*e.g.* wing brailing) may be necessary;
- The birds may be stressed by their new environment and behave erratically;
- The birds may be at increased risk of predation – practically it can be difficult to build fully predator-proof release enclosures, especially in remote locations - 24-hour guarding and/or the use of trip wires may be required; and
- The birds may be at increased risk of disease – the birds may encounter pathogens for which they have no immunological experience.

During this time, the welfare of the birds should be closely monitored and if possible there should be veterinary involvement so that obviously injured or diseased birds can be examined, diagnosed and treated as required. Personnel should be prepared to remove individual birds or all birds from the release enclosure if

they develop signs of disease and/or injury. A facility/location should be available for holding injured and diseased birds away from the release enclosure, potentially for rehabilitation.

At the time of release and immediately after release, again birds should be monitored as closely as possible. Close monitoring is required to determine how they adapt to their new environment, including what food sources they use; how they react to predators; if a social species, how they interact with each other and conspecifics if present in the area; how they interact with other species; habitat usage especially the choice of feeding and roosting sites; and how they respond to any humans they may encounter.

Community and stakeholder engagement is particularly important around the time of release, and special activities may be required. Some stakeholders will require notification of an imminent release. Care should be taken when revealing the exact location of the release enclosure so as to avoid unnecessary human disturbance. As a general rule, the exact location of a release enclosure should not be publicized and only made available to those who need to know for a specific reason, *e.g.* licensing authorities, local land-owners and veterinarians.

Other activities, such as short-term habitat management and predator control, may also be required immediately before, during or immediately after a release. Immediately after release, birds are particularly vulnerable to predators and other hazards in the environment – they may not yet be strong fliers, they may be stressed by the release process, and may otherwise behave inappropriately.

It is impossible to accurately predict how birds will react to release and personnel should plan for a variety of scenarios and be able to react quickly if outcomes are unfavourable.

6 POST-RELEASE STAGE

6.1 INTERVENTIONS

Interventions should be made according to the agreed interventions policy (see Section 4.3.9).

Efficient and effective interventions rely on good knowledge of how the birds are coping in the wild environment, *i.e.* information from post-release monitoring. Some released populations may require fairly intensive and long-term interventions while others may require no interventions at all.

The most common intervention is supplementary feeding, usually required immediately after release until birds have located and adapted to natural food sources. Supplementary feeding may also be required at other times, *e.g.* when seasons change and therefore natural food sources change. When possible, the body condition of released birds should be monitored for signs of weight loss and the feeding habits should be monitored to determine what kinds of foods are being eaten and how much time is being spent feeding versus searching for food. This information will help determine when supplementary feeding is required.

6.2 POST-RELEASE MONITORING

As soon as birds are released the post-release monitoring strategy (see Section 4.3.10) should be implemented. It is important that a detailed post-release monitoring strategy is pre-planned and there are no delays in implementation, as information gathered immediately after release can be vital (see Section 5.4). It is also important that data from the pre-release phase (*e.g.* collection/capture from the wild, captive breeding and rearing, etc) is made available as events during this period and the condition and behaviour of birds released will influence release outcomes. The post release monitoring team should have access to all available information on the birds, *e.g.* life history, sex, age, genetic relationship to other released birds.

The practicalities of monitoring released birds, which in some cases can only be accurately determined after release, may preclude some types of data collection required in the post-release monitoring strategy. Therefore, the strategy should be treated as a working document that is updated and adjusted as necessary depending on the behaviour and dispersal of the released birds.

It may be possible to develop a network of volunteers to assist with post-release monitoring. Volunteer networks can be powerful and cost-effective tools but, as volunteers are rarely trained researchers, the quality of data collection should be carefully assessed and monitored.

As post-release monitoring data is collected, it is important that data analysis and interpretation occurs on a timely basis. Results from post-release monitoring should be readily available to the project team so that success can be monitored and adjustments rapidly made to techniques, plans and the project PVA as required.

In general, post-release monitoring involves the following activity types:

- Fieldwork including observations and collection of samples – *e.g.* faecal and habitat sampling;
- Laboratory analysis – *e.g.* identification of food items in faecal samples, disease testing;
- Download of telemetry data, if available;
- Capture of the offspring of the released population for marking and occasionally re-capture of released birds to replace marks, if possible and appropriate. Capture can also be used to determine the sex of offspring, assess overall size and condition of birds and collect samples for health and genetic screening. Capture poses risks to birds, however, and these should be carefully considered against the value of any data that can be gathered;
- Data collation;
- Data analysis and interpretation; and
- Reporting.

6.3 ANNUAL PROJECT REPORTS AND PUBLICATIONS

Accounts and results of translocation projects are rarely published (Ostermann *et al*. 2001, Lee & Hughes 2008). The scarcity of available information on translocation methodologies and outcomes severely limits the development and refinement of translocation methods and techniques. As translocations generally have a very low success rate it is vital that reporting is improved.

The lack of reporting can, in part, be attributed to the lack of national and international monitoring schemes and a reluctance to report failures. As translocation activities (particularly the release of birds) are generally strictly controlled by national legislation, it is recommended that the reporting of outcomes be build into the national licensing process.

One significant step forward since 2008 in improving reporting and knowledge sharing is the establishment of the IUCN-SSC RSG's *Global Re-introductions Perspectives* series. Publications in this series (three so far to date at the time of writing) provide case-studies on translocation projects for invertebrates, fish, amphibians, reptiles, birds, mammals and plants. The case-studies are presented in a standardised format, which includes goals, success indicators, project summary, major difficulties faced, major lessons learned, and overall success of project with reasons for success or failure. The publications include failed projects and are invaluable in improving of knowledge sharing on translocations.

Project reporting has the following primary purposes:

- To allow for the assessment of project outcomes;
- To help refine methods, techniques, targets, plans and risk assessments, including Disease Risk Assessments;
- To determine conservation priorities for the released population;
- To provide accountability to funding bodies and regulatory agencies and to the conservation community; and
- To provide lessons learned to the wider translocation community with the goal of improving future translocations for related species.

As a minimum, reporting should include annual project reports (see below), a final project report, at least one publication in the scientific literature covering the entire project, a case-study submitted to the IUCN-SSC RSG for publication in their *Global Re-introduction Perspectives* series, and publications in popular literature as required by the community and stakeholder engagement strategy (see Section 4.3.11).

It is strongly recommended that annual reports are produced throughout the duration of a project, from the year that planning begins to the year post-release monitoring ends, the year the project is discontinued or the year the project is deemed to have been successful.

These annual reports should describe the activities conducted in each project area, *i.e.* not just captive breeding or release activities, but also engagement activities, habitat management activities, health monitoring, budgeting, etc. (see Case study 6-1 for an example contents list).

The final report, produced upon completion or discontinuation of a project, should synthesize the information provided in annual reports. The following structure is recommended:

- Identification of the species/population translocated;
- Identification of the area in which the translocation project occurred, including the migratory range if relevant;
- Aims and objectives of the translocation;
- Results of justification and feasibility assessments;
- Project summary;
- Targets and success indicators;

- Descriptions of the activities conducted in each project area over the entire duration of the project and the associated outcomes, including major difficulties faced and lessons learned;
- Evaluation of the overall success of the project (see Section 6.4.2);
- Description of how the project has contributed to the conservation status of the target species.

The final and annual reports should be made available to a wide-range of stakeholders, including funding bodies and the relevant regulatory agencies. Also see the suggested structure for reporting on translocation projects to AEWA (Appendix II).

Case study 6-1. The contents list from the first annual report produced for a re-introduction project for the Eurasian Crane *Grus grus* in the UK (the 'Great Crane Project'; GCP 2011).

SECTION A: SUMMARY

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A-2. Key milestones
A-3. Egg to current outcome table
A-4. Legislation and documentation, consents etc.

SECTION B: CRANE REPORT

B-1. Hatching and rearing: April 23rd to August 4th 2010
B-2. Summary of egg collection and nest outcomes
B-3. Health monitoring summary
B-4. Transportation and anchoring: August 4th to August 24th 2010
B-5. Post release summary: August 24th 2010 to March 31st 2011
B-6. Monitoring summary

SECTION C: COMMUNICATIONS

C-1. PR/media summary of year
C-2. Summary of community engagement work

SECTION D: HABITAT CREATION AND IMPROVEMENTS

D-1. Summary of land management and advisory work

SECTION E: BUDGET SUMMARY

E-1. Summary of pre-release and release Y1 [year one] costs

SECTION F: APPENDICES

F-1. Project team structure
F-2. Drawings of rearing facilities
F-3. Plan of release enclosure
F-4. Details of release enclosure

6.4 SUCCESS ASSESSMENT

The success of a translocation project should be assessed both on an on-going basis throughout the duration of a project and on completion.

6.4.1 On-going assessment: tracking progress throughout the project duration

It is vital that project activities are evaluated throughout a project's duration in order to track project progress, guide on-going decision making and allow for refinement of targets, techniques, plans and risk assessments, therefore allowing for an adaptive management approach.

Assessing progress relies on clear targets set at the outset of the project (see Section 4.3.1). Assessing progress is only possible when these targets are specific, measurable, attainable, realistic and time-bound (SMART).

On an annual or even more frequent basis, the results of project activities should be evaluated and compared with the relevant targets, and conclusions should be included in annual reports (see Section 6.3).

Progress should be tracked for all project areas, *e.g.* fundraising and communications, habitat management, engagement, sourcing birds, captive breeding and rearing as appropriate as well as post-release outcomes.

See Ewen et al. (2012) for a full discussion of the adaptive management approach.

6.4.2 Final assessment: overall success of the translocation

Overall project success should be judged against the objectives and targets of the project, so on socio-economic and habitat outcomes as well as the translocation of birds. For example, if a project fails to establish a self-sustaining population of the target species, but succeeds in restoring X amount of wetland habitat and engaging communities in conservation action, it would be incorrect to consider that project a complete failure as the project may have resulted in long-term conservation benefits. It is vital, therefore, that the aims, objectives and targets for the project are clearly established from the outset.

As described in Section 4.3.1, targets should include, and therefore success be judged against, the following:

- Fundraising targets, *e.g.* amount of funds secured by a particular date;
- Habitat management targets, *e.g.* number of hectares restored to habitat suitable for the target species, proportion of key sites given national and/or international protection;
- Sourcing targets, *e.g.* number of eggs or birds collected from the source population each year;
- Captive breeding/rearing targets, *e.g.* number of birds bred each year, number of birds successfully reared to fledging or release age each year, total number of birds released;
- Release and post-release targets:
    - Survival of founders, *e.g.* what % survived to a particular life stage;
    - Breeding by founders, *e.g.* evidence of breeding and/or productivity;
    - Breeding by subsequent generations, *i.e.* long-term persistence;
    - Habitat usage, *e.g.* dispersal range; and
    - Population viability, *e.g.* reduction in extinction risk according to PVA.
- Community and stakeholder engagement targets, *e.g.* number of local schools engaged with the project, number of people reached through websites and social networking, proportion of stakeholders supportive of the project – these can be assessed using questionnaires, online traffic and interactions statistics, feedback from workshops and public opinion polls or similar.

Assessing the final project outcomes against the targets will give an indication of success in individual project areas, but may not, however, indicate the overall success of the project in terms of whether or not the high-level aim was achieved.

As the ultimate aim of most translocation projects is the establishment of a self-sustaining population[3], an estimate of population viability that combines population size, growth-rate and growth-rate variance should be the main criterion for assessing overall success (WPA & IUCN-SSC RSG 2009). This requires accurate estimates of demographic parameters, such as survival and breeding rates, and the modelling of various stochastic events. These parameters can be reduced to four key sub-criteria – numbers of birds released, survival of founders, breeding by founders, and breeding by subsequent generations – that relate to the one main criterion – population viability (see Figure 6-1).

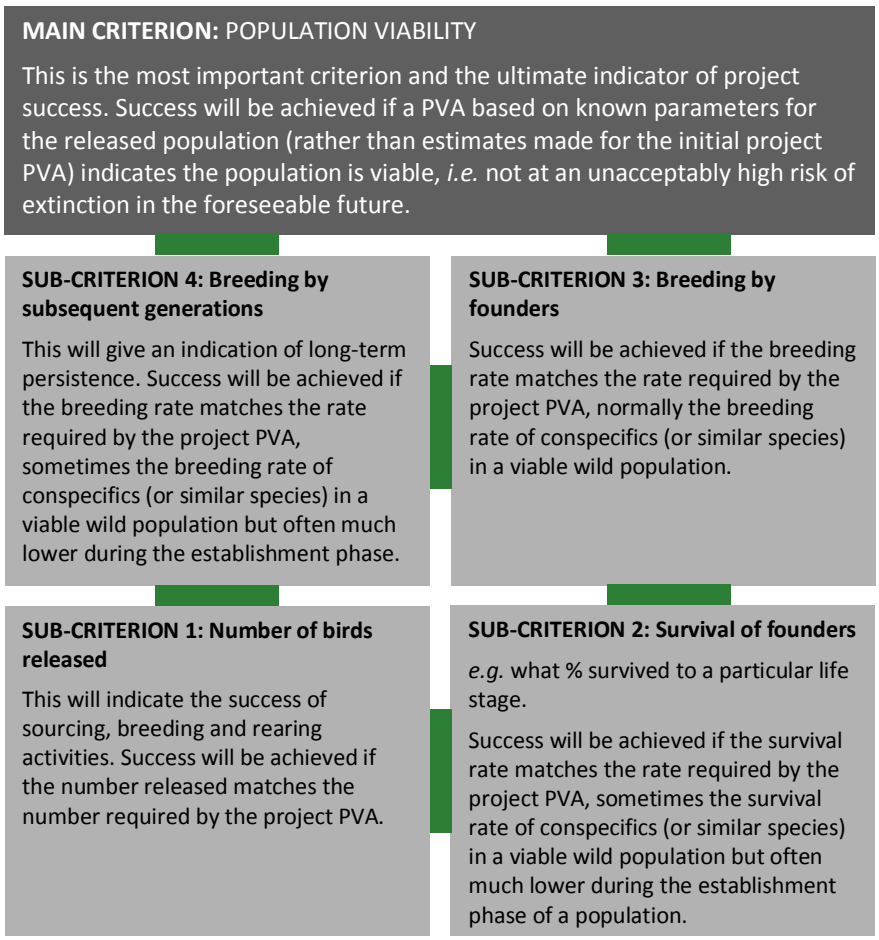

Figure 6-1. Five criteria for assessing the overall success of a translocation project where the aim is the establishment of a self-sustaining population.

As can be seen in the targets list near the beginning of this section, each of these parameters should be addressed by an individual project target. If this is the case and the progress towards those targets in assessed throughout the project, a final assessment of overall project success should not be complicated.

Where a species is known to disperse over large distances and thus determining demographic parameters may be a challenge, this should be taken into account. And it should be recognised that in situations where the

[3] Using a Minimum Viable Population approach, Beck *et al*. (1994) considered that success is only achieved when a released population contains 500 free-living individuals. This target, however, seems arbitrary and does not consider the life-history traits of the target species, the population growth rate, breeding status, the amount and quality of available habitat, or the eventual meta-population structure, which varies widely between released populations (WPA & IUCN-SSC RSG 2009).

required demographic parameters are difficult to establish by post release monitoring or post release monitoring is lacking, it may be impossible to determine overall success.
To accurately judge project success it is important that all targets are time-bound and that the success assessment takes the time-scale into account. A target is only meaningful in the context of its timeframe.

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APPENDIX I: SELECTION OF EXISTING TRANSLOCATION GUIDANCE[4]

Title	Author(s)	Year	Taxa	Download
GENERAL				
Guidelines for Reintroduction of Animals Born or Held in Captivity	Association of Zoos & Aquariums	1992	Various	http://www.aza.org/reintroduction/
Reintroduction of Captive Animals into their Native Habitat: A Bibliography	National Zoological Park Branch, Washington D.C	1988/ 1995	Various	http://www.nal.usda.gov/awic/zoo/reintrod.pdf
Re-establishment Principles Guidance Notes	Department of Sustainability and Environment	2011	Various	http://www.dse.vic.gov.au/property-titles-and-maps/surveying-home-page/advice-and-guidelines-for-surveyors/re-establishment-principles-workshop
Translocation of Living Organisms	IUCN	1987	Various	http://www.iucnsscrsg.org/download/IUCNPositionStatement.pdf
Reintroduction Of Endangered Animal Species: Complementing the IUCN Guidelines (DRAFT)	Collaboration For Environmental Evidence	2010	Various	
BIRDS				
Guidelines for re-establishing grey partridges through releasing	Game & Wildlife Conservation Trust	2008	Grey Partridge *Perdix perdix*	http://www.iucnsscrsg.org/download/Guidelines%20for%20re-establishing%20grey%20partridges%20through%20releasing.pdf
Parrot Re-introduction: Towards a Synthesis of Best Practice	N. J. Collar	2006	Psittacines	http://people.pwf.cam.ac.uk/cns26/NJC/Papers/LPF%20Parrot%20reintroduction.PDF
Florida Scrub-jay Translocation Guidelines	U.S. Fish & Wildlife Service & Florida Fish and Wildlife Conservation Commission	2011	Scrub-Jay *Aphelocoma californica*	http://www.fws.gov/northflorida/Scrub-Jays/Docs/20110606_gd_Scrubjay_translocation_guidelines.pdf
Reintroduction and restocking: guidelines for bird recovery projects	Bird Conservation International	1991	Aves	http://journals.cambridge.org/action//displayAbstract?fromPage=online&aid=7439544
National Recovery Plan for The South-Eastern Red-Tailed Black-Cockatoo	Department of the Environment and Water Resources	2007	South-Eastern Red-Tailed Black-Cockatoo	

[4] Guidance documents for non-avian taxa are included as many of the fundamental principles and even practical considerations are shared between translocation projects regardless of the target taxa.

Title	Author(s)	Year	Taxa	Download
			Calyptorhynchus banksii graptogyne	
Guidelines for the Re-introduction of Galliformes for Conservation Purposes	World Pheasant Association & IUCN-SSC RSG	2009	Galliformes	http://books.google.com/books?hl=en&lr=&id=oC475JsGyCMC&oi=fnd&pg=PA3&dq=re-introduction+guidelines+re-establishment+translocation&ots=vg0LajeVWF&sig=34doqDJY3IIJkV_6aBgHdEanWiU#v=onepage&q&f=true
OTHER TAXA				
Best Practice Guidelines for the Re-introduction of Great Apes	IUCN-SSC Primate Specialist Group	2007	Great apes	http://data.iucn.org/dbtw-wpd/edocs/SSC-OP-035.pdf
Guidelines for Tapir Re-introductions and Translocations	IUCN-SSC Tapir Specialist Group	2008	Tapirs	http://www.tapirs.org/Downloads/committees/veterinary/guidelines_tapir_re-Introduction_translocation.pdf
Reintroduction Guidelines for Iguana	IUCN-SSC Iguana Specialist Group	1999	Iguanas	http://www.iucn-isg.org/actionplan/ch3/reintroduction.php
Guidelines for the in situ Re-introduction and Translocation of African and Asian Rhinoceros	IUCN-SSC African Rhino, Asian Rhino & Wildlife Health Specialist Groups	2009	African and Asian Rhinos	http://data.iucn.org/dbtw-wpd/edocs/SSC-OP-039.pdf
Insect Re-establishment - a code of conservation practice	Royal Entomological Society of London	1986	Insects	http://www.amentsoc.org/publications/online/re-establish.html
Guidelines for Large Herbivore Translocation Simplified: Black Rhinoceros Case Study	WL Linklater, K Adcock, P du Preez, RR Swaisgood, PR Law, MH Knight, JV Gedir & GIH Kerley	2011	Black Rhinoceros	http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2664.2011.01960.x/abstract
KWS Elephant Translocation Protocol	Kenya Wildlife Service (KWS)	2009	Elephants	http://www.elephantvoices.org/multimedia-resources/document-download-center/doc_download/66-kws-elephant-translocation-protocol.html
Restocking of salmonids - opportunities and limitations	Fisheries Research	2003	Salmonids	http://www.carmarthenshire.org.uk/70518aprahamian.pdf
Captive breeding, population supplementation and	Norwegian Institute for	2004	Arctic Fox	http://www.nina.no/archive/nina/Ppp

Title	Author(s)	Year	Taxa	Download
reintroduction as tools to conserve endangered Arctic Fox populations in Norway	Nature Research			BasePdf/oppdragsmelding/825.pdf
Guidelines for Nonhuman Primate Re-introductions	IUCN-SSC RSG	2002	Non-human primates	http://www.iucnsscrsg.org/STORAGE/RSG%20CD/PDFs/RNews21.pdf#page=29
Captive Breeding And Reintroduction Of Arabian Mountain And Sand Gazelles In Saudi Arabia	OB Mohammed, TW Wacher, IA Nader & SM Mubarak		Arabian Mountain And Sand Gazelles	
The IUCN-SSC Red List Assessment, Reintroduction Guidelines and the Iberian Lynx: Applying the Red List criteria to define a recovery strategy for the Iberian lynx	U Breitenmoser, C Breitenmoser-Würsten, JG Santiago & F Zimmermann	2004	Iberian Lynx	http://www.catsg.org/iberianlynx/01_information/1_7_conferences/cordoba/Breitenmoser_et_al_2004_Iberian_lynx_red_list_assessment_Abstract_Cordoba.pdf
Amphibian Habitat Management Handbook: Chapter 12. Translocation and Reintroduction	J Baker, T Beebee, J Buckley, T Gent & D Orchard	2011	Amphibians	http://www.arc-trust.org/resources/AHMH.php
Oahu Rare Snail Working Group Reintroduction Guidelines	Oahu Rare Snail Working Group	2007	Snails	http://manoa.hawaii.edu/hpicesu/DPW/2007_YER/Appendicies/Appendix_3-2_Rare_snail_reintro_guidelines.pdf

APPENDIX II: SUGGESTED STRUCTURE FOR REPORTING ON TRANSLOCATION PROJECTS TO AEWA

The AEWA Action Plan requires that Contracting Parties "inform the Agreement secretariat, in advance, of all re-establishment programmes for populations listed in Table 1" (paragraph 2.4).

As translocations are often recommendations of AEWA Single Species Action Plans and other conservation initiatives, it is vital that their occurrence, progress and outcomes are reported to AEWA to allow the implementation of Action Plans and other conservation initiatives to be monitored.

To achieve these requirements it is recommended that the following reporting structure is used:

IMMEDIATE NOTIFICATION REPORT

The AEWA Secretariat is notified by the relevant National Focal Point when a translocation project for a population listed in Table 1 is planned in a Contracting Party.

The immediate notification report should include the following information:

- Identification of the target species/population;
- Identification of the area in which the translocation project is to occur, including the migratory range;
- Results of justification and feasibility assessments, ideally in the format provided in these guidelines (see Section 3.3 & 3.4); and
- The aims and objectives of the translocation (see Section 3.2).

ANNUAL REPORTS

The AEWA Secretariat should receive annual reports on the implementation of a project (see Section 6.3) from the relevant National Focal Point as soon as they are available.

FINAL REPORTS

After completion or discontinuation of a translocation project, the AEWA Secretariat should receive a final report on the project from the relevant National Focal Point as soon as it is available.

The final report should include the following information:

- Identification of the species/population translocated;
- Identification of the area in which the translocation project occurred, including the migratory range if relevant;
- Aims and objectives of the translocation;
- Results of justification and feasibility assessments, ideally in the format provided in these guidelines (see Section 3.3 & 3.4);
- Project summary;
- Targets and success indicators;
- Descriptions of the activities conducted in each project area over the duration of the project and the associated outcomes, *i.e.* synthesis of the information required in the annual reports (see Section 6.3), including major difficulties faced and lessons learned;
- Evaluation of the overall success of the project (see Section 6.4.2);
- Description of how the project contributed to the AEWA Action Plan and to any relevant AEWA Single Species Action Plans or other conservation initiatives, and how the translocation project has contributed to the conservation status of the target species and other species in Table 1 of the AEWA Action Plan.