世界自然保育聯盟物種生存委員會

再引回指導方針

IUCN/SSC Guidelines For Re-Introduction

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中華民國八十六年十月

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序

人類之科技發展至今，已顯著改變了生育環境及天然資源之自然秩序，雖大幅提升了多數人之物質生活，然人口持續生長，使人類對天然資源之需求漫無止境。基於對自然資源利用方式之關切，以及對長期資源供應人類利用之期望，許多學者及有識之士乃憂心忡忡，而大力疾呼自然資源保育。國內近年來的保育風潮正方興未艾，各界已有積極推動保育之共識，惟大多以動物資源保育爲主，政府也於民國七十八年明定「野生動物保育法」來保育野生動物，維護自然生態的平衡，但對於本省野生植物資源則尚無較完善的法令來保護。

有鑑於此，本中心於八十五年度起，承行政院農業委員會經費補助，由彭研究員兼秘書國棟規劃主持，進行「野生植物保育策略之研究」計畫，並指派相關研究人員共十三人成立工作小組，廣泛蒐集世界各保育先進國家之植物保育立法、策略及行動計畫等文獻資料，詳加研讀並翻譯，目標是吸收先進國家之經驗，經過整理後擬訂出配合台灣自然、社會、經濟及人文背景之植物保育策略，以供政府決策單位及國內保育界參考。其中由國際自然及自然資源保育聯盟(IUCN)物種生存委員會(SSC)所擬定「IUCN/SSC Guidelines for Reintroductions」(世界自然保育聯盟物種生存委員會再引回指導方針)一文，旨在因應日益增多的再引回計畫及對特定指導方針的需要漸增，以協助再引回計畫得以順利達到其原訂的保育目的，且避免造成更大衝擊的不利副作用。本指導方針爲一兼顧物種生存及生態系平衡，有效推動復育工作之寶貴參考資料，對國內目前正在推動的多項物種復育及研究工作將有甚大的幫助。爲能突破語言隔閡，引介本再引回指導方針於國內保育界，感謝 IUCN 物種生存委員會之慨然同意，由本中心植物組曾助理研究員彥學完成翻譯，植物組楊助理嘉棟負責編印作業，並請 IUCN 物種生存委員會指導委員暨國立台灣大學動物學系李教授玲玲博士審閱校訂。冀望本譯文之付梓，能獲得國內保育界之回響，有利形成共識，並共同推動自然保育工作。

台灣省特有生物研究保育中心

主任 顏仁德

謹識

世界自然保育聯盟物種生存委員會再引回指導方針

前言

本指導方針是由世界自然保育聯盟(The International Union for Conservation of Nature and Natural Resources，IUCN)物種生存委員會(Species Survival Commission，SSC)的再引回專家群(Re-introduction Specialist Group，RSG)所擬訂，爲因應日益增多的再引回計畫及對特定指導方針的需要漸增，以協助再引回計畫得以順利達到其原訂的保育目的，且避免造成更大衝擊的不利副作用。雖然世界自然保育聯盟(IUCN)在 1987 年已發表〝生物活體移置之立場聲明〞(Position Statement on the Translocation of Living Organisms)一文，然而吾人感受到更周延的涵蓋再引回實務工作之指導方針是必要的。

這些指導方針希望做爲有利於再引回計畫程序之指導原則，而非僵化的行爲準則。許多重點是針對圈養繁殖的個體再引回野外而非由野外直接移置，其他則是針對族群數量極少的全球性瀕危物種。每一個再引回的提議都應就其效益加以嚴格而精確地評估。值得注意的是，再引回計畫通常是一項長期、複雜且耗資的過程。

對於以短期、休閒或商業爲目的，包括垂釣及狩獵等活動，而不考慮在野外建立一個可以自給自足族群的再引回或物種移地保存工作，由於出發點不同，本指導方針並不適用。本文廣泛針對所有的動植物分類群，並將訂期修正，而再引回的工作手冊也將發展出來。

本文

日益增多的再引回以及移置促使了世界自然保育聯盟(IUCN)物種生存委員會(SSC)成立再引回專家群。該專家群首要之務乃致力於與世界自然保育聯盟(IUCN)的其他委員會諮商以重新出版世界自然保育聯盟(IUCN)於 1987 年所發表的生物活體移置之立場聲明。

重要的是這些指導方針應符合世界自然保育聯盟(IUCN)生物多樣性保育及自然資源之永續經營管理的整體政策。世界自然保育聯盟(IUCN)及其他保育組織的環境保育和經營管理哲學，已在如關愛地球(Caring for the Earth)和全球生物多樣性策略(Global Biodiversity Strategy)之類的文獻中有所陳述，這些文獻涵蓋了廣泛的主題，包括社區參與、自然資源永續保育、人類整體生活品質的提升以及保育與復原生態系等需求。關於後者，某一物種的再引回爲一特定的生態系復原的案例，而此種復原工作中通常只有此一物種消失。迄今完全恢復一群動植物物種的案例還很少。

在全球單一動植物物種的復原計畫愈來愈頻繁之際，有些復原計畫是成功的，但較多是失敗的。由於此種生態上的經營管理愈來愈常見，於是物種

生存委員會的再引回專家群的優先工作之一乃是發展指導方針以便再引回能較有根據，且較有可能成功，並且無論每一次案例成功與否都能使保育界有所收穫。希望這些以案例的廣泛檢視及跨領域的諮商爲根據的指導方針，即使涉及多樣的物種和條件，也能使再引回的觀念、設計、可行性和實施更加嚴密精確。

因此優先的事項便是發展能對規劃、認同或實行再引回的人士有直接且實質幫助的指導方針。所以這些指導方針的主要對象就是經營管理者或科學家，而非政府的決策人員。針對後者的指導方針則涉及較深入的法律和政策方面的議題。

一、名詞定義

(一).再引回(Re-introduction)：將原已在其分布範圍內絕滅的物種再引進其原分布範圍，並建立族群。

(二).移置(Translocation)：刻意將野生個體或族群由其分布範圍的一處移至另一處。

(三).補充(Re-inforcement/Supplementation)：在現存同種族群中加入個體。

(四).保育引進(Conservation/Benign introductions)：爲保育目的，在一物種原有分布範圍外的適當棲地及生態地理區建立族群，只有在該物種原分布範圍內已無適當棲地狀況下，才考慮的保育措施。

二、宗旨與目的

(一).宗旨

再引回的宗旨是爲全球性及地區性的野生瀕危或已絕滅的物種、亞種或品種，在野外建立一可永續存活的、自由活動的生物族群，該物種須被引回至其原棲地與分布範圍內，並至少有長期的經營管理。

(二).目的

再引回的目的可包括：增進物種的長期存活、在生態系內重建關鍵物種(Keystone species)、維持及恢復生物多樣性、爲全國或地方經濟提供長期經濟利益及提昇保育意識等。

三、跨部門合作

再引回計畫需要不同專業背景人士參與合作，除了政府官員外，還包括政府自然資源管理機構人員、非政府組織、財政援助單位、大學、獸醫單位、動物園、私人養殖場及/或植物園等，其範圍涵蓋各種專門的知識。這個工作的領導者必須負責協調各方參與者以及爲再引回計畫的宣導教育工作做應有的準備。

四、前置作業

(一)、生物考量

1.可行性研究及背景分析

欲再引回之物種應先確認其分類地位。除非存餘之數量不足，否則再引回物種必須和原絕滅物種屬於同亞種或同品種。此外，應調查研究再引回地區此物種個體滅絕消失之歷程及因素，若個體之分類地位有疑問時，應以分子遺傳加以確認。擬再引回種及其相近種族群內及族群間之基因變異研究也很有幫助。若該族群消失已久，則另需要其他更嚴謹的檢驗。

野生族群的現況和生物學應有詳細研究，以決定該物種的真正需求。對動物而言，這些研究應包括棲地的喜好、種內變異、對當地生態條件的適應程度、群內之組成與社會行爲、族群組成、活動範圍大小、食物與庇護的需求、覓食行爲、天敵、甚至疾病問題。對遷徒性物種而言，研究內容亦應包含其可能遷徒的地區。而植物方面，則應包含其生物性與非生物性的棲地需求、傳播的機制、繁殖生物學、共生關係(例如菌根、授粉者)及病蟲害等問題。總之，對目標物種自然史充分的了解對整個再引回計畫架構非常重要。

如有某些物種填補了再引回物種自原棲地消失後之空缺，則應加以確認。另外，了解再引回計畫對該生態系的可能影響，對確保再引回計畫的成功亦十分重要。

野放族群之建立應先以數種不同狀況加以預擬，以確認每年適當之野放數量、組成以及建立存活族所需要之時間。

族群與棲地存活力分析(population and habitat viability analysis)將有助於確認明顯的環境與族群的變數，並評估其可能互動方式，可作爲長期族群經營管理的指導。

2.過去之再引回歷史

在再引回進行之前或發展再引回方案的同時，應對相同物種或類似物種過去之再引回做深入研究，並廣泛聯絡相關專業的學者交換意見並取得經驗。

3.選擇野放地點及方式

野放地點應該是該物種曾經存活的地點。進行補充時，該地點應只有很少殘存個體；而進行再引回時，該地點應避免有該物種殘留的野生個體，以避免疾病傳播、群體的分裂及引進外來基因之干擾。在某些情形下，再引回或補充應在圍籬或地界明顯之區域內進行，但這些地區必須是在其原分布範圍之內。

保育引進應是在無法將該物種再引回到其原分布範圍內的情形下，所採取的最後手段，且在確定該引進工作對物種保育將有確切貢獻的情形下才進行。

再引回之野放區域必須確保能對物種提供長期保護。

4.再引回棲地之評估

適當棲地的提供：再引回計畫只有在再引回地點可以滿足該物種對棲地及地景的長期需求之下才能進行。該物種滅絕後自然環境可能的改變也應該被考慮在內。同樣地，相關法規、政治或文化環境的改變也可能成爲某種限制，需要加以確認評估。該地區應有足夠的能力承擔再引回族群的成長以及未來自給自足族群之負荷量。

先前導致族群衰退原因的鑑識、排除及減少：可能包括疾病、過度獵捕、過度採集、污染、毒害、外來物種的競爭或獵食者侵害、棲地喪失、早期研究管理計畫之不當影響、與本地家禽、家畜之競爭等。上述原因有些是週期性的。

野放區若因人類活動而被破壞，在實行再引回之前應先施行棲地復原計畫。

5.選擇合適的野放個體

＊野放個體最好來自野外，若有野生個體可供移置，這些個體應與原族群之基因相近且具有相似之生態特性(如形態上、生理上、行爲上或棲地偏好等)。

＊從野外或圈養族群中移出供再引回之個體，應先確保不危及這些種源族群，並保證未來再引回個體符合計畫的特殊條件且供應無虞。

＊只有在評估對野外種源族群的影響，並保證這些影響不是負面的，才可從野外種源族群移置個體。

＊若使用圈養或人工養殖的個體，則必須確保該個體乃取自按照現今生物保育原則，在遺傳上及數量上有健全管理的族群。

＊不可僅爲了擁有圈養個體就進行再引回工作，更不可將再引回工作

做爲丟棄多餘個體的方法。

＊若預定的野放個體包含政府間贈予的生物，應在出發裝運前便完成獸醫檢驗程序。

＊任何已感染非本地性或傳染性疾病者，或經檢驗呈陽性反應者，應自運送名單除名，其餘未經感染者，應等待適當的檢驗期後再加以測試，若再測試結果合格，始可運送。

＊因爲疾病感染可能在運送中發生，應注意儘量減少途中感染發生的可能性，尤其是洲際間的運送。

＊運送個體應符合接收國之檢疫單位規章且必要時應有適當之檢疫。

6.圈養個體之野放

大多數的哺乳類與鳥類都需靠幼年時的學習及經驗維持生存，牠們必須有機會藉由圈養環境中的訓練而獲得相關資訊才能在野外生活。圈養個體存活的可能性應接近野生個體的存活率。

具危險性的圈養繁殖動物(如大型肉食動物或靈長類)應確定其不至於不畏懼人類，以免日後危及人民或其家畜。

（二）社會、經濟及法規需求

＊再引回通常爲長期計畫，需長期的經濟及政策支持。

＊應進行社會經濟之研究以評估再引回計畫對當地人民之影響、花費及成本效益。

＊爲確保再引回物種能獲得長期保護，應對該地居民對於再引回計畫之態度予以評估，尤其當該物種之減少或消失歸因人爲的因素時(如過度捕獵、過度採集、棲地喪失或改變)更應如此。應讓當地社區充分了解、接受並支持再引回計畫。

＊再引回生物若因引回地點內人類活動而可能受危害，應採取具體措施以減少受害程度，若可採行之措施不足以解決問題，則應停止再引回計畫或另覓野放地。

＊計畫執行國家對再引回計畫以及相關物種之各項政策應予評估，內容包括檢視一省、一國或國際性之立法規章及頒布新措施或要求特定許可等。

＊再引回計畫的進行應有接受國或贈予國相關政府組織的授權與參與，尤其再引回計畫可能發生在邊境地區或可能跨越至其他省(州、國)時更爲重要。

＊若該再引回物種可能對任何生命或財產產生潛在威脅時，其危險性應予縮小，且應做適當的補償措施，在解決方案無效時，可以考慮移除或銷毀該野放生物。若爲遷徙物種，則應有跨國、跨省(州)性措施。

五、計畫、準備及野放階段

＊取得相關政府機關和地主的贊同以及國內和國際保育團體之配合。
＊籌組所有再引回工作各階段所需之專門技術跨領域工作群。
＊確認長期及短期成功指標，並預測計畫所需時間，作爲計畫的共識與目標。
＊確保各階段計畫都有足夠之資金。
＊設計野放前及野放後的監測計畫，使每項再引回計畫均是審慎設計的實驗，並以運用科學方法所收集之資料來檢驗方法。對於野放個體健康情形以及存活情形的監測是十分重要的，若再引回的族群其擴張速度出乎意料之外，則必須施以人爲處理。
＊對野放個體，包括兩國之間的贈予，應有適當的健康及基因檢查。再引回地區內之近親種的健康檢查，也應進行。
＊若野放個體是捕自野外，在運送前應特別留意，以確認這些個體未感染疾病或寄生蟲，且避免將這些可能缺乏免疫力的生物暴露在可能出現於野放區的帶原者或病媒中。
＊如需在野放前將個體接種疫苗，以預防當地野生個體或家畜感染地方性傳染病或流行性疾病時，應在準備階段施行，以便給予野放個體足夠時間獲得免疫力。
＊爲確保野放個體之健康情形，適當的獸醫或園藝處理安排是必要的。例如野放個體將運送至遠處或跨越國界時，更應有適當之檢疫。
＊運送生物至他國或再引回地區時，應有完備之交通運輸計畫，且應特別重視減少個體在運送過程中之緊迫。
＊決定野放策略(使野放個體適應野放區內之氣候、水土、環境等因素，包括獵食、覓食行爲訓練、群體組成、數量、野放形式和技術以及時間)。
＊建立人爲介入處理之原則。
＊發展確保各界長期支持的保育教育計畫、長期參與計畫人員的專業訓練，透過大眾傳播媒體及在當地社區所作之公共關係，並促進當地居民參與該計畫。
＊在上述各階段工作中應將野放動物之福祉列爲最高考量。

六、後續作業

＊野放後對全部(或部分)野放個體之監測十分重要，最重要是適切地選擇直接監測(如標記、遙測)或間接監測(如足跡或由其他人提供消息)。
＊應進行野放個體之族群數量、生態、行爲等研究，並研究野放個體及群體之長期適應過程。
＊進行死亡率資料之搜集和調查。

＊必要時需進行人爲處理(如食物的補充、醫療的提供或植栽的增補等工作)。
＊必要時野放計畫可以修正、重新安排或中斷。
＊需要時可持續棲地保護或復原。
＊持續包含教育及大眾傳播媒體報導等公共關係活動。
＊進行成本效益及再引回技術成功與否之評估。
＊將研究結果以科學性及一般性報告出版。

附　録

IUCN
The World Conservation Union

IUCN/SSC Guidelines For Re-Introductions

Prepared by the SSC Re-introduction Specialist Group *

Approved by the 41st Meeting of the IUCN Council, Gland Switzerland, May 1995

INTRODUCTION

These policy guidelines have been drafted by the Re-introduction Specialist Group of the IUCN's Species Survival Commission (1), in response to the increasing occurrence of re-introduction projects worldwide, and consequently, to the growing need for specific policy guidelines to help ensure that the re-introductions achieve their intended conservation benefit, and do not cause adverse side-effects of greater impact. Although IUCN developed a Position Statement on the Translocation of Living Organisms in 1987, more detailed guidelines were felt to be essential in providing more comprehensive coverage of the various factors involved in re-introduction exercises.

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

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

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

CONTEXT

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

It is important that the Guidelines are implemented in the context of IUCN's broader policies pertaining to biodiversity conservation and sustainable management of natural resources. The philosophy for environmental conservation and management of IUCN and other conservation bodies is stated in key documents such as "Caring for the Earth" and "Global Biodiversity Strategy" which cover the broad themes of the need for approaches with community involvement and participation in sustainable natural resource conservation, an overall enhanced quality of human life and the need to conserve and, where necessary, restore ecosystems. With regards to the latter, the re-introduction of a species is one specific instance of restoration where, in general, only this species is missing. Full restoration of an array of plant and animal species has rarely been tried to date.

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

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

1. DEFINITION OF TERMS

"Re-introduction": an attempt to establish a species(2) in an area which was once part of its historical range, but from which it has been extirpated or become extinct (3) ("Re-establishment" is a synonym, but implies that the re-introduction has been successful).

"Translocation": deliberate and mediated movement of wild individuals or populations from one part of their range to another.

"Re-inforcement/Supplementation": addition of individuals to an existing population of conspecifics.

"Conservation/Benign Introductions": an attempt to establish a species, for the purpose of conservation, outside its recorded distribution but within an appropriate habitat and eco-geographical area. This is a feasible conservation tool only when there is no remaining area left within a species' historic range.

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2. AIMS AND OBJECTIVES OF RE-INTRODUCTION

a. Aims:

The principle aim of any re-introduction should be to establish a viable, free-ranging population in the wild, of a species, subspecies or race, which has become globally or locally extinct, or extirpated, in the wild. It should be re-introduced within the species' former natural habitat and range and should require minimal long-term management.

b. Objectives:

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

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3. MULTIDISCIPLINARY APPROACH

A re-introduction requires a multidisciplinary approach involving a team of persons drawn from a variety of backgrounds. As well as government personnel, they may include persons from governmental natural resource management agencies; non-governmental organisations; funding bodies; universities;

veterinary institutions; zoos (and private animal breeders) and/or botanic gardens, with a full range of suitable expertise. Team leaders should be responsible for coordination between the various bodies and provision should be made for publicity and public education about the project.

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4. PRE-PROJECT ACTIVITIES

4a. BIOLOGICAL

(i) Feasibility study and background research

- An assessment should be made of the taxonomic status of individuals to be re-introduced. They should preferably be of the same subspecies or race as those which were extirpated, unless adequate numbers are not available. An investigation of historical information about the loss and fate of individuals from the re-introduction area, as well as molecular genetic studies, should be undertaken in case of doubt as to individuals' taxonomic status. A study of genetic variation within and between populations of this and related taxa can also be helpful. Special care is needed when the population has long been extinct.
- Detailed studies should be made of the status and biology of wild populations(if they exist) to determine the species' critical needs. For animals, this would include descriptions of habitat preferences, intraspecific variation and adaptations to local ecological conditions, social behaviour, group composition, home range size, shelter and food requirements, foraging and feeding behaviour, predators and diseases. For migratory species, studies should include the potential migratory areas. For plants, it would include biotic and abiotic habitat requirements, dispersal mechanisms, reproductive biology, symbiotic relationships (e.g. with mycorrhizae, pollinators), insect pests and diseases. Overall, a firm knowledge of the natural history of the species in question is crucial to the entire re-introduction scheme.
- The species, if any, that has filled the void created by the loss of the species concerned, should be determined; an understanding of the effect the re-introduced species will have on the ecosystem is important for ascertaining the success of the re-introduced population.
- The build-up of the released population should be modelled under various sets of conditions, in order to specify the optimal number and composition of individuals to be released per year and the numbers of years necessary to promote establishment of a viable population.
- A Population and Habitat Viability Analysis will aid in identifying significant environmental and population variables and assessing their

potential interactions, which would guide long-term population management.

(ii) Previous Re-introductions

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

(iii) Choice of release site and type

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

(iv) Evaluation of re-introduction site

- Availability of suitable habitat: re-introductions should only take place where the habitat and landscape requirements of the species are satisfied, and likely to be sustained for the for-seeable future. The possibility of natural habitat change since extirpation must be considered. Likewise, a change in the legal/ political or cultural environment since species extirpation needs to be ascertained and evaluated as a possible constraint. The area should have sufficient carrying capacity to sustain growth of the re-introduced population and support a viable (self-sustaining) population in the long run.
- Identification and elimination, or reduction to a sufficient level, of previous causes of decline: could include disease; over-hunting; over-collection; pollution; poisoning; competition with or predation by introduced species; habitat loss; adverse effects of earlier research or management programmes; competition with domestic livestock, which may be seasonal. Where the release site has undergone substantial degradation caused by human activity, a habitat restoration programme should be initiated before the

re-introduction is carried out.

(v) Availability of suitable release stock

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

(vi) Release of captive stock

- Most species of mammal and birds rely heavily on individual experience and learning as juveniles for their survival; they should be given the opportunity to acquire the necessary information to enable survival in the

wild, through training in their captive environment; a captive bred individual's probability of survival should approximate that of a wild counterpart.

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

4b. SOCIO-ECONOMIC AND LEGAL REQUIREMENTS

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

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5. PLANNING, PREPARATION AND RELEASE STAGES

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

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

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6. POST-RELEASE ACTIVITIES

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

Footnotes:

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

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

3 A taxon is extinct when there is no reasonable doubt that the last individual has died

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IUCN/SSC Re-introduction Specialist Group

The IUCN/SSC Re-introduction Specialist Group (RSG) is a disciplinary group (as opposed to most SSC Specialist Groups which deal with single taxonomic groups), covering a wide range of plant and animal species. The RSG has an extensive international network, a re-introduction projects database and re-introduction library. The RSG publishes a bi-annual newsletter RE-INTRODUCTION NEWS.

If you are a re-introduction practitioner or interested in re-introductions please

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世界自然保育聯盟物種生存委員會再引回指導方針

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出版：台灣省政府農林廳

台灣省特有生物研究保育中心

印刷：六桂企業有限公司

出版年月：中華民國八十六年十月

ISBN：957-02-0289-0 (平裝)