



Guidelines for Reintroduction of Animals Born or Held in Captivity

Adopted by the AZA Board of Directors in 1992

INTRODUCTION

The scientific and ethical complexity of reintroduction necessitates guidelines for those who plan, conduct, fund, regulate and publicize reintroductions. There is no shortage of guidelines; the 19 sources in the attached bibliography all propose reintroduction guidelines. However, some are contradictory.

For example, some advocate reintroduction as a humane way to deal with orphaned animals while others argue that the reintroduction of orphans poses an unjustified threat to wild populations. Some of the contradictions result from incomplete knowledge. For example, some argue that animals should be trained in survival skills before release while others suggest that such training is not cost-effective.

In such cases, the guidelines should be regarded as hypotheses that must be scientifically tested. Some guidelines may be taxonomically or situationally specific and thus resistant to generalization. For example, the recommendation that all reintroducees be individually identified may be pertinent to birds and mammals but not to invertebrates. Finally, some guidelines that emerge from emphasis on the welfare of individual animals may conflict with guidelines derived from population management.

We therefore suggest that the only real guidelines are that sincere consideration be given to all of these bibliographic sources and guidelines during the planning stages of reintroduction, and that reintroduction be regarded as science, with surveys of the pertinent literature, interdisciplinary participation, formulation of testable hypotheses and goals, thorough documentation, rapid publication of results, and review of the program by independent referees.

In addition to the bibliography, there are two recent edited collections of important papers on reintroduction. They are *Beyond Captive Breeding: Re-introducing Endangered Mammals to the Wild*, edited by J.H.W. Gipps (Oxford, Clarendon Press, 1991) and the November 1990 issue of *Endangered Species Update*, Volume 8, No. 1, edited by Suzanne R. Jones. These restate the guidelines found originally in our 19 basic sources, and add much new data and thinking to the topic. They too should be carefully consulted.

The following guidelines are keyed to their sources in the accompanying bibliography. We apologize to authors if we have misunderstood their recommendations, taken undue liberty in molding them to common wording, or omitted some that they would have included. These guidelines are intended to pertain to both reintroduction *sensu strictu* (where the species is extinct in the wild) and re-stocking (where the species still exists in the wild).

GUIDELINES FOR CONSIDERATION

Sufficient funding for completion of the reintroduction and for post-release monitoring should be reasonably assured at the outset (1, 3, 4, 5, 6, 12, 16, 17, 18). A cost-benefit analysis should show that reintroduction is the most cost-effective recovery strategy for the available funds (6, 8, 12, 14, 16, 17, 18).

Reintroduction should be used primarily to establish or reinforce a self-sustaining native wild population (1, 3, 5, 9, 12, 13, 14, 15, 17). Reintroductions to restock commercially harvestable populations, or to restock populations for recreational hunting and fishing are common, and may provide information useful for reintroductions intended to establish self-sustaining populations (1, 12).

Introductions of non-native animals to study reintroduction techniques, control agricultural pests or establish game ranches or free-ranging breeding colonies should be undertaken only with extraordinary precautions to preserve the native ecosystem and contingency plans to recapture the animals to prevent establishment of an injurious feral population (1, 6, 13, 16).

Reintroduction should not be used solely to dispose of animals surplus to a captive population, or to dispose of unplaceable "orphans". If reintroduction of unwanted surplus or orphans is politically unavoidable, then every effort should be made to release the animals in areas where they are genotypically appropriate, and to isolate them (at least initially) from wild conspecifics to protect the wild population from disease and disruption, and to protect the reintroduced animals from aggression (1, 6, 11, 12). (In view of the considerable mortality inherent in even the best planned and managed reintroduction programs, the reintroduction of orphans should not be represented as "humanitarian").

Reintroduction should proceed only in ecologically suitable areas and in appropriate habitats for the species. Normally reintroduction sites will be within the limits of the recorded distribution of the species, or subspecies if applicable (1, 3, 4, 8, 9, 10, 12, 13, 14, 16, 17, 18, 19). See (5, 9) for contrasting views.

Reintroduction should proceed in habitats where the original causes of threat, e.g. habitat destruction, habitat fragmentation, and/or over-hunting have been eliminated or ameliorated, and where there is minimal probability of serious pollution, manmade disaster, or exposure to exotic introduced predators, competitors or diseases (1, 3, 5, 6, 8, 9, 10, 12, 13, 16, 17, 19). In some cases habitat restoration may be a component of the reintroduction program (3, 12, 16, 17).

There should be extensive and early contact between people living in the reintroduction area and the reintroduction planners. Planners should try to understand (perhaps aided by scientific surveys) the needs and attitudes of local residents, should inform them of the rationale and techniques of the reintroduction, and try to gain their support for the program. Educational, employment and commercial opportunities may be appropriate as incentives (1, 3, 4, 5, 7, 8, 9, 12, 16, 17).

Conservation education should be an objective of reintroduction programs. Professional training should be associated as a means to foster long-term conservation action. Local, national and international publicity should be considered when appropriate for education (1, 12, 17).

There must be extensive and early contact with local and national regulatory agencies and the reintroduction planners. Representatives of local and national regulatory agencies might be invited to join the reintroduction management team to promote training and cooperation.

If there is an existing conspecific wild population, it should not be threatened by the reintroduction. Specifically, there should be no genetic swamping, overcrowding or disruption of ecological balances, minimal risk of disease, and minimal disturbance due to the activities of the reintroduction managers and observers (1, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 17).

If there is an existing wild population, reintroduction should proceed only when or where it is below carrying capacity, so as to avoid overcrowding and acute intraspecific aggression, or excessive interspecific competition and predation (1, 3, 5, 6, 8, 10, 11, 12, 13, 14, 17).

There should be thorough understanding of the natural history, ecology and behavior of the species in the wild, and of the behavior, physiology, and veterinary requirements of the species in captivity. Such information helps to identify the appropriate environment for the reintroduction, identify essential habitat features and critical resources (e.g. natural foods, predators, den sites), determine the appropriate numbers, social groupings (the natural social group is often recommended), ages (young animals are often recommended), sexes, and timing for reintroduction; predict mortality and reproductive levels; recognize disease and stress; and determine appropriate post-release management strategies. If the population is extinct in the wild, there must be greater reliance on generalizations from captive studies and on historical accounts of the species in the wild (1, 2, 5, 7, 8, 9, 10, 12, 13, 14, 16, 17, 18). In a crisis, where reintroduction is demonstrably the only way to preserve a habitat, it may be advisable to proceed before all such information is available.

Reintroduction should not begin until the captive population has sufficient numbers and genetic diversity to be secure (as defined by Population Viability Analysis), even if all of the reintroduced animals perish (9, 12, 13, 17). In a crisis, where reintroduction is demonstrably the only means to protect habitat, it may be advisable to proceed before the captive population is secure.

Large numbers of animals, e.g. 50-150 individuals of a vertebrate species, should be reintroduced to counter chance events affecting births and deaths, and to establish a population size necessary for normal social interactions and mating behavior. Successive cohorts may be preferable to one cohort (7, 9, 10, 16, 18). A small number of animals, or surrogates, might be released initially to test techniques and overall feasibility (3, 5, 6, 15, 16).

There should be the closest possible match of the genotype of the reintroduced animals to the genotype of the existing wild population (where one exists) or the best reconstruction of the genotype of an extinct wild population. In both cases, the wild genotype is that of the wild population from the specific geographical location of the reintroduction, so that subspecific distinctions can be maintained (1, 3, 5, 6, 7, 9, 11, 12, 16, 17, 18, 19). But see (5, 9, 12, 16) for contrasting views.

Reintroduced animals should receive stringent veterinary examination and rigorous quarantine before they are moved from the parent facility, and again before release if they are held for a substantial period in an on-site acclimatization enclosure. Reference blood samples should be banked. Reintroducees should be vaccinated against common, fatal infectious diseases. To protect the wild conspecific population and other elements of the wild ecosystem, individuals with contagious or potentially contagious diseases, and individuals with possibly genetically-

based defects should not be reintroduced (3, 4, 6, 7, 12, 14, 16, 17, 18). Wild conspecifics might also be examined and screened to establish baseline norms (4, 17).

For humane reasons, individuals with illnesses, injuries, infirmities or behavioral abnormalities that would significantly decrease their chances of survival should not be reintroduced (4, 11, 12, 14, 16, 18). Captive-born birds and mammals slated for reintroduction should be reared to avoid social imprinting or excessive dependency on humans.

When necessary, reintroduction candidates should be trained in essential behavioral skills, e.g. food recognition, food-finding, predator avoidance, shelter-seeking, locomotion, orientation and migratory traditions, and should be exposed to environmental conditions that will foster necessary physiological adaptations, e.g. coat growth for thermoregulation (1, 2, 3, 4, 5, 6, 8, 12, 14, 16). Where a wild population still exists, pre- or post-release exposure to wild-born individuals may promote training. But see (10) for evidence that pre-release training has limited effectiveness in some cases, and see (2) for possible animal welfare objections to rigorous training and acclimatization.

Reintroduction candidates should be held in enclosures at the release site for acclimatization to local environmental conditions, familiarization with landmarks, post-transport recuperation, and/or establishment of social and reproductive bonds (1, 3, 6, 8, 12, 14, 16).

There must be long-term post-release monitoring. This would include a studbook-type database on losses (deaths, disappearances), rescues and re-releases, births, and parentage. Causes of loss should be identified as specifically as possible. Injuries and illnesses should be documented as specifically as possible. Monitoring should also include information on behavior, e.g. feeding, intraspecific relationships, reactions to predators, response to climatic extremes, daily and seasonal activity cycles, spatial movements and establishment of territories, effects on other elements of the ecosystem, and interaction with humans. Interventions, e.g. post-release feeding, veterinary care, weighing, and returns of disoriented animals, should be documented (1, 3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 19). Reintroduced vertebrates should be individually and permanently identified for post-release monitoring (3, 15). When long-term post-release monitoring of individuals is not possible, there must at least be monitoring sufficient to estimate survival and reproductive success.

Post-release feeding and other sorts of life support are often recommended on humanitarian grounds, as a bridge to self-sufficiency, to maintain site fidelity, and/or as a means to maintain management control (3, 8, 9, 12, 13, 16). Specific policy should be determined in advance governing post-release feeding, veterinary care and other management support. Animal welfare concerns, and financial calculations emphasizing the costs of preparing, shipping and releasing animals, suggest that every effort must be taken to save every reintroduced animal. But the implications of natural selection, and financial calculations emphasizing labor costs, suggest that animals be allowed to perish from all but human-caused injuries and disease. The results of post-release monitoring should be used quickly to adjust reintroduction techniques so as to improve survival and reproduction, or to make the technique more cost-effective (3, 16, 17).

Reintroductions are scientifically-conducted management programs. As such, there should be a thorough advance review of the general literature on reintroduction and on previous reintroductions of related species. There should be adequate input from all relevant scientific disciplines to planning and implementation. There should be a clear and concise protocol documenting the goals and procedures of the reintroduction, deviations from which should be approved by a pre-arranged process. The protocol should also clearly delineate authority and

responsibility (individual and organizational) for all aspects of the reintroduction. Data and documentation of all aspects of project planning; financing; history, preparation and training of animals; transport; release techniques; the results of post-release monitoring; changes in attitudes and knowledge of local residents as a result of the reintroduction; and overall estimates of success must be published widely and accurately. The program should be independently refereed (1, 2, 5, 6, 8, 9, 10, 12, 15, 17, 18). The IUCN SSC Re-introduction Specialist Group and the AZA Reintroduction Advisory Group can supply expert reviewers and referees from their memberships, and should be consulted during planning stages.

Reintroductions must comply with all international and national treaties, laws, regulations and guidelines for animal care, transportation, veterinary management and quarantine, and import/export. Sufficient lead time must be allowed for administrative processing and there must be flexibility in coping with unpredictability of working with a number of (often international) regulatory bodies (1, 5, 7, 8, 9, 16, 17).

The reintroduction planners must adopt in advance a strategy and spokesperson for dealing with the media, legislators, funders and other VIPs. This recognizes the current fascination with reintroduction as a conservation tool, and the profound and widespread consequences of incorrect or unduly adverse publicity (16, 17).

There should be a contingency plan to discontinue or suspend the reintroduction if there is unanticipated mortality or an unanticipated serious problem with no immediate resolution (5, 9, 17).

SOURCES USED TO COMPILE REINTRODUCTION GUIDELINES

1. Anon. 1987. The IUCN position statement on translocation of living organisms. Gland, International Union for the Conservation of Nature.
2. Beck, B. B. 1991. Managing zoo environments for reintroduction. *Proceedings of the Annual Meeting of the American Association of Zoological Parks and Aquariums*: 436-440.
3. Brambell, M. R. 1977. Reintroduction. *International Zoo Yearbook* 17: 112-116.
4. Bush, M., Beck, B. B. In press. Medical considerations of reintroduction. In M. E. Fowler (ed), *Zoo & Wild Animal Medicine*, third edition (W. B. Saunders Company).
5. Cade, T. J. 1986. Reintroduction as a method of conservation. *Raptor Research* 5: 72-84.
6. Caldecott, J. and Kavanagh, M. 1983. Can translocation help wild primates? *Oryx* 17: 135-139.
7. Campbell, S. 1980. Is reintroduction a realistic goal? In M. E. Soule and B.A. Wilcox (eds) , *Conservation Biology* (Sinauer Associates, Inc., Sunderland, Massachusetts): 263-269.
8. Chivers, D. J. 1991. Guidelines for re-introductions: Procedures and problems. *Symposium of the Zoological Society of London* 62: 89-99.
9. Conway, W. 1986. Reintroduction and release. Unpublished paper presented at Lemur Conservation Workshop, St. Catherine's Island, Georgia.
10. Griffith, B., Scott, J. M., Carpenter, J. W. and Reed, C. 1989. Translocation as a species conservation tool: Status and strategy. *Science* 245: 477-480.
11. Harcourt, A. H. 1987. Options for unwanted or confiscated primates. *Primate Conservation* 8: 111-113.
12. Kleiman, D.G. 1989. Reintroduction of captive mammals for conservation. *BioScience* 39: 152-161.
13. Konstant, W.R. and Mittermeier, R.A. 1982. Introduction, reintroduction and translocation of Neotropical primates: Past experiences and future possibilities. *International Zoo Yearbook* 22: 69-77.
14. Anon. 1992. *Welfare guidelines for the re-introduction of captive bred mammals to the wild*. Hertfordshire, U.K., Universities Federation for Animal Welfare.
15. Scott, J. M. and Carpenter, J. W. 1987. Release of captive-reared or translocated endangered birds: What do we need to know? *Auk* 104: 544-545.
16. Stanley Price, M. 1989. *Animal Re-introductions-the Arabian Oryx in Oman*. (Cambridge, Cambridge University Press).
17. Stanley Price, M. 1991. Draft guidelines for reintroductions. Unpublished memorandum to members of IUCN SSC Reintroductions Specialist Group.

18. Wemmer, C. W. and Derrickson, S, 1987. Reintroduction: The zoobiologists' dream. *Annual Proceedings of the American Association of Zoological Parks and Aquariums*: 48-65.
19. Wirth, R. 1990. Reintroduction - Sometimes a conservation problem? *International Zoo News* 37: 13-17.

IMPORTANT RECENT EDITED COLLECTIONS

Gipps, J.H.W. (ed) .1991. *Beyond Captive Breeding: Re-introducing Endangered Mammals to the Wild*. Oxford, Clarendon Press.

Jones, S.(ed). 1990. *Endangered Species Update* 8(l).