IUCN guidelines on responsible translocation of displaced organisms

Julie Sherman, Vivek Menon, Richard Kock, Tony King, Sonja Luz, Ashraf N.V.K., Pritpal Soorae and Axel Moehrenschlager

CONSERVATION TRANSLOCATION SPECIALIST GROUP

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Mark Stanley Price and IUCN SSC Conservation Practice - a dedication

Mark SP (1947-2022) was a great friend and mentor to many of us, past and present, especially those working voluntarily within the Species Survival Commission. He was a renowned biologist and conservationist, “the” pioneer in establishing academic principles leading to practical solutions in critical conservation, including translocation interventions requiring strategic thinking such as introductions/reintroductions at the species level. Extinction is final but through direct action, many species have been brought back from the brink by securing their remnant populations, in captivity or within sanctuaries, to be later re-established in suitable habitat, enabling expansion and recovery. These initiatives involved mostly charismatic mammals and birds, at least in the early days, and this contributed to the popularity of conservation and brought global interest and funding. Happily, the interest in conservation translocations has broadened now and has led to a movement with expertise in securing, translocating and ultimately reinforcing populations on the brink across all taxa. With larger vertebrates, this has been achieved largely through the development of safe, effective translocation science and safe establishment of reinforcing populations in secure habitats and/or temporary environments. Mark was a leader in developing essential principles for a rationale to underpin this process. It is a challenge to think through the conditions under which direct, physical human interventions with species can be justified. Animal capture, captive management and breeding, translocations and reintroductions are fraught with risks and dangers to the species involved and more so with those critically endangered. In these cases, where every life constitutes a rare and unique genetic memory of a once abundant and successful species, a single loss can be catastrophic. Mark was extremely wise in his perceptions of science and policy and had the benefit of practical experience with one of the earliest efforts, with the reintroduction of Arabian oryx into Oman. He knew that a simple clear message was the only one likely to be followed and in the first Reintroduction guideline of the IUCN SSC, the messaging was kept simple. He believed that the process, of placing individuals of any species, now extinct in nature, back into natural habitat was only justified where the conditions that led to the extinction had been resolved (or were at least in a state worth attempting given the adaptive capacities of the species). An excellent tenet to work from. Without this cautionary approach, resources would have been wasted. When it comes to the conservation actions of saving species and of releasing individuals back into the wild, passion is often the driver of activity, and there are high levels of volunteerism and dedication, but sometimes common sense and scientific evidence for actions are absent. Efforts can be fruitless and even damaging to individuals involved or to the species and biotic communities. Again, Mark was a stickler for evidence-based science being applied but not to the degree where there was inaction for fear of the unknown. He knew that “learning through doing” was probably the only way of getting to any goal in reintroduction science. It is an accolade to Mark that there was general acceptance by international and national conservation bodies and authorities for adopting reintroduction guidelines into national legislation. The establishment of the specialist group for Reintroduction was a major legacy of Mark’s work in this area (1988-2000) and it has evolved into the Conservation Translocation Specialist Group (CTSG). CTSG works on more specific guidelines for metapopulation management, reinforcement and resolving conflict issues. This guideline is the latest in a series, recognising the complexity of the modern world and how wildlife survives within it, mostly between the human spaces. Inevitably, wildlife comes into contact with well- and not-so-well-meaning humans, resulting in wild organisms being commonly captured and held, sometimes naively, sometimes for exploitative reasons, and then often released haphazardly. Affected species range from common to rare, with haphazard releases occurring at a huge scale globally, often involving spatially displaced, rescued or confiscated wild individuals. This is both a cost and opportunity to conservation. Mark understood this, even in his early days, and recognised that there was a need for guidance to manage conservation in an imperfect world. It is fitting for us to dedicate this latest practical guidance, in a growing and important area of conservation science, to Mark.

Executive summary

<u>Problem statement</u>

Humans displace and irresponsibly release a large number of organisms due to conflicts, legal and illegal trade, infrastructure development, agriculture, natural resource extraction and other human activities. Organisms are also displaced by climate change and disasters both natural and human generated. Irresponsible translocations pose significant health and welfare, disease, genetic, and behavioural risks to wild organisms, ecosystems, and humans, as well as risks to the health and welfare of released individuals.

<u>Opportunity statement</u>

Displaced organisms are a potential source of candidates for responsible releases to benefit species and ecosystem conservation. Beyond conservation potential, additional opportunities exist to encourage and improve responsible translocations of displaced organisms that maximise their well-being while preventing serious risks to wild organisms, ecosystems, and humans.

Displaced organisms are individuals and groups of animals, plants, or fungi that have been recovered from legal or illegal trade, driven from their habitats through habitat destruction or human-wildlife conflicts, displaced or incapacitated by catastrophic events (fires, floods, and extreme weather events) or climate change, or captured or collected by humans. The full scale of irresponsibly translocated organisms is difficult to measure as most are unrecorded. Solely from illegal trade confiscations, many thousands of individuals are released each year, often without any health or disease screening, and in many cases into habitats where they are exotic and likely invasive (Rivera et al., 2021). In some island nations, invasive species now outnumber indigenous species due to a long legacy of irresponsible translocations (e.g., Stroh et al., 2023). Habitat impacts and human-wildlife conflicts have resulted in translocations that put released individuals, wild conspecifics and other indigenous species, and humans at risk (for example: Devan-Song et al., 2016; Fernando et al., 2012). Improving decision-making, planning, and management of displaced organisms can help avoid these serious risks and maximise opportunities for responsible translocations.

It is possible for some displaced organisms to be part of responsible translocations that follow the precautionary principle, meaning that they pose low risks (i.e. minimal consequence and likelihood) that the released organisms and their offspring produced in the wild will harm the genetics, social functions, behaviour, health, or conservation of wild conspecifics, or harm other indigenous wildlife, ecosystems, or humans (Beck et al., 2007; IUCN, 2007). Responsible translocations follow the 2013 *IUCN Guidelines for reintroduction and other conservation translocations* (IUCN, 2013) by using expert-driven pre-release assessments that confirm translocation would be ecologically sound and low risk compared to other management options for the individuals. Responsible translocations are based on pre-release assessments to identify suitable habitat, consider conservation risks to wild conspecifics and the ecosystem, monitor and minimise risks to health and welfare of conspecifics and released individuals, address or manage threats to the taxon in the release habitat, and avoid or manage risks to human communities. Responsible translocations conduct post-release monitoring of released individuals and recipient wild populations wherever possible and apply adaptive management actions as necessary.

Although translocation can appear a simple solution to the problem of what to do with displaced organisms, and can attract donors and public attention, irresponsible translocations undertaken without consideration of likely ecological impacts can lead to serious negative outcomes. Irresponsible translocations of displaced organisms have caused significant harm to wildlife, ecosystems, and humans. The acceleration of species declines and the scale of irresponsible translocations - including into areas of biological significance - underscore the importance of a precautionary approach to translocation that avoids harm and maximises conservation benefits. Translocations of exotic invasive species have caused hundreds of species and local population extinctions and massive economic losses, costing countries billions of dollars annually (e.g., Liu et al., 2013; Simberloff et al., 2013), and were recognised as a major cause of species decline in the 2019 Global Assessment of Biodiversity and Ecosystem Services (IPBES, 2019). Organisms translocated to avoid human-wildlife conflict often fail to survive or thrive, or leave release areas, causing further conflicts and frequently end up being killed (e.g., Boast et al., 2016; Mompoloki et al., 2021).

Most animals and plants translocated after being in contact with humans or confined with other wildlife or domestic plants and animals, have been exposed to pathogens that may be novel to them, and which they can transmit to wild populations. Pathogens carried by wildlife species that were introduced through human contact with, or movement of, wild animals and plants, have been implicated in species extinctions and severe local population declines (for example: Berry et al., 2015; Lips, 2016). Translocation using plant potting material with infections or parasites can likewise result in introduction of alien species (e.g., Fahselt, 2007).

Wildlife populations can be harmed by the addition of translocated individuals that cause social disruption or increased competition for limited resources, leading to physical harm or death of conspecifics, released individuals, and other wildlife (e.g., Maude et al., 2018). Releasing individuals that are from a different subspecies, variety or strain, or are a behaviourally or culturally distinct population from the recipient wild population can introduce hybridisation, harmful genetic issues, or problematic behaviours into that recipient wild population (Yan et al., 2018). Translocation of individuals that are ill-equipped to survive and thrive in the wild, or are released into unsuitable habitats, may result in lowered breeding success of wild populations and released individuals, and can lead to suffering and death of released individuals and wild conspecifics (e.g. Grundmann, 2006).

These guidelines are designed to help users determine whether displaced organisms are appropriate candidates for responsible translocation, and what to do to ensure responsible translocations of suitable candidates. This document complements existing guidance in the IUCN *Guidelines for Reintroduction and Other Conservation Translocations* (IUCN, 2013), *Guidelines for the management of confiscated, live organisms* (IUCN, 2019), and *Guidelines for human-wildlife conflict and coexistence* (IUCN 2023), and the World Organisation for Animal Health (WOAH) *Guidelines for Addressing Disease Risks in Wildlife Trade* (WOAH 2024) by providing information and resources to identify suitable circumstances for responsible translocation of displaced organisms, and to plan and implement these translocations where appropriate. This document focuses on organisms that have already been displaced – namely individuals that have been captured, kept or cultivated, driven from their habitats by human actions, injured, incapacitated or displaced by natural events or humans. The guidelines presented here do not cover mitigation translocations (planned movements of entire wildlife populations to enable development or other land uses), assisted colonisations (planned and managed movement of organisms outside their species range to aid the species in adapting to climate changes), or translocations for primarily economic purposes, such as biological controls for pests, tourism, or hunting/fishing purposes. These guidelines do not address individuals born or bred in captivity, those captured from the wild to serve as founders of captive or translocated populations, or free-ranging (not displaced) wild organisms.

Responsible translocations have low risks and can provide potential benefits to wildlife, ecosystems, and human communities. Although it is impossible to avoid all risk in translocation, the precautionary principle stipulates that proposed translocations that could pose more than minimal (low) risks to wild conspecifics, other wildlife, ecosystems, humans, or high risk to released individuals' welfare should not proceed, and alternative solutions for the displaced organisms should be pursued instead. Assessments of the target taxon, conspecific populations and interacting taxa, and the release habitat do not necessarily require that new studies be undertaken. In many instances, the relevant information may be sourced from existing published or unpublished literature and the knowledge of local species and ecosystem experts. Release candidates for responsible translocations are genetically suitable, adequately rehabilitated individuals that have passed appropriate health evaluations and disease-risk screening and exhibit age-appropriate wild behaviours. In the case of plants, responsible translocations use genetically suitable individuals that have passed phytosanitary and viability screening before planting in the wild. Where no suitably qualified veterinarians with species expertise are available locally, a national or international veterinarian with species expertise is needed to advise and monitor any interventions (either remotely or in person), laboratory work and other measures around disease and health conducted by local care providers.

Risk is defined as the likelihood of an outcome multiplied by the severity of consequences from that outcome. Because some consequences can be catastrophic, such as infection with a lethal disease, hybridisation, or harm to survival or breeding of wild conspecifics, the risk can be high even when the likelihood is low. Where there is uncertainty about the risks of a translocation, or there is not enough data to reliably determine that a translocation presents low risks, per the precautionary principle it should be assumed to present high risks. In such cases, alternative solutions should be pursued in lieu of translocation.

Determining if displaced organisms can be responsibly translocated requires answering key questions about the ecological need and justification for the translocation and any risks of ecological harm, the taxonomic identification, conservation status, source, health and welfare, genetic suitability and behavioural competence or propagation potential of the displaced individuals, and collating recent information on taxon-specific conservation translocation programmes, suitable release habitats, translocation methodology and post-release monitoring and support. All translocations require consultation with local communities and compliance with any applicable local, national and international laws, policies and conventions, e.g. the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) prior to release.

Organisms that have not been precisely identified or are not indigenous to the region where displaced cannot be responsibly released locally, but instead can be transferred to a conservation translocation programme in the region of origin if such exists. Wherever possible, displaced individuals from species or subspecies identified as threatened with extinction should be expeditiously transferred into the care of species-specific conservation translocation programmes, or species-specific conservation programmes that have capacity and resources to rehabilitate and potentially translocate them, including any necessary pre-release training or acclimatisation.

All displaced individuals that have been held, cultivated, or transported by humans, or confined with other wildlife, domesticated animals, or domestic plants, need to be assessed for health, injuries and pathogens of concern, and genetic suitability if of unknown provenance before they can be considered for translocation. Wild animals held by humans for more than a month should be assessed for behavioural suitability and acclimatisation to humans to determine if they need rehabilitation prior to translocation.

If analyses show the taxa would benefit from a conservation translocation programme and recent studies show there are suitable release habitats, individuals that are healthy (and behaviourally suitable in the case of animals) and pass appropriate disease screening by a suitably qualified veterinarian with expertise in the species concerned, can be translocated into habitats within their range. It is important that any potential release habitats have been carefully assessed to determine that translocations are not likely to present medium or high risks to resident conspecific populations, other wildlife, the ecosystem, or humans. Where export and transboundary movement are needed to bring the translocation candidates to the release habitat, pre-screening must include a health check by a government-certified official veterinarian or plant health specialist.

Wild organisms temporarily displaced from a known home range or local area due to weather events or other disasters, can be rescued and translocated back into or as close to their home range as possible without undergoing behavioural rehabilitation. Similarly, wildlife trapped in wells or other human infrastructure in or near their home range can be freed and released in place without behavioural rehabilitation, following assessment by a suitably qualified veterinarian for health and injuries.

Dependent young animals “rescued” because they were encountered alone are generally not abandoned and should be returned to their original location and monitored remotely, so their parents will continue to feed them. Local wildlife organisations can assist with these attempts. Dependent young animals that cannot be reunited with family will need species-appropriate rehabilitation to determine if they can later be suitable translocation candidates. In all cases, wild organisms should be handled and transported using appropriate sanitary and mitigation measures, such as gloves, masks, and sanitation protocols, to prevent transfer of pathogenic agents.

Rescued displaced individuals are often taken to rescue centres or other facilities where they could be in contact with or confined with other wildlife or plants prior to translocation to a natural habitat. These individuals need to be evaluated for diseases of concern by a suitably qualified veterinarian or plant health specialist to ensure they are healthy and test negative for infections and diseases of concern, deemed behaviourally competent by an expert in the species’ wild behaviour, and their taxonomic identity confirmed.

In situations involving human-wildlife conflicts, preventive actions and mitigation measures are the preferred solution. Prevention is generally less costly and more effective in the long term. Priority should be given to working with indigenous landowners and users, local communities, and land managers to find solutions for protecting wild organisms in their natural habitats rather than removing them. If the individuals are already displaced or captured, releasing them back into or near their home range is most likely to have conservation benefits for the species in the wild, and to avoid harms to wild conspecifics and ecosystems. Prior to any translocation back into their home range or local area, efforts should be made to mitigate the conflict issues in order to prevent the animals becoming displaced again. Displaced individuals that have habitually preyed on livestock and humans can potentially be translocated to identified suitable habitats if assessments show this would have low risk of negative impacts to the resident conspecifics, other wildlife, the ecosystem, and humans.

Following the steps in this guidance, attempts can be made to maximise the conservation benefit of translocations of displaced organisms. This can most likely be achieved by incorporating the displaced organism into an existing species conservation translocation or conservation breeding programme, where available. Otherwise, conservation benefit can often be maximised by selecting suitable release sites within the species range where wild populations have disappeared, are present but below the threshold for viability, are locally threatened due to isolation and lack of opportunities for natural immigration or gene exchange, or where the translocation would facilitate improved conservation management of the release area that would not likely occur otherwise.

Where responsible translocation is not possible, displaced organisms may still contribute to existing conservation translocation programmes through breeding, or to other responsible translocation programmes by being part of managed translocations in controlled sites used to gather better evidence on risks to the species' welfare, survival and breeding to see if larger-scale translocations into natural habitats are feasible. Where responsible translocation is not feasible, it may be possible to incorporate individuals into education collections at reputable sanctuaries, zoos and aquariums, or botanical gardens with high animal care, health and welfare standards.

Gibbon rescue © CWRC Subhamoy

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Key terms and acronyms

Key terms

Responsible translocation	Translocations that maximise health and welfare of released organisms, and avoid medium or high risks to resident conspecifics, other wildlife, ecosystems, and humans. These translocations follow the precautionary principle, meaning that they pose low risk that released organisms and their offspring born in the wild will cause harm to resident conspecifics, other wildlife, ecosystems, or to humans. Responsible translocations adhere to the *IUCN Guidelines for reintroduction and other conservation translocations*.
Irresponsible translocation	Any translocation that does not follow precautionary principles and poses medium or high risk to wild conspecifics, other wildlife, ecosystems, humans.

Animal	Any organism of the animal kingdom, including mammals, birds, reptiles, amphibians, fish, sponges, corals, and all other fauna.
Captivity	Any situation in which a wild organism is managed by humans in a spatially restricted environment.
Certified veterinarian	Government registered veterinarian who can sign off a shipment of live animals for export as healthy. This person may not be strictly qualified or experienced to assess the health of non-domestic species but is still legally required to do this.
Conservation translocation	The intentional movement and release of a living organism where the primary objective is a conservation benefit: this will usually involve improving the conservation status of the focal species locally or globally, and/or restoring natural ecosystem functions or processes (IUCN/SSC, 2013).
Culture (of an animal population)	Information or behaviour common within an individual animal group or population that is shared among group members through some form of social learning (Brakes et al., 2019).
Disease	A disorder (illness) in an organism's structure or functional systems.
Disease mitigation measures	Measures taken to mitigate sanitary and phytosanitary risks. Mitigation measures include vaccinations and tools to prevent infection transfer such as masks and gloves.
Displaced organism	An organism that has been recovered from legal or illegal trade, driven from its habitats through human-driven land-use changes or conflict with humans, displaced or incapacitated by catastrophic events (such as fires, floods, and extreme weather events) or climate change, or captured, restrained, or taken from their habitat by humans.
Domesticated animal	Any animal that has been selectively bred to live alongside humans. This includes pets, livestock, and any other animal that is genetically distinct from wild ancestors due to selective breeding by humans.
Ex-situ	Occurring outside the native habitat of the taxon.
Feral animal	Any domesticated animal that is living in the wild without human management.

Key terms

Funga	A term for the kingdom of fungi, used in conjunction with "fauna" and "flora" to denote the kingdoms of animals, plants, and fungi (IUCN SSC, 2021).
Fungi	Any organism (fungus) of the fungi kingdom.
Health	The result of interacting biological, social, and environmental factors that in combination determine an individual animal, plant or fungus's capacity to cope with change, as measured by the characteristics of the individual and its ecosystem that affect its vulnerability and resilience. (Stephen, 2014). Health includes the physical and mental condition of the individual as well as external factors that determine its ability to thrive.
Hybrid	The offspring of two distinct species, subspecies, varieties, or strains.
In situ	Occurring within the native habitat of the taxon.
Indigenous (or native) species	A species, subspecies, or lower taxon occurring within its present or historical natural range and dispersal potential (i.e. within the range it occupies naturally or could occupy without direct or indirect introduction or care by humans.) (IUCN, 2000).
Infection	The invasion and multiplication of disease-causing or potentially disease-causing organisms (parasites, viruses, bacteria, or other microorganisms).
Infectious Disease	A disorder (illness) in an organism's structure or functional systems caused by infection from a communicable pathogen.
Livestock	Any animals managed and bred by humans for utility, such as food or other animals products, or use in transportation or labour (generally excludes companion animals and specially trained working dogs such as assistance and herding dogs).
Non-native	A species, subspecies or lower taxon that is not indigenous to the area in which it is found, rescued, or seized.
Notifiable infection or disease	Any infection or disease that is required to be reported to public or animal health authorities if detected.
Organism	A member of a species, subspecies or lower taxon, and includes any part, gametes, seeds, eggs, or propagules of such species that might survive and subsequently reproduce (IUCN/SSC 2013, after Convention on Biological Diversity Decision VI/23, *http://www.cbd.int/decision/cop/?id=7197*).
Outplanting	The placement of translocated plants in the release site.
Parasite	An organism that relies on another species for survival; the host organism does not benefit from the relationship, and may suffer negative effects including possible infection and disease.
Pathogen or pathogenic agent	An organism that causes disease in the host species.

Key terms

Peridomestic wildlife	Wild animals living in and around human habitation (Kock & Caceres-Escobar, 2022).
Phytosanitary	Of or relating to plant health and disease.
Phytosanitary measures	Measure taken to prevent injury, disease, pests, or contamination of live plants.
Plant	Any organism of the plant kingdom.
Potting medium	The substrate (soil, sand, rocks, moss, bark chips, etc.) in which plant roots, seeds or other plant parts are kept.
Qualified veterinarian	A professional with appropriate education and a registration or license issued by the relevant veterinary statutory body of Nation to practice veterinary medicine (WOAH, 2023). For the purposes of wildlife health and disease specifically, there is not a single global standard qualification - only some specialty registrations and qualifications in some countries or regions - that describes a "suitably qualified" wildlife veterinarian in the context of these guidelines.
Recipient population	A wild conspecific population that a translocated organism is released into.
Recipient habitat, environment, or area	The surrounding environment of the specific site that translocated organisms are released into (see IUCN/SSC, 2013, p.18).
Recipient site	The specific location where a translocated organism is released (see IUCN/SSC, 2013, p.18).
Rehabilitation	The process by which captive animals are treated for medical and physical disabilities until they regain health, are helped to acquire natural social and ecological skills, and are weaned from human contact and dependence, such that they can survive independently (or with greater independence) in the wild (Beck et al., 2007).
Reinforcement	The intentional movement and release of an organism into an existing population of conspecifics. Reinforcement aims to enhance population viability, for instance by increasing population size, by increasing genetic diversity, or by increasing the representation of specific demographic groups or stages (IUCN/SSC, 2013).
Reintroduction	The intentional movement and release of an organism inside its indigenous range from which it has disappeared. Reintroduction aims to re-establish a viable population of the focal species within its indigenous range (IUCN/SSC, 2013).
Release	The act of placing or otherwise releasing the translocated organism into the recipient site.
Release habitat, area, or environment	The habitat or area in which the release location is situated (see IUCN/SSC, 2013, p.18).
Release site	See "Recipient site". The specific location within the recipient area where a translocated organism is released.

Key terms

Sanitary	Of or relating to the health and disease of live humans and non-human animals.
Sanitary measures	Measures to protect wildlife (animals, plants, fungi), livestock, domestic animals, and people from infection, disease, and pests.
Semi-wild habitat	A site where translocated wildlife is under some level of human management in a natural environment that is physically separated from the habitat of wild conspecifics. An example is islands where translocated animals can range freely within the confines of the habitat but cannot reach mainland areas inhabited by conspecifics.
Soft release	A managed release that provides assistance to released individuals to help them adapt to wild conditions, such as supplemental feeding and protection from predation.
Source population	The population an individual most recently was part of, meaning the group of animals it was transported or housed with during confiscation or captivity, or the wild population it was captured from.
Strain	A genetic variant or subtype of microorganism, such as fungi, virus, or bacteria.
Symbiont	An organism that has a beneficial, dependent relationship with another taxon in its environment.
Synanthropic wildlife	Animals that are free living, but that have adapted behaviourally and/or genetically over generations to living primarily alongside humans and in human landscapes, such as agriculture, infrastructure, or housing (Kock & Caceres-Escobar, 2022).
Temporarily displaced organism	A wild organism that has been displaced temporarily within or near its home range (such as due to extreme weather, fire, or caught in a snare/trap, well or other human structure) but, if found to be healthy, can be returned to that same home range or released where it was found.
Translocation	Any human-mediated movement of living organisms from one area, with release in another area, regardless of the distance, or lack thereof, between the area where an organism is captured/removed and the area where it is released (IUCN/SSC, 2013).
Variety	The taxonomic rank below subspecies in a plant.
Welfare	An organism's state of physical, psychological, and behavioural wellness and its quality of life. Welfare is comprised of the organism's nutrition, physical environment, health, behavioural interactions, and mental state (Mellor et al., 2020) that together enable an individual to thrive. The term "welfare" is generally applied only to animals.
Wildlife	Any free-ranging, live microorganism or non-domesticated organism other than humans. This includes free ranging invasive species or feral animals and plants that may have originated from domesticated individuals. However, feral and domesticated species are not considered indigenous species in these guidelines.
Zoonotic disease or Zoonosis	Any disease or infection that is naturally transmissible from vertebrate animals to humans and vice versa.

Acronyms

CABI	Commonwealth Agricultural Bureaux International
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CPSG	IUCN SSC Conservation Planning Specialist Group
CTSG	IUCN SSC Conservation Translocation Specialist Group
DRA	Disease Risk Analysis
FAO	Food and Agriculture Organization of the United Nations
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IUCN	International Union for Conservation of Nature
NGO	Non-governmental organization
WOAH	World Organisation for Animal Health, formerly the Office International des Epizooties (OIE)
PRM	Post-release monitoring
SSC	IUCN Species Survival Commission
WHO	World Health Organization
WTO	World Trade Organization

I. Statement of need

Biodiversity loss and species extinctions have escalated rapidly over the last two centuries (Ceballos et al., 2015; WWF, 2020). The earth is now considered to be undergoing its sixth mass extinction event, driven by human actions resulting in severe habitat loss and degradation (Ceballos et al., 2015; Ceballos et al., 2017; Cowie et al., 2022). Approximately one million species are now at risk of extinction (IPBES, 2019). Ecosystems have experienced similar levels of human-induced declines, with 75% of land surfaces significantly altered by human activities, and 66% of oceans impacted (IPBES, 2019). By far the greatest impact is from land transformation for agriculture and livestock, with livestock and humans comprising 96% of global mammal biomass and domesticated poultry comprising 70% of global bird biomass (Bar-On et al., 2018). Land- use changes and overexploitation of terrestrial, freshwater and marine species are the primary drivers of species declines and extinctions, while invasive alien species, and climate change and related natural disasters escalate risks to wild fauna and flora and humans (Bradshaw, 2020; IPBES, 2019). These declines in biodiversity and natural ecosystem functions have direct negative effects on human lives, well-being and economies: 23% of lands are already experiencing decreased productivity; the loss of pollinator species puts up to US$ 577 billion worth of crop production at risk, insect extinctions jeopardise the myriad ecosystem services on which humans depend; and at least 33% of fish stocks are exploited at levels the species cannot sustain (Cardoso et al., 2020; IPBES, 2019). Addressing these myriad challenges requires scaling up conservation interventions to protect all remaining species and natural habitats and restoring ecosystem functions wherever possible.

The global changes confronting ecosystems and wildlife can also result in individuals and groups of organisms being displaced. Organisms are displaced in many situations, namely when they are driven from their habitats by conflict or interaction with humans or by expansion of human populations and activities, displaced by climate change or disasters, seized from illegal and unsustainable trade, orphaned or otherwise affected by hunting, injured by humans, held by private owners, or sold as pets. The scale of wildlife displacement is massive: Millions of live animals and plants are seized annually from international illegal trade alone (Bergman, 2009; D'Cruze & Macdonald, 2016; Rivera et al., 2021; UNODC, 2020), and so many have been displaced by human-driven land-use changes that livestock breeds account for 96% of mammal biomass on earth (Bar-On et al., 2018). The global human food production system is a leading cause of this biodiversity loss (Benton et al., 2021). Food system effects including conversion of natural ecosystems, planting of monocultures, and introduction of alien species directly and indirectly displace wild indigenous organisms and destroy, deteriorate, and fragment their natural habitats.

These guidelines address the circumstances under which translocation, the human movement of wild animals and plants from one place for release in another, can be responsibly used for displaced organisms. Conservation translocations - human-mediated movements of organisms which seek to benefit wild populations of the translocated species or the ecosystems they occupy (IUCN/SSC, 2013) - can be a potential long-term solution for some displaced individuals. Translocations can also be used to restore species of cultural significance and for religious purposes. However, translocation of displaced individuals is used irresponsibly in some cases, such as in the release of unwanted pets, exotic species, unidentified species, or release of individuals that have not been appropriately assessed for infectious disease risks or that may cause social disruptions and competition into viable wild populations. Irresponsible translocations have contributed significantly to the loss of biodiversity through introduction and establishment of alien invasives. For example, in Britain and Ireland exotic species of plants now outnumber indigenous species (Stroh et al., 2023). Other negative outcomes from translocations of displaced organisms include the spread of communicable disease to wild populations (e.g., Lips, 2016; Scheele et al., 2019; WWF, 2020), negative genetic, behavioural or environmental impacts to wild populations (Banes et al., 2016; Fahselt, 2007; Liu et al., 2015; Maude et al., 2018), and translocated animals being killed by humans (e.g., Fernando et al., 2012; Mompoloki et al., 2021), returning to capture sites, or causing conflict in new areas (e.g., Boast et al., 2016; Goodrich, 2010; Sherman et al., 2021).

These guidelines focus on animals, plants, and fungi that have already been displaced by or are currently being directly affected by conflict with humans and climatic events such as extreme heat or cold, or disasters such as fire or floods. Translocations that pre-emptively move wild organisms that are not yet displaced, including moving rare species from areas slated for development (mitigation translocations) or expected to be negatively affected by climate change are addressed in the *IUCN Guidelines for Reintroduction and Other Conservation Translocations* (IUCN/SSC, 2013), and in the case of animals considered to be at risk of conflict with humans, in the *IUCN SSC Guidelines for human-wildlife conflict and coexistence* (IUCN, 2023).

In the face of the urgent need to maintain biodiversity, prevent species decline and ensure the functionality of ecosystems at all scales, there are opportunities for displaced organisms, especially individuals of rare species, to be part of responsible conservation translocations or conservation breeding programmes that benefit species populations and ecosystems. Additionally, some displaced individuals can be responsibly translocated without harming wildlife, ecosystems, or humans. There are also large numbers of animals and plants translocated irresponsibly every year that have negative effects on wildlife, ecosystems, and humans. Decision-making, planning, and implementation for translocation of displaced organisms can be improved to maximise opportunities for responsible translocations that avoid medium or high risks to wild conspecifics, other wildlife, ecosystems, and humans. This document provides guidance on how to determine whether displaced organisms are appropriate candidates for responsible translocation, and what to do and what not to do to ensure responsible translocations of suitable candidates. This document also provides general advice and resources to facilitate humane solutions for organisms that cannot be part of responsible translocations.

Leopard in a leg hold trap © Jose Louies

II. How these guidelines aim to improve responsible translocations of displaced organisms

These guidelines are designed to help all stakeholders determine whether and how displaced individuals or groups of individuals could contribute to existing conservation translocation programmes. Where contribution to existing conservation translocation programmes is not feasible, these guidelines assist stakeholders in evaluating whether and how they can be responsibly translocated. These guidelines also identify circumstances where translocations should not be undertaken because they would pose medium or high risks to wild conspecifics, other wildlife, ecosystems, or humans. The guidelines provide information and direct stakeholders to resources that can assist in determining appropriate solutions for individuals that cannot be responsibly translocated.

Rescued and translocated orchid *(Paphiopedilum hirsutissimum)* © Hong Liu

Situations covered in these guidelines

These guidelines address displaced organisms. Organisms are considered displaced if they are recovered from legal or illegal and unsustainable trade, driven from their habitats through human-driven land-use changes, conflict with humans, displaced or incapacitated by catastrophic events (such as fires, floods, and extreme weather events), climate change, or when they have been captured or collected from their habitat (Figure 1).

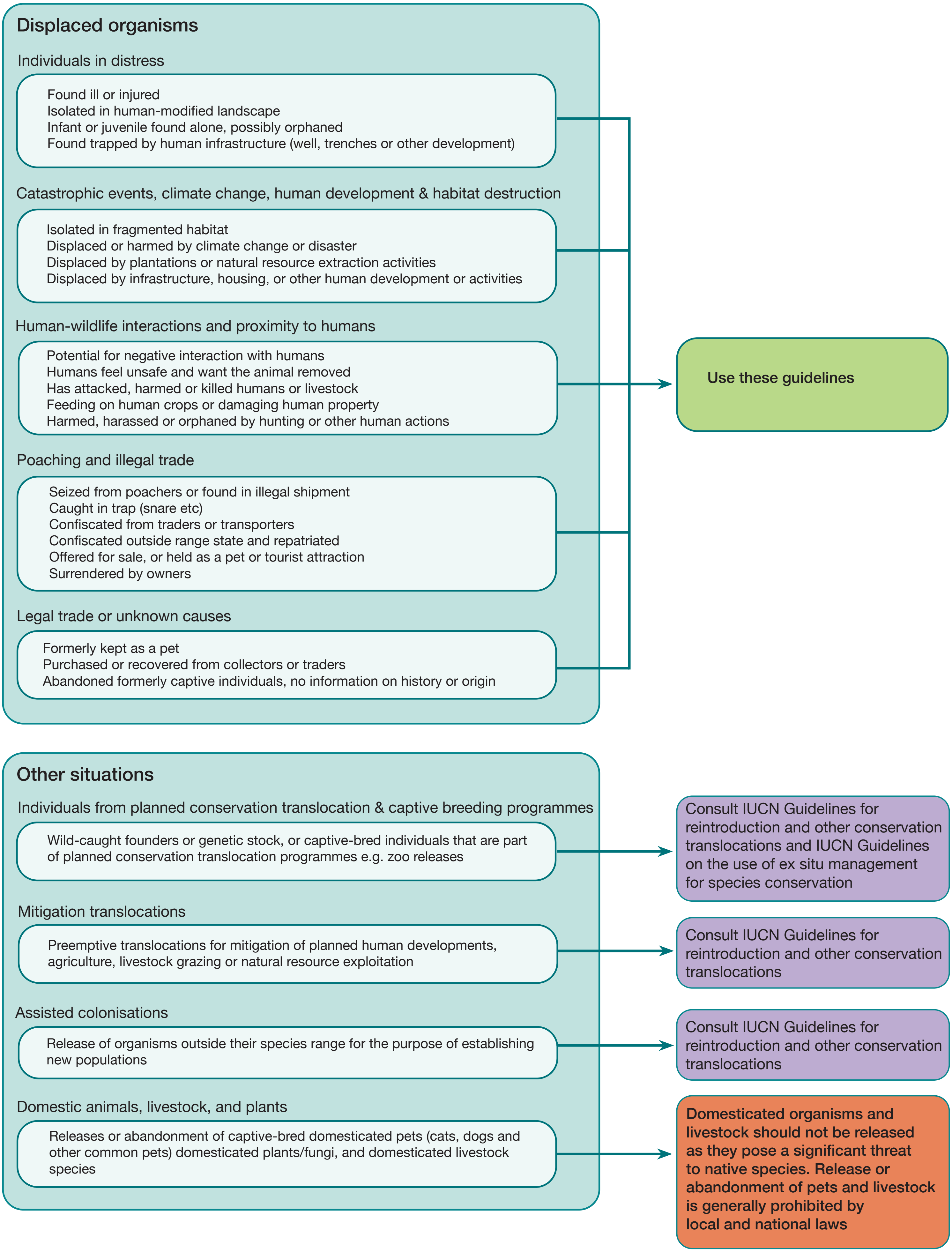


Figure 1.
Definitions of displaced organisms, other categories of translocated organisms, and related IUCN guidance documents. Source: Prepared by the report authors.

Confiscated, rehabilitated and other displaced organisms are not covered under the *IUCN Guidelines for Reintroduction and Other Conservation Translocations* (IUCN/SSC, 2013). While there are IUCN guidelines and a CITES resolution that address management of confiscated organisms (CITES, 2016; Maddison, 2019) and IUCN guidelines on captive-bred organisms (IUCN/SSC, 2014), this document builds on their guidance and provides additional decision-making support for whether and how displaced organisms can be part of responsible translocations. These guidelines also assist decision-makers and translocation practitioners to consider how displaced organisms can contribute to existing or planned conservation translocation programmes, or to conduct responsible translocations for non-conservation purposes (such as enhancing cultural values or tradition) that avoid harm to wild conspecifics, other wildlife, ecosystems, and humans.

Surviving confiscated birds are released into the wild following a health assessment
© FLIGHT

Many situations involving displaced organisms are complex and contain significant unknowns, and decision makers, practitioners and donors may be unsure whether or not their situations meet the standards in the *Guidelines for Reintroduction and Other Conservation Translocations* (IUCN/SSC, 2013), and what resources to consult for more details. This document complements existing guidelines that outline the decision-making process for placement of confiscated organisms, addressing human-wildlife conflict, and the steps necessary to undertake responsible conservation translocations.

The relationship of these guidelines to complementary IUCN guidance documents is outlined in Table 1.

Table 1.
Relationship of these guidelines to other IUCN guidance documents.

IUCN Guidance document	What these guidelines add
Guidelines for Reintroduction and Other Conservation Translocations (2013)	Translocation decision-making, planning, and implementation for confiscated, surrendered, or seized organisms and organisms displaced by human activity and conflicts, climate change and disasters
Guidelines for the Management of Confiscated, Live Organisms (2019)	Translocation decision-making, planning and implementation for confiscated and other displaced organisms
IUCN SSC Guidelines for Human-Wildlife Conflict and Coexistence (2023)	Decision-making on translocation suitability of individuals affected by conflict
Guidelines for the Prevention of Biodiversity Loss Caused by Alien Invasive Species (2000)	Background on translocations of alien invasive species motivated by perceptions of welfare or for religious or other non-economic purposes, and how to avoid translocating invasive species
Guidelines for Species Conservation Planning (2017)	Information on circumstances where displaced organisms can responsibly contribute to species conservation management, and details on decision-making, planning and implementation of translocations of displaced organisms
Use of Ex Situ Management for Species Conservation (2014)	Information on circumstances where displaced organisms can contribute to ex situ species conservation management
Guidelines for Wildlife Disease Risk Analysis (2014)	Background on risks specific to translocation of displaced organisms, and information on how to address disease risk analysis and management for displaced organisms
Guidelines for Invasive Species Planning and Management on Islands (2018)	Background on welfare, religious and other non-economic motivations for translocations of alien invasive species and how to avoid translocating invasive species

Source: Prepared by the report authors

Translocations not covered under these guidelines

Conservation translocation of non-displaced organisms

Many organisms translocated as part of conservation translocation programmes are not displaced, but instead are captured from the wild to serve as founders of translocated populations, or are captive born in conservation breeding programmes or other settings. For such situations, consult the *IUCN Guidelines on the Use of Ex Situ Management for Species Conservation* (IUCN/SSC, 2014) and the *IUCN Guidelines for Reintroduction and Other Conservation Translocation*s (IUCN/SSC, 2013) for guidance on translocation of organisms that have not been displaced.

This document does not cover mitigation translocations (planned movements of entire wildlife populations to enable human development), assisted colonisations (planned and managed movement of organisms to suitable habitat outside their species range to aid the species in adapting to climate changes), or introduction of non-native species for conservation purposes such as genetic rescues (release of closely related but non-native subspecies to improve genetic fitness) or introduction of non-native species to fulfil vital ecological roles. These issues are discussed in the Guidelines for Reintroduction and Other Conservation Translocations (IUCN/SSC, 2013).

Translocations for primarily economic purposes, such as biological controls for pests, tourism, or hunting/fishing purposes, also do not generally involve displaced individuals, and are thus not covered under this document. A recent study of translocations in the United States over the past 125 years indicates that these types of translocations have frequently resulted in negative consequences for native wildlife and ecosystems (Novak et al., 2021).

While translocations of non-displaced organisms are not covered in this document, the principles articulated in these guidelines and in the *IUCN Guidelines for Reintroduction and Other Conservation Translocations* (IUCN/SSC, 2013), are relevant for maximising benefits and limiting harm to wildlife, ecosystems, and humans from such releases. The *IUCN SSC Guidelines on human-wildlife conflict and coexistence* (IUCN, 2023) provide guidance on addressing wild organisms at risk of interactions or conflict with humans. Guidance on decision-making about translocation suitability of individuals affected by human-wildlife conflicts is provided in the decision tree (Appendix 1) and action steps of these guidelines (pp. 28-50).

III. Background

The scale of wildlife displacement

The most pervasive cause of wild organism displacement is human-driven land-use change for development, agriculture, livestock, and resource extraction. Human changes to natural habitats are the greatest threat to terrestrial and freshwater flora and fauna, followed by hunting, logging, fishing, and other collection or extraction (IPBES, 2019). These activities displace massive numbers of wildlife. Livestock now accounts for 96% of mammal biomass on earth, compared to merely 4% that are terrestrial and marine mammals (Bar-On et al., 2018). The population sizes of vertebrate species have declined by an average 68% since 1970 (WWF, 2020). Approximately 22% of assessed plant species face extinction largely due to land conversion for agriculture and livestock (Brummitt et al., 2015). Unsustainable hunting for wild meat and medicinal products affects millions of animals every year (IPBES, 2019), putting hundreds of species at risk of extinction (Ripple et al., 2016) and resulting in live captures, particularly of infants or juveniles. These individuals often enter the pet trade or are sent to care centres (GRASP & IUCN, 2018). Live individuals are also caught in traps or snares (Lazarus, 2019). Many organisms displaced by these actions are later translocated back to the wild.

More than 11,700 species are projected to be at risk of extinction due to trade (Scheffers et al., 2019). Millions of live animals and plants are seized annually from international illegal trade (Bergman, 2009; D'Cruze & Macdonald, 2016; Rivera et al., 2021; UNODC, 2020). These seizures often involve many thousands of individuals at once (Fobar, 2019). Unsustainable plant harvest for trade affects thousands of species and millions of individuals (Gale et al., 2019; Wong & Liu, 2019). The orchid trade in a single region of one country accounts for more than 1.2 million individual plants annually (Gale et al., 2019). The legal pet trade is similarly massive - approximately 200 million live animals per year are imported into a single country (Kolby, 2020). Many individuals that are seized from illegal and unsustainable trade, and former captive individuals from legal trade, are released to enable them a 'life in wild,' or to relieve overcrowded captive facilities or due to lack of captive care options (Rivera et al., 2021). Pets are often released once they have become too burdensome or expensive to care for (Lockwood et al., 2019). Displaced organisms traded for pets and those seized in large quantities, e.g. birds and reptiles, are often translocated.

Large numbers of individuals, and even entire wild populations, can be temporarily displaced, stranded or incapacitated by severe weather events such as heat or cold spells, cyclones, fires, and floods (Ferré-Sadurní, 2017; Mamun & Al Amin, 2020; Roberts et al., 2014). More than 4,500 sea turtles were rescued and later translocated back to their natural habitat after being stunned motionless by a winter storm (Treisman, 2021). Climate change effects can also permanently displace wildlife populations if their habitats become unsuitable (IPBES, 2019). Climate events can also trigger mass mortality events in animals, as occurred in 2015 where some 200,000 saiga antelopes in Kazakhstan perished, decimating 88% of one population, and resulting in nearly 100% fatality among affected animals (Kock et al., 2018) These types of events can result in individuals being taken into human care for treatment or to prevent their exposure to disease.

Appropriately rehabilitated, healthy individuals that are responsibly translocated into suitable natural habitats contribute to conservation translocation programmes which have helped re-establish several rare species populations and restore natural ecosystem functions (Morris et al., 2021; Novak et al., 2021). Translocations can also be misused and instead pose serious risks to wildlife, ecosystems, and even humans (Liu et al., 2013; Lockwood et al., 2019; O'Hanlon et al., 2018; Rivera et al., 2021; Simberloff et al., 2013). Evidence indicates large-scale haphazard movements of wildlife are posing serious risks to both humans and to the planet. This is exemplified by the extraordinary spread of invasive, exotic species that has caused significant population declines and extinctions of native species (Simberloff et al., 2013; Stroh et al., 2023).

Opportunities for responsible translocations of displaced organisms

Organisms can be responsibly translocated for a variety of reasons, most commonly for conservation, cultural, or animal welfare purposes. In all cases, responsible translocations are conducted to maximise health and welfare of the translocated individuals, and avoid medium or high risks to wild conspecifics, other wildlife, ecosystems, and humans.

Conservation translocations have successfully restored numerous species and ecosystems function in sites across the globe (Brichieri-Colombi & Moehrenschlager, 2016; Morris et al., 2021; Novak et al., 2021). A conservation translocation is defined as one that improves "conservation status of the focal species locally or globally, and/or restore[s] natural ecosystem functions or processes" (IUCN/SSC, 2013). Successful conservation translocations are typically characterised by well-planned and managed programmes that have conducted rigorous conservation-based risk assessments prior to release, and operate under good conservation governance, while the greatest likelihood of negative consequences occurs in translocations that do not conduct such risk assessments or follow conservation guidance (IUCN/SSC, 2013; Novak et al., 2021). Most conservation translocations are conducted using founders from wild populations, captive-bred or propagated individuals, or both (Fenu et al., 2019; Resende et al., 2020). Capture and translocation of wild founders is a difficult process that may have negative impacts on the population dynamics, welfare, and behaviour of wild source populations, while captive-bred animals or propagated plants may face steep challenges to adapt to wild conditions (Berger-Tal et al., 2020; Breed et al., 2019; IUCN/SSC, 2013; Resende et al., 2020). Translocation of suitable, healthy displaced individuals through well-planned and monitored projects with carefully assessed and managed risks, can be a conservation positive solution. This is particularly the case where re-established or strengthened wild populations are necessary to prevent species extinctions, but where translocation candidates from captive breeding are lacking, and captures from the wild would pose further risk to imperilled populations. Examples of success include restoration of the tiger population in India's Panna Tiger Reserve, which was rendered functionally extinct due to poaching, then restored using a combination of wild and displaced individuals (Krishnamurthy et al., 2018).

Individuals and groups of organisms can also be responsibly translocated for purposes other than conservation, for example to restore cultural values, to return healthy and behaviourally suitable displaced individuals to their home range, or to perform their ecological function within their native environment, or to improve the welfare of individual animals. Responsible translocations for non-conservation purposes share characteristics of careful planning and assessment to ensure individuals are released in suitable habitats within their native range, where they will not cause harm to wild conspecifics, other wildlife, ecosystems, or cause human-wildlife conflicts.

Displaced organisms have been responsibly translocated or have contributed to conservation translocation and breeding programmes in many circumstances across the globe.

Poached *conophytum* specimen,
© South African National Botanical Institute

Managing risks for translocation of displaced organisms

In any translocation, there are real risks related to genetics, behaviour, and disease that must be taken into consideration. Some risks are compounded in species that live alongside or among humans. Understanding and managing risks associated with displaced organisms can help prevent irresponsible translocations and identify where opportunities exist to conduct responsible translocations.

Exotic and invasive species risks

A recent study reported "massive" translocations, of several thousands of individuals at time, many of them unidentified species, being released anywhere convenient including into non-native habitats, without any suitable management to prevent disease and health/phytosanitary risks (Kock et al., 2010; Rivera et al., 2021). Although many species translocated outside their native range do not survive, **purposely translocated exotic (non-native) species and "dumped" exotic pets can become established and invasive, with dire consequences for native species and habitats. Translocations of invasive fungi, insects, plants, fish, birds, and mammals have caused numerous extinctions** (Simberloff et al., 2013). Examples of this include long-tailed macaques in Mauritius that are implicated in spreading invasive plant species (Reinegger et al., 2023), exotic reptile species in the United States which have caused extinctions of local fauna (Dorcas et al., 2012; Harvey et al., 2021), and exotic plants in the United Kingdom and Ireland, which now outnumbering native species in some island habitats (Stroh et al., 2023). Some 18 songbird species have been released outside their native ranges in Indonesia, at least five of which have established breeding populations, putting additional pressure on local birds and other wildlife (CABI, 2020; Iqbal et al., 2013; Shepherd et al., 2004). Translocation of feral species and mass ceremonial releases for religious reasons have also introduced invasive species, with devastating effects on native wildlife and ecosystems (Liu et al., 2013; Lockwood et al., 2019; Trouwborst et al., 2020). The **economic damage and losses from invasive species, and the costs to manage or eradicate them, are significant**. The costs of damages from invasive species in the United States alone are estimated to exceed USD 120 billion annually (Bradshaw et al., 2016; Pimentel et al., 2005). Management options for non-native species are discussed in the guidelines and in Appendix 3.

Land use and human-wildlife conflict-related translocation risks

Capturing and translocating wild animals has become a predominant response to wildlife harming humans, damaging human property, or entering areas where they could damage human crops or property, cause fear in humans, or potentially be at risk from humans. **Conflict-related translocations aim to protect both wildlife and humans, but survival rates for translocated wildlife can be very low. The translocations can also cause increased human-wildlife conflicts and negative effects on local wild populations, resident conspecifics, and ecosystems**. Translocated individuals from many taxa are known to leave release habitats and enter crops or human-occupied areas, or return to their capture site, causing further conflicts and repeated translocations (Hinderle et al., 2015; Jeffery et al., 2009; Villaseñor et al., 2013). Translocating wild individuals out of their local populations can have negative impacts on the species' social structure and breeding (Ancrenaz et al., 2021; Devan-Song et al., 2016). Hundreds of orangutans have been translocated from mixed forests and croplands, disrupting breeding patterns and depleting wild populations while failing to prevent orangutan crop foraging - an expected behaviour during fruiting seasons - that led to translocation (Oram, 2023; Sherman et al., in review). Hundreds of elephants are translocated annually in Africa and Asia to mitigate conflicts with humans, but this has been shown to be largely ineffective because elephants may preferentially use agricultural landscapes over primary forests (de la Torre et al., 2021) and tend to return to capture sites (Cowan, 2021; de la Torre et al., 2021; Shaffer et al., 2019). A study found that translocating "problem" elephants involved in human injuries, death, and property destruction resulted in increased conflicts, including several human deaths, and the killing of nearly half of the translocated elephants (Fernando et al., 2012). Studies of translocated lions, Amur tigers, leopards, and cheetahs show translocations have led to increased post-release mortality, with many animals killed by humans (Goodrich & Miquelle, 2005; Mompoloki et al., 2021), and counterproductive result of increased conflicts, failure to address livestock depredation, and increased attacks on humans (Athreya et al., 2011; Boast et al., 2016). **Translocation may be a non-lethal option for cases of animals habitually preying on humans or livestock that cannot be resolved through preventive or mitigative measures**. Special considerations for management and translocation of animals that pose safety risks to humans and livestock are discussed in the guidelines and in Appendix 3.

Prevention and mitigation measures to protect animals in their natural habitats while addressing concerns for human safety and protection of livestock, crops, and property are generally the most effective long- term solutions for human-wildlife conflicts (e.g. Goodrich, 2010; Shaffer et al., 2019). Translocation is often very expensive, and is not always a means to save costs compared to other conflict mitigation strategies (Weise et al., 2014). Many wild organisms use human-modified habitats or forage in crops or gardens. These individuals are generally not displaced or driven from their habitats, but instead have adapted to using human-modified areas as a part of their habitat (e.g. Oram et al., 2022). It is not recommended to remove wild organisms from their habitats for any reason if there is no feasible and responsible translocation option and no suitable facility in which to care for them humanely. Those legally responsible for the wildlife in question are responsible for both protecting wild populations from irresponsible translocations, and for making humane decisions on the disposition of the displaced individuals (see Appendix 3).

Health risk

Translocating wildlife entails moving any pathogens, parasites, and microflora they have, any of which could be novel to wildlife, domesticated and peridomestic animals, and humans in the recipient environment (Kock et al., 2010). Disease epidemics transmitted by translocated wild animals to humans, domesticated or peridomestic animals, or wildlife species, are uncommon but significant examples exist. A contagious, lethal upper respiratory disease that appears to have been transmitted by released former pet conspecific tortoises is part of the reason wild desert tortoise populations are threatened (Berry et al., 2015; Gardiner, 2019). An analysis of published data shows that 43% of human emerging infectious diseases over the past 60 years originated in wildlife (Kock & Caceres-Escobar, 2022). Disease risk due to wildlife translocations has not been systematically tracked across the increasing number of global translocations, and serious knowledge gaps persist.

Most animals and plants that have been kept in human care or confined with other wildlife or domestic plants and animals have been exposed to infections that may be novel to them, and which they can transmit to wild populations. Likewise, translocated individuals are at risk from naturally occurring pathogens at release sites and may succumb to diseases that resident wild conspecifics can tolerate. Risk of disease transmission from translocated animals or plants to wild conspecifics, or to other wildlife populations at release sites, is a serious concern. Communicable, pathogenic infections introduced through human contact or movement of wild animals have been implicated in species extinctions and severe local population declines (Scheele et al., 2019; WWF, 2020). One of the most devastating examples is the chytrid fungus, which threatens the survival of more than 400 amphibian species (Lips, 2016). Global environmental change and the wild animal industry likely initiated the spread of fungus (Daugherty & Hung, 2022).

Displaced plants, particularly those traded or kept by humans, can be subject to diseases that can pose risks to wild populations if transmitted through translocated (outplanted) plants (Commander et al., 2018; Fahselt, 2007; Maschinski & Albrecht, 2017). In addition, invasive invertebrates or fungal diseases have damaged ecosystems at planting sites when transplanted through potting mediums (Fahselt, 2007; Flowers-Kimmerle, 2021). Efforts to control or eradicate these invasions are extremely costly and difficult (Simberloff et al., 2013). Translocated plants can have low survival rates and can also pose genetic and environmental risks to local wild populations, other plants, and ecosystems at release sites (Fahselt, 2007; Liu et al., 2015; Maslovat, 2009).

Even where such outcomes are rare, catastrophic impacts are possible so infection and disease risks must be carefully monitored and precautions applied to any translocation. There is no such thing as zero disease risk when moving any organism, but careful assessment and management through implementation of IUCN guidelines on disease risk analysis (Jakob-Hoff et al., 2014), management of confiscated wildlife (Maddison, 2019), and conservation translocations (IUCN/SSC, 2013) can minimise these risks. Risk assessment and screening of all translocation candidates for diseases of concern is required if they have been in contact with or kept by humans, or confined with other wildlife, domesticated animals or peridomestic animals.

Behavioural, genetic, and welfare risks

Wildlife populations can also be harmed by the addition of translocated individuals that cause social disruption or increased competition for limited food, territory, mates, or other habitat resources (Ancrenaz et al., 2021; Maude et al., 2018; Pride Lion Conservation Alliance, 2021; Sherman et al., 2020). Many animal populations have distinct cultures and social complexities (Brakes et al., 2019) that could be diluted or disrupted by addition of individuals from another population with a different culture and its own social order. Translocated individuals may struggle to survive or thrive without the social learning that underlies the resident population's cultural traits (e.g., Meyburg et al., 2017). Translocated individuals of a different subspecies than the local conspecific population, or from different subpopulations of the same taxon can introduce hybridisation, harmful genetic issues, or problematic behaviours to wild populations (Banes et al., 2016; Benjamin-Fink & Reilly, 2017; Knapp et al., 2014).

Welfare risks

While releasing captive animals back to the wild is generally perceived as a positive outcome that affords these animals a free and natural life with improved welfare, many translocations have the opposite effect (Harrington et al., 2013). Capture and translocation are stressful events for wildlife, and often trigger disease and result in harm or death (Breed et al., 2019; Teixeira et al., 2007). Formerly captive animals may also have less fear of humans and can thus cause conflicts with humans, harm or kill humans, or be at greater risk of capture or killing post-release (Beck, 2019; Berger-Tal et al., 2020; McLennan & Hockings, 2016). Translocating individuals ill-equipped to survive and thrive in the wild, releasing organisms into unsuitable habitats or into wild populations where they will cause social disruption or competition may result in lowered breeding success of wild conspecifics, and could cause suffering and death of released individuals (Berger-Tal et al., 2020; Grundmann, 2006; Harrington et al., 2013; Rivera et al., 2021).

Considerations for displaced urban and captive wildlife

Contrary to popular assumptions of wildlife "belonging" exclusively to forests, wilderness, or protected areas, many species live in the human-wildlife interface, including urban areas. Some urban species, including peridomestic animals that live in and around human occupied areas, and synanthropic wildlife species that are free living but have adapted to and dominate human occupied landscapes, are more often associated with zoonosis and disease emergence than wildlife species that occupy areas with less human influence (Kock & Caceres-Escobar, 2022). Translocations of these taxa into the nearest protected area is common, and often conducted without precise taxonomic identification and assessments of suitable release habitats or of the individuals' health and disease risk.

Captive wildlife is sometimes found living in overcrowded or inhumane captive settings or is considered to be better off translocated than living in captivity. However, translocation is not a sustainable solution for overcrowding or poor welfare, as it does not address the root causes of overcrowding or inhumane facilities, which can arise due to insufficient funding and capacity at the facilities, and influx of animals from poaching, illegal and unsustainable trade, and abandonment from the pet trade. Translocation to address captive welfare conditions can only be responsible if it meets the standards for responsible translocations (see section IV). In some cases animals from overcrowded or inhumane captive settings can be incorporated into a managed conservation translocation programme (see section IV) for translocation or captive breeding. If this is not possible, a more humane solution for the individuals should be sought, such as transfer to another facility or improving the welfare at the current site, or humane euthanasia if there is no option to provide them with suitable welfare in an appropriate facility (see Appendix 3). Wildlife authorities and managers are responsible for protecting wild populations from irresponsible translocations and for making humane decisions on the disposition of the displaced individuals (see for example CITES resolution 17.8 (CITES, 2016) and *Guidelines for the management of confiscated, live organisms* (Maddison, 2019).

Any translocation of captive animals or urban wildlife poses risks to wild populations and for the welfare of the released individuals. Captive animals should only be translocated if they have undergone species-specific rehabilitation and have been evaluated as competent for release by an expert in the wild behaviour of the taxon, and had a health and disease screening by a suitably qualified and experienced veterinarian with the species concerned establishing that they are physically suitable for release and have neither clinical signs of, nor test positive for, infections of concern for the species (see section IV and section V actions 8 and 9). Additionally, for both captive animals and urban wildlife, suitable release habitats need to be identified through thorough assessment (section V, action 12). Failure to undertake these assessments and risk mitigation measures make the translocation irresponsible, with a high risk of causing harm to wild conspecifics, other wildlife, ecosystems, and humans.

Juvenile grey seal captured for health check and relocation away from a working harbour © BDMLR (British Divers Marine Life Rescue)

IV. Principles of responsible translocation

Responsible translocations

Responsible translocations follow the precautionary principle, which prioritises the conservation of wild populations by posing low risk that released organisms and their offspring will harm resident conspecifics (including infectious disease risk, negative genetic effects, harms to social cohesion or culture, competition for resources, or negative impacts to birth rate), other wildlife, ecosystems, or humans. The potential value of a translocation should always be considered in light of the risks to the recipient wild population, as conservation of this wild population should always take precedence over any potential welfare benefit to released individuals. This requires that all stakeholders in the potential translocation agree on what 'low risk' looks like so that appropriate and responsible decisions can be made.

While it is impossible to avoid all risk, serious harm can arise even from actions where negative consequences are considered unlikely. Where there is a lack of evidence or there is uncertainty about whether a human action will cause harm to the target species, other wildlife, or the environment, the precautionary approach is to assume that it will cause harm. Hence, if there is uncertainty about whether a translocation could harm wild conspecifics, other wildlife, the ecosystem, or humans, precaution dictates assuming the action will likely cause harm and should thus be avoided, even if harm is unlikely. Some risks can be reduced through careful assessment and management (e.g. health risks), but there must be evidence that these actions successfully mitigate the risk, otherwise it must be assumed it could still cause significant harm. The precautionary principle also applies to potential negative effects on human health and safety through pathogenic disease transmission or conflicts. Translocations that could have significant negative consequences for the health and safety of humans, even where these negative outcomes are unlikely, should be avoided.

Responsible translocations happen only after:

- **Individual release candidates are determined to be suitable for translocation.**
- **A suitable release habitat has been identified and assessed.**
- **All necessary actions have been taken to address known threats to the species in the release habitat.**
- **Feasibility and risk assessments establish that translocation will likely either have positive or neutral conservation benefits to the taxon, the resident wild population, or its habitat, with low risk of harm to wild conspecifics, interacting native wildlife, and the ecosystem.**

Responsible translocations also consider the **welfare of released individuals and wild populations**. An individual's welfare takes into account its nutrition, environment, its species-specific social and cultural requirements, health, behaviour and mental state and the effects of translocation and release on the animal's physiology. Good welfare for animals under human care means that measures are taken to reduce suffering where possible; the individuals are not ill or injured (although they may be under treatment); are free from hunger or thirst, have an environment sufficient for feeding, shelter, hiding, and sleeping; and are able to interact appropriately with conspecifics (see Appendix 3). While translocation inevitably causes released individuals some stress and will influence their behaviour during and after release, the stress of finding food, socialising, and avoiding predators and intraspecific aggression in the release habitat should not exceed expected thresholds for the taxon following a reasonable post-release acclimatisation period. These aspects will vary by taxon. It should be noted that for some taxa medium or high risk of mortality would be normal and acceptable (for example many turtle hatchlings and tadpoles have very high mortality rates even in wild populations), while for others this is not the case. Thus, assessment by a species-specific expert is needed to determine acceptable level of mortality risk. It is the collective responsibility of translocation teams and stakeholders to define acceptable levels of risk and post-release impact, and appropriate management actions if these thresholds are crossed.

Responsible translocations require time, effort, species knowledge and funding to conduct. The following standards are needed to achieve responsible translocation:

1. Specific taxonomic identity of release candidates has been established

Animal species, and, as applicable, subspecies and source population, have been identified. Plant and fungi species have been identified, as well as subspecies, variety, population, and strain as applicable. Local biodiversity experts or naturalists can usually help with these identifications. Genetic investigations and testing may be necessary to confirm species, subspecies, or genetically distinct populations and to prevent translocation of individuals that could hybridise with closely related wild populations or culturally, behaviourally, or culturally distinct conspecific populations.

2. Individuals are suitable for release

Animals

- Upon examination by a suitably qualified veterinarian, release candidates appear healthy and are without symptoms of ill health, disease, or injury, and are not carrying potential pathogens dangerous to wild conspecifics or other wildlife in the release environment. Where concerns are identified, individuals must be clear of carrying disease-causing organisms as confirmed via laboratory testing. National or international veterinarians with taxon-specific expertise can advise on and monitor any interventions, laboratory work, and disease and health risk mitigation measures if a suitably qualified veterinarian is not locally available.

- For higher-order vertebrates, a pre-release assessment by a taxon behaviour expert and the individual's caregivers determines that candidates are likely behaviourally, physically, and psychologically competent to deal with translocation, and to survive and thrive in the wild. Individuals that are not behaviourally or physically competent, or that lack appropriate social/cultural skills to adapt to life in the wild have a high risk of suffering from undue stress, decreased welfare, or mortality. Individuals that are dependent on humans or that remain acclimatised to humans other than their individual caregiver are not suitable translocation candidates and should not be released because their affinity for humans means they are more likely to come into conflict with humans, contract zoonotic pathogens, or be killed or captured.

  Candidates may undergo monitored soft release to acquire or improve appropriate skills. Soft releases are managed to assist released individuals to adapt to wild conditions. Soft releases can involve releasing individuals into large enclosures with natural vegetation or within the final release habitat itself, and generally include supplemental feeding and protection from predation. Monitoring should be done remotely (e.g. via GPS tagging) or from sufficient distance to avoid acclimatisation to human presence.

- Temporarily displaced individuals that can be translocated back into or near their home range do not require suitability assessment. However, the stresses translocation causes for the organism in a short-distance translocation are similar as for a long-distance translocation, and thus the process for determining whether responsible translocation is possible still needs to be followed.

Plants

- Plants selected for outplanting have been inspected by a qualified plant specialist and are in a suitable condition and have been inspected for diseases. Phytosanitary requirements have been fulfilled to ensure plants are disease free.

- If plants have been kept for some time in a different location than the outplanting area, potting material has been screened to ensure it is free of undesirable invertebrates or other contaminants that would pose a risk if released into the wild when plants are translocated.

For all organisms, health risks and pathogens of concern depend on the taxa, and need to be identified through a Health Risk Analysis, also called a Disease Risk Analysis (DRA), conducted by species experts including a suitably qualified veterinarian (with the taxonomic level of focus to be determined by the DRA participants). DRAs are situation-dependent, and may be simple and require few actions, or may be complex and involve many steps, depending on the circumstances and the diseases of concern for the taxon in question. The DRA will determine whether clinical examination is sufficient or if further disease screening is needed. Introduction of infectious disease is a high risk in translocations. Individuals and source populations that have not been assessed and/or screened for disease or infections potentially pathogenic to conspecifics or other wildlife could transfer pathogens to wild or domestic populations of the species, with potentially devastating impact. Diseases could also be transmitted from released organisms to other wildlife, domesticated, peridomestic, or synanthropic animals, or humans, potentially causing zoonotic disease outbreaks with disastrous consequences to human life and global economies. Some pathogens or infectious diseases will be endemic in wild populations and thus could be normally carried by displaced conspecifics (presenting little risk), while in other cases, addition of translocated individuals carrying the disease pose high risks of outbreaks or development of novel disease variants that could significantly harm wild populations.

It is useful to collect biomaterial and live cells from all individuals prior to release if appropriate collection and storage equipment is available. These materials hold valuable information for disease surveillance, can strengthen understanding of genetics, health and welfare, and physical condition, and provide a baseline for comparison of post-release health monitoring.

3. Suitable release site(s) have been identified

Suitable release habitat has been identified and has received all necessary review and approvals by governing agencies, landowners, and local communities, and meets the following conditions:

- Scientific studies of wild conspecifics and the release habitat indicate habitat has adequate ecological conditions and habitat resources for translocated individuals and their offspring, resident conspecifics and other native taxa.[1] Where scientific studies are lacking, careful assessment by experts along with monitoring and data collection will help improve knowledge of the taxon's ecological needs and translocation practice.

- The presence or absence of wild conspecific populations has been established, and there is low risk of any harm from adding individuals. If present, the resident wild conspecific population is either below its viability threshold or would benefit from addition of translocated individuals.

Species threatened with extinction merit additional precautions to protect wild populations. Generally, individuals of threatened species are best translocated into depleted wild populations, or areas within current range where wild conspecific populations have been extirpated. Healthy or viable wild populations of threatened species do not need to be supplemented, and adding translocated individuals creates competition with wild individuals for food and other habitat resources and may depress breeding success. This may hurt rather than help efforts to protect and recover the species. Careful assessment is needed to determine the long-term health of the wild population and the relative risks and benefits of translocation compared to other conservation actions. If translocation is likely to negatively impact the wild population, per the precautionary principle it should not be undertaken, and alternative conservation actions such as habitat protection and conflict mitigation should be pursued instead to protect the species.

- Habitat assessment indicates adding individuals is unlikely to cause conflicts between released individuals and conspecifics or other wildlife over resources and social needs.

- Habitat assessment shows that hunting, trade, and other threats to the species are not likely to affect released individuals, or these threats are being actively managed and addressed.

[1] Not required when translocating individuals back into their home range or the area they were recently displaced from.

Some threats cannot be fully resolved in the short or medium term, and may require ongoing effort to manage as best as possible. For displaced organisms translocated back into their home range or local habitat area, and organisms with no options for humane captive care or humane euthanasia methods, ongoing threats in the release habitat may be an acceptable risk so long as they meet the other precautionary principle standards.

- Translocated organisms are unlikely to come into conflict with humans, or potential conflict is proactively managed and mitigated. Communities around release sites should be consulted regarding potential translocations, and their perceptions incorporated into project planning. Animals released too close to human communities or property, or translocated without consideration of how their dispersal (including return to capture sites) could affect humans, may cause losses of human crops and property, or injure or kill humans. Good understanding of target species' ecology and behaviour and the needs of human communities around the release area is crucial to feasibility assessment and planning for a responsible translocation. It is possible in some cases to mitigate conflicts, but plans for this should be developed directly with communities to ensure solutions are acceptable to both the communities and the translocation project.

In all cases, release habitat selection should be based on consideration of risks. The potential risks within any release habitat should be evaluated, and where medium or high risks of negative consequences for wild conspecifics, the ecosystem, or to released individuals are a possibility, even if relatively unlikely, translocation should be avoided, and alternative actions should be considered. Alternate actions include assessment of other habitats for suitability, implementation of other conservation actions in lieu of translocation, and transfer of displaced organisms to an appropriate facility for long-term, specialised care, or humane euthanasia if they cannot be provided with suitable welfare in an appropriate facility.

Assessments already exist for many areas and taxa, and do not need to be redone for every potential translocation if relevant information is available that addresses current conditions in the habitat and for the target species.

Displaced organisms translocated back into or very near the area they were displaced from do not require habitat studies, as expert assessment will suffice.

4. Optimal methods of rescue, rehabilitation, and translocation are used

The rescue, rehabilitation, and translocation of displaced organisms follow best practices for the area experts, and the individual's keeper/care team. If methods are not yet established for the taxon, testing and monitoring may be possible using displaced organisms (see item 7, this section).

5. Translocation follows the precautionary principle

The translocation meets the criteria of the precautionary principle, and there is a plan in place that specifies whether and how to intervene if any issues arise. Translocation practitioners are responsible for collecting and analysing evidence that demonstrates that translocations will not or are not likely to cause significant harm to conspecifics, other wildlife, the ecosystem, or human health and safety. Practitioners may be legally accountable for any harm that results from a translocation.

There are five characteristics of translocations that adhere to the precautionary principle, which are discussed in detail above in items 1- 4:

- Scientific studies identify appropriate habitat with low risk to wild conspecifics.
- Release candidates are behaviourally appropriate.
- Release candidates are healthy and free of clinical signs of pathogens of concern.
- Major threats in the release habitat have been addressed or mitigated.
- The released organisms are unlikely to pose medium or high risks to human or animal health, safety, and welfare.

6. Individuals are monitored following translocation

Post-release monitoring (PRM) should be conducted wherever feasible. Monitoring of survival, adaptation, and breeding following release will help to determine the success of the release, identify any risks posed by the released animals, and inform and refine release processes. Medium- or long-term translocation programmes that involve multiple releases or a release of a large number of individuals) should have clear conservation and welfare goals that will be monitored post-release, and plans for adaptive management if set thresholds are crossed (such as if released individuals are failing to thrive after a given time). Translocation practitioners are responsible for confirming the outcomes of the translocation through post-release monitoring, and wherever possible, should make findings public to improve knowledge and practice of conservation ecology and translocation. Without post-release monitoring, practitioners cannot assume that organisms survived and adapted, or whether there were negative consequences to conspecifics, other wildlife, the ecosystem, or to human health and safety.

Post-release monitoring should always be attempted for threatened or rare species, as well as for any translocation of organisms that have been held by humans, or any translocations more than a short distance from the organism's home range, regardless of the species' status. Post-release monitoring is valuable for any translocated individual, but tracking can be difficult and costly, and thus it may be more feasible to track or monitor only selected individuals, such as dominant males or females, or to use short-term technologies that remotely track and record movement and location for organisms that are hard to monitor. Various technologies exist for monitoring released organisms ranging from the placing of visual marks on animals (e.g. tags on mammals or leg rings on birds) to surveillance with drones or camera traps, and radio telemetry or satellite trackers. Care should be taken not to cause the individuals additional stress or decrease their fitness or survival. Human health and safety and the welfare of wild conspecifics and released organisms are important considerations. Human tracking of released wildlife can cause additional stress and decrease individuals' fitness, and in some species can lead to aggressive behaviour towards humans.

Samples should be taken and stored appropriately throughout the pre-release (i.e. capture/rescue or rehabilitation) and translocation process regardless of perceived health status. This approach will provide baseline health data and evidence in case of pre- or post-translocation deaths. This will help to pinpoint the cause of death so that appropriate biosecurity measures be put in place, or the translocation programme can be reconsidered to prevent escalation of risks and further deaths.

Clouded leopard sighting after translocation © Panjit Basumatary

7. When possible, translocations are part of a conservation programme

Conservation programmes have clear conservation goals and monitor the conservation impacts of their actions. Conservation translocation goals may relate to the conservation status of the species or population, the species' role in the ecosystem, the functioning of ecosystem itself, or all of these. **Translocations involving rare species (i.e. those listed as Vulnerable, Endangered, or Critically Endangered on the IUCN Red List, or listed by local or national jurisdictions as at risk) should be part of a conservation programme wherever possible.** This does not mean that a new conservation programme must be developed for each translocation project. Coordinating with existing conservation programmes is strongly encouraged as it can boost conservation benefits of the translocation. The IUCN Species Survival Commission taxonomic specialist groups and its national centres for species survival, wildlife rescue alliances, conservation organisations, botanical gardens, and accredited zoos and aquariums are good resources for identifying species conservation programmes and responsible translocation projects where displaced organisms can be placed (see Appendix 3).

A conservation translocation programme has the following components:

- Clearly defined conservation goals for translocation in line with peer reviewed published data, species conservation action plans, and population and habitat suitability analyses.
- Risk assessment and feasibility analyses support the assumption that the species would benefit from supplementation of existing populations or establishment of new populations.
- The performance of the translocation project is monitored. and actions are adapted based on monitoring outcomes.
- Financial, infrastructure and personnel resources are in place to address challenges covering a taxon-appropriate period of survival and adaptation after release.
- A translocation plan is in place that defines success for the project and specifies when and how to intervene if translocated individuals or the translocated population are not thriving.
- A representative number of released individuals are monitored post-release, and resident wild conspecific populations, and wherever possible, populations of other interacting species (e.g. predator, prey, or parasitic species) are monitored before and after releases.
- Where appropriate, less optimal sites and circumstances may be used as part of scientific testing and monitoring of translocation methodologies for the taxon to determine safeguards for translocated individuals' welfare, survival and breeding.

For common species, coordination with local ecosystem or fauna/flora protection programmes is recommended to support development of conservation and welfare goals for translocations, and monitoring of impacts, particularly if multiple releases or translocations of large numbers of individuals are under consideration.

Irresponsible translocations

Irresponsible translocations have any one, or several, of the issues shown in Table 2.

Characteristics of irresponsible translocations are organised under a stoplight system, highlighting components that are critical risk (do not translocate under any circumstances if characteristics are present) or high risk (advise not to translocate if characteristics are present).

Table 2.

CRITICAL RISK – do not translocate in these situations
1. The species, subspecies, variety or strain (as applicable) of released organisms is not known Unidentified organisms should never be released. Unidentified organisms are likely to be exotic species, in which case they will likely either die or become invasive. Release of unidentified organisms can also lead to hybridisation or introduction of problematic genes to local fauna and flora.
2. The organisms are not native to the area where they are being considered for release Exotic species can become invasive and have devastating effects on local wildlife, and on human economies. Organisms should never be released outside of their native range except as part of a planned and managed conservation programme to assist colonisation of a species threatened by extinction, climate change or other local conditions, or to fill a vital ecological role formerly filled by an extinct species (see the Guidelines for Reintroduction and Other Conservation Translocations (2013).
3. Organisms have not been assessed for infections or diseases of concern Individuals should be assessed for their health status. Clear guidelines on health, welfare, and disease checks are not available for most species. Assessment by species experts including a suitably qualified veterinarian is necessary to determine the risks for the taxon or population in question.
4. Organisms are carrying diseases or infections harmful to conspecifics or other wildlife at the release site Introduction of pathogens or diseases dangerous to wild conspecifics or other wildlife at the release site could decimate native species, which could in turn compromise interspecific relationships, causing harm to the ecosystem. Determination of whether translocation is possible after treatment and testing demonstrating translocation candidates are clear of clinical signs of the disease is situation dependent and requires assessment by a suitably qualified veterinarian with species-specific expertise.
5. Translocation has a medium or high risk of harming conspecifics or other resident wildlife in the release habitat Adding more individuals to a wild population can mean resident conspecifics may suffer increased mortality, decreased fitness (reduced reproductive success) due to shortages of food or other resources, or may cause increases in aggression that could result in deaths of wild residents. If there is some likelihood (or unknown likelihood) of this occurring, then translocation into this wild population would be irresponsible. The potential conservation value of translocation should always be considered in light of the risks to the recipient wild population, as conservation of this wild population should always take precedence over any potential welfare benefit to released individuals. Translocation also should not have a medium or high risk of harming other resident wildlife by threat of communicable disease, unintended hybridisation, extreme social disruption, crowding, or exaggerated resource competition, or of the ecological integrity of the area.
6. Potentially affected human communities have not been consulted on the translocation, or there is a medium or high risk of human-wildlife conflicts from the translocation Translocations that are conducted without community consultation or that could have unmitigated negative impacts on humans may lead to translocation and conservation projects suffering from decreased social acceptability.
7. Released animals have significant physical or psychological damage Animals with significant physical or psychological damage are unlikely to be able to find food and mates, and adequately defend themselves from predators and competitors. These individuals will likely suffer poor welfare and possible death following release, or may return to the facility where they were formerly cared for, in an effort to feel safe and to secure food. Careful analysis of candidate suitability is needed. In some cases, it may be possible to address individuals' physical limitations or psychological issues with additional specialised rehabilitation.

Source: Prepared by the report authors

Table 2. (continued)

HIGH RISK – translocation is not advised in these situations
8. Animals do not have appropriate wild behaviours to survive and thrive in the wild Higher vertebrates that have been held by humans and do not have wild behaviours necessary to survive and thrive in the wild, or are acclimatised to or dependent on humans are not suitable translocation candidates. Individuals that are not properly rehabilitated are likely to suffer poor welfare and possibly die if unprepared for life in the wild, or may return to human-dominated areas in search of food and thus come into conflict with humans. Additional specialised rehabilitation or a soft release strategy may make some individuals suitable candidates at a later time, while others may never be suitable candidates for release for example those that continue to approach humans).
9. Release site has not been identified as suitable habitat using recent studies Organisms released outside suitable habitat are unlikely to survive without regular human assistance, due to insufficient food and other vital resources, and may harm any resident conspecific population or other native wildlife and the ecosystem by undue pressure on available resources. If habitat is unsuitable due to its degradation or fragmentation, it may be possible to improve habitat quality/connections and thus suitability through restoration activities. It can take years for these actions to improve the habitat sufficiently to enable translocation.
10. Release habitat has uncontrolled threats that are likely to impact the released organisms' ability to survive and thrive Threats to released organisms that are beyond expected natural stresses (e.g. predation or normal climactic variations) should be considered for any translocation. A release habitat with non-natural threats (e.g. hunting/collecting or habitat encroachments) that adversely affect the released organisms' natural mortality or breeding rates (i.e. the rates expected for the taxon in the wild) are not suitable for translocation. It may be possible to address threat levels through conservation actions such as law enforcement, community patrols, or alternative livelihood opportunities. It can take years for these actions to protect the habitat sufficiently to enable translocation.
11. The release habitat has infectious diseases that have a medium to high risk of reducing released organisms' change of survival Organisms translocated into areas with endemic pathogens that they have no resistance to, or which their prior exposure to might result in the illness and death of the released individuals. It may be possible to plan translocation methods to allow for release candidates to adapt to endemic diseases and microorganisms (e.g. intestinal and parasitic flora) which are present in release habitats.

CAUTION – MEDIUM TO HIGH RISK. Careful assessment is needed and additional steps may be required to ensure responsible translocation
12. Translocation would cause unexpectedly high risk of harming the welfare of released organisms For one-off translocation events to return one or a few temporarily displaced individuals to their home range or area of rescue, it can be assumed that welfare risks to the individuals are low or at a level normal for the taxon. For all other types of displaced organism translocations, the potential welfare outcomes for the released organism should be considered prior to translocation. 100% survival of released individuals is not realistic for most translocations. The expectations for survival and ability of released individuals to thrive should be made through consultation with species experts, and based on consideration of the taxon's natural mortality rates and current survival rates of conspecific infant/propagules/seedlings. Some organisms may be expected to have medium or even high risk of mortality if released because that would be normal for the taxon. If released individuals will have a higher than expected risk (for their taxon) of failing to thrive due to difficulty finding food, water, or other needs, unexpected stress from competition or aggressive interactions with conspecifics, or from human activities in the release habitat, translocation should be reconsidered.

V. Guidelines: Planning and implementing a responsible translocation with displaced organisms

Determining if a displaced individual or group of individuals can be responsibly translocated requires answering key questions about the source, taxonomic identification, health and welfare, and behavioural suitability of the release candidates, and the status of taxon-specific conservation translocation programmes, suitable release habitats, and resources for translocation implementation and post-release monitoring and support. This section presents the stepwise process to make this determination and to proceed with a responsible translocation in appropriate circumstances.

The actions below comprise the IUCN Guidelines for the Responsible Translocation of Displaced Organisms. These actions follow the questions in the decision trees (Figures 2 and 3). The relevant section of the decision trees is displayed for each action.

Action 1. Identify species, subspecies, variety, strain, or population as appropriate

Step 1. Can the organism's precise taxonomic identity be reliably discerned?

1a. Determine species identity

Species identity is crucial to determining translocation suitability. Individuals of unknown species should not be translocated. Exotic released species could become invasive, resulting in ecosystem damages, threats to or extinction of native species, and economic losses. Even non-invasive exotic species can cause negative effects for native species and ecosystems. Similarly, the effects of species hybridisation are practically impossible to reverse, and there can be severe and wide-ranging effects on the persistence of threatened species.

1b. Determine subspecies and population for animals, and variety or strain for plants and fungi, if applicable

Determining subspecies (animals) or the variety or strain (plants and fungi) is critical in cases where the species has more than one described subspecies/variety/strain to prevent hybridisation and other negative genetic effects, and to avoid releasing non-native taxa. As with species hybridisation, mixing subspecies, varieties, or strains can have severe and wide-ranging effects on the persistence of threatened species, and may be impossible to counteract.

If the displaced individuals in question could be hybrids, they cannot be released responsibly. If the individuals may be hybrids due to their source or questionable appearance or traits compared to the species norm, genetic testing is recommended to determine taxonomic identity. Individuals determined to be hybrids, or that may be hybrids but cannot be tested to confirm identify, should not be released.

1c. Determine population source, if applicable

If there are known genetically or behaviourally/culturally distinct populations in the species or subspecies/variety/strain, then genetic identification of the source of the displaced organism is important to ensure it is translocated back into the same population (to prevent negative genetic effects of mixing distinct populations).

Consult scientific/taxonomic literature on the species or subspecies/variety/strain if identification is uncertain.

- Note whether the species/subspecies/variety/populations are well described in the literature, and whether the science indicates uncertainty on taxonomic identity or descriptions.
- Local and international experts, museums, conservation organisations, zoos and aquariums, or botanical gardens, or the IUCN Species Survival Commission taxonomic specialist groups (Appendix 3) can assist in determining species identification. Note that some subspecies can be impossible to distinguish without genetic testing. In the case of uncertainty, genetic testing to determine species/subspecies/variety is necessary prior to translocation. Confirmation of species identification by a local or international expert prior to any consideration of translocation is vital to ensuring management decisions are appropriate for the species. This is particularly important for plants and animals confiscated from trade, to prevent release of non-native species/subspecies that appear similar to local taxa. Consultation with experts on the taxon can help determine the taxonomic level of population genetics that is important for its conservation. Most NGOs involved in rescues of displaced fauna and flora have local species expertise on staff, or can assist in sourcing these experts.

<u>Step 2.</u> Check that the species/subspecies/variety of the displaced organism and the potential release location and habitat match the species/subspecies' native range and habitat.

- Consult scientific literature to confirm that the species/subspecies is known to inhabit the area where it was rescued and any proposed release site.
- In the case of uncertainty in the science literature, consult with local and international species experts or the IUCN Species Survival Commission taxonomic specialist groups to confirm native range and habitat and to understand how best to manage this case.

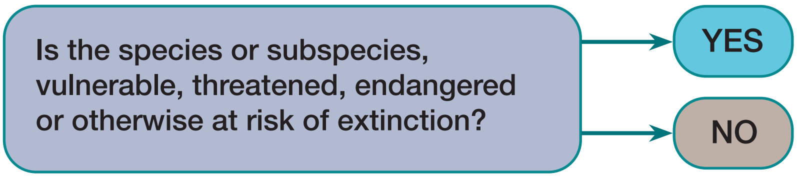
<u>Step 3.</u> Determine if the species/subspecies/variety ranges across multiple, geographically disjunct locations/habitats in the wild (i.e. it is taxonomically treated as a single species across multiple unconnected locations, such as different islands or landmasses, different cave systems, different mountains/highland ranges, different forest locations)

- These species are likely to contain multiple cryptic (as yet unidentified or unconfirmed) species, subspecies, or varieties, be restricted to specific locations, or have genetically, morphologically, and/or behaviourally distinct populations with varied cultural traits.
- If the release location is not the same location or area where the individual was originally from and genetic testing on the species across the range (including individuals from both release site and original location) has not already been scientifically reported, then genetic work will need to be done. This is important to prevent genetic mixing of populations that are adapted to different local habitats, and to avoid losing populations' cultural traits. However, if the species' disjunct distribution is unambiguously due to human-caused effects in recent history (e.g. human-caused deforestation resulting in habitat fragmentation), then cryptic species presence or local population differences are unlikely, and thus genetic testing to determine population source is not necessary.

For exotic species displaced via trade or captivity, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) provides several resources that offer identification assistance (see Appendix 3). Governments that commonly confiscate organisms from trade may consider proactively building relationships with taxonomic specialists to help with the identification process for exotic species. The IUCN Species Survival Commission has a number of taxonomic specialist groups that can help with this (Appendix 3).

Genetic testing samples must be carefully handled. Information on genetic sequencing laboratories and tools is included in Appendix 3.

Action 2. Determine conservation status of the organism



Step 1. Determine national and global species status.

- Check national endangered species lists, the IUCN Red List, and the CITES appendices to determine the species' conservation status (whether it is **locally or globally threatened with extinction, or has isolated populations that are locally rare**)
- Consult scientific literature: Determine if the science suggests the species is **under immediate or escalating threats**. For species with unknown status, the science may indicate whether there are current or emerging threats that would make it a species of concern.

Step 2a. Address placement of displaced organisms from species/subspecies or populations threatened with extinction.

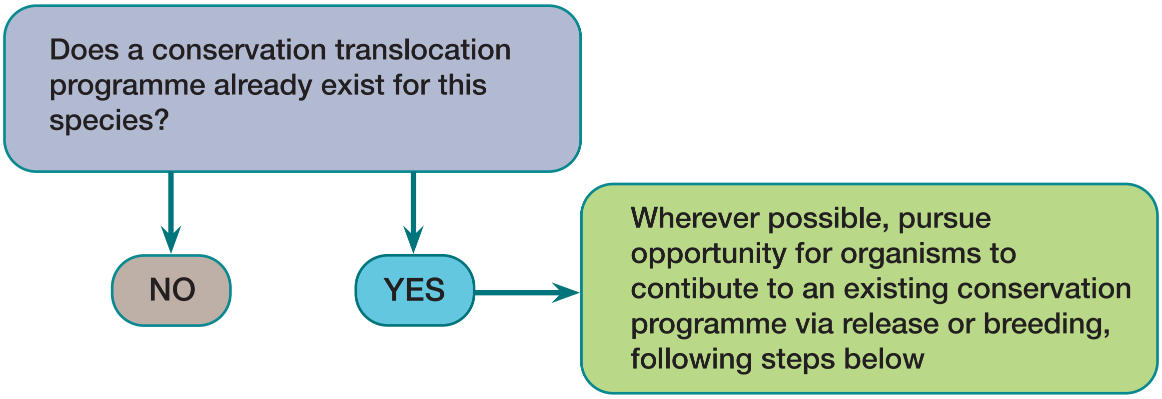
- **Displaced organisms of species/subspecies or populations threatened with extinction merit special consideration.** Most important for organisms found or recovered outside their country or area or origin (such as those seized from illegal international trade) is to facilitate their expeditious return to their country or area of origin or to a species-specific conservation programme, provided the welfare of the displaced organisms will not be unduly compromised. Suitable species-specific conservation programmes have capacity and resources to screen for disease, conduct appropriate rehabilitation as needed, and add individuals to well-managed and monitored programmes for conservation translocation or breeding, or lifetime care, as appropriate.
- **For native species that are locally or globally threatened, and for globally threatened species that are displaced through legal or illegal and unsustainable trade, it is a priority to work proactively with species experts and existing species conservation programmes to identify solutions for displaced individuals** (see details under Action 3). Displacements typically are emergency situations such as seizure of an illegal trade shipment, and swift action is necessary to prevent loss of life, diminished welfare, or behavioural changes in the displaced individuals. Relevant species and habitat studies may have already been done and safe translocation methods identified by experts in existing species conservation translocation programmes, in which case these programmes can conduct appropriate screening and assessment of the individuals to determine release suitability, or help identify suitable ex situ management, or long-term care facilities that displaced organisms can be placed into.
- Many displaced wild organisms will quickly die without specialised veterinary, zoological, or horticultural care and suitable conditions for accommodation that meet species-specific requirements. The availability of appropriate information on the immediate care and placement of seized live animals at the point of confiscation, and access to expert help and advice, is vital. Reference the 2019 *IUCN Guidelines for the management of confiscated, live organisms*, and the annexes of CITES resolution 17.8 on management of live confiscated organisms (CITES, 2016), and Appendix 3 of this document for resources. **Wherever possible, individuals of rare species should be transferred with all haste into the care of specialised conservation programmes or translocated into identified (already studied) suitable habitats within their range following suitable species-specific disease screening.** Because wild populations of rare species are particularly vulnerable to added threats such as disease and increased competition for natural resources within their habitats, **it is important that translocation candidates are screened for any species-specific diseases of concern, and that any potential release habitats have been carefully assessed to determine that translocations are not likely to present medium or high risks to resident conspecific populations, other wildlife, the ecosystem or humans.** Appropriate World Trade Organization and WOAH sanitary and mitigation measures should be followed during care, transport and translocation to avoid introduction of pathogens, disease, or other health risks (see Appendix 3).

Step 2b. Determine if displaced common or locally abundant species can be part of a responsible translocation.

- Translocations of **common or locally abundant species** can benefit conservation if they are planned to either maintain robust population size and genetic diversity, or help to maintain local ecosystem functions due to the ecological role of the organism (e.g. important seed dispersers or pollinators, maintaining prey-base, etc.). These translocations should follow the steps outlined in the remainder of this document and in Appendix 1 (animals) or Appendix 2 (plants) to ensure responsible translocation.
- **If the home range of the displaced individual is known, or the individual comes from the local area (i.e. the same ecosystem and geographically contiguous to site displaced from) and has been either captive or cultivated only a short period or suitably rehabilitated**, responsible translocation of the temporarily displaced individuals back into their home range or local area may be feasible and relatively low risk if screening by a qualified veterinarian (or a local expert with the advice and monitoring of a national or international expert veterinarian) shows they are negative for species-specific diseases of concern.
- **If the precise origin of the displaced organisms is unknown**, genetic testing should be conducted to ensure the individuals are released into sites containing wild populations of the same subspecies, variety or strain, population or culture. This will avoid negative genetic effects for target species that have subspecies/varieties/strains, or distinct populations or cultures.
- **Individuals from common species that are currently injured/ill or have been captive for more than a short period need to be evaluated for injury and diseases of concern (Actions 8 and 9), confirmed to be suitably rehabilitated (see Action 11) and follow the other actions in these guidelines to evaluate if they are suitable candidates for responsible translocation**. The definition of a "short period" differs by taxon and should be determined by consulting expert on taxon's wild behaviour (animals) or ecology and life cycle (plants), but regardless should be as short as possible. For animal species, a short period would generally not exceed one month for purposes of determining rehabilitation need. Evaluation for diseases of concern is necessary for an animal that has been held captive for any period of time, as pathogen transmission can occur very quickly.

Spot billed pelican release © Ennore Shantanu Krishnan

Action 3. Determine if there is an existing conservation translocation programme



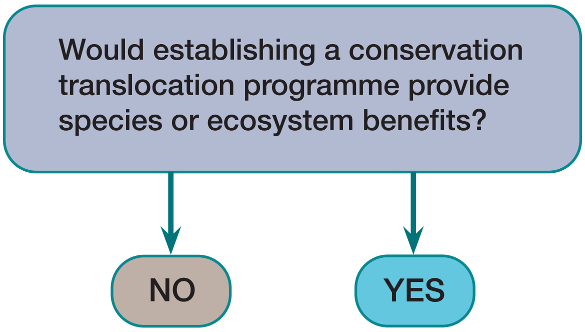
Step 1. Identify and review potential programmes.

A well-planned and monitored conservation translocation programme has the following characteristics:

- **Clearly defined goals** for translocation in line with peer-reviewed published data, species conservation action plans, and population and habitat viability analyses.
- **Risk assessment and feasibility analyses** support the assumption that the species would benefit from supplementation of existing populations or establishment of new populations.
- **Financial, infrastructure and personnel resources are in place** to address challenges covering a taxon-appropriate period of survival and adaptation after release.
- **A translocation plan is in place** that defines success for the project and specifies when and how to intervene if released individuals or the released population are not thriving.
- **A representative number of released individuals are monitored post-release.** Resident wild conspecific populations are surveyed or monitored before and after releases to assess impacts of the translocation. Wherever possible, findings and data from post-release monitoring should be shared publicly to improve learning, research initiatives, and the practice of responsible translocation.
- Where appropriate, less optimal sites and circumstances may be used as part of scientific testing and monitoring of release methodologies for the taxon to determine safeguards for translocated individuals' welfare, survival and breeding. When feasible, plan for research efforts and lab testing to better understand physiological response to translocation methods, or partner with educational institutes for specific research into this and other translocation issues.

Feasibility analysis, risk assessment, and planning and monitoring are crucial elements of a conservation translocation. Feasibility and risk assessments determine whether there is funding, personnel resources, potentially suitable habitat in native range, and appropriate methods to conduct a translocation that benefits the species or ecosystem and does not cause harm to wild conspecifics, other native wildlife, ecosystems and human communities. These elements also indicate whether translocation is an effective means to protect the species, or if alternative conservation actions such as habitat protection or work with local communities to address local threats would be more cost efficient and effective. Planning and monitoring ensure that translocations are designed to serve identified conservation aims, and that project design can be adjusted if things go wrong.

Action 4. **Determine if establishing a conservation translocation programme would be beneficial, if the organism can be responsibly translocated for non-conservation purposes, or if it can best contribute to species conservation in some other way**



If there is not a suitable conservation translocation programme in place, conduct feasibility and risk assessments to determine if one would provide benefit to the species or the ecosystems it inhabits. The considerations below, together with others in these guidelines, comprise the necessary actions to assess feasibility and risk, and for responsible translocation for either conservation or non-conservation purposes.

Step 1. Conduct feasibility assessment to determine the potential for conservation translocation.

- Collate or collect information about the species **biology and ecology** (what does it need to live, where and in what types of habitat does it live, and what are its social and breeding behaviours. **Understanding the basic needs of the species is crucial to responsible translocation**. This information may already exist—review the scientific literature and contact species experts to determine what is known and whether additional or more recent studies are needed.

- Determine whether there are potential release sites within the species' current range where **threats to the species have been mitigated or controlled enough to enable survival and where there is low risk of negative impacts to wild conspecifics, other native wildlife, and humans**. Studies on potential release sites may already exist—review the scientific literature and contact species experts to determine what is known and whether additional studies are needed.

- Identify the **resources (funding, personnel, equipment, logistics)** required over the long term to safely conduct and manage the translocation. Consider that many species do not survive translocations, or thrive post-translocation, without additional support such as acclimatisation periods, supplemental feeding, and medical interventions following release (this is known as soft release, and requires additional resources).

- Assess whether translocation is a **cost-effective action** or if there are more efficient ways to improve the species status (such as through better protection of habitat or community level interventions to address conflict or other threats), the organism's health and welfare, or to achieve other translocation aims.

- Identify whether the **necessary resources are in hand** or if can they be reliably secured. Consider that many organisms may live a long time and may have slow breeding/recruitment cycles, which should be factored into monitoring plans that track survival and breeding, welfare, and population status changes as a result of translocations.

Further information on feasibility assessments is available in the *IUCN Guidelines for Reintroduction and Other Conservation Translocations* (IUCN/SSC 2013).

Step 2. **Conduct risk assessment to determine the relative risks and potential benefits to the species, the ecosystems it inhabits, and to the released individuals.**

- Determine the **potential for conservation benefit.**
  - Will adding individuals through translocation help re-establish the species in sites within its current range from which it has been extirpated (reintroduction), or supplement existing wild populations that are not viable or are at risk of genetic issues (reinforcement)?
  - Will adding individuals through translocation help restore lost or diminished ecosystem functions or processes such as predator-prey relationships or seed dispersal?
  - Is translocation the best conservation option for the individual(s)? For example, it is useful to consider if individuals of rare taxa that have been held in captivity or cultivated could have more conservation value and/or pose lower risks to imperilled wild conspecifics by becoming part of a captive breeding programme that is well established and demonstrably adds value to in situ conservation efforts.

- Determine **whether responsible translocation is possible.**
  - Can translocation be done safely and with minimum risk to the survival, welfare, genetics, and behaviour of wild conspecifics?
  - Can it be done with low risk to other resident wildlife and ecosystem functions and processes? Will there be low risk to the welfare of translocated individuals?
  - Could the translocation have negative impacts on local human communities or lessen their acceptance of conservation or translocation projects generally?

Further information on risk assessments is available in the *IUCN Guidelines for Reintroduction and Other Conservation Translocations* (IUCN/SSC 2013).

The potential value of a translocation should always be considered in light of the risks to the recipient wild population, as conservation of this wild population should always take precedence over any potential welfare benefit to released individuals. Although translocation can serve as a communication tool to inform the public about species conservation, the expectation of good publicity is also not a reason to translocate and can drive poor decisions resulting in poorly planned or irresponsible translocations that may harm conservation of the taxon or the ecosystem (Moehrenschlager et al., 2013).

Step 3. If feasibility and risk assessments indicate developing a responsible translocation is an option for the organism, conservation translocation programmes should follow the standards defined in Action 3, along with the remaining actions in these guidelines and in the *IUCN Guidelines for Reintroduction and Other Conservation Translocations* (IUCN/SSC 2013). the ecosystems it inhabits, and to the released individuals.

Action 5. Develop a clear goal for the potential translocation

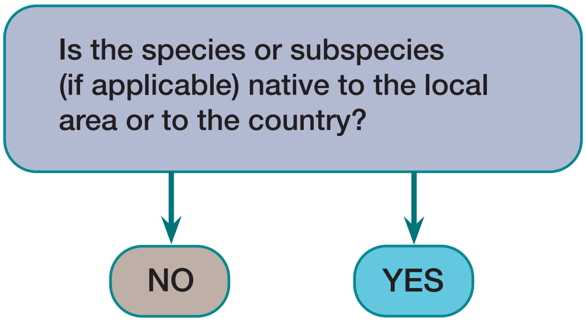
Create a clear goal for potential translocation: What does it aim to achieve, and how?

Step 1. Articulate a **clear goal** for the potential translocation. Define the purpose of the translocation, and its short and long-term goals. Articulate the desired outcomes and create a plan for how to achieve them.

Step 2. Develop a plan for determining translocation feasibility. A clear written plan covering how the aspects discussed in these guidelines will be assessed and implemented is essential for determining translocation feasibility, and to prepare for managing a translocation if feasibility assessments are favourable.

Greater one horned rhino (*Rhinoceros unicornis*) © Rathin Barman

Action 6. Determine if the species is native



Step 1. Determine if the organism is native to the local area, and whether is it part of a specific group/ population which may have specific cultural/behavioural characteristics.

- Consult the scientific literature to **confirm the species/subspecies/population range in the local area**. Suitable information describes current knowledge of the species/subspecies and the habitat.

- In the case of uncertainty in the science, consult with species experts to confirm native range and habitat.

Step 2. If the organism is not native to the local area, determine if it is **native (indigenous) to the region and country where it was encountered (e.g. found, rescued, confiscated, or surrendered)**.

- Consult the scientific literature to confirm the **region and country of species/subspecies/ population range.**

- Consult with species experts to confirm native range and habitat in case of uncertainty. **Organisms that are not native to the region where displaced cannot be responsibly translocated locally, but instead should be returned to an existing translocation programme in the region of origin.** If this is not possible, the individuals should be placed in lifetime care in a suitable facility (see Appendix 3 for information on animal welfare considerations and resources for finding suitable long long-term care facilities), or euthanised, as appropriate.

Non-native organisms should not be translocated locally. Non-native displaced organisms may be returned to their country of origin (repatriated) using appropriate legal channels, which will entail approval from appropriate government authorities in both the sending and receiving countries, and CITES permits if the species is listed under CITES. Species threatened with extinction can potentially be part of a managed conservation breeding or translocation programme (see Actions 3 and 4), or a local conservation programme. Organisms can also be placed in a species-appropriate long-term care facility if no such options are feasible. If the organism cannot be repatriated or placed in a suitable care facility, humane euthanasia methods may be considered.

In exceptional cases non-native displaced organisms that are species threatened with extinction may potentially contribute to existing or planned projects for assisted colonisation. Contact IUCN Conservation Translocation Specialist Group to determine if such opportunities exist for the organism in question.

Action 7. Assess the source of displacement and length of time held by humans

Organisms in distress

Catastrophic events, climate change, human developments and actions

Hunting, poaching and illegal trade

Legal trade

Human - wildlife interactions and proximity to humans

Step 1. Identify the source of the displaced organism, and whether it is wild or if it has been captured and kept by humans.

Step 2. Considerations for wild organisms not held by humans.

Wild organisms displaced or incapacitated by climate change or disasters

- Check organisms for **signs of physical injury or clinical signs of illness** (see Action 8), and psychological distress (see Action 11). Organisms displaced by disasters or climate change may be in poor physical condition and may need veterinary care (or phytosanitary care in the case of plants) to treat injuries, and address dehydration, undernourishment, or other conditions.

- Translocation opportunities for these organisms will depend on the **extent and duration of the displacement**. In the case of temporary events such as extreme weather, the individuals should be released in or as close to their home range as possible following cessation of the weather event. In cases of catastrophic fires or floods, habitats may take significant time to return to conditions suitable for the organism to survive and thrive. Temporary captive care may be required until the habitat recovers, or a suitable alternative release site within the species/subspecies/population range is identified (see Action 12 on release site selection).

- **Individuals displaced by climate change need to be translocated into suitable habitat within species range at an altitude and with climate and weather conditions that will stay within the species/subspecies or population's known tolerance limits for the foreseeable future.** In exceptional circumstances for species threatened with extinction where no suitable habitat is available within species range, being part of an existing or planned project for assisted colonisation may be a possibility. Contact the IUCN Conservation Translocation Specialist Group to determine if such opportunities exist for the organism in question.

- In all cases, WOAH sanitary and mitigation measures should be followed during care, transport and, where feasible, release to prevent transfer of pathogens, disease, and other health risks (see Appendix 3).

Wild organisms captured, collected, restrained or driven from their habitat due to conflict with humans, or displaced by human activities

- Priority should be given to working with local human communities and land managers to find solutions for protecting these organisms in their natural habitat, rather than removing them. Translocating these organisms presents welfare and survival risks to the individuals, as well as disease, genetic and behavioural risks to wild conspecifics and other wildlife at release sites. If moved, these individuals may return to capture sites or fail to adapt in new habitats.

- If the individual(s) have been captured, collected, restrained or driven from their habitat by human actions, rescuing and releasing the individuals back into or near their home range is most likely to have conservation benefits for the species in the wild, and to avoid harms to wild populations and ecosystems. Organisms released far from their home range may pose risks to wild populations in the release habitat, may fail to adapt to the new habitat, and are more likely to travel back to their area of origin, often causing further conflicts along the way.

- "Problem" individuals including carnivores that habitually prey on humans or livestock and foragers that habitually cause significant property damage or human injury or death (e.g. elephants) require special consideration. For problem individuals, prevention and mitigation measures are recommended prior to attempting translocation. This is particularly critical for species threatened with extinction. Prevention and mitigation can include actions such as zoning to separate people and livestock from carnivores, planting "buffer" crops that are unpalatable or unpleasant to forager species, avoiding livestock grazing in carnivore habitats, putting livestock in fenced enclosures at night, "hazing" to deter the carnivore's presence, improving the prey-base of the carnivore's home range, relocating human communities from key habitats of carnivores, and providing health and life insurance, financial compensation or incentives to address livestock, crop, or property losses and human deaths or injury. Information is available in the *IUCN SSC guidelines on human-wildlife conflict and coexistence* and from the resources portal of the IUCN Human Wildlife Conflict Task Force (see Appendix 3). If translocation appears the only option, evidence should be collected to ensure the animal in question is the culprit causing the problems, and potential release sites should not be saturated with conspecifics or other wildlife using the same prey base or other food resources. Efforts should be made to keep breeding females in their home ranges. Younger animals may be more amenable to adapting and establishing home ranges if translocated.

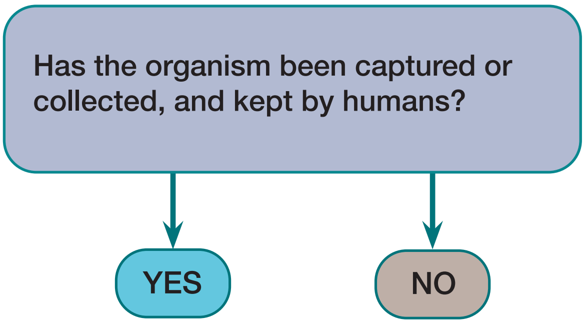
- In all cases, WOAH sanitary and mitigation measures should be followed during care, transport and release (if feasible) to prevent transfer of pathogens, disease, and other health risks (see Appendix 3). The collection of specific biomaterials for live-cell culture (biobanking) should be considered, where possible, prior to release as this ex-situ conservation tool can serve as an additional safety net especially for displaced and translocated species of conservation relevance (see Appendix 3 for assistance).

Wild animals too young to be independent encountered alone and seemingly abandoned

- Dependent young animals (e.g. infant mammals or bird chicks) are commonly picked up by humans when encountered alone because they are thought to have been abandoned by their parents. In fact, animals often leave their young alone while they seek food. Generally, these individuals are not abandoned, and should be returned to their original location and left alone (and monitored remotely, if possible) to facilitate them being found and fed by their parents. Local wildlife organisations may be able to assist with attempts to reunite the infants or chicks with their parent(s).

  Wildlife rescue organisations should be contacted in the case of young animals whose parents have been killed or who have not returned for more than a day. If the individuals need to be rescued because they are injured, in immediate danger, or are species whose infants require near constant parental care such as primates, elephants, and some marine mammals, follow the pathway in Appendix 1 (animals) or Appendix 2 (plants) and step 3 here for captive organisms to determine if translocation is feasible following appropriate rehabilitation.

Step 3. Considerations for organisms held by humans.



Wild organisms that have been recently captured or displaced

- **Organisms that have already been captured, displaced, or transported by humans should be released back into or near their home range if possible following assessment for injury and diseases of concern for the species by a suitably qualified veterinarian or phytosanitary expert before they can be considered suitable for release. Generally, healthy animals that have been captive for short periods (hours up to one month) are wild and do not need behavioural rehabilitation in a captive care facility unless they display notably human-habituated behaviours.** Sanitary and mitigation measures should be followed to prevent health risks (Appendix 3).

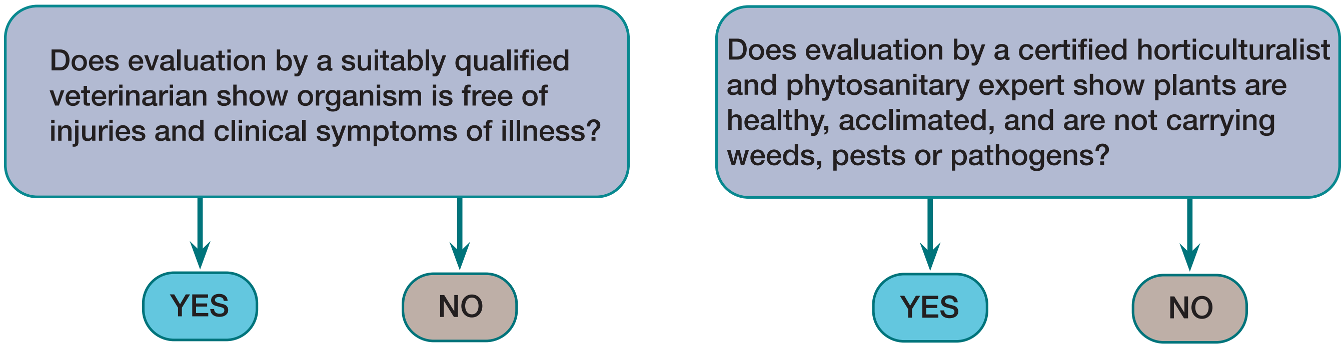
Organisms that are held by humans for longer periods

- **Organisms that have been held by humans for more than a month should be assessed for behavioural suitability to determine if they need rehabilitation prior to release.** Individuals kept by humans are likely to experience changes to their behaviours in relation to finding food and in responses to potential threats, including humans. Younger animals of higher vertebrate species in particular may not have developed suitable foraging or hunting skills to survive on their own in the wild if they have been kept in captivity for even short periods.

- **All organisms held by humans need to be assessed for injuries as well as diseases and infections of concern for the species before they can be considered candidates for translocation.** WOAH sanitary and mitigation measures should be followed during care, transport and release, and collection of samples for health surveillance and biobanking should be considered where feasible (see Appendix 3).

- **Individuals not healthy or behaviourally suitable for release should be further rehabilitated, placed in lifetime care in a suitable facility, or euthanised as appropriate.**

Action 8. **Determine the general health of the organism**



Step 1. Conduct a veterinary clinical examination to determine if the organism is free of injuries and clinical symptoms of illness.

Animals:

Veterinary clinical examination of any animal to evaluate health and disease requires professional skills and should not be left to laypersons. Laypersons may be involved in general first aid and primary care of a clearly sick individual. **Assessing risk of injury or disease to the animal in question and to other animals is a professional skill, and in many cases will need to be backed up by clinical pathological diagnostics, and require interventions such as isolation, quarantine, biological sampling and treatment before any decision on the fate or translocation of the animal can be allowed.** Where a suitably qualified veterinarian is not available locally, national or international expert veterinarians should be contacted for advice and to monitor any interventions, laboratory work, or similar risk mitigation measures around disease and health.

- If the animal has a **notifiable disease** (any disease required by law to be reported to government authorities for bio-surveillance), the disease will be regulated and the animal controlled under legal instruments requiring specific standard operating procedures and interventions.

- **Certifying that the animal is free of injuries and clinical symptoms of illness requires an honest and professional view of the animal showing normal behaviour and physiological signs such as body temperature, heart and respiratory rate, blood pressure and no physical visible anomalies, abnormal secretions or excretions.** Laboratory exams (haematology and biochemistry, testing for diseases of concern) are necessary when clinical signs indicate there may be a potential risk. If issues are identified that require laboratory testing but no laboratory is available, contact outside wildlife veterinary organisations for support and resources to enable necessary testing (see Appendix 3 for resources). Individuals with clinical signs of potential risk cannot be released. Potential for subsequent release after testing or treatment conducted or advised and monitored by an expert veterinarian is dependent on the specifics of the pathogen and its risk level for wild populations, as determined by the DRA analysis and confirmed by the expert veterinarian. Translocation practitioners are responsible for any risks created by translocations they conduct and the assessments they made of the release candidates. Release candidate assessments and the decisions made based on those assessments are likely to be scrutinised in the event of any post-release issues.

- **Species/subspecies threatened with extinction that have been held by humans or cannot be released into or near their home range should be screened for potential pathogens dangerous to wild conspecifics and other wildlife at the release site.** Even if the individual is healthy, the risk of introduction of novel infections or pathogens into naïve populations is high for threatened species, long-distance translocations, and in situations where the organisms have been kept with humans, domesticated animals, peridomestic animals or synanthropic wildlife. Also, if the displaced organism is potentially naïve to endemic pathogens/other disease agents in the release environment, that could pose a risk to its health or survival if released.

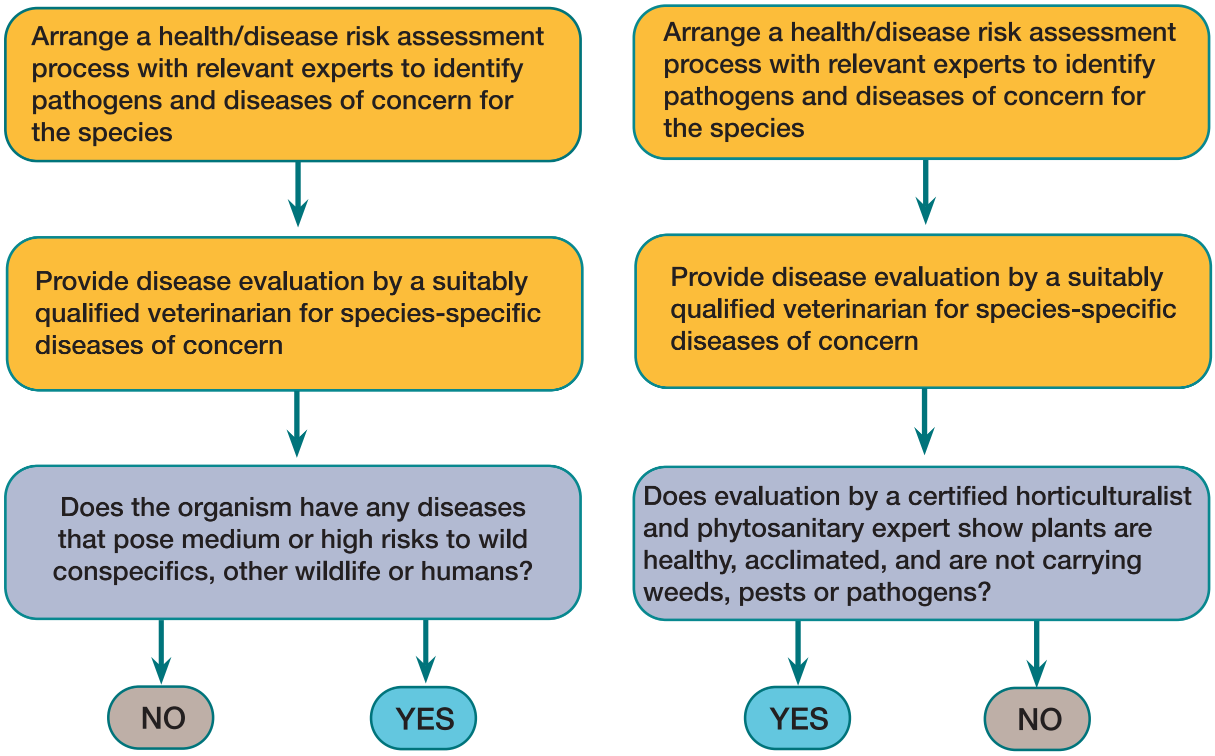
Plants:

Clinical examination of plant material to determine if it is healthy, acclimated, and free of weeds, pests, or clinical signs of pathogens requires professional horticultural and phytosanitary skills, and should not be conducted by laypersons. If the plant has a notifiable disease monitored by government authorities, there will be legal and regulatory controls and mandatory standard operating procedures and interventions.

Wherever appropriate collection and storage equipment is available, it is also useful to collect biomaterial and live cells from any translocation candidates (animals, plants, and other taxa) prior to translocation. These materials hold valuable information for disease surveillance, and can strengthen understanding of genetics, health and welfare and physical condition. The collection of specific biomaterials for live-cell culture can serve as an additional safety net especially for displaced and translocated species of conservation relevance (see Appendix 3 for assistance).

Confiscated plant specimens being sorted © South African National Botanical Institute

Action 9. **Assess the organism to determine if it has infections or diseases of concern that pose medium or high risk to its survival in the wild, and/or to wild conspecifics, other wildlife, livestock, or humans**



Step 1. Assess the organism following the precautionary principle to prevent introduction of pathogens to wildlife, domesticated animals, and humans.

Animals:

Any **source population**, (the wild or captive population the individual came from), **must be assessed for health as well as diseases and infections of concern before the individual can be considered a candidate for translocation.**[1]

- **Where the population/ecosystem is found to be or is known to be infected with notifiable diseases or infections of concern for any species, the individual requires definitive diagnostics to establish freedom from these infections and/or diseases caused by these agents before consideration of release.** The specific diseases and infections of concern depend on the taxon, and should be determined in consultation with veterinarians with expertise in the taxon. An expert-driven assessment will determine what screenings are necessary and whether laboratory testing is required. Where a suitably qualified veterinarian is not available locally, national or international expert veterinarians should advise and monitor any interventions, laboratory work, or similar risk mitigation measures around disease and health.

- **The individual is cleared to be a release candidate if it is found to be healthy and clear of infections of concern that exist in the source population or translocation pathways, and of any infections of medium or high risk to the individual or recipient population** using appropriate standards of diagnosis.

- **After the individual(s) is(are) released, both released individuals and any recipient population should be passively (and in some circumstances actively) monitored for several months for any signs of ill health and novel disease events in the same species, closely related species and unrelated species which share the habitat, in that order of priority.** Information on active and passive monitoring is provided in Appendix 3.

[1] Correction: A sentence fragment, "similar risk mitigation measures around disease and health" was deleted on July 29, 2025.

Plants:

- Any **plants or plant materials that have been kept or transported by humans need to be assessed for phytosanitary conditions and for diseases of concern for conspecifics and other plants in potential release sites before they can be considered candidates for outplanting.**

- **Soils or other potting medium** that the plant materials have been kept or transported in **must be assessed for potential pathogens, weeds, and pests before the plants or plant materials can be considered candidates for outplanting.**

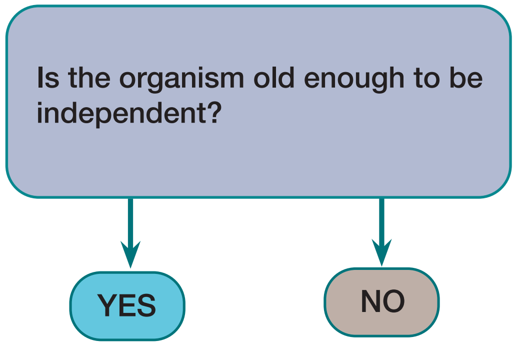
- Where the **source population/ecosystem is found to be or is known to be infected with notifiable diseases or infections of concern for any species, the individual requires definitive diagnostics to establish freedom from these infections and/or disease caused by these agents before consideration of outplanting.**

- The individual is cleared to be considered as a translocation candidate if it is found to be **healthy, acclimated, and free of weeds, pests, and any diseases of concern in the source population or translocation pathways, and of any infections of medium or high risk to the individual or recipient population** using appropriate standards of diagnosis.

Action 10. Determine if the displaced individual is old enough to be independent (animals)

Step 1. Assess the developmental stage of the organism.

Consult the scientific literature to determine morphological features and behaviours of adults versus infants and juveniles of the species. Determine the relative age of the individual, notably whether it appears to be an infant or juvenile. Species experts can help in case of uncertainties.



Step 2. Determine whether the organism is dependent on its parent(s) at the age it appears to be.

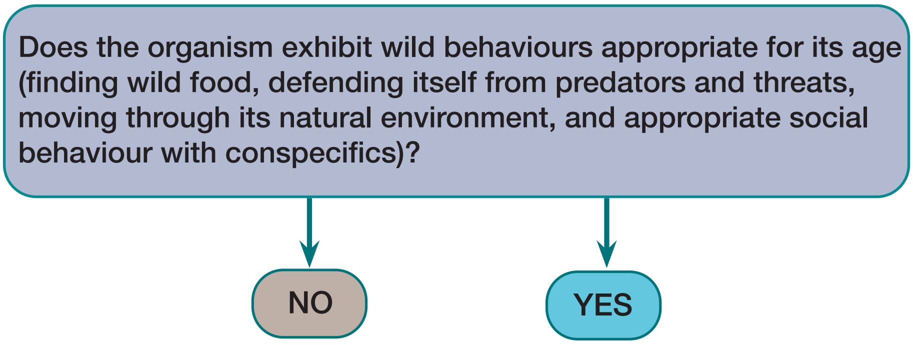
- **Nursing infants and altricial young are dependent on a parent/adult conspecific** and cannot be translocated before being weaned/trained to find food on their own.

- Some species including **primates, elephants, big cats, and some marine mammals**, cannot survive without long periods of dependency on their parents or a surrogate parent to learn how and where to find food and engage in appropriate intraspecific social behaviours. **Such species will need significant taxon-appropriate rehabilitation prior to consideration for translocation.** In some cases, dependent young organisms can be released with parent(s) or adult mentor(s) and gain necessary life skills in the recipient habitat. It is important to determine if the release habitat has suitable nutritional resources to meet the requirements of both dependent young and the parent(s) (these needs will be greater for lactating mammals for example).

Step 3. Confirm if the individual can find **food and water** on its own, and whether it is able to defend itself from **predators** and build **nests/dens** or otherwise meet safety and sleeping needs. It is also critical to determine whether the individual has had enough social training with adults based on species needs to **interact appropriately with conspecifics**. Many animal species need years to develop these skills. **Young animals will need significant species-appropriate rehabilitation to learn these skills in a captive or soft-release environment.**

Action 11. Determine if the individual is suited to release

Animals Determine behavioural suitability



Step 1. Determine whether there are proven appropriate rehabilitation methods for the organism's taxon.

- Consult the scientific literature, IUCN taxon-specific guidelines, and species experts to determine **successful practices for rehabilitation of wild behaviours in the species/subspecies**. Suitable information describes current knowledge of the species/subspecies' wild behaviour and rehabilitation practices. Consult species experts in case of uncertainties.

- Where no published science is available for the species, review scientific literature for available **information on closely related species**. Where no information is available for the target species/subspecies or closely related species, monitored and controlled experiments with small trial translocations (such as into managed, semi-wild habitats) can be conducted to develop, evaluate and adapt effective rehabilitation procedures.

Step 2. (Animals): Have a species behavioural expert and person involved in the individual's care assess it for social skills to defend itself, form alliances, and find mates as appropriate for its species and age. Consult the scientific literature to determine expected behaviours for wild conspecifics. Species experts can help in case of uncertainties. It may be possible for individuals without the full complement of species-specific skills to acquire them during a monitored soft release process.

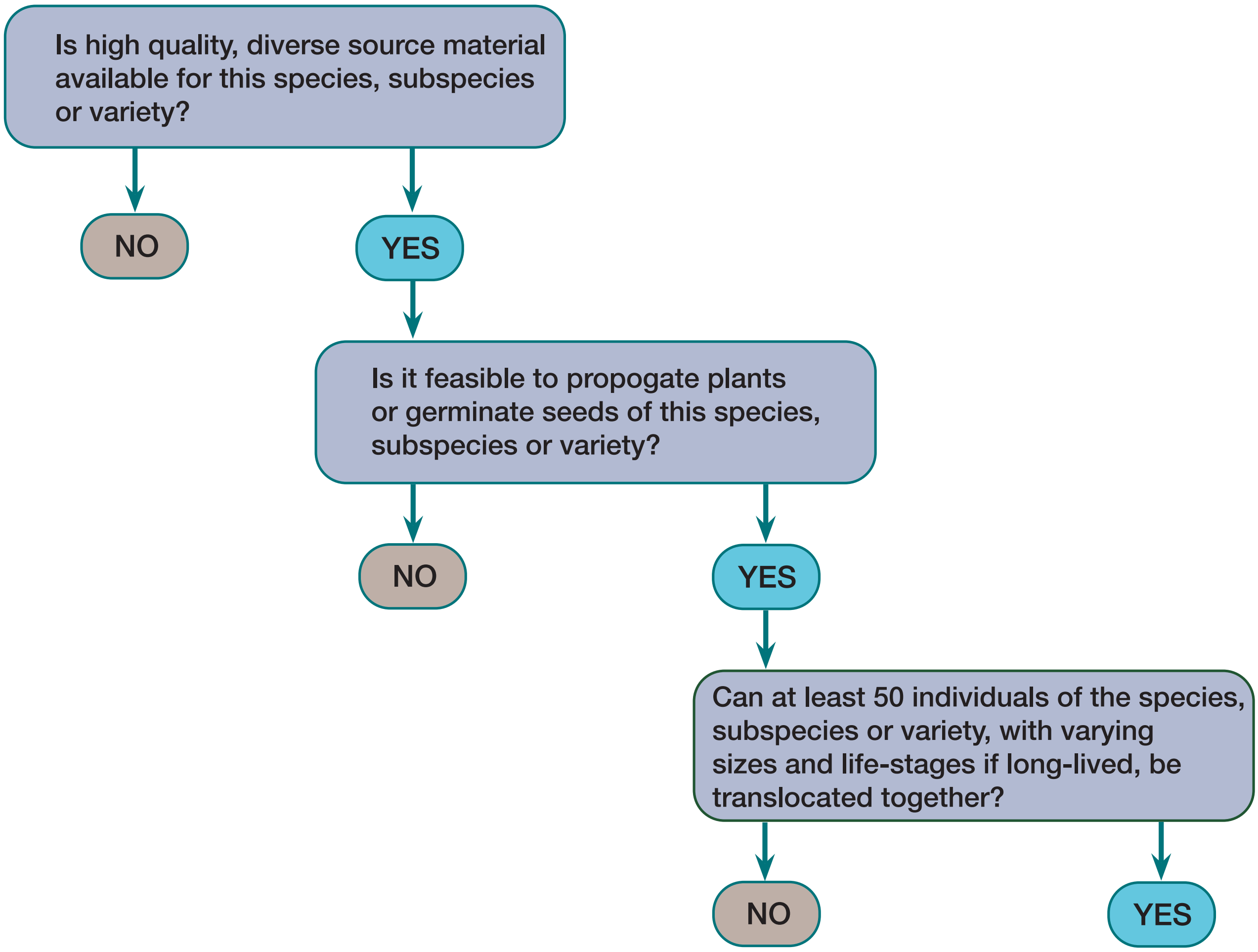
Step 3. (Animals): Confirm that the individuals are not overly human-focused (i.e., likely to seek human company or food/other resources from humans).

- **Individuals that expect food or other resources from humans are not suitable for release as they are likely to be involved in conflicts with humans.** Further rehabilitation may address this problem in some cases. If the problem cannot be overcome, the individual is not suitable for release.

- **Individuals that are overly comfortable in the presence of humans are at greater risk of being captured or killed.** While under rehabilitation, many species will become comfortable with or even develop strong social relationships with their specific caregivers. This is normal but contact and relationships should be minimised during later stages of rehabilitation to accustom the animal to living without human support. Additionally, animals that are comfortable with any human and not just their caregivers are likely overly human-focused. Care should be taken to manage undesirable behaviours in other captive individuals the release candidate lives with, lest the candidate learn and express these behaviours after release.

- **Many individuals seized from trade have been held by humans for short periods and thus retain wild behaviours and do not need behavioural rehabilitation in a captive care facility prior to release.**

Plants Determine if the displaced plants or plant materials comprise suitable source material for translocation



Step 1. Determine source material suitability.

- To be considered suitable source material for translocation, plants and plant materials should come from a **location with similar environmental and climatic conditions as the potential release site.**
- Plants from ex situ settings (including confiscated plants and plants kept by humans) can be used as source material but should be carefully managed to **avoid genetic issues facilitated by artificial selection and other practices.** Cultivated specimens used for source materials should have **even family line representation** to maintain genetic diversity and reduce selection risks.
- Source plants for outplantings of long-lived species should include **individuals of varying sizes and life stages** to maximise survival at recipient sites.

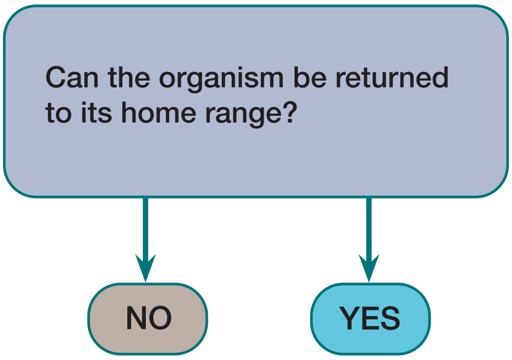
Step 2. Confirm that the organism be germinated or propagated.

- Individuals of species/subspecies/varieties should only be translocated if previous tests show they can be **successfully germinated or propagated.** Where germination or propagation is not feasible, plants and plant materials can potentially be used to help develop suitable germination and propagation techniques to advance translocation methods for the organism.

Step 3. Confirm that there are sufficient numbers of candidates for outplanting.

- Use of **at least 50 whole plants** is recommended for successful translocation. If using seeds the numbers should be much higher, **ideally a number commensurate with the assumption that germination rates may be as low as 1%.**

Action 12. Determine whether there is a suitable release site for the displaced organism



Step 1. Identify the home range of the individual, if known. Determine if the individual can be released back into or near its home range.

- Consult with individuals involved in rescues to **determine the origin of the organism as precisely as possible**. Consult the scientific literature and with species experts to ensure that reported home range is within species/subspecies/population range and is of suitable quality to maintain wild populations. Suitable information describes current knowledge of the species/subspecies and the habitat.

- Where there is **high certainty as to the home range of the individual** (for example if it is recovered from a well, trap, or disaster within or adjacent to a site within native species range), the individual can be returned to its home range or released where found without additional habitat analysis. If the home range is uncertain, see step 2.

- **Healthy and behaviourally suitable individuals** that are recovered from hunting, conflict, or disaster in or near their home range should be **returned to that home range whenever possible.**

- If **precise home range is known**, animals and plants in need of short-term care (such as for injuries or poor condition) should **be released into or near that home range, if possible, following health care, rehabilitation and screening for diseases of concern.** Returning an individual to its known home range will afford it the best chance at survival and minimise disruption to wild conspecifics, other wildlife, and the ecosystem.

- If the individual's home range is subject to **threats to the species/subspecies or population's survival,** such as hunting pressure or habitat destruction, **consider if efforts can be made to address these threats and protect and/or restore the home range to allow release of the displaced individual(s) in the future.** Scoping or planning for a potential translocation may provide political and social incentives to improve protection and/or restoration. **Translocations should only occur when the habitat is suitably protected to prevent excessive mortality or capture of released individuals, and when the area and quality of the habitat are sufficient to meet the food and resource needs of resident wildlife in addition to any released individuals.**

Step 2. If the individual's home range is uncertain or if it is displaced outside of species/subspecies or population habitat range, assess whether there is sufficient information on the organism to identify suitable release sites.

Is there sufficient information available on the natural habitats and ecology of the species or subspecies (if applicable) to identify suitable release sites?

→ YES

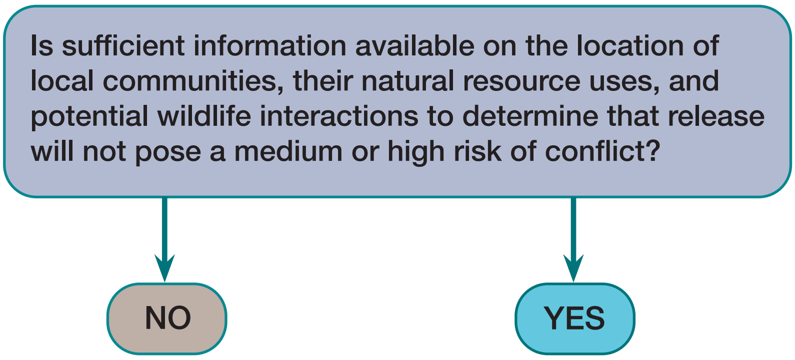
→ NO

- Consult the scientific literature to determine the following information about the species/ subspecies or population:
  - The **current distribution of the species/subspecies or population**. What **habitat types** does it use?
  - What are the **food, water, and nesting/denning or other natural resources** it requires to survive? How do these needs fluctuate seasonally and over the long term in the areas it inhabits? What are the biotic and abiotic habitat requirements including altitude, temperature range and weather (including episodic extreme weather events), rainfall, and terrain the species is adapted to? For animals, what are the socioecological needs? How do they form allegiances, find mates, defend territory, and raise infants?
  - What are the **home-range size and dispersal patterns (animals)** or **growth and dispersal** patterns (plants) of the species/subspecies or population?
  - **What other key species occur within the target species habitats?** What is the organism's **role in the ecosystem?** What other species does it depend on, and what species depend on it? Does the organism provide critical functions such as pollination or seed dispersal, or act as a symbiont or host of other fauna or flora?
  - What are the **threats to the organism and the ecosystems it inhabits**, and are there parts of the species/subspecies range where these threats are mitigated or controlled enough to enable long-term survival of the target species/subspecies or local population?
  - What are the **pathogens and diseases of concern for wild populations?** Are there novel diseases in captive organisms of the species/subspecies or in humans that might pose medium or high risks to wild conspecifics (see Action 7)?
  - Further information on necessary data is available in the IUCN Guidelines for Reintroduction and Other Conservation Translocations (IUCN/SSC 2013).

For some organisms these aspects are well studied, and **suitable existing information** can be compiled. Suitable information describes current knowledge of the species/subspecies and the habitat. Where this information is not available, it may also be possible to transfer displaced individuals to the care of an **existing translocation programme** for the species that is already undertaking the baseline studies needed to determine if there are suitable release sites within the species/subspecies range. Otherwise, organisations working with these species may already be conducting or willing to conduct such studies, in which case **partnerships** can be an efficient way to accomplish necessary research.

A useful tool to easily assess habitat suitability is a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis developed by a stakeholder team with relevant experts in candidate species' ecology and relevant topics e.g. interacting species, vegetation, hydrology, climate, and human impacts in the potential release areas, as described in White et al. (2015). This model also helps identify and prioritise actions to address threats and improve habitat suitability.

Step 3. (Animals). Identify potential impacts to and conflicts with human communities in or near the release site. Determine whether and how local communities in and near the release habitat use the area's natural resources. Consider whether conflicts with released individuals or over the translocation project are possible.

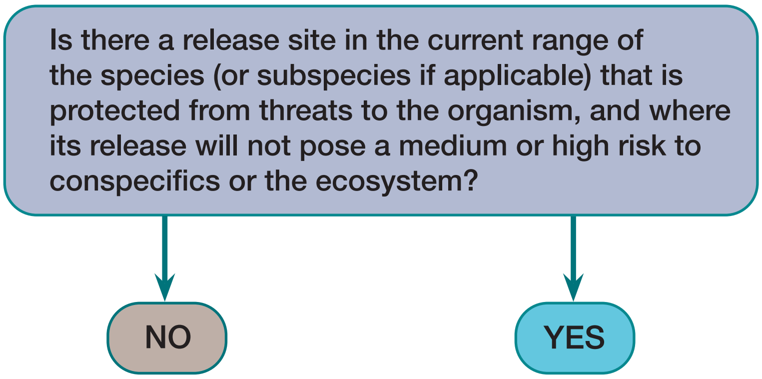


- Consult the scientific literature and local maps to identify **communities that are in or near the release site.**
- Work with social scientists to conduct **consultations with local communities**, or work with local organisations that can do this, to determine community use of the release area, how communities perceive translocations in the area, and whether they anticipate positive or negative impacts.
- Consider **partnering** with other organisations, such as community development organisations, that specialise in this type of research.

Step 3a. (Animals). Consider whether potential conflicts between humans and the project, and humans and translocated organisms, can be avoided or mitigated at the potential release site.

- Work with social scientists to conduct **community consultations** to determine how conflicts could be avoided or mitigated. This includes identifying local community needs that, if met, could mitigate negative perceptions and/or impacts of the translocation.
- Plan suitable **interventions that meet community and translocation project needs.** It is important to bear in mind that community needs are ongoing, and **interventions must be planned (and funded) to be sustainable over the long term.** Interventions conducted for a short time and then abandoned can generate resentment and lead to lower tolerance for the translocation project and the species instead of the intended positive impacts.

Step 4. (Identify any suitable release habitats in the current range of the organism where it is adequately protected from threats, and where its release poses a low risk to conspecifics, other wildlife, and the ecosystem.



- Consult the scientific literature for studies of potential release sites to determine the following:

  - The **presence/absence and status of wild conspecifics**, specifically if the population at the release site is healthy or viable, in which case translocations are likely to pose more risks than benefits, or if it is below viability or depleted, is declining sharply, or is experiencing inbreeding depression or lack of adequate genetic variation, and would thus benefit from reinforcement with released individuals.

  - Are there **closely related sister species/subspecies in the wild** at the release location that could potentially hybridise with translocated animals? Hybridisation/introgression can be a major problem, especially if either the released organism or sister species at the release location are endangered.

  - What is the availability of **sufficient food, water, and other crucial natural resources for the long term, nesting/denning (for animals), space for growth (plants) and for home range establishment and natural dispersal patterns (animals), for the released individuals in addition to resident wild populations**, accounting for projected population growth from translocations and associated breeding? If the release habitat is fragmented, the total area and connectivity allowing movement among fragments needs to be considered.

  - Have **threats to the species and the ecosystem** been addressed or are they sufficiently controlled to prevent decreased survival of released individuals and the resident wild population?

  - What other key species live in the release site, and will they compete for same resources with the target species?

  - What are the **interdependent species** such as pollinators, seed dispersers, symbionts or hosts that are present or absent at the release site?

  - Is there any **risk of conflict with human communities** from the planned translocation?

  - What are the **expected pressures including climate change** that might affect the organism at the site over the long term, and are they expected to remain within tolerance limits?

- It is important to take into account the breadth of ongoing actions and policies that affect the species' survival. Will reintroduction at a new site undermine efforts or political will to protect existing wild populations? Translocations should only happen where they are not expected to have a negative effect on the conservation of the species overall.

- For some habitats these aspects are well studied, and suitable existing information can be compiled. Where this information is not available, it may also be possible to transfer displaced individuals to the care of an existing translocation programme or species-specific conservation programme that is already undertaking the studies needed, or to develop partnerships to accomplish necessary research.

- While the level of detailed information required to assess suitable release sites may seem overwhelming, it is critically important to gather this baseline data. Studies show that more than half of translocations fail because individuals did not establish, most commonly due to lack of baseline biological and ecological knowledge.

Further information on habitat assessment is available in the *IUCN Guidelines for Reintroduction and Other Conservation Translocations* (IUCN/SSC 2013).

Step 5. Secure all necessary legal permission and authorisations.

Translocations require approval of government and/or all legal owners of the land, as well as any local communities that use the land or have traditionally done so.

When is a potential release habitat ***suitable***?

- Habitats with sufficient food, water, natural resources, and within environmental tolerance limits for the species/subspecies, with all required legal approvals secured, and where there is low risk of negative impacts to wild conspecifics and other native wildlife, and to local human communities, are *suitable*.

When is a potential release habitat ***unsuitable***?

- Habitats with insufficient food, water, and other natural resources adequate to supply resident wild conspecifics, released individuals and expected population growth are *unsuitable*.

- Habitats outside the species/subspecies tolerance limits for temperature, altitude or other environmental factors are *unsuitable*.

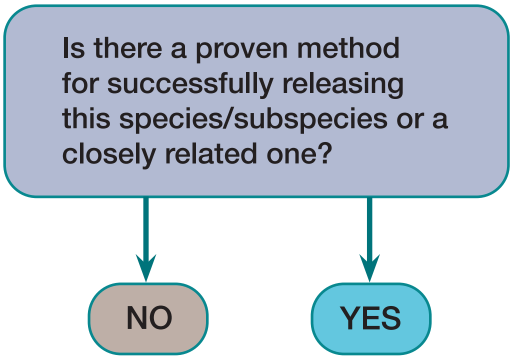
- Habitats without all required legal approvals (government, landowners, local communities) are *unsuitable.*

- Habitats where releases pose a medium or high risk of negative impacts to the wild conspecific population, other native wildlife, or the ecosystem are *unsuitable*.

  - ❖ Some species/subspecies should not be released into habitat with conspecific or closely related taxa due to high risk and threatened status of all species (for example great apes), high risks of hybridisation/introgression, or high risk of lethal disease transmission and spillover (for example amphibians vulnerable to chytrid fungus). Consult taxon-specific guidelines and consider the organisms' conservation status, with a focus on the priority of protecting wild populations. Releases that endanger wild populations for the benefit of released individuals or to improve the apparent success of the translocation by boosting surviving released individuals are irresponsible.

- Habitats where releases of displaced organisms would pose medium or high risks of negatively impacting local human communities are ***unsuitable***.

Action 13. **Identify whether there is a proven method to successfully translocate this or similar species**



Step 1. Collate any documented evidence that this species/subspecies can survive capture, transport, and release, and adapt to a life in the wild, and identify whether any additional support is needed following release.

- **Tolerance limits for stress, novel situations, and social integration with conspecifics** are crucial elements that will determine whether responsible translocation is feasible for this species/subspecies.

- Methods should take into account **recent developments in animal welfare science, best available scientific knowledge of the species/subspecies and its tolerance for stress, capture, and transport, and its needs for rehabilitation, pre-release care, and post-release management. Best practices avoid unacceptable stress, injuries and mortality during capture, transport, and release, and optimise survival and adaptation potential of the organism post-release.**

- Many organisms need **acclimatisation to a release site, and additional support following release** (soft release methods). Some species have **limited tolerance for captivity or human proximity, or cannot be kept alive in human care for extended periods**, and should be hard released expeditiously if healthy and behaviourally suitable. For unreleasable individuals, humane euthanasia methods would provide the most appropriate and humane solution. It is critical to review scientific literature and **seek expert guidance in the case of uncertainty about whether the species/subspecies is suitable for translocation and best practices for translocation where possible or captive care where translocation is not feasible.**

- For all release candidates, WOAH sanitary and mitigation measures should be followed during care, transport and release (see Appendix 3).

Step 2. If there is no existing proven translocation method for this or a closely related species, a controlled and monitored test translocation can potentially be done to gather information and refine methods. A test translocation should be done in an environment where there is low risk to wild conspecifics, other wildlife, and ecosystems. Since scientific literature is scarce, and translocation techniques in many cases still have low success rates (albeit rarely reported), sharing data and partnering with researchers is encouraged to improve knowledge of the biological and physiological outcomes and risks for future translocations.

<u>Action 14.</u> Develop a written translocation plan

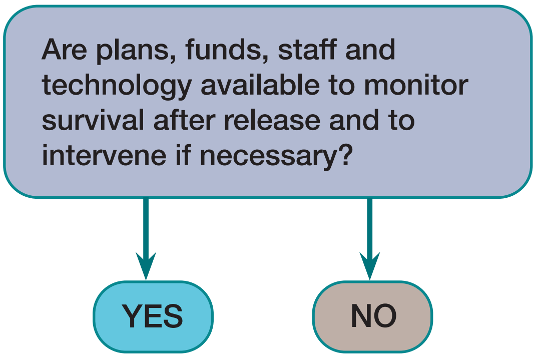
<u>Step 1.</u> Building off the feasibility assessment from Action 5, create a written plan that details the steps required for planning, monitoring, and managing the translocation. This plan should include clearly stated goals of the translocation, and a framework to monitor the outcomes of the project using measurable indicators of interim progress and translocation impacts.

Written translocation plans are strongly advised for most translocations. Plans are not required for translocations of a single, wild individual released after a short displacement time, or for displaced individuals that can be released back into their home range or local area (e.g., same ecosystem and geographically contiguous with their home range) after a short displacement time.

More extensive preparation is required and thus written translocation plans are needed in the following types of translocations involving displaced individuals:

- Releases of large numbers of individuals.
- Ongoing release programmes (multiple releases over time).
- Releases of individuals into endangered and critically endangered species, or species occupying very limited geographical ranges (excepting cases where one or a few displaced individuals are released back into their home range shortly after displacement).

<u>Action 15.</u> Develop a post-release monitoring (PRM) protocol and intervention protocols



Monitoring protocols should include data collection on a **representative sample of released individuals** to accurately determine the outcome of the translocation. It is often not possible to monitor every individual. **All released individuals should be marked if possible**, though marking need not be visible in all cases (e.g. if using subcutaneous implants). Marking all individuals allows identification in case of later capture or death. It is important to consider methods that will enable **tracking of long-term dispersal of translocated organisms both within and outside the release area. Human safety is a critical consideration** when monitoring animal species where on-the-ground follows are the preferred method. Animals may be stressed or aggressive to humans if followed too closely or during certain times such as mating season or when raising infants or chicks. It is important to recognise that some mortality and/or dispersal is expected in translocations.

Step 1. Identify any proven successful methods for marking and monitoring the organism, and determine what information will be collected.

- Consult the scientific literature on successful methods for marking the organism and monitoring it in its natural habitat. Assess how these methods can be adapted for the translocation circumstances and the release environment conditions. Marking should make identification possible without compromising the individual's behaviour, health and welfare (important components include weight and placement, see Appendix 3 for resources).

- Plan a PRM protocol that tracks seasonal changes in animal survival, movements, and breeding, and in dispersal and recruitment of plants. PRM plans should include funding, resources and protocols to gather both short-term survival and breeding data. Translocations should also collect data on long-term indicators including species population changes and ecosystem functions. Wherever possible PRM data collection should also include data on indicators of post-release adaptation such as location, body condition and general health, and for animals also feeding, movement patterns, and social behaviours.

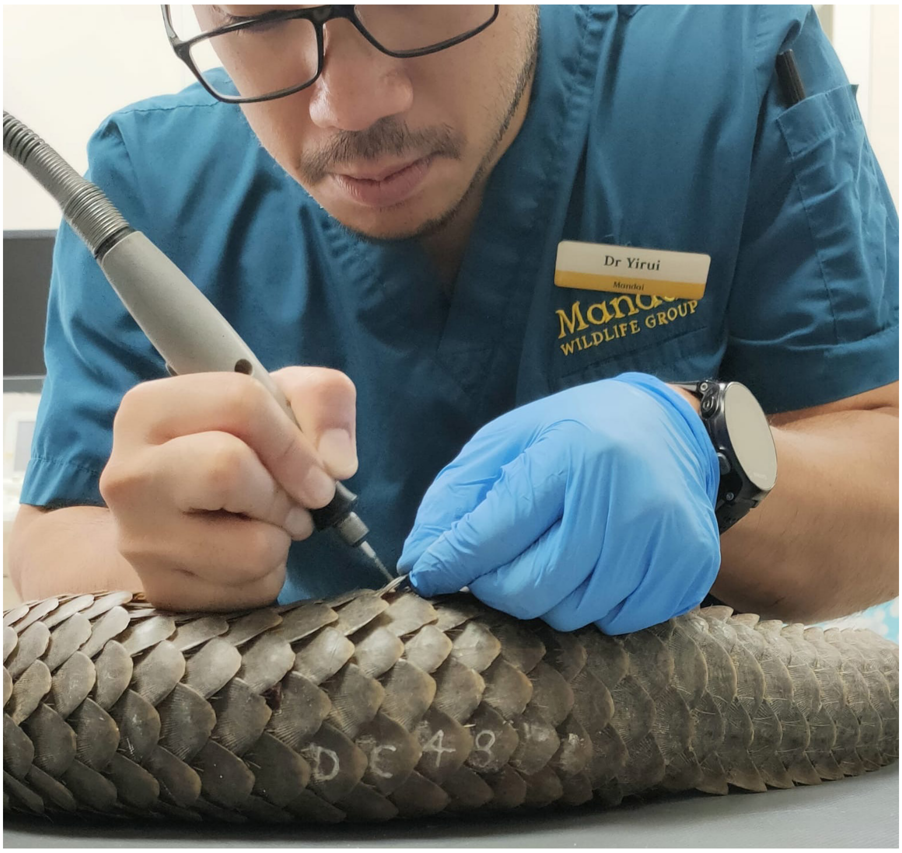
- Released individuals and any recipient population should be monitored for several months for any signs of ill health, novel disease events in the same species, closely related species, and unrelated species which share the habitat, in that order of priority. See Appendix 3 for resources on how to monitor for these indicators. When feasible, health and disease laboratory biomarkers on non-invasive (e.g. faeces, hair) or invasive (e.g. blood in case of re-capture events) samples should be collected to check post-translocation health, welfare and disease status and inform translocation practices through research analysis.

Step 2. For organisms or environments where there are no proven monitoring methods, determine how released individuals will be identified.

- Consult the scientific literature and consult with experts on the species/subspecies habitat and behaviour. Can the individuals be identifiably marked without compromising their behaviour and well-being? Will they tolerate a wearable monitoring device such a collar or tag? Testing of tolerance for marking and monitoring devices should be done on captive animals to enable quick intervention in case of intolerance, and to avoid negative impacts to wild populations.

- Consider the difficulties of tracking or recording data on the individual in remote or inaccessible locations, or extreme weather. In many cases camera traps, drones, or GPS or GNSS satellite devices can be used to collect data where on-the-ground monitoring is impossible. Consider how animals can be tracked over the period necessary to determine their role in population changes and ecosystem functions.

- PRM data should be collected on as many of the following variables as feasible: seasonal and long-term changes in animal survival, movements, and breeding, or dispersal and recruitment of plants; location; body condition and general health (animals and plants); animal feeding, movement patterns, and social behaviours; and species population changes and ecosystem functions (animals and plants).



Identification marking on pangolin scales for post-release monitoring © Mandai Wildlife Group

Step 3. Create a plan for any circumstances that require post-release intervention. Decide and document at what point, and how, released individuals will be provided further care, recaptured if necessary and further rehabilitated, returned to captivity, or humanely euthanised if needed.

- Consult the scientific literature. Based on the best available scientific understanding of the species/subspecies' welfare and behaviour, identify **maximum acceptable limits of apparent stress, agonistic interactions with conspecifics or other wildlife, declining body condition, signs of illness and/or injury, decreased movement and/or feeding, and negative impacts to wild conspecifics (see preceding list), other wildlife, or the ecosystem.**

- **Prior to translocation, develop a detailed plan, and put in place necessary funding, infrastructure and equipment and personnel** (enclosures, capture and first-aid drugs, darting equipment and personnel adequately trained in their use) to **locate, extract, and care for released individuals that are experiencing illness or injury, unacceptable welfare or causing negative impacts for conspecifics, other wildlife, or the ecosystem.**

- The plan must include **management options for the recovered individuals**. Can they be treated, or further rehabilitated in a captive or acclimatisation setting to improve adaptation post-release? Would they fare better in lifetime captive care? Are they suffering and can this suffering be alleviated? If suffering cannot be alleviated, humane euthanasia methods are an appropriate option.

- When translocated individuals are found dead, the situation should be carefully investigated. Where suitable material is available, investigation of mortalities should include necropsy and appropriate diagnostics. Re-captured individuals should have appropriate testing to evaluate any changes in microbial profiles or health from exposure to release site pathogens or parasites and/or stress of introduction. Any concerns should have follow-up on other released individuals and surveillance of any wild conspecifics they were in contact with in order to establish the extent of the issue and determine further actions or suitability of further releases. Wherever possible, data on from these investigations should be archived/published and made available to other practitioners to improve practice.

Where is PRM necessary?

- Individuals released into **habitats that are not in or adjacent to their home range *should be monitored post release***. This includes wild individuals that are captured and moved to new habitats within their species/subspecies range, such as those translocated to address or avoid conflict with humans.

- Individuals that have **spent more than a few days in captivity, including rescued and rehabilitated orphans and injured animals, *should be monitored post releas***e.

- PRM data on the survival and dispersal of these individuals is critical to understanding and improving conservation translocation practices for displaced organisms.

- Post-release monitoring is valuable for any translocated individual, but tracking can be difficult and costly, and thus it may be more feasible to track or monitor only selected individuals from groups released together, such as dominant males or females, or to use short-term technologies that remotely track and record movement and location for organisms that are hard to monitor.

Where is PRM *less* necessary?

- **Healthy wild organisms that have been temporarily displaced and have not spent time in captivity, and are promptly released in their home range or at the site of rescue or capture *do not have to be monitored***.

- While it may not be strictly necessary to monitor wild animals or plants that are translocated near, but not directly in, their home range, monitoring of these individuals would provide valuable data on welfare impacts of capture and release, and post-release survival, dispersal, and conflict-related behaviours.

- In all cases, PRM provides valuable data and helps improve the practice of safe and responsible translocations.

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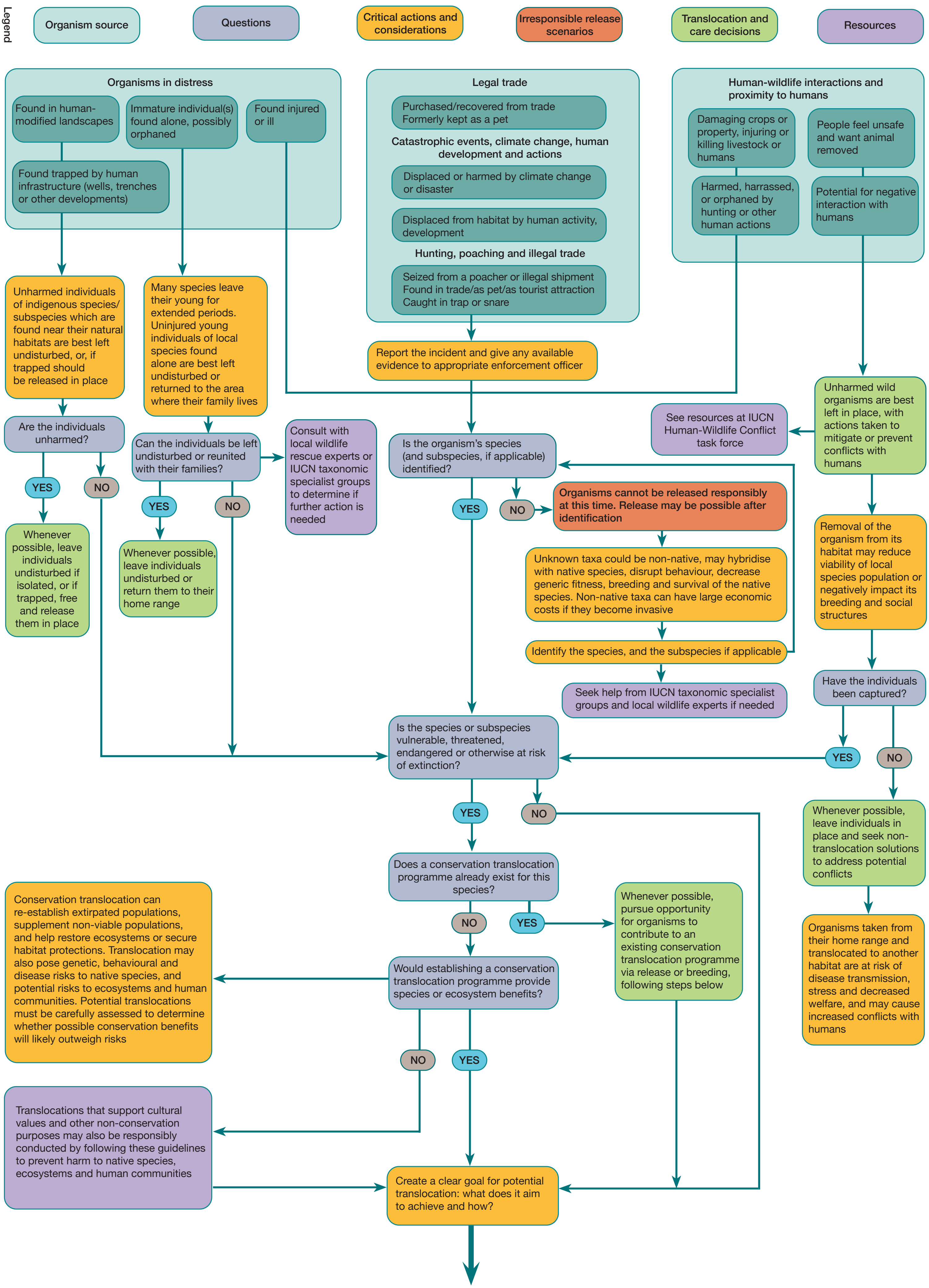
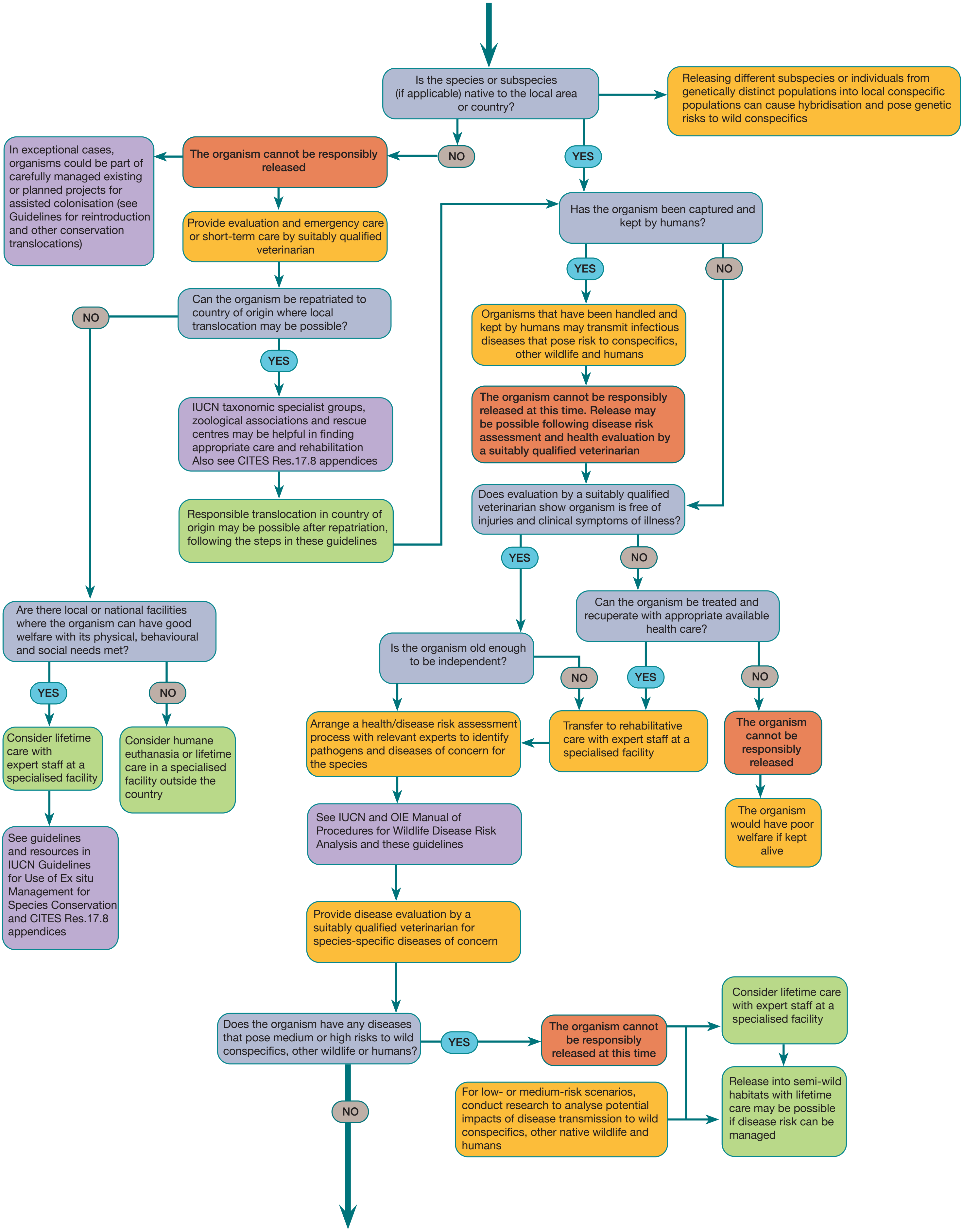
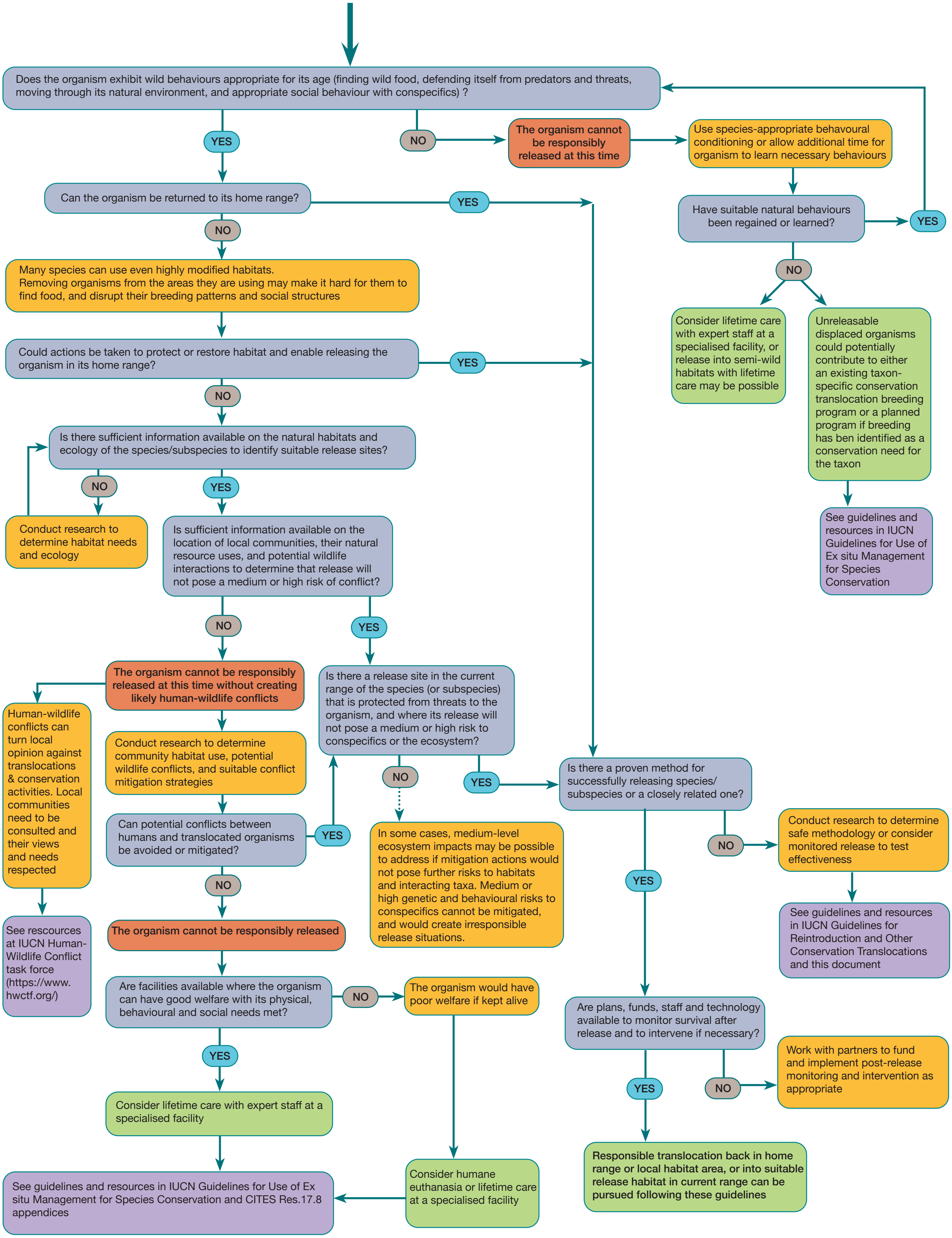
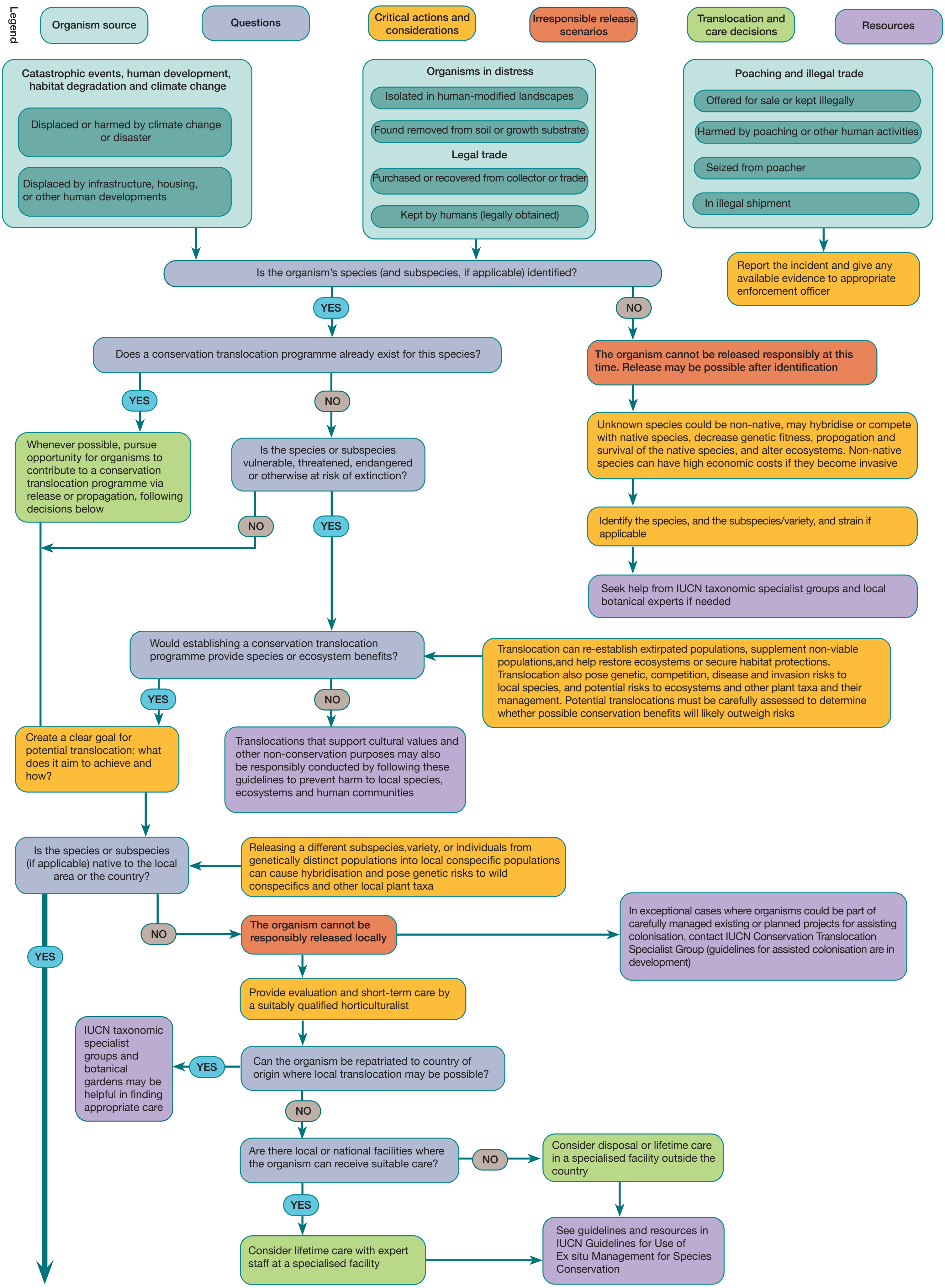
Appendix 1 Decision Tree - Animals

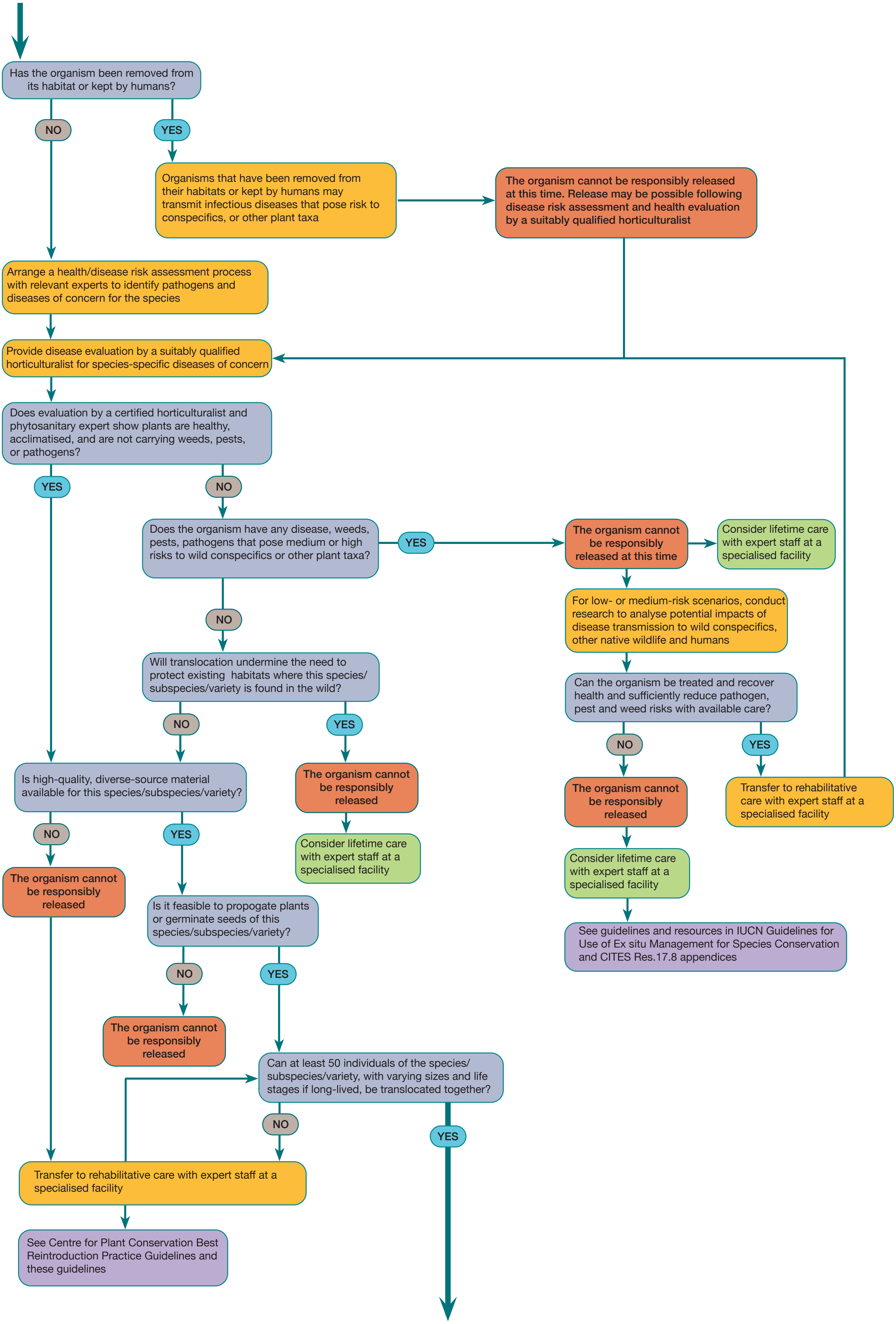


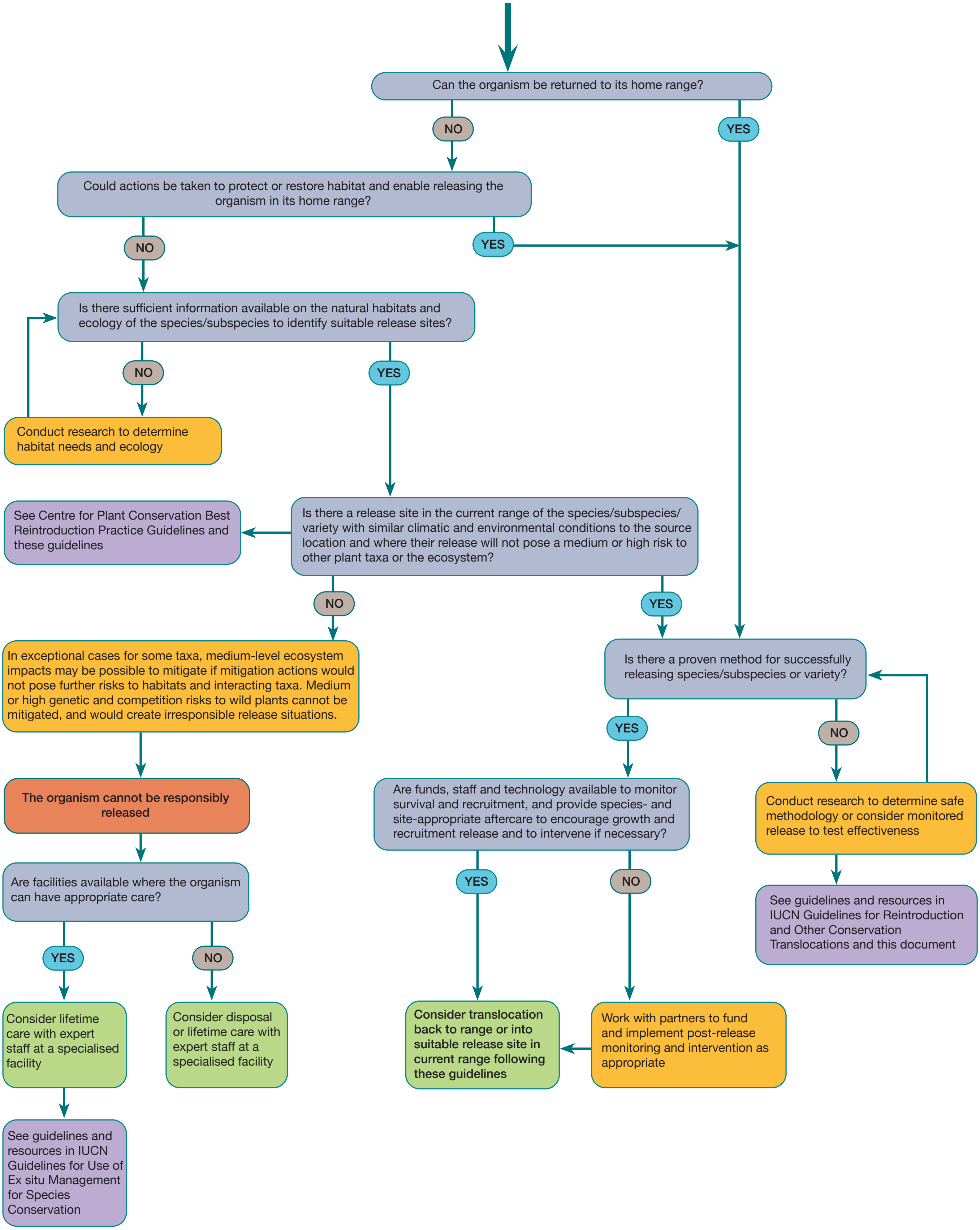

Is the species or subspecies (if applicable) native to the local area or country?
Releasing different subspecies or individuals from genetically distinct populations into local conspecific populations can cause hybridisation and pose genetic risks to wild conspecifics
NO
YES
The organism cannot be responsibly released
In exceptional cases, organisms could be part of carefully managed existing or planned projects for assisted colonisation (see Guidelines for reintroduction and other conservation translocations)
Provide evaluation and emergency care or short-term care by suitably qualified veterinarian
Can the organism be repatriated to country of origin where local translocation may be possible?
NO
YES
IUCN taxonomic specialist groups, zoological associations and rescue centres may be helpful in finding appropriate care and rehabilitation Also see CITES Res.17.8 appendices
Responsible translocation in country of origin may be possible after repatriation, following the steps in these guidelines
Has the organism been captured and kept by humans?
YES
NO
Organisms that have been handled and kept by humans may transmit infectious diseases that pose risk to conspecifics, other wildlife and humans
The organism cannot be responsibly released at this time. Release may be possible following disease risk assessment and health evaluation by a suitably qualified veterinarian
Does evaluation by a suitably qualified veterinarian show organism is free of injuries and clinical symptoms of illness?
YES
NO
Can the organism be treated and recuperate with appropriate available health care?
Is the organism old enough to be independent?
NO
YES
NO
Transfer to rehabilitative care with expert staff at a specialised facility
The organism cannot be responsibly released
The organism would have poor welfare if kept alive
Arrange a health/disease risk assessment process with relevant experts to identify pathogens and diseases of concern for the species
See IUCN and OIE Manual of Procedures for Wildlife Disease Risk Analysis and these guidelines
Provide disease evaluation by a suitably qualified veterinarian for species-specific diseases of concern
Are there local or national facilities where the organism can have good welfare with its physical, behavioural and social needs met?
YES
NO
Consider lifetime care with expert staff at a specialised facility
Consider humane euthanasia or lifetime care in a specialised facility outside the country
See guidelines and resources in IUCN Guidelines for Use of Ex situ Management for Species Conservation and CITES Res.17.8 appendices
Does the organism have any diseases that pose medium or high risks to wild conspecifics, other wildlife or humans?
YES
NO
The organism cannot be responsibly released at this time
For low- or medium-risk scenarios, conduct research to analyse potential impacts of disease transmission to wild conspecifics, other native wildlife and humans
Consider lifetime care with expert staff at a specialised facility
Release into semi-wild habitats with lifetime care may be possible if disease risk can be managed


Does the organism exhibit wild behaviours appropriate for its age (finding wild food, defending itself from predators and threats, moving through its natural environment, and appropriate social behaviour with conspecifics) ?
YES
NO
The organism cannot be responsibly released at this time
Use species-appropriate behavoural conditioning or allow additional time for organism to learn necessary behaviours
Have suitable natural behaviours been regained or learned?
YES
NO
Consider lifetime care with expert staff at a specialised facility, or release into semi-wild habitats with lifetime care may be possible
Unreleasable displaced organisms could potentially contribute to either an existing taxon-specific conservation translocation breeding program or a planned program if breeding has ben identified as a conservation need for the taxon
See guidelines and resources in IUCN Guidelines for Use of Ex situ Management for Species Conservation
Can the organism be returned to its home range?
YES
NO
Many species can use even highly modified habitats.
Removing organisms from the areas they are using may make it hard for them to find food, and disrupt their breeding patterns and social structures
Could actions be taken to protect or restore habitat and enable releasing the organism in its home range?
YES
NO
Is there sufficient information available on the natural habitats and ecology of the species/subspecies to identify suitable release sites?
NO
YES
Conduct research to determine habitat needs and ecology
Is sufficient information available on the location of local communities, their natural resource uses, and potential wildlife interactions to determine that release will not pose a medium or high risk of conflict?
NO
YES
The organism cannot be responsibly released at this time without creating likely human-wildlife conflicts
Human-wildlife conflicts can turn local opinion against translocations & conservation activities. Local communities need to be consulted and their views and needs respected
See rescources at IUCN Human-Wildlife Conflict task force (https://www.hwctf.org/)
Conduct research to determine community habitat use, potential wildlife conflicts, and suitable conflict mitigation strategies
Can potential conflicts between humans and translocated organisms be avoided or mitigated?
YES
NO
The organism cannot be responsibly released
Are facilities available where the organism can have good welfare with its physical, behavioural and social needs met?
NO
YES
The organism would have poor welfare if kept alive
Consider lifetime care with expert staff at a specialised facility
Consider humane euthanasia or lifetime care at a specialised facility
See guidelines and resources in IUCN Guidelines for Use of Ex situ Management for Species Conservation and CITES Res.17.8 appendices
Is there a release site in the current range of the species (or subspecies) that is protected from threats to the organism, and where its release will not pose a medium or high risk to conspecifics or the ecosystem?
NO
YES
In some cases, medium-level ecosystem impacts may be possible to address if mitigation actions would not pose further risks to habitats and interacting taxa. Medium or high genetic and behavioural risks to conspecifics cannot be mitigated, and would create irresponsible release situations.
Is there a proven method for successfully releasing species/ subspecies or a closely related one?
NO
YES
Conduct research to determine safe methodology or consider monitored release to test effectiveness
See guidelines and resources in IUCN Guidelines for Reintroduction and Other Conservation Translocations and this document
Are plans, funds, staff and technology available to monitor survival after release and to intervene if necessary?
YES
NO
Work with partners to fund and implement post-release monitoring and intervention as appropriate
Responsible translocation back in home range or local habitat area, or into suitable release habitat in current range can be pursued following these guidelines

Appendix 2 Decision Tree - Plants




Has the organism been removed from its habitat or kept by humans?
NO
YES
Organisms that have been removed from their habitats or kept by humans may transmit infectious diseases that pose risk to conspecifics, or other plant taxa
The organism cannot be responsibly released at this time. Release may be possible following disease risk assessment and health evaluation by a suitably qualified horticulturalist
Arrange a health/disease risk assessment process with relevant experts to identify pathogens and diseases of concern for the species
Provide disease evaluation by a suitably qualified horticulturalist for species-specific diseases of concern
Does evaluation by a certified horticulturalist and phytosanitary expert show plants are healthy, acclimatised, and are not carrying weeds, pests, or pathogens?
YES
NO
Does the organism have any disease, weeds, pests, pathogens that pose medium or high risks to wild conspecifics or other plant taxa?
YES
The organism cannot be responsibly released at this time
Consider lifetime care with expert staff at a specialised facility
For low- or medium-risk scenarios, conduct research to analyse potential impacts of disease transmission to wild conspecifics, other native wildlife and humans
Can the organism be treated and recover health and sufficiently reduce pathogen, pest and weed risks with available care?
NO
YES
The organism cannot be responsibly released
Transfer to rehabilitative care with expert staff at a specialised facility
Consider lifetime care with expert staff at a specialised facility
See guidelines and resources in IUCN Guidelines for Use of Ex situ Management for Species Conservation and CITES Res.17.8 appendices
NO
Will translocation undermine the need to protect existing habitats where this species/ subspecies/variety is found in the wild?
NO
YES
The organism cannot be responsibly released
Consider lifetime care with expert staff at a specialised facility
Is high-quality, diverse-source material available for this species/subspecies/variety?
NO
YES
The organism cannot be responsibly released
Is it feasible to propogate plants or germinate seeds of this species/subspecies/variety?
NO
YES
The organism cannot be responsibly released
Can at least 50 individuals of the species/ subspecies/variety, with varying sizes and life stages if long-lived, be translocated together?
NO
YES
Transfer to rehabilitative care with expert staff at a specialised facility
See Centre for Plant Conservation Best Reintroduction Practice Guidelines and these guidelines


Can the organism be returned to its home range?
NO
YES
Could actions be taken to protect or restore habitat and enable releasing the organism in its home range?
NO
YES
Is there sufficient information available on the natural habitats and ecology of the species/subspecies to identify suitable release sites?
NO
YES
Conduct research to determine habitat needs and ecology
See Centre for Plant Conservation Best Reintroduction Practice Guidelines and these guidelines
Is there a release site in the current range of the species/subspecies/ variety with similar climatic and environmental conditions to the source location and where their release will not pose a medium or high risk to other plant taxa or the ecosystem?
NO
YES
In exceptional cases for some taxa, medium-level ecosystem impacts may be possible to mitigate if mitigation actions would not pose further risks to habitats and interacting taxa. Medium or high genetic and competition risks to wild plants cannot be mitigated, and would create irresponsible release situations.
Is there a proven method for successfully releasing species/subspecies or variety?
YES
NO
The organism cannot be responsibly released
Are funds, staff and technology available to monitor survival and recruitment, and provide species- and site-appropriate aftercare to encourage growth and recruitment release and to intervene if necessary?
Conduct research to determine safe methodology or consider monitored release to test effectiveness
Are facilities available where the organism can have appropriate care?
YES
NO
See guidelines and resources in IUCN Guidelines for Reintroduction and Other Conservation Translocations and this document
YES
NO
Consider lifetime care with expert staff at a specialised facility
Consider disposal or lifetime care with expert staff at a specialised facility
Consider translocation back to range or into suitable release site in current range following these guidelines
Work with partners to fund and implement post-release monitoring and intervention as appropriate
See guidelines and resources in IUCN Guidelines for Use of Ex situ Management for Species Conservation

Appendix 3 Resources

Biobanking

The IUCN SSC Animal Biobanking for Conservation Specialist Group has resources and information at https://ssc-abcsg.org/, and can be contacted at abcsg@sdzwa.org.

Genetic testing

Genetic analysis requires intact DNA. Proper collection and storage of DNA for analysis is crucial. DNA extraction is recommended as soon as possible after sample collection (within 24 hours). Samples need to be taken into suitable media (RNA and DNA stabilisers). In the absence of these products, samples can be rapidly frozen in liquid nitrogen or freeze-dried for long-term storage prior to analysis. DNA/RNA samples can then be stored indefinitely at -80°C. For short-term storage, -20°C freezers and storage in 95% ethanol/50% glycerol are possible but present flammable hazards. Extracted DNA/RNA samples can be transported to labs that can conduct the required gene sequencing steps, but the cold chain must be maintained during transport.

Detailed information on sampling protocols and methods is available in the following book:
Gupta, S.K. (2018). Application of DNA Fingerprinting and Wildlife Forensics. In: H.R. Dash, P. Shrivastava, B. Kishore Mohapatra, S. Das (Eds.), *DNA Fingerprinting: Advancements and Future Endeavours*. Springer Nature. https://link.springer.com/book/10.1007/978-981-13-1583-1

IUCN SSC taxonomic specialist groups can assist in providing information on best practices for the organism in question.

Guidelines on species translocations, planning, management, and conservation

IUCN guidelines

Guidelines for Reintroduction and Other Conservation Translocations (2013)
IUCN SSC guidelines on human-wildlife conflict and coexistence (2023)
Guidelines for Invasive Species Planning and Management on Islands (2018)
Guidelines for the Management of Confiscated Live Organisms (2019)
Guidelines for the Prevention of Biodiversity Loss Caused by Alien Invasive Species (2000)
Guidelines for Species Conservation Planning (2017)
Guidelines for Wildlife Disease Risk Analysis (2014)
Use of ex situ Management for Species Conservation (2014)

Taxon-specific translocation guidelines

Amphibians
IUCN Guidelines for amphibian reintroductions and other conservation translocations

Mammals
Guidelines for the in situ re-introduction and translocation of African and Asian rhinoceros
Guidelines for the Rescue, Rehabilitation Release and Post-release Monitoring of Andean Bears
Guidelines for the In-situ Translocation of the African Elephant for Conservation Purposes
Guidelines for Nonhuman Primate Reintroductions
Guidelines for the Rehabilitation and Translocation of Gibbons
Guidelines for the Reintroduction of Great Apes

Birds
Guidelines for Reintroduction of Galliformes for Conservation Purposes
Guidelines for Re-establishing Grey Partridges Through Releasing

IUCN SSC taxonomic specialist groups
https://www.iucn.org/commissions/ssc-groups

Health assessment, infection and disease risk in translocation candidates

Several organisations specialise in helping address wildlife health concerns, including DRAs, health evaluations, disease screening, and laboratory testing. Regional or international zoological or botanical organisation can help identify the appropriate group: Association of Zoos and Aquariums (North America), European Association of Zoos and Aquaria, World Association of Zoos and Aquariums.

Numerous resources address assessment and management of infection and disease risks:

Jakob-Hoff R.M., MacDiarmid S.C., Lees C., Miller P.S., Travis D. & Kock R. (2014). *Manual of Procedures for Wildlife Disease Risk Analysis*. WOAH and IUCN. https://portals.iucn.org/library/node/43386

Hartley, M., Sainsbury, A. 2017. Methods of Disease Risk Analysis in Wildlife Translocations for Conservation Purposes. *EcoHealth* 14(Suppl 1): 16-29. https://doi.org/10.1007/s10393-016-1134-8

WOAH has manuals for both terrestrial and marine animal health:
Terrestrial animal health code - https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/

Aquatic animal health code - https://www.woah.org/en/what-we-do/standards/codes-and-manuals/aquatic-code-online-access/

Invasive species

IUCN Global Invasive Species Database is a resource for identifying organisms that are invasive outside their native habitat: http://www.iucngisd.org/gisd/

There are also two relevant IUCN guidelines:

Guidelines for the Prevention of Biodiversity Loss Caused by Alien Invasive Species (2000)
Guidelines for Invasive Species Planning and Management on Islands (2018)

IUCN has developed the following knowledge platforms: The Global Invasive Species Database (GISD) and The Global Register of Introduced and Invasive Species (GRIIS)

Management options for organisms that cannot be responsibly translocated

Resources on management options for unreleasable individuals are available in the IUCN Guidelines for the management of confiscated live organisms (2019), the IUCN guidelines on Use of Ex Situ Management for Species Conservation (2014), and in the appendices of CITES resolution 17.8. Local wildlife rescue experts, rescue centres, botanical gardens, animal welfare organisations, and rescue/rehabilitation organisations including Pan African Sanctuary Alliance (PASA), Asia for Animals (AfA), and the Global Federation of Wildlife Sanctuaries (GFAS) may also be able to assist or advise in the placement of non-releasable organisms.

Managing human-wildlife conflict

The IUCN Human-Wildlife Conflict Task Force had guidelines and maintains a large library of resources for understanding and addressing human-wildlife conflicts, and fostering human-wildlife coexistence.
The library is available at https://www.hwctf.org/document-library#

Managing illegally traded and confiscated specimens of CITES-listed species

CITES Resolution 17.8 Disposal of illegally traded and confiscated specimens of CITES-listed species

Monitoring health, infection and disease in released organisms

Monitoring released animals and wild conspecific populations for signs of disease can involve both passive and active monitoring. Passive monitoring is done by human observers monitoring for visible signs of ill health or mortality in released individuals, or amongst target species at the release site. This should be followed by active surveillance where there are suspicions of disease or ill health. Active monitoring involves capture and sampling of either the released individual suspected of disease or ill health (if this individual is marked and/or tracked) or of other individuals in the population in the case of any observed mortalities or ill health. Activity patterns of individuals can also be monitored remotely through satellite if the individuals have tracking devices. IUCN SSC taxonomic specialist groups can assist in providing taxon-specific information on best practices for monitoring the organism in question. Since species-specific literature is scarce, translocations offer unique opportunities to contribute to data sharing and research to improve translocation techniques, so when feasible this should be encouraged.

Further information is available in the following open access paper:
Nichols, J.D., Hollmen, T.E., Grand, J.B. (2017). Monitoring for the Management of Disease Risk in Animal Translocation Programmes. *EcoHealth* 14: 156–166. https://doi.org/10.1007/s10393-015-1094-4

Post-release monitoring

A variety of wildlife tracking and monitoring technology can be used across a broad range of organism sizes and environments. An overview is available in the following open access article: Lahoz-Monfort, J.J., Magrath, M.J.L. (2021). A Comprehensive Overview of Technologies for Species and Habitat Monitoring and Conservation. *Bioscience* 71: 1038-1062 https://doi.org/10.1093/biosci/biab073

IUCN SSC taxonomic specialist groups can assist in providing taxon-specific information on best practices for monitoring the organism in question.

Additional information and resources are available from the following sources:

Camera trapping in Africa - https://onlinelibrary.wiley.com/toc/13652028/2018/56/4
WWF Guidelines for camera trapping, remote sensing and acoustic monitoring -https://www.wwf.org.uk/project/conservationtechnology

Conservation drones organization - https://conservationdrones.org/

News articles discussing developments in wildlife monitoring:

Minh, T. C. (4 February 2022). These new technologies could transform wildlife conservation. *The Hill*, https://thehill.com/changing-america/sustainability/environment/592820-these-new-technologies-could-transform-wildlife

Robbins, J. With an Internet of Animals, Scientists Aim to Track and Save Wildlife. *New York Times*, https://www.nytimes.com/2020/06/09/science/space-station-wildlife.html

Sanitary and mitigation measures to prevent pathogen or disease transfer

Sanitary and mitigation measures for preventing disease transfer or epidemics are standardised under the World Trade Organization (WTO) Sanitary and Phytosanitary Measures Agreement (SPS): Understanding the Sanitary and Phytosanitary Measures Agreement

WOAH also has standards for both terrestrial and marine animals:
Terrestrial animal health code - https://www.oie.int/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/

Aquatic animal health code - https://www.oie.int/en/what-we-do/standards/codes-and-manuals/aquatic-code-online-access/

More information on WOAH standards is available at: https://www.oie.int/en/what-we-do/standards/
Any translocation not in or near the organism's home range, especially those that are in a different ecological zone or across national boundaries should follow WTO SPS agreement and WOAH health codes.

Species identification

CITES WIKI Identification Manual

CITES provides several additional resources that offer identification assistance, via links from their website: www.CITES.org

Welfare and well-being

The "Five Domains" model of animal welfare addresses an individual's nutrition, physical environment, health, behavioural interactions with the environment, other animals, and humans, and its mental state. An animal's nutrition, physical environment, and health affect its body systems and stability. The cumulative effect of negative inputs of nutrition, physical environment, and health result in behaviours whereby the animal works to restore its internal stability and facilitate its survival, known as "survival-critical affects". Animals have agency and consciously react to their environment, other animals, and humans to address their own goals in seeking stability and survival. Collectively all these experiences contribute to the animal's mental state. Providing good welfare or well-being to any organism means meeting its taxon-specific needs for nutrition, physical environment, and health such that it can have positive behavioural interactions and a positive mental state (for organisms other than animals, mental state would not be considered but all other considerations apply).

More information is available from the following open access paper:
Mellor, D. J., Beausoleil, N. J., Littlewood, K. E., McLean, A. N., McGreevy, P. D., Jones, B., Wilkins, C. (2020). The 2020 Five Domains Model: Including Human–Animal Interactions in Assessments of Animal Welfare. *Animals*,10 (10): 1870. https://doi.org/10.3390/ani10101870

Species experts should be consulted to determine the specific welfare/well-being needs of displaced organisms. Behavioural and advanced physiological monitoring (e.g. through non-invasive endocrinology analysis) should be encouraged within the post-translocation monitoring process when possible.

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