Global Re-introduction Perspectives: 2013

Further case-studies from around the globe

Edited by Pritpal S. Soorae

IUCN/SSC Re-introduction Specialist Group (RSG)

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Shaikha Al Dhaheri,
Executive Director,
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It gives us great pleasure and honor in supporting the production of the 4th issue of the *Global Re-introduction Perspectives 2013*. It is exciting to know that those 236 case studies will be read by more than 300 members, practitioners and decision makers throughout the RSG network and beyond, who will get the advantage to use it as a tool and reference for future programs and projects that will combat the continuous loss of species through re-introductions and translocation.

Small or big, success or failure, all these case-studies have surely made a difference in regard to the targeted species. This has been achieved by various means such as stabilizing populations, or re-establishing them, increasing their numbers in *ex situ* collections as they have suffered significant declines or even extinction in the wild.

Species re-introductions are an important feature of global conservation efforts and for the newly developed *IUCN Guidelines for Re-introduction and Other Conservation Translocations* along with this RSG edition will act as a powerful reference worldwide and especially to us in the Environment Agency embarking into new initiatives of re-introduction and translocations.

Finally, I would like to thank all practitioners and conservationists who shared their case-studies with us in this edition for their commitment, dedication and passion towards conserving species. Also I thank Denver Zoological Foundation for supporting RSG efforts, the editor of this edition Mr. Pritpal Soorae, Dr. Frédéric Launay, RSG Chair and Dr. Simon Stuart Chair IUCN Survival Commission for their continued devotion and contribution to species conservation worldwide.

Richard P. Reading,
Vice President for Conservation,
Denver Zoological Foundation

I am honored to have the opportunity to provide a forward to *Global Re-introduction Perspectives: 2013: Further case studies from around the globe* published by the IUCN Re-introduction Specialist Groups (RSG) and edited by Pritpal Soorae. Within this four volume set, Pritpal has pulled together an amazing 236 case studies on a wide variety of taxa from plant to invertebrates to vertebrates from all over the world.

Through these case studies and the recently released *Guidelines for Re-introductions and Other Conservation Translocations* by the Re-introduction and Invasive Species Specialist Groups' Task Force for Moving Plants and Animals for Conservation Purposes, the RSG has produced a valuable set of references for current and future translocation practitioners as they strive to restore populations of species depleted by the growing human footprint on our planet and finite resources.

The Denver Zoological Foundation is proud to support this publication and other RSG efforts to improve re-introduction success throughout the globe. We congratulate Pritpal Soorae on this fine accomplishment and extend our thanks to Dr. Frédéric Launay and the RSG for supporting this important publication, Dr. Simon Stuart and the IUCN Species Survival Commission, The Environment Agency – ABU DHABI, and especially to the contributors to this volume for their excellent summaries of re-introduction case studies from around the world.

Simon Stuart,
Chair,
IUCN Species Survival Commission

It seems like yesterday that I wrote the foreword for the third edition of *Global Reintroduction Perspectives*. Such is the pace of re-introduction efforts that another volume with 52 case studies is now available to inform and guide reintroduction practitioners worldwide. We now have an impressive 236 case studies from the four volumes of *Global Re-introduction Perspectives* published so far. In my previous foreword I recommended setting up a searchable database on the RSG website comprising all the case studies. I understand that steps are now being taken to implement this suggestion, and this will, I am sure, make the information in this excellent series much more broadly available to support the work of practitioners.

As in previous volumes, there is impressive taxonomic and geographic coverage in this latest edition. This ability to collect information on re-introductions worldwide is only possible because of the long-term focus and activity of the Re-introduction Specialist Group (RSG) of the IUCN Species Survival Commission. While this fourth edition was being prepared, the RSG completed the new *IUCN Guidelines for Re-introductions and Other Conservation Translocations*, which will provide further impetus to the efforts to return species to parts of their native ranges from which they had been lost.

As with the previous issue, I thank: the Environment Agency Abu Dhabi (EAD), in particular its Secretary General H.E. Razan Khalifa Al Mubarak, for the EAD's long-term and most generous support of the RSG; the Denver Zoological Foundation, in particular Dr Richard Reading, for supporting this publication; the RSG Chair, Dr Frédéric Launay; and the RSG's Programme Officer and editor of *Global Re-introduction Perspectives*, Mr Pritpal Singh Soorae. Without these people, *Global Re-introduction Perspectives* would not be possible.

Frédéric Launay,
Chair,
IUCN/SSC Re-introduction Specialist Group

The IUCN/SSC Re-introduction Specialist Group is glad to present the 4th Issue of Global Re-introduction Perspectives 2013. The series is receiving very good feedback and is gathering momentum under the capable hands of Pritpal Soorae.

A total of 236 case studies of various type of re-introduction, successful or not, have been collected and summarized in the four publications showing the relevance of re-introduction to species conservation. Actually the number of re-introduction projects, feasibility or research/trials is increasing in all taxa.

Whilst it is encouraging to see that re-introductions and translocations are widely used as a conservation tools for many taxa, it is also an indication that the pressure on species is increasing and that quality habitats and space available for species for is decreasing either through direct competition from alternatives land-use or through climate change and its associated effects.

The newly released 2013 *IUCN Guidelines for Re-introduction and Other Conservation Translocations* are addressing this increased reliance and/or application of translocations for species conservation and include reflection and guidance on controversial and debated issues as assisted colonization and ecological replacement. These guidelines are a much needed addition for practitioners and are very fitted for many of the case studies mentioned in this 4th Edition.

The new Guidelines and the cases studies highlighted in that publication are, we hope, a welcome contribution from the Re-introduction Specialist Group to the species conservation array of knowledge tools and prove useful to the practitioners, policy-makers and decision-makers.

I would like to conclude by thanking all the people that contributed case studies, not only for their contributions, but more importantly for their dedication and efforts in working on conserving species worldwide.

An overview and analysis of the re-introduction project case studies

Pritpal S. Soorae, Editor

Introduction

This is the fourth issue in the *Global Re-introduction Perspectives* series and has been produced in the same standardized format as the previous three to maintain the style and quality. The case-studies are arranged in the following order: Introduction, Goals, Success Indicators, Project Summary, Major Difficulties Faced, Major Lessons Learned, Success of Project with reasons for success or failure. For the first issue I managed to collect 62 case-studies, the second issue 72 case-studies, the third issue 50 case-studies and this one 52 case-studies.

These case studies in this issue cover the following taxa as follows:

- Invertebrates - 2
- Fish - 4
- Amphibians - 1
- Reptiles - 3
- Birds - 10
- Mammals - 24
- Plants - 8

I would also like to take this opportunity to thank the various authors for their patience and willingness to submit information on their projects and in many cases with a tight deadline. A few promised articles were not submitted by the last deadline and hopefully if we do another issue we can present them there. We hope the information presented in this book will provide a broad global perspective on challenges facing re-introduction projects trying to restore biodiversity.

IUCN Statutory Regions

The IUCN statues have established a total of 8 global regions for the purposes of its representation in council. The IUCN's "statutory regions" are a list of States by Region, as per article 16 and 17 of the Statutes and Regulation 36 of the Regulations.

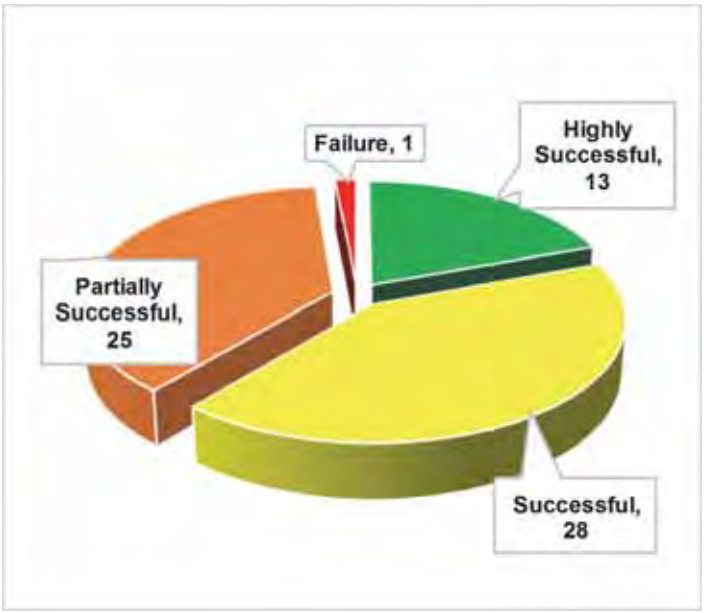
All eight global regions are represented within these case studies and the regions are as follows:

1. North America & Caribbean - 18
2. West Europe - 6
3. South & East Asia - 7
4. Oceania - 6
5. West Asia - 2
6. Africa - 4
7. Meso & South America - 3
8. East Europe, North & Central Asia - 6

Success/Failure of Projects

The projects presented here were ranked as Highly Successful, Successful, Partially Successful and Failure. Out of the 52 case-studies there were a total of 67 releases. In some cases there were multiple rankings as releases were conducted at more then one site or country. In some cases multiple species were released in more than one country. This made analysis difficult but in total the rankings can be seen in figure 1, 13 projects were Highly Successful, 28 were Successful, 25 were Partially Successful and 1 was a Failure.

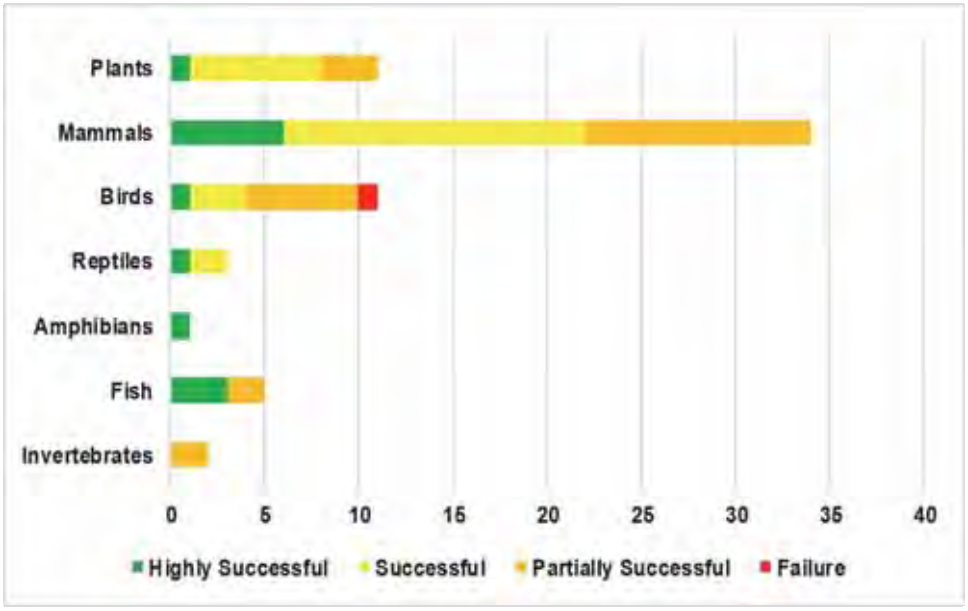
Fig. 1. Success/Failure of re-introduction projects



Success according to the taxa

An analysis was done to gauge the three different levels of success (highly successful, successful, partially successful) and failure

Fig. 2. Success/Failure of re-introduction projects according to major taxa



against the seven major taxa i.e. invertebrates, fish, amphibians, reptiles, birds, mammals and plants as can be seen in figure 2. Out of the seven major taxa only invertebrates did not have a project ranked as highly successful. There was only one amphibian case study and this was ranked as highly successful. The bird projects had all four rankings. The majority of plant and mammal projects were successful and the birds had a majority of partially successful projects.

Future issues of *Global Re-introduction Perspectives*

If you need any further information on future issues issue please contact me for further details. We would also appreciate any feedback you may have from this book. The Editor can be contacted at: iucnrsg@gmail.com

The release of northeast Bornean orangutans to Tabin Wildlife Reserve, Sabah, Malaysia

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Introduction

Bornean orangutans (*Pongo pygmaeus sp.*) are declining due to habitat destruction and fragmentation, hunting, and other human encroachment into their preferred habitats (Singleton *et al.*, 2004; Wich *et al.*, 2008), and are classified as Endangered (EN, A2c) (IUCN, 2012). A highly visible consequence of habitat loss is the presence of hundreds of displaced orangutans in rescue and rehabilitation centres throughout their range. The majority of remaining wild orangutans are located outside protected areas in forests that are exploited by humans or that are being converted for agriculture, thus it is likely that the number of orphaned animals arriving at rehabilitation centres will continue to rise. Since the early 1960s, hundreds of orangutans have passed through Sepilok Orangutan Rehabilitation Centre. Many of these individuals were subsequently released by the Sabah Wildlife Department (SWD) into Tabin Wildlife Reserve (TWR), yet nothing is known regarding re-introduction outcomes. The reserve (5°15'–5° 10'N, 118°30'–118°45'E),

Bornean orangutan © James Robins

which encompasses 1,205 km^2 of protected primary and secondary lowland dipterocarp forest, has an estimated orangutan population of 1,400 individuals, at a density of 1.26 per km^2 (Ancrenaz *et al.*, 2004). Tabin was first gazetted as a Wildlife Reserve in 1984, and is jointly managed by the Sabah Forestry and Sabah Wildlife Departments.

Goals

- Goal 1: Provide much needed data on the outcomes of re-introduced orangutans by conducting long-term regular post-release monitoring of all released individuals.
- Goal 2: Provide individual ex-captive orangutans with an opportunity for enhanced welfare through re-introduction to their natural environment.
- Goal 3: Evaluate the efficacy of current rehabilitation protocols in Sabah based on the behavioural results of rehabilitants compared to wild orangutans. In doing so, assisting rehabilitation managers in the future to produce viable release candidates.
- Goal 4: To test, and help to develop, the use of emerging technologies designed to facilitate post-release monitoring, i.e. subcutaneous telemetry transmitters.
- Goal 5: Engage local people through the delivery of an educational awareness program targeting nearby stakeholders, schools, and communities. This is designed to i) provide increased protection to the release site against illegal encroachment; ii) engender a sense of ownership and shared objectives among the local community.

Success Indicators

- Indicator 1: The collation of long-term intensive behavioral data from re-introduced orangutans in Sabah, precisely documenting re-introduction progress and outcomes.
- Indicator 2: Complete nutritional independence of rehabilitants, and the development of a healthy, stabilised post-release weight.
- Indicator 3: Demonstrably similar behavioral repertoires when compared with wild orangutans ranging in similar habitats.
- Indicator 4: Adequate integration of rehabilitants with wild orangutans to include reproduction and successful infant rearing.
- Indicator 5: The production of a larger number of viable orangutans for re-introduction through the development of improved rehabilitation protocol.
- Indicator 6: Demonstrably similar behavioral repertoires when compared with wild orangutans ranging in similar habitats.

Project Summary

Feasibility: The Tabin Orangutan Project is an orangutan post release monitoring program co-managed by Orangutan Appeal UK (OAUK) and the SWD, and was formed under the guidance of the Sabah Wildlife Advisory Panel. Field assessments conducted by Kinabatangan Orangutan Conservation Program, a local partner NGO, sought to determine the most appropriate release location within Tabin by i) identifying areas with sufficient year round food resources; ii)

considering the proximity of neighbouring plantations, human settlements and roads; and iii) an area's topography and general accessibility for researchers conducting the post-release monitoring. This analysis led to the selection of an area of regenerating forest in western Tabin. The site had the highest density of fruiting trees known to be part of the orangutan's diet in Sabah, and the most diverse range of food species of five separate locations sampled. It encompasses one of the few flat areas of significant size in the area, and is dissected by a rarely used ex-logging road resulting in fast access to daily nesting locations by truck and on foot. The location is rarely ventured to by humans; the nearest settlement being the research base camp located 2.5 km away. Other sparsely populated communes close by are the SWD headquarters and a small tourist resort located 8 km away. To facilitate ongoing assessment of seasonal fluctuation of food availability, we established phenology plots where all orangutan food trees are scored by trained observers each month for their abundance of fruits, leaves, and flowers. A network of additional trails was also established to ease the tracking process.

Collecting data in the forest
© Elizabeth Winterton

Implementation: Selection of individual apes to be released was based on pre-release behavioural and medical screening. Release candidates were observed within the semi-wild confines of Sepilok/Kabili reserve during their rehabilitation phase, with orangutans deemed inadequate for release due to poor natural foraging skills, over familiarity with humans, inappropriate substrate use and locomotive patterns (e.g. too much time spent on the ground), and, hyper-sociality with conspecifics. All animals were a minimum of 6 years old at their age of release. The medical histories of all candidates were scrutinised for signs of persistent illnesses or susceptibility to disease, and they underwent periodic veterinary examinations which measured body weight, rectal temperature, pulse and breathing rate, heart and lungs auscultation, membrane colour, hydration status, and general body condition. To prevent the introduction of novel diseases into a naive ecosystem, animals were tested for potentially transferable diseases including tuberculosis, hepatitis B, and malaria. We also took blood samples for meliodosis, full blood counts and a wide biochemistry panel. Faecal smears were taken to investigate the presence of intestinal parasites, and each animal was dewormed to prevent any transfer of parasites to the release site.

School visit © James Robins

The anatomical structure of an orangutan's neck and their predominantly arboreal lifestyle preclude the use of radio collars as seen with chimpanzees (Tutin *et al.*, 2001). In attempting to overcome this most fundamental of problems, which has long constrained opportunities for thorough post-release monitoring of orangutans, the Research Institute of Wildlife Ecology in Vienna (FIWI) developed a subcutaneous radio telemetry device and implantation method for use on this project. Surgical procedures to fit these transmitters lasted approximately 25 minutes and were carried out with no adverse effects to any animal.

Post-release monitoring: Five minute nest-to-nest focal interval sampling records information on activity; social interaction; substrate use and height; and, response to human researchers. We also continuously record data on food species; plant parts eaten; feeding patch duration; and nest-building behaviour. Ranging is monitored by way of GPS track logs which provide data on each animal's home range, nest locations, and daily distance travelled. Veterinary checks of released animals replicate the periodic examinations undertaken before release. Body weight is measured wherever possible although we often experience variance in sampling timing due to the unwillingness of the animals to submit to examination. In the absence of physical symptoms, we use any significant changes in activity levels, such as apparent lethargy or reductions in normal foraging, to gauge ill-health.

Three orangutans were released in 2010 using a hard release strategy with no supplementary food offered. In 2012 experiments began with the soft release of an additional five animals whereby food is offered on an *ad-hoc* basis. Orangutans are released in small groups of 1-3 individuals. We have three confirmed outcomes so far: one animal dispersed in month six, one died in month 10, and the other died in month 12. All individuals have integrated adequately with wild orangutans, and all have experienced varying degrees of post-release weight loss in their first few months after release. One released female has given birth to an infant male and both are healthy at the time of writing. The project is ongoing.

Major difficulties faced

- Maintaining contact with exploratory and fast moving animals over steep, undulating and broken terrain.
- Limited range of radio telemetry equipment in hilly terrain and bad weather. Some transmitters also failed earlier than anticipated. The reasons for the faults may not be easily discovered as recapturing and recovering devices would be highly invasive for animals that have already been released.
- Cutting dependency on humans - even the more independent of rehabilitated orangutans may view humans as an easy source of food. We witness many instances of begging behaviour, particularly in response to increased supplementation. This is an unavoidable legacy of rehabilitated great apes spending much of their infancy reliant upon humans for most their developmental needs.
- Balancing short-term welfare with long-term chances of thriving: i) supplementing an animal's diet can be at the expense of their developing sufficient natural dietary diversity, which is all they are able to rely on once monitoring stops; ii) post-release veterinary examinations may cause undue stress and inhibit gradually developing independence - we encountered a worrying situation at one animal's routine three month examination when his pulse and temperature rose to high levels, and he became very stressed, rendering the basic parameters fundamental to a clinical assessment effectively meaningless. Equally, orangutans are incredibly stoic and may only show signs of severe illness after a condition is already well advanced, thus calling into question the efficacy of using behaviour as the primary means of assessing health.
- Inappropriate training environments to facilitate acquisition of key skills needed to survive post-release: i) twice daily food supplementation for tourism purposes in rehabilitation centres may quell the need for independent foraging and learning; ii) Tabin is a secondary regenerating forest, while the rehabilitation facility at Sepilok is located in a virgin jungle reserve. The crossover of available food species is not identical, which may explain a heavy dependence on lower quality fall back species that we have seen post-release.

Major lessons learned

- For animals that require short-term medical treatment or close observation, it is important to have a holding cage/facility located within, or very close to, the release forest. This prevents the need to transport an animal back to its original rehabilitation centre, thus limiting psychological stress and restricting the likelihood of transferring disease between two areas. While a full-time veterinary presence may not be necessary for small group releases, regular external input offers a fresh perspective on the behavioural and physical health of an animal, and is crucial to increasing survivorship. In addition, non-invasive measures of health should be pursued. Despite encountering difficulty in gaining regular access to weigh the more independent animals, a stabilised healthy weight developed during the first year after a re-introduction, combined with complete dietary independence and good health, is likely to be the most important determinant of long-term survival. Given that a reluctance to submit to physical examination should be viewed positively, it would be ideal to

develop a method for non-invasive weighing in the field. Similarly, monitoring parasite loads provides another non-invasive method for assessing health. At pre-release it is important to avoid over enthusiastic pre-release worming regimes, while regulating exposure to allow some development of immunity

- Researchers should familiarise themselves with the wider release location, and try to anticipate movements away from any core areas previously identified during the pre-release phase. To maintain contact with animals, particularly in the first few months of their re-introductions, we needed to cut trails as we went. However, once more permanent trails had been established covering a larger area; we lost contact with the animals much less frequently
- Deciding when to stop following re-introduced rehabilitants is not an exact science and must be judged based on an individual's progress, and their natural desire to disperse. If animals are however not performing well, and are unable to learn from latterly re-introduced animals, they should be returned to the rehabilitation facility on welfare grounds. Given that all re-introduction mortality statistics are heavily influenced by the duration of post-release monitoring, the longer an animal can be monitored, then the truer the picture of re-introduction successes/failures and the reasons behind them
- Small group releases have enabled long-term post-release monitoring of all of our re-introduced animals so far. Depending on the number of staff available to re-introduction managers, and assuming nest-to-nest follows are conducted, we recommend that animals are followed intensively (≥three days per week). This minimises the likelihood of losing contact while also allowing for each animal's health and behavioural status to be checked on a regular basis
- Re-introduction marks the beginning of the most challenging aspect of the entire rehabilitation process. As such, post release monitoring projects involving great apes must be conducted thoroughly over several years for its data to be most valuable. To most precisely document post-release outcomes, it is vital to equip an animal with a tracking device. Today we are using radio-telemetry, although there are still limitations associated with this. Further technological development may soon produce satellite devices that last for several years, and for some rehabilitants this may dispense of the need for a potentially disruptive, and expensive, human presence on the ground

Success of project

Highly Successful	Successful	**Partially Successful**	Failure
		√	

Reason(s) for success/failure:

- The project has contributed to the refinement of never before trialled implanted radio telemetry transmitters, which, in turn, has assisted researchers to stay in regular contact with all newly released animals.
- Large amounts of intensive behavioural data have for the first time been collected on the fate of individual rehabilitated orangutans.
- It is too early to assess the impact this research may have on shaping future rehabilitation protocol. More data must first be collected, analysed, and acted upon, from a larger number of orangutans, before judgement can be made on

this goal. However, the confirmed deaths of two out of three animals released during the hard release stage of the project demonstrate that in some cases rehabilitant orangutans are unable to survive without post-release support. Periodic weight loss displayed by others when not regularly supplemented also raises preliminary questions over both the suitability of the release site, and the current rehabilitation protocols in use in Sabah. In contrast, the carriage and subsequent birth of a healthy baby from a released rehabilitant mother is encouraging.

- It remains unclear how well prepared many orphaned orangutans are for thriving in a natural forest. Learning from similarly aged conspecifics or from human care givers is no substitute for an extensive mother/offspring learning period as experienced by undisturbed wild infants and juveniles.

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Release of the western subspecies of chimpanzee in Guinea, West Africa

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Introduction

Throughout their range across Africa, chimpanzees (*Pan troglodytes*) are threatened with extinction due to habitat destruction, disease and unsustainable levels of hunting and capture (IUCN 2008), in spite of being protected by national and international laws. All four known subspecies of chimpanzee (Eastern: *P. t. schweinfurthii*; Central: *P. t. troglodytes*; Nigeria-Cameroon: *P. t. ellioti*; Western: *P.t. verus*) are classified as Endangered (IUCN 2008) and listed on Appendix I of CITES. Although current total population estimates are imprecise, the second most threatened subspecies after *P. t. ellioti* is the Western subspecies (*P. t. verus*) with 21,300 - 55,600 individuals and c.50% found in Guinea (Kormos *et al.*, 2003). Unfortunately, the majority of chimpanzees in Guinea are found outside protected areas. The bushmeat and pet trade, as well as the exacerbation of human-chimpanzee conflict situations, have resulted in recent years in a significant increase in the number of orphan chimpanzees. The Chimpanzee Conservation Center (CCC), located in the north-western edge of the Mafou core area of the High Niger National Park (HNNP), is the only Pan African Sanctuary Alliance (PASA)-accredited sanctuary caring for chimpanzee orphans in Guinea. The CCC has been rehabilitating confiscated chimpanzees since 1997 and releasing selected suitable candidates since 2008.

Released chimpanzees © CCC

Goals

- Goal 1: Successfully release a group of

rehabilitated chimpanzees and reinforce the numbers and genetic diversity of the wild chimpanzee population within the HNNP.
- Goal 2: Contribute to the long-term conservation of the HNNP by strengthening law enforcement activities and efforts led by government agencies and authorities locally and fostering government commitment to protecting the national park-one of two in the entire country.
- Goal 3: Increase environmental and conservation education efforts locally and nationally to influence both public-opinion and attitudes and policy-makers at the local and national level.
- Goal 4: Enhance our understanding of the release-potential of chimpanzees, the relationship between rehabilitation procedures and release success, and generally contribute to improving best practise guidelines for the rehabilitation and release or re-introduction of chimpanzees.

Success Indicators

- Indicator 1: Self-sufficient and healthy released individuals exhibiting species-specific ranging and association patterns either forming a fission-fusion social grouping of their own (eventually accommodating wild immigrant females) or having successfully integrated a wild chimpanzee community.
- Indicator 2: Successful reproduction of released individuals and infant survival rate comparable to wild conspecifics living under similar environmental and climatic conditions.
- Indicator 3: Decrease in the anthropogenic pressures and threats to the habitat and wildlife within the HNNP compared to baseline assessments pre-release.
- Indicator 4: Increase in wildlife populations within the HNNP compared to pre-release data.
- Indicator 5: Increase in environmental awareness at the local and national level contributing to the eventual demise of the pet trade and to positive changes in people's attitudes and behaviour towards chimpanzees.
- Indicator 6: Number of scientific publications, thesis, dissertations and other academic documents or media outputs based on project activities, results and findings.

Project Summary

Feasibility: Finding a suitable release site was a key step in the feasibility stage and a challenging affair since no single site in Guinea can fully comply with the IUCN Re-introduction Guidelines for Great Apes (Beck *et al.*, 2007). After careful consideration of the 1998 National Chimpanzee Survey Report by R. Ham and nationwide maps of vegetation distribution and protected areas network, four areas were selected for survey as potential release sites (Raballand, 2004). Four major selection criteria served to compare each site (Humle *et al.*, 2010). The first criterion was *habitat suitability*. The habitat had to provide i) sufficient food in quality and distribution across seasons, ii) suitable nesting sites and tree species appropriate for nesting, and iii) access to natural sources of water should water be a limiting factor. The second was *distance from human habitation and settlement*; distance to villages and settlements had to exceed 20 km, unless access was hindered by a geophysical barrier, e.g. a river. The third criterion was the *protection status of the area and current and future anthropic pressures* on

High Niger National Park survey

the local fauna, chimpanzees (if present) and the habitat. Areas where it is culturally and/or religiously taboo to kill chimpanzees and consume their meat and that already benefitted from a legal protection status were favoured over others. In areas where human activity is strictly prohibited, protection levels could be reinforced readily if necessary in collaboration with the support of national, regional and/or local government agencies. Therefore governmental support was secured early on. The fourth criterion was *the distribution and status of wild conspecifics*. Since clear risks are associated with releasing chimpanzees in an area harbouring wild conspecifics (e.g. attacks, potential resource competition, disease transmission), it was decided that the future release site was not to overlap extensively with the core area of a wild community, while being able to sustain the group of released individuals. Finally the selected site was an area in the northern part of the Mafou core area (554 km^2) in the High Niger National Park, 32 km by road from the CCC facility (Raballand, 2004). This site was distant from human settlement and presented two river networks (the Niger and the Mafou rivers) potentially restricting ranging of the released individuals into the buffer zone of the park. The environment is dominated by savanna interspersed with dry and riverine forest patches. The release site revealed a low wild chimpanzee density and peripheral usage of the release zone (30 km^2) by wild conspecifics.

Implementation: Selection of suitable release candidates was based on their long-term rehabilitation at the CCC as a social group (7 - 11 years) and individuals' ability to demonstrate species-specific social and ecological skills necessary for their survival in an environment similar to the release site. Prior to release, release candidates were screened for diseases to ensure their wellbeing upon release and to prevent disease transmission to wild conspecifics. Released candidates were also genetically screened to confirm that they belonged to the Western subspecies. A first socialized group of 6 males (1 adolescent and 5 adults) and females (1 adolescent and 5 adults) was released in June 2008 and a second group of 5 individuals (2 adults males and females with one infant-one of the males was one of the original released individuals) supplemented the first core release group in August 2011. All adults were wild-born.

For post-releasing monitoring purposes, the to-be-released chimpanzees were first equipped with mock collars 5 to 12 months prior to release (Humle *et al.*,

2010). All fully adult sized males were then equipped with VHF/GPS store-on-board/ARGOS radio collars and most of the females were fitted with simpler VHF/GPS store-on-board collars. Two adolescent chimpanzees and one adult male and female were not fitted with functional collars. A large cage and enclosure was built at the release site to facilitate release procedure. Transport was done by road in individual transport cages; released individuals were mildly to fully anaesthetized to minimise stress during transport and to cloud their sense of direction with respect to the location of the CCC facility.

Post-release monitoring: The CCC decided to implement a minimal *in situ* post-release monitoring strategy. The reasons for this were four-fold: i) promote weaning from human contact; ii) minimize potential risk of aggressive behaviour by males towards monitoring teams; iii) minimize potential risk of disease transmission from humans to chimpanzees, especially as all released individuals had been medically screened prior to release; iv) facilitate integration of released females into wild communities and promote their natural behaviour and survival skills. *In situ* monitoring thus involved i) daily location of their whereabouts either via VHF transmitters every 30 min. between 6:30 am and 7:30 pm or the remote Argos system, ii) periodic visual sightings (once every 2 - 3 months) aimed at evaluating their health condition.

Major difficulties faced

- Initial soft release protocol involving a period of acclimatization at release site in *in situ* built cage and enclosure could not be adhered to for two main reasons: i) a bushfire during months preceding the release burnt down the enclosure, and ii) not all release candidates could be moved to release cage as it was not designed to hold 12 individuals day in day out. Five males were therefore initially transported to the release cage 4 to 12 weeks prior to the release and the other seven individuals were subsequently transported to the release site the day of the release.
- Scattering of individual males and some females during the initial stages of release (within the first and second days) possibly caused by lack of complete group acclimatization at release site prior to release: this compelled retrieval missions, aimed at reuniting dispersed individuals and at returning them to the release site; during one of the missions, one adult male failed to recover from his anaesthesia due to human error. The scattering also led to losing track of three non-collared individuals. However, they were sighted a year later in a zone with wild chimpanzees; they were healthy and are presumed to be still alive.
- Ability of some released chimpanzees to cross the Niger River during the dry season: this large river was predicted to act as an impassable boundary demarcating the northern limit of the release zone. This situation inevitably raised concerns about the potential increased risk of encounter between released chimpanzees and humans in the park's buffer zone thus compelling management to confine core release group members in the release cage for several weeks annually at the end of the dry season. The chimpanzees are then released once water levels swell back to impassable levels.

Education in schools

- Challenge in securing necessary funding for long -term post-release monitoring beyond the first year, especially linked to the expense of the sophisticated tracking collar systems used for distance monitoring. We expect post-release monitoring to continue for another three years although this will depend on future performance on release success indicators.
- Death of two new-borns among three post-release births (the first was recorded 16 months post-release): presumably by baboons widely ranging across the northern area of the Mafou core area; this group of baboons comprises more than 200 individuals; the nature of wounds on the mother (the infants' corpses were never retrieved) indicated the high probability of a baboon attack. However to date the survival rate of new-borns is 33% which is within range of wild counterparts.

Major lessons learned

- Value in i) soft group release of individuals well acquainted with one another and rehabilitated together: in spite of initial split, most released individuals now form a cohesive unit group behaving comparably to a small wild chimpanzee community and ii) releasing candidates during period of high fruit availability to maximize their initial survival and minimize food stress upon release, decreasing necessity for provisioning.
- Importance of ecological and social competence of release candidates: it is vital that release candidates are equipped with the necessary social and ecological skills to survive in release environment (familiarity with range of food items, including fallback foods during periods of fruit scarcity, locating water sources, dangers including predators such lions and leopards and potentially wild conspecifics) - two males were brought back to the CCC; these two males exhibited poorer ecological and social skills respectively compared with the other 14 candidates.
- Importance of conducting pre-release assessment of future release site and behavioural evaluations of release candidates during preparation phase. The CCC has an on-going behavioural assessment program which aims to identify suitable release candidates, to improve future assessments of rehabilitation and release success, and to help inform future release projects.
- Value of GPS store-on-board and Argos system: males ranged initially further than the females and were relocated thanks to the Argos collar system, although average transmission rate was on average only 13.2% in a relatively

open and topographically uniform environment. The downloaded GPS data contributed to our understanding of the released chimpanzees' habitat preferences, social dynamics and ranging patterns without having to observe individuals at a close distance (Humle *et al.*, 2010) - the downside to this system is the requirement to replace collars approximately every 12 months for continued post-release monitoring purposes.

- Although it is possible to release adult male chimpanzees, the release success of young adult female chimpanzees is greater than for males since young adult females are more likely to integrate wild communities (Humle *et al.*, 2010), and are less likely to incur fatal injuries from wild conspecifics should any be present (none were recorded during this project) and to take risks, e.g. in crossing challenging boundaries such as rivers.

Success of project

Highly Successful	Successful	**Partially Successful**	Failure
		√	

Reason(s) for success/failure:

- Self-sufficiency and adaptation of core-release group (now consisting of 8 individuals) to release zone: the core release group has settled in a defined home range within original surveyed release zone; group members demonstrate fission-fusion social dynamics and a reproductive rate comparable to wild chimpanzees.
- Released chimpanzees have adapted well to the presence of wild counterparts: Only one minor attack by wild chimpanzees on monitored release individuals was ever reported since the project began and at least one young adult female has integrated a wild chimpanzee community.
- Increased protection of the Mafou core area at least in its northern area: due to presence of monitoring staff in buffer zone and around passable river-crossing areas, in addition to increased deployment of park and local military authorities' patrols in and around core-area, and of road blocks and law enforcement initiatives, e.g. moratorium on commercial fishing along the Niger river in areas bordering the core area of the Mafou.
- Increased mobilization and awareness of the local and national authorities and local communities to the value and importance of the Niger River and the park, a site of high priority for the conservation the Western subspecies of chimpanzee (Kormos *et al.*, 2003).
- 'Insurmountable barriers' are not what they seem: annual issue with river crossing during dry season months has hampered the project's success; released chimpanzees' incursions into the buffer zone could pose a risk to humans which management is unwilling to take. The implications are severe in relation to the project's success unless the reason(s) why some of the chimpanzees (esp. males) cross the river can be identified with confidence and addressed. Bushfire management may be a possible solution, since all crossing events coincided with the presence of bushfires in release zone. Sustained education efforts specifically focused on how to behave when encountering a chimpanzee can also help alleviate these concerns; however,

these can never quite fully eliminate a risk which could jeopardise the release project.

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Preliminary observations from a welfare release of woolly monkeys in the Colombian Amazon

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Introduction

Humboldt's woolly monkey (*Lagothrix lagotricha*), the largest primate throughout most of its geographical range, is a sensitive indicator of human influence in the Upper Amazon region due to its extremely low reproductive rate and need for large areas of undisturbed primary forest. Populations were decimated in the 1960s and 1970s due to the global demand for exotic pets and spotted cat skins (the monkeys were the preferred bait in the cat traps). National laws and the CITES convention reduced the volume of exploitation, but the species is still in decline due to habitat loss and overhunting. It is categorized as VU in Colombia and VU A3cd by the IUCN.

The taxonomy of *Lagothrix* is an unresolved issue of conservation importance. The IUCN follows Groves' recognition of 4 species, based on morphological characters, while the Colombia Red List follows more recent cytological and molecular evidence consistent with a single species with four geographical subspecies. Amacayacu National Park, like other protected areas in the Colombian Amazon, shares jurisdiction for most of its area with indigenous reserves whose inhabitants have legal rights to the traditional use of natural resources. Woollies have been locally extinguished from much of the southern part of the park.

Female Humboldt's woolly monkey
© Angélica Martínez A.

Rehabilitated individuals
© Angélica Martínez A.

Goals

- Goal 1: Establish a self-sustaining troop of woolly monkeys rescued from the wildlife trade in an area of local extinction that is now protected by the community.
- Goal 2: Consolidate and strengthen support in the local indigenous community for their ban on hunting woolly monkeys and other threatened game species in their territory.
- Goal 3: Evaluate re-introduction/ supplementation of woolly monkeys as a potential conservation tool for the management of a threatened species, for ecosystem restoration in areas of local extinction, and as an element in the campaign against illegal wildlife trafficking.
- Goal 4: Use the specific case of woolly monkeys, a threatened and ecologically important species, to facilitate the improvement of coordination and interpretation of current legal norms so that re-introduction/supplementation can be a more available and better - defined tool for species and ecosystem management in Colombia.

Success Indicators

- Indicator 1: Survival of the liberated individuals.
- Indicator 2: Species-typical behavior of the liberated individuals in terms of social interactions, foraging, use of substrate, and use of habitat.
- Indicator 3: Support, participation, and cooperation from the local indigenous community for both the maintenance of the hunting ban and for protection of the liberated troop.
- Indicator 4: Application of lessons learned in regional and national natural resource management planning.

Project Summary

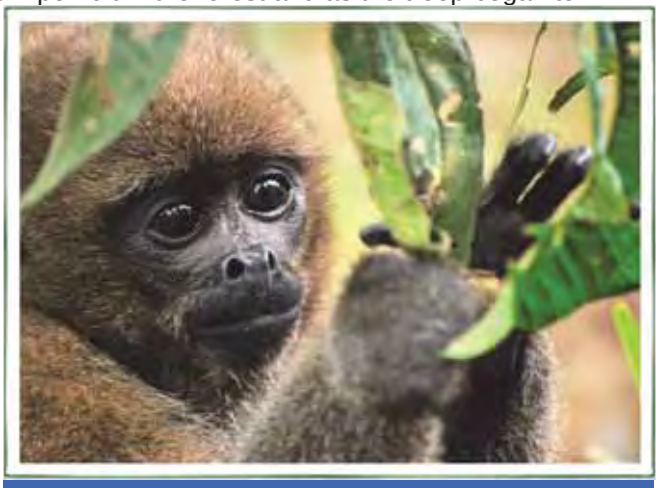
Feasibility: Results reported here are from an ongoing pilot study for a possible long-term project conceived gradually as part of the evolution of the continuing discussion of natural resource use among Amacayacu National Park and the indigenous communities in its southern zone of influence. In 2004, the Mocagua Indigenous Reserve (most of which overlaps with the Park) made a collective decision to stop hunting threatened game species in its territory, with a

special emphasis on the woolly monkey. The creation in the Park of a rescue center for orphaned primates confiscated from the illegal wildlife trade and a small, community-based NGO to administer this function in collaboration with the Park and the regional government agency for natural resource management (Corpoamazonía) were direct results of this agreement. At first, the rescue center simply served as an organic regional solution to the enforcement of anti-wildlife trafficking laws; activities were focused on the humane management of the confiscated victims. Healthy orphans of various primate species were free-living in natural habitat with conspecifics and with human nutritional /veterinary support.

Free-living, rehabilitated woollies begin to present special management issues as they mature - the males become dangerous and the females begin to explore widely in search of a troop to join. For this reason we decided to relocate the eight young individuals under our care to a site more isolated from human activities and gradually help them become independent. Accumulating evidence that the future diversity of Amazonian forests is highly-dependent on the seed dispersal function of robust ateline populations, that the other indigenous communities in the southern part of the park are overhunting woollies, and that the species is one of the most frequently confiscated from the illegal pet trade led us to treat this as an experiment not only in the management of confiscated individuals, but also of the wild population and a fauna-depleted ecosystem.

Implementation: In July 2010, we took an adult male and two sub-adult females to the chosen site and confined them for a few days to adjust to the change (in the small cabin built for the human support team). Then we brought up the 5 remaining individuals (a younger sub-adult female, 3 juvenile females, and a juvenile male), who were released on the spot, and freed the older ones. There was relatively little stress involved, and all the individuals stayed together, exploring and foraging as a cohesive group.

Post-release monitoring: The relocation occurred at the beginning of the season of relative scarcity of ripe fruit in the forest and as the troop began to explore we continued to provide them with food and observe them nearly continuously for six months. As the availability of fruit became greater, we began to leave them on their own for longer periods, while continuing to observe their movements and behavior regularly. During the 2011 season of fruit scarcity, when it became clear that they were losing weight we began to provide food



Juvenile woolly monkey © Angélica Martínez A.

Field staff © Angélica Martínez A.

again. During the second season of abundance, they were completely independent and no longer “central-place foragers”. In their third season of scarcity we have begun supplementing again due to an obvious deterioration in the physical condition of the male. Two individuals have disappeared and one died after we brought her back in poor health for intensive care. During the first year of this experiment there was a change in the national regulations for the management of impounded wildlife in which the release in protected areas of confiscated animals whose precise origin is unknown is prohibited, and we were no longer able to continue receiving orphans.

Woolly monkeys typically live in large, multi-male, multi-female troops whose home ranges overlap. The males are philopatric and females tend to disperse from their natal troops at around 6 years. So far there has been no reproduction in the rehabilitated group, apparently due to a “kibbutz effect”. Our original intention to create a second group of rehabilitated individuals with this in mind is no longer possible. It seems likely that the females will soon begin to search for a wild troop to join and the male will become solitary. Our conclusion from the experience is that the re-introduction of confiscated and rehabilitated woollies in areas where the natural population is locally extinct, fragmented, or significantly reduced is a viable, not harmful, and probably beneficial conservation option if long-term follow-up is possible to ease them through their first seasons of fruit scarcity. Even if the released individuals do not reproduce, their foraging restores, at least temporarily, a significant ecosystem function, i.e., seed dispersal for the many plant species with large-seeded, nondehiscent fruits dependent on these large wide-ranging primate frugivores. We recommend modification of the national norms or their interpretation so that nonarbitrary, species-specific protocols for evaluating potential risks and benefits of re-introduction can be developed and applied.

Major difficulties faced

- New national regulations for the management of impounded wildlife intended to prevent uncontrolled “dumping” of confiscated animals in effect now prevent re-introduction or supplementation as a practical option for the conservation management of protected areas in Colombia.
- There is little basic information about regional *Lagothrix* foraging ecology and our evaluation of habitat quality in the area of release, especially during the

long season of relative scarcity of ripe fleshy fruit, has been more intuitive and experiential than empirical. It is not clear whether the released individuals' difficulties in the season of fruit scarcity result from their inexperience or from the effects of selective logging for domestic use in the area, since some of the preferred timber species are also woolly monkey food plants.

Major lessons learned

- Consideration of the details of dispersal biology is critical in the long-term planning of a re-introduction. For woolly monkeys, we think a minimum of two multi-male groups is necessary, so that females reaching reproductive age can disperse from their "natal" troop.
- This project, *sensu latu*, has provided highly visible positive reinforcement for a responsible local community decision with respect to threatened game species.
- The analysis of the issues relevant to the advisability of re-introduction brought about improved understanding of the status of and increased protection for the wild population. The woolly monkey is now recognized as an "integral conservation priority" in the management plan of Amacayacu National Park as a result, and a program for monitoring the wild population has been designed and initiated. The isolation of the Colombian "trapezius" from the rest of the country has been recognized in the process; the urgent need for international action to guarantee biological connectivity within the biogeographic unit defined by the Amazon, Putumayo, and Napo rivers and the eastern cordillera of the Andes is addressed in a joint action plan of the national parks department's Amazonian subdivision and Corpoamazonía.
- The re-introduction of rehabilitated woollies appears to be a viable, not harmful, and probably beneficial possibility for conservation management, but only makes sense in the context of a comprehensive long-range strategy for species and ecosystem protection. Despite generally excellent environmental laws, Colombia lacks adequate planning and coordination mechanisms among government agencies with different functions and geographical scales of action for this to take place.

Success of project

Highly Successful	Successful	**Partially Successful**	Failure
		√	

Reason(s) for success/failure:

- Success: Total community involvement and participation from the project conception, with proactive support from national park and regional natural resource management agency.
- Success: Long-term commitment of those involved (community, national park, NGO), not only to reintroduction of woollies, but in general to biological conservation as a major aspect of cultural conservation, economic development, and human well-being.
- Failure: Top-down, arbitrary management from a national level with insufficient involvement from regional actors. In preventing the risks of pathogens,

invasive species, and exogamic depression associated with re-introduction or supplementation of wild populations in protected areas with rehabilitated individuals, the new national regulations in effect also prevent the potential benefits of increasing numbers and avoiding the loss of genetic variability associated with small and fragmented populations.

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