Global conservation translocation perspectives: 2021

Case studies from around the globe

Edited by Pritpal S. Soorae





IUCN SSC Conservation Translocation Specialist Group

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IUCN is pleased to acknowledge the support of its Framework Partners who provide core funding: Ministry of Foreign Affairs of Denmark; Ministry for Foreign Affairs of Finland; Government of France and the French Development Agency (AFD); the Ministry of Environment, Republic of Korea; the Norwegian Agency for Development Cooperation (Norad); the Swedish International Development Cooperation Agency (Sida); the Swiss Agency for Development and Cooperation (SDC) and the United States Department of State.

Published by: IUCN SSC Conservation Translocation Specialist Group, Environment Agency - Abu Dhabi & Calgary Zoo, Canada.

Citation: Soorae, P. S. (ed.) (2021). *Global conservation translocation perspectives: 2021. Case studies from around the globe*. Gland, Switzerland: IUCN SSC Conservation Translocation Specialist Group, Environment Agency - Abu Dhabi and Calgary Zoo, Canada. xiv + 353pp.

Edition: 7th Edition

Cover photo: Clockwise starting from top-left:
I. Darwin's rhea (*Rhea pennata pennata*) © Cristián Saucedo
II. Orinoco turtle (*Podocnemis expansa*)
III. Leopard cat (*Prionailurus bengalensis*) © Mei-Ting Chen
IV. White saxaul (*Haloxylon persicum*) © EAD
V. Southern pygmy perch (*Nannoperca australis*) © Michael Hammer

Cover design & layout by: Pritpal S. Soorae, IUCN SSC Conservation Translocation Specialist Group

Printed by: Arafah Printing Press LLC, Abu Dhabi, UAE

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Conservation Translocation Specialist Group

The IUCN SSC Conservation Translocation Specialist Group (CTSG) aims to ‘empower responsible conservation translocations that save species, strengthen ecosystems, and benefit humanity’ for a vision of ‘a world where courageous action repairs nature’s past damage and secures against threats of the future’. CTSG collaborates with others to plan, conduct, or evaluate any conservation programs that involve translocations in the wild, or releases arising from breeding, propagation, or headstarting. Through science, policy, guidance, training, action, and outreach, CTSG can help enable effective reintroductions, reinforcements, assisted colonization, or ecological replacements spanning all terrestrial, freshwater, or marine ecosystems.

www.iucn-ctsg.org/

Environment Agency - Abu Dhabi

Established in 1996, the Environment Agency - Abu Dhabi (EAD) is committed to protecting and enhancing air quality, groundwater as well as the biodiversity of our desert and marine ecosystem. By partnering with other government entities, the private sector, NGOs and global environmental agencies, we embrace international best practice, innovation and hard work to institute effective policy measures. We seek to raise environmental awareness, facilitate sustainable development and ensure environmental issues remain one of the top priorities of our national agenda.

www.ead.ae/

Calgary Zoo

The Calgary Zoo’s vision is to be Canada’s leader in wildlife conservation. In close alignment with IUCN, this vision is pursued through a mix of Canadian and global conservation initiatives regarding two strategic pillars: 1) conservation translocations, such as reintroductions, to avert species extinction and strengthen ecosystem function; and 2) community conservation to bring mutual and sustainable benefits for local livelihoods and biodiversity. The Calgary Zoo engages in collaborative partnerships around the world to develop the innovation and application of science-based solutions to achieve long-term benefits for conservation.

www.calgaryzoo.com/

Wildlife Reserves Singapore

Wildlife Reserves Singapore (WRS) is dedicated to the management of world-leading zoological institutions - Jurong Bird Park, Night Safari, River Safari and Singapore Zoo - that aim to inspire people to value and conserve biodiversity by providing meaningful and memorable wildlife experiences. A self-funded organization, WRS focuses on protecting biodiversity in Singapore and Southeast Asia through collaborations with like-minded partners, organizations and institutions. Each year, the four attractions welcome five million visitors.

www.wrs.com.sg/

The Aspinall Foundation

The Aspinall Foundation is a UK-based charity devoted to the conservation of endangered species and returning them to wild protected areas. Major achievements include the reintroduction of gorillas to the Batéké Plateau, the reinforcement of small isolated gibbon and langur populations in Java, the translocation of captive-born Eastern black rhinos and Southern cheetahs from the UK to protected reserves in Africa, and the implementation of a community-based species survival program for the Critically Endangered Greater bamboo lemur in Madagascar.

www.aspinallfoundation.org/

IUCN Species Survival Commission (SSC)

With over 8,000 members, the Species Survival Commission (SSC) is the largest of the six expert commissions of IUCN and enables IUCN to influence, encourage and assist societies to conserve biodiversity by building knowledge on the status and threats to species, providing advice, developing policies and guidelines, facilitating conservation planning, and catalyzing conservation action.

Members of SSC belong to one or more of the 140 Specialist Groups, Red List Authorities and Task Forces, each focusing on a taxonomic group (plants, fungi, mammals, birds, reptiles, amphibians, fishes and invertebrates), or a disciplinary issue, such as sustainable use and livelihoods, reintroduction of species, wildlife health, climate change and conservation planning.

www.iucn.org/theme/species/about/species-survival-commission

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Dr. Shaikha Al Dhaheri
Secretary General, Environment Agency - Abu Dhabi & IUCN Global Councillor for West Asia

Two years have passed, and I once again would like to present the 7th issue of the *Global conservation translocation perspectives* which has a total of 69 case studies covering a total of 78 species worldwide. The case studies are as varied as ever covering crayfish in Australia, desert fish in restricted waterbodies in Las Vegas, deer in China to large-scale rainforest restorations in Brazil. The Reintroduction Specialist Group has now had a name change to the Conservation Translocation Specialist Group which was timely as there are many new conservation actions which now fit under the "conservation translocations" umbrella.

In this issue plants cover 35% of the case studies, and I am glad to report that we have an example of a plant restoration project from the region specifically from Abu Dhabi, UAE. The White saxual is a species living on the extreme edge of its distribution range and is challenged by many factors such as increased aridity, and the Environment Agency - Abu Dhabi's (EAD) efforts have resulted in restoration of this species in its native habitat.

The EAD has also been working diligently on the iconic Scimitar-horned oryx reintroduction project in Chad which was comprehensively covered in the 2018 issue with currently 350 individuals in the wild. We have also released 50 Addax antelope and with Dama gazelle and Red-necked ostrich planned for the future. This will be a large-scale restoration of ecosystem function with these releases in Chad in the Sahel region of Africa.

Finally I would like to thank Pritpal Soorae for compiling these case studies and the support of partners such as the Calgary Zoo, Wildlife Reserves Singapore and The Aspinall Foundation who have come together to ensure best practices in species and ecosystem restoration are available for the wider conservation community.

Dr. Axel Moehrenschlager
Chair, Conservation Translocation Specialist Group, Calgary Zoo

This is a book about action. It is about saving species and ecosystems to yield profound benefits for nature and humanity. This book is also about courage. It is about amazing teams working together, sometimes against all odds, to make a difference. I am so grateful to my friend Pritpal for once again investing his passion, skill, and time to bring these stories into the limelight. Overarching analyses of previous case studies in leading scientific journals illustrate the collective power and potential of our approaches. Once again, I hope global efforts and successes on the pages to come inspire you as much as they inspire me.

Despite a 30-fold increase in the last 30 years, future projections call for even greater use of our techniques. Why? Because more species need help in a changing world, other conservation approaches are often insufficient on their own, and our science-based actions are increasingly effective. Building on a proud 30-year history as the Reintroduction Specialist Group, the recent Renaissance as the Conservation Translocation Specialist Group (CTSG) escalates our role to meet future needs and opportunities through….

- **Our Vision:** A world where courageous action repairs nature's past damage and secures against threats of the future.
- **Our Mission:** To empower responsible conservation translocations that save species, strengthen ecosystems, and benefit humanity.

Our new 10-year plan strives for even greater impacts felt in the oceans, deserts, grasslands, lakes, forests, and mountains of our world. With deep gratitude to the Calgary Zoo, Environment Agency of Abu Dhabi, Wildlife Reserves Singapore, The Aspinall Foundation, and the Species Survival Commission, I also invite others to come join this cause! Everyone can help. We need your help. Come share the joy of making a difference together…

Dr. Sonja Luz
Director, Conservation, Research and Veterinary, Wildlife Reserves Singapore

As modern zoos, conservation is what we do. Our work in the areas of animal care, education, public engagement, research and conservation give us the social mandate to operate. Hence, we believe that Wildlife Reserves Singapore (WRS) has a major responsibility as a world leading zoological institution to contribute towards species conservation, particularly in the region we operate and where incredible biodiversity exists.

With that, we are a proud supporter and partner to the IUCN SSC and the Conservation Translocation Specialist Group. Conservation translocations are key components of many conservation efforts and we congratulate the CTSG and all the contributors to this newest edition of the *Global conservation translocation perspectives*, for their valuable and impactful conservation contributions. WRS focuses its conservation efforts on the Southeast Asia region. We see an increasing need for conservation translocations, with many threatened species being displaced by human-wildlife conflict, habitat loss and over exploitation. We are particularly grateful for the CTSG who have provided guidelines and tools that have helped to address these pertinent issues in a structured and scientific manner. We hope the fantastic stories in this book will inspire many more conservation translocation activities and encourage new approaches to conservation translocations globally.

As threats to species show no sign of abating, zoo-based conservation institutions like WRS play an important role in protecting their future existence, especially under the concept of the “One Plan Approach”. Saving species cannot be done in isolation, and we are proud to be part of this community, and be able to contribute to the publication of this book. We look forward to more close collaborations with the CTSG. Together, we can protect wildlife and actively make a difference to the future of biodiversity and the preservation of animal species.

Tony King
Conservation and Reintroduction Coordinator, The Aspinall Foundation

It is a great pleasure to be involved in the seventh issue of the *Global conservation translocation perspectives* series, compiled with such dedication by Pritpal Soorae with contributions from conservationists from all around the world. I am very pleased that our own projects are included in this series.

We contributed one case study to the very first edition of the series back in 2008, concerning the reintroduction of Western gorillas to the Batéké Plateau region of Gabon and Congo in Central Africa. The project has continued to develop and flourish and has now seen over 70 gorillas released and over 30 births within the two re-established populations. In this edition we summarize similar projects for three primate species in Java, Indonesia, totaling 159 released primates in five population reinforcement projects. These highlight the benefits that the release of primates rescued from the illegal pet trade can have on isolated or locally-extirpated populations. They also demonstrate that zoo-born primates can be incorporated into such projects, but that zoo-born individuals may have lower survival and reproduction rates than rescued primates. Another case study highlights the successful welfare release in South Africa of a single Brown hyaena, born in a European zoo, illustrating that it can be possible to release zoo-born carnivores. Our final contributed case study showcases the return of Europe's largest land mammal, the European bison, to Romania. The European bison remains one of the surprisingly few examples of how zoo populations can bring species back from extinction in the wild.

The case studies in this series show us that habitats and populations can be restored when sufficient will and resources are put to the task. They offer hope and inspiration at a time when our planet needs action more urgently than ever before.

Dr. Jon Paul Rodriguez
Chair, Species Survival Commission (SSC)

Once again, our colleagues of the Conservation Translocations Specialist Group (CTSG) deliver a new volume of *Global conservation translocation perspectives*. Edited by Pritpal S. Soorae, the seventh edition increases the tally of case studies to 418. This issue includes 4 invertebrates, 6 fishes, 5 amphibians, 3 reptiles, 12 birds, 21 mammals and 27 plants, which includes multiple species in some case-studies. Jointly, the 69 studies cover all of IUCN's eight statutory regions, while an examination of their success rate indicates that only 4% of them are classified as failures, 24% were highly successful, 50% successful and 22% successful.

Since the publication of volume 6 in 2018, the group changed its name from Reintroduction Specialist Group, to Conservation Translocation Specialist Group, in recognition that reintroductions were a special case of a broader set of interventions, better characterized as conservation translocations. They span "any human-mediated translocation for conservation purposes," including conservation breeding, propagation, or head starting for release, reinforcement, ecological replacement, assisted colonization, rewilding and de-extinction. The case studies contained in volume 7 reflect this diversity of interventions, and include habitat restoration or protection, threat mitigation, partnerships with local communities, landowners, researchers and governments, and adaptive management. A complex portfolio or tools that seek to "to return species that have been lost regionally or globally from the wild."

What are the major lessons learned from this massive compilation? Are there common elements to successful projects? What must the conservation community avoid to prevent failure? How long does it take a project to begin generating positive results? Are there taxa that are comparatively "easier" than others? These are the kinds of questions that we can explore with the wealth of knowledge gathered by Soorae and his colleagues over the years. I would encourage a young and enthusiastic member of the CTSG to pursue such an analysis. There is enough

information for a Master's thesis or independent research project. I can imagine an influential publication in a major conservation journal, as an early step in the career of an emerging CTSG leader. Analysis of these data, combined with mining the knowledge of the SSC network of experts is sure to generate important results.

SSC is about evidence-based conservation, which is exactly what the seven volumes of *Global conservation translocation perspectives* are about. In two years or so, I would expect to see the next round of case studies to be ready for release. This is roughly the same amount of time required for the analysis of data already available. I look forward to the publication of a synthesis of past studies and the new cases at the same time.

There are very few examples of such a sustained research effort, and at least part of the explanation is the historical support of Environment Agency - Abu Dhabi, the strategic engagement of Calgary Zoo, and the participation of Singapore Zoo and The Aspinall Foundation, among others. My deepest gratitude to all for helping the SSC network advance species conservation around the world.

An overview and analysis of the reintroduction project case studies

Pritpal S. Soorae, Editor

Introduction

This is the 7th issue in the *Global conservation translocation perspectives* series and has been produced in the same standardized format as the previous six to maintain style and quality. The case studies are arranged in the following order: a) Introduction, b) Goals, c) Success Indicators, d) Project Summary, e) Major Difficulties Faced, f) Major Lessons Learned and g) Project outcome - with reasons for success or failure.

Case studies per issue

The following numbers of case studies have been collated for the last seven issues: 1) 2008 issue - 62 case studies, 2) 2010 issue - 72 case studies, 3) 2011 issue - 50 case studies, 4) 2013 issue - 52 case studies, 5) 2016 issue - 54 case studies, 6) 2018 issue - 59 case studies and 7) 2021 (this issue) - 69 case studies. This is a total of 418 case studies in all seven issues.

IUCN Statutory Regions

The IUCN Statutes have established a total of eight 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 numbers of case studies in the regions are as follows:

1. North America & Caribbean - 9 case studies
2. West Europe - 14 case studies
3. South & East Asia - 10 case studies
4. Oceania - 15 case studies
5. West Asia - 1 case studies
6. Africa - 3 case studies
7. Meso & South America - 18 case studies
8. East Europe, North & Central Asia - 8 case studies

There are 69 case studies with a total of 78 species as some case studies have multiple species.

Success/Failure of projects

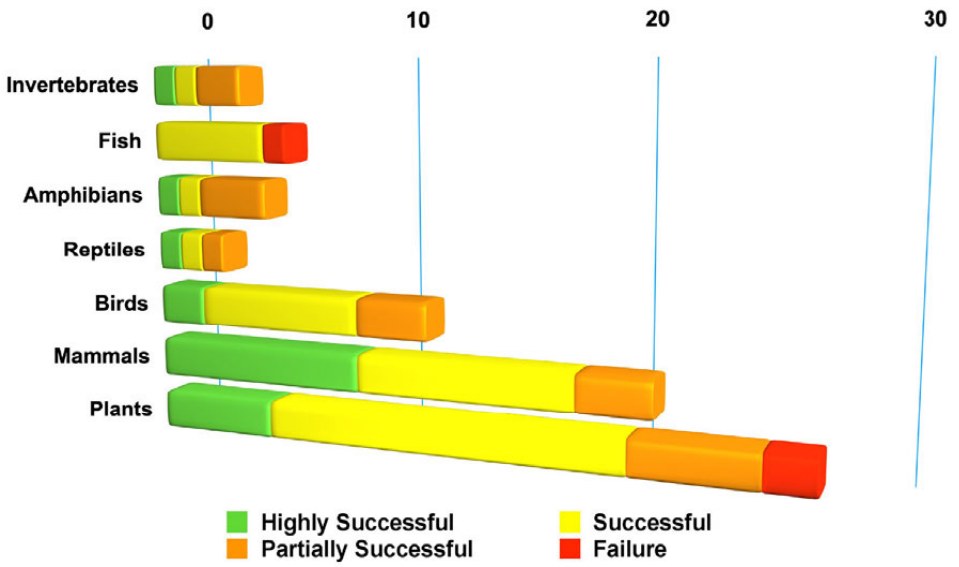
The projects presented here were ranked as Highly Successful, Successful, Partially Successful and Failure. Out of the 69 case studies, there were some cases of multiple rankings, as some projects had multi-species restorations. A total of 19 projects were Highly Successful (24%), 39 were Successful (50%), 17 were Partially Successful (22%) and 3 were listed as Failures (4%).

Success according to the taxa

An analysis was done to gauge the three different levels of success (highly successful, successful and partially successful) and failure against the seven major taxa i.e. invertebrates, fish, amphibians, reptiles, birds, mammals and plants as can be seen in figure 1.

As can be seen below the majority of case studies were covered in the following order - plants, mammals, birds, fish, amphibians, invertebrates and reptiles. Out of the seven major taxa only fish did not have a project ranked as Highly Successful. Successful projects were ranked in all 7 taxa. Only fish did not have a Partially Successful project. Only fish and plants had case studies ranked as a Failure.

Figure 1. Success / failure of projects according to major taxa



Reintroduction of collared peccary in the Iberá wetland, northeastern Argentina

Sebastián Di Martino*, Magali Longo, Talia Zamboni, Emanuel Galetto, Carolina Rosas, Juan P. Vallejos, Gustavo Solís, Pablo Aon, Augusto Distel, Federico Pontón, Alicia Delgado, Elena Martín, Florencia Donari, Héctor Ortiz, Fabián Yablonski, Juan C. Minvielli, Pablo Cabrera, Jorge Gómez, Jorge Peña, Ignacio Jiménez Pérez & Emiliano Donadio

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Introduction

Collared peccaries (*Pecari tajacu*) are listed as of Least Concern by the IUCN and included in CITES Appendix II, except for populations inhabiting Mexico and the United States. The species is classified as Vulnerable in Argentina, where specialists speculate that habitat loss and transformation, and increasing levels of poaching and hunting caused a 30% population decline within the last 15 years. Indeed, Collared peccaries were partially eradicated from at least three and driven to extinction in two provinces (Camino *et al.*, 2019). Located in northeastern Argentina, Corrientes is one of the provinces where Collared peccaries disappeared around the mid-20th century. Corrientes is home to the Iberá wetland, a 13,000 km^2 complex of federal (i.e., Iberá National Park) and provincial reserves that protects an interconnected system of marshes, large ponds and streams associated with subtropical grasslands and remnants of native forests. Collaborative efforts implemented by governmental agencies and non-governmental organizations led to a steady recovery of wildlife and natural habitats in the Iberá wetland; thus, creating the conditions to revert extinction processes. Indeed, since 2015, Foundation Rewilding Argentina has been reintroducing collared peccaries in Iberá National Park (28.65491 S, 57.43166 W). Here, we summarize results obtained during the first five years of work.

Collared peccary with young © Rafa Abuin

Goals

- To restore Collared peccaries to the Iberá wetland.

Success Indicators

- Number of groups formed.
- Percentage of groups that are no longer supplemented with food.
- Percentage of groups that reproduced.
- Percentage of

reproductive events that resulted in piglets surviving ≥6 months.
- Number of self-sustainable populations established.

Project Summary

As a result of improved conservation and legal status and habitat restoration the Iberá wetlands became suitable for the reintroduction of Collared peccaries. Threats like hunting and poaching were minimized and, in some locations, even halted by law enforcement and patrolling. Furthermore, Collared peccaries were successfully reintroduced in Texas, USA (Litondo, 1993), lending support to reintroductions as tool to restore this species. Provincial and federal wildlife agencies were reluctant to allow translocations of wild peccaries (*see major Difficulties Faced*). Thus, we resorted to zoos and wildlife shelters to obtain the needed individuals (*see Reasons for Success*). We obtained permits to transport and release peccaries from provincial and federal Wildlife Agencies, according to existing regulations. Overall, the public supported the reintroduction of this species, but governmental officers were concerned regarding large and small agricultural producers, who could see peccaries as having similar impacts than Feral pigs (*Sus scrofa domestica*), being the latter invasive and harmful to agriculture and animal husbandry. To overcome this misconception, we held several meetings with these officers and explain them the differences between peccaries and Feral pigs. As a result, we could reintroduce a few groups and once officers realized that peccaries would not impact agricultural activities, we obtained a full approval for the translocation project.

We obtained 205 collared peccaries from eight zoos and wildlife shelters. We transported peccaries from their home institutions to our quarantine facilities using 70(l) × 40(w) × 50(h) cm crates made of iron and wood. Peccaries were placed individually in each crate to avoid fights. Distances between home institutions and quarantine facilities varied between 700 - 1,500 km and trips lasted from 12 - 36 hours. If temperatures were high, we stopped frequently to refresh the animals with a hose and cold water. Only four animals died during transportation.

Once at the quarantine facilities all animals underwent a sanitary screening. We used results from the screening to classify animals as either potentially fit or unfit for reintroduction. The latter included animals diagnosed with foot and mouth disease, classical and African swine fever, bluetongue disease, brucellosis, vesicular stomatitis, pseudorabies (Aujeszkys disease), and porcine reproductive and respiratory syndrome. The presence of one or more of these diseases would result in animals removed from the project. However, sanitary screening proved that all animals were fit for reintroduction. We observed some mortality during the quarantine because of fight-related injuries.

The quarantine period lasted on average 83 (range = 45 - 137) days. Length of quarantine depended on animal conditions at arrival and time elapsed until all health check-ups and analyses were finished. Before release, we treated animals for internal and external parasites using 300 µg/Kg (Dectomax®, Zoetis AR Laboratory), ricobendazole 7.5 mg/Kg (Axilur®, MSD Animal Health), praziquantel

5.5 mg/Kg (Cestodan®, Köning Laboratory), and friponil 1% pour on formulation 1mL/10 Kg (Ectoline®, Boehringer Ingelheim).

Peccaries fit for release were moved to pre-release pens, where we fed them daily with a mix of non-native and natural foods. Time spent in pre-release pens varied from 7 - 30 days. If small groups were consolidated at arrival, animals would spend a short period in pre-release pens. Conversely, if small groups had yet to be formed, animals would spend more time in pre-release pens. In some cases, we collared all individuals that we freed, but as the number of entanglement events increased, we began collaring only a few (*see major Difficulties Faced*). We implemented an intensive post-release monitoring scheme based on radio-telemetry because peccaries struggled identifying native sources of food; thus, periodic food supplementation was need. Food supplementation lasted ~30 days to a year, but time decreased as we gained experience regarding the native foods that peccaries preferred. Food supplementation was terminated when we observed that animals would not lose weight despite a steady reduction in the amount of food we provided. However, if after some time animals lost weight, food supplementation was reinstated. Interestingly, we observed that individuals that were thriving after release would teach recently freed animals how to find food resources in the wild. Thus, we began establishing mobile pre-release pens with naïve individuals in the territories of stablished ones. Established solitary males taught naïve females, and groups of females taught naïve males.

Out of 167 individuals released in four different locations, 32% died from collar and agonistic-related injuries, starvation, drowning and unknown causes. At least 21 groups became established, 16 (76%) of which are completely independent (i.e., food supplementation was terminated) and 19 (90%) are formed at least by one female and one male. Of the later, at least 11 (58%) reproduced ≥1 times. Out of 19 recorded reproductive events (i.e., piglets were observed), 11 (58%) resulted in at least one piglet surviving ≥6 months. Currently, two self-sustaining populations thrive in two locations, whereas two populations, still under management, are being established in other two locations. More releases are planned for 2020.

Major difficulties faced

- Federal and provincial wildlife agencies would not issue permits to translocate wild individuals. They perceived translocations as a hazard to source populations rather than a conservation tool. As a result, we were limited to reintroduce captive animals provided by zoos and wildlife shelters.
- Misconceptions about the potential for peccaries to harm agricultural activities.
- Captive animals required lengthy quarantines, and intensive veterinary care and management before and after release extending project times, costs and increasing risks.
- Although critical for post-release monitoring, collaring was problematic.

Individuals tended to lose weight after release, which translated in decreasing levels of fat around the neck. Thus, collars became loose increasing the frequency of entanglements, where animals would get entrapped with a front leg through their collars (i.e., between the collar and the neck). This often resulted in severe injuries and even deaths.

Researcher at release site © Rafa Abuin

- Often, we lacked information about group membership of the animals that we incorporated in to the project. Thus, large groups were kept in the same pen and then released. Large group size increased the frequency of intraspecific strife, which resulted in injuries, deaths, and triggered undesirable early dispersal. Early dispersal of uncollared individuals hindered food supplementation during the critical first weeks after reintroduction.

Major lessons learned

- Favor large (e.g., 40 × 40 m) over small (e.g., 20 × 20 m) pens during quarantine when social relationships between individuals are unknown. Large corrals allowed large groups to split into ≥2 small consolidated ones and individuals being able to avoid aggressive encounters. This strategy decreased the frequency of agonistic encounters that were resulting in severe injuries and sometimes deaths.
- Favor small mobile over large static pre-release pens at release locations. Mobile pens allowed releasing groups at different sites within the reintroduction area; thus, decreasing risky agonistic encounters with previously released groups that could have stablished their territories nearby.
- Radio-collaring is key as VHF radio-collars were critical to implement intensive post-release monitoring and managing (*see Major Difficulties Faced*). Locating animals periodically allowed for food supplementation (see below) and treatment of injuries and infections.
- If captive animals are reintroduced, then implement a food supplementation scheme. Hundred percent of the animals we reintroduced originated from captive facilities and took them time to develop skills to find native sources of food. Without food supplementation, most of the animals would have died soon after release. We suggest including native foods gradually, so they completely replace non-native food at the time of release.
- Group size matters at the time of release. Releasing large groups (≥15

individuals) led to fission processes that resulted in some groups lacking radio-collared individuals hindering monitoring and management (e.g., food supplementation). Small groups also facilitated the use of small mobile pre-release pens. We suggest releasing consolidated small groups (≤5), identified during the quarantine or in prerelease pens, each of them with two radiomarked adults, preferable the dominant male and the dominant female.

Success of project

Highly Successful	Successful	Partially Successful	Failure

Reason(s) for success:

- Intense consultation with practitioners before the implementation of the project.
- Availability of institutions that had Collared peccaries and were willing to support the project.
- Experienced personnel able to write proposals, secure funds, establish positive relationships with source institutions and authorities, implement and build safe transportation strategies and equipment (e.g. crates), manage animals at quarantine facilities, evaluate sanitary issues, monitor released animals, and communicate results to different stakeholders and the general public.
- High capacity to respond rapidly to unexpected situations (e.g. animals having their forelimbs entangled with the collar).
- Adequate funding to support long term work and face unpredicted situations.

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