Global Re-introduction Perspectives: 2016

Case-studies from around the globe

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IUCN/SSC Re-introduction Specialist Group (RSG)

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Cover photo: Clockwise starting from top-left:
i. Bolson's tortoise, USA @ Turner Endangered Species Fund
ii. Wetapunga, New Zealand @ Richard Gibson
iii. Morelos minnow, Mexico @ Topiltzin Contreras-MacBeath
iv. *Silene cambessedesii*, Spain @ Emilio Laguna
v. Tasmanian Devil, Maria Island, Tasmania @Simon DeSalis
vi. Agile frog, Jersey @ States of Jersey Department of the Environment

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The Peregrine Fund's California condor recovery program, northern Arizona and southern Utah, USA

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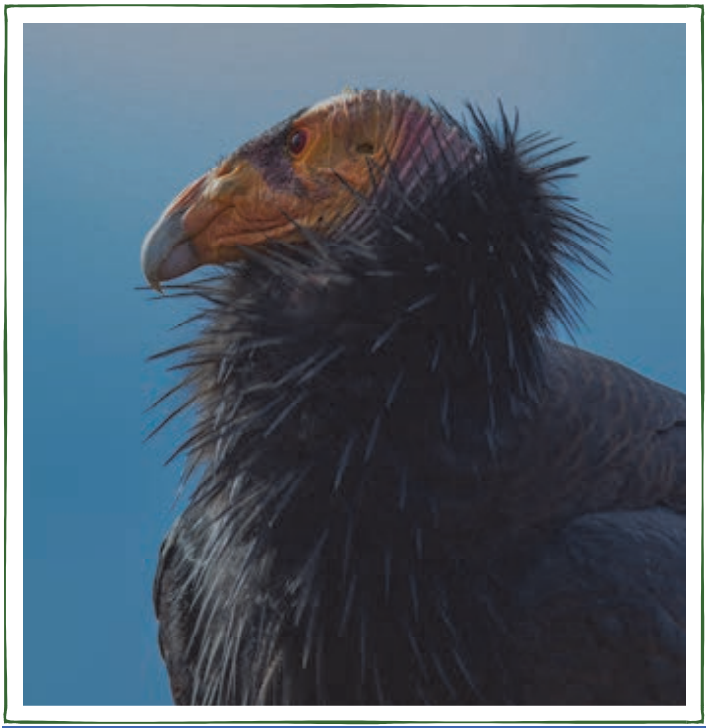
Introduction

Historically, the California condor (*Gymnogyps californianus*), North America's largest flying land bird, inhabited varying landscapes stretching between the Pacific and Atlantic coasts. A vast reduction of available food (carrion) in the form of now extinct Pleistocene megafauna resulted in a severe range reduction of the condor, leaving a remnant population along the Pacific coast subsisting in part on the remains of marine mammals (Chamberlain *et al.*, 2005). As part of an overall recovery program whose primary goal is to re-establish a population of 450 condors range-wide, a sub-population of over 70 condors now exists in northern Arizona and southern Utah. These free-ranging birds are a product of a re-introduction program beginning in 1996 under article 10(j) of the Endangered Species Act, a non-essential experimental population (USFWS 1996, Cade *et al.*, 2004).



California condor
© C. Parish, The Peregrine Fund

Despite an increasing population overall (captive and wild) - the result of a very successful captive-breeding program - the species remains listed as Critically Endangered on the IUCN Red List, and it appears on CITES, Appendix I and II (BirdLife International, 2013). Condors are slow to reproduce and require at least 92% adult survival for a stable population (Meretsky *et al.*, 2000). Persisting anthropogenic threats like that of lead poisoning among released populations require continued captive reproduction and release to replace fatalities.

Goals

- Goal 1: Contribute to overall condor recovery by establishing and maintaining a self-sustaining population of at least 150 individuals in northern Arizona and southern Utah.
- Goal 2: Reduce and eventually eliminate significant anthropogenic causes of mortality, particularly lead poisoning.
- Goal 3: Define and delineate suitable habitat by monitoring flock dispersal and analyzing collected data.
- Goal 4: Acquire a fuller understanding of the factors that influence pair formation and nest success.
- Goal 5: Increase local capacity for continued conservation efforts by engaging local and neighboring communities through sharing struggles and successes, thus making them a dynamic part of the program.

Success Indicators

- Indicator 1: Overall public acceptance of non-lead ammunition projectiles for killing animals whose remains may become available to scavengers in northern Arizona and southern Utah.
- Indicator 2: A strong trend of reduction in blood-lead levels and lead-caused morbidity and mortality among free-ranging condors in the region.
- Indicator 3: An annual adult survival rate of at least 92%.
- Indicator 4: A "normal" reproductive rate unaffected by lead-caused death among pair members and sufficient to population growth.
- Indicator 5: A local public pleased with and protective of the condor population in the region.

Project Summary

Feasibility: The fossil record holds evidence supporting the presence of the genus *Gymnogyps* back 100,000 years, although condors likely disappeared from the Grand Canyon region by the end of the last Ice Age (Emslie, 1987; Chamberlain *et al.*, 2005). Elsewhere, landscape changes (largely human-influenced) have both aided and hindered population stability. The introduction of domestic stock by Spaniards increased carrion availability, but the expanding human presence brought new threats to condors such as habitat loss, direct persecution, egg and specimen collection, and finally, lead poisoning that persists today. By the mid-1980s, 27 individuals remained, all in captivity, and seven pairs were selected for captive propagation.

A successful captive-breeding program, consisting of five institutions in three states and two countries, allowed for re-introduction in California, Arizona, and Mexico. With re-introduction, changing attitudes and land use policy, the population again stretches into the interior southwest.

Implementation: The Peregrine Fund began releasing condors in northern Arizona in 1996 (USFWS, 1996). Release candidates are brought to the release site at Vermilion Cliffs and housed in a 12 m x 18 m x 6 m flight pen to assess their suitability for release. Selected condors are fitted with radio-transmitters and

California condor release site
© C. Parish, The Peregrine Fund

then transferred to a smaller hackbox in full view of feeding areas and preferably, free-flying condors. Efforts are made to promote natural behavior to the extent possible (e.g. ample perches to encourage little to no ground perching, other than feeding, and food delivered under the cover of darkness to reduce association with humans). Mock, electrified power poles are placed both inside and outside of the housing facilities to discourage pole-sitting and to discourage any attraction to power-lines. Condors are soft-released, meaning the doors are remotely opened from an adjoining blind while additional field staff observe from a distance to monitor every move of departing birds during the ensuing days.

Post-release monitoring: Released condors are monitored by means of direct visual observation and radio-tracked with standard VHF (very high frequency) receivers and, in some cases, with GPS (global positioning systems) satellite-reporting technology. As of winter 2014, field staff were tracking and monitoring over 70 condors from the south rim of the Grand Canyon to the northern reaches of Zion National Park in southern Utah. Extended flights of more than 482 km have been documented, but the core of the population remains within a 112.6 km radius of the release area at Vermilion Cliffs National Monument in northern Arizona. Despite population dispersal and self reliance, staff continue to track and monitor the population afield, as movement data are vital to gaining and maintaining an understanding of variables contributing to mortality. In this regard, we are vigilant to any irregularity, including mishaps among recently released condors and condor-human interactions. These procedures have resulted in fewer adverse incidents.

When condor radio-signals become stationary, we respond immediately to determine the cause. We collect fatalities and quickly transfer them to laboratories where necropsies are performed to determine the cause of death. We carefully examine the site of each fatality to obtain additional evidence. We search for missing condors by fixed-wing aircraft. We monitor lead blood levels among condors that return to the release site, and treat condors showing high values or other evidence of dangerously high lead exposure. Lastly, we monitor pair formation, courtship, and other aspects of the nesting cycle.

Major difficulties faced

Condor field staff
© John Sherman Photography

- Avoidable, anthropogenic causes of mortality, particularly lead poisoning, have been the primary and persistent impediments to condor recovery.
- Although the process of identifying major threats and potential solutions in condor recovery has been relatively straightforward, effecting adequate and meaningful change is painfully slow.
- Initially, like many ESA species restoration programs, local communities feared that the re-introduction of the condor would somehow limit their freedoms, but through time and a better understanding of the protections afforded by the non-essential, experimental 10(j) designation, those fears waned.
- Condors are slow to mature, and do not do not produce viable young until their 8th year of life. The species also exhibits a low reproductive rate, producing a maximum of only two young every 3 years. As a result, population growth is slow, thus requiring long-term management and sustained financial support.
- High profile recovery efforts such as the California condor often attract large special interest groups whose agendas and/or reputations can negatively affect progress by either diluting or misrepresenting the core issues of the recovery program.

Major lessons learned

- Beyond the foundation of well-structured and detailed plans, nothing will better define problems and solutions than having the species in the landscape being tracked and monitored by field biologists.
- Patience, patience, patience. Without patience and a keen eye for detail, problems and potential solutions can be overlooked, or altogether missed. Where the ultimate goal of re-introduction is to recover a species, especially a long-lived species, the public and interested parties have a tendency to lose focus and even lose hope of eventual recovery. For this reason, we highly recommend setting, managing, and making known to all, reasonable expectations in the form of long and short-term goals or benchmarks.
- Species recovery is fertile ground for adaptive management. All too often, the tendency of scientists and biologists is to stick to a study design without

reappraisal. However, the flexibility of adaptive management in recovery efforts is much more effective, as is having the autonomy to make program-level decisions in a timely manner. At the same time, frequent re-evaluation protects against the sometimes-undesirable outcomes of abrupt changes. Efficient data collection and its timely examination aid in such reappraisals, and if appropriate data are collected in a consistent manner, then all decisions and results can be appropriately analyzed.

- While science should be the foundation of any re-introduction effort, one cannot rest at merely producing scientific results, even when they are perfectly in line with recovery goals. Scientific evidence alone does not build effective and lasting policy necessary to maintain a recovering, re-introduced species, nor does effective policy rest in well-written and well-guided suggestions. For policy to become effective, the problems must be credible to managers and the public, and ultimately, the changes must become part of the local culture.

Success of project

Highly Successful	Successful	**Partially Successful**	Failure
		√	

Reason(s) for success/failure:

- Except for their predisposition to encounter lead within their food, condors tolerate a high level of intrusion and hands-on management, making possible the tracking, blood testing, and in some cases, invasive medical treatment. These characteristics have allowed for a greater understanding of the issues condors face.
- Despite the very long duration of the effort (condors were among the first species listed under the Endangered Species Act), governmental agencies, well-meaning policy, and the public continue with financial and moral support. This suggests that recovery is possible, even though painfully slow and arduous.
- One of the greatest successes of the Condor Recovery Program thus far is the cooperative nature of the program. Numerous players, including governmental and non-governmental agencies, have come together to see this process through. The continued strain of financial need is among the greatest stressors, but with many willing cooperators contributing their time and hands-on effort, the program has had many successes. True success, however, lies in the definition of recovery - a self-sustaining condor population - and will remain the ultimate goal of this effort.
- Lead poisoning accounts for greater than 50% of diagnosed deaths in the Arizona/Utah population and a likely substantial proportion of undiagnosed fatalities. Under current exposure conditions, it is not sensible to continue without the hope of further lead reduction. To eliminate the presence of available lead, or reduce it to a sustainable level of threat for the condor, program participants must generate effective policy that results in lasting change. That requires public acceptance and participation. Understanding that we, as a culture, are sometimes slow to change, program direction must

proceed in the direction of the social sciences. We must better understand how to share scientific findings with the public in such a way that brings about behavior and traditions that will ultimately ameliorate the problems revealed by the initial science. Doing so will complete the task, and allow this effort to become a true and lasting success in conservation.

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