

# Bearded Vultures on the Move: Satellite Telemetry for the Monitoring of Reintroduced Birds in the Alps



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## The return of bearded vultures in the Alps

A bad reputation was the main reason that bearded vultures disappeared in the Alps. In the scientific literature of the 19th century, this species was described as a bloodthirsty bird of prey that attacks lambs, sheep, and even children. The authorities actively supported the eradication of this



Bearded vulture in flight.

species by paying bounties for shot animals. Together with a lack of food due to the low densities of wild ungulates during this period, the population decreased dramatically in the 19th century, and the species disappeared completely

from the Alps in the beginning of the 20th century. The understanding that bearded vultures are not voracious predators but highly specialized raptors which live mainly on the bones of ungulate carcasses, came too late for the Alpine population.

Luckily, in the 1970s, a group of scientists, zoo-specialists, conservationists, and representatives of governmental organisations and universities initiated an international project for the reintroduction of the bearded vulture to the Alps. This project is an outstanding example of how a nearly extinct species can be brought back to nature when nature lovers and conservation organisations work closely together over decades, with very different stakeholders, and over international boundaries. Today, roughly 200-250 bearded vultures live with 29 established breeding units thanks to an international bearded vulture breeding program and the annual release of young bearded vultures, which began in 1986. While further releases are required, the project is in a final stage and can be considered as a great success for nature conservation.

## Satellite telemetry: an important tool for monitoring the success of the reintroduction

A critical component to the success of the project is close surveillance of the program. According to the IUCN guidelines for reintroductions, it is mandatory to accompany any reintroduction program with sound and scientifically meaningful monitoring. Adequate marking methods have to ensure that the success of restoration programs can be evaluated and that possible risks and failures are recognized in time. Therefore, young released bearded vultures in the Alps are closely monitored with various techniques. An important tool is satellite telemetry. Thanks to this technology, we have already recovered several very valuable birds, which otherwise would have died, and thus learned about the risks that released birds encounter in the wild. Some birds had problems in the beginning of the first winter, as during this period the supply of carcasses is limited and the fresh snow cover makes it difficult to locate food. With the satellite tags, we were able to recapture several inexperienced birds and bring them to aviaries where they could regain their strength for a second release. Satellite telemetry also helped to identify relevant anthropogenic risks. We were able to find weakened birds which were suffering from lead intoxication after ingesting the remains of lead bullets in their food or were injured after being shot.

In the framework of the Alpine reintroduction project, 50 bearded vultures have been marked with satellite tags, and more than 170,000 locations have been recorded. Thanks to these data, we now have much more detailed knowledge about the spatial behaviour of the released bearded vultures and insight into how they settle once they reach sexual maturity (Figure 1). The data of the peregrinating young birds show a very patchy distribution of the locations. Some regions, which are not related to a release site, are very frequently visited (e.g. the Austrian Lechtal, the north-eastern part of the Vallais in Switzerland, the French Vanois region, and some part of the Italian Aosta Valley). On the other hand, there are regions, like the Ticino in Switzerland, which were only occasionally visited (Figure 2).

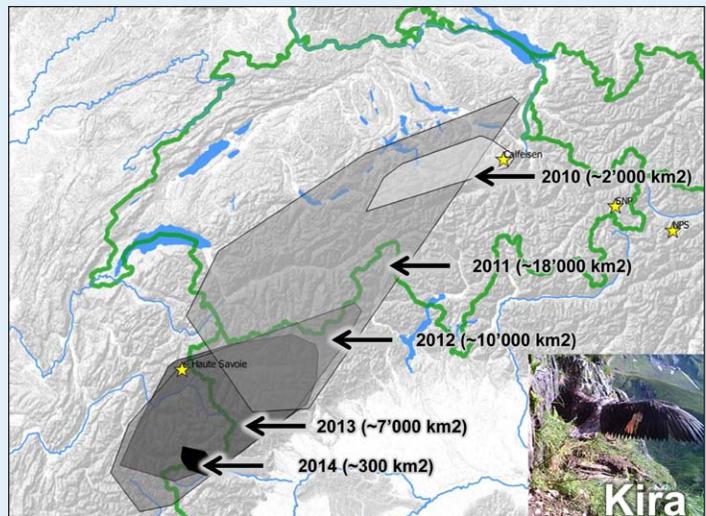


Figure 1. Minimum convex polygon of the bearded vulture Kira, released in 2010 in the Swiss Calfeisen Valley.

Interestingly, among the 50 tagged individuals, seven made extended excursions to areas outside the Alpine chain (Figure 2). Five juvenile individuals flew far north, up to the North Sea. Three of them made their way back home, whereas two individuals were greatly weakened and had to be re-trapped. Only one animal flew south and spent the entire winter of its first year in the Italian Alpi Apuane before it flew back to Austria.

The satellite data from the Alps were used to analyse the movement patterns of pre-adult individuals, comparing wild-born individuals from the Pyrenees and released individuals from Andalusia. These analyses, which were published in Plos One (Margalida et al., 2013\*), showed that the tagged bearded vultures in Andalusia and the Alps moved significantly farther than those in the Pyrenees, where no excursions out of the Pyrenees have been recorded. To link the different bearded vulture populations and establish a metapopulation, the reasons for this observed pattern have to be carefully analysed, and possible management measures must be taken to improve the connectivity between the populations evaluated (e.g. management of feeding places). This is also the reason

why a new release site has been established since 2012 between the Alps and the Pyrenees in the French region of Grands Causses/Cévennes.

\*Reference: Margalida, A., Carrete, M., Hegglin, D., Serrano, D., Arenas, R., & Donazar, J. A. (2013). Uneven Large-Scale Movement Patterns in Wild and Reintroduced Pre-Adult Bearded Vultures: Conservation Implications. PLoS ONE, 8(6), e65857. doi:10.1371/journal.pone.0065857

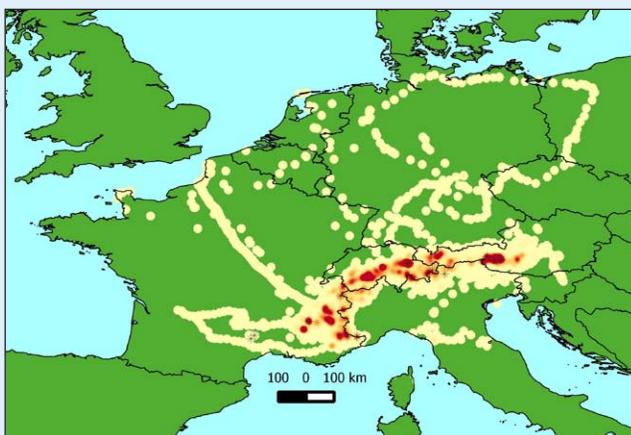


Figure 2. A heatmap showing the distribution of the locations of satellite-tagged bearded vultures in the framework of the reintroduction program for bearded vultures in the Alps.