

# Re-establishing the California Condor

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The California condor has never been an abundant species. There were likely only a few thousand existing during the time of the Lewis and Clark expedition when the birds ranged from British Columbia to northern Baja California. They have declined in population since then due to shooting, lead poisoning from spent bullets in the hunter game animals that they feed on, and from habitat loss. By the 1960s only about 60 birds were restricted to a small horseshoe shaped range 50 miles north of Los Angeles. In early 1980 permission was granted to trap some of the remaining condors and attach ID wing tags that incorporated radio transmitters that I had developed and tested on Andean condors in Peru, South America. The technology helped us to discover that there were about 22 condors remaining in the wild. Realizing how fast the population was declining, permission was granted to capture the last birds and place them into the protective custody of the Los Angeles and San Diego zoos. With only 27 birds in the program in 1987, captive breeding was successful and by 1992 the first progeny were released to the wild in Hopper Canyon in southern California. Since then, releases have been successful in the Grand Canyon in

Arizona, Big Sur and Pinnacles National Monument in California, and in Northern Baja California, Mexico. Today we have over 320 condors in

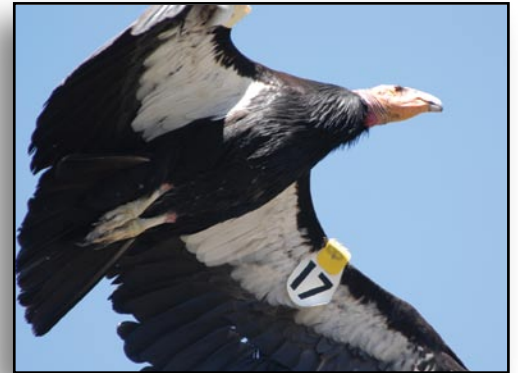


Photo by Mike Wallace/San Diego Zoo

A GPS satellite transmitter on the wing of a California condor.

the world with more than 175 in the wild. Tracking with radio telemetry has been an integral part of the management of our released condors but it is only effective with line of sight to the birds making management quite labor intensive. During the mid 1990s I collaborated with Paul Howey to develop a wing mounted satellite transmitter using our captive California condors and Andean condors I was helping to release in Argentina with Luis Jacome of the Buenos Aires Zoo. These prototypes worked well and we began using them in the California condor program in the U.S. The Argos based satellite transmitter has been immensely helpful in studies of large bird migration and other large scale movement patterns but because of limited accuracy and resolution at the kilometer scale, they were quite costly for the limited value in managing the released condors in the wild. The addition of GPS capability over the last decade brought location accuracy to within a few meters. The improved technology has helped the recovery and study of California condors in several ways. In day to day management of the condors we

rely on the accuracy of the GPS transmitters to predict where the best feeding site should be in relation to where the birds roosted and fed last. As young birds take their first tentative flights from the release zone they occasionally cannot find their way back to the safety of the release site and the other condors 20 or 200 km away. We need to locate their exact position and sometimes mount a rescue. The transmitter speed feature



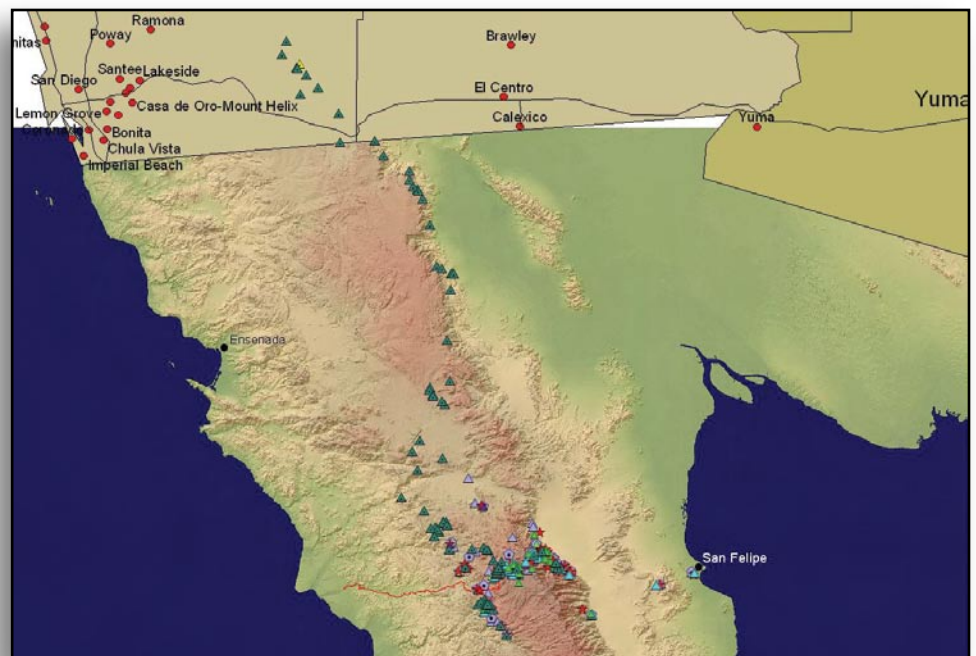
Under side of GPS transmitter on condor in flight.

allows us to deduce important activities and their locations such as nighttime roosting (when the speed is "0" after dark or a possible carcass discovery and feeding site when the "0" speed is mid-day. As the condors range along the Sierras toward the U.S. border and other more distant places we can track their exact progress as they gradually expand their range. We are currently relying on the transmitters to help us locate their breeding caves as they mature and begin the reproductive phase of the project. By correlating wind speed and direction from our 6 weather stations positioned at key sites within the study area with the movements of the tagged birds we are in the process of studying just how the condors make decisions on how high, fast and how far to fly throughout the day. It would not be inaccurate to say that without the GPS satellite transmitter our goal to re-establish the California condor in the wild would be impossible to accomplish.



Photo by Mike Wallace/San Diego Zoo

A GPS patagial (wing) transmitter on the wing of a juvenile condor.



One day's flight by condor 321 of over 145 miles from the release site in the south to the Anza-Borrego Desert in San Diego County, California to the north. She returned a day later.