3D technology used to help California condors and other endangered species

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A team including researchers from the U.S. Geological Survey (USGS) and the San Diego Zoo Institute for Conservation Research has developed a novel methodology that, for the first time, combines 3-D and advanced range estimator technologies to provide highly detailed data on the range and movements of terrestrial, aquatic, and avian wildlife species. One aspect of the study focused on learning more about the range and movements of the California condor using miniaturized GPS biotelemetry units attached to every condor released into the wild.

"We have been calculating home ranges for the tracked condors in three dimensions for the first time using this GPS location data, and our novel density estimator was used to incorporate the vertical component of animal movements into projections of space-use," said James Sheppard, Ph.D., a postdoctoral associate at the Institute for Conservation Research.

While its population now stands at approximately 400 birds, up from only 22 in the mid-1980s, conservation efforts to reintroduce the California condor to its former habitat in the mountains of California and Mexico have been hampered by a lack of understanding about condor movement patterns and habitat use.

"This data will be used as a predictive management tool to inform conservation efforts to restore condor populations, particularly with regard to emerging threats such as climate change and wind energy impacts," added Sheppard.

The team created highly detailed data sets and visualizations relying on expertise from researchers at the San Diego Supercomputer Center (SDSC) at the University of California, San Diego, after they tracked three highly iconic but threatened species: California condors, giant pandas, and dugongs, a large, marine animal somewhat similar to the manatee.

"We were able to speed up their software by several orders of magnitude," said Robert Sinkovits, SDSC's director of the Scientific Applications Group, which helps researchers make optimal use of SDSC's larger supercomputers. "In this case, calculations that had formerly taken four days to complete were finished in less than half an hour."

More information: "Movement-Based Estimation and Visualization of Space Use in 3D for Wildlife Ecology and Conservation." Jeff A. Tracey, James Sheppard, Jun Zhu, Fuwen Wei, Ronald R. Swaisgood, Robert N. Fisher. Research Article | published 02 Jul 2014 | *PLOS ONE*. DOI: 10.1371/journal.pone.0101205

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