

Science-driven strategies for more effective endangered species recovery

January 6 2016



An endangered California condor soars through the Bitter Creek National Wildlife Refuge in California, where captive-bred birds are released into the wild. Condor conservation benefits from unusually rigorous population monitoring compared to most recovery programs for endangered species. In the Winter 2016 edition of *Issues in Ecology*, Dan Evans and colleagues press for the extension of monitoring to other, less famous endangered species. Credit, USFWS.

The Endangered Species Act (ESA), which quietly passed its 42nd birthday last week, has shielded hundreds of species in the United States from extinction and dramatically achieved full recovery for a celebrated few. Flexibility of implementation is one of the ESA's great strengths, allowing for adaptation in response to new knowledge and changing

social and environmental conditions.

In a [report](#) released by the Ecological Society of America today, 18 conservation researchers and practitioners propose six broad strategies to raise the effectiveness of the ESA for endangered [species](#) recovery, , based on a thorough review of the scientific literature on the status and performance of the law.

"The ESA is one of our country's strongest environmental laws, but it has only partly fulfilled its conservation promise," said Daniel Evans, who led the report while serving as a policy fellow at the United States Forest Service. "Innovation will be key to implementing the ESA in the coming decades because the threats to at-risk species are pervasive and persistent. Many listed species are conservation-reliant, requiring ongoing management for the foreseeable future, and climate change will continue to shuffle the mix of species in ecosystems, increasing both extinction risk and management uncertainty."

The ESA grants the administering agencies, the National Marine Fisheries Service (NMFS) and the Fish and Wildlife Service (FWS), discretion to interpret the requirements of the law, including the meaning of "endangered." The agencies determine the management actions needed for species protection and recovery and prioritize conservation efforts. Funding for conservation actions under the ESA has not kept pace with the growth of the US economy, increased environmental pressures due to development and encroachment of [invasive species](#), and the subsequent expansion of the number of species at risk.

"Throughout the ESA's 42-year history, government funding has been insufficient to recover most listed species and funding has been highly skewed among groups of species. For example, as we discuss in the paper, from 1998 to 2012 over 80 percent of all government spending

went to only 5 percent of all listed species," said Evans.

The number of officially [endangered species](#) has grown from the original 78 species listed by the ESA's forerunner, the Endangered Species Preservation Act of 1966, to [1,590 listed as endangered or threatened](#) in January 2016. Only 32 species have recovered sufficiently to be [removed from the list](#). It is likely that some species may remain indefinitely "conservation-reliant" after recovering to sustainable numbers. Reliant species require consistent interventions to maintain historic habitat, connect small genetic populations isolated by development, or control predators, competing invasive species, or parasites. These species are more complicated to graduate from the list than success stories such as the bald eagle, which went from 417 nesting pairs in 1963 to more than 11,000 in 2007.

In "[Species recovery in the United States: increasing the effectiveness of the Endangered Species Act](#)," the 20th report in the Ecological Society's peer-reviewed series [Issues in Ecology](#), Evans and colleagues recommend that the administering federal agencies, state natural resource management agencies, Native American tribes, and their conservation partners:

- **Establish and consistently apply a system for prioritizing recovery funding to maximize strategic outcomes for listed species**
- **Strengthen partnerships for species recovery**
- **Promote more monitoring and consistently implement and refine approaches for adaptive management**
- **Refine methods to develop recovery criteria based on the best available science**
- **Use climate-smart conservation strategies**
- **Evaluate and develop ecosystem-based approaches that can increase the efficiency of managing for recovery**

"By adopting these strategies, conservation managers, policymakers, scientists, and the public can use the ESA more effectively and efficiently to save species at risk," said Evans.

Provided by Ecological Society of America

Citation: Science-driven strategies for more effective endangered species recovery (2016, January 6) retrieved 22 September 2024 from <https://phys.org/news/2016-01-science-driven-strategies-effective-endangered-species.html>

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