



Over \$1.5 billion per year is needed to recover Endangered Species Act (ESA)-listed species

Recovering species listed as threatened or endangered under the Endangered Species Act (ESA) requires both significant and targeted investments to address the threats that caused the species' decline and the need for ESA protection. Here we briefly review conservative estimates of costs to recover species under the ESA, including one published source and one estimate we derive using the same approach but newer data.

The published estimate comes from Gerber's 2016 paper on conservation triage under the ESA¹, placing the cost of recovery at \$1.21 billion per year. That estimate was based on recovery cost data from 2010 and for about 1,100 listed species. While that estimate is somewhat dated, it is consistent with our own calculations below. Further, this and any estimate based on the recovery plan cost estimates alone is likely a conservative estimate: Gerber noted that the cost to recover 15 species delisted due to recovery as of late 2015 was 74% higher than the recovery plan estimates². If that pattern held across currently listed species and the costs accrue on an annual basis, we estimate the need at \$2.26 billion per year from Gerber's calculation.

We calculated an updated, independent estimate using Gerber's basic method, applied to the data contained in the U.S. Fish and Wildlife Service's (FWS) 2013-2014 recovery report to Congress³. In brief, the recovery report shows an estimated cost of \$9.4 billion for 481 species that have recovery cost estimates, or approximately \$19.5 million per species. Multiplying the per-species cost by the count of 1,662 currently listed species⁴, we estimate total recovery cost for ESA-listed species at \$32.5 billion. Dividing that by the median estimated time-to-recovery of 20 years—data from the recovery report—**we estimate \$1.62 billion per year** is needed to carry out actions to recover current ESA-listed species⁵.

A key value judgement that science cannot answer is how much different parties should contribute to the recovery of ESA-listed species. That is informed by the species' specific recovery needs, recovery habitat ownership, and stakeholder expertise. We can, however, consider patterns of past expenditures⁶ to inform current and future allocations. Of the ~\$1.4 billion in compliance and recovery expenditures reported in 2016, 80.3% came from other federal agencies, 13.4% from FWS, and 6.3% was reported by the States⁷.

In short, our calculations from newer recovery costs **data put the cost of ESA recovery at over \$1.5 billion per year to address species protected under the ESA today**, which is consistent with the cost estimates from previous peer-reviewed research. Filling this need will require that any sources of conservation funding, especially if federally derived, be sustainable and primarily targeted to address the significant needs for recovering listed species and honoring the vision and purpose of the ESA.

¹ Gerber, L. R. Conservation triage or injurious neglect in endangered species recovery. *Proc. Natl. Acad. Sci. U. S. A.* **113**, 3563–3566. (2016).

² Many of the recovery plans and cost estimates have not been updated in decades and are likely higher today. Further, the FWS report excludes species under sole jurisdiction of NOAA Fisheries, so costs are further underestimated.

³ Full code for the analysis available at <http://bit.ly/ESA-recovery-report-13-14-analysis>.

⁴ We assume that the listed species with recovery cost estimates are a random sample of all listed species and therefore representative, but that assumption is broad and can be refined with additional modeling in the future.

⁵ Confidence limits are warranted because we are estimating from a sample. Randomly sampling the known cost estimates 1,000 times we arrive at a 95% confidence interval of \$1.24 billion to \$2.04 billion per year.

⁶ Available at <http://bit.ly/ESA-exp-analysis>

⁷ The contribution from non-governmental sources is unknown at this time, but because actions for species require permits from federal agencies, those costs may be captured by agency reporting.