



3 Park Place, Suite 307
Annapolis, MD 21401-3722 USA

Phone: 301-731-4535
Fax: 301-731-4538

esa@entsoc.org
www.entsoc.org

ESA Position Statement on Endangered Insect Species: Protecting Endangered Insects is in the Nation's Best Interest

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Insects are essential components of the biological diversity that sustain healthy ecosystems. Abundant in all terrestrial and freshwater habitats, insects play critical roles as pollinators, scavengers, and decomposers. They are food for birds, fish, and mammals, and are important herbivores and predators. Habitat alteration and loss, pollution, and invasive species threaten insects, like they do other animals. Because insects typically have very specific habitat requirements and are sensitive to environmental changes, insects are useful as indicators of environmental health. Thus, protecting endangered and threatened species of insects also means protecting unusual ecosystems and the other (often rare) plants and animals that share these systems.

Insects comprise approximately 75% of known animal species. More than a million insect species have been described and as many as eight million may await discovery – in contrast to about 50,000 known species of vertebrates. However, only 84 species of insects are listed as endangered or threatened in the US (compared to 439 vertebrates)ⁱ, which greatly underestimates the number that are threatened. Reasons cited for the under-representation of insects on the U.S. endangered list include habitat specificity, dependence on a host plant or animal that is itself rare, restrictions for listing subspecies, the blanket prohibition of listing any species that could potentially become a pest, and the fact that many groups are understudied.^{ii,iii,iv}

One example of an economically important endangered insect species is the rusty patched bumble bee, *Bombus affinis*. Its addition to the U.S. Endangered Species list in 2017 occurred after over a decade of research and advocacy. This species, once common across the Midwest and eastern U.S. and Canada as late as the 1990s, now inhabits just 0.1% of its historic range^v. It is an excellent pollinator of cranberries, and contributes to the pollination of plums, apples, and several dozen species of native wildflowers. It has been on the IUCN (International Union for the Conservation of Nature) Red List since 2014 and the Canadian list since 2010. Preserving native pollinators helps ensure food production and the survival of native plants.

Another endangered and beneficial insect is the American burying beetle, *Nicrophorus americanus*, which once occurred in 35 states from Texas to Canada and Florida to Maine. Today, populations remain in only six states. Adult beetles bury animal carcasses to feed their offspring, benefiting humans by removing breeding habitat for flies that can transmit diseases to people, pets, and livestock. The beetle's saliva, which inhibits bacterial and fungal decomposition, is a potential source of new

antibiotics and new ways to preserve meat. Preserving detritivores helps ensure human and livestock health.

The Endangered Species Act Benefits the Common Good and is Cost-Effective

The Endangered Species Act of 1973 is one of America's key conservation laws, designed to protect species and the ecosystems that sustain them. It was approved by Congress without controversy.

Beyond their intrinsic value as irreplaceable elements of the biological diversity that shapes life on Earth, endangered and threatened insects help sustain healthy ecosystems. Because ecosystems embody complex relationships among the plants, animals, and microbes that inhabit them. The loss of a species can have unpredictable and catastrophic consequences.

Federal and state agencies spend some \$1.5 billion per year to implement the Endangered Species Act^{vi}, but the economic return on protecting the biodiversity of insects alone is far greater^{vii}. For example, native insects such as the rusty patched bumble bee, contribute to more than \$3 billion in pollination services to U.S. crops, while providing food for wildlife, reducing costs of pest control, and improving ecosystem health by recycling nutrients, services that total more than \$57 billion^{ix}. Endangered species protection is widely recognized as a worthwhile economic investment^{viii}.

As written and implemented, the Act allows a great deal of room for compromise, especially for site-specific actions^{ix}. However, there is opportunity to improve the evaluation process for listing insects. Scientific evidence should remain a foundation for decision-making.

The Endangered Species Act Works

The Act has likely prevented the extinction of at least 200 species. About half of the currently listed species are now stable or increasing in numbers, including at least 100 species that have seen dramatic improvements in distribution and population size. Of some 1,400 U.S. species that have been listed as endangered, about 2.5% have recovered sufficiently to be taken off the list, reflecting the fact that complete recovery of a species typically takes decades. The longer a species has been on the list, the more likely it is to show improvement in population size and distribution^{x,xi,xii}. Thus, the Endangered Species Act is necessary to continue protecting those species already listed as endangered, and in anticipation of protecting other species that are currently in decline.

The Entomological Society of America advocates the following positions regarding the U.S. Endangered Species Act of 1973:

- The decision to protect a species should be made by scientists on the basis of scientific evidence.

- Insect conservation is important. However, a clear bias towards plants and vertebrates exists in the listing process. The population dynamics and speciation processes of insects differ and should be accounted for when assessing their status. This is an area where the ESA needs improvement.
- Recovery plans must continue to take into account multiple stakeholders, including landowners, developers, the agriculture community, and the general public, with sound science as an integral part of the process.
- **The Endangered Species Act should not be repealed.** The Act works. It has repeatedly been demonstrated that species with adequately funded recovery plans can recover. Federal protection and funding is crucial as endangered species often cross state lines.

ⁱ <https://www.fws.gov/endangered/species/us-species.html>

ⁱⁱ Dunn, R.R. 2005. Modern insect extinctions, the neglected majority. *Conservation Biology* 19: 1030-1036

ⁱⁱⁱ Black, S.H. 2008. How the ESA (Entomological Society of America) can work with the ESA (Endangered Species Act) to conserve insects. *American Entomologist* 54(2), 111-113.

^{iv} Black, S.H. and Vaughn, M. 2009. Endangered Insects. In *The Encyclopedia of Insects* (Eds. Resh, V. H. and Carde, R.). Academic Press, San Diego, CA.

^v <https://www.fws.gov/midwest/endangered/insects/rpbb/>

^{vi} https://www.fws.gov/endangered/esa-library/pdf/20160302_final_FY14_ExpRpt.pdf

^{vii} Losey, J.E. and Vaughn, M. 2006. The economic value of ecosystem services provided by insects. *Bioscience* 56:311-323.

^{viii} <https://www.fws.gov/nativeamerican/pdf/why-save-endangered-species.pdf>

^{ix} https://www.fws.gov/endangered/esa-library/pdf/ESA_basics.pdf

^x <https://www.fws.gov/Endangered/news/episodes/bu-04-2013/coverstory/index.html>

^{xi} Taylor, M.F., Suckling, K.F., Rachlinski, J.J. 2005. The effectiveness of the Endangered Species Act: a quantitative analysis. *Bioscience* 55:360-367.

^{xii} https://www.fs.fed.us/rm/pubs_journals/2016/rmrs_2016_evans_d001.pdf