by Kim Winter

The Conservation of Pollinating Species

Eric VanderWerf

'Akohekohe, a Hawaiian bird.

A lesser long-nosed bat pollinates a saguaro flower.

Pollinating animals are critically important to the maintenance of virtually all terrestrial ecosystems, yet the population status of most pollinating species often goes unnoticed. Butterflies, moths, bats, birds, bees, beetles, flies, ants, and wasps assist almost all flowering plants in their reproduction, helping them to develop the seeds, foliage, nuts, and fruits that ensure the survival of innumerable wildlife and human populations worldwide. Sadly, many pollinator populations are declining precipitously around the world.

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In 1999, scientists and natural resource managers concerned with pollinator conservation founded the North American Pollinator Protection Campaign (NAPPC), administered by the Coevolution Institute to promote the health of resident and migratory pollinating animals. NAPPC has grown to become a partnership of more than 100 organizations, ranging from universities and environmental groups to utility companies, zoos, and government agencies throughout the United States, Canada, and Mexico (http://www.nappc.org/partners2005.html). The U.S. Fish and Wildlife Service recently signed a Memorandum of Understanding with the Coevolution Institute, giving the Endangered Species Program access to NAPPC's tri-national network of experts in pollination biology.

Prompted by a NAPPC initiative, the National Academy of Sciences (http://www.nationalacademies.org) is undertaking a study of the status of pollinating species in North America, the results of which should illuminate some of the most important species of concern.

It is unknown exactly how many federally listed animal species are pollinators, or how many federally listed plant species depend on rare pollinators for reproduction. What we do know is provided in the table. In addition to the federally listed species, there are others that may be of concern. For example, the Xerces Society maintains a Red List of Pollinators (http://www.xerces.org/Pollinator_Red_List /index.htm) that describes the pollinating butterflies, moths, and bees in need of conserva-

tion attention in the U.S., Canada, and Mexico. The society identifies 35 additional butterflies, and 58 bees, nearly half of which are *Hylaeus* species in Hawaii that either need additional study or may need additional conservation measures.

Endangered species biologists can become involved with NAPPC pollinator conservation by:

- Considering plant-pollinator relationships. Management efforts to restore healthy populations of an endangered flowering plant must also consider the animal pollinators that may assist in its reproduction. Likewise, endangered and threatened species of pollinators may have coevolved with a distinct species of flowering host plant.
- Working with NAPPC scientists to plan pollinator conservation projects throughout the United States, Canada, and Mexico.
- Creating pollinator habitats using "Pollinator Friendly Practices" guidelines, a joint project of NAPPC and the Wildlife Habitat Council. The guidelines are available online at: http://www.nappc.org. They focus attention on foraging, nesting, and reproductive requirements of pollinating species.
- Learning more about NAPPC activities at www.coevolution.org and www.nappc.org. To receive links to news articles and publications or to ask collaborating scientists about pollinators or management practices, join the pollinator listserv at: http://lists.sonic.net/mailman/listinfo/pollinator.
- Offering feedback to the National Academy of Sciences Study on the Status of North American Pollinators at: http://www8.nationalacademies.org/cp/projectview.aspx?key=BLSX-K-02-06-A.
- Contributing to or using the NAPPC conservation database about plant-pollinator relationships, by contacting info@nappc.org.

Theresa S. Talley

Valley elderberry longhorn beetle

Examples of pollinator guilds currently listed under the Endangered Species Act

Birds	At least some bird species listed as endangered are known to be pollinators. Some Hawaiian honeycreepers have a highly coevolved relationship with the plants and moth pollinators upon which they feed. For example, Hawaii's endangered palila (*Loxioides bailleui*) depends upon forests of an endemic legume, the mamane (*Sophora chrysophylla*), for nesting, shelter, and food. *Cydia* (Tortricidae) moth caterpillars also feed upon mamane and are an important food resource for palilas, demonstrating the intricate interrelationships between a pollinating bird, pollinating moth, and flowering plant.
Bats	At least three species of pollinating bats are federally listed as endangered, including the lesser long-nosed bat (*Leptonycteris curasoae*), Mexican long-nosed bat (*Leptåonycteris nivalis*), and Mariana fruit bat (*Pteropus mariannus mariannus*). Both long-nosed bats migrate north from Mexico to feed on nectar and pollen of several species of *Agave*. These bats leave the U.S. for Mexico in late summer or early fall, after the blooming period of agaves has passed.
Butterflies	There are 23 federally listed species of butterflies and skippers identified as pollinators on the Xerces Red List, with 17 recovery plans completed or in draft form. Many butterflies are listed because of their coevolved relationships with diminishing host plant populations, such as the case with the Fender's blue butterfly (*Icaricia icarioides fenderi*) and Kincaid's lupine (*Lupinus sulphureus* ssp. *kincaidii*) in the Pacific Northwest.
Moths	Two species of sphinx moth are listed, including the Kern primrose sphinx moth (*Euprserpinus euterpe*), which uses evening primrose plants (*Camissonia* sp.) as host plants. When this endangered moth lays its eggs on the introduced plant, filaree (*Erodium* spp.), its larvae cannot develop and soon perish, prompting its populations to decline.
Beetles	At least one of the 17 species of beetles listed as endangered may be a pollinator, the valley elderberry longhorn (*Desmocerus californicus dimorphus*). Its emergence coincides with the flowering of its host plant, the elderberry (*Sambucus* spp.), which is visited by other pollinators. Elderberries provide an important source of fruit for at least 50 species of songbirds and other wildlife.

Dr. Winter, a wildlife ecologist and International Coordinator for NAPPC, can be reached at kw@nappc.org or 301-405-2666.