



## U.S. FISH AND WILDLIFE SERVICE

# Kaua'i Cave Wolf Spider and Kaua'i Cave Amphipod

### What are the Kaua'i cave wolf spider and Kaua'i cave amphipod?

The Kaua'i cave wolf spider (*Adelocosa anops*) and Kaua'i cave amphipod (*Spelaeorchestia koloana*) are restricted to subterranean cracks, voids, spaces, and cave-bearing rock of the Koloa District of the island of Kaua'i. They are "trogllobites" - animals that live only in cave habitats.

In general, wolf spiders are relatively large spiders that utilize their sharp vision and swiftness to capture prey rather than relying on the use of the sticky web as does most spiders. They are found in various habitats throughout the world, but it is only in the Hawaiian Islands that they have evolved into a major group of cave-dwelling hunters. The Kaua'i cave wolf spider is the only wolf spider that is known to be totally eyeless.

Amphipods are tiny shrimp-like crustaceans, related to crabs or sand fleas. While most amphipods occur in marine habitats, in the tropics they are common components of terrestrial ecosystems, often occurring in wet leaf litter. A number of cave-inhabiting



Kaua'i cave wolf amphipod.  
Photo by William Mull

amphipods are known throughout the world. The Kaua'i cave wolf spider and the Kaua'i cave amphipod have lost their eyes, and adaptive character associated with cave animals.

At its largest size, the cave wolf spider can reach a total leg span of 1 ½ inches (4 cm). Its abdomen and legs are covered in light or silvery hairs that contribute to its pale appearance relative to most other wolf spiders. It moves slowly through inner cave environments relying on touch, taste, and smell to detect prey (e.g., the amphipod and other cave inhabitants). It then pounces on its selected meal and subdues it with large fangs.

The cave wolf spider reproduces at a very slow rate relative to terrestrial-dwelling wolf spiders, producing 10 to 30 offspring per clutch (terrestrial wolf spiders typically produce 50 to over 100 offspring per clutch).



Kaua'i cave wolf spider with spiderlings.  
Photo by Gordon Smith - USFWS

The cave amphipod reaches an adult length of about ¼ inch (5mm) and is translucent in appearance. The amphipod is a debris-eater, consuming woody debris derived from plant roots penetrating into the cave environment from intact plant communities growing over the cave. Without woody roots from intact, above ground plants, amphipod populations will decline and eventually disappear. Without amphipods or other cave-dwelling animals, the cave wolf spider will also disappear from these unique cave environments. Cave amphipods with offspring have not yet been found in the cave environment, but their morphology suggests that they, like the cave wolf spider, reproduce very slowly relative to other terrestrial species.

Both the Kaua'i cave wolf spider and the Kaua'i amphipod are found only in the Koloa area of Kaua'i. While they occur in small, subterranean spaces, voids, and cracks in relatively young lava flows as well as consolidated calcium carbonate deposits (i.e., uplifted fossilized reef and sand dunes), these two species are only known from four to six caves respectively.

Not all caves in the Koloa area contain these unique animals. Not only must the cave contain a woody debris food source for the amphipod and other generalist feeders, the proper cave environment must be present. These animals require conditions at or approaching 100% relative humidity. If the caves, cracks, or voids are drafty or exposed to drying conditions, the cave animals will retreat, if possible, to more suitable habitats. Both of these cave animals are threatened by habitat destruction due to construction, unsuitable pesticide use, and the release of certain biocontrol organisms. Human visitation and associated damage to caves as well as

nonnative predators also threaten these animals.

The Kaua'i cave wolf spider and the Kaua'i cave amphipod were discovered in 1971 and placed on the list of endangered species on January 14, 2000.

## What is the Endangered Species Act?

Enacted by Congress in 1973, the U.S. Endangered Species Act (Act) provides a legal mechanism for the conservation of endangered and threatened species and the ecosystems upon which they depend. The Act places restrictions on a wide range of activities involving endangered and threatened animals and plants to help ensure their continued survival.

One such restriction requires all Federal agencies to consult with the Fish and Wildlife Service whenever an action they wish to fund, carry out, or authorize will affect an endangered or threatened species or adversely modify the species' critical habitat.

### Critical Habitat

Critical habitat is the term used in the Act to define those areas of habitat that are known to be essential for the conservation of an endangered or threatened species and that require special management or protection. The ultimate goal of the Endangered Species Act is to restore healthy populations of listed species within their native habitats so that they can be removed from the list of threatened and endangered species.

When designating critical habitat, the U.S. Fish and Wildlife Service considers habitat features needed for life and successful reproduction of the species. The Service is required to use the best scientific data available and to consider economic and other impacts of designating an area as critical habitat.

For the Kaua'i cave wolf spider and the Kaua'i amphipod the Service considered two environmental requirements in determining critical habitat: (1) the presence of dark and/or stagnant air zones within the caves and cracks; and (2) the presence of roots from living, nontoxic plants. The maximum elevation of the critical habitat is less than 600 feet (183 m). On April 9, 2003, the Service designated critical habitat for the Kaua'i cave wolf spider and the Kaua'i amphipod that consists of 14 units whose boundaries encompass an area of approximately 272 acres (110 hectares). All of the units are located in the Koloa District of southern Kaua'i.

## How does the designation of critical habitat increase protection of threatened and endangered wildlife?

If critical habitat is designated for a species, all Federal agencies, under Section 7 of the Act, must consult with

the Fish and Wildlife Service to ensure that any action they authorize, fund, or carry out is not likely to result in the destruction or adverse modification of the critical habitat. In addition, designation of critical habitat focuses attention on those areas that are important to the species' recovery.

## How does critical habitat affect the State or private landowner?

Critical habitat designation does not affect activities on State or private lands unless some sort of Federal permit, license, or funding is involved. Activities of the State or private landowner, such as farming, grazing, and logging, generally are not affected by critical habitat designation, even if the landowner's property is within the geographical boundaries of the critical habitat. The designation has no impact on individual, town, county, or State actions if there is no Federal involvement, nor does it signal any intent of the Federal government to acquire or control the land.

## How does critical habitat affect Federal agencies?

Federal agencies are required to ensure that any activity they fund, carry out, or authorize is not likely to jeopardize the survival of a listed species or destroy or adversely modify its critical habitat. By consulting with the Fish and Wildlife Service, an agency can usually minimize or avoid any potential conflicts with listed species and their critical habitat, and the proposed project may occur.

## How many Hawaiian invertebrates are federally listed as endangered or threatened, and how many have critical habitat?

Currently, 60 species of Hawaiian invertebrates are listed as threatened or endangered: O'ahu tree snails (41), Newcomb's snail, Blackburn's sphinx moth, Hawaiian picture-wing flies (13), Hawaiian damselflies (2), and the Kaua'i cave wolf spider and amphipod. Critical habitat has been designated for all but the O'ahu tree snails and the two damselfly species.

The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people. For more information on our work and the people who make it happen, visit <http://www.fws.gov/pacificislands/> or contact:

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