



**UNITED STATES OF AMERICA  
DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
ENDANGERED SPECIES PROGRAM**

**TELEPHONIC INTERVIEW TIME (08:17)**

**WEKIU BUG (HOST – SARAH LEON WITH DAN POLHEMUS, PH.D.)**

This transcript was produced from audio provided by FWS Endangered Species Program

**P R O C E E D I N G S**

(Music plays.)

This is Sarah Leon for the U.S. Fish and Wildlife Service, and I'm on the phone today with Dr. Dan Polhemus, the Coastal Conservation Program Manager at the Service's Pacific Island's Fish and Wildlife Office.

Dan, what can you tell us about the wekiu bug?

DR. POLHEMUS: The wekiu bug is an interesting animal. It's a flightless seed bug that lives up in the alpine zone of the Mauna Kea Volcano on the big island of Hawaii. It's confined to elevations from about 11,700 to 13,800 feet. Most people don't realize that we have mountains that high in Hawaii, but we do and this is one of the interesting critters that lives up top.

MS. LEON: What are some of the major threats to the species?

DR. POLHEMUS: In the past, the primary threat had been the construction of observatories. Mauna Loa is one of the premiere observing sites in the world for astronomical observation. So in the past, they've gone up and put in a wide array of different facilities up on the mountain. Gradually it was realized that, in doing this, they were running over the habitat for the wekiu bug and other species that live in that area. Since then, there have been a variety of measures taken to try to limit the amount of impact that the observatory construction has caused.

We still have concerns now about potential invasive species introductions that can be brought up there either by species hitchhiking in construction materials that are still being brought to the summit from down below; or in some cases from the mainland United States from a temperate climate brought in through the Port of Hilo; or from things that might hitchhike on the vehicles of

tourists who come up the mountain for the day just to check out what it's like to be up in the alpine zone on a tropical island.

And then finally, there are those undetermined effects that might result from global climate change.

MS. LEON: This species is actually being removed from the list of candidate species in need of Endangered Species Act protection. What's been done to help improve this species' status and preclude the need for listing as threatened or endangered?

DR. POLHEMUS: Oh, yes. As I mentioned, it was realized that the major threat in the past has been loss of habitat in the summit area from observatory construction. In 2004, the State of Hawaii's Mauna Kea Management, which was responsible for overseeing the summit, created a wekiu bug scientific advisory committee to advise OMKM management actions to protect the bug. This committee was composed of a set of scientists, who were experts in various aspects of insect ecology and biology, life in extreme environments such as the summit of Mauna Kea, and in data collection and experimental design. This included scientists from the University of Hawaii, the State of Hawaii's Department of Land and Natural Resources, the [U.S. Geological Survey's] Biological Resources Division, and the U.S. Fish and Wildlife Service. And so, this group provided a set of recommendations to the state of things that they could do to try to get a better handle on both the current status of the species, and the ways in which we could prevent further impacts to its habitat.

Among the things we recommended were: much more extensive surveys of the entire alpine summit area, above 12,000 feet, to determine the locations of populations. Initially it was thought that wekiu bugs were largely confined to the very top part of the summit. But as we sent survey crews around in what's really a large, vast alpine landscape, we gradually found that we had scattered populations on various groups of cinder cones from about 11,700 feet on up to the top. In some cases, these cones were widely separated from each other. So, it seemed like we had multiple populations in multiple areas up in the alpine zone. This was useful in that we determined that the species was much more abundant and widespread than we had originally thought.

We also recommended, and they funded, a life history study of the wekiu bug by a graduate student at the University of Hawaii. This formed the basis for a Ph.D. dissertation that is being defended as we speak, actually. This also revealed that we get pulses for recruitment of the bug. So, you could have a big hatch of these things one year, and then as you go along you don't see them very much for another 5 or 6 years. You think: "Oh my gosh, we have a mess. The population has crashed." Then you get the right set of environmental conditions and you get another big hatch. And this last year has been a very, very good year for wekiu bugs after a long period in which they had been really scarce.

Finally, we asked that they set up monitoring for invasive species pathways, particularly along the summit access road—putting out things just as basic and peanut butter baited popsicle sticks so that you could see whether ants or other predacious species might be hitchhiking up to the top.

So, we recommended that they get a lot of basic science under their belt to understand the species. Also, of course, we felt that there was probably a need for better land use planning—and not only us, but several other non-governmental organizations and other concerned citizens. So in April of 2009, the University of Hawaii put forth a natural resources plan for the

summit. This was part of the broader, comprehensive management plan that also had plans dealing with cultural resources management, a public access plan, and also a decommissioning plan in case they ever wanted to get rid of some of these facilities if they outlived their usefulness. Some of the key aspects of this agreement were that there would be no new construction on crater rims because it was determined that the rims of these craters were, in fact, the most important habitat areas for bugs. So new facilities are now being located in areas that have shown to be of lesser utility to wekiu bugs, particularly areas that are glacial till. It turns out that the Mauna Kea was glaciated in the Pleistocene, and there are areas where the glaciers sort of compacted the substrate. As a result, there aren't that many pore spaces in it and so it's not as useful for wekiu bugs. Finally, any new permit applications for construction have to be accompanied by plans for both monitoring bugs before and after construction; a habitat restoration plan; and then, as noted before, a decommissioning plan as to what will you do with the facility if you decide you don't need it.

MS. LEON: Did these conservation measures benefit any other species there on the summit?

DR. POLHEMUS: Yes. Although it's not a super diverse ecosystem there up top, there are several other very interesting arthropods in addition to the wekiu bug. There's a flightless moth whose caterpillars feed on lichens. There's also a predacious lachesis spider. And although neither of these are currently listing candidates, they'll both benefit from the conservation actions that are being undertaken in the Mauna Kea alpine zone.

MS. LEON: Why is it that we care to conserve the wekiu bug and other Mauna Kea arthropods? What value do they have?

DR. POLHEMUS: I think most people I talk to, especially those that come from the other 49 states, are amazed when they realize that we have mountains in Hawaii that are taller than anything in states that people typically think of as mountainous, such as Wyoming or Montana. And we do. We have two different mountains that go up 13,800 feet. The species that are up there are very unusual and unique; and as such, it would be a shame to lose them when in fact a little bit of careful planning and conservation we can make sure that they stick around.

In addition, there's a final interesting twist. There's some evidence that wekiu bugs may have natural antifreeze in their system that helps them deal with the very cold nighttime conditions that can occur on the summit. And we've also seen them out in the day at temperatures as low as 17 degrees Fahrenheit. So, there's an aspect of who knows what useful applications might be derived from understanding more fully how this natural antifreeze works in these bugs' systems.

MS. LEON: Thanks so much, Paul, for sharing.

DR. POLHEMUS: Thank you very much.

MS. LEON: For the U.S. Fish and Wildlife Service, this is Sarah Leon.