

# Feeling The Heat

*Global warming is already disrupting the biological world, pushing many species to the brink of extinction and turning others into runaway pests. But the worst is yet to come*

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**QUIVER TREE** This striking giant aloe was given its name by the San people of southern Africa, who use the tree's hollow branches as quivers for their arrows. Scientists have discovered that quiver trees are starting to die off in parts of their traditional range. The species might be in the early stages of moving southward, trying to escape rising temperatures closer to the equator.

**PINON MOUSE** This tiny resident of the southwestern U.S. has long eked out its living in juniper woodlands, but in California it is heading for higher, cooler altitudes in the High Sierra conifer forests. The mouse is one of several small mammals in the region that have moved their homes 1,000 to 3,000 ft. higher in elevation over the past century.

**RED-BREADED GOOSE** Twenty-six bird species, including this goose, which breeds in the Arctic, are listed by the World Conservation Union as threatened by global warming. Half are seabirds whose food supplies are diminished because of climate changes. The rest are terrestrial species, including several whose coastal habitats are at risk because of rising sea levels.

**AFRICAN ELEPHANT** Global warming might not only shrink the elephant's range within Africa but may also wreak havoc with the animal's love life. The relative abundance--or scarcity--of food affects the social hierarchy of the herd, which in turn can determine which animals get to breed.

**BUTTERFLIES** Researchers have documented shifts in the ranges of many butterflies. One study looked at 35 species of nonmigratory butterflies whose ranges extended from northern Africa to northern Europe. The scientists found that two-thirds of the species had shifted their home ranges northward by 20 to 150 miles. In the U.S., researchers have closely tracked the movements of the butterfly known as Edith's checkerspot (at right, middle). Though butterflies might be sturdier than they look, scientists believe many species will not survive the impact of climate change.

**KING PROTEA** It is the national flower of South Africa, just one among the many spectacular members of the large family of flowering plants named after Proteus, a Greek god capable of changing his shape at will. Scientists fear that more than a third of all Proteaceae species could disappear by 2050.

**MISTLETOE** The limber pine dwarf mistletoe is proliferating throughout western forests in North America, thanks to heat and drought-weakened trees that act as perfect hosts for this botanical parasite. It's not unlike what happens in your body, says researcher Connie Millar of the U.S. Forest Service: "When your system is stressed, you're more vulnerable to all kinds of things that want to get you."

**FROGS** Amphibians have been hopping, swimming and crawling about the planet for 350 million years. But their future is hardly assured. A global assessment of the state of this entire class of vertebrates found that nearly one-third of the 5,743 known species are in serious trouble. Climate change may well be the culprit in most cases, either directly or indirectly. The home habitat of the golden toad (at right, bottom) in Costa Rica moved up the mountain until "home" disappeared entirely. More than two-thirds of the 110 species of colorful harlequin frogs in Central and South America, two shown above, have also disappeared. Scientists believe that what killed many of the harlequins and what threatens a great many other amphibian species is a disease caused by the fungus *Batrachochytrium dendrobatidis*. Climate change seems to be making frogs more vulnerable to infection by the fungus.

What troubles scientists especially is that if we are only in the early stages of warming, all these lost and endangered animals might be just the first of many to go. One study estimates that more than a million species worldwide could be driven to extinction by the year 2050.