

Possum on the Rostrum

By William F. Laurance

When we ponder the perils of global warming, the polar bear pops into many people's minds before any other threatened creature. But a different icon may be needed. Undoubtedly the bear is seeing its habitat melt away; yet the Arctic harbors only limited biodiversity. Plant and animal species at the Earth's equator vastly outnumber those at the poles—and may be even more vulnerable to temperature changes.

Polar bears and others living near the poles have adapted to seasonal swings of temperature, whereas tropical-zone species are thermal specialists, adapted to a narrow, stable temperature range. For every 1,000-foot rise in tropical-mountain elevation, temperatures drop by about 3.5 Fahrenheit degrees. Accordingly, local species adapted to relatively cool, cloudy upland conditions, often find the sweltering lowlands unbearable. Their montane populations become geographically isolated, allowing them to evolve and diversify—spawning kaleidoscopes of unique, locally endemic species.

Those montane endemics may be

among the most vulnerable species on Earth. “As the world gets hotter, these creatures have nowhere to go,” says rainforest ecologist Stephen E. Williams of James Cook University in Queensland, Australia. Williams has attempted to predict the responses to global warming of every endemic bird, mammal, frog, and reptile species in the rainforests of northern Queensland. His conclusions are jolting. If average temperatures rise by more than 4 degrees—which could easily happen this century—his studies suggest that extinctions will spike dramatically.

For Williams, the poster child for global warming should not be the polar bear, but the white lemuroid ringtail possum, a rare color morph of the species *Hemibelideus lemuroides* [see photograph above]. As photogenic as any polar bear, that marsupial is restricted to a single mountaintop in tropical Queensland, and it hasn't been seen by anyone in four years. Its death knell may have been a heat wave that hit the region in late 2005, when dead possums of several species were found in the forest. With their white brethren gone, lemuroid ringtail possums that sport the species' more common brown fur may not be far behind.

Tropical lowland species could be just as vulnerable as their mountain-dwelling cousins. On Barro Colorado Island in Panama, where I sometimes work, research suggests that many species—such as silky anteaters, insects, and iguanas—are living dangerously close to their thermal maximum. “If you heat an anolis lizard just a few degrees above its preferred foraging temperature, you risk killing it,” says evolutionary physiologist Raymond B. Huey of the University of Washington in Seattle. Mass die-offs of tropical animals during heat waves seem to confirm this view.



White form of Australia's lemuroid ringtail possum

Many biologists now believe that global warming could rival habitat destruction as a threat to tropical biodiversity, endangering possibly a thousand times more species than those imperiled by warming near the poles. With an expanse of rainforest the size of fifty football fields going up in smoke every minute, that says a lot. At the very least, the two threats will conspire synergistically. Increasing habitat loss and fragmentation are likely to trap forest species, preventing them from shifting to more favorable climates or elevations. The small populations that remain could then be battered by heat waves, droughts, storms, and other manifestations of global warming, perhaps disappearing forever.

This alarming scenario has tropical biologists, myself included, wondering which battle to fight first—habitat destruction or global warming. I believe that slowing habitat loss is the higher priority, in part because the rapid destruction of tropical forests produces about a fifth of all greenhouse gas emissions today. Hence, saving rainforests is also a very effective way to combat global warming.

I, for one, will be keeping a white rainforest possum in mind as temperatures rise.

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Young green iguana on Barro Colorado Island, Panama