Hunting with fire appears to benefit Australia's small-mammal populations, researchers say

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Nyalangka Taylor, near Parnngurr Aboriginal Community in Australia's Western Desert, waits behind a burn to begin searching for monitor lizard in the 'nyurnma' - a freshly burned patch of land. Credit: Rebecca Bliege Bird

(Phys.org) -- When species start disappearing, it usually makes sense to blame it on the arrival of humans. But in the case of Western Australia's declining small-mammal populations, the opposite may be true.

The Aboriginal Martu people of Western Australia have traditionally set small fires while foraging, leaving a patchwork landscape that proves a perfect environment for bilbies, wallabies, possums and other threatened mammals.

Stanford anthropologists have discovered that when these controlled burns cease, the desert rapidly becomes overgrown – and a single lightning strike can send wildfires tearing through hundreds of square miles of tinder-dry mammal habitat.

The paper, authored by Stanford anthropology Associate Professor Rebecca Bliege Bird, senior research scientist Douglas Bird, postdoctoral scholar Brian Codding and undergraduate Peter Kauhanen, appeared recently in the journal *Proceedings of the National Academy of Sciences*.

Hunting with the Martu

Martu Native Title, deep in Australia's Western Desert, contains some of the most remote human settlements in the world. Parnngurr, a Martu community with a population of around 80, is located more than 200 miles from the nearest mining outpost.

Making the most of the harsh, arid landscape's resources, the Aboriginal Australians hunt bustard, emu and kangaroo and collect a wide variety of fruits, tubers and seeds. But their most important resource is the sand goanna – a 4-foot long burrowing lizard that accounts for nearly 40 percent of all foraged calories.

The goanna hunt likely hasn't changed in thousands of years. In winter, when the lizards are hibernating, groups of women head out from the camps and set fire to patches of the spinifex grass covering den entrances.

Once the brush has been cleared, the woman who sets the fire has first rights to dig out any goanna burrows she finds in the fire scar.

The practice is so ingrained in Martu culture that the Martu language has words for every stage of plant growth following a fire, ranging from

nyurnma – a fresh fire scar – to kunarka – a landscape overgrown with spinifex.

"If you're out hunting with Martu, it involves fire all the time," said Douglas Bird. "You can't understand any of their values without factoring in the fundamental role of fire."

Comparing scars

The Martu were cleared from their lands in the mid-1960s to make way for the British government's Blue Streak missile tests. Until the people won the official title to their territory again in 2002, an Alabama-sized portion of the Western Desert that they had previously managed saw no controlled fires.

Without human intervention, El Niño-driven monsoons had allowed dense spinifex to spring up in some areas and sprawling lightning-caused fire scars to appear in others.

"You ask the Martu people, and they explain, 'We left, and the fire regime broke down,'" Douglas Bird said.

Now, 10 years after the Martu's reinstatement of traditional hunting practices across their territory, the researchers compared a decade's worth of fire scars in hunting grounds to land without an Aboriginal Australian presence.

The differences were stark. Where Martu women had hunted for goanna, the fire scars were smaller and more clustered, and there was a greater variety of ground cover.

Outside these areas, lightning strikes had burnt a small number of enormous scars, often larger than 10,000 hectares in size.

"Without the Martu, it's very much like what we have in California," said Rebecca Bliege Bird. "The desert is covered with a large, contiguous set of fuels."

The burning also seemed to buffer against major seasonal changes – spreading fires throughout the year, rather than concentrating them during periods of extreme drought.

Managing for mammals

Evidence suggests that the lightning-style landscape is no good for small mammals. Thick brush is difficult to travel through – spinifex is tipped with painful silica points – and large fire scars mean few resources and more exposure to predation.

Australia's mammal populations are disappearing faster than anywhere else in the world, and there's reason to believe that the decline coincided with the collapse of Martu fire regimes.

"Presumably the same resources have been used for at least 5,000 years," said Douglas Bird. "That's plenty of time to get strong coupled interactions between humans and other mammals."

Alternately, the researchers suggest, there is evidence that Australia's climate variability was less extreme before humans arrived. Aboriginal peoples' burning practices may have recreated the conditions mammals had originally evolved in.

"It challenges a bias that a lot of ecologists have," said Rebecca Bliege Bird, "which is that all human impacts are negative."

Western Australian Environment and Conservation officials have taken note of Martu strategies and currently conduct extensive prescribed

burns across Western Australia, but official resistance to hunting and gathering remains.

"The government would rather come up with an interventionist policy than support these traditional processes that provide the same services," Rebecca Bliege Bird said.

Provided by Stanford University