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Cave man

Wildlife Ecologist Wynne seeks out life underground

By David Thompson

A cave is not just a hole in the ground.
It's a living museum.

So says J. Judson Wynne ('93), a wildlife ecologist with the USGS-Southwest Biological Science Center and a Biology Ph.D. candidate at Northern Arizona University, Flagstaff. Starting out as an archaeologist, Wynne turned his love of wildlife to a career of studying seldom-seen subterranean animal life. "That has been my passion ever since I got turned on to caving while studying animals associated with a large bat roost in a Belize cave," he said.

Cave-dwelling animals – whether blind catfish, spiders or beetles – are the descendants of creatures that retreated from the surface during the last ice age, seeking the more stable climatic conditions of subterranean environments. Wynne wants to find and preserve for further study as many of these sites as possible.

"You can view cave-dwelling animals as relics of the past," Wynne said. "They're generally characterized by low population numbers and are often highly susceptible to disturbance. We're dealing not only with relics of the past, but often highly sensitive taxa," he said. "It's fascinating to me how we can make these new species discoveries, piece together their life history and then find ways to protect these living museums in perpetuity."

Since last September, Wynne has been taking his subterranean knowledge to new heights – developing above-ground technologies to find underground spaces. He is working with a NASA-funded team of geologists and physicists to find ways of detecting caves from the air, paving the way for identifying and eventually exploring caves on Mars.

"What we're doing is looking at available thermal imagery related to areas containing caves," said Wynne. "In addition to that, we're also collecting ground-based measurements at these sites" by taking temperature, humid-



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ity and air flow measurements at several caves identified as Mars-like in structure.

"Meanwhile, the astrogeologists will be doing a thorough review of all Mars imagery and identifying those areas on the Martian surface most likely to contain caves," Wynne added. "The astrophysicists will be developing models to simulate the thermodynamics of Earth caves using the data we collect, and then tweak those parameters to mimic the Martian atmosphere and surface conditions to give us an idea of how caves will behave thermally on the Martian surface.

"Once we figure out how we can do it on Earth, we will to apply these techniques to the Martian surface," said Wynne.

Phase I, due to be completed by September 2006, is a concept study. "Once we do that, we likely begin the second phase, which we envi-

sion as being a more intensive collection of ground-based measurements and, at the same time, actually collecting thermal imagery either by a fixed-wing aircraft or helicopter over cave sites identified as Mars-like."

The Martian surface is constantly bombarded by cosmic radiation, so the possibility of finding any evidence of life on the surface is diminished to "almost nothing," said Wynne. "What caves offer is essentially a shelter to any evidence of past life or potentially current life forms. The most plausible approach is to find the big holes, send probes into those cavities and see what we can find."

Another compelling possibility for caves is that they offer interplanetary explorers protection from the harsh Martian surface. "This cave detection project may also assist NASA in identifying areas suitable for astronauts to construct base camps for exploration," he said.

Wynne has a special place in his heart for his grandparents, who made it possible for him to fulfill his dream of attending college and embarking on his career. About 10 years ago, he legally changed his last name from "Gregory" to "Wynne" in honor of his grandparents.

When Wynne isn't scuttling about a cave floor, he is training for endurance and adventure races. "My training as an endurance athlete keeps me in the condition necessary to endure the challenges of working underground," he said.