

Smart Collar' in the Works to Manage Wildlife Better

By [KIRK JOHNSON](#); New York Times; Published: August 29, 2011

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Training the mountain lion Rascal to accept using a treadmill, which scientists said was a first for adult mountain lions, took months of acclimation and reward. Matthew Staver for The New York Times.

FORT COLLINS, Colo. — The collar of the wild is coming.

Lisa Wolfe, a veterinarian at Colorado Parks and Wildlife, fed and monitored Rascal on Monday as he walked on the treadmill. And in the same way that the smartphone changed human communications, what might be called the “smart collar” — measuring things that people never could before about how animals move and eat and live their lives — could fundamentally transform how wild populations are managed, and imagined, biologists and wildlife managers say.

The collars, in development in academia and intended for commercial production in the next few years, use a combination of global positioning technology and accelerometers for measuring an animal’s metabolic inner life in leaping, running or sleeping. From the safari parks of Africa to urbanized zones on the edge of wildlands across the American West — places where widespread interest in the devices has already been voiced, scientists said — the mysteries of the wild might never be the same.

“What you end up with is a diary for the animal, a 24-hour diary that says he spent this much time sleeping, and we know from the GPS where that was,” said Terrie Williams, a professor of biology at the University of California, Santa Cruz, and one of three co-investigators [on the project](#). “Then he woke up and went for a walk over here. He caught something over here. He ate something and we know what it was because the signatures we get for a deer kill vs. a rabbit kill are very different.”

And Mischief, a 10-year-old captive female mountain lion here in Colorado, may have provided a crucial link in the chain of research. The 121-pound cat, orphaned shortly after birth when her mother was shot by an elk hunter and raised by the state as a study animal, paced on a modified treadmill on Monday morning while munching venison morsels hand-fed in reward by her trainer, Lisa Wolfe, a veterinarian at Colorado Parks and Wildlife.

“We got the data point,” Professor Williams said, looking up from her laptop, which was measuring Mischief’s oxygen intake while the cat moved at three kilometers per hour. She said the accumulation of data points for mountain lions — what she called “a library of signatures” for every kind of movement — was the first phase of the project. One of her graduate students is developing the next iteration of the collar for wolves and coyotes, two other animals that live in proximity to people across wide swaths of the nation.

That mountain lions do not normally eat and walk at the same time is just one of the wrinkles that will require a fine calculation, in adjusting for the added calories that Mischief burned in gulping her treats. Training her and her brother Rascal to accept the treadmill at all, which scientists said was also a first for adult mountain lions, took eight months of acclimation and reward at the state research station 65 miles north of Denver.

“At first, it was the classic walking-and-chewing-gum-at-the-same-time problem — they’d take a bite, then stop,” said Michael W. Miller, a senior wildlife veterinarian at Colorado Parks and Wildlife.

The lions here, since their capture, have been actively trained in a research project on the effects of a neurological disease, chronic wasting, which infects many of the deer, elk and moose that lions eat. They have been fed mostly on infected animals donated by hunters, and trained— in balancing, recognizing geographic shapes, and now on treadmills — as a way of assessing their mental and physical health. Dr. Wolfe said that so far no ill-effects had been detected. Professor Williams said she searched for two years for any lions that might be trainable for her motion tests before finding Rascal and Mischief.

But [the goal](#) of the project, which was financed by about \$800,000 in grants from the National Science Foundation, is not just to gain knowledge about animals that might be captured and fitted with the devices. What the researchers are aiming for is no less than a platform for predicting wild behavior, a human dream since the first hunter-ancestors ventured onto the African savannah. Most wild animal collars now in use can tell where an animal is, using radio or satellite technology, but not much more. “We want to know what they’re doing,” Professor Williams said. “This is resting, this is walking, this is running, this is really tearing after something.” The data stream from a smart-collared animal would show, for example, when the animal had last eaten, and how likely it was to go beyond its normal range in searching for food.

“We want to get to a stage where we can say, ‘We’ve got a lion that, for whatever reason, is really hungry out there and chances are you should put your dog indoors and shouldn’t go hiking in this area’ — that there’s a higher likelihood that this animal is going to go after something,” Professor Williams said.

If a sampling of animals that lions or wolves prey on, like deer or elk, could be added into the mix with monitoring collars of their own, scientists said they envision a new way of thinking about landscapes in general. With data flowing about both predators and prey, national park or wilderness managers might one day be able, over morning coffee at their desks, to predict a kind of calorie-budget that might unfold that day for the ecosystems they oversee: who might eat and be eaten, and where both sides might go, driven by survival instinct or hunger.

Colorado's Parks and Wildlife commissioner, Robert G. Streeter, who was here for Monday's treadmill tests, said that social networking sites might be incorporated into the new human-wild interface as well, with data from the collars posted online as it comes in.

"We could put up a Facebook account for each animal," he said.