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In a Warmer Yellowstone Park, a Shifting Environmental Balance

By [JIM ROBBINS](#)

YELLOWSTONE NATIONAL PARK, Wyo. — The grassy sweep of the Lamar Valley in the northeastern corner of this park is famous for its wildlife, especially its vast herds of elk and bison and the wolves that hunt them.

But while walking across the Lamar last fall, Robert L. Crabtree, chief scientist with the Yellowstone Ecological Research Center in Bozeman, Mont., pointed out a cascade of ecological changes under way. The number of grizzly bears and gophers in the valley has increased, Dr. Crabtree said, an increase supported by the spread of an invasive plant from the Mediterranean that a warming climate benefits.

“It’s the early stages of a new ecosystem,” he said, “one that hasn’t been seen here before.”

The plant, Canada thistle, provides food for grizzlies in more than one way but may also be squeezing out native plants that cannot compete.

Canada thistle first appeared in North America several hundred years ago and has been present in Yellowstone at least since the 19th century, Dr. Crabtree said. Because of its extensive root system, the plant defies spraying, and park officials have largely abandoned efforts to control it. Warming temperatures have helped its fortunes.

Areas along the Lamar River that were once marshy have dried out because of a drought that began around 2000. As the ground becomes drier, the thistle invades. Dr. Crabtree theorizes that its range in the valley has doubled since 1989, when he started research on the ecosystem here.

Enter the pocket gopher, a half-pound dynamo that tunnels into the ground near the surface. The gophers love the abundant, starchy roots of the plant and burrow beneath it to harvest the tubers. What they do not eat they stockpile under plants or rocks.

The expansion of pocket gophers and thistle is not gradual, Dr. Crabtree said, but a rapid positive-feedback loop. As the gophers tunnel, they churn surface soil and create a perfect habitat for more thistle. In other words, the rodents help spread the plant. And more plants, in turn, lead to more pocket gophers.

“The pocket gophers are unconsciously farming their own food source,” said Dr. Crabtree. Their numbers here have tripled since the late 1980s, he said.

For their part, grizzly bears have discovered the gophers' caches and raid them. As a result, the Lamar Valley is pockmarked with holes where grizzlies have clawed up bundles of roots. Bears also devour gophers and their pups.

Dr. Crabtree thinks the bears started feeding in earnest on the new food source in 2004 — a poor year for another bear staple, the white bark pine nut. Now, he adds, they seem to be eating the gophers and roots more routinely.

Tom Oliff, chief scientist for Yellowstone, confirms that the growing season for the park has expanded 20 days a year since the mid-1990s, which may explain the spread of Canada thistle. Mr. Oliff said the park reduced control efforts because evidence showed that the plant ebbed and flowed and that the range would probably shrink on its own.

About the idea a new ecosystem, Mr. Oliff said: "It's an interesting hypothesis. Is it true? That's a good question."

Charles C. Schwartz, leader of the Interagency Grizzly Bear Study Team, said his agency had no way to tell whether there were more bears in the valley. "I think what he's seeing is real," Dr. Schwartz said of Dr. Crabtree. "It wouldn't be surprising to see individuals shift and take advantage of an abundant food supply."

Whether the changes last over the long haul, he said, is another question.

As [climate change](#) alters ecosystems, Dr. Crabtree said, "the winners are going to be the adaptive foragers, like grizzlies that eat everything from ants to moose, and the losers are going to be specialized species that can't adapt."

He said one specialized declining species was the long-tailed weasel. It feeds primarily on voles, which are also declining. The changes in the Lamar Valley might point to a new approach for invasive species, which are overwhelming many natural systems. "Invasives are the single biggest threat to biodiversity," Dr. Crabtree said.

As budgets for controlling invasive species shrink, he suggested a triage. "If you are going to give up on a species," he said, "it's best to give up on one that has ecological value."

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