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Can wolves restore an ecosystem?

By Sandi Doughton
Seattle Times science reporter

THE HOH RAIN FOREST — No trace remains of the wolves whose howls ricocheted for millennia down the lush valleys of the Olympic Peninsula.

Settlers and trappers killed them all in little more than three decades.

But the loss of the stealthy predators in the early 1900s left a hole in the landscape that scientists say they are just beginning to grasp. The ripples extend throughout what is now Olympic National Park, leading to a boom in elk populations, overbrowsing of shrubs and trees, and erosion so severe it has altered the very nature of the rivers, says a team of Oregon State University biologists. The result, they argue, is an environment that is less rich, less resilient, and — perhaps — in peril.

"We think this ecosystem is unraveling in the absence of wolves," said OSU ecologist William Ripple.

Everything from salmon to songbirds could feel the fallout from the missing predators, the scientists say.

It sounds hard to believe, but the research adds to growing evidence that key predators do more than simply keep prey species in check. Most famously, Ripple and his OSU colleague Robert Beschta showed that within three years after wolves were reintroduced to Yellowstone National Park and elk populations fell, pockets of trees and shrubs began rebounding. Beavers returned, coyote numbers dropped and habitat flourished for fish and birds.

It was an "explosive" discovery, said David Graber, regional chief scientist for the National Park Service. "The whole



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Roosevelt elk splash through the Hoh River in Olympic National Park. Since wolves were eradicated in the early 1900s, some scientists say, overbrowsing by elk has damaged the forest understory and increased riverbank erosion, threatening the ecosystem.



ecosystem re-sorted itself after those wolf populations got large enough."

A push to reintroduce wolves to Olympic National Park a decade ago fizzled in the face of local opposition, but the OSU work could revive the debate.

"If what we're saying is right, and the Park Service believes it, that means they have to do something," Beschta said.

Something missing

Beschta was searching for cottonwoods in the Hoh River rain forest on a day when clouds and sunshine chased each other across the sky. Centurion cedars unfurled their boughs. Raindrops glistened on waist-high ferns, and a carpet of moss muffled the sound of footfalls. Few corners of the state are less touched by man, and the idea that an ecological crisis was unfolding seemed laughable.

"To most people, this would look pretty pristine," Beschta conceded.

But decades spent studying forests and rivers have taught him to notice things most people don't.

Those "fern prairies," for example, shouldn't occupy vast swaths of forest floor. Nor should you be able to see 100 yards in any direction. "This looks like a well-kept lawn," Beschta said with dismay.

Gone is the junglelike understory of shrubs, young cottonwoods, hemlock and maple reported by early explorers.

The reason?

Beschta pointed to piles of elk pellets that made walking an obstacle course.

"Trophic cascade" is the term biologists use for the ecological chain of events set off by extermination of wolves and other top predators.

Starting in Yellowstone more than a decade ago, Beschta and Ripple have documented these trickle-down effects in landscapes across the West. In Zion National Park, they linked the absence of cougars to an upswing of mule deer and a crash in cottonwoods, followed by stream-bank
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Oregon State University researcher Robert Beschta says the forest understory in the Hoh Rain Forest is unnaturally open, and few young trees have survived to maturity since wolves were killed off and elk multiplied.



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Bull elk in Olympic National Park can weigh up to 1,000 pounds. Cows, like this one browsing in the Hoh Rain Forest, generally weigh 400-700 pounds.



and a crash in cottonwoods, followed by stream-bank erosion and declines in butterflies, frogs and native fish. Similar patterns of vegetation and habitat destruction emerged in Yosemite and Jasper national parks, the latter in Canada.



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OSU scientist Robert Beschta examines a huckleberry bush chomped by elk. Behind him is an ancient Western red cedar, whose seedlings are another favored elk food.

"We think this may be pretty universal," Ripple said.

Some are skeptical of the pair's conclusions, including Olympic National Park wildlife biologist Patti Happe. She questions some of the historical records used to conclude the ecosystem has shifted, and points out that increased erosion could be caused by more frequent floods in recent years.

"There's no denying that predation ... would shape the behavior and population numbers of elk," she said. "But how much, we don't know — and to extrapolate that to salmon and (rivers) is to my mind just too big of a reach."

Elk population growth

President Theodore Roosevelt created Mount Olympus National Monument in 1909 to protect the unique subspecies of elk that now bears his name. None of that solicitude was extended to wolves, which were trapped, poisoned with strychnine and shot on sight. The final stragglers were killed around 1920.

Elk populations spiked, and park managers warned of the consequences.

"Unless some substitute for this now-absent controlling factor (the wolf) is provided, serious destruction of certain plants and even their total elimination ... will occur," said a 1938 report. Starvation drove elk numbers down, and the park's year-round population has stabilized at between 3,000 and 5,000 animals, Happe estimated.

But elk today don't behave like they did when wolf packs were on the prowl. Gone is the "ecology of fear" that kept browsers on the move, wary of narrow river bottoms and thick brush. Bear and cougar occasionally kill elk in the park, but the big herbivores feel complacent enough to hang out in the valleys and eat their fill. That's disastrous for the young plants they fancy most, like cottonwood, hemlock, big leaf maple and Western red cedar.

"With no reason to be looking over their shoulder, they now stand around and eat down to the ground," Beschta said, scanning duff and nurse logs for seedlings.

He finds none. But a cluster of cottonwoods anchors a small clearing, their trunks up to 3 feet across. These patriarchs sprouted 140 years ago or more — a few decades after Lewis and Clark blazed a path to the Pacific.

Beschta and Ripple walked transects in the park's valleys, counting and aging every cottonwood and big leaf maple. They found that after wolves were eradicated, very few seedlings made it past the knee-high stage

Information

Research information: www.cof.orst.edu/cascades

Elk in the Olympic National Park

maple. They found that after wolves were eradicated, very few seedlings made it past the knee-high stage.

Along one 3-mile stretch of the Hoh, not a single new cottonwood survived the ravenous elk in the last half-century.

"It's totally out of whack," Beschta said.

Where elk browsing is lighter and the animals are regularly hunted — a stretch of the lower Quinault River outside the park — he and Ripple estimate thousands of cottonwoods have taken root in the decades since wolves were killed off. And the fact that cottonwoods are thriving on the lower Quinault indicates that changing climate can't explain the drop in tree survival inside the park.

Riverbank changes

Beschta scrambled down a steep-cut bank onto cobbles that mark the expansive channel where the Hoh now meanders on its way to the ocean. A small cluster of willows sprouted from the sand, a remnant of dense stands that historical records say once bound the park's rivers in narrow, shady channels more hospitable to salmon, birds and insects.

"This should be a sea of willows, but it's not," Beschta said, bending the pliable stalks to reveal chewed tips.

The explorers of the Press Expedition, which crossed the Olympic Peninsula in 1890, described the upper Quinault River as "so dense with underbrush as to be almost impenetrable." They tried to float the river, but found it jammed with logs — bad for navigation, but excellent for fish.

"These rivers don't look anything like that today," Beschta said, surveying the bare gravel and scattered logs.

On two river sections outside the park where elk are less plentiful, the scientists documented narrower channels and stream banks less damaged by browsing and erosion.

"The degradation we're seeing in the park is profound. It's catastrophic," Beschta said.

Robert Naiman, who has studied Olympic's rivers for decades, finds that a bit alarmist. Though the mix of vegetation has changed, said the University of Washington ecologist, species like alder still line the riverbanks and abundant dead wood provides refuges for salmon.

"It's in pretty good shape, as near as I can tell," he said.

Wide, meandering stream channels are also common in coastal rivers in British Columbia, where wolves still live, Naiman pointed out.

The one missing piece

As mist hugs the treetops and the light fades, it's easy to imagine yellow-eyed wolves stealing down to the Hoh to drink. Indeed, since the recent reintroduction of the weasel-like fisher, wolves are the only original species missing from the park, Happe said.

But no one is likely to send a shipment anytime soon. The state Department of Fish and Wildlife is opposed to transplanting wolves from elsewhere, and the U.S. Fish and Wildlife Service, which engineered the Yellowstone/Rocky Mountain wolf-recovery project, has no interest in establishing an isolated population on the
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Yellowstone/Rocky Mountain wolf-recovery project, has no interest in establishing an isolated population on the Olympic Peninsula, said project coordinator Ed Bangs.

The wolf population in the Rockies now numbers 1,500 animals, and could be taken off the endangered-species list soon. The success leaves little doubt wolves could be re-established in Olympic National Park — but not without headaches.

"Wolves are magnificent, cool animals, but they're a pain in the butt, too," said Bangs, who fields the calls from ranchers whose sheep and cattle are picked off.

A few wolves already have ventured into northeastern Washington. If they thrive, some of those animals might eventually be shuffled to other parts of the state, including Olympic National Park, Happe said. The Park Service could also sponsor its own reintroduction program. But it would be a slow process that would require lots of public support, she cautioned.

Another way to restore the park's damaged ecosystems is to reduce elk populations, Beschta pointed out. But killing animals inside a national park would not be popular.

Wolves are.

A survey earlier this year found 75 percent of Washington residents support wolf recovery. Support was strongest among urban dwellers, but 54 percent of all those polled said they would travel for a chance to see or hear wolves in the state.

Just as transplanted wolves have proved resilient, the experience from Yellowstone shows that ecosystems can bounce back when all of their original pieces are restored, Beschta pointed out.

"So if you put wolves back into Olympic National Park, will it recover?" he asked. "We're optimistic."

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