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manage for this by spacing trees irregularly or thinning early on in the growing process, he said, others do not.

But regardless of spacing, the cookie-cutter height and characteristics of the trees creates limitations that deny many woodland creatures the diversity they need to survive.

"A lot of species that nest in the older, aged forests need multilayer canopies because that provides protection to them," said Kim Nelson, a research and wildlife biologist at OSU.

Nelson has been studying the marbled murrelet, a seabird that flies inland to nest, since the 1980s. The murrelet was listed as abundant in the 1900s, she said, but today is listed as threatened under the Endangered Species Act – a status that gives it habitat protections on private lands in Washington and California, but not in Oregon.

She said the decline of the murrelet, along with other bird species such as the spotted owl and woodpeckers, is attributed to habitat loss from forestry.

Jason Gonzales at Oregon Wild said coho salmon and hundreds of smaller and "less charismatic" species such as salamanders, frogs, lichens and other fauna are also threatened as a direct result of forestry practices in the Pacific Northwest.

But Nelson pointed out that some private landowners are voluntarily trying to employ practices that are consistent with wildlife needs.

She's studying what buffers around murrelet territory should look like and whether the birds can be attracted to new

nesting sites – and she's doing it with funding from the timber industry.

"The timber industry, including Oregon Forest and Industries Council, lobbied the Oregon Legislature, saying they wanted marbled murrelet research done so that some of these questions that they want to know, about how to better provide for the murrelet, are answered," she said.

The timber industry, through a self-imposed tax on lumber, funds a lot of research at OSU's College of Forestry, Maguire said.

A benefit of this, he said, is third-party, neutral research that's publishable in peer-reviewed journals.

Conflicting opinions among timber interests regarding research funding serve as an example of how deeply the industry's values are split.

"I've witnessed some very interesting, some very heated arguments among industry members," Maguire said. "There are some that will say, 'Why should we be funding someone to find stuff out that is going to diminish our ability to harvest?' And there are others that are just adamant that's what we do as foresters; that's our responsibility."

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DOUG MAGUIRE,

PROFESSOR OF FOREST MANAGEMENT AT OREGON STATE UNIVERSITY'S COLLEGE OF FORESTRY

Gonzales, who leads Oregon Wild's Forest and Watershed campaign, said another way tree plantations differ from native forests is that their interiors are warmer. He said this has contributed to the warming of Oregon's streams, which last year killed millions of fish.

An OSU study released earlier this year compared the microclimates of old-growth forests to plantation forests in the Oregon Cascades, finding that tree plantation interiors can be up to 4.5 degrees Fahrenheit warmer.

One of the study's authors, OSU professor Matt Betts, told the college's department of News and Research Communications: "To the untrained eye, plantations might look similar to old-growth forests in terms of the aspects that are well known to influence temperature, particularly canopy cover. So the magnitude of the cooling effect of old-growth structure is somewhat surprising."

Gonzales said watershed warming is a "major problem all over the state, especially in far western Oregon – throughout the coastal areas of lakes, with algae blooms that are dangerous, rivers that are warm and fish that are dying."

The carbon question

In the era of climate change, one potential problem with clear-cut logging jumps out: It involves removing entire patches of Pacific Northwest forests, which are shown to have tremendous potential for carbon dioxide sequestration.

A study authored by faculty at OSU's Department of Forest Science and University of Washington's College of Forest Resources in 2002 found old growth forests in the western portion of the Pacific Northwest store more carbon dioxide per acre than any other forests in the world.

Some of that carbon is absorbed in the lush understory – the thick blanket of shrubs, ferns and other plants that covers the forest floor but gets cleared away after a clear cut and experiences limited growth in densely packed tree plantations.

One group of researchers argues the state needs to start accounting for the timber industry's long-ignored contribution to climate change.

In a November 2015 report, the Center for Sustainable Economy and GEOS Institute in Ashland pegged the timber industry as the second-largest contributor of greenhouse gas emissions in Oregon, surpassed only by transportation.

According to "Clearcutting our Carbon"

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PHOTO BY JOE GLODE

A clear-cut viewed at milepost 23 along Oregon Highway 26, west of Portland.