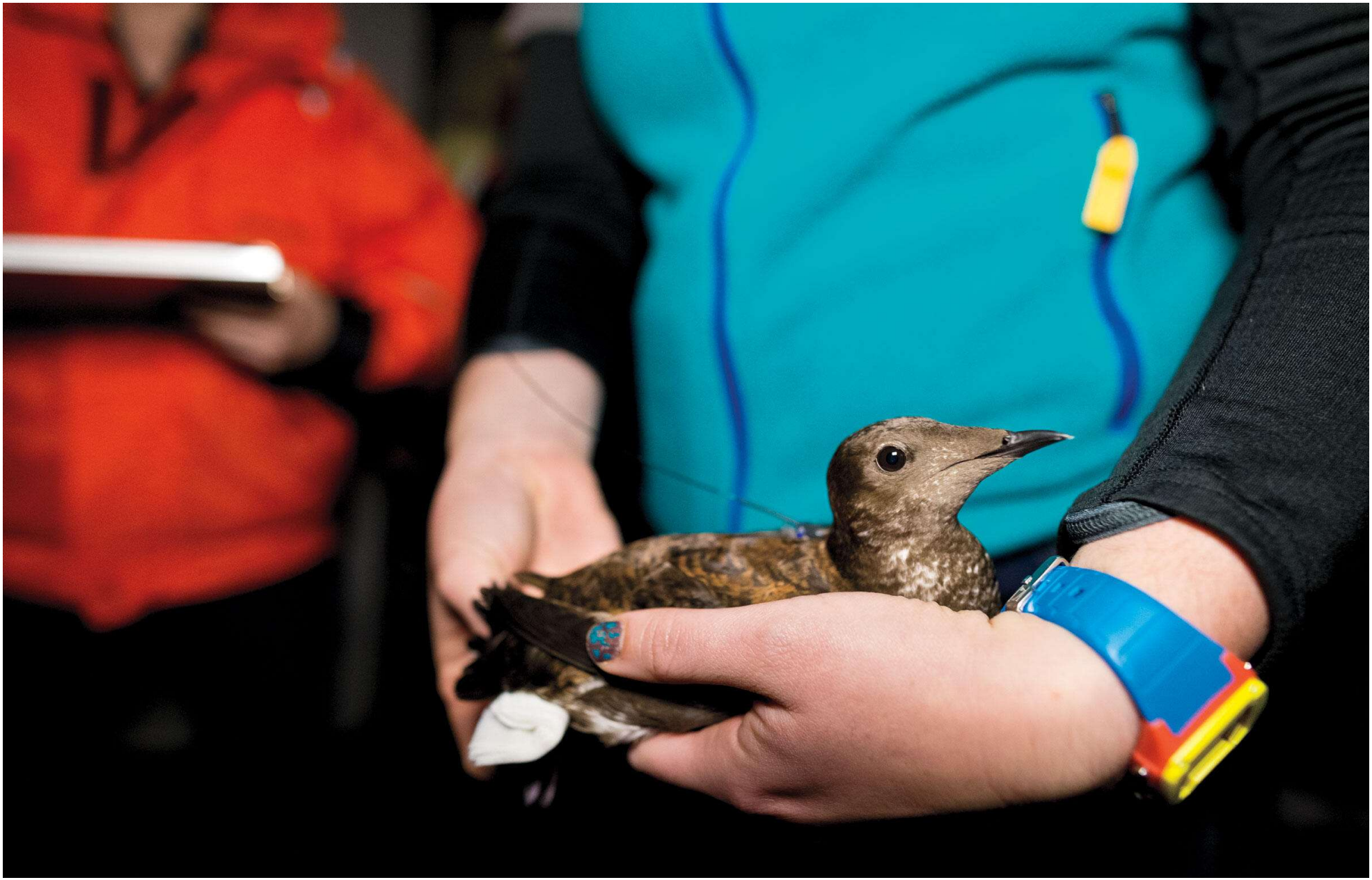

Marbled Murrelets are tagged with radio transmitters on their marine feeding grounds and then tracked to the inland forests where they nest. Here, Oregon State University researchers Cheryl Horton and Lindsay Adrean handle a murrelet caught on a nocturnal excursion this may. Photo: Jaymi Heimbuch

## News

# From Sea to Tree, Scientists Are Tracking Marbled Murrelets With Rising Precision

*A network of experts in Oregon seeks to uncover the secrets of a threatened, enigmatic seabird.*

**By Juliet Grable**

Fall 2018

Disponsible en español

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Birds in This Story

Marbled Murrelet

Latin: Brachyramphus marmoratus

Steller's Jay


Jim Rivers squints out into the moonlit water, bracing against the *Pacific Storm's* deck as she rolls over the swells. In the distance, the lights of the coastal town of Waldport, Oregon, glitter.

Rivers, a professor of animal ecology at Oregon State University (OSU), is worried about the moon. It's clear and bright, which could make sneaking up on swimming seabirds more challenging. A spotlight flashes, then grows larger and brighter. The radio crackles.

"Bird coming in!" Marty Martinez, a contractor for the California Institute of Environmental Studies, announces from the deck.

A Zodiac pulls up alongside the research vessel, and the three-man crew hands Martinez a pet carrier. Inside is a single Marbled Murrelet. About the size of a small duck, the plump, drab-colored seabird is about to undergo what Martinez jokingly calls an "alien abduction."

Each spring researchers from OSU are allowed to tag up to 100 breeding murrelets on their marine foraging grounds as part of the

**Oregon Marbled Murrelet Project**, a multi-year effort launched by OSU's College of Forestry in 2015 to understand the nesting needs and preferences of the elusive and increasingly threatened species.

off on the *Pacific Storm* from Newport, Oregon. Photo: Jaymi Heimbuch

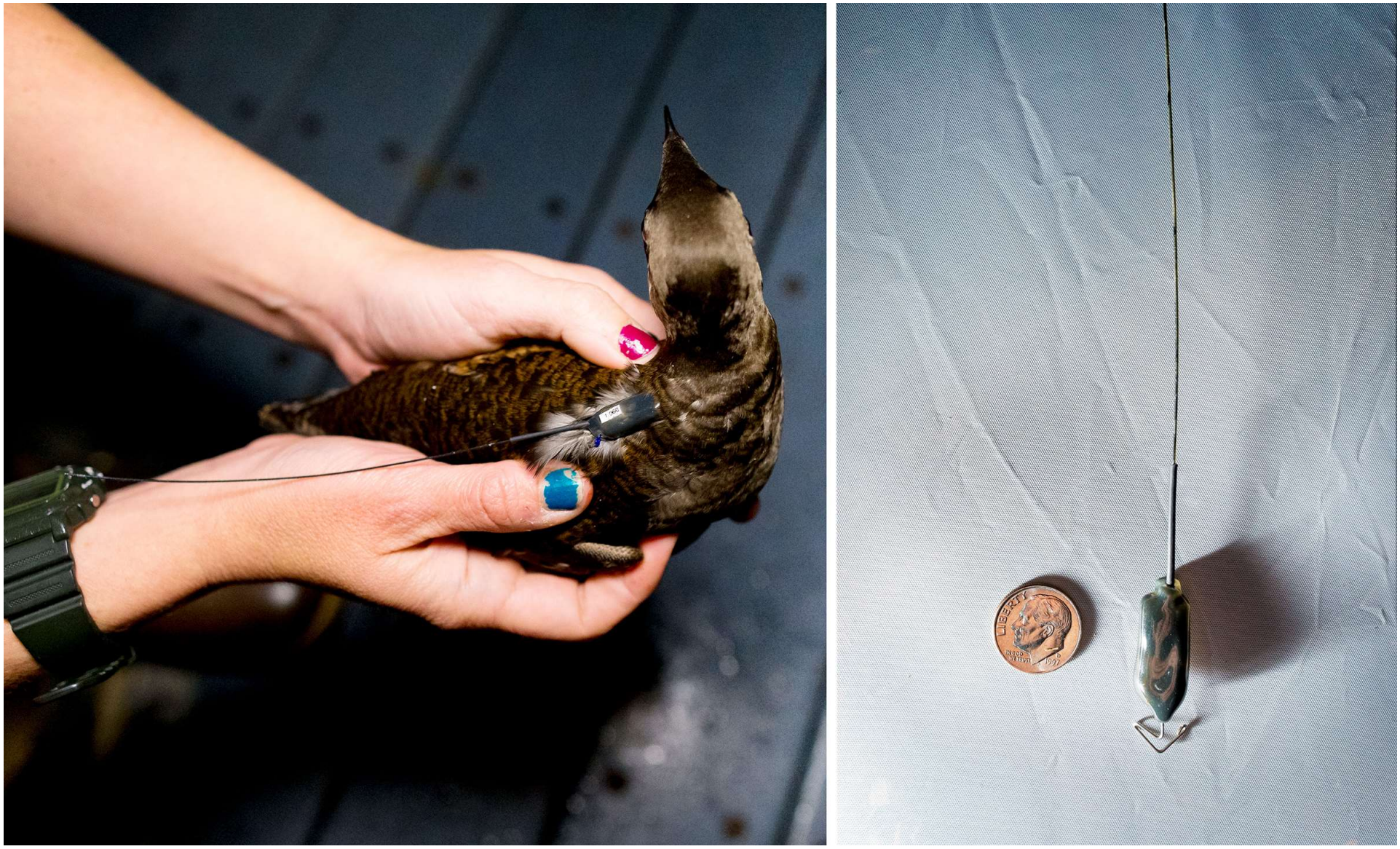
On this May night, the OSU group is joined by an elite seabird team from the **California Institute of Environmental Studies**. In the cabin, the techs silently take measurements and feather samples from the captive murrelet and attach a leg band before gently passing it on to the research assistants, who have the painstaking task of suturing a tiny

transmitter to the back of the bird's neck. All of the field crew sport blue-painted fingernails—a morale-boosting tradition that took off back in April.

Martinez pokes his head back into the cabin. "Another one on the way."

The *Pacific Storm* will cruise this stretch of ocean until the wee hours. By dawn they will have tagged nine Marbled Murrelets. Despite the long nights, "there's nowhere else this team would rather be," Rivers, one of the project leads, says.

But catching and tagging murrelets is the "easy part," he notes—and it's just the first step in learning about the birds' cryptic life cycle.




From left: A researcher holds a tagged Marbled Murrelet. The entire process of working with the bird, capture to release, takes under an hour; a closer look at the transmitter tag, compared to a U.S. dime. Photos: Jaymi Heimbuch

Dubbed “fog-lark” by Pacific Northwest loggers, the Marbled Murrelet has a complicated survival strategy. Ranging between southern Alaska and central California, the mottled, stubby-winged divers spend most of their lives at sea, foraging for small fish and krill. During the summer, however, they fly up to 50 miles inland

to nest in the sanctuary of mature trees, where they choose a thick, mossy limb on which to lay their single egg. They can log dozens of miles a day flying back and forth from nest to sea to feed chicks. (Some in Alaska have been documented dining up to 125 miles offshore.)

This astonishing arrangement served the Marbled Murrelet well until the 1850s, when heavy logging began destroying much of its nesting habitat. Since then, the species has declined between an estimate 50 to 80 percent, prompting the U.S. Fish and Wildlife Service to **list the Pacific population as threatened** in 1992. Despite the special status and further protections under the **Northwest Forest Plan**, murrelets continue to decline in some places.

“Young forests have not had a chance to grow into mature forests,” explains Kim Nelson, who’s also a lead scientist on the OSU project. She first became intrigued by murrelets in the 1980s, when she was studying woodpeckers and heard the seabirds calling from the trees. “Meanwhile, logging still occurs on state and private lands, and wildfires have taken out habitat on the Oregon coast,” Nelson says.

What suitable habitat that remains is highly fragmented, and murrelet eggs and chicks are more vulnerable **to predation from ravens and Steller's Jays** at forest edges. Nelson’s years of monitoring show that more than 70 percent of nests fail, mostly because of predation. If ocean conditions are unfavorable, the murrelet may not even breed at all. From 2014 to 2016, for example, marine prey plummeted in parts of the eastern Pacific Ocean due to a massive heat wave known as “**The Blob**.” Such episodes could portend a future under the influence of climate change—and yet another challenge for the Marbled Murrelet.


ans Unmanned use thermal drone imagery to look for signs of seabird life. The average height of a murrelet nest in the Pacific Northwest
Jaymi Heimbuch

To make matters worse, the species also suffers from a shortcoming of births squared with mortalities; birds are either dying before they fledge or before they can breed. One **demographic model** estimates an 80 percent chance of murrelets going extinct in Oregon by 2100.

All the more reason to take the Marbled Murrelet Project to the next level. By diagnosing the specific factors that influence breeding success, OSU researchers hope they can inform forest managers to better plan around crucial seabird nesting zones. With buy-in from both timber companies and conservation groups, the plan to set aside habitat for the species' recovery is more than plausible. But before they can see the results, the researchers have to pinpoint exactly which trees are worth saving.

Two weeks after the *Pacific Storm* cruise, Rivers and research assistant Lindsay Adrean stand among chest-high sword ferns in a coastal forest near Waldport. Their necks are craned skyward, where 200-foot Douglas firs tower. The only sounds are **the sweet song of a Varied Thrush** and the constant low buzz of a small drone, which hovers near the mid-story of one of the trees.

Brian Taggart of **Oceans Unmanned** maneuvers the controls, bringing the drone up a foot or two, while his partner Matt Pickett studies the thermal image transmitted from its camera. Rivers peers over their shoulders. The picture on the tablet screen is a collage of magentas and reds. "Do you think that's a bird?" asks Rivers, pointing to an orange-white heat highlight. Taggart maneuvers the **Phantom 4** to the left to change the camera's angle.

Taggart and Pickett, both former pilots for the National Oceanic and Atmospheric Administration, launched the nonprofit Oceans Unmanned to popularize the use of unmanned aerial vehicles (UAVs), also known as drones, in marine conservation and studies. In 2017, Rivers' team invited them to see if UAVs fitted with **FLIR thermal-imaging cameras** could help detect Marbled Murrelets on the nest.

One demographic model estimates an 80 percent chance of murrelets going extinct in Oregon by 2100.

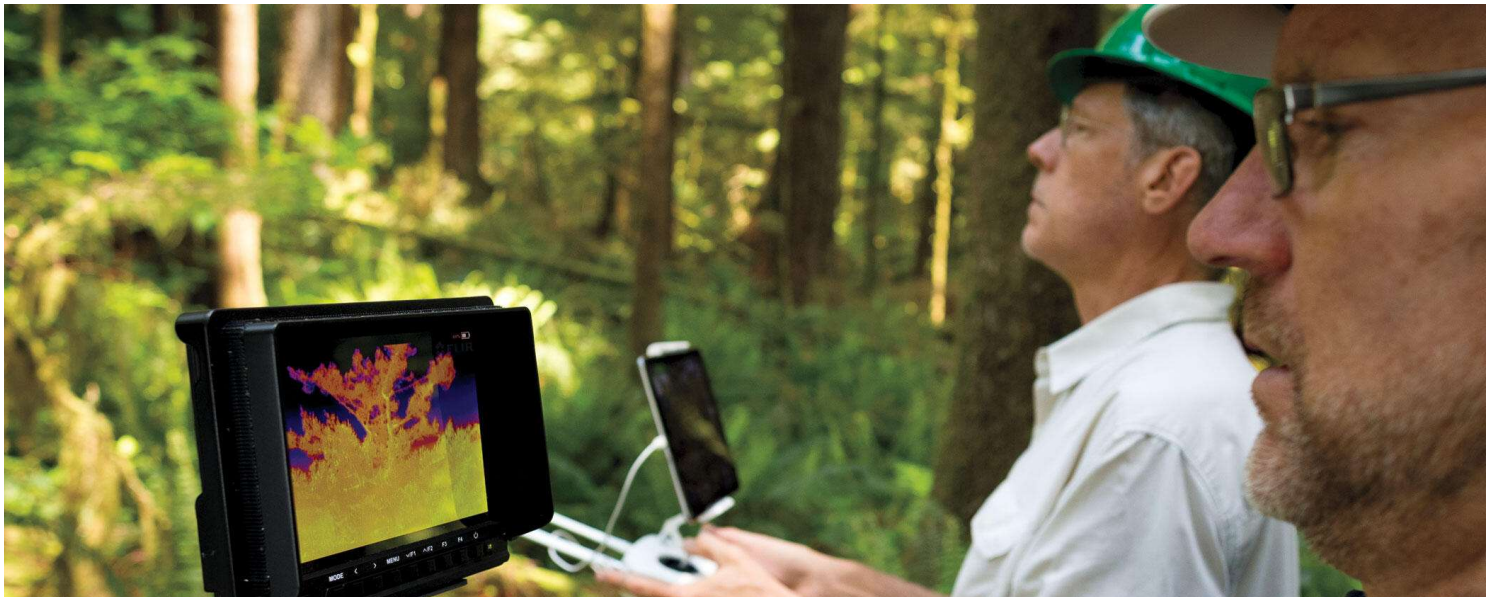
"I can't believe how far into the forest these birds fly to nest, and how well they can hide," Taggart says.

During the breeding season, Marbled Murrelets acquire the cryptic mottled plumage that gives them their names. A pair takes turns

incubating a one-egg clutch in 24-hour shifts, switching posts in the early morning hours.

Once the birds are tagged on the ocean, coastal ground crews coordinate with piloted aircraft to track the birds to shore. Another ground crew then takes over in the forest, using radio telemetry and a binocular-clad tree climber to zoom in on nests. “You have one chance to glimpse the bird as it flies through the canopy at 60 miles per hour,” says Nelson, who discovered the first Marbled Murrelet nest in Oregon.

Locating a nest can take several days to a week; it’s hard for land-bound crews to get a precise signal from a transmitter tag way up in the canopy. A drone, on the other hand, can maneuver up and down, scanning the tree until it detects the heat signature of a bird on the nest.



Taggart and Pickett started testing the thermal-imaging technology on seabirds at the Oregon Coast Aquarium, then on caged Japanese Quail, which they placed in the canopy of a potential murrelet-breeding site. The FLIR images revealed perfect white quail shapes.

But the field work has proved challenging. The U.S. Fish and Wildlife Service's drone permit only allows one hour of flying time near a nest tree per day, and the UAV batteries limit individual trials to about 15 minutes. High winds can ground the drones, and sunny days can create "false positives"—splashes of sunlight that mimic the heat signatures of nesting birds.

This season Taggart and Pickett made two trips to the Oregon coast to further hone their search techniques. While they didn't detect any birds, Rivers remains hopeful about the technology. Next year, they may try strapping telemetry receivers to the drone's carriage, in addition to the cameras.

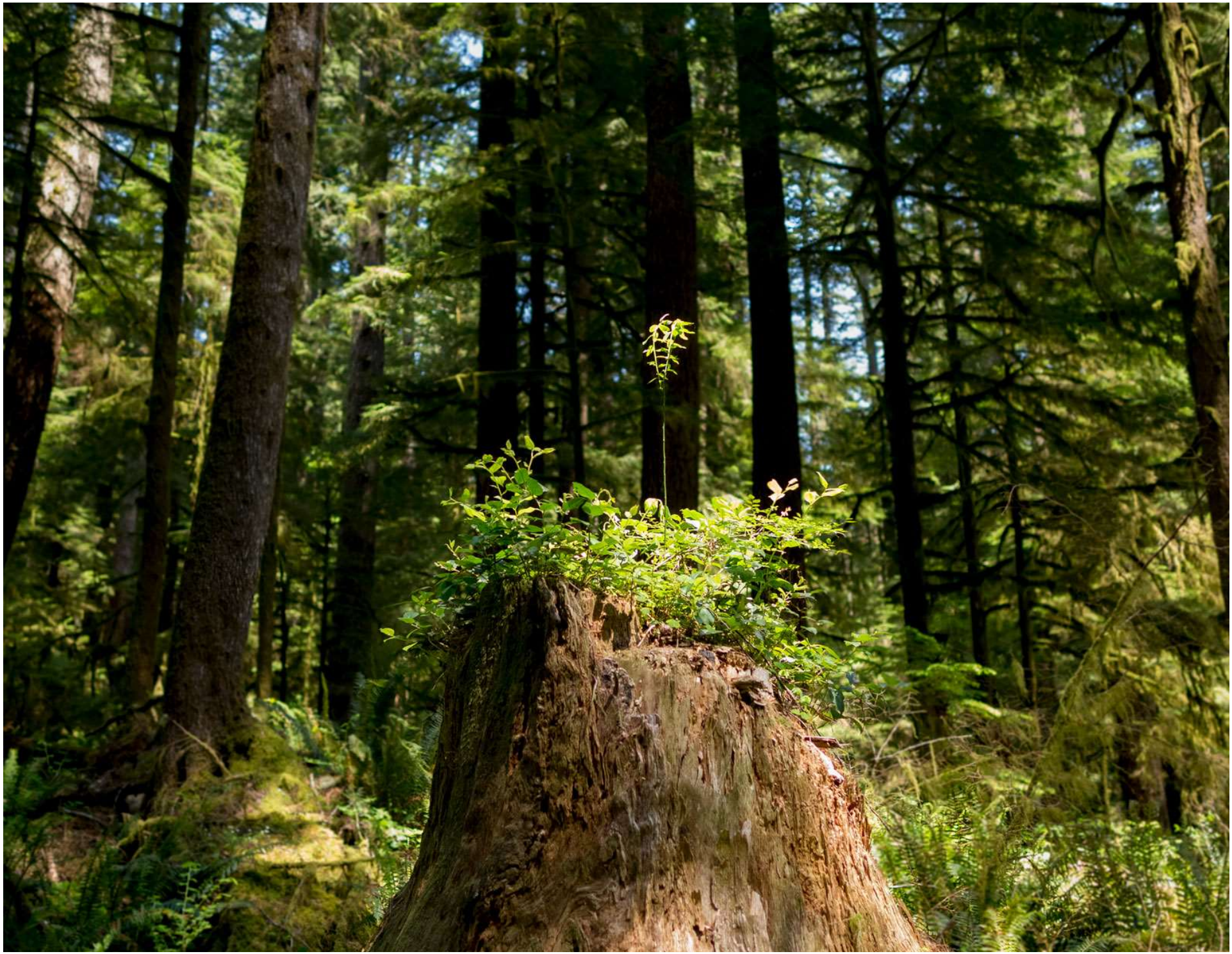
"This is a long-term process," says Rivers. "I'm learning to be patient."

In just two field seasons, the OSU crew has seen plenty of twists—and a few setbacks as well. In 2017, none of the 61 tagged birds nested, and nearly two-thirds left the study area. Researchers tracked them as far south as San Francisco and as far north as Washington state.

The murrelets, they think, likely left in search of food, as foraging conditions off the central Oregon coast were poor last year. But the birds' wanderings call into question the accuracy of West Coast population surveys, which sample in **alternating conservation zones** each year. "We don't know if the California survey is counting some of 'our' Oregon birds," Nelson says.

This year, six of the 76 tagged birds nested, including one that chose a bigleaf maple rather than a conifer—the first record of a murrelet breeding in this tree species in the Lower 48.

Cameras were installed near the six nests so that researchers could monitor them around the clock. In the coming months, experts will comb through the footage for information on how frequently parents feed their young, what fish species they bring to the nest, and how they react to potential threats such as jays and ravens.



The murrelets' fate in second-growth and logged areas is unknown. The OSU team is tracking such nesting sites to find out the impact and hopefully guide future forestry tactics. Photo: Jaymi Heimbuch

This is exactly the type of fine-grained data that can inspire future management decisions, such as the creation of no-disturbance buffer zones around nesting sites. It's already clear that intact, high-quality habitat is essential for a healthy murrelet population in the Pacific Northwest. Recognizing this, the **Audubon Society of Portland** and other organizations have worked to protect both at-sea foraging grounds and old-growth breeding forests on the central Oregon Coast, which boasts **the highest density of Marbled Murrelets** in the state.

The Audubon chapter led the charge for the designation of the **Marbled Murrelet Important Bird Area** that encompasses 80,000 acres of coastal and near-shore habitat along Oregon. The zone includes the 216-acre **Ten Mile Creek Sanctuary** and overlaps with the no-wildlife-take **Cape Perpetua Marine Reserve**, two federal **Marine Protected Areas**, and a **Seabird Protection Area**.

This mosaic helps preserve "multiple pieces of a larger picture, which connect terrestrial and marine habitat," says Paul Engelmeyer, who manages the Ten Mile Creek Sanctuary for the Audubon Society of Portland and helms **volunteer murrelet counts** with Nelson.

Despite the expansive effort, the murrelet's recovery is tenuous, though. In February, the Oregon Fish and Wildlife Commission voted to classify the species as endangered on the state list, a move that would have spurred greater protections on public lands. Four months later, the agency **reversed its decision**, citing the need for more robust data about how the species is faring in Oregon. The Audubon Society of Portland and four other conservation groups have since **filed a suit** against the commission.

In February, the Oregon Fish and Wildlife Commission voted to classify the Marbled Murrelet as endangered on the state list; four months later, it reversed its decision.

With so many potential threats, including the wild card of climate change, the OSU team is racing against the clock to find answers and give the Marbled Murrelet a boost. "Everyone wants to do a better job of managing for this species," says Rivers. "That's why this project has such broad support." Thanks to his assemblage of murrelet-mad brainiacs, the data needed to safeguard the seabirds is almost within drone's reach.

*This story originally ran in the Fall 2018 issue of* Audubon *as "Ground Control." To receive our print magazine,* ***become a member by making a donation today.***

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