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MENU

Research for the future in one of America's oldest forests

HJ Andrews Experimental Forest is located in the Oregon Cascade Mountain Range. It is one of America's foremost places for long-term ecological research and a source of knowledge for the entire world.

September 27, 2019

Text & Photo: Kajsa Skarsgård



At a vantage point, Hankyu Kim (center) goes through some bird sounds along with Jake Zywicke (left) and Eric Beck (right) before entering the forest and continuing the bird count.

It is just before five in the morning and in the dark the tall spruce fir trees have just begun to feel like silhouettes against the sky. On a dirt road near the top of Carpenter Mountain stands Hankyu Kim, a PhD student in forest ecology, with a headlamp on top of the cap and a binoculars around his neck.

He explains to his company, high school teachers Eric Beck and Jake Zywicke, that they should note all the birds they can hear, or see, for three intervals for a total of ten minutes. For two weeks, the teachers take part in the researchers' work here to bring home knowledge and inspiration to their students in science.

With rapid steps, Hankyu Kim descends the slope in the forest and at a tree marked with a blue band the bird count starts. It's the third of the season and data collection is in its eleventh year.

The song of the birds comes from all directions and in many different tunes - Hankyu Kim makes 43 detections.

Erik Beck counts his to 23, but still gets praise. In The Andrews, which the research forest is called in the common people, breed about 60 bird species and the other people who are out in different places in the forest to this day and count have received four weeks training by Hankyu Kim. At the measuring points, they also check if wine maple or rhododendrons are growing and, in that case, note how far they have come in their flowering, data added to the phenological observation series. Hankyu Kim also takes the opportunity to download data from some of the 184 small sensors that are scattered throughout the forest and measure the temperature of the microclimate every twenty minutes.

Here you can find cougars and lynx

The Andrews was established as a research area in 1948 by the US Forest Service and has since been a central point for research in forestry, ecology and climate change. The area covers the entire basin of Lookout Creek and is 74 square miles.

Since 1980, The Andrews has been part of the US program for long-term ecological research, LTER, but here are data series on water and forest ecology that go back much further than that.

- The LTER program, funded by the National Science Foundation, is one of the real strengths of the United States. Not least in our time of climate change, we need data to be able to make comparisons over time, says Hankyu Kim.

He notices lynx spills on the path - here also has cougars - and then continues:

- In my home country of South Korea, and in many other countries in the world, systematic and long-term ecological data series are often missing. So if you want to know which species are on the decline or make plans for increased biodiversity, there is not always enough good data to support.

Measures birds' reaction to climate change

One of the birds that Hankyu Kim hears at each measurement point this morning is the hermit forest singer, a small yellow-headed bird his own research at Oregon State University focuses on. It is nesting here, but is wintering down towards Central America, and he wants to find out more about bird migration, habitat and how it responds to climate change.

Last year he put on small sensors on 55 hermit forest singers to log their path, and this year he has so far managed to capture twelve of them again. The bird is territorial and returns to its old nesting site.

- The hermit forest singer is common here but there is not much data on it. As in the case of other migratory birds, it also does not have as many alternative places to move to if it loses its habitat, says Hankyu Kim.

500-year-old forest

Between the 1950s and 1970s, 25 percent of the forest in The Andrews was cut down to study various techniques and their effects on ecology. 40 percent are still 400–500 years old forest with Douglas fir, giant hemlock and giant fur, up to 100 meters high and four meters in diameter.

At the higher elevations, where Hankyu Kim moves this morning, cascade firs that have grown since the mid-1800s dominate when a forest fire broke out here.

Research from The Andrews has shown that the primeval forest can create a buffer effect on climate change and its consequences. For example, the population of hermit forest singers in the northwestern United States has been adversely affected by the warmer summers, but that effect is less and in some cases opposite in the landscapes with a higher proportion of forests, probably because the microclimate is more stable there.

The primeval forest preserved thanks to the researchers

That this part of the US still has significant areas of primeval forest remains thanks to the researchers at The Andrews. In the 1980s, they could show that the spotted owl would be eradicated if the intensive harvesting of older forests continued.

This led to the Clinton administration adopting the Northwest Forest Plan in 1994 with tougher regulations to create a more ecologically sustainable use of federal land from northern California up to Washington.

With this, the spotted owl has become the biggest celebrity here - and the controversy.

The spotted owl, with its powerful oversight, has in some forestry communities become a symbol of lost job opportunities, despite the fact that technology development and world trade have also changed the conditions in the forest industry.

Social implications of forestry and environmental policy are among the research issues that social scientists contribute to in The Andrews. Researchers in the humanities also come here to collect and contribute knowledge. For example, the research leader for the LTER work is a professor of environmental philosophy and ethics.

Feeding the owls with mice

When the songbirds are finished, high school teachers Eric Beck and Jake Zywicke take the opportunity to follow Steve Ackers, a zoologist and senior faculty research assistant at Oregon State University, to learn how to invent and mark spot owls.

While most researchers only visit The Andrews for periods of time to collect data, this has been Steve Acker's permanent workplace for nearly 20 years. He has therefore experienced how the population decline of the spotted owl first decreased slightly in the area, but then increased again as the invasive crow's eye from the east coast became more and more common.



(<https://universitetslararen.se/wp-content/uploads/2019/09/pa-plats-2.jpg>).

While the owl dad (far right in the picture) is watching, Steve Ackers shows Eric Beck how he had hoped to catch the owl kid with a snare to ring it.

After a drive up winding dirt roads, Steve Ackers and the teachers descend into the forest towards a previously identified owl nest. The estate is still 150 meters of dense forest when Eric Beck discovers the spotted owl who is still monitoring the group from a branch. It has met them, aware of the waiting meal. Spotted owls are unusually fearless for humans and scientists use mice to find their cubs and ring them. - I don't like it, neither having to have mice and cleaning their cages or giving them to the owls, but without the mice we couldn't have located their nests and cubs, he says.

He opens his bag and picks up a mouse that he puts on a branch. The owl sweeps in with a wingspan of over a meter, grabs the mouse and disappears. Steve Ackers retires after. Some distance away he finds a white fluffy kid with dark eyes sitting in a tree, and the parents at close range.

The whole gang stays like this for an hour, the people in the steep among rhododendron bushes and the owls in the trees a few meters above, observing each other in the hope that something good will happen.

Suddenly, the owl chokes up a ball, and Steve Ackers quickly arrives and picks it up. He also finds an old, dried spy ball that falls apart. In it he identifies a jaw bone with a tiny canine tooth from a bush-tailed forest rat and a bone, no larger than a conifer, from a flying squirrel. In an attempt to find out if there are more owl kids that the parents want to feed, Steve Ackers according to the protocol has to hand out a few more mice, but then there is a stop, and no further kid is seen.

Importantly supporting the whole ecosystem

He also fails to get close enough to the kid to catch it with the string he has mounted at the end of a rod, not even when he lures with the cat toy that the owl chicks usually cannot avoid. It will therefore be another visit with attempts at ring marking a few days later.

On the way back to the research headquarters, Steve Ackers says that attention to the spotted owl has a downside: The US Forest Service's own research funding has been focused on the spotted owl since the 1990s at the expense of other relevant research.

- The most important thing is not that we remove precisely the spotted owl from the list of threatened species, but that we support the entire ecosystem.

What are you doing here?

Brooke Penaluna,
fish biologist and
researcher at the US
Forest Service.



Brooke Penaluna

(<https://universitetslararen.se/wp-content/uploads/2019/09/brooke-penaluna.jpg>).

- I do research on the coastal cutthroat trout, a subspecies of larynx trout, which is the fish

that gets to the top of

the waterways in The Andrews. I am investigating where the end point of its distribution is because up to that point a larger buffer zone is needed against logging.

What do your latest research results show?

- By analyzing the water's e-DNA (environmental DNA), we can detect fish up to 250 meters further up in the waterways than by electric fishing, which is the traditional method. This means that forest managers would need to expand the buffer zone upstream.

What makes The Andrews special for you?

- Based on research here, the article was published in 1980 that established the conceptual idea of the ecology of watercourses as a continuum of processes linked all the way out to the sea, which forms the basis of the research field of aquatic ecology in flowing ecology. It is cool to work in the place where those thoughts took shape.

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FACTS

Started in 1948

Full name of the business:

HJ Andrews Experimental Forest.

Number of employees:

13. About 150 researchers also work there every year.

Research leader:

Michael Nelson, Oregon State University, and Sherri Johnson, US Forest Service.

Location:

Blue River, Oregon, United States.

Budget:

Divided by different financiers. Only the LTER program has \$ 1 million per year.

The business started:

1948.

Objectives of the business:

To support research on forests, streams and river basins and to promote collaboration between ecosystem science, the humanities, education and management of natural resources.

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