Seeing the Forest through the Trees

H.J. Andrews Experimental Forest tackles tough ecological questions

By Sara Zaske

Horace Justin Andrews

Horace Justin Andrews was no stranger to controversy. A well-known authority on Pacific Northwest forests, Andrews held the challenging job as the head forester of Region 6, covering Oregon and Washington in the 1940s—a time when federal forests were entering a period of major timber production.

"Region 6 reminds me of the third baseman's job on a baseball team," Andrews once wrote to a colleague. "All the hot ones come his way."

While times have changed, the Pacific Northwest forests are still a tinderbox for hot issues. An advocate for scientific study of forests, Andrews was praised for his fairness in dealing with conflicting interests surrounding federal forests. It is certainly fitting that the forest that bears his name is known for shedding the light of science on many problems facing today's forests.

Today, the H.J. Andrews Experimental Forest is one of the world's foremost centers of forest ecology. It has fostered research that has revolutionized the way scientists look at forest ecosystems and the way land managers deal with harvests, streams, and natural disturbances. The forest is a collaborative effort among Oregon State University, the USDA Forest Service's Pacific Northwest Research Station, and the Willamette National Forest. As one of the first sites to join the National Science Foundation's Long-Term Ecological Research (LTER) program, Andrews Forest promises to deliver major new discoveries for literally, hundreds of years to come.

The Andrews Idea

It is not the usual practice to name an entire research forest after a federal forester, but Horace Andrews wasn't an ordinary Forest Service employee. According to the Bend Bulletin, "No man had a surer grasp or a fuller understanding of the forest problems of the Northwest."

During his tenure in Region 6, Andrews dealt with the Forest Service's transition from a stewardship role to one that promoted timber production. While he worked in an era of intense harvesting, Andrews had great foresight when it came to better understanding and conserving forest resources. Concerned about the impacts of logging on water quality, he helped set aside a tract of land in 1948 for the Blue River Experimental Forest, which later became the Andrews Forest.

Andrews' work attracted attention in the nation's capital, and he was selected for a national leadership position in the Forest Service in 1951. A great enthusiast of the Pacific Northwest, Andrews accepted the position with some reluctance. "He was not looking forward to move to Washington D.C.," recalled his daughter, **Virginia Burns**. "But it was an honor, and he had a strong sense of duty. It wasn't the type of thing you could say 'no' to."

Tragically, Andrews died in a car accident while house hunting in Washington. Upon his death, two governors, several members of Congress, and Supreme Court Justice **William O. Douglas** all wrote his family to express their condolences. In a rare honor, the forest he worked so hard to set aside for scientific study was renamed in his memory.

The Big Picture

Like its founder, H.J. Andrews Experimental Forest has become known for taking the long view of Pacific Northwest forests. Much of the research at the Andrews Forest is dedicated to looking at long-term issues, such as forest growth and succession, tree decay, stream ecology, carbon cycling, and the impacts of global climate change.

"The Andrews," as it is commonly called, is perhaps best known as the place where science first revealed the unique characteristics of old growth forests. Many may know of the Andrews as the place where studies of the spotted owl and its controversial relationship with old growth forest were conducted, but scientists at the Andrews were investigating older forests long before the term "old growth" became well-known.

In the 1950s and 1960s, older forests were generally considered decadent and over mature since they produced little new wood. The Forest Service had slated most of these forests to be cut and replaced with younger, faster-growing stands that appeared to be more productive. A Forest Service scientist named **Jerry Franklin** decided to study the older stands before they disappeared, and in 1969, convinced the National Science Foundation to provide funding through OSU as part of the International Biological Programme (IBP), an ambitious worldwide project to study the fundamental properties of ecological systems, such as their productivity and cycling of nutrients.

Franklin and College of Forestry Professor **Dick Waring**, Forest Science, led the effort, attracting a cadre of post doctoral researchers and young doctoral students during the 1970s. More than 100 people from 10 departments at OSU worked on the Andrews studies along with colleagues from the Forest Service and other universities. The researchers hailed from all areas of science, bringing expertise in multiple disciplines from botany and mammology to hydrology and biochemistry.

"The group had the reputation for doing large, integrated projects across a number of disciplines and lots of innovative science," said Professor **Mark Harmon** (Forest Science). "They were doing things like climbing old growth trees (to study the canopy), and studying dead trees— things that other people just weren't doing."

Andrews family photograph (top left to right) Phil Burns, Chris Burns, Melissa Burns, Pam Wong, Stewart Burns (bottom left to right) Chuck Burns, Terri Burns, Amber Haley, Justin Haley, Raine Haley (child on Justin's lap), Carolyn Haley, Erin Haley, Virginia Burns, Dakota Burns (child on Virginia's lap). Not pictured: Scott and Tim Haley, Rob and Linda Burns

Harmon first became involved at the Andrews when he was an OSU doctoral student in biology, working on a massive 200-year study of rotting logs. While far from over, the log study has already revealed that dead logs are a significant source of carbon and nutrients to the soil and to the growth of new trees and other vegetation.

Harmon's study is just one among many at the Andrews that painted a picture of forests that was dramatically different from previous conceptions. The Andrews research revealed that instead of being unproductive, old growth stands actually supported rich diversity in vegetation and wildlife. It also changed how scientists viewed forests by showing that older forests had a structure, composition, and function distinct from younger forests.

And while the research conducted was primarily considered "basic," as opposed to applied research, the implications of many Andrews studies have had a profound impact on forest practices and policy. Today, thanks to Andrews research, federal land mangers now leave trees—living, dead, and dying—behind after a timber harvest, and Andrews stream and riparian zone research has influenced the management of the stream/land interface worldwide.

"There are times when basic research jumps right into application because there is just such a fundamental change in understanding," said Harmon, who was Andrews' lead principal investigator for the past seven years. "Sometimes you discover something that is so different that it shows we've been looking at the system in a fundamentally wrong way."

Forest succession

The H.J. Andrews Experimental Forest is now in its 57th year of existence, with more than 35 years of intensive ecosystem research. Soon after the IBP funding ended in the late 1970s, the Andrews was chosen to be among the first cohort of the National Science Foundation's LTER program. Many OSU faculty and Forest Service scientists have been conducting research there for decades.

"This kind of work shows a belief in the future," said Professor **Fred Swanson**, (courtesy, Forest Science), a Forest Service geologist who has worked at the Andrews for 35 years. "The future has the best chance when we undertake experiments that will clearly outlive us. It is a monument to the commitment to the larger process of learning."

Today, more than 100 studies are underway at the Andrews, from climate investigations in the tree tops to studies of carbon deposition below ground. Projects include such long-term, professor-led investigations as a 33-year-old study of cutthroat trout populations and the relatively new "Airshed Project" headed up by Professor **Barbara Bond** (Forest Science), a forest physiologist and the new lead principal investigator at the Andrews.

While many have studied how forests on flat lands respire, producing oxygen and fixing carbon, not much is known how these processes works on sloped terrain. Bond and her colleagues are working to fill that crucial gap in information since many of the world's forests are on mountainous land. Like much of the Andrews work, Bond's study is basic research, designed to uncover new information, but any discoveries may have important implications as many world governments look to forests to mitigate the effects of global climate change.

Also in keeping with the Andrews tradition, graduate and undergraduate students are heavily involved in the research. For example, OSU master's student, **Charles Frady** (Fisheries Science), has been examining aquatic invertebrate biodiversity in streams located in old growth versus second growth stands. Another study by doctoral student **Alan Tepley** (Forest Science) analyzes how fire regimes vary across terrain at the Andrews and two other western Oregon landscapes.

"Andrews is such a flagship, it draws in students and scientists that are really the best in the world," said Bond. "Whole suites of graduate and undergraduate students have completed independent research projects in the womb of this very interdisciplinary program. It is just an incredible place for learning."

The beauty and productivity of the today's H.J. Andrews Experimental Forest has left a deep impression on Virginia Burns. She believes her father would have loved to see what has become of the land he set aside nearly 60 years ago. "I think he would be thrilled," she said.