wasn't there, it was miles and miles and miles back." When Lohrey's Type 1 IMT assumed command of the Florence Fire on July 31, the north end was anchored and they could concentrate on finishing the construction and burnout of the east line towards the California border. This line would prevent fire from reaching the valley floor and thousands of residents in the Illinois Valley.

Eventually, the weather cooperated. "Once they had hooked that piece off the north and headed back toward Squaw Peak, the east/northeast wind flow was a good thing for the burnout operation. The wind just pushed the fire into itself. Initially, the wind was pushing out of the west, associated with the canyons. And that was the fear, that it was going to run with the west/southwest flow up Briggs Creek."

Boothe could not recall any memorable quotes uttered by people involved in this critical turning. His speech tends toward the laconic. "Like I say, they did a good job of getting that early work accomplished and securing that piece of line."

RESEARCH: "- - the most enjoyable part of the whole experience was right during the event when there were so many interesting things to see and hear."

Fred Swanson *Swanson received a permanent appointment in 1978. He has spent his whole career at the Pacific Northwest Research Station Forestry Sciences Laboratory in Corvallis, Oregon, where he was a Research Geologist in 2005.*

As I drove up the McKenzie River in heavy rain on the evening of February 6, 1996, reflections on earlier floods in the region came to mind. I first came to the west coast in the summer of 1965. To the eyes of this easterner, an undergraduate geology major, the landscape of north coastal California on the heels of the December 1964 flood was incredible. Massive landslides in the rugged mountains had torn off whole hillsides, including the roads we were trying to travel, and blocked rivers; signs posted well above the highway marked high river levels.

In 1972, I began working in the H.J. Andrews Experimental Forest in the Oregon Cascades. My studies concerned landslides, river channel change, and the history and function of big wood in streams and rivers.

From those perspectives, signs of the 1964 flood were everywhere on the land and in the minds of others studying landscape change. The experienced hands had great stories of being out in the storm, hearing debris flows rumbling down stream channels, snapping old-growth trees and blocking roads. Dick Fredriksen and Al Levno (both of PNW Research Station) had a harrowing, night-time tale of hiking out of the Andrews to the McKenzie River during that storm and almost being swept away by the flood. Al had thick glasses that fogged up, so in some stages of the trip Dick had to lead him by the hand, through the darkness in pouring rain.

That storm affected the Andrews Forest and the workers there in more ways than just triggering landslides, reshaping streams, and limiting access. It also stimulated a great deal of study by Fredriksen, Ted Dyrness (PNW Research Station), and their colleagues on effects of roads and logging on soil erosion, including studies in experimental watersheds and inventories of landslides over larger areas. The storm taught lessons that led to changes in forestry and road construction practices, resulting in improved watershed management.

Coming into the Andrews Forest landscape eight years after the 1964 flood, I tried to learn more about how the watershed functioned, including effects of that flood and other forces of change. I extended Ted Dyrness's 1964 flood landslide inventory to span the first 25 years of forest management in the Andrews Forest and started tree-ring studies of wildfire history for the past 500 years. Jim Sedell, George Lienkaemper (both of PNW Station), other colleagues and I began work on big wood in streams, recognizing its many natural ecological and geomorphic functions. This was part of bigger, integrated ecosystem studies based at the Andrews Forest led by Jerry Franklin (PNW Station) and Dick Waring (Oregon State University) and carried out through good cooperation with the Willamette NF.

So, driving up the McKenzie more than three decades after the 1964 flood, I wondered if we were heading into a replay of that event - the snowpack, river discharge, present and forecasted rainfall, and our guts all said, "Yes!" I was traveling with 1964 flood veteran Al Levno, fellow disasterologist Gordon Grant (PNW Station), Beverley Wemple, an Oregon State University PhD student studying road hydrology and several others. We arrived at the Andrews Forest offices in late afternoon. In the dim winter light we checked out a few gauging stations on small watersheds. Flows were up and muddy, the

rain steady and the snow soggy when we departed for dinner at the Rustic Skillet diner (locally termed the *Rusty Skillet*). Returning after dinner in the dark we found that debris flows had ripped through two experimental watersheds including wiping out one of the gauging stations where its predecessor had been destroyed in the 1964 flood. We went to bed knowing the storm was still building.

The next morning the rain was steady and water flowed everywhere, including many places where we had never before seen streams. Gordon, with video camera in hand, and I went to Lookout Creek and excitedly viewed the flood waters. Massive, old-growth logs that had been lying in the channel for 15 years or more were gone! Tips of a toppled 30-year-old alder stand that had grown on a gravel bar in mid-channel poked up through the surface of the muddy flood water. We shared a childish enthusiasm shouting, "Rip city!" as we watched old-growth logs (*aircraft carriers*) charging length-wise down the channel. We had a combined four decades of study of wood in rivers and had never before seen really big pieces on the move. Gordon caught it on videotape, which we have revisited on many occasions to study the scenes which were so full of information of great interest to us that we could not digest it all at the time - there was just too much to absorb for these kids in the candy store.

Gordon and I spent several days during the 1996 flood tromping around the Andrews landscape and along the upper McKenzie River. Small watersheds at low elevation were pumping out lots of water, with rainfall supplemented by snow-melt, but higher elevation watersheds were not flowing so high, perhaps because a thicker snowpack was temporarily storing the rainfall. The flood waters were turbid rather early in the event, but movement of the big boulders over the streambed did not begin until flow was appreciably higher. Early in the morning of February 7, we could hear the deep, *thunk-thunk* of passing boulders rolling down the bed of Lookout Creek and we could still hear it well into the next day, more than 24 hours after the flood peak on Lookout Creek.

The small landslides and debris flows occurred during several different brief periods of intense rainfall when flow in the small watersheds peaked in the evening of the 6th and early morning of the 7th, but the mainstem of Lookout Creek did not peak until about 1 pm

Flood damage to a road in the H.J. Andrews Experimental Forest, Willamette NF – 1996

on the 7th. Log movement in the larger channels occurred on the rising flood waters and then ceased; most logs in small channels did not move unless they were swept up by debris flows. Muddy water persisted for days on the waning limb of the flood peak. Thus, some processes occurred early in the event and shut down while others continued throughout the flood. Some processes operated only in small streams while others were relegated to the larger channels.

Thinking more broadly, we considered how the stage was set by events leading up to the floods of 1964 and 1996. The 1996 flood itself was set up by snow in the previous week and then a prolonged period of warm rain, which saturated the soil and melted much of the snow. The Andrews Forest watershed had experienced little logging or road construction in nearly 25 years prior to the 1996 flood, so it was not as sensitive to flooding as it had been in the 1964 flood, which came after 15 years of clearcutting, broadcast burning, and road construction under early management standards and it occurred in the unstable, lower-elevation parts of the Lookout Creek watershed. Comparing the number of landslides in the two floods, we found similar amounts of landsliding in forest areas, but less in cuts and roads in 1996 than in the 1964 event, apparently due to regrowth in plantations and earlier sliding of the most unstable parts of the landscape. So flood effects reflected the interaction of lots of water with the condition of the watershed at the time of the flood.

During our walks in the flood, Gordon and I commented that there would be much follow-up work to do and the most enjoyable part of the whole experience was right during the event when there were so many interesting things to see and hear. That proved true. In the following years we took part in flood studies, report writing, public discussion and debate among scientists about the effects of forestry on floods and landslides, interactions with reporters, and other communications work. But when we got frustrated with the business end of the deal, we could always reflect on the excitement of witnessing the flood and trying to understand how it worked.

These experiences highlight the value of places like the Andrews Forest which are dedicated to long-term ecological and watershed research where information grows over time and is passed from generation to generation.

"WE HAD AN OBJECTIVE IN MIND"

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