

# The Umatilla Barometer Watershed Story



*A forest, large or small, may render its service in many ways. It may reach its highest usefulness by standing as a safeguard against floods, winds, snow slides, moving sands or especially against the dearth of water in the streams.*

Gifford Pinchot, 1905

When President Theodore Roosevelt and Gifford Pinchot, the first chief of the Forest Service, established a system of National Forests, 'securing favorable conditions of water flows' in the nation's headwaters was a primary purpose. For over a century, the Forest Service has carried out its mission of protecting water and sustaining the ability of ecosystems to provide the goods and services that people need and want. This mission extends beyond the national forest system to over 400 million acres of privately owned land, which make up nearly 60 percent of the nation's forests. The people who own and manage these lands also serve as stewards of the nation's water supply and other ecosystem services that benefit society.

In 1910, the Forest Service established its first experimental watershed to conduct long-term ecosystem research that informed management and policy. This research tradition continues today. The agency works with a wide array of partners to bring its scientific and technical knowledge to private landowners and countries around the world.

During the mid 1960s the administrative branch of the Forest Service started a major national watershed research effort called the Barometer Watershed Program. Objectives were to "meet the need and demand for water information to support land use and program planning on national forest system lands". The Umatilla Barometer Watershed was selected as one of 50 planned study areas across the nation. Studies began in 1966 and were completed in 1996.



**High Ridge Evaluation Area**



**PHOTOS clockwise from above: aerial views of watershed and harvest treatment units, stream measurement weir, snow tube measurement, snow course marker and data recorders**



## The People

In the early days...Mack Moore, Leonard Patton, and Gary Hodges helped install equipment...Ed Calame took over field operations in the late 1960s and operationally tested sampling equipment. Curt Johnson, Earl Spangenberg set up the study, and Ernie Felix helped with analysis and first reports... Dave Helvey, Bill Fowler, Art Tiedeman from the Research Branch helped design studies, analyzed data, and published technical papers. Ed Calame and Greg Holden, with help from the Forest kept the study operating to its conclusion



## Study Design

The study focused on a 560 acre area called High Ridge, located in the headwaters of Buck Creek, a tributary to the SF Umatilla. Here, 4 catchments were delineated for comparison of intensive management treatments against a control (untreated).

The first timber cutting took place in 1976 with timber harvest treatments applied to 3 of the 4 catchments. The 4th area was left untreated for comparison. In 1984, there was a second harvest of timber to cut even more area so that 2 of the catchments were 100% clearcut, and the 3rd area was over 60% in patch cut. Clearcuts were machine piled and burned. Some units were seeded with an erosion control mix.

Measurements taken before and after, and compared to the control included: air temperature, precipitation, streamflow, water temperature, sediment, soil moisture, stream chemistry, erosion, and vegetation recovery...



## What did we learn?

We learned how watersheds function in the Blue Mountains: what critical role the snowpack plays in sustaining streamflows, how soils and vegetation interact through the summer dry season, rapid response of vegetation after harvest, effects of timber harvest on micro-climates, water yields, water chemistry, sediment, and channel stability, and the effects of grass seeding on erosion control. Small increases in water yield and peak flows were measured but were short lived. Other changes measured include sharp increases in fine sediment for several years but very small changes in channel stability.

The people who operated the study tested and applied new watershed technology and computer programs – innovations included sediment sampling (the Manning sampler was one of 4 in the nation tested), electronic data collection and computer processing, and snow sampling (snow telemetry)



North Fork Umatilla River winter flow measurement, 1997

The Umatilla Barometer study was an active training and educational program for Forest personnel, other organizations and interested public. The study was maintained, operated, and fulfilled its original objectives because of sustained forest commitment and dedicated staff.

Over 15 reports and publications were produced representing some of the earliest and longest records of measured climate, hydrology and soils data in the Blue Mountains. The study contributed to better understanding of timber harvest effects on water yield and water quality, and helped guide the future of timber harvest practices. Timber harvest practices used in the study changed significantly by the late 1980s because of new regulations and growing concern for water quality and fisheries protection. The study was closed in 1996, having fulfilled its original mission. The High Ridge data are permanently archived in national databanks.

