Wind River Ranger District, Carson, Washington, U.S.A.

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Intensive forest management is a much used term here in Western North America. In Irish forestry we have been practicing intensive forest management for decades for without it we would not have the ever expanding forest resource that we now have. In the Pacific Northwestern States of Oregon and Washington much of the virgin old growth native forest has been logged, and the importance of intensive forest management has increased in the past decade.

For Irish forestry the home of silviculture and management is Avondale Estate, Co. Wicklow. Here in the great forested region of the Pacific Northwest, the home of silviculture and intensive forest management is Wind River.

The Gifford Pinchot National Forest is situated in south central Washington State. It is one of 19 national forests in the Pacific Northwest, and it is subdivided into 5 forest districts one of which is the Wind River District. The offices for the district are situated in Hemlock some 97km east of Portland, Oregon, and 16km north of the Columbia Gorge in Skamania County. The total area of the district is 102,000 hectares of which 97,000 is classified as "commercial forest land".

Situated on the western slopes of the Cascade Range, the Wind River District is characterised by steep slopes and gentle rolling plateaus. The fast flowing rivers, the Wind River and the Lewis River drain the district and flow into the Columbia River. Elevation ranges from 150m to 1524m.

The climate is typical of the western slopes of the Cascades. Winters are cold and wet with temperatures often below 0°C, and the summers are hot and dry with temperatures often in excess of 21°C. The annual precipitation on the district ranges from 130cm on the eastern side to 310cm on the western side. The average winter snowfall at the higher elevations is more than 6m, and is usually less than 0.5m at the lower elevations.

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The geology of the forest area is primarily intrusive and extrusive volcanic material, however some small isolated pockets of bedded sediments do occur. The major soil groups are derived from volcanic ejecta, which includes ash, pumice and cinders from the now dormant snowclad volcanic cones of Mount St Helens, Mount Adams and Mount Hood. These soils tend to be unstable and harvesting limitations have been placed on all soils that are highly erosive.

A diverse natural flora exists on the forest which includes many of the economically important tree species of Western North America. The predominant commercial timber species on the district are in order of importance, Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco), Pacific Silver Fir (*Abies amabilis* (Dougl.) Forbes) and Western hemlock (*Tsuga heterophylla* (Raf.) Sarg.). Other species of importance are Western red cedar (*Thuja plicata* Don.), Noble Fir (*Abies procera* Rehd.), Grand Fir (*Abies grandis* (Dougl.) Lindl.), Lodgepole Pine (*Pinus contorta* Dougl.) and Western White Pine (*Pinus monticola* Dougl.). Some of the typical ground cover vegetation includes the beautiful Vine Maple (*Acer circinatum* Pursh.), Bigleaf Maple (*Acer macrophyllum* Pursh.) and Oregon grape (*Berberis aquifolium*). Other species common to the region are Red alder (*Alnus rubra* Bong.), *Alnus oregona* Nutt., huckleberry (*Vaccinium spp*), salal (*Gaultheria shallon*) and Bracken fern (*Pteridium aquilinium pubescens.*).

Avondale is to Irish forestry what Wind River is to forestry in the Pacific Northwest, for it was here that the early American Foresters came to be trained as far back as 1912. Wind River is known internationally for its fine bare rootstock nursery, which covers 49 hectares and produces some 30 million seedlings annually, primarily Douglas-fir. This district is also the location of the oldest arboretum in Western North America. It was established in 1912 with the primary object of testing the suitability of exotic tree species from all over the world. The arboretum covers 4.5ha and no less than 641 seedlots and planting stock have been planted out here. Some of the exotic tree species have survived but the most productive species proved to be the native tree species in the case of the Pacific Northwest. This region of the world is the place from which many of the seeds came that were planted in Avondale many decades ago. Some of the native species of this region have become the cornerstone of many planting programmes in Western Europe including Ireland. Some 480ha of "old growth" timber has been set aside as the Wind River Natural Area. In 1933, 4,400ha were set aside as the Wind River Experimental Forest. This is one of several experimental forests dedicated to serve as a centre for testing various silvicultural techniques, including spacing and fertilization trials. Studies on forest protection, ecology, forest harvesting and slash disposal are also carried out in this designated area.

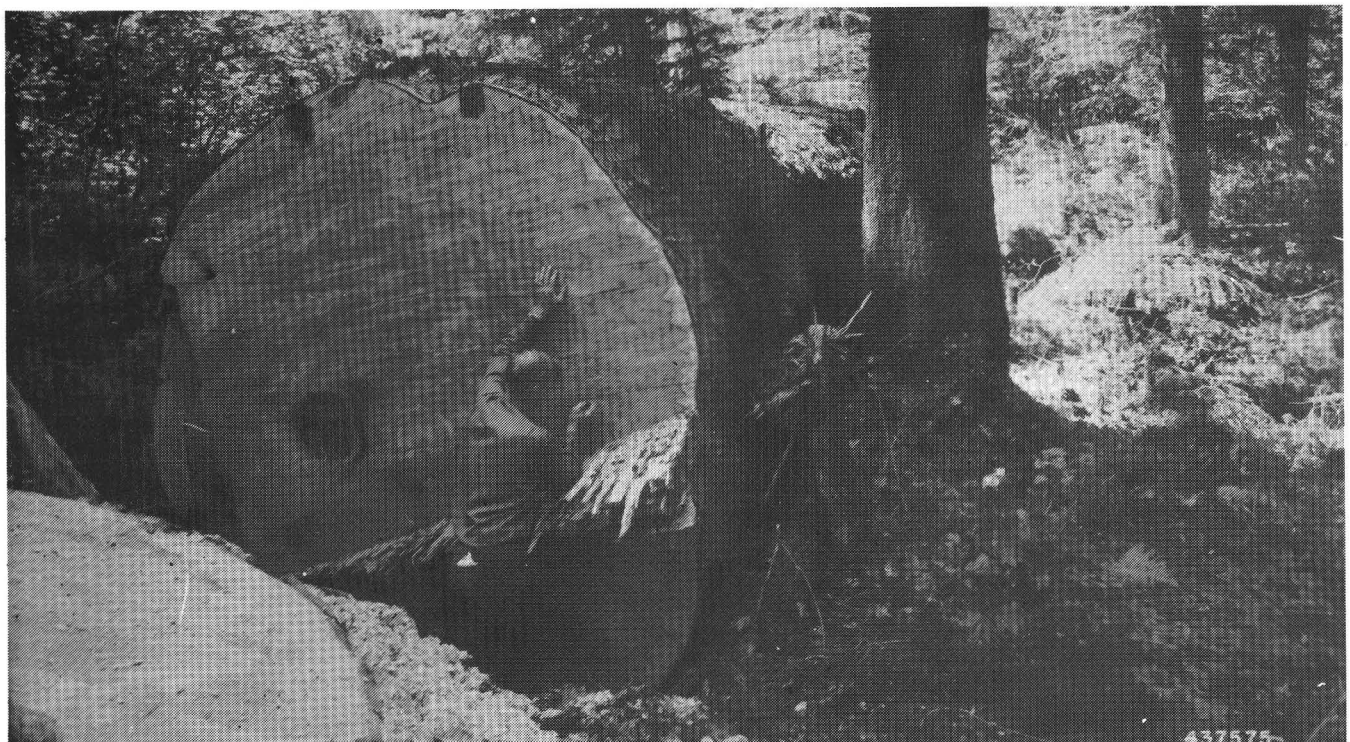
The professional staff of the Wind River District consists of five

assistants one for each of the following areas, Resources, Timber Sales, Silviculture, Fire Management, and Engineering. Each assistant is responsible to the District Ranger and all hold university degrees. A brief outline of the responsibilities of each assitant is given below.

The Resource Assistant is responsible for fish and wildlife management, watershed management, recreation, special use permits and all mining exploration on the district. In 1972 the Gifford Pinchot National Forest had more than one million visitors. The Wind River Ranger District has 87km of nature trails, two toll campsites and four tollfree campsites. The famous Pacific Crest National Scenic Trail which stretches some 3,800km from Canada to Mexico passes through the district. A wildlife biologist is working as part of the Resource staff and his primary responsibility is the monitoring of the turbidity of water samples taken before, during and after logging on "class one" streams. A class one stream is one in which anadromous fish are found, and/or a stream which is used as a domestic water supply. The changes in turbidity of the water samples allow foresters to schedule harvesting and road construction operations to times when the minimum damage is done to the fish populations. The wildlife biologist also has the responsibility of big game management, which includes hunting and the maintenance of a sustained forage supply. Natural meadows, ponds, nesting sites and other niches are protected. The deer hunting season spans three weeks and the elk season two weeks. During the 1977 five week season, 500 deer and 70 elk were harvested on this district alone.

The Timber Sales Assistant is responsible for all timber sales on the district. The sustained nondeclining evenflow allowable cut for the district is estimated at 168,000m^3 annually. The average annual revenue from timber sales in recent years has averaged £9.6 million — 75% of this revenue is retained by the U.S. Government, and the remaining 25% is returned to the county in which the timber was cut. Half of the revenue given to the county is allocated to schools, and the other half to road construction and maintenance in that county. In this way the people benefit directly from the revenue of timber sales in their county. In Skamania county in 1972, the yield supported three local sawmills, and four plywood mills which employed 720 people and the annual payroll amounted to £3.7 million.

The Timber Sales Assistant is also responsible for the layout and extent of clearfellings. Clearfelling has long been a controversial issue in the Pacific Northwest. Today as always, clearfelling is the most widely used harvesting system on the district but strict limitations have been placed on the size and location of clearcuts. Clearcuts average 6ha in size, and range from 1 to 50ha, depending on soil conditions, topography, accesibility and value of the timber. Most of the harvesting on steep slopes is done by highlead, or skyline,



Douglas-fir, butt end 3m diameter. Counting rings showed it to be 524 years old. On Baker Highway, National Forest, Washington.

with some tractor skidding on the flatter sites. Some loggers leave vast quantities of "unmerchantable material" behind as slash. The amount of slash left on the forest floor ranges from 14 to 580 tonnes per ha. The gross standing volume ranges from 175 to 760m^3 per ha. Much of the timber cut is "oldgrowth" Douglas-fir which is often over 500 years old.

The Silviculturalist is responsible for reforestation, spacing, fertilisation and precommercial thinning. Intensive forest management is only in its infancy here in Western North America, because with such an abundance of "oldgrowth" many people thought it to be almost inexhaustible. These "oldgrowth" stands are rapidly disappearing (Fig. 1) and being converted into young vigorous "second growth" stands through the application of intensive forest management. The Silviculturalist on the district is keenly aware of the importance of intensive forest management to maintain and boost current yield. This is achieved by having all stands fully stocked and growing at their optimum rate throughout their rotation, which for Douglas-fir averages 120 years. Full stocking and precommercial thinning are prerequisites to maximising the economic return over the rotation. A great deal of research has been carried out in the Wind River Experimental Forest on the effect of spacing on volume production by Dr Donald Reukema. Many of the recommendations of Dr Reukema have been applied to large areas in the district. Fertilisation of stands has also been researched, but as of yet no extensive use of fertilisers has been made in the district. It should be mentioned that although the Wind River Ranger District is one of the most intensively managed publically owned districts in the entire Pacific Northwest Region, in comparison with intensive management in Ireland this district has still a long way to go.

Fire management is the sole responsibility of the Fire Management Assistant. Each summer a fire crew of 60 men and women are hired for fire prevention and fire fighting. During the summer months fire is prevalent and if the fire hazard becomes too high all logging operations are closed down. The Fire Management Assistant can call upon regional firefighting equipment such as aeroplanes carrying liquid fire retardnt, smoke jumpers, and extra manpower if climatic conditions and the size and intensity of a forest fire deem it necessary. A highly trained and well organised team of smoke jumpers can be parachuted into the scene of a forest fire within a very short time of the fire being reported. These men work to contain the fire with the help of the district fire crew and the aircraft support.

The Engineering Assistant has the responsibility of transportation planning, road layout, and all other engineering tasks on the district. Roughly 50km of road is constructed annually and all roading is designed to facilitate harvesting and intensive management. The engineering staff work in close contact with the Timber Sales staff. At the present time the district has 1000km of forest road.

Finally, the overall responsibility for the Wind River District lies with the District Ranger. He coordinates the efforts of his staff into what is a blend of many disciplines and background experiences. The policy and decision making responsibility for the district rests with the District Ranger. Environmental Analysis Reports are produced for all major management projects. These reports state clearly what the anticipated impact the proposed management activity will have on the environment. If the impact of a management activity is potentially great, then an Environmental Impact Statement is prepared for the planning unit in question. This Environmental Impact Statement is based on the management alternatives open to the District Ranger. Public input and criticisms are invited on all Environmental Impact Statements. Eventually a Final Environmental Impact Statement is published which outlines the alternatives open to the District Ranger and the preferred alternative, which is usually a multiple use alternative, and the consequences to the environment of its implementation.

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