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History of the Priest River Experiment Station

Kathleen L. Graham



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Abstract

In 1911, the U.S. Forest Service established the Priest River Experimental Forest near Priest River, Idaho. The Forest served as headquarters for the Priest River Forest Experiment Station and continues to be used for forest research critical to understanding forest development and the many processes, structures, and functions occurring in them.

At the time the Forest was created, Idaho had been a State for only 11 years. The early Forest Service leaders, such as Gifford Pinchot, Raphael Zon, and Henry Graves, were creating a new department and making decisions that would impact the culture, economics, and history of not only the State of Idaho and the Northwest, but the nation. The location of the Forest, in a remote section of northern Idaho, was due partly to the need for research on tree species within the Pacific Coast forest region, but also because it contained large amounts of western white pine, the prized tree species for construction.

Since the Forest's establishment, numerous Forest Service researchers, educators from colleges and universities across the nation, and State and private forestry personnel have used the Forest to solve problems impacting forests and economics, not only locally and regionally but also worldwide. Researchers such as Bob Marshall, Harry Gisborne, Richard Bingham, and Charles Wellner made enormous contributions to the forestry industry. Due to the importance of the research still being conducted, it continues to attract dedicated scientists today.

Key words: western white pine, fire, silviculture, progressive conservation, McSweeny-McNary Act

The Author

Kathleen L. Graham has two degrees from the University of Idaho—a bachelor of science in 1993 and a master of arts in 2001. Currently she is a higher education software consultant and continues to enjoy researching and writing historical pieces. This current document was written in partial fulfillment of her master of art degree.

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History of the Priest River Experiment Station

Kathleen L. Graham

Foreword

No one can doubt the central place of forests in the history of Idaho and the Pacific Northwest. Residents have a close connection with forest lands – the identity of the region is closely tied to forests. While in recent years scholars and the general public have come to realize that American forests require considerable attention and care, Kathleen Graham's study of the Priest River Experiment Station, near Priest River, Idaho, clearly shows that scientists, the Federal government, and other entities boast a long history of forest management, research, and education.

Graham places this history within the context of important national trends. Established in 1911, the Priest River Experimental Forest was a part of the Progressive conservation agenda Theodore Roosevelt and Gifford Pinchot advocated. One element of Progressivism was certainly a reliance on experts and their research, and the Priest River Experiment Station provides a first-rate example. The impact of the New Deal, particularly the Civilian Conservation Corp, is another illustration of how developments on the national scene were reflected at the Station. Following World War II, the Station followed the national pattern, and its efforts became more highly specialized.

As is fitting, Kathleen Graham's work emphasizes the scientific research accomplished at the Priest River Experiment Station and its impact on forest management and practices throughout the country. Although located in an isolated part of northern Idaho, the Priest River Experiment Station played a vital role in forest research, in part due to the place of western white pine (a prominent species in the area) in the building trades industries. From the Station's early pivotal role in the study of fires and their prevention, to later work on forest insects and diseases, tree genetics, timber management, and silviculture, Graham traces the many contributions scientists at the Station made.

These individuals – Forest Service employees and scientists – played a critical role in the history of the Priest River Experiment Station. Kathleen Graham excels at providing the reader with insights into the personalities of researchers as well as informative discussions regarding their scientific experiments and discoveries.

Kathleen Graham's work makes a real contribution to the history of Idaho, the Pacific Northwest, and the nation. Her history is much more than an institutional study; she makes the Priest River Experiment Station and the many people associated with it over the years come alive. Her work leaves no doubt as to the significant role the Station played in forest research and in history in general.

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Thanks to all.

Kathleen L. Graham
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Contents

Chapter 1: Introduction	1
The Historical Context	2
Early Beginnings of Conservation	4
Creation of the U.S. Forest Service and Region One	6
U.S. Forest Service Research	7
The 1910 Fire	9
Transfer From Pinchot to Graves	10
Clarke-McNary and McSweeny-McNary Acts	11
The Time is Ripe	11
Chapter 2: The First Years of the Priest River Experiment Station	13
Priest River, Idaho	14
Getting Started	15
Construction	17
Early Research Begins	19
Chapter 3: The Larsen Years 1913 to 1924	21
The Era of Bob Marshall	22
The Convolutated Evolution	24
The Gisborne Era Begins	25
The Depression Years	27
Fire Research Results	31
Chapter 4: The 1940s War Years and the Gisborne Era	35
The War Years	35
Postwar and the Gisborne Era	36
The End of the Gisborne Era	38
The Gisborne Legacy	40
Chapter 5: Disciplinary Research 1950 to 1975	41
Organization	41
Research Emphases	43
The Era of Success But Uncertainty	47
Chapter 6: New Forestry 1975 to Present	49
Organization	50
Administration and Maintenance	50
Anniversaries	52
Research Emphases	53
End of a Millennium and Beginning of the Next	58
Chapter 7: Conclusion	60
Appendix A: Personnel Who Established the Priest River Experimental Station	63
Appendix B: Initial Costs of Establishing the Priest River Experimental Station	64
Appendix C: Directors, Superintendents, Scientists-in-Charge of the Priest River Experimental Forest	65
Appendix D: Forest Service Chiefs, with Extended Biographies of Those Who Directly Impacted the Priest River Experimental Station	67
Appendix E: Popular Article by Bob Marshall	70

Chapter 1: Introduction

Idaho's early history was influenced by a variety of individuals and groups including miners, farmers, politicians, railroad men, and lumbermen. The State was founded in 1889 with a population of approximately 32,000, and geography played a key role in how the State developed (Schwantes 1991). Not only did the State have mountains, it had two large rivers (the Snake and the Salmon), Hell's Canyon, lakes, high deserts, and forests that separated the residents.

Because gold was discovered in Pierce, Idaho, the northern part of the State developed faster than the southern part. However, as settlers moved westward using the Oregon Trail, southern Idaho's population gained in numbers when farmers and towns' people took advantage of open lands for farming and ranching opportunities. Because Idaho had so few voters, was located within the Rocky Mountains, and contained a huge supply of timber, the Federal government saw the area as a perfect location for supplying wood products for the growing nation.

By the turn of the century, northern Idaho was known for its forests, lakes, mountains, and remoteness. Transportation was limited to horses, wagons, and trains that whisked passengers by on their way to Seattle, Washington. There were few settlers and, therefore, few towns in the panhandle of Idaho. Yet, because of the route of the Great Northern Railroad, the town of Priest River grew and provided railroad ties for the tracks.

In 1911, the Priest River Experiment Station was established by the Federal government to promote the fledgling efforts of forest research. The

types of tree species, the climate, and the elevations provided the ingredients for a variety of study sites for Western research projects. Those who came from Washington, DC, to determine the exact location of the site must have been amazed at seeing the area. Charles Leiberg, a dendrologist from the General Land Office, evaluated the area when it was made a forest preserve, and in his report he indicated that the reserve contained a huge supply of western white pine, the most important tree species for wood products at that time. After timber companies depleted the inventory of eastern white pine, they headed westward to find a new inventory from which to profit. But by the turn of the century, conservationists such as Theodore Roosevelt and Gifford Pinchot were calling for controlling the harvesting of timber and for replanting to replenish the depleted forests.

Forest management was in its infancy and little information was available for those interested in maintaining and enhancing the forests. Other than research conducted in Germany, there was no effort being made to understand the hows and whys of tree growth, the impact of fire, or how to maintain an adequate supply of timber for future generations. But far-seeing individuals, Gifford Pinchot and Raphael Zon in particular, recognized the need to create locations dedicated



to discovering the mysteries of various tree species. Because trees require such a long period to grow, the researchers had to be patient and willing to wait for Mother Nature to divulge her secrets. It takes a special personality to be a forestry researcher, and those who have made significant impacts on research have that rare combination of curiosity, determination, patience, and knowledge. But they also must be self-confident and in general display a "do it my way" attitude. Often, this strong-willed attitude influenced the direction of the research and the methods employed. They had no instruction book then and are still creating it now.

This report describes the evolution of the Priest River Experiment Station from those early years to the present. While many researchers have contributed to the body of knowledge, this paper singles out only a few of the most noteworthy individuals who have made contributions to research not only use-

ful on Federal and State lands but also on government and private lands worldwide. For example, the fire research done at Priest River led to the creation of the smokejumpers, the fire research laboratory in Missoula, Montana, and the National Interagency Fire Center in Boise, Idaho, to fight forest fires nationwide. Because humans are encroaching into forested, rural areas, the lives of people are threatened and the loss of property has skyrocketed. And as the fires in New Mexico, Montana, Idaho, Colorado, and other Western States during recent summers demonstrated, the need for further research continues. This report also shows how disease and insect devastations have impacted forests causing economic hardships for an important industry in the State, and how critical research helped reduce the damage caused by these pests.

Although Priest River Experimental Forest's role has been significant to the forest industry and to the State of Idaho, most residents are unaware of these activities. With this report, past and current critical research, and the researchers themselves, should be more appreciated.

Nestled in the northern panhandle of Idaho near the pristine area of Priest Lake is the Priest River Experiment Station (over time the Station went through a number of name changes; the current name is "Priest River Experimental Forest"). This forest has been the site of many experiments that have led to breakthrough research. How did this remote area of the Western United States become the site of a national Forest Service research station, who were the contributing scientists who impacted forest research nationwide and worldwide, and how did they come to do their research here?

The story begins with a multitude of unrelated incidents that culminated in the creation of the Northern Region

(Region One) of the U.S. Forest Service and the Experimental Research Station.

The Historical Context

The early history of northern Idaho is tied to the Native American Tribes who lived in the area such as the Coeur d'Alenes, Blackfeet, and Spokane Nations. The first Euro-American movement into the area came in the late 1700s when the Hudson Bay Company obtained exclusive rights to all fur-bearing animals on lands that were claimed by the company. Euro-American explorers were in search of the Northwest Passage that would link the East to the Pacific Ocean, and despite efforts by the French and English, none were able to push the frontier beyond the area just north of present-day Montana. With the Louisiana Purchase in 1803, President Jefferson purchased all the territory in the interior part of the now-Continental United States from France. America now owned a huge but unknown quantity of new territory. Following the Lewis and Clark expedition, the area was opened to settlement although at the expense of the Native American Tribes who lived there. Except for the fur traders sponsored by the British North West Company, the area remained sparsely populated for many more years. David Thompson, a surveyor and geographer in charge of opening a fur trade in the area of the headwaters of the west-flowing Columbia, Kootenai, and Clark Fork Rivers, entered Idaho in the spring of 1808. He set up a trading post near present day Bonners Ferry, just south of what is now the Canadian border. Over the years, the British and French attempted to establish additional fur trading locations, especially for beaver pelts, but with limited success.

By the mid-1800s another group of Euro-Americans entered the area. Missionaries, such as Henry and Eliza Spalding, came to convert the Native Americans. Later Father Pierre-Jean DeSmet established a mission at St. Maries, Idaho. The greatest change to the area, however, came in 1860 when Elias Pierce discovered gold in Idaho on the Clearwater River. Although his discovery brought miners to the area, few of them stayed once the gold played out, and boom towns died as quickly as they sprang up. However, some towns did grow as regional locations for the mining industry such as Butte and Missoula, Montana, and Lewiston, Idaho. Due to its critical location on the Clearwater and Snake Rivers, Lewiston later became the capital of the Idaho Territory. Settlers who were unable to find success in mining resumed their former professions of farming and supplying timber to the mining industry and established small settlements. This growth sparked the interest in creating a stable government, and the push for Statehood gained momentum.

In 1787, Congress had established the Northwest Ordinance for governing territorial expansion and the incorporation of new frontiers into the United States. Idaho and Montana were included in the Oregon Territory that Congress created in 1848. In 1853, the Territory was split so that Idaho and western Montana became part of the Washington Territory when Oregon received Statehood. Because of fear of being politically outnumbered by miners, both the Washington and Dakota Territories lobbied Congress to create an Idaho Territory, which Congress did in 1863. Over the next few years, the area became a political dilemma. Because of bitter fighting with the Mormon population in the southern part of the State, Idaho failed to make any

progress toward achieving Statehood. In 1889, President Harrison authorized in a bill the areas of Montana, Idaho, and the Dakotas to create and submit constitutions to be considered for Statehood. Finally, in 1890, Territorial Governor George Shoup convened a constitutional convention, and Idaho was granted Statehood on July 3, 1890.

With the completion of the contiguous United States, citizens who had been told that their natural resources were inexhaustible began to realize that the vast amount of minerals, timber, and lands even in the West were no longer limitless. By the turn of the century during the Progressive Era, many saw the need to bring under control the effects of the Industrial Revolution. While the period from 1830 to 1914 marked a zenith of scientific progress

including medical and biological advancements, it also marked an era when social and political changes were overwhelming. The Civil War, for example, shaped industries between the North and South and standardized the monetary system, and businessmen such as Andrew Carnegie and Gail Borden created industrial empires; also, Northern politicians created legislation that insulated American businesses against foreign competition (LaFeber and others 1992).

Industry brought not only prosperity but also changes in the economic status in the United States. Cities grew, pollution from the numerous manufacturing plants impacted the surrounding countryside, and the demand for natural resources forced newly formed companies such as Standard Oil, U.S.

Steel, and Ford Motor Company to produce huge quantities of products to meet the demand but with devastating consequences to the environment. Because of this industrial revolution and the concern for its consequences, Congress enacted the Forest Reserve Act (26 Stat.1095) on March 3, 1891, that authorized President Grover Cleveland to set aside large tracts of timbered land, mostly in the Western United States, for Federal Government administration. Among other changes, the act abolished the sale of public domain lands. Three weeks after passage, the first Forest Reserve, called the Yellowstone Park Timber Land Reserve, was established for 1.2 million acres on the south and east sides of Yellowstone National Park.

Trains played a significant role in the development of the West.



When Congress created the Territories of Idaho and Montana in 1863, the Federal government held title to all the land with the General Land Office in the Department of the Interior administering these lands. In 1862, Congress passed the Homestead Act, allowing unrestricted settlement on public lands, the Timber Culture Act in 1873, the Timber Cutting Act of 1878, and the Timber and Stone Act of 1878 to aid in transferring these lands into private ownership. The Act of 1897 was a significant step because it provided for the organized protection and systematic use of the Forest Reserves for purposes of protecting the water supplies of the Western States and helping guarantee continuous timber supplies. It also awarded power to the President to create additional Forest Reserves that greatly impacted the newly admitted Western States. The regional Forest Reserves were created on February 22, 1897, and included the portions of what would later become Region One of the U.S. Forest Service, including the Bitterroot, Lewis and Clark, Black Hills, and Flathead Reserves. The Priest River part of the Kaniksu was created in 1898 (Baker and others 1993).

In addition to controlling and protecting the forested lands in the West, there was also an interest in transcontinental rail routes to the West Coast. In 1864, Congress directed the Northern Pacific Railroad to create a route from Lake Superior to the West Coast either to Portland or to the Puget Sound. To entice the railroad company to build in such a difficult and remote location, Congress promised to provide 40 sections of land per mile through the Idaho, Montana, and Dakota areas. Along with other compensations due to Native American reservations and homesteaded lands, the Northern Pacific Railroad acquired 44 million acres of land, of which 3 million acres were

in northern Idaho (Baker and others 1993). A second transcontinental line owned by the Great Northern Railway was laid from Minot, North Dakota, to the Puget Sound area providing a rail line for Bonners Ferry, Idaho, and Spokane, Washington. Because of the necessity for ties, pilings, and cords of wood to fuel the locomotives, local lumber entrepreneurs filled the need from their sawmills. The original 4,000 miles of construction required an estimated 10 million ties, meaning that railroads provided a long-term demand for all types of lumber (Baker and others 1993). Even the Federal government saw the need to supply the railroads. Army Colonel Henry C. Merriman built one of the first commercial sawmills at Fort Sherman (Coeur d'Alene, Idaho) in 1878; it lasted until 1898 when the fort was taken out of commission. In 1880, Frederick W. Post built the first water-powered sawmill at Post Falls, Idaho. Others followed with mills in Rathdrum, Idaho, and a steam-driven mill at Coeur d'Alene.

Frederick Weyerhaeuser was among the early lumbermen to see the future in the West. Already the largest timber producer in Minnesota, in 1900 he purchased 900,000 acres of land in the Washington-Oregon region plus another 40,000 acres containing western white pine on the Clearwater River, Idaho (Baker and others 1993). He also purchased lands on the headwaters of the St. Joe River and the Pend Oreille-Kootenai areas in Idaho. Many small timber companies, including the Potlatch Lumber Company, were created from these purchases, and each produced between 50 to 70 million board feet of lumber each year (Baker and others 1993).

Other timbermen followed, but these lumber entrepreneurs discovered the terrain in the West was much more difficult to control than they had found

in the East and Lake States, so flumes and other methods of moving the harvested timber were created. As a result of their interest in getting the timber at whatever cost, the environment, land, and waterways were often abused and misused. Western white pine, spruce, and Douglas-fir, in demand in the East where the supply was short, were exploited. About 40 million board feet were harvested in the Idaho-Montana territory in 1879, but by 1899, with the completion of the railroads, the harvest was escalated to 320 million board feet (Baker and others 1993).

Because most of the timber harvested came from Federal Reserves, concern rose over the damage caused by some of the careless loggers, and a regulating process was viewed as essential to protect the government's property. To monitor the forested lands, the Director of the General Land Office appointed J.B. Collins as Superintendent in 1899, and an office was established in Missoula, Montana. Eight Forest Rangers, including Major F.A. Fenn, who later replaced Collins as Superintendent, and Captain Seth Bullock, were among those appointed to help patrol the vast areas. By 1899, the Alta Ranger Station, the first in the nation, had been built by Rangers H.C. Tuttle and N.E. Wilkerson on what is now the Bitterroot National Forest in Montana. The cabin, which is now on the National Register of Historic Places and is maintained by the Forest Service and private donations, was originally paid for by Tuttle and Wilkerson without reimbursement.

Early Beginnings of Conservation

Although the turn of the century saw the most dramatic changes for conservation, early steps toward protecting

forest lands had been implemented as far back as the colonial days. Because of the need for having a supply of timber for building purposes, especially for ship construction, Easterners planted trees to replenish depleted supplies of high-grade timber. Settlers moving westward also planted trees to provide wind breaks and building supplies, but few saw the need to conserve forests, which seemed to be limitless, for the long-term future. Some conservation efforts were started in the 1870s when the American Association for the Advancement of Science was formed to influence Congress and State legislatures to preserve forests. The first Federal law, in 1876, provided for the appointment of a Forestry Agent in the U.S. Department of Agriculture. In 1881, the Division of Forestry in the Department of the Interior was established to do investigative work and general public education in forestry, and in 1886 the Division was given permanent rank. Bernhard E. Fernow, a German forester who had immigrated to the United States in 1876, headed the Division of Forestry. Fernow wrote numerous articles on forestry and testified before Congress on forestry issues. When he resigned from the Department of the Interior in 1898, he became Dean of the newly created forestry school at Cornell University. But before he left, he authored the "Report Upon the Forestry Investigation of the U.S. Department of Agriculture 1877—1898," which described the research work done by the Department at that time.

The American Forestry Association was organized in 1875 to promote forestry. This group sponsored the first American Forest Congress in 1882 where several State governors participated. The most significant step was made in March 1891 when Congress passed a law authorizing the President to set aside areas in the public domain

as forest preserves, although the law failed to provide for the administration of these reserves. Because most of these lands were in Western States, the closed areas were unpopular with Westerners who pushed to have the lands available for mining, farming, and privately owned lumber companies. By 1896, the Secretary of the Interior asked the National Academy of Sciences to review forestry practices, and the report they produced recommended that efforts be made to provide for the protection and administration of the Forest Reserves. The Act of June 4, 1897, granted the authority for administration of the reserves with the objectives "to improve and protect the forests within the reservations, or for the purpose of securing favorable conditions of water flows and to furnish a continuous supply of timber for the use and necessity of citizens of the United States" (Clepper and Meyer 1960: 4).

The 1890s also saw changes to the Division of Forestry in the Department of Agriculture in the areas of education, research, and working with private owners of forested lands. The first attempt to actually "practice" forestry was in 1892 when Gifford Pinchot was employed to manage the 7,000 acre forest on George W. Vanderbilt's Biltmore Estate in North Carolina. Pinchot, from a wealthy Pennsylvania family, became interested in conservation and forestry at an early age. There were no forestry schools in the United States, so Pinchot studied at L'Ecole Nationale Forestiere in Nancy, France, after completing his undergraduate degree at Yale. The European influence on forestry at this time cannot be understated. Pinchot, for example, had been highly influenced by Sir Dietrich Brandis, who led

forestry in Germany in the 1800s and who had observed forestry practices throughout Europe and India. President Theodore Roosevelt recognized Brandis' contributions. Germany was also developing experimental forests for research, which became the basis for the development of experimental forests in the United States.

In his memoirs, Pinchot states: "When I got home at the end of 1890...the nation was obsessed by a fury of development. The American Colossus was fiercely intent on appropriating and exploiting the riches of the richest of all continents" (Pinkett 1970: 15-16). Pinchot felt that there was little that could be done to control what the private forestry owners did, but "on the national Forest Reserves we could say, and we did say, 'Do this,' and 'Don't do that'" (Limerick 1987: 298). His mission became to change American



President Theodore Roosevelt and Gifford Pinchot crafted the conservation policies that shaped early forestry.

attitudes to manage existing forests with emphasis on natural reproduction and not tree planting for replacement of the stand. According to one historian, Pinchot may have been driven by an omnipotent right based on his wealthy and privileged background, which led to a forestry practice that ostensibly supported democracy while advocating its direction under an elite group of professionals (Limerick 1987). Indeed, by 1894, Pinchot presented a paper “Forester and Lumber in the North Woods” (Pinkett 1970: 33) to a number of prominent advocates, including Theodore Roosevelt, on forest preservation. The focus of his paper was to distinguish the differences between logging solely for profit versus forestry that would get the largest return while protecting and increasing the productive capacity of the forest. Because of this conservation view, Pinchot later became politically aligned with the Bull Moose Progressive Party headed by Theodore Roosevelt.

As the first professionally trained American forester and recognized for his abilities in this new profession, Pinchot left Biltmore when he was appointed by President William McKinley to head the Department of Agriculture’s Division of Forestry in 1898. That same year, Carl A. Schenck, who succeeded Pinchot as Forester for the estate, opened the Biltmore Forest School, a private school to train foresters. Public courses in forestry were available only in Europe, but in the fall of 1900, with money from Pinchot and his family, Yale University began a curriculum of graduate professional forestry education, and other universities followed over the next few years based on Pinchot’s views on forestry education. The New York State College of Forestry was also established at Cornell University, the first undergraduate forestry school at the college level. In

1903, Yale made Pinchot a Professor in the Forest School.

As Pinchot’s efforts to create a National Forest policy grew, he became more influential in Washington, DC. By 1897, President Cleveland created 13 additional Forest Reserves in South Dakota, Wyoming, Montana, Idaho, Washington, California, and Utah without consultation with the legislators from those States. Despite opposition from many Western Senators, enough support for the Forest Reserves was found to allow for the approval of Cleveland’s proposal. Pinchot personally toured the forests in the Western areas evaluating the timber and seeing first hand the variety of species not seen in the East. He even climbed Columbia Peak in Washington located in what would later become the Gifford Pinchot National Forest named for him in 1949. Pinchot began to collect a staff of foresters including Henry Graves (who was the second American-schooled forester), William L. Hall, Albert Potter (an Arizona range man who provided expertise on range issues), and Raphael Zon. Zon later became instrumental in creating the Priest River Experiment Station. From 1905 through 1940, Yale graduates became Pinchot’s leaders in the Forest Service.

In 1900, the Secretary of the Interior asked the Secretary of Agriculture to provide some technical advice on managing the Forest Reserves. Pinchot, working in the Department of Agriculture’s Forestry Division, was asked to respond, and his proposal for the administration of the forests under a centralized system later became the foundation for the Forest Service. At that time, however, the Department of the Interior failed to take any action on the plan.

Seven foresters—Gifford Pinchot, Henry S. Graves, Overton W. Price, Edward T. Alan, William L. Hall, Ralph

S. Hosmer, and Thomas H. Sherrard (all Forestry Division employees with Pinchot)—founded the Society of American Foresters in 1900. This was the first professional organization in the United States, thus giving the field of forestry in the United States a professional level like that already seen in Europe where forestry practices had been conducted for a number of years.

Creation of the U.S. Forest Service and Region One

Theodore Roosevelt, a champion of forest conservation, recommended in his first message to Congress after being elected President in 1901 that the Forest Reserves be transferred from the Department of the Interior to the Department of Agriculture under the direction of the Bureau of Forestry. However, opposition forced the change to be delayed until 1905. By then, however, even the private industrialists and lumbermen recognized the need to work with the President. Industrialist Frederick E. Weyerhaeuser of Minnesota and James J. Hill, President of the Great Northern Railway Company, recommended cooperation with government officials such as Pinchot. Roosevelt recognized the need to consolidate the various forestry programs scattered under the General Land Office, the Geological Survey, and the Bureau of Forestry under one unit. He also saw the need to put the forestry program under the control of one person. When the transfer was made, the Bureau of Forestry became the Forest Service, and 2 years later the Forest Reserves were renamed National Forests. Roosevelt appointed Pinchot administrator of the newly created Forest Service.



Gifford Pinchot, first chief of the U.S. Forest Service.

Pinchot reorganized the Forest Service and created three districts, increasing it to six by 1908. An inventory of the amount of standing timber in the country in 1907 showed 2,500 billion feet, a yearly lumber cut of 40 billion feet, a yearly growth of only one-fourth as much (Greeley 1951). District One (renamed Region One after 1933) was formed from lands in Idaho and Montana as well as North Dakota and South Dakota. William B. Greeley, a Yale graduate who would later become the third Chief, was selected as the first Regional Forester and set up the first administrative office in Missoula, Montana, in the National Bank Building. Greeley was a product of Pinchot's Yale Forestry School and completed his master's degree in 1904. Greeley hired such professionals as Ferdinand Silcox, R.H. Rutledge, Robert Y. Stuart, A.W. Cooper, David Mason, and C.H. Adams. Several of these men would be involved in the creation of the Priest River Experiment Station and would later become leaders in the Forest Service administration in Washington, DC.

By 1910, there were 50 employees in the Missoula office. Under Greeley's direction, the Supervisors of the National Forests, which changed in number over the years with consolidations and realignments, became the protectors of the forests nationwide. Among these men were F.A. Fenn, Charles Ballinger, and Elers Koch, who was Assistant District Forester. The other positions included rangers, forest guards, forest workers, and clerical staff. Koch administered the inaugural ranger's examination in 1906, marking the first time that foresters, as Civil Service employees, were required to meet professional standards to be hired. Rangers were expected to build living quarters on their own time. Among the duties of these supervisors were fire protection, appraising timber, arranging for timber sales, overseeing logging contracts, supervising grazing on Federal lands, monitoring and maintaining lookouts, building and maintaining trails, and working with the public. Often, working with the public was the most difficult part of the job as many, especially

Westerners, perceived that the Federal government exerted too much control over the best areas of timber. Pinchot's vision of local administration was intended to resolve problems at the local level and to pacify the West by not allowing "Easterners" to administer lands in the West, but often this resulted in forest officials versus local politicians. For example, Governor F.R. Gooding of Idaho opposed the creation of additional National Forests and, in his 1906 campaign, accused the forest rangers of engaging in political activities against him (Pinchot 1998).

U.S. Forest Service Research

Because of Pinchot's interest in forestry education, he was also keenly aware of the need for more scientific research to facilitate forest management. His own research had produced two publications in 1896, *The Western White Pine* and *The Adirondack Spruce*. From 1898 to 1905, Pinchot's forest



Gifford Pinchot (seated, second from right) and members of the 1905 Use Book Revision Committee.

assistants used field investigations to study particular species of trees' growth, range of the species, soil requirements, insect damage, effects of fires on present and future stands of timber, and other scientific data. He created the Section of Silvics (Latin for "trees") in the Forest Service in 1903 to coordinate and classify all the data collected. By 1907, the Forest Service was also cooperating with several universities and State agricultural experiment stations to improve nursery planting, cultivation, and tree adaptation to various regions.

However, not all the data collected were being used to make management decisions wisely, nor was there any correlation as to how these pieces of data interacted. Raphael Zon wrote a paper, "Plan for Creating Forest Experiment Stations," in May 1908 basing his thesis on German research being done on experiment stations created in the 1870s. Pinchot agreed with Zon's conclusions, and the first experiment station, Fort Valley, was established in July 1908 in the Coconino National Forest near Flagstaff, Arizona, and a second was created in 1909 near Manitou, Colorado. The Priest River Experiment Station soon followed in 1911. Zon's plan was to establish stations in each silvicultural region across the nation over the next few years. The Office of Silvics, headed by Zon, administered all the stations.

Pinchot also recognized that a national wood-testing laboratory was needed to concentrate forest products research in one institution. The Forest Service invited several universities to make offers for a cooperative laboratory. Rivalry between the University of Wisconsin and the University of Michigan elicited political pressure by the Congressmen from the two States, but after consideration, Pinchot accepted the bid from the University of Wisconsin, and in 1910, the Forest Products Laboratory was established in Madison.

Items that required field investigations and long-term research included reforestation, grazing impacts, and logging techniques. However, among the main issues that needed research were forest fires and their effects. Pinchot, during his first year as Chief, authorized studying the history of forest fires. His staff cataloged 5,000 fires occurring since 1754 as a basis for the study. Since 1870, forest fires had destroyed an average of \$50 million worth of timber per year on Federal lands (Steen 1976). However, researchers noted that fires had also been beneficial in controlling the quantity of fuel and reducing the amount of large-scale damage. Henry Graves authorized a study at the Yale School of Forestry with California lumberman T.B. Walker underwriting the cost. This was one of the first studies that had significance not only for Federal lands but for private lands as well.

These and other studies pointed out the need to expand research, but Graves chose not to use Forest Service money but rather asked Congress to fund research directly. Graves also required that there was a distinction between investigative and administrative projects. In June 1915, Graves established the Branch of Research and placed Earle H. Clapp in charge. (Clapp would become Acting Chief when Silcox died of a heart attack in 1939, but President Roosevelt never appointed him Chief even though he served for 3 years as acting.) The role of research was more clearly defined, and the district foresters were instructed, through administrative channels, how to implement research findings. The Chief would settle any disputes between the Chief of Research and the Chief of Administrative Branches. According to Albert Potter, head of the Grazing and Range Section, research was the reason for the Forest Service being in the Department of Agriculture, rather

than in the Department of the Interior, and stated that "were it not for research work conducted by the Forest Service, it would be merely an administrative organization" (Steen 1998). Clapp's memoirs also clearly state that "what the reorganization did was to give research a recognition and standing in the Forest Service which it had never had.... It helped to break the subordination caused by the enormous, urgent, often highly controversial effort to bring administration of the National Forests up to speed" (Steen 1998: 86). To bolster the cause of research in 1921, Clapp authored a pamphlet called "Forest Experiment Stations" and proposed creation of 10 additional regional experiment stations with several scientists and an adequate supporting budget to fund the research. While this proved premature, his vision was used to establish each of the stations later.

Chief Graves determined that there was not adequate research material to draw upon, and also that some scientists were too tentative in their conclusions, so that administrators rarely sought advice and information from researchers. Clapp agreed with this analysis and began to make the necessary changes to the organization and to flesh out the inadequate areas. In addition to more funding, Clapp lobbied for procedural changes. He requested that his position report directly to the Chief and that each of the experiment stations report to him. This was unpopular with the District Rangers who suggested that the research being conducted pertained to their areas and, therefore, should be under their jurisdiction. Another unpopular part of this legislation was that the Experiment Station Directors were paid at the same level as the District Rangers. The District Rangers felt this was unfair since they administered a much larger organization than did the Experiment Station Directors. He also called for

having Station Directors and the Director of the Forest Products Laboratory attend general Forest Service meetings so that both groups could work together and see the broader vision of research within the Forest Service.

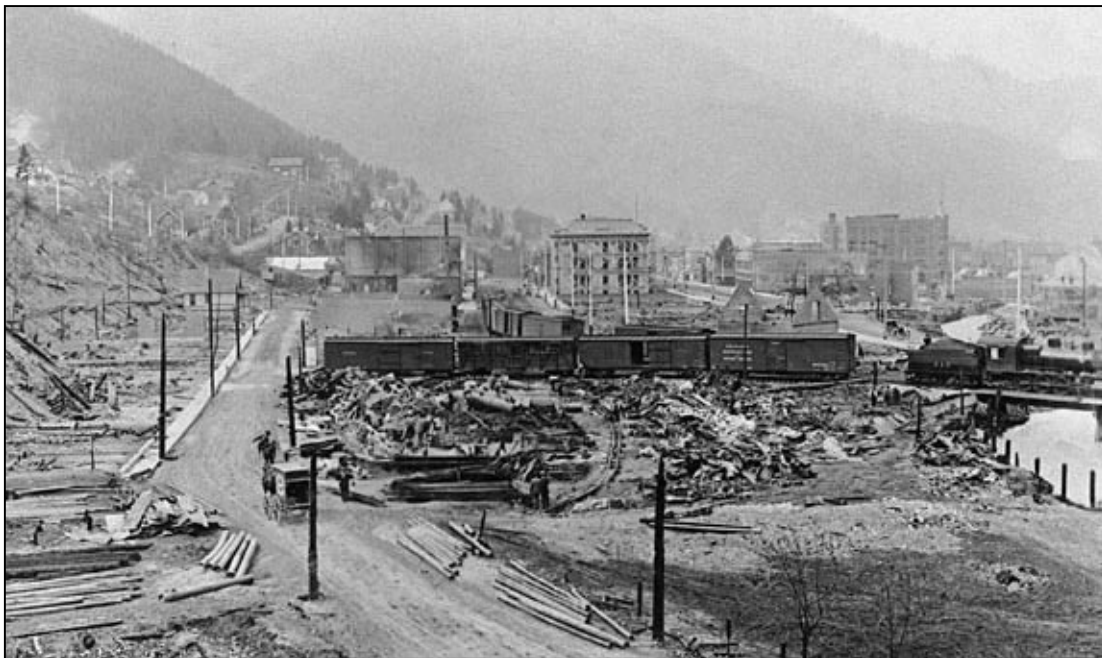
As the importance of research became more apparent, the Washington, DC, chapter of the Society of American Foresters established in 1924 a Special Committee on Forest Research and named Earle Clapp as chairman. The industry-based National Forestry Program Committee also proved to be an ally. Clapp used these groups to promote the need for expanding the budget for research—a million dollar budget for the Forest Products Laboratory, a million for the experiment stations, a half-million to inventory forest resources, and a quarter of a million to study grazing. Ohio Congressman John R. McSweeney had introduced a bill in 1927, but Congress adjourned before the bill was voted on. Senator Charles L. McNary of Oregon joined McSweeney's cause, and on May 22, 1928, the McSweeney-McNary Act

was passed (see further explanation of this act later in this chapter). This law, which contained material from a 1926 report by Earle Clapp, is the basic authority governing Forest Service research. Some of the main points of the act provided for the Forest Survey to collect data on the inventory of the nation's timber resources, designate what research could be done, set up guidelines to look at the interrelationships of forestry, give legal sanction to the Forest Products Laboratory and the Forest Service experiment stations already in place, and set up a 10-year financial program to fund the research. After 8 years Clapp finally achieved recognition for the importance of research and the budget he needed to consolidate all the individual sections of research that he had in place. The bill accomplished several other critical things: it provided the Branch of Research a broader place within the Forest Service; it strengthened the basis for dealing with other agencies such as the Entomology and Plant Industry Bureau; it dealt with

non-Federal research needs; and it began to balance silvicultural and products research. One of the main parts of the bill provided for the Forest Survey, a nationwide inventory of National Forest lands. This law was vital to the growth of research because it recognized forest research as an integral part of forestry.

The 1910 Fire

Many historical records suggested that large and devastating fires had taken place in the Northwest including Idaho and Montana. In 1846 the Yaquina Fire in Oregon burned 450,000 acres, and in 1853 the Nestucca Fire, on the Oregon coast, burned 320,000 acres (Cohen 1978). The difference between these earlier burns and the one of 1910 was that the population of the area had substantially increased. In addition to the Native American inhabitants, the area had become populated with towns and homesteaders so that settlers and fire collided. As populations grew



Results of the 1910 fire on Wallace, Idaho.

and the need to protect the trees for harvest became even more paramount, the need to control forest fires became essential. By 1908, the Milwaukee Railroad, being built through the Lolo National Forest in Montana, caused many fires as the workers cleared the timber, adding to the responsibility of the rangers to control these wildfires. Causes of fire varied and included natural causes and lightning strikes, but most often they were human caused. Weather conditions, lack of precipitation, thunderstorms, plus the amount of burnable vegetation and timber available, contributed to these fires.

Conditions in District One in 1910 were ripe for devastation. According to reports, 1909 and 1910 had abnormally low amounts of precipitation, and temperatures for the month of April were the highest on record. By June only a half inch of rain, and by July no rain, had been recorded in District One. By August the lack of rain and the dry forests made for perfect fire conditions. A series of 1,736 fires, including the big one of August 20 and 21, ravaged millions of acres and killed 85 (possibly 87) people during the summer of 1910. According to Elers Koch, Supervisor of the Lolo National Forest, the fires of 1910 were a “complete defeat for the newly organized Forest Service force” because the fires burned 3 million acres in northern Idaho (Baker and others 1993: 69).

Contributing to the problem that summer were primitive transportation, lack of communication and fire fighting equipment, rugged terrain that included more than 40 million acres within the district, inadequate numbers of experienced fire fighters and supervisors, and the lack of funds. Congress had created Glacier Park on May 11, 1910, but no money had been designated for fire protection for the Park. District Forester William Greeley, however,

felt obligated to protect that area of the district and dispatched fire fighters from the Flathead and Blackfoot National Forests to the Park when fires broke out. Spot fires began to break out in many places within the region, making it difficult for the office in Missoula to keep track and provide enough workers to fight the blazes. Temporary help, including miners from Butte, Montana, logging crews, soldiers, ex-convicts, and vagrants, were hired at 25 cents an hour. The worst fires broke out along the crest of the Bitterroot Mountains along the border between Idaho and Montana at the rate of three to four per day. Wallace, Idaho, with its 6,000 residents, felt the brunt of the fire as half the town was destroyed.

One individual, Edward Pulaski, working on the Coeur d’Alene District, became a folk hero when he saved most of his 43-man crew by sheltering them in the tunnel of the War Eagle Mine near Wallace as the fire raced by them. The fire was finally contained, aided by a change in weather conditions when the temperatures dropped and snow fell on the higher elevations.

The aftermath of the devastation of the fire was enormous. Approximately \$13.5 million dollars worth of damage was done, 3 million acres of private and public lands burned (Cohen 1978), and 78 fire fighters, two residents of Wallace, one prospector, and three homesteaders near Priest River were killed. The smoke drifted as far away as Saskatchewan, Canada, Denver, Colorado, and Watertown, New York. The Savenac Nursery near Haugen, Montana, the largest forest nursery in the United States, was destroyed but later rebuilt in 1911 as were buildings in many of the towns such as Taft, Saltse, and DeBorgia in Montana, and Wallace, Idaho. Region One became the center of attention not only for the impact the fires had but

also because its Forest Service personnel became the “experts” on fire. However, it was apparent that there was a need to have better information, equipment, and workforce. According to Greeley, “Congress and the Forest Service now realize that fire protection was the number one job of the Forest Service. We knew this before, but the 1910 experience burned it in terms of sweat, labor, and human life. Protection was it—we must lick the fire problem” (Spencer 1956: 267). But, as the 1910 fires pointed out, no research information was available to the Forest Service regarding forest fires and the conditions that promote devastating fires such as these.

Transfer From Pinchot to Graves

By 1908, when President William Taft succeeded Roosevelt, Pinchot had become embroiled in a battle with newly selected Secretary of the Interior Richard Ballinger. Several issues, such as administration of forestry affairs on Indian reservations and the Alaskan coal claims, created clashes between the two. Taft, to prevent attacks by one department head on another, chose to dismiss Pinchot in 1910, and Henry Graves was chosen to succeed Pinchot as Chief of the Forest Service. To rebuild morale and to prevent the resurgence of the idea for State control of National Forests, Graves concentrated on the internal structure of the organization. To answer charges of fiscal waste and overexpenditures and to prove that the Forest Service could be self-sufficient, Graves began creating a timber policy. William Greeley, District Forester from Region One headquartered in Montana, indicated to Graves that the Forest Service could increase timber sales substantially

Savenac Nursery
1910, in western
Montana near
the Idaho border.



without exceeding annual growth and without sacrificing the intrinsic value of the timber. The 1910 fire in Idaho and Montana had created an enormous amount of dead timber, and the Forest Service administration felt that it was “morally obligated” to harvest the marketable timber. By 1911, Greeley was able to report that half a billion board feet of fire-killed timber from the 1910 burn had been sold. This equaled the amount cut from all other National Forest lands and nearly 14 percent of all timber cut in the United States from all sources in 1911 (Steen 1976). Despite the extent of the 1910 fire, Greeley had proven himself a worthy forester and was promoted to Chief when Graves retired due to poor health.

Clarke-McNary and McSweeney-McNary Acts

In 1924, Congress passed the Clarke-McNary Act, which provided for incentives, rather than force, to be

used to improve conditions on private forest lands. Fire and reforestation would be jointly monitored and controlled by the Federal, State, and private sectors. According to Samuel Dana, Assistant Chief of the Branch of Research under Earle Clapp, research was included in the original draft, but Clapp maintained that it would be lost in a law that contained so many controversial provisions. Clapp instead insisted that there be a separate law for research that resulted in the McSweeney-McNary Act.

The idea behind the Clarke-McNary Act was that reducing risks would prompt landowners to adopt less destructive cutting practices because they could see the future benefits. Threat of fire remained high in the Pacific Northwest, and in 1909 the lumber industry formed the Western Forestry and Conservation Association headed by E.T. Alan. With the 1910 fire as a prime example of how devastating fires were, Graves had also learned that there was a need to have more trails, telephones, and patrols. The law

also dealt with land acquisitions for National Forest purposes. The Weeks Law of 1911 had restricted purchases to headwaters of navigable streams, but now the National Forest Reservation Commission could recommend the purchase of land for timber production as well as protection of streamflow. It also authorized up to \$100,000 per year to be used cooperatively with States to establish nurseries that would provide stock for reforestation. Congress also authorized money for technical advice to farm woodlot owners.

The Time is Ripe

By the turn into the 20th century, dramatic changes had shaped the course of the development of not only the Forest Service but also the use of natural resources in the United States. As the industrial revolution impacted the growth of the nation, the demand to provide adequate supplies for industries was apparent, and timber was among the leading needs. Powerful men such as

Roosevelt and Pinchot were guiding the nation toward conservation to replenish the supply of lumber. Their personalities, dominating and commanding, drove the nation's natural resource policy of the day of not only conservation but also timber production.

As a result of the exploitation of the natural resources in the East where the forests had been depleted, Pinchot and his followers determined that the West would be handled far differently. In their opinion the Federal government could manage the natural resources, especially in the West, far better than private industries had done in the East. Natural disasters, such as the 1910 fire, also influenced the path that the Federal government would take in its policies and procedures. Pinchot's forestry views were based on his experiences in Europe where most of the forests were under government control. He fought to counteract the private timber companies' policy of cut for profit and move on. Congress, no doubt influenced by Pinchot, agreed and passed several

pieces of legislation that backed the Forest Service's method of managing the forests. A question that is unanswerable is how the policies and procedures of the Forest Service would have been altered if Pinchot had remained Chief.

To manage the forests well, the Forest Service's leaders knew that they needed to collect more information to make better decisions. But the Forest Service administration quickly learned that they lacked the necessary information to make sound decisions. Clapp, Zon, and others emphasized that to aid in decisionmaking for the forests, research was required. Following examples in Germany, experimental forests were needed to study native trees and to learn from experimentation. Given the policymaker's ideas and Mother Nature's devastating events in the area, the time was ripe for establishing the Priest River Experiment Station. The viewpoints of these early Forest Service leaders, therefore, imprinted how, where, and what type of research would be conducted at Priest River.

Chapter 2: The First Years of the Priest River Experiment Station

Priest River Experimental Forest, along the Priest River, is 13 miles north of the town of Priest River, Idaho. The Benton and Canyon Creek drainages encompass the majority of the Forest.



In the 1890s the Priest River Reserve covered land in Idaho and Washington and contained 645,120 acres. In 1897, John B. Leiberg, Dendrologist with the General Land Office, evaluated the topography of the Priest River Reserve in northern Idaho and described the rivers, elevations of the mountains, the soil, the topographical features of the valleys and, most important, the condition of the forest. In his report he states:

...there are but few tracts within its boundaries that do not now, or did not a few years ago, support a dense, magnificent forest...of these, the western white pine and tamarack (larch) form about 91 percent of the total...the white-pine zone is the predominant one in the reserve. It lies principally between altitudes of 2,400 and 4,800 feet above sea level, and reaches its greatest development between elevations of 2,800 and 3,500 feet. Its area is about eighty percent of the forested portion of the reserve, or about 480,000 acres, including such tracts as are now in a state of reforestation and covered

with pure, or nearly pure, growths of lodgepole pine (Leiberg 1897).

This description no doubt had an impact on the placement of the Experiment Station especially due to its large amount of western white pine, a highly prized forest product. With the establishment of Experiment Stations in Arizona and Colorado, it was evident the Pacific Coast region, with western white pine as the major species, was another valuable site. Based on the U.S. Forest Service Annual Report of 1911 (USDA Forest Service 1911), other reasons played a role in the creation of the Priest River Experiment Station:

1. Representation of the forest types located in Region One.
2. Areas suitable for reforestation experiments in the more important forest types.
3. Reasonable access to the District Office and to transcontinental routes of travel.

4. Land wholly National Forest ground and subject to withdrawal for exclusive use by the Forest Service.
5. Suitable building site, good water supply, desirable surrounding, and other natural conveniences as possible.

According to F.I. Rockwell (USDA Forest Service 1911), Forest Assistant for Region One, several sites were considered that were close to the main railway lines – the Kootenai, Kaniksu, Coeur d'Alene, St. Joe, and the Lolo. But the area near the Benton Ranger Station on the Kaniksu National Forest was chosen because it best fulfilled the desired conditions including the ability to study climatology of the area and the impact of weather on the various species. All the important forest types (western white pine, western larch, Douglas-fir, and western yellow pine) were found on the 720 acres set aside for the Station. There were also large flats that were covered with lodgepole

pine while a trail from the Station along a ridgetop led up to the alpine type species on the top of Bald Mountain. Rockwell determined that the even-aged stands of western white pine, western larch, Douglas-fir, and western yellow pine of 40 to 50 years of age in Benton Creek Basin would provide excellent opportunities for experiments in thinning and for the creation of permanent sample plots for the study of forest yield and growth.

Having decided upon the desirability of establishing an experiment station, it became necessary to choose a suitable site. According to a forest map of North America prepared by the Dendrologist, there are three distinct forest regions represented in the area embraced in District One. The "Northern Forest" of the Appalachian Mountains, Great Lake Basin, and Canada is represented by the four national forests of Michigan and Minnesota. That portion of Montana east of the Continental Divide, the Dakotas, and the southern and eastern portions of the Missoula, Bitterroot and Nez Perce Forests, comprise an important part of the "Rocky Mountain Forest," whose important commercial species are limited to the lodgepole and western yellow pines, Engelmann spruce, and Douglas-fir. The remaining National Forests of western Montana and northern Idaho with their dense heavy stands of western white pine, western larch, Douglas-fir, lowland fir, hemlock, and cedar are essentially a part of the "Pacific Coast Forests." Some of them contain, however, a more or less irregular and wide band of transition forest where the latter region meets the Rocky Mountain Forest. Eventually it may be desirable to establish an experiment station within each of these three regions. For the present, however, because of shortage of men and funds, it was thought best to concentrate our energies and resources at one station, that of course to be located in the Region One [in] which the need is most pressing, where the problems to be solved are most important. ...

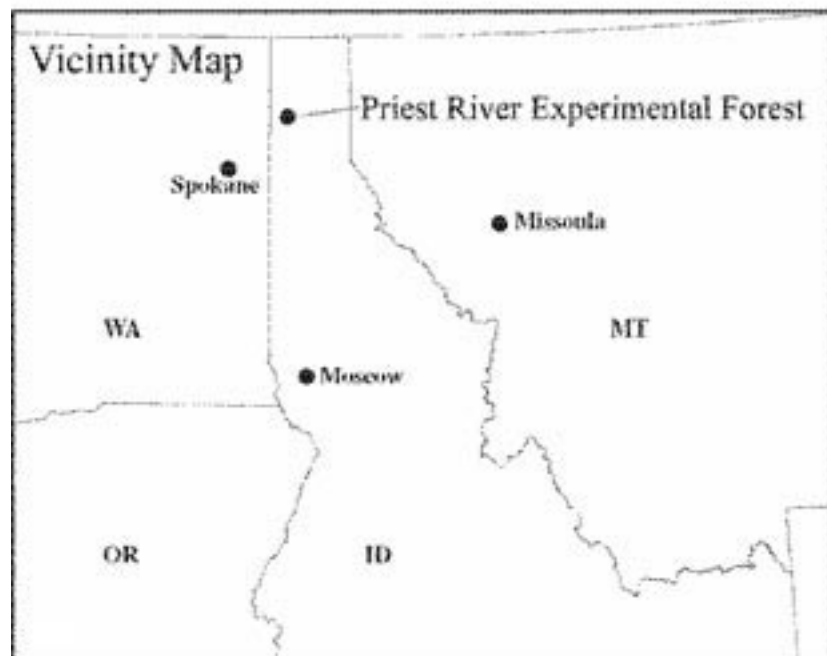
In the Pacific Coast Forest region, however, no forest experiment station has yet been located. ...From a commercial point of view, however, it is much the most important, since it contains nearly 80 per cent of all the merchantable saw-timber within the District, while at the present time it is yielding approximately 70 percent of the total cut. ...All these reasons considered, there was no doubt of the advisability of placing the Station in the Pacific Coast Region One, the western white pine belt. There was more difficulty in deciding on the Forest. ...Practically all of the available sites within reach of the main railway lines on the most promising Forests, viz. The Kootenai, Kaniksu, Coeur d'Alene, St. Joe and Lolo, were examined or considered, and the vicinity of the Benton Ranger Station on the Kaniksu National Forest, was finally chosen as coming the nearest to fulfilling the desired conditions. ...All in all I believe the site selected is as nearly ideal as could be found (USDA Forest Service 1911).

Not only were the forest conditions right for establishing the Experiment Station but the labor force, transportation,

and communication were available in the nearby town of Priest River.

Priest River, Idaho

Founded in 1889, Priest River was established for logging and ranching by Henry Keiser. His daughter, Melinda, was the first white child born in Post Falls, Idaho. Originally, the settlement was given the name of Valencia according to the railroad maps, but when it was discovered that another Idaho town had that name, it was changed to Priest River. According to James Estes (1961) in his *Early Days of Priest River*, the name Priest River derived from the Catholic Priests, such as Father DeSmet, who worked with the Native Americans in the area. Father DeSmet, according to legend, named the lake Roothaan after a boyhood friend; however, the Native Americans could not say that word so they called it Kaniksu, which means black robe. As the settlement grew, the name Priest River was adopted.



Vicinity map. Priest River Experimental Forest in northern Idaho.

The Great Northern Railroad was constructed in the 1890s, and the section in northern Idaho produced a demand for laborers, called gandy-dancers, to lay ties. These laborers, mostly Italians, were brought in, and many of them remained in Priest River. These workers then sent for their families still in Italy, and Priest River was nicknamed "Little Italy." Priest River became the center for ties for the railroad, and the lumbermen were paid 12 cents per tie (Estes 1961).

By 1900, the 50 residents in the town were granted the right to have a post office. Two ferries traveled between Priest River and Sandpoint, Idaho, and a ferry was later added between Priest River and Newport, Washington. The earliest businesses, not surprisingly, were lumber mills. Graham-Robinson Mill and the Priest River Company opened in 1901. In 1903, the White Pine Lumber Company was added, and it produced 75,000 to 100,000 board feet per day (Estes 1961). Despite the lack of paved roads, the first cars were brought to the area by 1907; Dr. Arthur Drake, a dentist, owned the first. The cars were used only during the summer months and only when the roads were dry, and in the winter they were put up on blocks. By 1910 an auto stage (an early form of a bus) was operated by David Coolin to take passengers to and from Coolin on the East Side Road. During the 1910 fire, a second auto stage was established to haul 12 to 15 fire fighters at a time from Priest River to Priest Lake. The operator of this stage made \$1,500 in 2 months by charging \$2.50 per person, but because of the poor road and lack of power of the car, the men had to push the car up the hills, meaning they walked as much as they rode (Estes 1961).

One of the more colorful residents of Priest River during these early years

was Nell Shipman, a filmmaker who made silent movies. Born in Victoria, British Columbia, Canada, in 1892, she became an actress in a touring vaudeville company at a young age. Her first films, based on James Oliver Curwood stories, used the wilderness and animals. Curwood gained a short-lived reputation as an equal to Zane Grey and Jack London.

During the shooting of *Back to God's Country*, Shipman met Bert Van Tuyle, who was the Production Manager for the film, and they formed Nell Shipman Productions in 1921. Between 1922 and 1924 they moved to upper Priest Lake (Shipman 1987). They lived in a log cabin, called Lionhead Lodge, 21 miles from the nearest road and 50 miles from a railway line, and had to use a dogsled and snowshoes to get out in the winter. She maintained a small zoo including Brownie the bear, coyotes, wolves, a cougar, eagles, and owls and used them in her films, and she did her own stunts. Shipman wrote, directed, and starred in two feature films, *Something New* in 1921 and *Grubstake* in 1923. Shipman invited the residents of Priest River to see *Grubstake* at the local hotel in the Beardmore Building. By the mid-1920s, silent films lost their popularity so she closed her Idaho production company and moved to California. Boise State University has created a collection of her work, which includes 23 films.

The peak of growth for Priest River was in the 1920s when the population grew to 2,000. It was, at that time, the fastest growing town in northern Idaho. During World War II, prisoner-of-war camps were established in northern Idaho and northern Montana, and many of the prisoners were allowed to work in the timber industry in the area (Marilyn Cook, personal communication).

Getting Started

Tom Benton, a pensioner, established a claim in 1891 and built a cabin on the north end of Benton Flat. But when the General Land Office survey was completed in 1897, the area proved to be part of the Northern Pacific Railroad land. Benton and his daughter moved to the Big Creek area and established a Half-Way-House for travelers (Larsen 1976). According to Charles Wellner, research scientist and responsible for the Station in the 1960s, the history of the land arrangement for the Experiment Station is convoluted due to the interaction of the State of Idaho, the General Land Office, and the Department of Agriculture. Wellner states:

The major problem was that at the same time the Priest River Station was being established, officials of the State of Idaho and the Department of Agriculture were reaching an agreement to convey lands in which the experimental forest was located to the State. A large area of National Forest land east of Priest River and Priest Lake was to be excluded from the National Forest as indemnity land for selection by the State in lieu of unsurveyed school grant sections 16 and 36 within the National Forest. It took 17 years to unscramble the ensuing mess! (Wellner 1976: 71).

In 1911, Benton and Canyon Creek drainages were to be included in lands available for the State to claim, but 4,270 acres were withdrawn from selection and excluded in a Presidential Proclamation of March 3, 1913. Although an agreement was established between the State and the Forest Service, the paperwork was never properly handled. As a result the State selected the lands, and it was approved by the Secretary of the Interior. To resolve the matter, the Federal government brought suit against the State to recover

the lands, so on February 27, 1928, the Supreme Court decreed certain lands within the Priest River Experiment Station to be returned to the United States. Finally, on April 18, 1931, Robert Y. Stuart, Chief of the Forest Service, signed an Establishment Report reserving the Experiment Station a full 20 years after it was actually created. Much later, other changes were made to the amount of land set aside. Public Land Order 2377 of May 11, 1961, reserved 6,368 acres for the experimental forest (Wellner 1976).

In August of 1911, a party consisting of Raphael Zon, head of the Forest Service's Office of Silvics, and Robert Y. Stuart and F. I. Rockwell from the District Office visited the Benton Ranger Station in the Priest River Valley bringing in the basic supplies needed to establish the Priest River Experiment Station. In addition,

the Chief of the Forest Service, the Regional Forester, and other prominent foresters visited and approved of the area. The location offered the ability to study climate and ecology of forest types. Within a half mile of each other were found available sites illustrating the entire range of conditions in the region from the moist northeastern slopes to the dry southwestern slopes with an intermediate type between. The Savenac Nursery, rebuilt after the 1910 fire, was also available to supply seeds and other assistance. There were two main drawbacks to the area. One was the isolation of being 15 miles from a railroad, which meant mail was delivered only twice a week in the winter and three times a week in the summer; however, a railroad was anticipated within a few years. The other drawback was the expense of freighting heavy equipment and building supplies to the

area. Both problems were seen as minor compared to the advantages.

By September 1, 1911, Zon and Rockwell along with William W. Morris, on temporary assignment from the Coeur d'Alene Forest, and Donald H. Brewster, on temporary assignment from the St. Joe Forest, began the preliminary work of creating the physical facilities. Along with 10 men, including "Dad" Crosby, teamster Howard Simpson, and Douglass MacDonald, the cook, they set up camp, and by October preliminary work had been completed, and the remainder of work was left to Brewster and MacDonald, who had been appointed Forest Guard (see appendix A). Although there were few residents in the area, a number of ranches within a short distance of the Station could supply fresh milk, butter, eggs, and vegetables. They would also provide labor for extra work at



Founding party 1911. Left to right: William Greeley, Regional Forester, Tanner, David Mason, Ferdinand Silcox, James Girard, M.H. Wolff, Henry Graves, Chief of the Forest Service, and Mallory Stickney.



Donald Brewster, first Director of Priest River Experiment Station 1911-1917.

busy times. The Station was already connected with the Kaniksu telephone line providing access to Priest River and Coolin a few miles away. A journal entry in Donald Brewster's log book indicates that the Forest Service personnel were accepted by the local ranchers and that a "house warming in the Laboratory building ended at 6 a.m. and was attended by about fifty people. Every one voted it the most successful affair of the season" (personal journal, pages unknown).

Construction

To replace the tents and temporary structures, several buildings were built and other improvements were made. These included a trail 8 feet wide to

connect the weather stations with the Laboratory, a road 12 feet wide connecting the buildings with the Ranger Station and stage road, and a foot path along the north side of the creek to the stage road. Several areas were cleared to prepare for a nursery and other buildings. A gravity water system that made 13 gallons per minute was installed with a pipe about 3,200 feet up Benton Creek.

Along with the laboratory, an office building of 24 by 26 feet, a story and a half tall and containing five rooms, was built by late October. The office also contained a large laboratory, workbenches, filing cases, and a herbarium with specimen cabinets. A kitchen completed the first floor. During the first year, the building was used by Brewster for his residence, while



Construction party 1911. Howard Simson, Raphael Zon, two unidentified men, "Dad" Crosby, standing by wagon, William Morris, Donald Brewster, and F.I. Rockwell.

MacDonald and his family occupied a one-room cabin (12 by 20 feet) built on the site. A greenhouse (12 by 18 feet) was constructed on the southeast side of the laboratory so that it would receive the best sunlight. The Forest Service had also provided tools and equipment such as aneroid barometers, anemometers, photometer, camera and tripod, microscope, herbarium, seed sampling machine, and a pendulum clock for maintaining standard time. According to the Annual Report, the grand total for establishing the Station was \$3,071.04 (see appendix B).

A number of experiments were immediately started including testing of climatic varieties, planting and sowing methods, nursery practice, introduction of exotics, seed production, meteorological observations, and seed testing. Additional work would be done in the

nursery such as studying the extent of shading on different species during the seedling stage in nursery beds, root pruning to produce roots of uniform length and character, cultivation of seed and transplant beds versus watering, preparation of seed beds for the study of developing tap roots in favor of lateral roots, and testing the differences in climatic variations. Other studies planned were seed production, meteorological observations, seed extraction of cones, and seed testing from other forests in conjunction with the nursery in Boulder, Colorado, and Savenac Nursery. According to Brewster in the Annual Report for 1911, the opportunities for investigative work were overwhelming and limited only by the amount of work one man could do well. In spite of the need for the various kinds of research being done

at the Station, the Forest Service failed to provide an adequate staff to carry on the research. Brewster's journal entries are filled with comments about the lack of time to do experiments and the burden of paperwork.

The organization of the Priest River Experiment Station changed over the years and reflected the emphasis and reorganization of the Forest Service. The first change came in 1914 when the nursery and planting investigations were transferred to Savenac Nursery and to Placer Creek near Wallace, Idaho. Because of the need to restore the forests devastated by the 1910 fire, the emphasis was to serve practical needs in addition to long-term scientific research. By 1915, when the Branch of Research was created in Washington, DC, Graves and other Washington Office staff members



The tent in the meadow in 1911. Ronald MacDonald, the cook's son, stands in front of the tent.

recognized the need for larger staffs at the research sites and for better facilities, and the need to distribute the results of the research more widely. In 1916, a section of Forest Investigations for Silviculture was established under the Assistant District Forester of District One, and Brewster was assigned this responsibility. As a result an agreement was reached in the Missoula District Office, the Washington Office, and reluctantly by Brewster and Zon, to move Brewster to Missoula and leave J.A. Larsen as the only technical person at the Station. Larsen had responsibility for the research program but answered to Missoula. A local Ranger was given responsibility for maintenance, improvement, and protection of the Station and reported to the supervisor of the Kaniksu National Forest. The intent from the beginning was to have the Station be a model and demonstration forest of intensive management. This was best summarized from Brewster's journal entry of September 23, 1913:

Mr. Raphael Zon, Chief of Forest Investigations, from Washington, D.C. arrived for the annual inspection of the Station, coming up on the auto stage in the evening. He found many changes since he left two years ago, the latter part of September 1911, and seemed pleased with the progress that has been made. Mr. Zon went over all the investigative and improvement work, the files, and records in great detail. He also spent an afternoon in looking over the withdrawal up Benton Creek valley and came back a very enthusiastic convert to the plan of making the Priest River Experiment Station a miniature administrative unit of 4,500 acres - a model Forest intensively managed along European lines. With some ten million feet of merchantable timber ready to cut and large bodies of young timber coming to maturity, the unit could be made self-supporting on the basis of its annual increment and in a minimum of time. The

timber would be immediately accessible and saleable as soon as an inexpensive permanent road system can be installed, with a main trunk road about two miles long up the valley from the landing on Priest River and sided roads up each gulch. Mr. Zon stayed until Sunday morning September 28 (Wellner 1976: 10).

The idea of the Station as a model was useful for district people as well. The annual Ranger Training School, which lasted 2 months each year, was held there not only for the value of the training but also to help build facilities and improve the model forest. For example, in 1915, the bunkhouse at the west end of the Station clearing was constructed and a woodshed/icehouse with a lecture room upstairs was built near cottage 1 where Larsen and his family resided. According to Larsen's (1976) memoirs, the buildings, designed by Brewster, were considered "curiosities" because he wanted them to serve the Station after the ranger school was over. A water supply dam was built in Benton Creek, and a gravity water system was completed in 1912, improving on the original system built

the previous year. In 1917, a lookout was built; three additional cottages, workshop, various outbuildings, and livestock fences were also completed. Cottage 1 was remodeled and had the distinction of being the first Forest Service building to have a bath tub (according to Julius Larsen). World War I, however, drastically shifted funding to national and world issues so that the Station struggled to maintain its meager existence. A budget of \$650 per building imposed a constraint on the amount of expansion that could be done at the Station (Wellner 1976).

Early Research Begins

All the construction activities, however, took energies away from the research projects. Because of the need for more data about the Forest, Joseph Kitteredge, Samuel V. Fullaway, Claude Sutton, and F.R. Paine mapped and cruised the Forest during 1913 and 1914. They evaluated 4,250 acres in the Benton and Canyon Creek drainages.

Brewster left for military service in 1917, and Larsen was responsible



Plantation of western white pine in 1911.

for handling all aspects of the Station. In 1918, research was separated from the National Forest administrative organization and put directly under the Branch of Research in Washington, DC. Larsen became Director of the Priest River Experiment Station and reported to the Branch of Research. The Station and all research suffered its lowest level of funding in 1920 when Congress drastically cut appropriations. Larsen was temporarily transferred to District One to work with W.C. Lowdermilk, and funds for Priest River were used for maintenance and protection only.

Guiding research activities during the war years was an investigative committee. Forest Service Chief Henry Graves, in Directive Order 41 dated January 2, 1912, ordered the establishment of an Investigative Committee consisting of representatives of each major line of investigation, which included silviculture, grazing, and forest products. This committee, meeting annually except for 1917 and 1918, reviewed, advised, and made recommendations to the District Forester, and required that investigators prepare written reports to justify their

programs and progress. At the 1916 meeting, the Committee requested that a study of the detection and control of forest fires be established, emphasizing the rate that fires spread, the interaction with weather, and site conditions. Larsen monitored the project by periodically analyzing the moisture in the duff, litter, and surface soil at three locations where climatic readings were taken. These and other studies with Lowdermilk mark the beginnings of fire research that later would lead to breakthrough discoveries.

Charles Wellner estimated the amount of time spent on the various research projects from 1911 through 1920 (Wellner 1976: 16).

Line of study	Responsibility	% of effort
Planting	Brewster, Larsen, Kitchen, Wahlenberg, Delavan, Rogers	45
Methods of cutting	Brewster, Larsen	30
Thinning	Brewster	2
Meteorological studies	Larsen	8
Volume, growth, and yield	Brewster, Larsen	3
Tree studies	Brewster	2
Fire studies	Larsen, Lowdermilk, Delavan	10

Experimental planting area for the western white pine at Priest River Experimental Forest. Area logged in 1910. Photo taken in 1911.



Chapter 3: The Larsen Years 1913 to 1924



Julius A. Larsen, second Director
1917-1921.

The second Station Director, Julius A. Larsen, joined the Forest Service and had been assigned to Montana shortly after graduating from Yale. He was recommended for research work at the Station in 1912 after working on the Blackfoot National Forest in Kalispell, Montana. In 1913, Larsen, his wife, and baby daughter, Margaret, traveled from Montana by “dead axe wagon” in 2 feet of snow arriving April 6, 1913, in Priest River. They stopped over at the Benton Half-Way-House overnight and then went on to the Station the next morning. Due to the limited accommodations they shared cottage 1 with the Brewster family until cottage 2 was completed later in 1913.

Under the leadership of Larsen, the years between 1920 and 1924 were used to offset the lean war years. Increased funding from Congress was used to expand the research program

but was limited to the variety of studies that could be conducted. The Station also expanded its role as an educational site for universities in the area. During this time the Office of Blister Rust Control was established in Spokane, Washington, and, in contrast to the meager allotment of research money (under \$20,000), the studies of western white pine blister rust budget was \$54,000 (Wellner 1976). The emphasis on eradicating a nationwide problem took precedent over any other studies being done in the area.

The Office of Blister Rust Control was created to develop practical methods of eradicating Ribes from western white pine forests. White pine blister rust, a fungus, was brought to North America in shipments of pine seedlings from Europe. First identified at Geneva,

New York, in 1906, it had spread by 1915 throughout New England. By 1921 it was found in various locations in the Pacific Northwest in plantings from seedlings shipped to Vancouver, British Columbia, Canada. Little was known about its development and fast-paced dispersal, and the western white pine forests proved to be vulnerable to this invasive disease.

White pine blister rust requires two hosts for it to survive: white pine and Ribes. On white pine, the fungus, traveling by spores from current bushes, first enters the needles and proceeds to grow down the limb until it reaches the main stem of the tree where it encircles the tree, killing it. This can take 30 years or more in old trees but much less time in young trees. Growing on white pine, the fungus forms another type of



Cottage used by the Larsen family. Photo taken in 1923.



Residents living at the Priest River Experiment Station in August 1923, left to right: Mrs. Julius Larsen, W.C. Lowdermilk, Gerhard Kempff, and William MacCarthy.

spore that, when carried by the wind, infects the Ribes host such as a current or gooseberry bush. This spore is then transferred from the Ribes back to the pine, completing the two-host process.

A campaign was developed to eradicate all of the wild currant and gooseberry bushes in the white pine forests of District One. This massive works project, however, proved ineffective, but this information came only from the long-term research conducted at the Station.

In 1926, the agency created the District One Investigative Committee to study the blister rust problem. The committee included Fred Morrell, District Forester, Elers Koch, Robert H. Weidman, Samuel V. Fullaway, H.R. Flint, T. Lommasson, D.S. Olson, W.M. Nagel, and W.W. White. From the Station Harry T. Gisborne, Melvin I. Bradner, Ivan T. Haig, W.G. Wahlenberg, and Bob Marshall were included. In an effort to avoid duplication of research

efforts in the area, representatives from the forestry schools at the University of Idaho and the University of Montana filled out the committee. Stephen Wyckoff and James C. Evenden from the Office of Blister Rust Control of the Bureau of Entomology in the Forest Insect Station in Coeur d'Alene, Idaho, completed the committee. The University of Idaho School of Forestry required its faculty to spend 2 months each year working on research, so cooperative blister rust projects between the Experiment Station and the University of Idaho were created and continue today. Cooperation with the Office of Blister Rust Control was also done by exchanging field data, but Wyckoff urged that a specific study be started. Due to a lack of funds, the Station declined, but he arranged for funding from the Blister Rust Office through the approval of the Executive Committee of the Western Blister Rust Conference, an advisory board of lumbermen.

The Era of Bob Marshall

In the summer of 1925, Bob Marshall came to the Station as a Junior Forester working on silvicultural investigations. Marshall, who would later become a nationally known conservationist, was born in New York City, the son of a wealthy Jewish immigrant father. His father, Louis Marshall, completed law school at Columbia University and became a famous lawyer. Louis shared the concerns expressed by George Perkins Marsh and others who felt that the country's natural resources were being destroyed. Marsh, through his widely influential 1864 book *Man and Nature*, was one of the first to suggest that people were agents of change on the environment, and he raised concerns about the destructive impact of humans based upon his observations in Vermont and his travels in the Middle East. (He was also instrumental in the creation of the Smithsonian Institution.)

As a result of Marsh's and others' influence, Louis Marshall put his legal skills and prestige to work for conservation, supporting measures restricting lumbermen and guaranteeing a forest tract to be set aside as the Adirondack State Park in New York. He also served on the board of trustees of the New York State College of Forestry. Bob Marshall grew up with his father's influence, and time spent at a vacation home in the Adirondacks instilled a sense of commitment to the land and a love for the forests. Marshall chose forestry as his profession and attended the College of Forestry at Syracuse, New York, graduating in 1924. He also completed advanced degrees from Harvard University and Johns Hopkins University. In 1925, he went to northern Idaho to work at the Station and left in 1928 to complete his studies at Johns Hopkins.

Bob Marshall's well known exploits as a hiker were exemplified by an anecdote in a biography written by James M. Glover. Floyd Carlson, a worker on the Forest stated:

On this occasion I had driven to the Bitterroot National Forest in Montana at the West Fork Ranger Station. A number of telephone calls were coming in the afternoon I arrived there. Since the day was quiet and there had been no rains, I knew the calls could not be about forest fire or fire danger. I was puzzled as to why these calls were coming in. When my curiosity got the best of me I asked the Forest Ranger what was happening. "Oh," he said, "these telephone calls are coming in from lookouts and other people in the forest who have made a wager on the time which Bob Marshall will be getting in from a 40 mile hike which he started early this morning. He is due here...some time around dark." (Glover 1986: 67)

Most of the research being conducted during Marshall's tenure at the Station centered on western white pine. Marshall worked on all aspects of this research, including methods of cutting, reproduction, intermediate cuttings, yield, reforestation, and fire. As part of the fire research, he traveled to remote



Bob Marshall inspecting tree seedlings after a fire in 1927.



Planting seedlings in the 1910 burned area.

lumber camps and ranger stations, which more than met his criterion for solitude. His work involved the detailed study of how trees grew back after fire or logging operations. Counting seedlings, collecting data on sunlight, soil composition, slope, logging debris, ground cover, and other variables consumed his time and research report writing. Not content with just scientific writing, Marshall also took a creative writing class at the University of Montana and published articles in journals, magazines, and newsletters. One of his most popular articles, "Contribution to the Life History of the Northwestern Lumberjack," appeared in the Forest Service's Northern District newsletter (see appendix E). In it he describes, with much humor and wit, the eating habits, table manners (or lack of), and the use of profanity by the loggers. For example, he reported:

...average woodchopper spends just 35 minutes a day in food assimilation...and 33 percent of the diners commonly depended upon their forks to harpoon the staff of life...and it is the virility (of the lumberjack's) adjectives and interjections which differentiates his oral activities from those of ordinary mortals...it transpired that an average of 136 words, unmentionable at church sociables, were enunciated every hour by the hardy hews of work. (Marshall 1929)

During his time at the Station, Marshall was under the supervision of Station Director Robert Weidman, who later became Chief of the Silvics Division then Superintendent of the Institute of Forest Genetics at Placerville, California. Weidman encouraged Marshall to gain more practical experience:

Although you are strong on the essential qualities desirable in a novice either in research or administration... you are weak in the mechanics of field work and field living. You are

awkward with the tools and equipment that are necessary to a forester's work in the woods, and you lack orderliness in certain aspects of field work.... To overcome these weaknesses you need nothing more than field and office experience in an organization such as the Forest Service. (Glover 1986: 76-80)

In the summer of 1926, Marshall was sent back to New York to recover from an acute ulcer. He wrote to Weidman asking for a leave of absence to pursue his doctoral degree, but decided instead to return to the Station in September 1926. But by April 1928, recovered from his illness, he decided to go to Johns Hopkins University to study. He spent the rest of his career in the Forest Service in various administrative roles. In 1937, Ferdinand Silcox, Chief of the Forest Service, appointed him Chief of the Division of Recreation and Lands, a post created especially for him. By the 1930s, Marshall and a small number of others called for the Forest Service to be more of a model of conservation rather than use oriented. His trekking experiences in the Selway-Bitterroot areas of Idaho and Montana contributed to his fierce love of wilderness and prompted him to work for setting aside certain areas as protected. In 1933, Marshall wrote in *The People's Forests* that timberlands should be nationalized and placed under the control of the Federal government to ensure long-term use. Despite his efforts at lobbying from his Washington, DC, office, the idea failed, but some changes in forest regulations were made. Secretary of Agriculture Henry Wallace agreed to create wilderness areas to placate Marshall's faction. Marshall managed to add 5,437,000 acres to the government's preserve system as wilderness with the backing of a group called the Wilderness Society in 1935. This group included Benton MacKaye (a naturalist who was the

creator of the Appalachian Trail), Aldo Leopold (author of *A Sand County Almanac* in 1948, he was considered the father of wildlife ecology and creator of the "land ethic" philosophy), and Harvey Broome (a conservationist who, along with Marshall, MacKaye, and Leopold, founded the Wilderness Society in 1935). Marshall died in 1939 at the age of 38, but his influence on forestry, wilderness, and the need to revamp the Forest Service's policy about Western forests is unquestioned. The Bob Marshall Wilderness area in Montana, created by Secretary of Agriculture Henry A. Wallace on August 16, 1940, is named in his honor.

Although Marshall spent only a short time at the Station he wrote several publications including: *Life History of Some Western White Pine Stands on the Kaniksu National Forest*, *Volume Production in Forestry*, *The Effects of Fire Temperatures on Forest Seed in the Duff*, *Reproduction Following Fire and Logging in Northern Idaho*, *The Girdled Pine Still Lives*, *American Forests and Forest Life*, and *Natural Reproduction in the Western White Pine Type*. A handwritten document, entitled "History of the Northern Rocky Mountain Forest Experiment Station" was also written by him in 1928 but apparently never published.

The Convoluted Evolution

As we have seen, the early leaders of the Forest Service determined the need for experiment stations nationwide to reflect the various forest types. Following examples witnessed in Europe by Pinchot and Zon, the Stations' purpose was for studying the various aspects of tree species and silviculture, and for applying the knowledge to practical application on

the nearby forests in each area. While legislation such as the McSweeney-McNary act helped support the policies in managing the nation's forests, the laws also recognized the need for funding and developing research programs.

During these early years, the Forest Service was going through growth spurts and development. However, with these growing pains, the Priest River Experiment Station suffered an identity crisis. With Brewster's move to Missoula, the leadership responsibility by default shifted from the Priest River location to Missoula. By 1918, research in the field was separated from National Forest administration, and the Priest River Experiment Station reported directly to the Branch of Research in Washington, DC, with J.A. Larsen serving as Director with residence at Priest River. To add to the convoluted organization, in 1922 the Station headquarters was moved back to Missoula and it was called the Priest River Experiment Station, Missoula, Montana, with Robert H. Weidman as Director. To reflect the wider responsibilities of the Station, a name change was requested to the Northern Rocky Mountain Experiment Station, but this was not approved until June 1925. From 1925 until 1930 the Station had a variety of names including Priest River Branch Station, Priest River Station, and Forest Experiment Station, Priest River, Idaho. Finally, in 1930 the accepted name became the Priest River Experimental Forest.

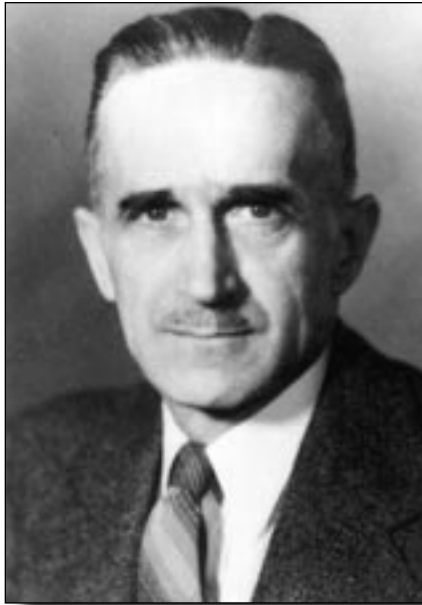
Not only was there confusion regarding the name, there was also confusion about the lines of authority. At the beginning, the Station was more independent and worked in conjunction with District One. Then by World War I, the Investigative Committee began to set policy and procedure. Nevertheless, the Priest River Experiment Station survived even though funding fluctuated

and, during the war years, was reduced to virtually nothing.

Even though the researchers were, for the most part, Easterners, they seemed to settle into the community well. They viewed their work as researchers to be above the day-to-day political trials and tribulations, exemplified by their ability not only to construct the buildings but also to lay the foundation for answering many research questions and retaining their strong will and determination. With the firing of Pinchot and the diminishing role of his protégés who had created and led the Forest Service and research, other foresters, from other educational backgrounds, were now making policy and influenced the type of research being conducted at the Station. The Station had endured hardship and was ready to proceed.

The Gisborne Era Begins

Harry Gisborne, who began working at the Station in 1921, became renowned for his fire research. Fire suppression had been a high priority since Pinchot created the Forest Service. But while fire research was also a high priority, it often took a backseat to fire fighting. At the Priest River Experiment Station, Larsen had started the work to correlate the Station's weather data with fire records, especially on the Kaniksu National Forest. The program at the Station divided forest areas into climatic units, studied meteorological and climatic conditions, fire rate of spread under various conditions of weather, and described fuels and topography with the intent to predict dangerous conditions. In 1916, Earle H. Clapp emphasized that research needed to be done on forest fires. He provided the incentive that anyone



Harry T. Gisborne, circa 1930.

who successfully worked out solutions would receive the highest type of recognition, both within and outside the Forest Service, and the men who were the leaders of fire research would become the most important forest researchers in the country.

In 1921, the Station received a substantial increase in funds and a new Director, Robert H. Weidman. Earle Clapp requested that Gisborne transfer to the Station to demonstrate his ability to study the fire problem in the Northern Rocky Mountains. Gisborne was appointed Forest Examiner on April 1, 1922, at an annual salary of \$1,920 (Hardy 1983). Both Weidman and Gisborne lived in Missoula and traveled to Priest River to conduct their work.

Harry Gisborne grew up in Vermont and graduated from the University of Michigan Forestry School in 1917 at the height of the Progressive Era. Following a 2-year stint in the military in World War I, Gisborne joined the Forest Service's Sitka spruce research study and spent the next few years working on various projects

within the Northwest. Although he was offered a teaching position at Syracuse Ranger School in New York State, he preferred work in the Forest Service.

When Gisborne arrived at the Station, he inherited some preliminary work on fire research that had been done by Larsen and Lowdermilk, and also from work done by S.B. Show and E.I. Kotok in California. The 1919 Annual Report even mentions fighting fires with gas bombs using "aeroplanes" and dirigibles, although it was written with much skepticism. The 1920 Annual Report recommends the development of a lightning detector and a device for measuring static electricity, and lightning fire research was given a high priority that year. Because of the McSweeney-McNary Act, fire research was given more emphasis when it designated that forest experiment stations would carry out investigations on fire weather study, and research was given an annual appropriation of \$50,000 (U.S. Department of Agriculture 1933).

After reviewing the work completed and that in progress, Gisborne



Robert H. Weidman, third Director 1921-1931.

decided that the first priority would be to determine what combination of factors indicated a major fire possibility requiring manpower to meet the emergency. He established three fire weather stations on the Kaniksu, Clearwater, and Nezperce Forests and began researching fire predictability. He found that temperature was an important variable in moisture content determinations, and that the moisture content of the duff was due to the constantly changing humidity and temperature. His research also found that the distribution of rainfall was more important than amount of rainfall in influencing dangerous fire conditions. Working closely with the Madison, Wisconsin, Forest Products Laboratory, he studied moisture content of duff, twigs, and down logs in relation to temperature and relative humidity. Moisture contents of forest floors were considered in relation to weather forecasts from the Pacific Coast via the wireless in hopes of predicting fire conditions a few days in advance. But after the first year he found no one single factor to measure or to predict inflammability.

To do more specific types of research, he developed specialized tools. In 1923, he and Matt Dunlap of the Madison Laboratory devised the “duff hygrometer,” which measured changes in humidity. Hygrometer data were gathered from the Nezperce, Clearwater, Lolo, Bitterroot, and Flathead Forests as well as at Priest River in 1925 and telegraphed to the District Fire Desk. Although this procedure was used during the 1930s, calibration was difficult, and the hygrometer was discontinued around 1940. In 1930, Gisborne, with Dunlap, developed the anemohygrograph, which was intended to measure fuel moisture, wind, and duff so that manual measuring was not required, but costs prevented taking this instrument past the experimental stage.

Budget constraints forced Gisborne to come up with inexpensive weather instruments such as the S-shaped wind gauge.

The second priority Gisborne investigated was the relationship between lightning and fires and how to predict, in advance, when lightning storms were approaching. His study included the effects of lightning on soils, rocks, forest cover, and topography, and, if possible, how to control lightning. The project began with 1,300 storm reports through which he began to sift for topics to research. For example, he learned that most storms were not single, well-defined storms but rather numerous isolated storms.

In 1924 and 1925, the records Gisborne collected and those from earlier years’ compilations were put onto punch cards using the Hollerith machine in the Washington Office. (Punched cards were first created by Herman Hollerith for the 1890 census to tabulate results. The cards were read electronically by putting them between brass rods, and when the holes in the cards made the rods contact, an electronic response created a “count.” Hellerith’s Tabulating Machine Company was eventually taken over by IBM.) The results of Gisborne’s compilations were published in the *Monthly Weather Review* of 1926 and in *Northwest Science* in 1927. These reports emphasized the need to report lightning storms so that preparatory action could be taken, and the need for the U.S. Weather Bureau to make long-range forecasts.

The third priority of study dealt with fire weather forecasting and involved the U.S. Weather Bureau. The 1923 Annual Report mentions that long-range forecasts up to 10 days based on sunspot forecasts by the independent meteorologist Father Richard of Santa Clara, California,



Harry Gisborne reading anemometer dial.

were quite often correct. Gisborne was interested in sunspot activity based on 11-, 22-, and 44-year cycles. His 1925 paper, “Cyclic Fluctuations of Rainfall in the Northern Rocky Mountains,” summarized his attempts to predict rainfall for the months between April and September based on 44 years of precipitation records.

In 1923, the Fire Weather Warning Service was set by the U.S. Weather Bureau headquartered in San Francisco, California, and in 1926, Congress created a special appropriation to assist forest fire weather forecasting. Input came mostly from large city stations because no mountain weather stations existed. But in 1926, the first daily reporting of local fire weather data began with data telegraphed from Priest River to the Spokane Weather Bureau office. Broadcasting of regular fire weather forecasts and special warnings

were started in 1927 on radio stations KOUM (University of Montana), KHQ (Spokane), KOMO, KJR, and KFOA (Seattle), and KGW and KOIN (Portland). By 1929 a part-time meteorologist was assigned by the Weather Bureau to analyze the mass of data submitted by Forest Service observers, and the Weather Bureau was urged to finance a full-time position.

With the aid of his assistants, Jemison and Hayes, Gisborne was able to spend time observing fires by working as close to the front line as possible where he measured things such as slope, size, kind, amount, and arrangement of fuels. In 1928, he published *Measuring Forest Fire Danger in Northern Idaho* that discussed the results of his work to that point. But the research required much more time and effort than he and his assistants could handle, so he turned to the forestry schools at the University of Montana and University of Idaho. At both schools he was given laboratory

privileges that helped him with studies of forest fuel combustion, and cooperative studies included one by Professor E.E. Hubert, at the University of Idaho, dealing with the inflammability and heat retention of different moisture contents. By the end of the decade, methods resulting from Gisborne's and Hubert's work were being adopted in many Districts of the Forest Service. One of the worst fire seasons was in 1929, and by then the research had been proved and helped in many phases of fire control. As a result, District One proposed to Washington, DC, that research should be accelerated.

Gisborne's work was unique in the Forest Service and, therefore, no Civil Service classification was available. He began at the Station as a Forest Examiner but was then designated Assistant Silviculturist, Associate Silviculturist, and finally Silviculturist at a salary of \$4,000 by 1930. The small staff consisted of Gisborne, Weidman, Wahlenberg, Kempff, and, in 1928,

J. B. Thompson, who transferred to the Station as Superintendent. However, Gisborne was the only one working in fire research.

The Depression Years

In 1933 the Copeland Report, officially named *A National Plan for American Forestry*, was published. The 1,677-page study was the result of U.S. Senator Royal Copeland's resolution calling for extensive work that proved to create much labor for the Forest Service. In Copeland's report, he outlined four main problems facing the Forest Service: (1) that almost all of the problems of American forestry have resulted from private ownership; (2) that within the public sector there was little or no management; (3) that there was no organized manner of solving forest problems between private and public ownership; and (4) that the problems



Weather station, circa 1935.

facing the forest industry were major issues facing the nation (U.S. Department of Agriculture 1933).

Clapp wrote to each of the experiment station Directors indicating that this was an “opportunity” to restate American forestry in a positive fashion (Steen 1998). However, a decade later, Clapp wrote bitterly about the lack of strong leadership from the Chief and lack of interest by President Franklin D. Roosevelt. As a result, the resolution calling for Federal regulation of the forest industry failed to gain Congressional support. The report, however, created by the Forest Service was not completely ignored as forestry students often used it as a required textbook. The report also contained two sections on Forest Service Research, a history, and an appraisal by Clapp. The appraisal contained a list of accomplishments done by researchers and some forest economics such as data on lumber production and consumption that had been collected earlier in the decade.

As noted, the restricted Federal funding caused by World War I and the Depression negatively impacted research in a number of ways but also sparked ingenuity. Gisborne and others were forced to devise resourceful methods of doing research and creating the tools needed when dollars were not available. For example, to measure windspeed, Gisborne asked a plumber to make 160 of his home-grown devices. Because of the slight differences in the craftsmanship, George Jemison, an assistant, then mounted each of the gauges on the front of his car and, while his wife drove at 5 to 15 miles per hour, he lay on the fender and counted the revolutions to calibrate each of them (Maunder 1978). Other experimental tools included the trail-sized tractor called the “Iron Horse,” which proved unsuccessful in replacing the horse, and the Cordeau-

Bickford, which was chain dynamite that was used to open a fire trench but that also had limited success. Other experimentation was on backpack radios for use in the field.

The Depression Years proved to be a blessing for fire research. To offset the effects of the Depression, President Roosevelt instigated many programs including the Civilian Conservation Corps (CCC). He called upon the Rangers to supervise the work of thousands of young CCC men. To avoid opposition from labor, the CCC workers were assigned projects not already covered by public works relief. The Forest Service administered nearly half the projects, while the Soil Conservation Service, National Park Service, and other bureaus accounted for the remainder. By 1942, the CCC had spent over 6 million hours fighting fires and cleared thousands of acres. The Deception Creek Experimental Forest, near Coeur d’Alene, and the Coram Experimental Forest in Coram, Montana, were established in July 1933. The Vigilante Experimental Range and Work Center in Alder, Montana, was created in 1925

(demolished in 1957, although the site was retained and preserved). Forests and rangelands provided additional resources for experiments and a more diverse variety of timber to study. For example, in Idaho, approximately 50 camps a year were operated with a total financial obligation within the State of more than \$82 million.

In 1933, a full 200-man CCC camp, F-127, was established in the extreme southwestern corner of the Forest between the county road and the Priest River. The 1934 Annual Report, written by Director Lyle Watts, noted:

The Station was particularly fortunate during 1934 in the allocation of Civilian Conservation Camps. One entire camp was allocated each to Priest River Experimental Forest (F-127), Deception Creek Experimental Forest (F-137), and Coram Experimental Forest (Montana). While the largest single work project in each instance was the construction of utilization and protection roads, material progress was made in other ways. The enrollees, under the direction of carefully selected technicians, established thinning and stand improvement plots, treated a considerable



Civilian Conservation Corp workers.

area of old burns to reduce fire hazard, eradicated the Ribes from the entire area of the two white pine experimental forests, poisoned rodents, accomplished a number of improvements of roadside, planted trees on poorly stocked areas and in the arboretum, and assisted in many other improvement and research projects. From four to eight selected enrollees were assigned during the entire year for office work at the Station headquarters in Missoula. Plans call for full camp at Priest River, not only for the present summer, but for the winter of 1935-36 as well; a full camp at Deception during the summer and approximately half a camp at Coram for the winter of 1935-36. With this amount of CCC help assured, the road and trail systems on these experimental Forests will be completed in a reasonable period and a vast amount of other worthwhile work will be done. Unfortunately, the camp allotments for overhead, equipment and materials, and miscellaneous expenses have now been so greatly reduced that much otherwise logical work cannot be attempted. CCC assistance at Miles City (Vigilante) has been impossible to obtain due to the long distance from any established camp (U.S. Department of Agriculture, 1934 Annual Report).



Lyle Watts, fourth Director 1931-1936.

Between 1935 and 1942, Camp F-127, Priest River Experiment Forest, was a year-round camp occupied by Company 1235. The CCC workers—many of whom were experienced carpenters, masons, or had other construction skills—did a tremendous amount of work on the experimental forest including building improvements, road construction, maintenance of buildings and grounds, stand improvements, fire hazard reduction, blister rust control, tree planting, research plot establishment, and research assistance. Due to the emergency funds and the CCC workforce, the facilities at the Priest River Experimental Forest were completely rebuilt between 1935 and 1938. The office/laboratory was built in 1936 and contains four offices on the first floor and four laboratory rooms on the second floor. The bunkhouse/mess hall was originally built in 1915 as a lecture room and woodshed and remodeled in 1934 to accommodate groups of

people working and visiting the Station. The gas house was built in 1931 for storing fuel for cars and equipment. The woodshed was built in 1934 and was used to store the winter supply of firewood to heat the buildings prior to electric or gas heating added during the 1970s and 1980s. There are two other sheds both built in 1936 and are still used for storage. The lodge/cottage 1 was built in 1936 and is a story-and-a-half wood-frame building with a full basement and garage. It resembles a ski lodge structure, hence its name. The building contains several bedrooms on each level to accommodate researchers and special guests. Cottage 2 was built in 1936 and is a story-and-a-half wood-frame building that has a half basement used as the mechanical room. Cottage 3 was also built in 1936 and is a story-and-a-half wood-frame building with basement. Cottage 4, the Superintendent's home, was built in 1939 and is a one-story wood-frame building containing two bedrooms, kitchen, dining room, living room, bathroom, and a full basement. The CCCs also built a dam to measure streamflow on Benton Creek. (Historical note: All the CCC buildings have been upgraded over the years and in 1993 were modified for handicapped access. However, the Camp 127 itself was used as an Iowa State College summer forestry camp, then was demolished in 1950.)

The 1936 Annual Report stated: "Staff members are about to realize a long-cherished hope in the new laboratory and office building that is now four-fifths complete. About three-fourths of the necessary scientific equipment is now installed and by next summer the structure will be completed" (U.S. Department of Agriculture, 1936: 6).

Gisborne had even higher hopes for the research center. He requested a wind tunnel that could accommodate

fuels of definite moisture content, at any desired slope, wind velocity at any level, and controlled temperature and humidity. With the collapse of funds, however, this wish was not fulfilled until 1960, almost 30 years later.

Company 594, organized in Kentucky and Ohio in 1933, was sent to the Forest in April 1934 as Camp F142 to work with the Forest Service personnel and to continue work started by the CCC men from California and Idaho. Their Four Corners Camp (Camp F164) was at Moose Creek, 15 miles from the town of Priest River, and contained approximately 200 men. According to a document entitled *The Civilian Conservation Corps, Fort George Wright 1938-39*, they were assigned many projects such as clearing and burning brush, bridge construction across the West Branch of the Priest River, and completing the telephone line from the town of Priest River to Bismark Ranger Station.

The Annual Report for 1934 also noted extra funds were obtained from the National Industrial Recovery Act. Passed in June 1933, this law was one of several measures created by President Roosevelt to help the nation's economic recovery. The act authorized \$3.3 billion for the expansion of public works and was monitored by the National Recovery Administration. The Forest Service funds from this act were used to improve the 150-foot fire weather observation tower and to complete the 13 miles of power line from the town of Priest River to the Forest. Funds also allowed for construction of a four-room cottage, a shop, a five-stall garage, a gashouse, water system, and landscaping at the Deception Creek Experimental Forest. Because of the increase in workforce and funds, several additional research areas were proposed including Rochester Basin Experimental Range (no



Stephen Wyckoff, fifth Director 1936-1939.

location was specified in the Annual Report), Vigilante Experimental Range, Pleasant Valley Experimental Forest (for research on ponderosa pine), and the Clearwater Experimental Forest, but only the Vigilante became a reality.

Several organizational changes occurred at the Forest from 1931 through 1944. Lyle Watts became Director in 1931 and left in 1936 to become Regional Forester in Milwaukee, Wisconsin, and later Chief of the Forest Service. Stephen Wyckoff, who had been in charge of the Office of Blister Rust Control in Spokane, succeeded Watts as Director of the Station in 1936 and left in 1938 to become Director of the Pacific Northwest Station. Melvin Bradner, who came to the Station in

1931 as head of the Office of Forest Products, succeeded Wyckoff as Director in 1938 until his death in 1946.

In addition to the CCCs, other work programs such as the Works Progress Administration (WPA) provided Gisborne with the workforce and funds he needed, although on a temporary basis. Using emergency program funds (see accompanying table), he was able to hire promising young scientists, such as F. Lloyd Hayes in 1934 and George Jemison, and then switch them to regular funds later. Hayes began work in 1934 as an assistant in the silvicultural field crew at Priest River then at Deception Creek. That autumn he began work under Gisborne in fire research. He also served during 1937 to 1938 as Superintendent of Priest River after Thompson transferred and before McKeever reported. He transferred in 1942 to the Southeastern Station to work on fire research. Jemison, who had seen Gisborne while a University of Idaho student, was so impressed by Gisborne's lectures at the University that he applied for a job in the summer of 1930. By 1931, he received a permanent position as the first full-time professional assistant in Gisborne's fire research program. Jemison's career flourished; he transferred to Appalachian Station in autumn of 1937, he become Director of the Northern Rocky Mountain Experiment Station in 1950,

Year	Regular funds	Emergency funds	Personnel
1932	\$18,900	0	Gisborne, Hornby, Jemison
1934	\$14,837	\$4,630	Gisborne, Hornby, Jemison
1935	\$13,501	\$14,811	Gisborne, Hornby, Jemison, Hayes
1937	\$13,625	\$18,220	Gisborne, Hornby, Jemison, Hayes, Kachin, Buck, Cline, Naiman
1940	\$15,000	0	Gisborne, Hayes, Lyman, McKeever, Cline, Naiman, Weyerman

and later became Forest Service Deputy Chief for Research.

The amounts of emergency funds that were available for Gisborne's work are shown in the table on this page, taken from Hardy (1983). The table indicates that the drop in emergency funds eliminated the ability to operate at even a maintenance level by 1940. In a memorandum to the staff in 1933, the Director decreased funds by 28 percent and required projects be curtailed or temporarily discontinued. There was concern that the Forest would lose its leadership in fire research unless studies could be resumed. However, Gisborne's salary was raised in 1935 to \$4,600, perhaps an indication of how important he and his work were considered by the Station's administration (Hardy 1983).

Research continued, however, despite the problems and the limited staff. Jemison and the others were given a number of tasks to accomplish with Gisborne monitoring each step. One of Jemison's first duties in 1930 was to establish on Benton Flats the full timber inflammability station in addition to the clear-cut and half timber sites already in place. He cleaned and fenced the area and installed the instruments. He then took weather measurements three times a day and summarized the data. In 1923, J.A. Larsen had traveled to Europe to visit several experiment stations and reported to Gisborne that in France they were evaluating wood as a criterion of atmospheric change by observing how it reflected humidity. Given this idea, Gisborne took it further and had Jemison measure round wood sections, dowels, that became "hazard sticks," which were weighed and measured at various times of the day. Richard E. McArdle (later Chief) carried out a parallel fuel moisture cylinder development program at the Pacific Northwest Forest Experiment Station (PNW) in Portland, Oregon. McArdle used square



Gisborne's fuel moisture sticks.

sticks instead of round, which Gisborne criticized because "square sticks didn't occur in nature." Although friendly, the dispute between McArdle and Gisborne prevented any effort to merge the studies. In fact, while Gisborne's scientific abilities are unquestioned, his "do it my way" attitude made it difficult for coworkers to work with him. According to Jemison, Gisborne was "so dynamic" that he pushed ahead with his own ideas rather than accept someone else's work (Maunder 1978).

Fire Research Results

In 1927 fire research had an annual budget of \$5,000, and even though the McSweeney-McNary Act of 1928 was to augment research funds, none were designated for Gisborne until 1931. Major W. Evan Kelley (who had held several Forest Service positions and, in World War I, commanded all saw milling, logging, and road construction operations in France for the military) became Regional Forester in 1929 and enthusiastically supported fire research

and put Lloyd G. Hornby in charge of the fire control planning project using Gisborne's data (Baker and others 1993).

Since the 1910 fire, controlling and suppressing fires had been the Forest Service's top priority. Because of the damage caused by fire, research gained the full support of the timber industry especially because States such as Idaho and Montana lacked the funds to provide adequate fire protection measures. Gisborne worked with Harry Flint, the District's Office of Operation Director and close friend of Gisborne, to plan fire control. By 1926, Gisborne was able to put statistics together to form the beginnings of a rating system. With all the data collected and analyzed in 1930, Gisborne was able to produce a simple and readily usable pocket-sized device, the Model 1 Fire Danger Meter that was used in the 1932 fire season. The meter was a little cardboard envelope with windows and two slides, A and B. Factors including fuel moisture (half-inch round sticks), wind velocity, relative humidity, and the number of lightning storms were integrated to produce six classes of fire danger both in terms of rate of spread and action needed to fight it. An article in the *Northern Region News* of July 6, 1932, stated: "the first issue of the forest fire danger meter in early May has created such a demand for inflammability stations that the Experiment Station has utilized all the wood cylinders and duff hygrometers available and has not been able to equip all of the Stations for which requests have been received" (Hardy 1983).

Gisborne quickly created seven fire danger stations in Region Four (Utah, southern Idaho, and Nevada) and 18 others in the 10 Western Region One forests, Glacier Park, and Yellowstone Park. By the end of 1933, 30 more

inflammability stations were created in Region One.

In 1934, working with the District Ranger in the Selway country in Idaho, Gisborne and Jemison set up stations at Pete King-McClendon Butte on the Lochsa and Selway Rivers. Based on the Fire Danger Meters, the area showed an extreme condition ripe for fire in early 1934. On August 10, a lightning storm started a dozen fires but, because of the warning from Gisborne's meters, adequate workforce was available to contain the fires quickly. Modifications to the meters continued over the years, and by Model 6, used from 1942 through 1953, an additional change was done to include a Burning Index Meter that rated the effect of calendar date along with the other factors.

Gisborne also began analyzing precipitation data based on the "November Precipitation Predictor," which held that the severity of the fire season was related to the amount of precipitation in the previous November. Rain maps were made from plots of November precipitation in various areas, and the results generally supported the theory. For example, the McLendon Butte-Pete King fire site in 1932 was in an extremely dry area based on these maps. The fire consumed more than 250,000 acres and required 5,000 firefighters, mostly CCC workers. For the next 13 years a group of prominent administrators in Region One (called the Organization of Fire Danger Raters) made a game of outguessing each other in what the following fire season would hold, even publishing their guesses in the *Northern Region News*. The 1931 Annual Report describes how the fire-weather forecasts were becoming increasingly accepted and that the Weather Bureau began to summarize the records from all stations in 1930



Chuck Wellner making observations on clear-cut inflammability station 1932.

to provide a better forecasting of thunderstorm-producing weather patterns. In 1935, the Fire Weather Warning Service was moved to Missoula funded largely by Montana Senator Burton K. Wheeler's bill.

Lightning strike research conducted by Gisborne caught the attention of K.B. McEachron who was in charge of the General Electric Company's Pittsfield High Voltage Laboratory in Schenectady, New York. In 1933, Gisborne hired Edmund A. Evans from the General Electric Company's Schenectady Laboratory to try to measure static electricity related to lightning. Jemison and Evans stretched piano wire antenna from the "weather tree" across Benton Creek to the "Crows Nest" tree on the ridge to the south (2,000 feet) and attached it to a spark gap in the office attic. During a thunderstorm, Evans would man the equipment and see if he could correlate the activity of the thunderstorm with the amount of spark he could produce from the antenna. He had a similar setup at Looking Glass

Lookout. Jemison recounted how Gisborne would often hang on to the wires during a storm so that the static electricity would flow through his body. He would then excitedly display his hands that had flames streaming from each finger until they were discharged (Hardy 1983).

Jemison also related in his memoirs how Gisborne's fire danger rating system was used in the northeast because of the 1938 New England hurricane (Maunder 1978). The storm damage created massive amounts of downed trees, which created a fuel hazard, and Jemison was asked to establish a fire danger rating system there. As a result of applying Gisborne's work to other situations, recognition of his fire research work reached a wide audience (Maunder 1978).

In 1931, the first true Research, Development, and Application program at the Station was started when Lloyd G. Hornby was transferred from the Flathead National Forest to the Station. Gisborne appreciated Hornby's abilities

and noted that his work was one of the keystones in this kind of research. Hornby developed a new field of research, later aided by computers, known as “operations research.” With Hornby’s help, in addition to fire report analysis, two other studies were started: fuel type mapping and “seen-area” mapping. Fuel type mapping described the fuels in terms of rate of spread and resistance to control with four levels, low to extreme, used for evaluation. “Seen-area” mapping was done at existing lookouts and any location thought to be a potential lookout. This enabled the managers to make maximum use of the least amount of lookouts. In 1936, “Fire Control Planning” in the Northern Rocky Mountain Region was published. It pulled together all the research that Gisborne and others had done to that point. Chief Silcox praised the publication not only for its research but also for the cooperative efforts between the Station and Region One. Hornby was transferred to Washington, DC, in 1937 to head a nationwide fire control planning program, but in August 1937, on a return visit to Missoula, he died of a heart attack while working on the Toboggan Creek fire in the Clearwater National Forest. Gisborne, perhaps in a tribute, added to Hornby’s principles of fire control planning, and in 1939 Gisborne published in the *Journal of Forestry* an article around the eight major principles. He emphasized that the personnel factor was vital and that adequate numbers and training were essential.

Based on these publications, the Forest Service in 1935 instituted the “10 a.m. Policy,” meaning that all resources would be assigned to control any fire on Federal land by 10 a.m. of following day. Gisborne, however, was not in favor of this policy and, in his “Milepost” (a Region One publication) article stated that:

... the policy of control by 10 a.m. undoubtedly rates either a milestone or a tombstone. If and when that policy becomes clearly recognized as a temporary expedient, I believe that it will rate a milestone. If, however, it has already become or ever does become the death knell of all previous objectives based on damage, then it rates a tombstone executed in the blackest of black granite. Fires can be caught small and cheaply, often more cheaply, without controlling them by 10 a.m. tomorrow. If one function of research is to assemble and array all the significant facts, it seems more than possible that it might contribute something here. (Hardy 1983: 45)

In a memo to the Director dated March 11, 1936, Gisborne notes problems Hornby had in his efforts to put his research into use, and one of the most difficult was that “Hornby started his planning on the basis of least cost plus damage, but he was then forced to change all of his objectives to make them fit the control by 10 a.m., which was and is an uneconomic expression impossible to justify in low value or little injury types of vegetation” (Hardy 1983: 45).

With the 10 a.m. policy came the need to reach the fire more quickly. The idea of aerial bombing became interesting to Gisborne. Howard R. Flint wrote in the *Northern Region News* in 1935 a description of how the first attempts were made to drop water on a fire. The idea was simple: load a plane with water, fly to the location. But this is where it got tricky—how to drop it at the right time, right place, and in sufficient quantities. Gisborne tested not only water but also foam retardant. While these early attempts were not always successful, they did prove getting water to a remote fire was workable. As early as 1917 the Forest Service and the Army Air Corps began flying fire patrols over Western forests, and from 1925 to 1935, those

two agencies worked cooperatively to do aerial photography and fire patrols out of Spokane, Washington. In 1935, the Aerial Fire Control Experimental Project was set up in Washington, DC. The Forest Service purchased its first aircraft and continued the water and chemical bombs that Howard Flint had started in Region One. In 1939 the project was moved from Washington, DC, to Region Six, and bombing tests were discontinued, but parachute-jumping experiments began instead. Smokejumpers, who used to fight fires in remote areas that were unreachable by other means, evolved as a result of these experiments.

By the late 1930s, funding had dramatically declined, and the emergency crews were no longer available. Gisborne became discouraged, and at times bitter, about the inability to carry on adequate research. By 1938, the Station was working on less funding than it had in 1934. Gisborne assumed leadership of the Division of Silvics Research in addition to fire research from 1942 until 1945 because neither adequate staffing nor funding was available. Cooperative work with other bureaus was also accomplished during the 1940s. For example, the U.S. Fish and Wildlife Service opened an office at the Station and was staffed by a biologist. The Division of Forest Pathology reestablished its office by assigning personnel to work on the western white pine pole blight problem in 1948. The staff of the Forest Insect Laboratory was increased to seven. Gisborne worked with Elton Bentley, John Crowe, Lou Whetsler, A.W. Peiffer, and Melvin Bradner, who served in succession as Resident Superintendents at the Priest River Experimental Forest, to maintain essential measurements and records while other fire research related work was dropped. During the summers of 1939 and 1940, Chalmer K. Lyman,



Melvin Bradner, sixth Director 1939-1946

a recent forestry graduate, was hired to take measurements on 74 fires to determine the fuel types. The results were used to verify the estimates set up in Hornby's fire control planning project. Paul Stickel was transferred from New England to work with Lyman in 1940, but to keep Stickel, a position in silvicultural research was sacrificed.

Because most of Gisborne's fire research had been conducted in timber fuel types, little was known about the rate of fire spread in grass. At the request of Region Four, a cooperative venture with the Nezperce Forest was started in 1944 with a series of 10-foot square plots of bunch grass near the Riggins Ranger Station. Gisborne served as technical advisor, and the

data collected were added to Hornby's rate of spread tables.

In addition to the fire research being conducted by Gisborne, other researchers were working on projects. During the 1930s, the forest survey project was completed in northeastern Washington and northern Idaho, and the Station's staff compiled an economic report. The report indicated that the average annual cut of all species, except cedar poles, was 580 million board feet as compared with an allowable cut (amount of timber extracted from the National Forests for the nation's use) of 518 million board feet. It also noted that western white pine was being cut at a much faster rate of 351 million feet a year.



Experimental planting of ponderosa pine 1932.

Chapter 4: The 1940s War Years and the Gisborne Era

The War Years

The decade of the 1940s saw a continued pattern of research on reduced funds. Annual appropriations for the entire Forest Service research program averaged \$105,000, about half the record high of the 1930s (Jemison 1950). World War II caused a further reduction in funds but also a major emphasis shift in the research program. In 1942, 30 percent of regular Forest Service personnel entered military service. In 1944, only 13 technical staff were at the Forest, the lowest number since 1930, but by 1945, some return to normalcy occurred and new studies were started. It is important to note that during the 1940s, women began to be part of the staff working as clerks and stenographers.

The war years and postwar years brought an increased demand for wood products. Research began to focus on forest products, previously handled by the Forest Products Laboratory in Madison, Wisconsin. In 1945, the Forest Utilization Service was established to bring the results of products research directly to the wood users and processors in the area. Staff members from the Madison Laboratory participated in a tour of the Northern Rocky Mountain area to acquaint them with the region and to participate in a Wood Products Clinic in Spokane, Washington. As a result of the demand, 200 new sawmills were created in 1946 in the region, and the Forest Utilization Service provided invaluable information to this local industry.

Another area of research was in wood preservation. With the end of the

war, emphasis was placed on improving the Rural Electrification Program, which, according to the Annual Report of 1944, now needed three million power poles annually. Researchers were asked to provide consulting and written advice to individuals interested in going into the business of treating fence posts and power poles. They also worked more closely with the Forest Products Laboratory in Madison to consolidate wood preservation research.

But a substantial increase in funding, beginning in 1946, also provided money for expanded timber and range research. The Station's territory was subdivided into research centers, and the Upper Columbia Center (western Montana) and the Inland Empire Center (northeastern Washington and northern Idaho) were created with Charles Wellner as the Research Center Leader. A small allotment enabled a project in forest economics research to be started at the Station. In 1948 a flood control survey unit was established to monitor the headwaters of parts of the Missouri and Columbia Rivers.

Organizational changes began in 1945 when the Division of Forest Protection and the Division of Silviculture were reestablished. Because of the increased timber sale activities in Region One, the accumulated backlog of silvicultural work on timber sales, and the possibility of a new postwar work program, the new Assistant Regional Forester for Timber Management, Axel Lindh, requested increased emphasis on silvicultural research. As a result, Russell K. LeBarron was transferred from the Lake States Experiment Station to become Silviculture Division Chief. In

1946 Director Bradner died, and Gisborne served as Acting Director until a new Director, Charles L. Tebbe, arrived from Region Six. Charles Wellner returned from the Navy in 1946 and resumed his work with Austin Helmers, another silviculturist. Additional funding allowed for silvicultural research to be done at Coram, the new Western Montana Work Center. Gisborne's area, the Division of Forest Protection, added Jack S. Barrows to its staff. The Annual Report for 1946 also notes that Gisborne had, in addition to his fire research staff, the "help of one temporary assistant, a girl forestry student" but does not state her name or where she attended school (U.S. Department of Agriculture 1946: 23). In 1946, a Division of Forest Economics was created to address the growing importance of the economic phases of



Charles Tebbe, seventh Director
1946-1950

forestry and to consolidate projects. A vital question that needed data was the economic impact of blister rust on the forest. The Division absorbed the work of the Forest Survey, which was still in the initial phase of the inventory process. A 10-year plan for maintaining and finishing the survey was created. With the additional staff, inventory work was conducted in various parts of the Northwest including Cascade County, Montana, Stevens County, Washington, and Benewah County, Idaho.

Two areas of concern were raised during the late 1940s. For years, Gisborne's fire research had been ahead of the application, but with the use of postwar tools such as aerial delivery of men and supplies, road development by the CCCs, and an influx of labor, administrators began to step ahead of the research. According to the 1946 Annual Report "administrators are making changes on the basis of judgment and estimates and guesses without benefit of research analysis. The program is too big, the expenditures too large, and the stakes too high to be safeguarded by such tactics" (U.S. Department of Agriculture 1946: 24).

Another area of concern was the lack of research data regarding the effect of soil and cover disturbance on the quantity and quality of water. The Northern Rocky Mountain region straddles the headwaters of the two largest proposed river developments in the country, on the Missouri and the Columbia Rivers. Researchers, as well as the foresters in the area, were apprehensive about the push to cut the trees because there was little understanding of the long-term consequences.

Postwar and the Gisborne Era

Gisborne resumed his fire research with new ideas on how to adapt

scientific developments created during the war, such as pattern forecasting that was developed by the military meteorological services. Because of the prestige of Gisborne and his proven fire research record, the National Fire Chief D.P. Godwin and the Army Air Force initiated tests, under Gisborne's direction, using aerial bombing techniques in July 1947. Two P-47 Thunderbolt fighters dropped two 165-gallon tanks, and a B-29 Superfortress carried eight specially modified 165-gallon water bombs, to demonstrate the possibility of aerial bursts of water over small hot fires. Assessing the tests was the Aerial Bombing Evaluation Board, consisting of the State Forester of Oregon, Regional Fire Chiefs from San Francisco, California, Portland, Oregon, and Ogden, Utah, representatives from two National Forests (not named), Lieutenant Colonel Keilman of the Air Proving Ground Command, and the Chief of the local Division of Fire Research. Their report favorably highlighted areas of fire control in which the aerial bombing offered promising possibilities. Gisborne and the others involved determined that the research phase of the project was completed and that it could now be turned over to the administrative side to work out the logistics and details for putting it into practice (Annual Report 1947).

The Priest River Experimental Forest facilities were recognized for their educational benefit, and Dean McDonald of Iowa State College brought four members of his faculty and about 100 students to the Forest for a 2-month summer school. Russell LeBarron, Charles Wellner, C. Alan Friedrich, Jack Barrows, and Gisborne gave lectures. Other visitors noted

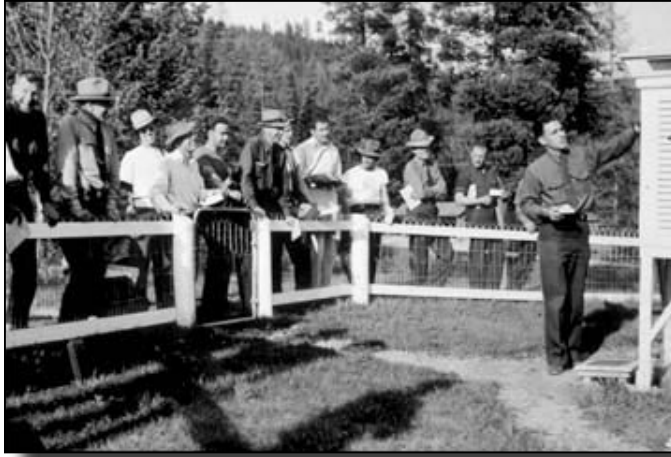


Harry T. Gisborne presenting to the University of Montana, School of Forestry seniors in 1941.

in the Annual Report were Dr. W.C. Lowdermilk, Dr. and Mrs. Joseph Kirtledge of the University of California, Dr. Philip Church, the meteorological consultant on the Hanford, Washington, bomb project, and H.W. Beall of the Canadian Forest Service.

Long before Rachel Carson's book *Silent Spring* in 1960, the 1947 Annual Report briefly mentions a study on the effects of the pesticide DDT on wildlife. The study, done in cooperation with the Bureau of Entomology and Plant Quarantine and the Forest Service, was conducted on 400,000 acres of Idaho forests that were treated with 1 pound of DDT per acre to control the tussock moth. According to the Annual Report, the results of the study were inconclusive; however, the dangers of DDT were recognized even at this early date. A report on the DDT studies in Idaho and Wyoming was published in *Outdoor Montana*, a sportsmen's magazine, and a technical report was done for *The Journal of Wildlife Management* (U.S. Department of Agriculture 1947).

In 1948, due to new funding, an office in the Forest Service Warehouse in Spokane, Washington, was opened. The northern Idaho silvicultural research, titled the Priest River Research Center,



Bert Naiman presenting to the University of Montana, School of Forestry seniors in 1941.



G. Lloyd Hayes presenting to the University of Montana, School of Forestry seniors in 1941.

and the Spokane Research Center, which included both silvicultural and range work, were operated from this site. Charles Wellner served as Center Leader for both. Staff at the Priest River Research Center included Marvin W. Foiles, Richard F. Watt, and Albert W. Peiffer (who resided at the Forest). Staff of the Spokane Center included Donald W. Lynch and Grant A. Harris. Responsibility for operation and maintenance of the Priest River Experimental Forest was shifted from the Division of Fire Research, headed by Gisborne, to the Center in Spokane. Perhaps the shift of responsibility of the Forest reflects not only the change in emphasis in research after the war but also a concession to Gisborne's age, which in 1948 was 55 years old.

By 1949, the Priest River Research Center and the Spokane Research Center were combined and renamed the Inland Empire Research Center. The change was in name only since Wellner had managed the two divisions as one since the beginning. Gisborne added to his fire research a project involving the possibilities of seeding clouds with dry-ice to make rain and stop lightning. He worked with Dr. Vincent Schaefer, research chemist who originated the dry-ice method of cloud seeding, at the General Electric Research Laboratory in Schenectady, New York. Schaefer spent 3 weeks at the Forest, but due to unseasonable weather conditions, no seeding was accomplished. The work in lightning prevention demonstrated the superiority of the Cyclone Arrester

over the Master-Mechanic Front End and also showed a substantial reduction in railroad fires not only in the Northwest but also in other parts of the country—another demonstration that the fire research was impacting a far wider area.

An interesting historical aside from this era can be found in Schaefer's memoirs, written in 1976, in which he noted that he enjoyed his time at the Station and felt that Gisborne's research was critical to not only fire research but also to the study of meteorology. Schaefer also recounts a story that depicts Gisborne's personality. The Forest Service provided Gisborne with a car, but a black one. Gisborne, impatient with administrators who failed to know how the hot Idaho sun would be on a black car, went to a hardware store, purchased a can of white enamel paint, and spray painted the car white (Hardy 1983).

The 1949 Annual Report noted that the emphasis was changing from collecting fire information to providing methods and techniques of planning adequate fire control at the least possible cost. By 1948, Gisborne and his staff had collected data on two National Parks, seven Indian reservations, seven fire protection associations, and three State forestry departments. As a result, the researchers could analyze the fire load for Region One and the fire control requirements for 53 million acres of forest and range lands. They were also able to analyze the effectiveness of lookouts based on the detection time and percent of fires covered. Included in the results were:

- 54 percent of the fires were discovered by lookouts at a cost of about \$1,000 per fire (1940s dollars).
- 18 percent of the fires had an initial attack time of over 6 hours.

- During 1931 through 1939 the average fire was 3.5 miles from the nearest road.
- During 1940 through 1945 the average had been reduced to 2.5 miles (an indication of how many new roads had been created).
- The average fire required 62 man-hours in the fir-larch type and 230 man-hours in the cedar-hemlock type.
- 5 percent of fires reached Class C (100 acres) or larger, and 9 percent on cutover lands reached these sizes.

The emphasis now shifted to studying fire fuels and their effect on fire fighting schemes. Several thousand selected fires were used to determine the rate of spread by timber type and fuel type. This type of study proved to be significant in the years to come.

Three other significant projects were completed during 1949. The Flood Control Surveys Division was also established to study snow accumulation and melt and was headed by Austin Helmers. Helmers and DeWilton C. Smith moved to the Forest from Spokane and established a network of weather stations and snow courses to take advantage of the winter conditions. The Office of Forest Pathology, which studied pole blight disease of western white pine, also shared the facilities at the Forest. The pole blight project continued to be a cooperative project with the University of Idaho faculty that included D.S. Welch, T.S. Buchanan, F.D. Johnson, and Hubert Bynum. Other cooperative work continued, including the blister rust project headed by Richard T. Bingham, who became internationally known as a forest geneticist, retiring in 1974. Other visitors to the forest included Albert W. Slipp of University of Idaho and Rexford Daubenmire of Washington

State University. The collaboration with Daubenmire was likely the first with Washington State University, due largely to the connection with the Spokane facility. Rexford Daubenmire and his wife, Evelyn, began studies of habitat typing of plants and forests that became the basis for a number of research projects. Professor Emeritus of botany at Washington State University, Rexford Daubenmire died in 1995. He was one of the nation's foremost authorities on plant ecology, and his classification of forest and grassland vegetation in the Pacific Northwest became a standard measurement tool for government agencies and the timber industry of the West.

Other research projects were being added to the workload during this time. Deception Creek Experimental Forest near Coeur d'Alene, Idaho, created in 1933, was being used more because of the additional postwar staffing. In 1948, more than 100,000 board feet of western white pine were sold at a stumpage price of \$28 per 1,000 feet because they were heavily infested with beetles.

Another new project involved Christmas tree silvicultural practices. The Christmas tree industry in western Montana supplied one-seventh of the nation's trees and brought approximately \$1 million annually to the State, which prompted a need for management of these trees. Three kinds of Christmas tree experiments were created in the Eureka and Kalispell, Montana, production areas, and the Station entered into a cooperative program with Dr. Thomas Childs, pathologist with the U.S. Department of Agriculture, Bureau of Plant Industry, Soils and Agricultural Engineering. The report issued by the researchers tried to explain methods for combating extensive damage to the needles of the Douglas-fir Christmas trees in the Northern Rocky Mountains (U.S.

Department of Agriculture 1949). Such projects indicated the growing importance of Priest River research to both the Forest Service and the timber industry, especially within the Northwestern United States.

In 1949, the Spokane Research Center planned to establish an experimental forest to demonstrate cutting practices on a larger scale than on sample plots available at the Priest River Experimental Forest. The intent was to find suitable privately owned land so that the results would be more useful to private landowners than if the plots were on National Forest land.

The End of the Gisborne Era

On August 5, 1949, the Mann Gulch Fire on the Helena National Forest in Montana trapped 16 firefighters, and within a short time, 11 men were burned to death, and two others died the next day from their injuries. While Gisborne did not go to the Mann Gulch Fire, he stood by at the Forest monitoring cloud conditions in case they developed enough for seeding. By 1949 his supervisors restricted his personal participation in any arduous adventures because of his heart condition and physical problems, but his interest was piqued by the abnormal behavior of this particular fire. In *Young Men and Fire*, a book about the fire by Norman Maclean, author of *A River Runs Through It*, Maclean describes how the fire was called a "blowup" by the fire fighting crew. Maclean writes that it was a "deadly explosion of flame and wind rarely encountered and little understood at the time" (Maclean 1992, jacket blurb). After the fire, Gisborne interviewed those who survived and tried to piece together the evidence about the weather conditions, wind

velocities, and other items of importance. Based on this circumstantial evidence he then presented a theory about the behavior of the fire. Other Forest Service scientists such as Jack Barrows and Charles (Mike) Hardy in Missoula suggested that extraordinary effects produced the extraordinary causes such as a thunderhead. This theory suggested that as the thunderhead passed, its cool air mingled with the hot rising air from the ground, which also prevented rain from reaching the ground. This weight sat on the top of the fire, created spot fires, and the gusts of wind fanned the spot fires into the main fire, creating one massive fire. However, none of the survivors mentioned a thunderstorm. According to Maclean, the “obstacle theory,” created by Clive Countryman and Howard E. Graham in the 1950s, supported Gisborne’s theory. In this theory the wind hits objects such as the rocky promontory of a ridge, causing the wind to shear and spin, catching the fire and carrying it along, causing more spot fires farther away (Maclean 1992). Gisborne, however, never had the chance to follow either theory to its conclusion.

Gisborne, no doubt anxious to see the results of the fire first-hand, was asked to investigate. On November 9, 1949, he went to the site, traveling by Jeep to the location to lessen the stress on his frail physical condition, and accompanied by Robert Jansson, Ranger of the Helena National Forest’s Canyon Ferry District and a survivor of the fire. Jansson realized that, at the point where they left the Jeep and started to walk, Gisborne’s physical condition would turn the half-hour hike into a 2-hour trip. As they slowly made their way, Jansson, who wrote a report of the events, noted that Gisborne said “all his theories on the fire were blasted” (Maclean 1992: 135-139).

They discovered a fire whirl that had gone on a line to the top of the ridge, and Gisborne wanted to map it. Seeing that Gisborne showed signs of distress from the walking, Jansson convinced the stubborn Gisborne to stop so that they could return to the gulch the next day to evaluate what they had found. Gisborne, though excited about the potential of a new theory, reluctantly agreed. But about a half-mile from their truck, Gisborne suddenly had a fatal heart attack.

Jansson created a map and wrote a report, “Statement to Accompany Form CA2 in the Case of the Death of Harry T. Gisborne,” which covered the events and the conversations of the day (Maclean 1992). On top of the devastating fire, the Mann Gulch now claimed the prime fire researcher of the day.

The loss of Gisborne was noted by his alma mater, the University of Michigan, which eulogized him in the 1950 yearbook. The University of Idaho Forestry School’s publication, *The Idaho Forester*, dedicated its annual to Gisborne for his work and for his service to the college. Charles L. Tebbe, Gisborne’s supervisor as the Director of the Rocky Mountain Experiment Station, found in Gisborne’s personal papers a picture of the Mission Range, north of Missoula, Montana, that had been taken from the west side of the valley and that showed a profile of a reclining man. In Gisborne’s writing were instructions that he wanted his ashes dropped “right in the old man’s eye” (Hardy 1983: 87). To honor his wishes, Tebbe, Clayton Crocker, and Forest Service pilot Floyd Bowman did just that on May 26, 1950. Years later, when Gisborne’s wife, Alice, passed away, her ashes were spread on the same site.

To further honor Gisborne, the U.S. Board of Geographic Names in 1949 gave permission to name a peak,



Harry Gisborne and his wife, Alice.

unofficially called Looking Glass Mountain, located 4 miles east of the Forest’s headquarters, as Gisborne Mountain. On July 8, 1951, the mountain was dedicated in a ceremony attended by many including his widow, Alice, and A.A. Brown, Chief of Fire Research in the Washington, DC, office. A plaque was placed at the summit of the mountain with the inscription:

**Harry T. Gisborne
1893—1949**

**Inspiring, Enthusiastic, Far-Seeing
Pioneer in Forest Fire Research**

In 1947, Secretary of Agriculture Clinton P. Anderson awarded the Superior Service Award to Gisborne in recognition for his 25 years of achievements. He was the first Region One, Northern Rocky Mountain Research Station employee to receive that honor.

In August 1999, Forest Service Chief Mike Dombeck and Montana Governor Marc Racicot hosted a ceremony in recognition of the 50th anniversary of the Mann Gulch Fire. Robert Sallee, the only living survivor of the fire, unveiled a Forest Service bronze plaque that depicted a smokejumper's jacket and helmet; the plaque was placed at the Merriweather picnic area. In his remarks, Sallee recognized Gisborne as the 14th victim of the fire:

And this commemoration is likewise an opportunity to honor the memory of other men whose lives were touched by the fire in Mann Gulch, men who have since passed on. Men like Forest Service fire researcher Harry T. Gisborne, the little-known 14th victim of the Mann Gulch Fire who, in November 1949, while doing research on the Mann Gulch Fire, died of a heart attack in nearby Rescue Gulch (Smokejumpers Web site 2000).

The Gisborne Legacy

During Gisborne's 28-year long career, he produced 111 publications. His work influenced fire fighting techniques, the understanding of conditions that promoted fires, and the study and use of climatology throughout the United States. His research papers were donated to the University of Montana in the 1960s. Among the legacies Gisborne left was the creation of the Fire Laboratory in Missoula, Montana. His work with brothers Robert and Dick Johnson, owners of Johnson Flying Service, paved the way for the use of airplanes in fighting forest fires and led to the creation of the Smokejumpers and HotShot crews. The tools he created or perfected to study weather, such as the anemometer, continued to be used and became the standard



Looking Glass Lookout, circa 1940. Renamed Gisborne Lookout in 1949 and dedicated as such in 1951.

across the nation. The Burning Index Meter, used throughout North America, resulted from his experimentation that came from learning how many minutes it would take for a Bull Durham cigarette to burn up 100 acres if tossed into a bed of duff on the forest floor.

Gisborne exemplified the perfect researcher – curious, determined, physically able, and highly knowledgeable. His personal drive enabled him to accomplish unique and far-reaching research. However, he was also abrasive, egotistical, arrogant, and eccentric, making work and relationships difficult for his coworkers. As noted, he sarcastically dismissed Richard McArdle's early work with hazard sticks because they were square not round. The question arises: had he cooperated with McArdle, could the research have progressed further or faster? He overshadowed his peers, and though he shied away from public recognition, he paradoxically reveled in the prestige he garnered over the years. His reputation for being outspoken was well known. For example, he complained about Federal employees taking coffee breaks and told his crew that they would not "gang up for a coffee period." He also wrote to Montana Senator Mike Mansfield complaining about Federal employees getting 30

days of paid vacation. In a 1948 note, he indicated that employees should not be motivated by pay or position but by their accomplishments (Hardy 1983).

Fire research became his whole life, and he had little patience for those who did not appreciate his work or ideas. While Director of the Station, he influenced the type of research conducted and attempted to focus more time and energy into his studies than to the other research work being done. Yet, he oversaw the greatest growth of the Station during his years and guaranteed the Station's continued existence when funding was erratic at best. He also set the tone for cooperative work between government and private agencies, such as his work with the General Electric company.

With the end of the Gisborne era, other researchers stepped forward to build on the foundation that Gisborne had created and took research in new directions. Among the fields of study were genetics, watershed, and forest management. The Forest Service was also forced to change its focus after World War II. It was no longer the caretaker of the nation's forests but from the 1950s forward was instead required to be the major provider of timber.

Chapter 5: **Disciplinary Research 1950 to 1975**

By the 1950s, the postwar era of peace and prosperity was allowing the Station to expand the number of technical and support staff to 30. The Inland Empire Research Center in Spokane had six staff, and the Upper Columbia Research Center had five. In addition to the Priest River Experimental Forest, four field locations were maintained by the Station: Deception Creek in Idaho, Coram in Montana, Northern Plains in Miles City, Montana, and Vigilante in Alder, Montana.

To promote the benefit of research, in 1952 the Secretary of Agriculture established the Forest Research Advisory Committee. The committee included academics, State representatives, and forest industry leaders. Because the postwar era funding was being questioned, it was felt that demonstrating the importance of a Federal program, in addition to State and private programs, would offset the cries for cutting the funding. The committee toured research facilities annually to witness firsthand the studies being conducted. In 1953, Jemison and the Forest scientists hosted the meeting and presented examples of the research being conducted. (In 1970, the Committee was disbanded by the Secretary of Agriculture because it was viewed as an agent to lobby for increased appropriations from Congress, a violation of law.)

In 1956, the Department of Agriculture established the Committee on Research Evaluation (CORE) to identify research areas for either curtailment or expansion, and new areas that required attention. CORE's draft report was circulated to State agricultural experiment stations and

forestry schools. Assistant Chief Harper observed that forestry deans were included for the first time in research planning discussions between the Department and land grant schools, and he recognized that there was a major need to increase research being done by universities. University of Maine's Forestry Dean, Albert Nutting, was active in the review process, so it was not surprising that Congressman Clifford McIntire from Maine requested a forestry cooperative research bill. By 1962, the McIntire-Stennis Bill became law. The act allowed for more interactions between the Forest Service and the nation's forestry schools at land grant universities. This is evidenced by the kinds of visitors listed in the 1957 guest book, a record kept each year for visitors to sign when they arrived at the Forest:

February 9: University of Montana dendrology class

May 7—8: Pole Blight Investigations Steering Committee

May 25—26: Washington State College ecology class

June 18: Priest River Girl Scouts

June 25—27: Project Skyfire School

July 19: Forestry School Deans tour

July—every Thursday—Boy Scouts of America, Camp Cowles

September 9: Logging slash review for R-2 and Rocky Mountain Station

September 16: Turkish Foresters

September 27: Western white pine Management School

In 1957, the Forest was also visited by then Secretary of Agriculture Ezra Taft Benson. He and his family lived in the lodge during their 6-week summer stay while the Secretary became familiar with Forest Service research programs first hand. One of the projects he observed was with Charles Tebbe, which involved spraying in the Madison River country to kill larvae in the timber.

With the surprise launch of the Russian spacecraft Sputnik in 1958, Congress was suddenly highly motivated to provide additional funds to support science and research. Although forestry research was on the fringe, it had funding benefits. The era of the 1950s through the 1970s is considered by some as the "Golden Age" for Forest Service research programs due to the laboratory and equipment enhancements and increased staffing.

Organization

Changes in leadership came again as George Jemison replaced Charles Tebbe as Station Director in 1950. Jemison had grown with the Station as he developed from a young assistant to Gisborne to assuming the role of Director. He served until 1953 when he was named Director of the Forest and Range Experiment Station in Berkeley, California. As the number of staff increased, the workload was distributed among the many men associated with the Station. Austin Helmers, a silviculturist, was in charge of the Forest; Marvin Foiles, a recent master's graduate of the University of



George M. Jemison, eighth Director
1950-1953

Idaho, was responsible for Deception Creek; Anthony Squillance was in charge of Coram Experimental Forest; Laurence Short was in charge of the Northern Great Plains in Miles City; and Anthony Evanko was in charge of the Vigilante Experiment Range.

Once again, the Forest underwent a name change in 1954. With the consolidation of the Northern Rocky Mountain and the Intermountain Forest and Range Experiment Stations, the name was changed to the Intermountain Forest and Range Experiment Station with the headquarters in Ogden, Utah. Dr. Reed Bailey served as Director of the Intermountain Forest and Range Experiment Station after the consolidation. With the consolidation, new territory was acquired, including northwestern South Dakota, eastern Washington, and a small section of eastern California. This additional area meant that the scientists were now responsible for conducting research

within these new boundaries. Jemison noted in his memoirs that this consolidation was “almost disastrous”:

I was called to Washington to explain to Mike Mansfield, the senior senator from Montana, why it was necessary to abolish the Station in his home state. I innocently went into his office one afternoon to rationalize the proposed move, only to find that someone had tipped him off as to the purpose of my visit. Boy! Was he lying in wait for me. I never took such a dressing-down in my life as that from Senator Mansfield. But, after he got that off his chest, he gave me a chance to explain the reasons; we went ahead with the consolidation, and everything was fine. I think it was just a case of mishandling an attempt to change an organization. Obviously, Mansfield should have been brought into the discussion much earlier since this concerned his constituency and his district. It was a good move at the time, although now the program in Missoula is many times the size of the one we abolished back in 1953 (Maunder 1978: 205).

In 1963, the Forest headquarters in Spokane was moved to Moscow, Idaho,



Reed W. Bailey, ninth Director
1954-1961

when the office on the edge of the University of Idaho campus was completed. The new laboratory provided facilities that the scientists had not had before and also enhanced the cooperation between the University of Idaho, Washington State University, and the Forest Service. While the proximity to the two universities was a welcomed addition, the distance of driving 4 hours to the Forest from Moscow was not.

The responsibility for the Forest also transferred to the Moscow Laboratory. Glenn H. Deitschman, Project Leader of the western white pine silviculture project at the Moscow Laboratory, was given the responsibility for the day-to-day management of the Forest from 1961 to 1973. The person responsible for the forest was assigned the title of Scientist-in-Charge, a title that required more responsibility, more work hours, and no extra monetary compensation. In 1973, Dr. Albert Stage became leader of the combined silviculture-forest measurements project, and he delegated responsibility for the Forest to Marvin Foiles, a silviculturist, who shouldered the duties until 1976 when he gradually shifted them to Dr. Russell Graham, also a silviculturist.

In addition to the budget concerns and maintenance of facilities, the Scientist-in-Charge became responsible for coordinating research, educational and training sessions, tours, and other activities on the Forest. New experiments had to be monitored so that they did not overlap on sites, did not interfere with ongoing experiments, and summer labor for working on the projects had to be budgeted and arranged. Because the responsibility for overseeing the Forest was now in Moscow, it was even more critical that the resident Superintendent handle the day-to-day work but without research responsibilities. Duties of the Superintendent included



The 1963 dedication of the Moscow Forestry Sciences Laboratory.

minor maintenance of the buildings, monitoring and collecting the weather data, snow removal on trails and roads on the forest and when necessary from building rooftops, contact for visitors to the Forest, preparing for tours and other public events, aiding researchers in their projects, and writing the annual reports. In January 1965, Calvin L. Carpenter transferred from the National Fire Sciences Laboratory in Missoula, Montana, to assume the role of Superintendent of the Forest. Carpenter, his wife, and family moved into cottage 4, which became the Superintendent's residence.

After decades of use, the Forest headquarters needed significant maintenance work, but the yearly budget did not provide adequate funding. Because Bonner County, in which the Forest is located, was listed as economically distressed by the Federal government at that time, the Forest received \$60,000

of Accelerated Public Works funds in 1962 and \$30,000 additional monies in 1963 (Wellner 1976). These funds were used to improve the office, roads, sewage system, and research facilities. In addition to the maintenance work, an A-frame was added to the nursery, and an additional bunkhouse and shed were constructed in 1966.

Savenac Nursery, established in Haugen, Montana, in 1909, had been used by the Station for obtaining stock and for distributing tested tree seedlings since the establishment of the Station. In 1969, activities of the nursery were transferred to Coeur d'Alene, Idaho, and renamed the Coeur d'Alene Nursery. The nursery continues to be used as a distribution point for seeds and seedlings resulting from successful research projects. These seeds and seedlings are dispersed not only for use on Federal lands but also for State and private industry.

Research Emphases

Fire

After Gisborne's death, Gisborne's assistant, Jack Barrows, headed fire research. In 1951, the Station, the Weather Bureau and Region One joined forces to establish a joint project to inspect fire danger stations, maintain and repair fire weather instruments, train fire danger station operators, and plan relocation of some stations. The Northern Rocky Mountain burning index meter, which evaluated fuel moisture, was enhanced so that it was more reliable in nonnormal years. Because there was a lack of funding to maintain fire lookout stations, the need for better detection methods was critical.

In 1952, a field laboratory for logging slash research was established at the Forest in cooperation with the University of Idaho, Idaho State Forestry Department, the Priest Lake Timber Protective Association, Potlatch Forests, the Region One smokejumpers, the U.S. Weather Bureau, and the California Forest and Range Experiment Station. Over 150 slash plots were established where inflammability could be measured for various tree species as well as amounts of fuel in controlled burning tests.

A direct result of the work started by Gisborne, and continued by Barrows and others, was the creation of the Aerial Fire Depot. Regional Forester Percy Hanson directed the construction of the Aerial Fire Depot at the Missoula Airport to provide a headquarters for the control of forest fires through the use of airplanes and smokejumpers. Supplies to maintain 5,000 firefighters in the field for 48 hours were stored as well as helicopters and aircraft for use in reconnaissance, smokejumping, and transport as well as large quantities of fire-retardant chemicals (Baker and

others 1993). A training camp for the smokejumpers was also established at Camp Menard west of Missoula. *Red Skies Over Montana*, filmed in 1952, used these facilities and depicted the work done by smokejumpers. In 1954, a crowd of approximately 30,000 was on hand to see President Dwight Eisenhower officially dedicate the depot (Cohen 1983).

Another outgrowth of the fire research was the Intermountain Fire Sciences Laboratory located near the depot. The Laboratory had two functions: fire research for the special problems of the forests and ranges of the Inland West, and basic fire research that could have application in any region. In 1954 when the Intermountain Fire Sciences Laboratory was created, the Forest was used extensively in a study called Project Skyfire. This project concentrated on lightning fire research throughout the Western United States and tested the possibility of reducing the severity of lightning fires through cloud modification. The Munitalp Foundation, one of the main backers of Project Skyfire, funded construction of the mobile atmospheric research laboratory and also provided technical assistance. Dr. Vincent Schaefer, a pioneer in this research with Gisborne, was now the Director of Research and Codirector of Project Skyfire. Other agencies involved were The Boeing Airplane Company, which provided high-altitude photography of clouds and lightning storms, the University of Washington, which assisted with meteorological work, and the University of Idaho, which constructed a cloud chamber for studies of atmospheric nuclei. Initially, the project used the Forest as a field base until 1955 when Missoula became the base of operations. This research resulted in a model to predict fire behavior, and by the 1960s, the 10 a.m. fire policy

for Federal agencies was abolished. Gisborne would have approved of both.

During 1952, a program was initiated at four Northern Rocky Mountain fire lookouts to use time-lapse motion pictures of lightning storms and other cloud conditions associated with the behavior of lightning fires. Several hours of cloud action was condensed into a few minutes of film time allowing the researchers to watch the development of storms and match them against lightning fires.

When Alaska became the 49th State in 1959, fire research analysis was required to study the newly acquired forested lands. Barrows and other members of the fire research staff were sent to Alaska to gather data. Prolonged daylight during the fire season, weather conditions, and the topography of the Alaskan interior all contributed to the unique difficulties involved in studying and applying fire research.

Watershed

Weather data collected over the years at the Forest and streamflow records aided a new area of study on snow accumulation and melting rates. Watershed studies were necessary because of the loss of timber and vegetation, the damage to stream channels, loss of topsoil, and the damage to recreational areas.

The Division of Flood Control Surveys was established as part of the Station in 1948 after a devastating flood on the Columbia River. Austin Helmers moved to Priest River and created a network of weather stations at various altitudes and snow courses and, over the next 4 years, accumulated valuable data. Helmers had a cooperative program with the University of Idaho Engineering Experiment Station to test and collect information using precipitation gauges on Gisborne Mountain. By 1952, however, the studies suddenly

ended as funds for the flood control surveys were curtailed. Data from the Forest studies were later analyzed and reported by Paul Packer, watershed scientist at the Forestry Sciences Laboratory in Logan, Utah. Helmers was reassigned to a project headed by the U.S. Army Corps of Engineers' Waterways Experiment Station at Vicksburg, Mississippi. Helmers and several others, including Ray Boyd who joined the project in 1953, used several sites on the Forest to test soil infiltration. Boyd finished the project in 1954 when Helmers was transferred to Washington, DC. An erosion study was conducted at the site of the Mann Gulch Fire to study the erosion caused by flooding, and the results were reported in Research Note 102 entitled *Forest Fire—Thunderstorm, Knockout Combination for Watersheds* (U.S. Department of Agriculture 1955).

By 1966, Harold Haupt joined the Station to lead the watershed program. Assisted by Bud Jeffers, a resident technician, they conducted a cooperative program with Washington State University and the University of Idaho. Pilot tests of effects of road building and cutting on streamflow based on results found on studies conducted on the Forest provided baseline information for further studies.

The streamflow records collected since 1938 on Benton Creek and the 1948 through 1952 snow studies by Helmer provided a start for intensive studies of Benton Creek to understand the hydrology of densely forested watersheds. Using a network of stations to study climate, soil, snow, streamflow, and sediment, the Benton Creek Model Watershed was established. By 1968, this network, consisting of 14 stations, provided a database for understanding the hydrology of Benton Creek and also served as a framework for special cooperative studies. For example, in 1972,

a University of Idaho graduate student, Gordon Snyder, developed mathematical models to study chemical processes in undisturbed streams in the Northern Rocky Mountains. Many sites on the Benton Creek watershed were used to develop his model. In 1974, a three-way cooperative study between the Station, the University of Idaho, and the Dow Corning Corporation was conducted to determine the effectiveness and side effects of a silicone emulsion as an antitranspirant to increase water yield. A 60-acre section of trees on Benton Creek was sprayed, and streamflow was compared with an unsprayed drainage. Biological effects of the material on vegetation, water quality, small mammal populations, and aquatic and terrestrial insects were monitored, and the results showed negligible effect on the flora and fauna and a moderate increase in water yield (U.S. Department of Agriculture 1974). By 1975 the watershed research was reduced at the Forest and moved to Horse Creek on the Nez Perce National Forest.

Other studies by Station scientists in Missoula included a major project to prepare comprehensive problem analyses for both the Inland Empire and the Upper Columbia areas. After the Inland Empire Research Center was terminated in 1953, the Station took on the responsibility of projects related to western white pine. This study, the Comprehensive Agricultural Program Report, was continued throughout the 1950s.

Forest Insects

The Intermountain West's forests were suffering from a variety of insect infestations. Dr. Malcolm Furniss, entomologist, was Project Leader of the Forest Insects Research Work Unit, which studied lodgepole needle miner, Pandora moth, sawflies, mountain pine beetle, Englemann spruce beetle, and

Douglas-fir beetle. Furniss transferred from Missoula to Moscow and conducted the insect research at the Forest. Another entomologist in the work unit, Robert Denton, conducted research on larch casebearer where he investigated insecticides to control this defoliating insect and also tested the use of parasites on both western larch and European larch, an exotic planted in the early years. As a result of this research, the larch casebearer was brought under control through the use of parasites. Dr. Richard Schmitz studied the occurrence of mountain pine beetles in mid-aged stands on the Forest. His research led to a better understanding of what tree characteristics promote infestations.

Forest Diseases

In the 1940s, another major killer of western white pine was identified. Pole blight, a name coined by researcher Russell K. LeBarron, was killing trees within the 40 to 100 year age classes. The acreage of western white pine pole blight in the United States stood between 90,000 to 95,000 acres (U.S. Department of Agriculture 1954). Before World War II, Charles Wellner had conducted cooperative studies on the disease with the University of Idaho and, after returning from the war, resumed this work.

When the Division of Forest Pathology was transferred to the Forest Service in 1954, and headquartered at the Forest, Charles Leaphart and Donald Graham were added to the study. Leaphart worked with Dr. Albert Stage in a dendrochronology study to evaluate the relation of pole blight to climatic conditions.

Studies of the pole blight disease were completed by the late 1970s. Results from the several-decades research showed that drought had created conditions that stressed the western white pine trees. Using the climatic



Blister rust canker

records kept by the Forest since 1911, the scientists were able to pinpoint the variables, especially the lack of rainfall, that had caused the disease.

Other disease research projects being conducted included black shoestring root disease, dwarf mistletoe, Indian paint fungus, and redbelt fungus. In 1961, Dr. Edward Wicker established a field plot in the nursery to study dwarf mistletoe. Dr. Alexander H. Smith, University of Michigan, also used the Forest for intensive studies of the fungi of northern Idaho, another indication of how important the Forest was to nationwide research.

By the 1950s all attempts at controlling the blister rust disease were proving unsatisfactory. Despite the eradication effort on Ribes, rust infection was exceeding tolerable levels.

Scientists were changing their line of thought to studying microclimatic conditions that might be promoting the spread of the pine-infecting spores. As a result, a meteorologist with the Weather Bureau, Merle G. Lloyd, was transferred to the Inland Empire Research Center in 1956 to help with the research. He studied thermal structure of the atmosphere, wind movements, and simulated spore movements, and by 1960 he had determined that climate was an important factor: blister rust is spread when even a gentle air current transports spores from a single point during moist periods, and the short-lived sporidia form in autumn when the humidity is high (U.S. Department of Agriculture 1959). Perhaps because climate cannot be controlled, more emphasis would be placed on Richard Bingham's genetic work to finally resolve the question of how to create disease-resistant stock.

Tree Genetics

While early work on tree genetics was done at the Institute of Forest Genetics at the California Forest and Range Experiment Station, some aspects of the program were done at the Forest for investigating blister rust resistance in western white pine. Among the accomplishments listed in the Annual Report for 1950, Jemison listed the increased role of forest genetics:

Anthony Squillance of the Station worked in cooperation with the Division of Blister Rust Control, headed by Richard Bingham, in cross pollinating fifty native western white pine trees that appeared to be highly resistant or immune to blister rust. A staff person was sent to the Institute of Forest Genetics at the California Forest and Range Experiment Station to receive instruction in artificial pollination of coniferous trees. A regional forest genetics steering committee, composed of representatives from

universities, agricultural experiment stations and Federal agencies was created (Jemison 1950: 49).

This genetics work with the Office of Blister Rust Control resulted in western white pines resistant to blister rust. When the Blister Rust Control was transferred to the Forest Service, Bingham became part of the Region One staff but had his office in Spokane at the Research Center. In 1958, Region One and the Station cooperated with the University of Idaho to build a genetics center for the rust resistance program on the campus, and Bingham moved to Moscow. The Forest Sciences Laboratory, completed in 1963, was built adjacent to this genetics center. The Forest played an important role in the western white pine genetics program. In the mid-1950s, some of the earliest plantings of rust resistant western white pine were planted by Bingham and his crew on a slope near the headquarters of the Forest. This planting, containing genetically improved rust resistant trees, was to determine if these trees had normal growth and form characteristics. The results of these vigor quality (VQ) plots showed that western white pines exhibiting rust resistant characteristics had excellent form and growth, validating the techniques being used by Bingham. By 1975, after 25 years of research done by Bingham and other researchers, two generations of resistant trees were developed and planted throughout the Northwest, thus protecting the forests from devastation by this disease.

Building on Bingham's work, this line of genetic research was continued by Dr. Ray Hoff, Dr. Gerald Rehfeldt, Dr. Raphael Steinhoff, Dr. Gerald McDonald, Pat Wells, Duke Coffen, and Duane Andrews. The Forest nursery became the site for continued studies and refinement on rust resistance in western white pine. From seed collections

from the western white pine region, seedlings were tested to determine what level of resistance existed in the trees throughout the region.

In the 1970s, new studies were conducted on blister rust resistant western white pine. These pines, with various resistant attributes, were outplanted in the lower part of Canyon Creek and became the primary gene bank for resistant trees. From these trees, seeds and cuttings have been used in tree improvement programs and seed orchards throughout the Western United States and Canada. The Forest proved to be an invaluable resource for the creation and maintenance of this resistant tree stock, which continues today.

Another genetic test proved invaluable by showing the importance of using local seed sources for reforestation. Brewster and McDonald planted ponderosa pines from 22 sources from throughout the West on the Forest in 1911 and 1912. The sources ranged from California to the Black Hills of South Dakota. By the 1950s and into the 1970s, it was evident that trees that had their origins on the Kaniksu National Forest survived and grew better than the nonlocal tree species. This kind of information was essential for proper reforestation. This is an example of how long-term investigations are required for natural resource research, and how the Forest, through the monitoring of these trees for 60 years, provided scientific data to aid land managers.

Despite the conclusion that local seed sources are more successful than nonlocal sources, the ponderosa pine plantings of 1911 did show that trees from different sources can be adapted to their new sites. Because reforestation is conducted throughout the United States after timber harvesting, wildfires, and other disturbances, information was needed on the adaptability of

seeds to specific sites. Dr. Rehfeldt began studies on Douglas-fir using the nursery and other sites on the Forest. He collected seeds from throughout the Western United States and planted them in a common garden. From his evaluation of these plantings, seed zones were developed and the extent of their boundaries was determined. These seed zones helped managers to select the appropriate seed sources for reforestation.

Timber Management and Silviculture

Permanent plots for measuring tree growth had been continuously used since they were established in 1911. These plots were located in various aged stands and some were treated with different cuttings and others were left untreated. At 5- and 10-year intervals these plots were measured, taking into account the regeneration of new trees and mortality due to insects, weather, and disease. Irvine T. Haig, who started at the Forest in 1923, used these plots and others to establish tables describing how western white pine forests develop. These tables showed the number of trees, sizes, and volumes through the life of a stand until age 160. These tables were the fundamental growth and yield prediction method when establishing forest management plans for National Forests throughout the Northern Rocky Mountains.

While these tables were beneficial for forest planning, they lacked adaptability to different sites and different management scenarios. In the 1960s, Dr. Albert Stage initiated the use of computers to predict the growth of trees, which ultimately replaced the yield tables. This developed into the Northern Idaho Prognosis for Stand Development Model (Stage 1973), a computer analysis tool that gives

scientists and managers a way to predict how stands would look in the future based on different attributes such as mortality rates, climate, insect infestations, and other variables. Because computers were in their infancy, so was the Prognosis Model, but the results proved promising (Johnson 1997).

During the 1960s various timber harvests on the Forest tested a range of silvicultural systems including large clearcuts at the head of Benton Creek and lower Benton Creek. These cuttings not only were used to evaluate regeneration of conifers but also showed the impact of harvesting on the watershed studies conducted by Harold Haupt. The lower Benton Creek cuts were broadcast burned in August 1967 during one of the worst fire seasons in recent years. The information gathered after these fires provided valuable examples of how burn intensities impact both the soil and vegetation. Dr. Peter Stickney, from the Forestry Sciences Laboratory in Missoula, established permanent vegetation transects in the south- and north-facing clearcuts. These transects continue to be monitored yearly. Stickney's studies described the revegetation after wildfires and showed what range of vegetation develops after different intensities of fires. Like the sample plots, these data became invaluable for use in computer models to predict vegetation development after disturbances. Additional cuttings in lower Benton Creek were completed, releasing young stands of trees created by the Highland Fire of 1934. These stands were subsequently thinned to create conditions for timber management research. Included in these silviculture studies were fertilization, different stand spacings, seed tree, shelterwood, and group selection cuttings. All of these areas and cuttings provided future research projects.

The Era of Success But Uncertainty

During the 1950s, 1960s, and 1970s, Forest Service research expanded dramatically due to the return of labor and Congressional funding in the postwar era. The Fire Sciences Laboratory, the Missoula Forestry Sciences Laboratory, the Moscow Forestry Sciences Laboratory, and many others were added to the Northern/Intermountain Forest and Range Experiment Stations. Staff was increased, programs were added, scientists were enthusiastic, and money flowed.

With the passage of the Multiple-Use Act of 1960, not only were the National Forests being used for timber harvesting, they were now expected to be used for recreation, range, watershed management, and wildlife. The Intermountain Forest and Range Experiment Station, headquartered in Ogden, Utah, rather than Missoula, struggled to keep up with the demand for research. Research had been ahead of need, but now the demand was ahead of research.

Based on a Washington Office general inspection by George Jemison and Thomas McLintock in 1960, the Station was changed into functional or disciplinary research projects. Under Gisborne, the Station had focused mostly on fire research, but now there were several research work units, each with a strong leader. In contrast to the old military style of command with one leader and one center, there were now separate projects, each with a leader who expected a fair share of the pie and was willing to fight for funding and recognition.

With the change from experimental forests to laboratories, by the 1960s a serious question was raised as to the future need for the Priest River Experimental Forest (Wellner 1976). One

suggestion was that the Priest River Experimental Forest, like the Bernice and the Piquette Forests, should be disbanded and returned to the Kaniksu National Forest or to make it a summer facility only. But in 1961, Station Director Reed Bailey determined that the Forest was essential to the program of the Station and would be kept, and all buildings would be retained (Wellner 1976).

One of the side effects of the disciplinary research was that funding for the Forest was now dependent upon the individual research project units rather than having one lump sum from the Station. Disagreements resulted over the share that each unit would contribute, the priorities of that money, and how the funds were spent. This included maintenance of the buildings and operating expenses (gas, heat, and lights). A result of how extreme this bickering became was that some high profile research was moved off the Forest to National Forest administered lands (Dr. Russell Graham, personal communication). Sometimes the best characteristics of a researcher—determination and self-confidence especially—prevented the scientists from working together as a cohesive team. Nevertheless, the research produced during this time continued to be high quality, plentiful, and widely used to address forest management problems for the National Forests, the States, and private industry. However, funding problems continued to plague the Forest.

Chapter 6: **New Forestry 1975 to Present**

Beginning in the 1960s, environmental issues came to the public's attention with the publication of Rachel Carson's *Silent Spring*. Protests arose against the spraying of pesticides in general but especially on National Forest lands. Other forestry practices such as clearcutting and replanting to an even-age, single-type forest also drew fire from environmentalists. Congress responded to the public's increased awareness by allocating millions of dollars to intensify the investigations on DDT and other biological issues.

By the end of the decade, a major controversy was raised on the Bitterroot National Forest, which not only became an issue for Region One but also nationwide. Because of the increased demand for timber during World War II, the increased postwar demand, and the increased access to forests by the public, the interaction between the public and forest policies on public lands came to a crisis. The need to build up the annual cut allowed under sustained yield management required the Forest Service to intensify forest management. In 1969, Joseph F. Pechanec, Director of the Intermountain Forest and Range Experiment Station (1962—1971) in Ogden, Utah, and Regional Forester Neil Rahm, Missoula, Montana, questioned how these management practices were being applied and called for a special Forest Service task force to review the forestry management practices in the Bitterroot National Forest. Three of the committee members who served were from the Intermountain Forest and Range Experiment Station and included Charles Wellner. Montana



Joseph F. Pechanec, tenth Director
1962-1971.

Senator Mike Mansfield also requested an external review by the University of Montana Forestry School. A few months later, a committee headed by

Dr. Arnold Bolle, Dean of the University of Montana Forestry School, issued its report, which added fuel to the fire. Repercussions of the Bolle report caused changes to management policies and philosophy not only in Region One but also across the Forest Service.

However, a positive side effect of these environmental issues was an increase in Forest Service research dollars. By the time Jemison retired in 1969, the total research budget had jumped from \$15 million to \$40.7 million (Steen 1998). Congress recognized that alternative methods of management needed to be researched and developed to help land managers avoid controversial clashes with the public over management of public lands.

In 1972, Region One prepared a response to the Bolle report and to the Montana Congressional delegation, who were reviewing the Bolle report,



Bitterroot terraces around 1982.



Robert Harris, eleventh Director
1971-1974.

to show how research being done by the Intermountain Forest and Range Experiment Station was significant to aid Montana's forests. The response was also done to justify the need for expanded research. In the document, Intermountain Forest and Range Experiment Station scientist Charles A. (Mike) Hardy reminded the Montana Congressional delegation how much valuable Station research had been accomplished that had proven essential to forestry practices not only in Montana but the Northwest (Baker and others 1993). During this time the Station was under the leadership of Robert W. Harris (1971 – 1974). Because of the need to develop new management techniques, a revised philosophy—often called New Forestry—emerged that called for management practices that addressed long-term soil productivity, quantified forest health, and observed changes in photosynthetic rates and atmospheric carbon dioxide levels caused by elevation and climatic differences. The research on the Forest became even more significant.

Organization

In 1974, Roger Bay became Director of the Station. The mensuration and silviculture projects were combined in 1973 and led by Dr. Albert Stage, and the responsibility for the Forest was transferred from Deitschman to Marvin Foiles to Dr. Russell Graham. In 1980, the consolidation of the mensuration and silviculture projects was discontinued, and silviculture was made an independent project led by Acting Project Leader Marvin Foiles. With Foiles' retirement in 1981, the silviculture project worked directly for the Assistant Station Director, Thad Harrington, with rotating Acting Project Leaders of Dr. Dennis Ferguson, Jonalea Tonn, and Dr. Russell Graham. In 1982, Dr. Alan Harvey returned to Moscow, Idaho, from Missoula to lead the Forest Pathology Research Work Unit. In 1983, the forest pathology and silviculture projects were combined with Dr. Harvey as Project Leader. In



Roger Bay, twelfth Director 1974-1983.

1988, the silviculturists were moved from the pathology project and combined with genetics, forming a new work unit headed by Dr. Ray Hoff.

In 1992, with the upcoming election as an incentive, Agriculture Secretary Edward Madigan asked all agency heads, including the Forest Service, to evaluate their operations and to find ways to streamline and cut costs. Forest Service Chief Dale Robertson proposed merging the Intermountain Station (headquarters in Ogden, Utah) with the Rocky Mountain Station (headquarters in Fort Collins, Colorado). Before the merger could be completed, however, the Clinton Administration replaced the Bush Administration. Vice President Gore requested that agencies develop plans for restructuring and, until those plans were finalized, the merger was postponed. However, in 1997, the Clinton Administration agreed that the reorganization was cost effective and more efficient. As a result, the Moscow Laboratory and Priest River Experimental Forest became part of the Rocky Mountain Research Station (RMRS) under Station Director Dr. Denver Burns. RMRS currently administers 14 experimental forests, ranges, and watersheds within a 14-State territory and has 400 scientists, administrators, and support staff. Dr. Marcia Patton-Mallory became Station Director in 2002.

Administration and Maintenance

By the 1970s, the Forest had acquired several buildings including cottages 2, 3 and 4, the office, and the bunkhouse/mess hall. Vic Hager, Maintenance Engineer from the Moscow Laboratory, was in charge of all maintenance and new projects done to the facilities at the Forest. An amphitheater, designed by the Panhandle National



Office building, October 2000. (Author photo).

Forests landscape architect, with seating capacity for 200 people, was installed near the north end of the office. The lodge (cottage 1) was remodeled to include basement sleeping quarters, a bathroom with showers, and a laundry room. The bunkhouse/mess hall was modified to accommodate safety issues such as adding a fire escape.

In 1971, the Intermountain Forest and Range Experiment Station began sponsoring the Youth Conservation Corp (YCC), a Federal program for promoting social awareness of environmental issues to youth (Baker and others 1993). Young adults, ages 15 through 18 years, from the area spent 8 weeks during the summer at the Forest to “earn-work-learn.” They focused on conservation-related projects and forest ecology to teach them about environmental issues. The YCC crew, led by camp director Robert Weisel, a teacher from Moscow High School, and several other staff members were responsible for the work as well as the recreational program for the young people. Because of this program, many additional research projects were initiated and maintained as well as projects for the Priest Lake Ranger District and the Idaho Fish and Game Department.

The YCC crew helped create a new trail in the 982-acre Lower Canyon

Creek area, which was created as a natural area in 1937. This area was set aside as an untouched ecosystem so that various habitat types would be available for monitoring and comparison long before Congress mandated by law that the Forest Service find and set aside areas not only on experimental forests but on all National Forest lands. Charles Wellner maintained the importance of this area because it displayed a variety of stands, primarily western hemlock, western redcedar, subalpine fir, western white pine, Douglas-fir, grand fir, western larch, ponderosa pine, Englemann spruce, and whitebark pine, which are key species to the Pacific Northwest habitat types. The importance of a natural area on experimental forests is that it can be used as a comparison to areas that have been treated.

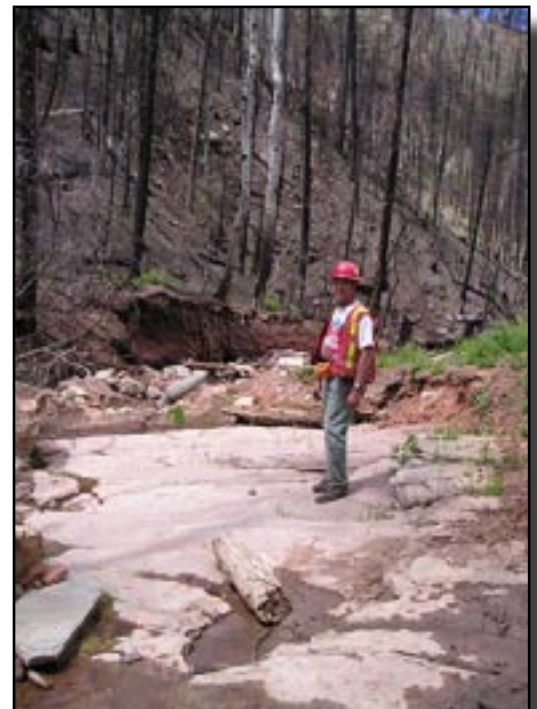
Monies were budgeted during the 1980s to upgrade the laboratory, shop, and other buildings. The conference room in the laboratory was renovated, insulation was added to the cottages, and new plumbing was installed in cottages 3 and 4. An A-frame sleeping/lab building located near the Gisborne lookout was moved to the compound and nicknamed the Gisborne Hilton. In 1986, the bunkhouse/mess hall, originally built in 1915 and 1916 as a lecture room and woodshed and reconstructed in 1934 by the Civilian Conservation Corps, was upgraded by adding electric baseboard heating. Not only did this change provide less maintenance, it also provided more space in the rooms to accommodate the larger numbers of participants at various meetings and workshops being held at the Forest. New equipment was also acquired

including two snowmobiles and a John Deere diesel tractor for tilling planting sites and snow plowing.

In 1984, Cal Carpenter retired after 19 years as Superintendent of the Forest. His replacement, Chuck Hepner, had worked at the Moscow Laboratory since 1976 when he transferred from the Forestry Sciences Laboratory in Ohio. Hepner left in 1987, and Mel Morton replaced him for 2 years. During the transition to a permanent replacement, Cal Carpenter returned from retirement to reprise his role as Superintendent. Dr. Russell Graham also began delegating routine supervision of the Forest and budgetary work to Dr. Terrie Jain.

In 1990, Robert Denner replaced Chuck Hepner as Superintendent and Marina Frederick joined him as an assistant. Like Bob Marshall, Denner came from New York and was drawn to forestry and the Northwest. He moved west to fight fires and completed his degree at Washington State University.

In addition to the routine maintenance of the buildings and grounds,



Bob Denner, current Superintendent.

the office at the Forest was upgraded to enhance the computer capabilities for the Superintendent. Routine maintenance, however, only covers the cosmetic needs of the buildings, and more long-term preservation is needed. The Department of the Interior has established guidelines for rehabilitating historic buildings—guidelines that are critical for retaining the integrity of the structures but make it more difficult to make basic repairs and modernize. The guidelines define in detail how to repair and replace brick, stone, roofs, windows, porches, and mechanical systems on historic structures. In 1993, Scientist-in-Charge Dr. Russell Graham and Dr. Terrie Jain wrote a proposal to apply for recognition for the Forest for the National Historic Register, which was created under the National Historic Preservation Act of 1966 to preserve and protect historic buildings on Federal lands. Cort Sims, U.S. Forest Service archaeologist from the Idaho Panhandle National Forests, visited the Forest in October 1993 to evaluate the buildings and to collect data related to the historic significance of the site. In 1994, the Station headquarters was added to the Register.

In 1995, Dr. Russell Graham and Dr. Terrie Jain submitted a proposal

to the Idaho Heritage Trust to obtain a grant to help preserve the historical value and to retain the original structure of the buildings when renovation is needed as the buildings deteriorate. The Trust had been created with goals similar to the National Historic Register. While the Trust agreed that the Forest was important historically to the State of Idaho, unfortunately the Trust's resources were inadequate to provide the \$10,000 grant that was requested but did provide \$3,000 for minor upgrades. However, the Forest became eligible for future proposals.

Because of the increased usage of the Forest for workshops, seminars, and training, under the leadership of Drs. Richard Krebill, Keith Evans, and Dean Knighton (Acting Station Directors 1992—1993), a new conference facility was approved and completed in 1999. The conference building, attached to the bunkhouse/mess hall, can accommodate 50 participants. It was constructed to blend in with the other buildings and to retain the historic look.



Keith Evans, Richard Krebill, Dean Knighton, Acting Directors 1993.

Anniversaries

By 1976, the Station had completed 65 years of research. To recognize the anniversary, a weeklong celebration was planned and a committee, chaired by Charles Leaphart from the Moscow Laboratory, was created to arrange for the programs and workshops. On August 11, a public celebration was held at the Forest attended by local residents, forestry officials, current researchers, and many people with close associations



Conference building and mess hall.



Chuck Wellner, Assistant Director
1961-1972.

with the Station. Special guests that day included Dr. Roger Bay, who was then Director of the Intermountain Forest and Range Experiment Station in Ogden; Charles Wellner, retired Assistant Director; George Jemison, C. L. Tebbe, and Joseph Pechanec, former Station Directors; Dr. Julius Larsen, who was 99 years old, traveled from his home in Nebraska along with his daughter, Margaret Larsen Blumenschein. Larsen recounted his days at the Forest, and his daughter talked about her childhood memories of living at the Forest. (Larsen died a few months after the anniversary celebration.) Current researchers presented examples of the ongoing work, and members of the regional Society of American Foresters hosted field trips to review various sites within the Forest. Local coverage of the event appeared in the *Priest River Times* and the *Sandpoint Daily Bee*, and stories ran in various Forest Service publications. Wellner also authored a history of the Forest, *Frontiers of Forestry Research—Priest River Experimental Forest 1911—1976*, for the occasion. The 75th anniversary

was marked in 1986 with a 1-day commemoration on August 13. Station Director Larry Lassen (1983—1992), Associate Chief of the Forest Service Dale Robertson, and Society of American Foresters President Warren Doolittle were among the special guests. Charles Wellner was recognized for his work at the Forest, and current researchers presented examples of their work.

Research Emphases

Genetics

Because forest management had emphasized timber harvesting over the years, the primary species for research had been western white pine and Douglas-fir. But because of the New Forestry philosophy, which brought changes to management within National Forests, other species, such as grand fir, Washo pine, western larch, subalpine fir, whitebark pine, lodgepole pine, and Engelmann spruce, were now being studied. The need for understanding forest ecology and the interrelationships between and among the tree species was also being recognized. As the early researchers had done, seeds from the Western United States were planted in the nursery to be used for genetic trials. To accommodate the growth of this research, the nursery was expanded, fences were installed to prevent invasion by deer and small rodents, and an irrigation system was added so that the environment could be controlled. Many of the supplies came from the old Savenac Nursery when it was closed and replaced by the Coeur d'Alene Nursery. Thousands of seedlings were grown in containers at the Moscow Laboratory greenhouses and transplanted to sites on the Forest including the Weidman Arboretum (named for former Station Director Robert Weidman), near the old CCC



Larry Lassen, thirteenth Director
1983-1992.

camp, and high elevation sites near Gisborne Mountain. These various locations were used to assess stressful conditions such as a shorter growing period and colder temperatures.

In addition to Dr. Rehfeldt and Dr. Hoff, many people were involved in this research including Dr. GERAL McDonald, Pat Wells, Duke Coffen, Duane Andrews, Mel Morton, Dennis Joyce, and Bruce Young. To accomplish the fine measurements needed, the scientists and the support staff looked at a wide variety of attributes, such as time of bud burst, needle length, needle color, and growth rates. The Annual Reports for these years refer to the unique characteristics of those involved in this work. Bruce Young, for example, traveled with a Julia Child cookbook and prepared many sumptuous dinners in the lodge. Dr. Rehfeldt was an enthusiastic jogger and is credited with running the 8 miles to the



Pat Wells and Terrie Jain working in nursery.

top of Gisborne Mountain (5,900 feet) in one and three-quarters hours (U.S. Department of Agriculture 1978, 1989).

The genetic research, led by Dr. Rehfeldt, eventually showed that some species, Douglas-fir and lodgepole, for example, are genetically specialized and, therefore, adapted to only specific sites or environments. Even minor changes in elevations or latitudes could cause poor growth or death from weather conditions. In contrast, western white pine is a generalist and adaptable. There is little difference in genetic characteristics of these seeds or trees in the Puget Sound area and those growing in northern Idaho.

Dr. Ray Hoff, geneticist, studied the relationship between insects and diseases and their tree hosts. As a result, his work showed that different genetic sources are resistant or adapted to fend off diseases—not only blister rust, but also gall rust or insects such as shoot bores. An example of how his research was applied was the creation of a gene bank for slow canker growth, a resistance mechanism found in a small number of trees near Elk River,

Idaho. Located in the nursery at the Forest, these trees will preserve this unique gene trait.

This plantation provides research material for other researchers, such as Donna Decker Robertson who joined the Silviculture Genetics Research Work Unit in Moscow with the retirement of Dr. Hoff. Her work, with the help of Marcus Van Warwell, also a new member of that work unit, focuses on whitebark pine and uses plantings

in the nursery to look at rust resistance mechanisms in this species. This tree is critical at high elevation sites throughout the Western United States, and its seeds are a primary food source for the threatened grizzly bear. Not only was all this genetic research used for practical application but it also provided the framework for basic research for the future, including cooperative work with Region One previously led by Dr. George Howe and now headed by Dr. Mary Frances Mahalovich.

Forest Health

An important part of New Forestry, or ecosystem management, is forest health, which considers the effects of management practices on forest productivity, observing changes in disturbances such as catastrophic insect and disease epidemics, extreme wildfire seasons, and the role forests play in global warming. “Forest health” is the term applied to all the factors affecting forests including air quality, climate changes, disease, and insects. Recent Forest Service research projects, such as the Columbia Basin Assessment, have been applied to large landscapes and take into consideration all biological



Counting mycorrhizae 1983. Bev Cornwall, Marilyn Wolosiewicz, Mark Holden from Michigan Technology University, Houghton, Michigan.



Priest River Experimental Forest nursery.

and human variables impacting that site. Continued research is needed to understand water and soil relationships, insects and disease, wildlife, and water quality.

Starting in the mid-1970s, long-term research began looking at the role organic materials play in forests. This research involved Dr. Alan Harvey, from the Forestry Sciences Laboratory in Missoula; Dr. Martin Jurgensen, Professor at Michigan Technology University, Houghton, Michigan; and Dr. Mike Larsen from the Forestry Sciences Laboratory in Madison, Wisconsin. This work monitored the effects of timber harvesting, different levels of wood utilization, and different intensities of fire on soil quality. During the summers, many graduate students from Michigan Technology University were involved in the work, taking soil samples with large heavy slide hammers that drove 4-inch well casings into the forest floor. Samples were removed and the soil layers were analyzed. The roots found in these samples were also removed, and the microscopic fungal root tips were counted on thousands of cores. This research not only provided basic information on relationships

regarding soil organic matter and how it affects soil nutrition, and soil water-holding capacity, but it also led to recommendations for managing course woody debris (downed and dead material 3 inches or larger in diameter) throughout the Rocky Mountains.

In the 1980s, Dr. Russell Graham, Jonalea Tonn, and Dr. Debbie Page-Dumroese joined this research effort called the Great North Idaho Bedding Experiment. The team planted western white pine and Douglas-fir seedlings in soils with various levels of organic matter near the Weidman Arboretum and mid-way up a slope in Canyon Creek. With the help of the Michigan Technology students who spent many long hours analyzing the samples, these studies showed the importance of soil properties, especially organic matter, on the formation of root systems, on nutrition, and on seedling growth. Among results were recommendations of soil disturbances that maintain soil productivity yet provide conditions conducive to good tree growth. This information continues to be applied throughout the Northern Rocky Mountains for site preparations for establishing trees after natural disturbances such as wildfires

and timber harvests. By the 1990s Terrie Jain joined this Organics Team and helped develop course woody debris recommendations for specific habitat types (ecological classification system used to describe forest settings based on plants species) located from Mexico to the Canadian border.

With Dr. Harvey and Dr. Larsen's retirement, Dr. Graham, Dr. Terrie Jain, and Dr. Jessie Michaels from the Forest Products Laboratory are continuing this work and investigating different methods of treating large amounts of fuels that exist as a forest health problem in the Rocky Mountains. Methods being tested on the Forest include inoculating course woody debris with fungi, breaking up forest floor residues into large chunks, and residue burning. One goal is that some of these methods will prove useful in addressing the urban interface issue (building of residences in or near forest settings) of protecting buildings from wildfires.

The Forest is one site of a long-term national study looking at the impact of organic matter removal and soil compaction on tree growth. Along



Deborah Page-Dumroese.

the Priest River on the west side of the Forest both western white pine and Douglas-fir were planted following guidelines created by the national study. Dr. Debbie Page-Dumroese, a soil scientist at the Moscow Laboratory, is leading this effort for the Station.

Another aspect of forest health is the presence of diseases that weaken and kill trees. Often forest diseases and successional changes work together to create conditions ripe for wildfires. Dr. Geral McDonald, forest pathologist from the Moscow Laboratory, has described different kinds of root diseases and the conditions in which they can become epidemic. In his work he has sampled organisms in various types of stands on the Forest and used this information to show how different types and mixes of tree species and locations are related to disease levels. Using this information, stand treatments can be designed that minimize the impact that diseases have on forests.

Insect infestations, another serious problem for forest health, have been part of the ongoing research on the Forest since the early years. Dr. Furniss, entomologist at the Moscow Laboratory, and Dr. Garrell Long from Washington State University have continued the long-term research on larch casebearer. Dr. Long looked at several aspects of the interactions of the parasites and weather and the impact on larch casebearer populations. In addition to Dr. Long, Dr. Jim Moore and Dr. Karl Stoszek from the University of Idaho used this information to determine the impact this insect has on cone production of western larch. Some of the trees used for sampling were from areas that Harry Gisborne clear cut for some of his fire research.

As a result of an invitation by Dr. Malcolm Furniss, a cooperative agreement with Dr. Douglas Ferguson, Lead Scientist of the Department of

Agriculture's Lepidoptera Research Section, was developed in 1981. Dr. Ferguson spent 4 weeks at the Forest collecting a variety of insects for further research. This work was the first compilation of research on moths and resulted in a catalog of all the species that occur in the Rocky Mountains.

To answer some of these forest health issues, the long-term weather records, collected since 1911, have proven invaluable. These records, along with the streamflow records on Benton Creek, supplied baseline data on weather, and these records are now available on the Internet (<http://www.snow.og.uidaho.edu>) for use by other Federal agencies in global warming and forest health studies.

Forest Structures and Processes

An important component of the Forest is to provide effective conditions for research. Building on the treatments that Gisborne, Wellner, Deitschman, and other silviculturists created, Graham developed, on Observatory Point in the Canyon Creek drainage, several different stand structures—the spacing, mixture of large and small trees, and different tree heights. These stands

ranged from small openings to selection harvests, shelterwood harvests, and a small clear cut (12 acres). These were used to show how forests could be managed to meet the objectives of New Forestry or ecosystem management. The stand structures that maintain high forest cover provided wildlife habitat, protected watersheds, and minimized soil erosion, yet provided some forest products. These forest conditions also showed the drawbacks of maintaining these conditions, which often perpetuated many forest insects and diseases.

The shelterwood areas at Observatory Point provided an excellent opportunity to show how fire affects the moist forests of the Northern Rocky Mountains. In cooperation with Dr. Kevin Ryan and Dr. Jim Brown from the Forestry Sciences Laboratory in Missoula, different burns were completed during fall and spring. Each fire promoted different forest communities to grow, ranging from ones dominated by western larch to those dominated by more shrub species such as buck brush. Cooperating with the Organics Team, the effect these fires had on soils was also studied. From this research, recommendations could be made for



Prescribed fire on the Priest River Experimental Forest.



Graham's Folly.

applying fires that maintained the forest floor organic matter, yet reduced the fuels and fire hazards and promoted desired forest communities.

The Forest contains some of the most productive ponderosa pine growing sites in the Northern Rocky Mountains. These sites were maintained historically by frequent (every 40 years) surface fires but, because of fire exclusion promoted by Gisborne's research, fires were suppressed and the pine stands were overgrown by Douglas-fir, grand fir, and western redcedar. In cooperation with Dr. Steve Arno and Mick Harrington from the Fire Sciences Laboratory in Missoula, different stand densities of ponderosa pine were created through timber harvest, and different fire intensities were applied both in the spring and fall to determine their effectiveness in preparing sites for ponderosa pine regeneration. These same sites were used by Dr. Gerald McDonald to show the impact these same treatments had on the presence of root disease.

The impact that forest fires have on the soil and water resources is critical to forest health. Working with Dr. Charles Luce, formerly from the engineering project in Moscow and now associated with the Forestry Sciences Laboratory in Boise, Idaho, three paired watersheds are being monitored for streamflow and sediment

production. After sufficient baseline data are collected from watersheds in Canyon Creek and Benton Creek, one subwatershed of each pair will be treated with a timber harvest and a prescribed fire. One of the planned treatments is to simulate a wildfire, which will entail killing the overstory trees without felling them and treating the forest floor with a prescribed fire. Other treatments planned include a timber harvest removing a portion of the stands. This line of research will provide information regarding the impact wildfires have on watersheds and help in designing mitigating measures. The Organics Team will evaluate how these treatments affect organic matter and nutrients on the forest floor.

Not all fires on the Forest, however, worked as planned. In 1979, in the lower portion of Benton Creek, a small, 5-acre clear-cut was ignited on June 1 by Dr. Graham, Fire Management Office, Larry White from the Priest Lake Ranger District of the Idaho Panhandle National Forests, and two summer students. Then 5 days later the fire erupted and consumed another 3 acres of the area along Benton Creek bordering the clear cut. Vic Hager, Cal Carpenter, and Lyle Cooper, along with personnel from the Priest Lake Ranger District, attacked the fire and put it out. This area, dubbed "Graham's Folly," now supports a second generation of rust resistant white pine stands adjacent to the first generation of rust resistant white pines (the VQ plots) planted by Richard Bingham in the 1950s.

Modeling

One of the many tools available to researchers for studying forest health is the Prognosis Model, created in the 1960s and now known as the Forest Vegetation Simulator (FVS). It provides users with an easy-to-use computer program where variables (management

actions such as thinning, fertilization, and cut cycle) are entered, and output provides the user with one or more possible results. Forest managers no longer have to wait years for forest stands to grow to see details such as mortality rates, number of new trees, and growth rates. The options provided by the FVS can guide scientists into a more exacting direction of research before implementing them on the Forest. Since its inception, FVS has been upgraded and can now project the development of forest stands throughout the United States and Canada. The long-term records of tree growth located on the Forest, and measured every 5 to 10 years, continue to provide many validation tests for FVS. This model was broadened to include insect and disease information and linked to other models looking at fire effects and behavior and soil erosion developed by scientists within the Station.

Technology Transfer

Because of the various short- and long-term studies conducted over the years, the Forest has been a superb site for the exchange of information on a one-to-one basis as well as with large groups regionally and from across the nation. In 1980, an extensive training session was held in cooperation with Washington State University for members of the Continuing Education in Forest Ecology and Silviculture (CEFES). This training session was attended by silviculturists from throughout the Northern Rocky Mountains and continued the tradition of the Forest as an educational asset.

The Forest also hosted a large group of educators from various colleges and universities nationwide including Orono, Maine, Nacagdoches, Texas, and Lexington, Kentucky. This group observed examples of forest research that highlighted western white

pine blister rust work and genetic studies growing in the nursery. In 1981, the Forest hosted the Fairchild AFB Survival Unit and the CEFES Refresher III. Some 27 students and 16 instructors participated in the 2-week course. During the 1980s, many foresters from the Peoples Republic of China toured the United States, and in 1985, a delegation of five foresters and two interpreters spent time at the Forest reviewing current research projects and discussing research work being conducted in their country.

End of a Millennium and Beginning of the Next

By 1999, the age of uncertainty was replaced by the age of stability. Once more the Forest was the center of a wide variety of research programs. Many of the administrative problems that had developed during the 1950s and 1960s were resolved. To establish a more stable funding practice and to reduce the infighting among the projects, a three-tiered funding approach was established. First, a corporate responsibility was assigned to the Forest. As a corporate facility the Station had a responsibility to maintain the buildings minimally. A second tier charge was for prime users of the Forest and its facilities. This was determined by a historical use pattern established year after year. Projects that routinely used the Forest and the facilities were charged accordingly. The third tier was applied to secondary users. A basic cost of staying at the Forest in the lodge or one of the other guesthouses was established. Visitors from other parts of the Station, faculty/students from a university, or other guests would pay a nominal fee to cover the cost of housekeeping and routine maintenance.



Terrie Jain taking soil samples.

Groups hosting meetings would pay rent for the conference facilities. This three-tiered approach would pay for the Superintendent's salary and assistant and all operating costs of the Forest. This system proved to work so well that after the consolidation, the Rocky Mountain Research Station applied



Denver Burns, fourteenth Director 1993-2001.

this to the other experimental forests at Frasier and Manitou, Colorado.

The deterioration of the buildings, which are almost 100 years old, became a major concern. Most of the researchers who spend a large amount of time at the Forest develop a close attachment and a feeling that the Forest is their second home. This emotional tie has both positive and negative aspects. While the researchers take pride in maintaining the quality of the buildings, they often disagree with proposed upgrades and enhancements. The Scientist-in-Charge, Dr. Graham, has attempted to maintain the historic appearance of the buildings yet modernize them to meet the needs of the various users. Having the buildings on the Historic Register and recognized by the State of Idaho as having historic significance will enable Dr. Graham to maintain the buildings long into the future.

Just as in the past, some of the most difficult conflicts are not about political issues or funding, but are interpersonal disputes between researchers. As noted, some conflicts have occasionally been so severe that



Marcia Patton-Mallory, fifteenth Director 2001-present.

they have changed research directions or prevented cooperative work that might have enhanced the progress of the research. Research is a personal endeavor, and each project takes on the personality of those involved.

However, the Forest also has a tradition of bringing together people from different agencies and different disciplines to exchange ideas not only in a workshop or a classroom but also in informal settings. Perhaps more has been gained from conversations where people are preparing meals together in the lodge than at any other time.

Research work has progressed to the point that it is shared across work units more than in the past. Because of the themes of New Forestry and Ecosystem Management, there is more of a recognition that all research must blend together. Each work unit has its main focus for research, but interdisciplinary attempts are being made to link research projects.

Another sign of the times is that there are many women researchers who are joining the ranks and working on projects at the Forest. The Moscow Laboratory, for example, includes Jonalea Tonn, Dr. Debbie Page-Dumroese, Dr. Melinda Moeur, Dr. Mary Frances Mahalovich, and Dr. Terrie Jain. And currently heading the entire Rocky Mountain Research Station, as previously mentioned, is Marcia Patton-Mallory.

During this era, there is a history of continuity with Superintendent Cal Carpenter and now Bob Denner. Dr. Graham has administered the Forest since 1976 and has gradually delegated work to Dr. Terrie Jain. As the centennial anniversary approaches in 2011, the importance of the Forest and its facilities has been guaranteed and seems ready for the future.

Chapter 7: Conclusion

Forestry research scientists aspire to be among those contributing significantly to the body of knowledge to solve major problems afflicting forests. Trees, because of their long reproductive cycle, make more difficult subjects for investigative work compared to annual crop studies. But because they are a critical part of the ecosystems of the West providing habitat for wildlife species, recreational use, and materials for the nation's wood products industry, the Forest Service has dedicated substantial time and energy to research. Researchers over the years have learned through trial and error how to consider all possibilities and to learn from false starts. Results of research work have been affected by state-of-the-art technology, and the scientists have contributed to not only the knowledge but also the equipment used. Research conducted at the Priest River Experimental Forest has produced results that have not only benefited local forests but have been applied to sites worldwide. Success, however, comes gradually as witnessed by the 25 years of blister rust studies that produced disease-resistant trees.

Over the last few decades, the public has criticized the Forest Service for its management techniques. As the keepers of the nation's forests, the Forest Service has been expected to know exactly what is required not only to harvest the timber but also to provide for the public's need for recreation and to protect wilderness areas, fisheries, and wildlife. In other words, to be all things to all people. But politics, State and local concerns, and battles between environmentalists and those who think the priority should be

employment, regardless of the effect on the environment, have contributed to the problems facing the Forest Service. In Pinchot's era, he made the rules for the National Forests and told Congress what was needed to carry them out. Now, the Chief of the Forest Service is a political appointee and answers to the Presidential Administration, as well as Congress and the public.

Because the Forest Service is part of the Department of Agriculture, trees are therefore considered by many to be a crop (timber) whose basic purpose is to be harvested. The allowable cut, the amount of timber required by law to be extracted from the National Forests, has been increased over the years. By the 1950s, to meet the known and the anticipated postwar building boom, Congress raised the allowable cut from 3.5 billion board feet to 9.3 billion board feet (Hirt 1994). Determining what defined "merchantable" became an issue especially for Chief Richard McArdle when timber lobbyists demanded that the agency modify the Forest Service's timber inventory to include some tree species that had previously been considered unmarketable. In McArdle's words: "There was never a week that I wasn't being beat upon to raise the amount of timber which could be cut.... In brief, they wanted the allowable cut figure to be based on everything. This led to misunderstandings because the timber they wanted to cut was the best timber and only the best" (Hirt 1994, pp 133). This was the same cut-and-run problem that Pinchot faced when the Forest Service was created. The private loggers wanted to use only what was profitable and to cut the timber as quickly and as cheaply as

possible without consideration for the future.

By the 1960s, "multiple use" became the rallying cry, and the public pushed for wider use of the forests. The Izaak Walton League and the Wilderness Society (Bob Marshall being a founding member) called for other uses of the forests that included wildlife and recreation. The Forest Service's District Rangers were suddenly called upon to be experts on watershed, fisheries, and recreational uses as well as timber management. Chief McArdle actively sought to modify the legislation being written to include wording about sustained yield—meaning that the forests would be managed to reproduce a supply for the future to replace what was harvested each year. However, it should be noted that "multiple use" applies to people while "sustained yield" applies to the resources, so it was like comparing apples and oranges. The Multiple Use-Sustained Yield Act (MUSY) was passed in 1960 but with mixed opinions.

Another issue that the Forest Service was dealing with was the amount of new lands that had been added to the Federal bank account. As a side effect of the Weeks Act and the Clark-McNary Act, many acres were either acquired through purchase, donation, or exchange. Many of these acres were "abused" and required reforestation, but the staffing levels of the Forest Service prohibited it from handling this function. The allocation for reforestation was removed during World War II when funds were directed to the war effort. Following the war, Montana's U.S. Senate delegation, Lee Metcalf and Mike Mansfield, raised the

issue of reforestation, citing examples from the forests within their State. The Forest Service requested \$1.3 million for reforestation, but Congress reduced the appropriation to \$290,000 (Hirt 1994). As a result of underfunding by Congress during the 1960s, emphasis was placed once again on timber sales. While the rhetoric was on multiple use, the reality was that harvesting was the number 1 priority.

In response to the pressure to “get the cut out,” the Forest Service often employed its own severe methods of logging, such as clearcutting. In the 1970s in the Bitterroot National Forest and the Monongahela National Forest in West Virginia, the Forest Service came under attack by the public for such management practices. The internal evaluation completed by the Forest Service acknowledged many agency mistakes and called for immediate action to change these policies and to restore the public confidence and trust. Clearcutting was defended, but Forest Service officials stressed that it should be used only in specific conditions and not as the main silvicultural tool. They also noted that external issues aggravated the situation because of the Federal law emphasizing timber sales and the lack of funding by Congress for workforce. This internal evaluation was not the only report produced. The Bolle Report, completed by the Dean of the Forestry School at the University of Montana, was even harsher in its assessment of the situation on the Bitterroot National Forest. While the Forest Service did modify its clearcutting policies and considered all the recommendations that the Bolle Report suggested, the President’s Advisory Panel on Timber and the Environment (PAPTE) came to different conclusions. It called for more old-growth harvests and, to increase cutting, called on the Forest Service to review and revise

policies for allowable cut determinations (Hirt 1994). As a result, the harvesting of old-growth timber and the emphasis on timber sales continued throughout the 1970s and 1980s.

By the 1990s, endangered species, such as the spotted owl, added to the controversy and the problems surrounding timber harvesting. Within the Forest Service, Forest Supervisors, such as John Mumma from Region One, called for lower harvest levels so that environmental laws could be met and sustainable yield could be achieved. Other Supervisors wrote to Chief Dale Robertson that they could not meet the timber sale goal that the Bush Administration required. Due to political pressure on Chief Robertson, he asked Mumma to take a new assignment in Washington, DC, but instead, Mumma resigned.

Shortly after President Clinton was elected, the Administration, in an

attempt to address the problems related to National Forest management, held a conference in Portland, Oregon. However, one conference could not resolve decades of problems. Postconference policy only confused the issues more. As the 21st century begins, the controversies continue, and there has been no real solution to the allowable cut issue. Paul Hirt, author of *A Conspiracy of Optimism*, points out that the Forest Service is a “pawn in a chess game presided over by special interest groups and their political allies” (Hirt 1994: 295).

The question is, how can these problems be fixed? Some might feel that the problems are beyond repair, but I disagree. The main problems are related to forest management, and the way to determine how best to deal with these problems is with more research. The Priest River Experimental Forest has made significant contributions to resolving issues that have developed



Scientist-in-Charge of Priest River Experimental Forest Russell T. Graham 1976 to publication date (2004).

over the years, but the potential for more groundbreaking discoveries and problemsolving in the future is apparent. As the recent fires in several other Western States (years 2000 through 2003) point out, fire research, which started at Priest River, plays a critical role today. Forestry is a young profession, and the learning process continues. Resources are being depleted at alarming rates due to urbanization and population increases, so conservation of resources for future generations becomes even more critical.

According to the current Scientist-in-Charge, Dr. Russell Graham, research is progressing toward landscape ecology (Graham, personal communication 2000). This type of research looks at all the interconnected pieces such as watershed, wildlife habitat, and biological diversity, and Priest River Experimental Forest continues to offer the perfect laboratory for studying these ecosystems. He also emphasizes that the goal of research at the Forest is to stay one step ahead of the need. Because the public is more keenly aware of how the Forest Service administers the National Forests, researchers are working toward finding better management tools for the land managers. The Forest Service offers the public various opportunities for its opinion, and research tools can help the land managers demonstrate how to best maintain the quality and quantity of timber, keep watersheds clean, and maintain wildlife and fisheries to promote forest health.

In 2003, the Forest was added as a participant to the National Atmospheric



Sign at entrance to Priest River Experimental Forest approximately 2000. (Author photo)

Deposition Program/National Trends Network. This network, composed of more than 200 sites across the nation, is a cooperative effort among many groups, including State agricultural experiment stations, the U.S. Geological Survey and the U.S. Department of Agriculture. The purpose of this venture is to collect data for analyzing long-term trends on the chemistry of precipitation, namely acid rain (a term to describe acidic particles that are collected from earth surfaces, such as from factories, and then fall back to earth through rain).

Another important part that Graham stresses is technology transfer in various forms such as publications, written or electronic, conferences, workshops, and tours on site to show the current status of research projects. The knowledge gained from years

of research is of no benefit unless it is distributed to those who make the decisions. Currently some 500 archival libraries at colleges and universities worldwide receive copies of all Forest Service research publications, amounting to some 300 to 500 individual titles yearly. In addition, hundreds of thousands of copies of publications are sent to individual requesters and to mail lists that include private citizens, industry, organizations, other Federal agencies, universities, State or other governmental agencies, and foreign audiences, and each USDA Forest Service Research Station in the nation maintains extensive Web sites containing published information. Although many private companies have their own research departments, they often look toward work being done by the Forest Service researchers to help solve problems on their lands too.

Under the leadership of the Directors, Scientists-in-Charge, and the Superintendents, the Forest has been well maintained over the years. Now that it has been added to the historic registry, its significance, not only as a Federal structure but also to the State of Idaho, is assured.

As Julius Larsen noted in 1944 to Harry Gisborne, research has an important role in all forestry:

You who shall carry this important work forward, I salute and wish good speed. It is always satisfying to know that we are doing something which contributes in a substantial way to the happiness of our people and the well-being of our glorious nation. (Larsen 1976: 28)

Appendix A: Personnel Who Established the Priest River Experimental Station

According to the first Annual Report (U.S. Department of Agriculture) for 1911, the following are the personnel involved in the establishment and maintenance of the Experiment Station. Additional and subsequent biographical material is included.

Donald R. Brewster—Director of the Station from 1911 until 1917. Brewster reported to the Assistant District Forester (in charge of silviculture) in Missoula with technical guidance from the Office of Silvics in Washington, DC. Brewster began the tradition of writing annual reports. His notes provided historical information and insight into the creation of the Station, and his journal includes names of visitors to the Station.

Julius V. Hoffman—Technical Assistant from 1912 to 1913 when he left for the Wind River Forest Experiment Station in Washington.

Julius A. Larsen—Second Director of the Station from 1917 until 1922. He held two degrees from Yale's Forestry School and left to become a Professor at Iowa State University. His journal includes names of visitors to the Station.

Ernest C. Rogers—Field Assistant in 1913 and from the Minnesota Forest School. He transferred to Savenac Nursery in 1914 to conduct planting studies. He resigned from the Forest Service in 1917 to begin graduate studies at Johns Hopkins University and later died in Washington, DC.

W. C. Lowdermilk—Held the position of Liaison Officer in Missoula, Montana, a contact man between research and timber sales administration. He was an Oxford graduate, and his main responsibility was to interpret research results so that the land managers could put them into practical use.

F. I. Rockwell—In charge of silvics in District One. Although not assigned to the Station directly, he was a member of the original group that selected the site of the Research Station.

W. G. Wahlenberg—Worked at Savenac Nursery in 1920 in the Office of Planting.

Appendix B: Initial Costs of Establishing the Priest River Experimental Station

Item	Cost (1911 dollars)
Laboratory	\$646.00
Greenhouse	\$168.37
Cabin	\$89.39
Clearing for laboratory	\$78.65
Clearing for trails	\$102.27
Nursery	\$74.81
Road to Benton Station	\$91.75
Water supply	\$584.20
Electrical line	\$28.01
Equipment purchased	\$134.37
Establishing camp	\$42.86
Survey and mapping	\$17.63
Preparing experimental areas	\$220.87
Climatic varieties experiments	\$73.01
Planting and sowing	\$14.96
Seed production	\$89.36
Introduction of exotic tree species	\$9.78
Meteorological observation station	\$28.17
Nursery Practice	\$18.53
Seed Extraction	\$13.05
Seed Testing	\$4.00
Misc. improvements	\$157.00
Correspondence	\$293.20
Maintenance and Sundays	\$125.52
Total	\$3,071.04

Appendix C: Directors, Superintendents, Scientists-in-Charge of the Priest River Experimental Forest

Directors

Donald Brewster 1911 to 1917
Julius A. Larsen 1917 to 1921
Robert H. Weidman 1921 to 1931
Lyle Watts 1931 to 1936
Stephen Wyckoff 1936 to 1939
Melvin Bradner 1939 to 1946
Harry T. Gisborne 1946 (Acting following the death of Bradner)
Charles Tebbe 1946 to 1950
George M. Jemison 1950 to 1953
Reed W. Bailey 1954 to 1961
Joseph F. Pechanec 1962 to 1971
Robert Harris 1971 to 1974
Roger Bay 1974 to 1983
Larry Lassen 1983 to 1992
Richard Krebill 1993 (Acting)
Keith Evans 1993 (Acting)
Dean Knighton 1993 (Acting)
Denver Burns 1993 to 2001
Marcia Patton-Mallory 2001 to publication date (2004)

Superintendents

John B. Thompson 1928 to 1937
G. Lloyd Hayes 1937 to 1938
Donald G. McKeever 1938 to 1941
Elton E. Bentley 1941 to 1942 (winter)
John D. Crowe 1942 to 1944
L. H. Whetsler 1944 to 1945
A. W. Peiffer 1945 to 1948
Austin E. Helmers 1948 to 1953
J. H. Dieterich 1953 to 1954
Albert R. Stage 1954 to 1956
J. W. Hanover 1956 to 1958
R. W. Mutch 1958 to 1958 (3 months)
W. Muegler 1958 to 1959 (2 months)
Edward F. Wicker 1959 to 1959 (4 months)
R. W. Mutch 1959 to 1960
Stan Carpenter 1960 to 1961
Robert Doty 1961 (2 months)
Robert Pfister 1961 to 1962
Robert Doty 1962 (2 months)
Phil Gustafson 1962 to 1963
Robert Pfister 1962 to 1963

Bill Shambo 1963 (5 months)
Stan Carpenter 1963 to 1964 (5 months)
Robert Doty 1963 (5 months)
Dave Crukovich 1964 to 1965
Calvin Carpenter 1965 to 1984
Chuck Hepner 1984 to 1987
Mel Morton 1987 to 1989
Cal Carpenter 1989 to 1990 (returned from retirement)
Robert Denner 1990 to publication date (2004)

Scientists-in-Charge

Glenn H. Deitschman Silviculture 1963 to 1973
Marvin W. Foiles Silviculture 1973 to 1976
Russell T. Graham Silviculture 1976 publication date (2004)

Appendix D: Forest Service Chiefs, with Extended Biographies of Those Who Directly Impacted the Priest River Experimental Station

Gifford Pinchot, 1905 to 1910

When the Forest Service was created in 1905 by Theodore Roosevelt, Gifford Pinchot was appointed the first Chief. When he began, he requested that his title be changed from Chief to Forester as there were many Chiefs in Washington, but only one Forester. The Forester title remained in effect until 1935 when the title Chief was readopted. Pinchot's contributions to forestry and research are many: fostering conservation values and changing the nation's attitude that the forests were inexhaustible, creating the first public forestry school at Yale with his own funds, and creating a Federal agency to manage the national forests. Pinchot was well aware of the need to focus energy toward research, and the two original experimental stations, Fort Valley, Arizona and Manitou, Colorado, were established. Pinchot visited the Priest River Experiment Station and Deception Creek in 1937.

Henry S. Graves, 1910 to 1920

Selected to replace Pinchot after the Ballinger controversy, Graves was a Yale forestry graduate and a close friend of Pinchot. Prior to assuming the job as Chief, Graves was the Dean of the Forestry School at Yale and one of the original seven members of the Society of American Foresters. Graves maintained the Forest Service under difficult times during World War I when funding was limited and many of the Forest Service employees were called to military service. During his tenure, the Forest Products Laboratory was established in Madison, Wisconsin, and the Priest River Experimental Station was established in 1911. Graves was among the members of the founding party to establish the Priest River Experiment Station and was a frequent visitor over the years.

William B. Greeley, 1920 to 1928

William B. Greeley was born in New York in 1879 and graduated from the University of California in 1901 and from the Yale Forestry School in 1904. He joined the Bureau of Forestry after graduation and was quickly promoted to Assistant Chief in charge of silviculture in the Washington, DC, office. By 1908 he was appointed the first Regional Forester for District One (later renamed Region One) headquartered in Missoula, Montana, and included the Priest River Experimental Station. He was in charge of the firefighting efforts during the devastating fire of 1910, and because of his experience and background, was a natural choice for Chief after Graves resigned. During his administration the Clarke-McNary Act of 1924 became law; the Act extended Federal authority to purchase forest lands and to enter into agreements with various States to help protect State and private forests from wildfire. Greeley had disagreed with Pinchot's belief in the mercenary character of the average lumberman, and when he resigned as Chief, he became the head of a private timber company.

Robert Y. Stuart, 1928 to 1933

Also a Yale graduate, Robert Stuart was instrumental in getting the Forest Service prepared to deal with the critical crises caused by the crash of the stock market in 1929. As a result of the depression, the CCCs were formed, and under Stuart's direction, they were used by the Forest Service for a variety of projects including building additional structures at Priest River Experimental Forest. During his term, the McSweeney-McNary Act of 1928, promoting forest research, was passed. Stuart requested that the Forest Service complete the National Plan for American Forestry, also called the Copeland Report, that detailed projects needing completion in the National Forests. During his tenure as Chief of the Forest Service, he signed an Establishment Report in 1931 reserving the Priest River Experiment Station a full 20 years after it was actually created.

Ferdinand A. Silcox, 1933 to 1939

Born in 1882 in Georgia, Silcox graduated from the College of Charleston, South Carolina, in 1903 and completed a master's degree in forestry at Yale Forestry School in 1905. After serving in the forestry engineering branch of the U.S. Army, he worked in the private sector for 11 years as a director of industrial relations. Silcox served as Ranger on the Leadville National Forest in Colorado, and in 1908 he was appointed Assistant District Forester for Region One. During the 1910 fire, he helped organize the firefighters throughout Region One. When Greeley was appointed Chief, Silcox became District Forester in 1911.

After the death of Stuart, Silcox took over and led the Forest Service through some of the most difficult times. He helped coordinate the CCCs and the Works Projects Administration (WPA) functions in the National Forests. Silcox was among the Washington men who came to Priest River in 1911 to evaluate the site for the Priest River Experimental Station. Silcox was supportive of the research being conducted at the Station and was especially interested in Gisborne's fire research work. In 1936, a document was published pulling together all the research that Gisborne and others had done to that point. Chief Silcox praised the publication not only for its research but also for the cooperative efforts between the Station and Region One.

Earle Hart Clapp, 1939 to 1943

Earle Clapp was the first Chief of the Forest Service to serve his entire career with the agency primarily in research. Although he was not formally appointed Chief, serving with the official title of Acting Chief from December 1939 to January 1943, he was in actual practice the Chief during that 3 years.

Clapp was born on a farm near Rochester, New York, on October 15, 1877. He credited his dentist with getting him thinking about a forestry career. In 1901, Clapp entered the new Forestry School at Cornell University, which closed in 1903 after wealthy neighboring landowners vigorously objected to Dean Bernhard Fernow's clearcutting on the school's Adirondak Forest. The Cornell diaspora resulted in Clapp's transfer to the University of Michigan where he graduated in 1905, a few months after the Forest Service was created. He went to work for the new agency, first on timber sales in Wyoming and Montana, then in Washington, DC, and then as the first Assistant Southwestern District (Regional) Forester in Albuquerque, New Mexico. He spent the next 4 years as a roving Forest Inspector out of the Washington, DC, office.

In 1915, Chief Henry Graves created the Division of Research to give research greater independence and stature and placed Clapp in charge as Assistant Chief. During the next 20 years Clapp guided the research effort and established most of the Service's research facilities. As a member of the Society of American Foresters, Clapp as chairman helped write a report in 1926 that outlined the existing forestry issues and proposed a program of research to find solutions. This report led to the passage of the McSweeney-McNary Act of 1928, which authorized a system of Forest Service regional experiment stations.

In a 1928 talk, Clapp noted the potential value of a forest belt in the Great Plains. Thus he, along with Fernow, Raphael Zon, Charles E. Bessey, J. Sterling Morton, and Carlos Bates, can be credited among the early backers of the idea for the Prairie States Forestry Project (Shelterbelt) of the 1930s.

Clapp consistently pressed for accurate timber statistics. His compilation of such data resulted in the first comprehensive survey of the nation's timber supply. In 1933 he directed the publication of A National Plan for American Forestry (Copeland Report 1933), which updated the timber survey and contained many proposals for dealing with forestry problems during the Great Depression, including a big expansion of the National Forests.

In 1935 Clapp reluctantly left his research program to become Associate Chief. When Ferdinand Silcox died in office on December 20, 1939, Secretary Henry A. Wallace appointed Clapp Acting Chief. Clapp maintained the Forest Service during World War II despite the reduction of employees due to military service. But his tenure was punctuated by a spirited controversy over proposed Federal regulation of private timber cutting, which he had strongly supported since the issue resurfaced in the early 1930s, and by an all-out struggle with the Secretary of Interior, Harold Ickes. Clapp fought to prevent the transfer of the Forest Service to a new Department of Natural Resources, which Ickes would head. President Franklin Roosevelt supported the proposed reorganization, and when Congressional opposition blocked the transfer, he blamed Clapp and

the Forest Service and reportedly denied Clapp the title of Chief. He even wanted to fire him, but Secretary Wallace stood by Clapp. In later years Clapp believed that the hostilities created by the transfer controversy had prevented Roosevelt from working for comprehensive conservation legislation. Roosevelt also refused Clapp's suggestion to use his war powers to regulate the timber industry. When Lyle Watts was appointed Chief in January 1943, Clapp stayed on for 2 years more as Associate Chief until his retirement. He died in Washington, DC, on July 1, 1970, in his 93rd year.

Lyle F. Watts, 1943 to 1952

Lyle Watts was born in 1890 and graduated from the Iowa State College School of Forestry earning both a bachelors and masters degree. Entering the Forest Service in 1913, he worked in various positions in the Rockies. He became Director of the Priest River Experimental Station in 1931 and left in 1936 to become Regional Forester in Milwaukee, Wisconsin, and later became Regional Forester in Portland, Oregon. In 1943 he was appointed Chief of the Forest Service during the turbulent World War II years. He served as a member of the Technical Committee on Forestry and Primary Forest Products of the United Nations Interim Commission on Food and Agriculture in 1944 and 1945. Although concerned with the Forest Service's role during the war, he was also concerned with its role after the war. He encouraged the hiring of war veterans who had completed their education after the war and used these additional employees to develop the road systems of the National Forests and to begin the sustained yield management practices of the day.

Richard E. McArdle, 1952 to 1962

McArdle began his career in research as a silviculturist for the Pacific Northwest Forest and Range Experiment Station in Portland, Oregon. McArdle and Gisborne carried on a friendly dispute over an aspect of fire research, and, although amicable, the dispute between them prevented any effort to merge the studies. In 1934 he served as Dean of the University of Idaho's School of Forestry so was well aware of the cooperative work being done between forestry schools and the Forest Service. He also served as Director of the newly established Forest and Range Experiment Station at Fort Collins, Colorado, and also the Appalachian Station in Asheville, North Carolina. Becoming Chief in 1952, McArdle was the first to hold a Ph.D. degree and to have been a published researcher. As a result of his research background, he pushed for long-range plans on the National Forests and in the research branch. McArdle was instrumental in upgrading Forest Service personnel, hiring new specialists to begin intensive management, and increasing the professionalism of employees. He also improved relations with the timber industry by backing away from earlier proposals to regulate timber harvesting practices on private lands. During his tenure the Multiple Use-Sustained Yield Act of 1960 was passed, which established policy for the broad development and administration of the national forests in the public interest.

Edward Cliff, 1962 to 1972

John R. McGuire, 1972 to 1979

R. Max Peterson, 1979 to 1987

F. Dale Robertson, 1987 to 1993

Jack Ward Thomas, 1993 to 1996

Michael P. Dombeck, 1996 to 2001

Dale Bosworth, 2001 to publication date (2004)

Appendix E: Popular Article by Bob Marshall

Contribution to the Life History of the Northwestern Lumberjack

By Robert Marshall

Social Forces Vol. VIII, No. 2, 1929

“For it is the nature of man, the extreme prejudice of knowledge, to delight in the spacious liberty of generalities, and not in the enclosures of particularity.” Frances Bacon.

If the social sciences are ever to justify such a dignified appellation they will have to submit to the same quantitative treatment which the more advanced physical sciences have long recognized as prerequisite. For entirely too long a time we have been in the habit of recounting individual conduct by a broad barrage of meaningless approximations instead of utilizing the specific methods of biometry. From the Malay Archipelago to the Court of St. James, we derive our knowledge of the deportment and colloquy of humanity not from the exact data of systematic investigation, but from the ambiguous generalities of superficial impression. Historically it is impossible to draw representative pictures of past demeanor from such misleading evidence. Coevally the situation is only improved within the narrow orbit of personal acquaintance. Otherwise we still found our conception of the mores of the majority of mankind on the casual basis of shallow and often prejudiced assertion.

The more unusual or picturesque the mores are, the more essential it is that we forsake this almost universal subjective approach and adopt the modern scientific manner, because extraordinary customs are the ones most likely to be grossly exaggerated when reported in words, so that merely the oddest features are retained. Consequently the picture which is handed down to posterity is a crude caricature entirely devoid of honesty. The only way to overcome this deplorable result is to record the customs in a concise, objective fashion.

Perhaps no body of Americans have ever been described more picturesquely and less definitely than the lumberjacks. This is partly because of the great romance naturally inherent in the woodsman’s dangerous and severe profession, and partly because his habitat is so remote from that of the average citizen. Few qualities are less conducive to accuracy than romance and remoteness, and thus there have been woven about the lumberjack a great many fabulous fancies which have gone very well as poetry, but have scarcely even approximated the truth. To remedy this defect in our comprehension of a unique participant in the American civilization I have undertaken a quantitative study destined to chronicle certain of the more outstanding social peculiarities of the Northwestern lumberjack. The traits which I have chosen for mathematical analysis are:

- The lumberjack’s speed in eating;
- His table manners;
- The subjects of his conversation;
- His use of profane and libidinous language.

These attributes will be discussed in the ensuing section in a strictly statistical manner, which will give them not only a precise present meaning, but will render them capable of comparison with future narrations of similar characteristics.

With the consideration of a lumberjack’s eating arises the obvious question is: how fast? To provide an answer I have timed three or four hundred men in nine north Idaho camps during 144 meals (Table 1).

Table 1. Time allotted to eating by northern Idaho lumberjacks.

Meal	Number of minutes eating		
	Fastest	Slowest	Mean
Breakfast	6	15	10
Lunch	7	16	12
Supper	8	17	13
Total	21	48	35

Not only the first bolter and the last Fletcherizer were clocked, but also the average man, say the twentieth fellow to leave the table out of forty. As a result the mean figures in Table 1 were obtained.

Translated from arithmetic to prose, this table implies that the average woodchopper spends just 35 minutes a day in food assimilation. Furthermore, there is in each camp a fastest man or group of men who waste but 21 minutes diurnally in the mad dash for sustenance. On the other hand there is generally some incorrigible laggard who requires as much as a quarter of an hour for the mastication of every mean.

It was only possible to gather data bearing on a few of those numerous specific habits of eating which an arbitrary society has established as table manners. Based on an actual analysis of 100 samples it was found that 12 per cent of the eaters were two tool men; that is, employed both knife and fork to lift the food onto the oral cavity. As regards bread spearing, 33 percent of the diners commonly depended upon their forks to harpoon the staff of life. Those banal euphoniums, please, preceded 93 per cent of all the requests for the passage of sustenance. In the imbibition of soup the average auditory range to the nearest even unit was 9 feet.

Since conversation is the principal absorber of the lumberjack's leisure, one naturally wonders to what fields he devotes his interlocutory abilities. As a silent listener, watch in hand, to 1800 minutes of confabulation during the summers of 1927 and 1928, I have obtained the figures shown in Table 2 on subject matter.

Table 2. Conversations of northern Idaho lumberjacks.

Subject Under Discussion	Percent of time
Pornographic stories, experienced and theories	23
Personal adventures in which narrator is hero	11
Outrages of capitalism	8
Prohibition, bootlegging and jags	6
Acrimonious remarks about bosses and employers	5
Wildlife, excluding human	5
Agricultural methods and failures	5
Tunney-Dempsey and Dempsey-Sharkey boxing battles	3
Scientific dissertations	3
Personal adventures in which narrator is not hero	2
Employment and unemployment prospects	2
Charles Lindberg and aeronautics	2
Forest fires	2
Religious discussions, more profane than spiritual	2
Automobiles, particularly Fords	2
Reform economic schemes to supersede capitalism	1
Sarcastic evaluations of the late war to end war	1
The meteorological outlook	1
Sears and Roebuck vrs. Montgomery Ward	1
The good old days of golden past	1
Food and culinary art	1
Sickness and quacks	1
President Coolidge, with mordant comments on pseudo-cowboys . . .	1
Mr. Hoover and Mr. Smith	1
The Forest Service	1
A local murder	1
The Sacco-Vanzetti case	1
Miscellaneous	3

But after all, it is not the subject matter which is most typical of the logger's conversation. It is the virility of his adjectives and interjections which differentiates his oral activities from those ordinary mortals. To derive an exact measure of this vocal distinction, ten conversations were closely heeded for 15 minutes each. All profane and lascivious utterances, assumed to be taboo in chaste circles, were tallied. From this record it transpired that an average of 136 words, unmentionable at church socials, were enunciated every quarter hour by the hardy hewers of wood. Divided by subject matter the profane words overwhelmingly in the majority, for they constituted 96 of the 136 maledictions. Of the remaining 40 mephitic sounds enunciated every quarter hour, 31 were of sexual import and 9 were excretory in nature. Unfortunately various heritages from Anthony Comstock's activities make it impossible to mention individually those profanations and obscenities.



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