The Forest Service Timber Appraisal System

A Historical Perspective 1891-1981


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The Forest Service Timber Appraisal System: A Historical Perspective 1891-1981

by

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Preface

Foresters in the 1890's and early 1900's envisioned that the United States Forest Reserves, then being created, would provide a continuous supply of timber for the needs of local industry, under Federal control. Their vision has been realized in the National Forests, as the Reserves were renamed in 1907. Under the Forest Service's sustained-yield principles, these Forests today furnish raw materials for one-third of the lumber and one-half of the plywood manufactured in the United States each year.

Under the original regulations formulated for the Forest Reserves, neighboring settlers were allowed to take up to $100 worth of timber from the Reserves for their own use each year, without charge. For this purpose, "Public Timber Permits" were issued, and the free timber was appraised by a Federal agent before being cut by the settler.

From these early regulations gradually evolved a timber appraisal system that has been the subject of considerable controversy ever since, despite frequent adjustments and modifications. Many users have extolled its lack of bias; others have condemned it for various reasons. Even its critics do not agree on what is wrong with the system. The wood products industry has criticized it for being too stringent and complicated; some environmentalists have criticized it for being too lenient.

The purpose of this study is to record a history of the appraisal systems used by the Forest Service to determine the values of timber sold off the National Forests, from the earliest years of commercial sales of the present. This book outlines the progression of events that shaped the present appraisal system. It is not an evaluation of this system, but an attempt to explain how it came to be the way it is.

The first section traces this development from the first rules established in 1897 by the General Land Office (GLO), U.S. Department of the Interior, to the present. GLO revised its rules in 1901 and 1902; then early in 1905, the Bureau of Forestry, U.S. Department of Agriculture, soon renamed Forest Service, took over the Reserves. The Forest Service's first "Use Book" that year restated and revised timber appraisal procedures for the Reserves. The system went through many modifications and elaborations over the years, as described in the various timber appraisal manuals and the appraisal sections of the Forest Service Manual and supplementary instructions.

The second section of this study examines individual selected sales and reappraisals in each of the six western Forest Service Regions, and explains how they were crucial in modifying the appraisal system. The third section covers key pulpwood sales in three major areas--southeastern Alaska, the Colorado Plateau, and the upper Great Lakes.

Section IV deals with the various major internal, joint, and external investigations, audits, and reviews of the timber appraisal procedures between 1957 and 1973. Section V discusses measurements, reappraisals, and escalations. Section VI covers several special situations--wartime price controls, appraisals of timber for land exchange purposes, appraisals for damage and claim settlement purposes, and appraisals in the individual sustained-yield units authorized by Congress. Each of the six sections has its own tables and its own list of reference notes. There are 54 tables in all, listed by section.

This project was conceived and implemented by the Timber Management Staff of the Forest Service in Washington, D.C., in response to an expressed need inside and outside the agency to better understand how the present timber appraisal system developed, what actions were taken to improve it, and what resulted from such actions. This demand came from many of the Forest Service's own personnel, as well as those in State forestry offices, the timber industry, forestry schools, public interest organizations, Congress, and other Government agencies, in Canada as well as the United States.

Suggestions and comments were solicited from many sources. A group of reviewers was selected to give advice and criticism as the manuscript was drafted. The History Section agreed to help guide the manuscript through the editing process in order to help insure that it met accepted criteria for a scholarly historical study. I served for many years as the Forest Service's Chief Timber Appraisal Officer and am now retired.

Thanks are due to many people for their assistance in gathering data for this historical summary. Particularly important contributions were made by Ira J. Mason, former Forest Service Director of Timber Management, from records in his personal files; by Regional Office staff people, who reviewed the manuscripts; by J. J. Juhasz, Chief Appraiser of the British Columbia Forest Service; by Joseph Dose and David Estola of the Bureau of Land Management, U.S. Department of the Interior; by Fred Reseberg of Western Wood Products Association; by Richard Crawford and J. Douglas Helms of the National Archives and Records Service; and by the Forest Service History Section.

I offer my apologies to some of the reviewers, because it was not possible to use all of their suggestions or, for that matter, all of the information that I gathered. I found it necessary to limit the coverage to those occurrences that I considered significant either to describe the development of basic appraisal principles that are now used or to understand the political climate in which appraisals have had to be made in the past and that may affect the future. It would have been repetitious to include more examples of sale appraisals or appraisal appeal situations than were finally settled on, although each has its own unique aspects and each adds local color and life to an intricate statistical subject.

I also wish to acknowledge my personal debt to associates over the years who helped in my appraisal training, particularly the late John R. Bruckart and his contemporaries, Carl Hildman, John Hough, Rex Wakefield, S. T. Moore, Fred Briem, and W. F. Cummins. Also the following: Walter H. Lund, David R. Gibney, Harlan C. Hiatt, Albert W. Sump, Burnett Payne, Russell McRorey, Homer Hixon, Axel Lindh, Robert Smart, H. V. Allen, Jr., David Kee, Elmer Mattson, Charles Lockard, Sam Evans, Newell Wright, Ben Carson, John Castles, Bill Callender, Ed Groesbeck, Bill Bryan, Fred Mason, Bill Bates, Herb Ochsner, Marlon Galbraith, and Ed Clarke. Even this is a short list.

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Alexandria, Va.

Contents

Page

Section I: Development of the Timber Appraisal System 1
Free Use Permits 1
Rules and Regulations for Early Sales 1
The Transfer to the U.S. Department of Agriculture 6
The 1911 National Forest Manual 9
The 1914 Timber Appraisal Manual 13
The 1922 Timber Appraisal Manual 21
The 1931 Forest Management Manual and Regional Appraisal Manuals 22
Julian Rothery's 1947 Draft 22
The 1954 Draft 23
Title 7 Instructions 23
The Section 2423 Instructions 24
Reference Notes 25

Section II: Significant Sawtimber Sales and Reappraisals 28
Region 1--Northern Rocky Mountains 33
Region 2--Central Rocky Mountains 39
Region 3--Southwest 42
Region 4--Great Basin 46
Region 5--California 48
Region 6--Oregon and Washington 51
Reference Notes 66

Section III: Significant Pulpwood Sales 72
Southeastern Alaska 72
The Colorado Plateau 79
The Lake States 80
Reference Notes 83

Section IV: Investigations, Audits, and Reviews 86
The Weintraub Report (1958) 86
The Timber Appraisal Review (Worrell) Committee (1963) 87
General Accounting Office Reports (1963-65) 91
Followup Studies on the Worrell Committee Report 94
The "Four-Point Report" (1962) 94
Joint Appraisal Study Group (1973) 96
Reference Notes 96

Section V: Measurements, Reappraisals, and Escalation 98
Utilization 98
Measurement Methods 98
Mill-Scale Studies of Lumber Quality Yields 99
Readjustment, Reappraisal, and Index Escalation 105
Reference Notes 110

Section VI: Special Situations 112
Price Controls 112
Land Exchanges 115
Damage or Settlement Appraisals 117
Sustained Yield Units 117
Reference Notes 118

Appendix I: Comparison of the Timber Appraisal Systems of the Forest Services in the United States and British Columbia 121

Appendix II: Comparison of the Forest Service and the Bureau of Land Management Timber Appraisal Systems in the United States 129

Appendix III: Julian Rothery and the "Rothery System" 131

Appendix IV: Notes Relating to Timber Sales From Forest Service "Service Committee" Reports (1905-32) 135

Tables

Page

Section I

Table 1.--South Dakota Case No. 1 and Case No. 4..... 4
Table 2.--Volume of Timber Sold and Stumpage Prices, Forest Reserves, 1900 and 1904, by State..... 4
Table 3.--Volume of Timber Sold from Forest Reserves, 1904, by State and Reserve..... 5
Table 4.--Volume of National Forest Timber Sold and Stumpage Prices, 1906-10, by State..... 7
Table 5.--Examples of Investment and Overturn Methods of Timber Appraisal, 1914 (National Forests)..... 16
Table 6.--Sample Ponderosa Pine Lumber Values at Local Western Mills, 1914..... 18
Table 7.--Sample Ponderosa Pine Lumber Values at Northwestern Mills, 1979..... 20

Section II

Table 1.--National Forest Timber Sales by Region: Volume and Prices, Fiscal Years 1911-14..... 28
Table 2.--National Forest Timber Sales by Region, Volume and Prices, Fiscal Years 1915-22..... 29
Table 3.--Individual Large Timber Sales, National Forests, Regions 2, 3, 5, 6: 1922-25..... 29
Table 4.--Individual Large Timber Sales in Effect, National Forests, Regions 3, 5, 6: 1921-30..... 30
Table 5.--Individual Large Sales of Lodgepole Pine Railroad Ties, National Forests, 1921-25..... 30
Table 6.--Total Annual Volume of Timber Sold and Average Bid, National Forests, Fiscal Years 1905-80..... 31
Table 7.--Total National Forest Wood Volume Sold by Regions, All Sale Sizes, All Convertible Products, All Units (Board Feet, Ccf, and Cords), Converted to Millions of Board Feet, 1979..... 34
Table 8.--Appraisal Cost Elements, National Forest Sawtimber Sales, All Regions, 1979..... 34
Table 9.--Pulpwood Costs in the Lake States, 1902-08..... 36
Table 10.--Region 1 Average Lumber Manufacturing Costs, 1916-38..... 36
Table 11.--Appraisal History of the Keeler Creek Timber Sale, Kootenai National Forest (Mont.), Region 1, 1940-62..... 38
Table 12.--Major Early Timber Sales, Region 2, 1908-28..... 42
Table 13.--Moose Creek Plateau Timber Sale Reappraisals, Targhee National Forest (Idaho), Region 4, 1965-77..... 49
Table 14.--Large Region 6 Timber Sales, 1905-10..... 52
Table 15.--Region 6 Standard Timber Price Guides, 1909..... 52
Table 16.--Appraisal of Costs, Salt Creek Timber Sale, Cascade (Willamette) National Forest (Oreg.), Region 6, 1914..... 53
Table 17.--Average Wholesale Selling Prices for Various Douglas-fir and Hemlock Lumber Products, U.S. Pacific Northwest, 1912-15..... 54
Table 18.--Region 6 Timber Sales Reported "Sold and Appraised," 1915..... 54
Table 19.--Pelican Bay Timber Sale Reappraisal, Crater and Paulina National Forests (Oreg.), Region 6, 1922..... 56
Table 20.--History of Pelican Bay Timber Sale and Reappraisals, Crater and Paulina National Forests (Oreg.), Region 6, 1914-38..... 56
Table 21.--Bear Valley-Hines Lumber Co. Sale, First Reappraisal, Ponderosa Pine, Malheur National Forest (Oreg.), Region 6, 1944..... 59
Table 22.--Bear Valley-Hines Lumber Co. Sale Reappraisals, Ponderosa Pine, Malheur National Forest (Oreg.), Region 6, 1946-63..... 60
Table 23.--Bear Valley-Hines Lumber Co. Sale Reappraisals, Douglas-fir and Larch, Malheur National Forest (Oreg.), Region 6, 1941-62..... 61
Table 24.--Satsop River Timber Sale Reappraisals, Olympic National Forest (Wash.), Region 6, 1949-72..... 63
Table 25.--Satsop River Timber Sale Emergency Reappraisals, Olympic National Forest (Wash.), Region 6, 1970-72..... 64

Section III

Table 1.--Winning Bid Price, Ketchikan Pulpwood Sale, Alaska Region, 1948..... 75
Table 2.--Sitka Pulpwood Sale Reappraisal, Alasks Region, 1976..... 77
Table 3.--West Tofte Block Pulpwood Sale Appraisal, Superior National Forest (Minn.), Region 9, 1958..... 82
Table 4.--West Tofte Block Pulpwood Sale Reappraisals, Superior National Forest (Minn.), Region 9, 1959-68..... 83

Page

Section IV

Table 1.--Trends in Stumpage Prices in All Regions, 1950-75..... 86
Table 2.--National Forest Sawtimber Stumpage Prices and Volumes, by Region and Species, 1965, 1978 92
Table 3.--Net Income of U.S. Timber Companies After Taxes, 1963..... 95
Table 4.--U.S. Timber Firm Profits, 1962, by Size Class..... 95

Section V

Table 1.--Mill Scale Studies of Lumber Quality Yields From Softwood and Hardwood Logs in the United States, by Region and Species, 1929-59..... 100
Table 2.--Major Mill Scale Studies of Lumber Quality Yields From Ponderosa and Sugar Pine Logs, 1915-57..... 101
Table 3.--Mill Scale Studies of Lumber Quality Yields From Ponderosa Pine Logs in Oregon, 1913-31..... 102
Table 4.--Average Percentages of Lumber Outturn From No. 5 Ponderosa Pine Logs in the U.S. Pacific Northwest, 1927-39..... 104
Table 5.--Average Lumber Grade Production From Douglas-fir Peeler Log Grades, 1952..... 104
Table 6.--Summary of Several Mill Scale Studies Showing Lumber Grade Recovery for Lowland White Oak Logs Before 1940..... 106
Table 7.--Mill Scale Studies of Lumber Quality Yields for Logs of Western Conifers, 1915-34..... 106
Table 8.--Changes in "Index Log" Values for Ponderosa Pine, Douglas-fir, and Larch, 1933-76..... 108
Table 9.--Western Wood Products Association's Annual Lumber Price Indexes for Ponderosa Pine, Douglas-fir and Larch, 1933-80..... 109

Section VI

Table 1.--Comparison of Timber Cut on National Forest Land Exchanges with Commercial Timber Sales, Fiscal Years 1928-65..... 116

Appendix I

Table 1.--Comparison of Average Stumpage Prices Bid for Major Timber Production Species in British Columbia with Average Advertised and Bid Stumpage Prices in Neighboring U.S. National Forests, 1958-61..... 124
Table 2.--Comparison of Average Timber Stumpage Sale Values in British Columbia with Average Stumpage Appraisals and Sales in U.S. National Forests, 1958-61..... 125
Table 3.--Comparison of Average U.S. National Forest and British Columbia Timber Stumpage Prices by Geographical Regions, 1977..... 126
Table 4.--Average Prices Bid for Timber Stumpage in British Columbia, 1919-80..... 127

Appendix II

Table 1.--U.S. Bureau of Land Management, Average Timber Stumpage Prices in Western Oregon, 1918-80..... 130

Section I:
Development of the Timber Appraisal System

Free Use Permits

By proclamation of President Benjamin Harrison, the first six national Forest Reserves were created between March 30, 1891, and June 23, 1892, under section 24 of the General Land Law Revision Act of March 3, 1891,[1] which repealed the Timber Culture Act of 1873. This provision led directly to the formation of the first rudimentary timber appraisal system in the United States. An amendment to section 8 of the Act directed the Secretary of the Interior to issue rules for cutting of timber by settlers and prospectors, on the Reserves and unreserved public domain for their own needs. The Secretary set up a system of issuing free "public timber permits" to parties whose applications were approved, allowing permit holders to harvest up to $100 worth of timber each year from these lands.[2] The economics of the time dictated that only the most accessible timber could be cut.

The first harvests made under these permits were recorded in the fiscal year 1893 Report of the Commissioner of the General Land Office (GLO), Department of the Interior, which had jurisdiction over the Reserves and over the unreserved public domain. In that year, 91 permits were issued, 25 each in Utah and Montana, and 16 in Idaho. In these States, Forest Reserves were not established until 1898.[3]

The law and the implementing regulations did not set out a uniform system for determining the value of the timber. How much timber constituted $100 worth? The usual appraisal method was simply a judgment by the local GLO agent based on the going rates for privately owned timber. At that time, the prevailing stumpage rate was less than $1 per thousand (M) board feet (BF), which means that approximately 4 million (MM) board feet were harvested under the first 91 permits, an amount then worth about $3,000.

The infant timber permit business was an obvious target of political influences in these early days. The 1903 GLO annual report cited 329 timber trespass (theft) cases, with a combined value of $471,000; the legitimate timber business that year was valued at only $2,950.[4] Unreported trespass cases probably accounted for even greater losses to the Government. Farmers, ranchers, and miners who were allowed only $100 worth of free timber each year resorted to stealing Government timber to fulfill their needs and wants. Some commercial lumbermen continued to do the same on a larger scale. The small number of trespass cases actually tried are evidence of the political pressures of the day. District Attorneys hesitated to bring cases to trial, because local juries tended to acquit the trespassers. In determining the damages in those cases that were tried, however, the value of the timber became a point of great concern and controversy. Up to this time the usual fine for timber trespass was only $2.50 per acre.

Four years after the first free public timber permit was issued, the annual number of permits issued had declined to only 54, according to the General Land Office (GLO) Annual Report of 1896.[5] Changes in the permit system were obviously needed; and that year, "A Bill to Protect Public Forest Reservations," one of several bills introduced after 1891, was pending in Congress. All the earlier bills were unsuccessful. Binger Hermann, the General Land Office Commissioner, commenting on the proposed legislation, stated in a letter to the Secretary of the Interior that:

> ...the objects for which public timber reservations shall be established shall be to protect and improve the forests for the purpose of securing a continuous supply of timber for the people, and insuring conditions favorable to water flow....[6]

Hermann also recommended changes in the public permit system that would make establishment of a formal timber appraisal system inevitable.

He recommended that:

> The Secretary of Interior...permit the cutting, removal and disposal of so much of the dead timber as may, in his judgment, be expedient;...[and] that in disposing of such timber, [he]... shall cause the same to be properly marked and designated and thereafter appraised and advertised for sale to residents of the state or territory...Such advertisement shall offer the timber for sale at not less than the appraised value.... (Emphasis added.)[7]

The same language appears in the Act of June 4, 1897 (also known as the Organic Administration Act, or the first Forest Management Act), which for the first time provided for the legal commercial sale of timber for profit from public lands.[8]

Until the enabling legislation could be translated into actual sale procedures, fewer and fewer permits for removal of $100 worth of timber were issued. In 1897, 35 free public timber permits were issued and 44 were rejected.[9] After 1899, by which time a commercial sale system was functional, the number of timber sale permits issued grew significantly.

Rules and Regulations For Early Sales

From March 3, 1891, to June 3, 1897, public timber permits were issued for removal of up to $100 worth of timber, free of charge, from the Forest Reserves. Then the Organic Act of June 4, 1897, provided for public timber sale permits, for the first time allowing the sale of timber from the Forest Reserves.

Regulations had to be devised to govern these newly authorized timber sales; and on June 30,

1897, the Government Printing Office published the first edition of "Rules and Regulations Governing Forest Reserves, Established Under Section 24 of the Act of March 3, 1891." These regulations called for all timber to be examined and appraised by a Forest Reserve official and for all appraisals to be justified in writing. These requirements, coupled with a section 22 stipulation that timber be sold for harvest "at not less than the appraised value," underscored the need to establish a formal timber appraisal system.

Section 23 set out the procedures for receipt of timber sale petitions from responsible persons. Here again, the need for an appraisal system became apparent in the wording of the petition requirement. The petition was to contain a description of the quantity "of each kind in trees per acre...average diameter of each kind of timber, and kind per acre above average diameter...with an estimate of the value of the timber as it stands." (Emphasis added.)

Section 24 stated that a "duly designated official" would "examine and appraise" the timber before action was taken on any petition. Section 31 promised that special instructions would be issued to all officials whose duty it was to examine and appraise timber. These instructions were contained in letters that the Commissioner of the General Land Office sent to each of the 11 superintendents requesting a report on each application for timber. Typical of such letters is the following:

> The stumpage value is determined by the locality, the species and size of the timber; the commercial use for which such timber is sought; and the demand therefor, although no sales may have been made in the particular locality of the timber under consideration.[10]

The problem faced by the superintendents was obvious. They were to use transaction evidence from comparable sales in determining their price, even if there had been no comparable sales. This problem persisted in one form or another until the 1914 Forest Service appraisal manual was published.

Despite the lack of systematic instructions on the subject, appraisals were considered important; and some attempt was made to monitor them, even in the early days, as the following 1902 letter from the GLO Commissioner demonstrates: "If an officer fails to make an intelligent estimate of the amount of timber sought and an honest, intelligent estimate of its value, you should send back his report and see that he performs his duty."[11]

Section 26 reaffirmed that timber was "not to be sold for less than appraised value," and also sheltered a "sleeper" requirement that the Commissioner of the General Land Office approve every timber sale--even sales valued at less than $100--which did not have to be advertised. The Commissioner, accustomed by his land claim activities to following instructions to the letter, took this charge literally and asked the Secretary of the Interior for permission to advertise, review, and authorize sales for amounts as small as $2.50 worth of timber.[12] The Commissioner was also empowered by this section to divide large sales among several purchasers "to avoid monopoly."

These first rules and regulations stipulated that timber had to be "used in the State or Territory in which the timber reservation may be situated, but not for export therefrom," and that proposed sales had to be advertised for 60 days before bids were accepted.

During this period, appraisals generally came out $1 per M board feet for green timber and 25 cents for dead and down timber or "tops and lops." Occasionally, the price of timber in abnormally remote areas or on steep ground might drop to 15 cents, or even as low as 5 cents, per cord.

Although an 1898 report from the Commissioner hinted at problems in handling the new timber sale authorization, National Archives records show that one sale was made that year. On May 21, 1898, in California Case No. 2, 1,200 cords of pine, probably ponderosa and sugar pine, were sold on public bid at 50 cents per cord to the applicant, Rose Consolidated Mining Co.[13] Perhaps for lack of experience with the new procedures, the California superintendent mistakenly allowed cutting in the wrong township. California's dubious "first" might be excused on the basis that legitimate cutting of public timber was rooted in history in that State. In 1834, under Mexican rule, wood was obtainable free of charge for warships, or at 2 pesos per tree for commercial use. This translates into approximately 25 cents per M board feet.[14]

Other sales might have been made that year, but were delayed because the standard sale procedures turned out to be extremely time consuming. Case No. 1 in the Black Hills of South Dakota illustrates the extreme delay between permit application and approval that was typical of this period. The Case No. 1 timber was applied for in early 1898.[15] In June of the following year, a field report was characterized as "practically worthless" and returned by the Commissioner for correction.[16] It was not until August 4, 1899, that Case No. 1 went to the Secretary of the Interior for approval to advertise. The bid by Homestake Mining Co. was finally accepted November 3, 1899--18 months after the initial application.[17]

All sales, no matter what their size, were subject to the same bureaucratic delays. Case No. 324, another Black Hills sale, was a case in point. This sale, with a total value of $3.75 worth of timber, was processed "by the same numbers" in the same manner as were sales involving millions of board feet. Such grotesque cases led to the Forest Service's later emphasis on decentralizing its permit processing system.

Lacking a definitive appraisal system, appraisals of this period appear to have been particularly vulnerable to the same political pressures that kept trespass trials to a minimum. For instance, Senator R. F. Pettigrew of South Dakota wrote a letter to the Commissioner in an attempt to expedite the Case No. 1 sale in his state. The Commissioner responded: "I have suggested as a minimum stumpage value, not less than $1.00 per M feet, for [lumber logs] and not less than 25¢ per cord for cordwood..."[18]

It was probably not mere coincidence that the figures cited by the Commissioner were the advertised--and bid--prices for Case No. 1. South Dakota Case No. 1 was also the first recorded sale in which a bid price was appealed. The company protested the price on November 16, 1899, but the appeal was rejected. In line with the Commissioner's recommendation, the appraisal for Case. No. 1 showed 66,300 trees totaling 14 MM board feet of green timber at $1 per M, 1.5 MM board feet of standing dead timber at 50 cents per M, 5,100 cords of tops and lops from the standing timber at 25 cents per cord, and unestimated dead and down timber (timber killed by windfall, fire, or other natural cause) at 15 cents per cord.[19]

With a formal bid on December 31, 1898 (contract awarded January 27, 1899) Colorado Case No. 5 became the first timber sale in the Nation awarded through proper channels following the procedure set out by the 1897 Rules and Regulations. Advertised as 126 M board feet at 50 cents per M, Case No. 5 went for a high bid of 52 cents per M, a total value of $65. This $65 sale, like all others, had to be approved first by the Commissioner and then by the Secretary of the Interior himself.

During this early period, dead and down timber became the subject of considerable debate. Some, including the same Senator Pettigrew who attempted to intervene in South Dakota Case No. 1, thought that dead and down timber should be available without cost. Although agreeing in principle, the Commissioner disagreed in practice:

> I agree with Mr. Pettigrew's suggestion that it would save expense and benefit the forest to permit dead and down timber to be taken without charge....At the same time, practical experience has shown that the privilege of using dead and down timber free of cost serves...as a direct inducement to firing the live timber. Since a convenient fire can deaden tracts of desirable timber, the liability to abuse of the privilege renders it inadvisable to grant such license....[20]

Most of the early timber sales were small. The South Dakota Case No. 1 sale to Homestake Mining Co. was one of the first two sales of substantial size; the other, also in the Black Hills, was Case No. 4, sold to Holy Terror Mining Co. Average stumpage values for these two cases illustrate the low prices then prevailing. (See table 1.)

These two Black Hills sales accounted for the bulk of the timber sales business in fiscal year 1900, as shown by the South Dakota sales figures in Table 2.

Average prices cited in table 1 are composites of a number of species and products, including sawlogs, mine timbers, posts, poles, and railroad ties. Sawlogs of high-value species such as white pine or ponderosa pine drew higher prices. White pine prices of $2.50 per M board feet during the 1897 to 1905 period and $4 to $5 thereafter were not uncommon.

After 1899, timber sales increased in number and volume. The number of sales completed was up substantially in 1901, totaling 31 cases, compared to 12 in the previous year. Also in 1901, the administration of the Forest Reserves was shifted from Division P, the Special Services Division of the General Land Office, to Division R, the new Forestry Division.

Three years later, in 1904, sawtimber sales had increased markedly to a total of 377 and a volume of 85 MM board feet as shown in table 3.

The transfer of the Forest Reserves to Division R also resulted in changes in the original Rules and Regulations. An April 10, 1901, revision provided in section 21 for "Free Use of Timber and Stone." This provision restated that bona fide settlers, miners, residents, and prospectors for minerals had the right to remove $100 worth of timber from Forest Reserves each year free of charge. It pointed out for the first time that such timber was only to be used for firewood, fencing, buildings, mining, or other domestic purposes. In order to remove such transactions from the appraisal mechanism used for sales, section 21 allowed Forest Supervisors to handle free use permits locally. Only applications for removal of more than $100 worth of timber had to be approved by the Secretary of the Interior. Section 23 of the new Rules and Regulations said that a petition for timber now had to show that "removal of[green timber]will tend to preserve and promote the life and growth of the younger trees...." The timber applied for had to be described by categories: (1) standing green; (2) down, not dead; (3) standing dead; and (4) down dead. Tops and lops, too, had to be described by number of cords and value per cord.

Section 24 was revised at this time to require an advertising cost deposit; an applicant who failed to bid forfeited the deposit.

The original Rules and Regulations failed to consider the possibility that late bids, which were required to be rejected, might be the only bids made for some sales. To rectify this oversight (such situations had occurred) section 26 was altered to permit acceptance of bids within 1 year after advertisement of a sale if no other bids had been received by that time.

These 1901 revisions also created the first policy guidelines for extending the sale period in a new section 28. Under the General Land

Table 1.--South Dakota Case No. 1 and Case No. 4[1]

	Case No. 1 Homestead Mining Co. (Bid accepted November 3, 1899.)		Case No. 4 Holy Terror Mining Co. (Bid accepted September 8, 1899.)	
	Volume sold	Stumpage price per MBF	Volume sold	Stumpage price per MBF
	MBF	Dollars	MBF	Dollars
Live Norway pine[2]	13,989.3	1.00	11,343.7	1.00
Tops and lops	2,550.0[3]	.50[3]	--[4]	--
Dead standing	1,530.0	.50	1,134.4	.25
Dead down	Not estimated	.30[5]	Not estimated	.25
Total	18,069.3		12,478.1	
Weighted averages		.93		.93

[1]First Black Hills Forest Reserve timber sales.
[2]Ponderosa pine in the Black Hills was locally called Norway pine at the time.
[3]5,100 cords at 25 cents per cord.
[4]-- = not applicable or not available.
[5]15 cents per cord or 30 cents per MBF.

Source: National Archives, Record Group 49, Records of the General Land Office.

Table 2.--Volume of timber sold and stumpage prices--Forest Reserves, 1900 and 1904, by State

State	Fiscal year 1900		Fiscal year 1904[1]	
	Volume sold	Price per MBF	Volume sold	Price per MBF
	MMBF	Dollars	MMBF	Dollars
Montana	1.0	1.07	10.2	.18
Idaho	--	--	.8	.30
Wyoming	--[2]	--	22.4	.18
South Dakota	48.8	.71	20.6	1.83
Colorado	1.7	.58	9.8	.17
Arizona	--	--	5.8	.86
New Mexico	--	--	4.0	.22
Utah	--	--	5.2	.82
California	--	--	3.0	.49
Washington	--	--	2.2	.18
Oregon	--	--	1.7	.61
Total	51.5		85.9[3]	
Weighted averages		.71		.68

[1]Plus 32.6 MMBF in free use permits with an estimated value of 71 cents per MFB. No free use estimate for 1900.
[2]--= not applicable or not available.
[3]Includes cordwood, poles, and material other than sawtimber converted to board feet.

Source: National Archives, Record Group 49, Records of the General Land Office.

Office, timber sales from Forest Reserves could be made for only 1 year; however, experience had shown that 1 year was often insufficient time in which to complete a sale, owing in part to the cumbersome approval process. The new section 28 provided that the Secretary of the Interior could grant extensions for good cause. South Dakota Case No. 1, for example, was extended annually from 1899 to 1907. Because the maximum sale term remained 1 year, this revision paved the way for yet another time-consuming activity--processing extensions.

Further changes in 1902 amended the Rules and Regulations to require the applicant to go over the ground with the Supervisor and agree on prices and conditions before signing a timber sale application.[21] Although the California advertising period remained 60 days, elsewhere it was reduced to 30 days.

Regulation 9(i) of these 1902 changes clarified the 1901 "free use" clause: "In placing a valuation on timber given under the 'free use' act, $1.00 per M for timber, green or dry, and 25¢ per cord for fuel wood will be the minimum price considered."

Table 3.--Volume of timber sold from Forest Reserves, 1904, by State and Reserve

State	Forest Reserve	Volume sold	
		Reserve	State subtotals
		MMBF	MMBF
Montana	Lewis & Clark	4.1	
	Yellowstone	4.0	
	Little Belt	1.3	
	Madison	.8	
			10.2
Idaho	Priest River	.8	.8
Wyoming	Medicine Bow	13.3	
	Yellowstone	8.1	
	Big Horn	1.0	
			22.4
South Dakota	Black Hills	20.6	20.6
Colorado	Pikes Peak	8.2	
	White River	1.1	
	South Platte	.5	
			9.8
Arizona	Prescott	3.2	
	Mt. Graham	2.1	
	Black Mesa	.3	
	Grand Canyon	.2	
			5.8
New Mexico	Gila	3.9	
	Pecos	.1	
			4.0
Utah	Uintah	4.0	
	Manti	1.1	
	Aquarius	.1	
			5.2
California	Sierra	2.2	
	San Bernardino	.6	
			2.8
Washington	Washington	2.2	2.2
Oregon	Cascade	1.6	
	Ashland	.1	
			1.7
Total		85.5	85.5

Source: National Archives, Record Group 49, Records of the General Land Office.

These amendments also delineated log scaling methods. The 1902 rules specified that logs 24 feet and longer were to be scaled at 16 feet and at the top.[22] The title of this second revision, "Forest Reserve Manual for the...Use of Forest Officers," presages the title of the next major revisions, contained in the first Forest Service "Use Book" of 1905.

Although the 1902 changes were important, the 1901 change providing for extensions had unforeseen repercussions. The extension business flourished, further complicating a review process already in need of streamlining.

Eventually it became apparent that longer contract periods were needed and that a formal method was also needed to reappraise contracts when they were extended. Without a formal appraisal method, the original contract itself was the best transaction evidence available of the going price of stumpage during the extension period. Thus, allowing increases by reappraisal was difficult.

Reappraisal problems may have been a factor in causing the GLO Commissioner to write in his 1904 report:

> Forestry, dealing as it does with a source of wealth produced by the soil, is properly an agricultural subject. The presence of properly trained foresters in the Agricultural Department, as well as the nature of the subject itself, makes the ultimate transfer [to the Agriculture Department]...essential to the best interests both of the reserves and of the people who use them.[23]

Commissioner William A. Richards, author of that statement, made an accurate forecast of the eventual home of the Forest Reserves. One year later they were placed under the authority of the U.S. Department of Agriculture. Richards, of course, was an appointee of President Theodore Roosevelt, who under the influence of Gifford Pinchot, head of the Bureau of Forestry in the Department of Agriculture, became an ardent advocate of the transfer soon after taking office in the fall of 1901.

The Transfer to the U.S. Department of Agriculture

On February 1, 1905, the Forest Reserves were transferred to the U.S. Department of Agriculture under the Bureau of Forestry, then headed by Gifford Pinchot, who called himself "The Forester." Secretary James Wilson created the Forest Service within the Bureau to run the Reserves. The Bureau then became the Forest Service. Pinchot's staff prepared a new manual for the job, "The Use of the National Forest Reserves, Regulations and Instructions," labeled "To take effect July 1, 1905."[24]

According to this first "Use Book," the object of the Forest Reserves was: "preserving a perpetual supply of timber for home industries...and protecting local residents from unfair competition in the use of forest and range...."

These early foresters outlined three Forest Service principles: (1) sustained yield, (2) multiple use, and (3) protection of local communities, although not in those exact words. These principles guided National Forest administration from then on. Congress later reaffirmed them.

The reappraisal problems stemming from the 1901 revision were finally addressed in this 1905 Use Book, which provided that sale periods could be for up to 5 years, with discretionary extensions. This first Use Book further simplified procedures by stating that sales of up to $20 worth of dead timber could be made by any ranger; up to $100 worth of living or dead timber, by any Supervisor; but more than $100 worth had to be approved by the Chief Forester. It also altered the original prohibition on removal of timber for distant use. After 1905, timber could be sold for use anywhere, with two exceptions. By law, timber from the Black Hills and Idaho Reserves still had to be used locally.

Shortly after the transfer of the Reserves, the 1906 San Francisco fire and earthquake occurred, significantly altering the pattern of timber demand and prices. The urgent need to rebuild after this disaster greatly escalated both prices and sales throughout the West.

Under the Department of Agriculture, the Forest Reserves had been divided into three, and then six Inspection Districts. In December 1908, each District got its own local staff and headquarters.[25] The Districts were renamed Regions in 1930 in order to distinguish them from Ranger Districts. To avoid confusion, only the term "Region" is used in this text, even for references before 1930. As shown in table 4, before the fire, 1906 sales from Reserves in all Regions totaled 329 MM board feet; the following year, after the fire, sales nearly tripled to 950 MM board feet. The volume of timber sold from Pacific Coast Forest Reserves surged 17-fold from 15 MM board feet in 1906 to 225 MM board feet in 1907. However, this was not nearly enough to meet the sudden enormous demand to rebuild San Francisco. Although local markets in the Rocky Mountains at the time called primarily for lodgepole pine for railroad ties and mining timbers, it is obvious from figures in table 4 that most of the Forest Reserve lumber that went to rebuild the city during fiscal year 1907 came from these other Regions. The sharp rise in prices caused by the fire is shown in table 4, which includes average stumpage prices for the period 1906-10.[26] The table also shows that the West Coast lumber industry remained at a high level of activity throughout the period in comparison with the other western Regions. However, most timber for rebuilding San Francisco came from private lands.

Table 4.--Volume of National Forest timber sold and stumpage prices, 1906-10, by State[1]

States and Regions	Fiscal year 1906		Fiscal year 1907		Fiscal year 1908[1]		Fiscal year 1909		Fiscal year 1910	
	Volume sold	Stumpage Prices Per MBF	Volume sold	Stumpage Prices Per MBF	Volume sold	Stumpage Prices Per MBF	Volume sold	Stumpage Prices Per MBF	Volume sold	Stumpage Prices Per MBF
	MMBF	Dollars	MMBF	Dollars	MMBF	Dollars	MMBF	Dollars	MMBF	Dollars
Pacific Coast:										
Alaska	2.3	.61	4.0	.60			6.6	.79	15.5	1.12
California	10.3	1.78	174.1	1.85			24.6	1.97	69.0	2.36
Oregon	.4	1.75	28.6	1.70			30.2	2.49	21.7	2.10
Washington	2.0	1.45	49.0	2.55			51.7	1.80	81.6	2.30
Subtotal	15.0		255.7				113.1		187.8	
Average		1.21		1.95				1.96		2.20
Rocky Mtns.:										
Idaho	8.6	1.56	76.2	2.17			42.2	2.32	86.8	3.02
Montana	53.5	2.05	134.1	3.95			30.7	2.14	49.7	2.83
Utah	10.7	1.37	19.9	2.48			7.1	1.92	14.4	2.33
South Dakota	73.0	1.17	18.5	1.34			12.9	1.50	10.5	2.04
Wyoming	71.3	2.07	233.7	2.76			8.3	2.80	109.3	2.44
Colorado	27.3	1.41	42.2	1.84			44.1	1.71	45.5	1.90
Nevada	--[2]		--				4.4	3.25	2.9	2.17
Subtotal	244.4		524.6				149.7		319.1	
Average		1.67		2.84				2.07		2.56
Southwest:										
Arizona	27.6	2.54	110.9	3.47			13.5	1.39	45.4	2.84
New Mexico	1.0	3.80	59.1	2.69			10.1	1.81	19.1	1.51
Subtotal	28.6		170.0				23.6		64.5	
Average		2.58		3.20				1.57		2.45
East, Mid-West, South:										
Minnesota	--		--				--		1.1	6.27
Oklahoma	--		.2	.67			.1	2.17	.04	2.25
Arkansas	--		--	--			.1	2.00	2.1	2.33
Subtotal	--		.2				.2		3.2	
Average		--		.67				2.08		3.67
Total: All States and Regions	288.0 328.7[3]		950.5 1032.9[3]		386.4		286.7		574.6	
Averages: All States and Regions		1.74 1.52[3]		2.66 2.45[3]		1.90		1.98		2.44

[1]Data not available by State and Region for 1908, the first year after decentralization into District (Regional) offices. This breakdown was never compiled.

[2]-- = not applicable or not available.

[3]Includes material sold in cords and lineal feet.

Source: Annual Reports of the Chief of the Forest Service.

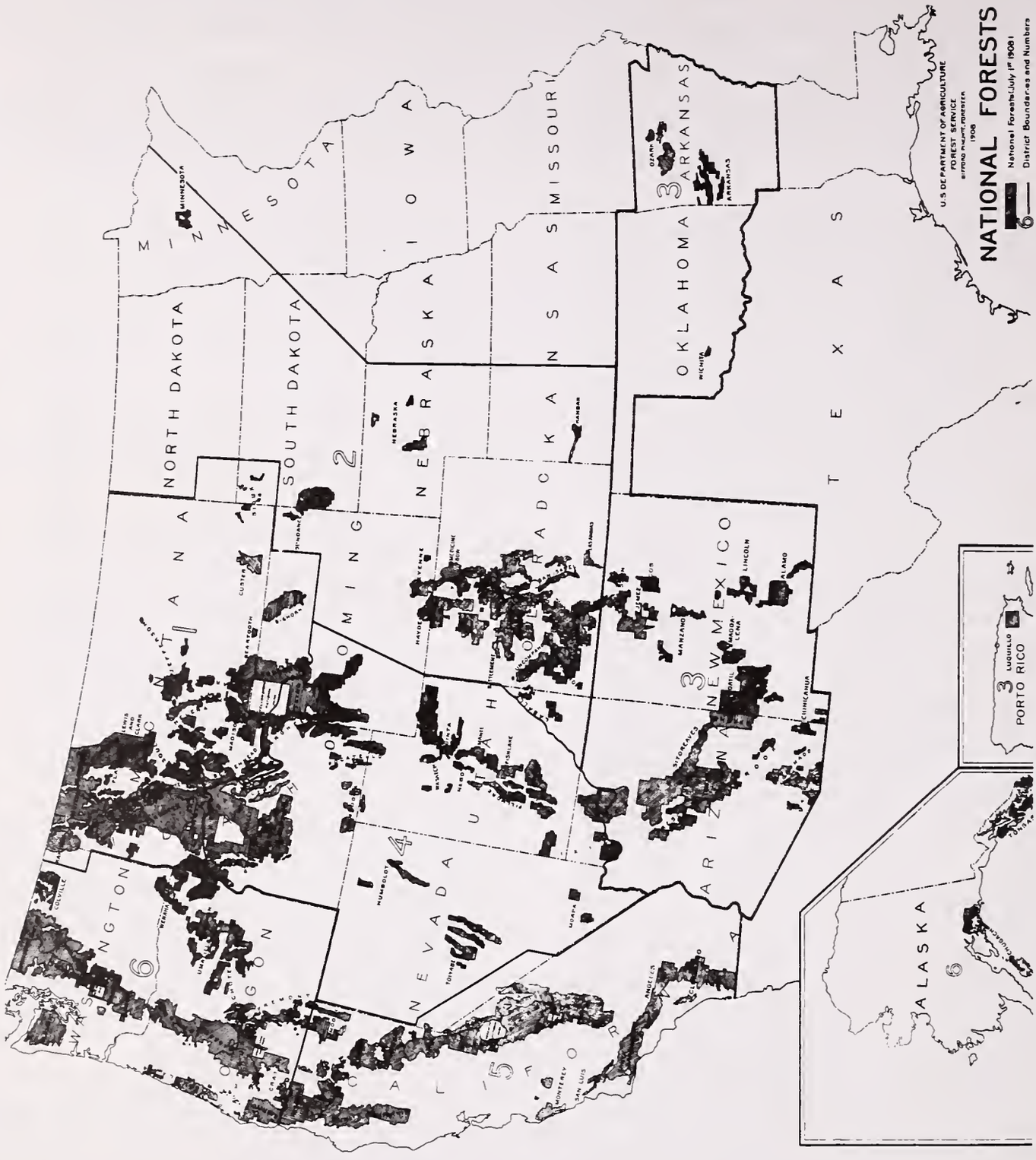


Figure 1.-- The National Forests and the six western Districts (renamed Regions in 1930), as of July 1, 1908. These western forests covered substantially the same areas in 1982.

(Forest Service and Geological Survey)

The "Use Book" was amended the year of the fire and in subsequent years. The 1906 revisions added two noteworthy changes allowed by Congress. Timber could be sold for use anywhere except from the Black Hills Reserve. Idaho Reserves now could sell out of State. Timber could also be shipped anywhere from the Black Hills, if insect-killed. The 1906 Use Book also contained some new instructions for a formal timber appraisal system by adding the following specifications to regulation 26:

> The forest description should always state the cost of each step of logging and manufacturing, the sale value of lumber or other material manufactured from timber procured from a forest reserve, and the price which competing lumber from outside sources brings. The estimated profit of the purchaser if the sale is approved and the stumpage rates recommended must also be given.
>
> No application will be approved by the [Chief] Forester unless the report... shows definitely that the full market value of the timber will be received. (Emphasis added.)[27]

The Use Book for 1907, the year the Forest Reserves were renamed the National Forests, gave more specific appraisal guidelines and further simplified the decentralized sale procedures for small volumes of timber. It established three classes of sales and the highest authority necessary for each: class A, up to $50 (Ranger sales); class B, up to $100 (Supervisor sales); and class C, more than $100 (Chief Forester's sales). Supervisors were also given the authority to extend the time period for class A or B sales.

The new guidelines for determining timber values follow:

> Prices.--In all sales, the stumpage prices should be based, not on custom, but upon the actual value of the timber. This must be determined by a careful study of the quality of the timber and the cost of logging....In some sales it may be desirable to introduce a sliding scale of prices, providing for an annual increase...after the first year of the contract. In others it may be best to make provision for readjustment of stumpage prices at a definite time upon a definite basis....Stumpage rates should not be reduced for any purchaser because his methods of manufacture are imperfect or his utilization is incomplete. (Emphasis added.)

This paragraph appears to be the beginning of the principle that appraisals should neither subsidize the inefficient, nor penalize the efficient.

Reflecting the political pressures of the day, the 1907 Use Book also cautioned: "There is no way to prevent favoritism and graft except to treat a timber sale as a business matter and get the full value of the timber sold."

The Forest Service continued under the 1907 revisions with few changes of note for several years. Then in August 1910, a series of catastrophic fires in the northern Rocky Mountains, principally in western Montana and northern Idaho, known as the "holocaust fires," killed some 5 billion board feet of timber. (There was some controversy over the amount actually lost, some estimates going as high as 10 billion board feet.) Subsequently, the need to price the vast quantity of lost timber heightened interest in timber appraisal methods.

The holocaust fires had other consequences as well. New milling capacity had to be developed to salvage the dead timber, and other large timber supplies had to be made available to allow investors to write off the sizable investments needed for new sawmills, railroads, and flumes.

The 1911 National Forest Manual

The period 1911-14, between the 1910 fires and World War I, marks the real beginning of the modern timber appraisal system. It was during this period of growth in the timber industry that an attempt was made to consolidate the disparate regional guidelines into the first National Forest Manual, the timber sales portion of which was issued in 1911. This section was the forerunner of the landmark 1914 Timber Appraisal Manual, which embodied appraisal principles that have been used by the Forest Service ever since.

Certain members of the Forest Service made valuable contributions to the 1911 manual. One of the earliest contributors on the subject of pricing was William T. Cox, Assistant to Chief Forester Gifford Pinchot. In 1907, Cox wrote to the Chief of Management:

> I wish you would look into the timber prices that California has been getting. Today we [learned] of sugar pine and cedar at 25¢ a thousand.... We will probably put an order in the next Program jolting up Supervisors on this subject.

His orders seemed to produce results. California's average price, lower than that for Washington State in 1907, was higher than Washington's for 1909 and 1910.[28]

Cox also recognized a need for experienced people in both administrative and field work capacities within the Forest Service. In a letter dated February 9, 1909, he said:

> Experience has shown that it is a good policy to put only men who are familiar with woods work in charge of timber sales, and to keep the same officer in charge of the sale as long as practicable.[29]

Cox deliberated about staff and other policy matters for more than a year, and in the minutes of weekly Service Committee (Chief and Staff) meetings in Washington, D.C., toward the end of 1910, he noted that the "timber sale section of the code" was nearly ready to be sent to the Secretary of Agriculture for approval.[30] Shortly thereafter, Henry Solon Graves, who succeeded Gifford Pinchot as Chief Forester in 1910, suggested that the term "manual" be used in lieu of "code." On December 1, 1911, Secretary of Agriculture James Wilson issued the first National Forest Manual, which included the timber sales section. Wilson's frontispiece stated that the new manual would "supersede all previous regulations...and constitute a part of the Use Book."[31] A summary of the timber sales section follows:

Regulation S-1 provided that timber could, upon applications, be examined and appraised. The officer making the field examination "shall base his appraisal on the character of the timber, the cost of logging, transportation and manufacture, and the sale value of the manufactured products at practicable markets."

Regulation S-2 provided for publishing minimum and maximum stumpage prices. These could not be exceeded (above or below), without approval of the Secretary.

Under Regulation S-7, contract modifications could only be allowed "where modification is sought in respect to the unexecuted portion... and the modification would not be prejudicial to the interests of the U.S."

Regulation S-9 permitted sales at cost to settlers and farmers. Regulation S-23 prohibited the recipients of free use timber from cutting "on shares" with loggers. Under Regulation S-10, sales over $5,000 in value could be allotted to several bidders (at the high bid price) to avoid monopoly.

Regulation S-12, "Conditions of Sale," covered scaling and called for the Scribner Decimal C log rule. First official recognition appeared for "long log" scaling in the Douglas fir region, as well as in Alaska.[32] Regulation S-14 required a financial statement on all large (over 10 MM) sales.

This first manual noted that appraisals should not be based upon local prices, but upon residual type calculations, "by deducting from the value of the product the cost of logging and manufacturing a percentage of profit ranging from 10 to 30% on the investment required." It also stated that "Stumpage rates will not be reduced for any purchaser on the ground that his methods of manufacture are imperfect and utilization incomplete."

The 1911 National Forest Manual contained a number of other sections. The major one on "General administration of the Forest Service and the Protection and Use of the National Forests" described a philosophy and established a policy that profoundly influenced, over the years, how the public timber was managed, and, indirectly, what value would be placed on the timber when put up for sale. The influence that the following pertinent paragraphs have had on Federal timber sales cannot be stressed too strongly:

> National Forests have for their objects to insure a perpetual supply of timber, to preserve the forest cover which regulates the flow of streams, and to provide for the use of all resources which the forests contain, in the ways which will make them of largest service. Largest service means the greatest good to the greatest number in the long run. It means conservation through use, with full recognition of all existing individual rights and with recognition also that beneficial use must be use by individuals; but without the sacrifice of a greater public benefit to a less. In other words, the forests are to be regarded as public resources to be held, protected, and developed by the Government for the benefit of the people.
>
> The injury which results from the destruction of forests by fire and ill-regulated use is a matter of history in older countries, and has long been a cause of anxiety in the United States. A cheap and plentiful supply of timber is important if not necessary to the welfare of communities; a forest cover is the most effective means of maintaining a regular stream-flow for irrigation and other purposes; and the future of the western livestock industry depends upon the permanence of the range. Exhaustion of a local timber supply means the cessation of lumbering and the business activities dependent on it, and often leaves desolation, impoverishment, and industrial depression; there are vast public and private losses through unnecessary forest fires while a rapidly growing population creates an increasing demand for lumber.
>
> With forest destruction, the flow of streams becomes irregular just when development of the country makes them indispensable to transportation, manufacture, or irrigation....Without regulation there is a serious decrease in the carrying capacity of the range. In short, forest protection is vital to the public welfare. (Emphasis added.)

This philosophy extends into such activities as the successful Smokey the Bear fire prevention campaign, which began during World War II. It also explains why extremely high costs are often incurred for disposal of slash and debris after logging, and why clear cutting is deemed necessary in those Forests that have highly flammable timber residues, such as southern pines and Douglas-fir.

Although William T. Cox had a large hand in the 1911 manual, the two men actually responsible for it were Chief Forester Graves and his Assistant Forester, William B. Greeley, who also later became Chief. Much of the early Forest Service correspondence was written by Graves and Greeley and deals with problems common to public timber sales. Graves brought Greeley in from Region 1 to head the Branch of Silviculture in June 1911.

In a 1911 memorandum, Graves recommended that appraisals be based upon lumber, not log market, prices. He also authorized Regional Foresters to use "clean cutting," arguing that:

> ...clean cutting followed by artificial restocking would be the best and most consistent silvicultural system. This is true because of...1) the large amount of immediate stumpage returns which must be sacrificed under any seed tree system, greatly exceeding the cost of artificial restocking; 2) the probability that none of the trees left as seed trees will have any future market value because of loss from wind-throw, conk [rot] and other causes; 3) the uncertainty of seed production in relatively old timber of this character which has grown up in dense stands; and 4) the further possibility that the dense ground cover of brush, fireweeds and the like may... prevent general reproduction for many years.[33]

This advice was incorporated in the 1911 manual in a paragraph titled "Clean cutting" on page 48:

> In dense stands of ravaged timber, particularly of species liable to wind throw, clear cutting [sic] may be the only practicable method. In such cases, compact groups or patches of timber, of sufficient size to be wind firm should be left at frequent intervals to insure restocking....[34]

Because it affected logging costs and timber quality, clean cutting ultimately had a significant impact on appraisals.

The 1911 manual also addressed the problem of confidentiality of price and other business information. A clause in form 202, the standard timber sale contract form, was revised in 1912 or 1913 to read:

> All the books pertaining to our logging operation and milling business shall be open to inspection at any time by a Forest Officer authorized by the District Forester to make such inspection with the understanding that the information obtained shall be regarded as confidential.[35]

This crucial clause enabled Forest officers to examine actual woods and mill records, information that would be useful in formulating standards for the profession, and information that would be vital to the writing of the 1914 manual.[36]

Greeley had been Forest Management Inspector in California (Region 5) at the time of the 1906 earthquake and had also been Regional Forester in Missoula, Mont. at the time of the holocaust fires of 1910. He had experienced the pressures of demands for accelerated timber sales in both places, which led to his intense interest in logging costs and product prices. As early as 1911, Greeley addressed the problem of appraisal base periods--how much time selling prices should reflect. He pointed out that certain events, the San Francisco fire, for example, had resulted in price increases in 1906 and 1907, whereas a 1911 "panic" resulted in a marked drop in the price of western woods. Similar events could happen in the future. He felt it was unwise to drop prices to those current in 1911, but that to return to prices at the time of the San Francisco fire would also be unsatisfactory. He suggested using an average of prices in the years 1909 and 1910 as the base appraisal period.[37]

Meanwhile, the Region 5 Regional Forester, Coert DuBois, was also working on the subject of data base periods. After conferring with several lumber companies and operators, DuBois reported three suggested methods of setting initial prices: (1) arbitrary prices, (2) percent of the conversion, and (3) present stumpage rates.[38]

The 1910 holocaust fires in the northern Rocky Mountains had focused attention on the need for long-term sale contract periods to allow lumbermen time to build sawmills to process the dead timber and for a liberal extension policy to reduce risk to the timber buyers. Processing the paperwork for reappprasals on short contracts would delay the sales for recovery of dead timber from the fires. To this end, and to protect purchasers from forced operation during low markets, Chief Forester Graves recommended amending clause 12 of the basic contract form 202 to read:

> Provided that in the event lumber values fall below those prevailing during the calendar year ____ for a continuous period of not less than 6 months, an extension of cutting period will be granted by The Forester if necessary in his judgment to relieve the purchaser from hardship.[39]

Graves also provided a substitute for an extension in the form of the first "emergency reappraisal" clause:

> It is further agreed that the [Chief] Forester will at any time after ____ upon application of the purchaser,... redetermine and establish the stumpage rates and designate a date when the rates...shall be effective, which date shall be within 6 months of the date of application....[40]

By 1912, Graves was ready to consider specific remedies to the appraisal problems that had arisen in previous timber sales from the National Forests. He sent a letter to all Regional

Foresters, soliciting their suggestions. In it he wrote that the general Forest Service policy would be to increase the timber sales business. Sales usually should not be larger than 500 MM board feet or for longer than 10 years. Graves cautioned that attempt should not be made to undersell privately owned stumpage. The letter said:

> ...it has occurred to me that much of the difficulty which our field men now experience can be obviated by the right kind of a bulletin dealing with lumbering in and near the National Forests with particular reference to National Forest operations and appraisals of stumpage....It should standardize methods of handling logging costs...; and it should give as a check...reliable average costs for specified regions and methods. In addition...it should cover thoroughly both the theory and the practice of stumpage appraisals.[41] (Emphasis added.)

Several Regional Foresters responded in detail to Graves' request. George Cecil of Region 6 (Portland) suggested long-term contracts as a method of "increasing the sale value of the stumpage... and making our propositions more attractive to purchasers." He proposed that 20-year contracts become standard, with a reasonable provision for reappraisal, reasoning that "the stability of the business will warrant a smaller rate of profit than in a short time contract."[42]

Cecil also listed several problems at the heart of the appraisal debate. He decried the meagerness of cost data available in general. Then he wrote of the need to know the amount of capital expended before returns on investment, the number of times the operating capital turned over in a year (in his Region, the Pacific Northwest, the number was four times a year), and overrun. For instance, in his Region, Cecil said that lumber volume overruns of 8 percent were common for Douglas-fir at circular-saw mills and that overrun surpassed 20 percent on band-saw mills.[43]

Austin Cary, Forest Expert in the Washington Office of the Forest Service, summarized the recommendations of Cecil and the other Regional Foresters. In a memorandum prepared for Assistant Forester Greeley, he described the two appraisal methods used before the standardization project began:

The Skeels Formula*

X = SP - LC - 20% of LC - MC - 10% of MC, where:
X = stumpage.
SP = selling price.
LC = logging cost (to the mill).
MC = manufacturing cost.

*named after the Region 1 appraiser, Dorr Skeels.

The variable percentages were profit for the entrepreneur. This formula provided for a lower percentage for profit on manufacture where there were existing mills; the presence of local mills eliminated the element of risk specifically associated with the building of new mills where none existed.

The Forester's Formula

X = SP - OC - D - I - P, where:
X = stumpage.
SP = selling price.
OC = operating and maintenance costs.
D = depreciation of fixed investment.
I = interest on fixed capital.
P = profit.

This formula, used under the 1911 Timber Sale Manual, gave principal weight to operating expenses and little weight to capital invested. In his comments, Forester Swift Berry of Region 5 recommended an "operating profit," which he defined as 25 percent of costs plus stumpage. Today, Berry's method is known as the "Rothery profit ratio" system after Julian Rothery, a widely known Forest Service official of the 1940's.

Cary disagreed with the Skeels formula, arguing that the "only reasonable [practice] was not to split the capital...but to modify the percent which is to be looked for in the whole."[44] He understood the factors that affect profit percentages:

> Expected rate of profit will vary from region to region depending on the general state of prosperity, the abundance of private timber, the number of men familiar with lumbering, the attractiveness of other enterprises that are open...[45]

Cary added: "Sales to going concerns are not always readily reckoned with on the investment basis because of the complications and overlaps that arise."

On May 15, two weeks after Cary issued his memorandum, a report on "The Valuation of Stumpage" was released by William B. Hunter, special examiner for the Bureau of Corporations. Hunter recommended that data allow only "the methods of the average man"--the average efficiency concept. He also recommended that depreciation be ignored for existing mills on the premise that those costs had already been written off against other timber. Hunter's comment was probably the first official warning against duplication of costs in appraisals.[46]

Opinions continued to appear in releases, correspondence, and special reports, and not all of them from persons directly involved in Forest Service affairs. H.H. Chapman, a former forest management inspector then at Yale University, introduced the term "residual value" into the debate to describe the difference between costs and selling prices. He advised: "Do not under any circumstances attempt to subtract interest as an expense before stating the profit, or neglect to state what rate of interest this profit really represents.[47]

Greeley had sent both Cary's analysis and Hunter's report to all Regional Foresters. He now had recommendations from various sources and was ready to propose several definitive policies. In the fall of 1912, he outlined his thoughts on what an official appraisal manual should contain. Responding to the Hunter report, Greeley said only that the Forest Service should generally follow a liberal policy in charging off depreciation of investments as an operating cost.

Greeley covered all aspects of the appraisal process. Although he advocated the proper development of long-term contracts, he recognized the danger of monopoly from award of too many long-term contracts. To counter this danger, he proposed that the Forest Service might accept a lower bid "from an independent company" specifically to avoid monopoly. On the other hand, Greeley wanted sale revenues to increase, even if that goal would require approving more than one contract per purchaser.[48]

Greeley also favored readjustment periods longer than the annual period recommended by some. The maximum would be 5 years between readjustments, but shorter periods could be used if applied uniformly.

Greeley was reluctant to specify lumber grade percentages in contracts for readjustment purposes. He believed that log grade prices would work as a readjustment feature in Region 6, but mill lumber prices would be more appropriate elsewhere. Readjustment clauses "should not be used to guarantee an average profit to the purchaser; he must stand the periods of low profit," Greeley said. He revised this position later in order to provide for a form of escalation of stumpage prices that became common in the period through the 1920's.[49]

Greeley disagreed with a suggestion that profit should be a percentage of invested capital. This, he said, put one too close to the individual operator. "We should use broader averages," he said, averages which "were not dependent upon either the investment or the success or failure of an individual purchaser."[50]

Greeley favored the "forester's formula" as outlined in the 1911-12 Timber Sale Manual, because the "capital invested is given but little weight and operating expenses are given the principal weight." He wrote:

> It has been my feeling that under average conditions considering the experience and training of our appraisers, it would be easier to determine the operating costs with approximate accuracy than the total investment. However, I have come to the conclusion that in the larger, more permanent operations, where appraisals are made with exceptional care and by the best experts we have, the 'investment method'is the sounder and more consistent.[51]

Greeley also suggested that it was important for the Service to know what purchasers' profits actually were when they cut Government stumpage, and he urged his Regional Foresters to pursue aggressively the issue of actual profits on purchases of National Forest timber.[52]

To accommodate the fact that low-valued species in the southern Appalachians and western hemlock in the Douglas-fir region would not cover depreciation and full profit, Greeley recommended prorating all fixed charges in accord with relative value. However, he conceded that "practically the same result is obtained by the present method of averaging the profit in accordance with the returns on each."[53]

On the subject of overruns, the Region 6 Forester, George H. Cecil, had insisted that despite not using overrun as an appraisal factor in portions of eastern Oregon, the Forest Service had received full stumpage value. Greeley responded in favor of using overruns: "I agree with you that the full value...has been obtained...however, I feel that this is due to our good fortune in securing competition rather than in the appraisals."[54]

Greeley went on to specify a minimum price of 50 cents per M board feet for any species of green timber, because it represented "the average cost of sale administration throughout the Service, large and small sales together."[55]

On selling price, Greeley's recommendation was to the point:

> ...Returns will be wholesale f.o.b. cars at the nearest common carrier shipping point, [and] ...through retail yards only when organization of a company makes it necessary to proper analysis of costs and returns.[56]

A year after Greeley made his recommendations, the minutes of one of the weekly meetings of the "Service Committee" noted the appointment of seven logging engineers.[57] These seven men joined Henry Graves, William Greeley, and Austin Cary as the key forces behind publication of the Forest Service's first formal appraisal manual, Instructions for Appraising Stumpage on National Forests (1914), otherwise known as the Timber Appraisal Manual.

The 1914 Timber Appraisal Manual

The Forest Service published its first manual of instruction for appraising the value of its timber in 1914. The manual was significant in shaping the thinking of foresters within and outside the Forest Service on how to put a value on standing timber.[58]

Written following a Forest Service conference in Salt Lake City, Utah, and entitled, "Instructions for Appraising Stumpage on National Forests," the 65-page manual attempted to bring together the results of American forestry experience in one set of standardized principles and methods of appraisal. The goal of the manual was "to ascertain the existing market value of the timber" in order to comply with the "not less

than the appraised value" requirement of the Act of June 4, 1897.

The manual instructions were originally intended for the exclusive use of officers of the Forest Service and were not to be furnished to persons outside the Service. They offered general guidance to Forest Service officers in performing appraisal duties and defined terms and suggested formulas. Although specific instructions were expected to form the basis of all officers' appraisals, good "judgment and business sense" were expected to augment every appraisal decision.

The manual focused on three important aspects of appraisal: the quality of the timber, the investments required (listed below), and the problems of logging and transportation. It advised "intensive study" of the costs and investments involved, warning that "National Forest stumpage must not be appraised by adopting current local prices, by uniform rates on the same Forest, or by guesswork or hasty assumptions." The manual warned foresters that risks in the lumber industry were great--declines in the market often came quickly and without warning. The industry was dependent upon weather and subject to natural disasters such as fires and floods. There were risks in estimating timber quality and quantity. But, the manual advised, buying National Forest timber had certain advantages which Forest Service officers were expected to be aware of and to promote. Purchasers of National Forest timber, although they might forego speculative profits, could save a substantial amount in interest and taxes, making small payments on long-term sales, and had less to lose if the enterprise turned out to be a failure or if losses ensued from fire or other hazard.

The manual listed the following harvesting investments. Under "Logging (stump to landing)": chutes; slides; roads; landing improvements; teams; sleds; big wheels, bummers, go-devils; wood tools; steam loaders; steam skidders; donkeys; horse loaders; and camps. Manufacturing investments: ponds, kilns, yard equipment; sawmills, burners, lighting; planers, sheds, and fire protection. Transportation Investments: railroads, railroad rolling stock; flumes, tugs, bateaux, stream improvements, teams, roads, harnesses, sleighs, and traction engines.

Grouping and standardizing costs were important considerations brought to light in the manual, although long before they actually became practical. "As data on more operations and chances [timber sales] in the region are obtained," the manual predicted, "it may be possible to standardize cost items or groups of items generally applicable to...local types of logging or milling."

The manual advocated the use of "conservative" calculations. By conservative, the instructions meant "average" costs, in contrast to maximum efficiency costs. "As a standard rule," it said, "costs should be based on the work of the average operator rather than that of either the most or the least efficient...."

The 1914 manual led foresters point by point through the process of timber appraisal. Timber species and quality determined the selling price. Regional Foresters were to set minimum stumpage (standing tree) rates which would constitute "upset prices for use in all stumpage appraisals." In other words, the stumpage price of a tract of timber could not go below the established minimums even if the appraisal indicated a lower price. In addition, "It is the policy of the Service," the manual said, "to favor small and medium sized operations....If larger operations are clearly the most practical and logical, stumpage prices must be appraised accordingly." (The term "upset price" was used in the lumber trade at the time to mean a standard appraised value.)

Flat average prices for all species were to be discouraged. Such rates might discourage utilization of inferior species. Each species was to be appraised on its own merits.

After much discussion of whether the minimum stumpage price should be 50 cents or $1 per M, it was set at 50 cents per M. As long as the inferior species were appraised at 50 cents or above (without profit or depreciation of fixed costs), the prices of more valuable species would be reduced to maintain the average profit. However, if inferior species were appraised (without carrying profit or depreciation) <u>below</u> 50 cents, the more valuable species prices would <u>not</u> be reduced to compensate for the deficit. Standard prices in the trade for low-grade species could be used if found to be satisfactory and not below the minimum rate. The 50-cents-per-M figure was the approximate cost of making commercial, nonsalvage sales. It excluded such overhead costs as fire protection and land management, which would be incurred whether or not timber sales were made.

Determination of selling price and profit margins constituted the bulk of the manual. Although mill scale studies were unavailable in 1914, the manual recognized their importance in determining selling prices:

> In all but the smaller operations. lumber is graded and sold at grade prices which cover a wide range in value. The problem is further complicated by varying prices for different dimensions. The average selling price of the product in such cases depends not only upon the price obtained for each grade, but upon the proportions of the different grades in the standing timber....

The manual did recommend the prorating of profit margin to each species in proportion to its value. Particularly, this was done in order to maintain a minimum rate for green timber of each species and to "adjust stumpage prices on the more valuable timbers so that they will carry the less valuable..."

The manual also suggested prorating the depreciation by species. It pointed out that inferior species could be cut or left (at that time) as the market warranted. Operators would "usually cut inferior species if a profit could be netted over bare operating costs, figuring that cost of improvements is borne wholly by the better stuff."

Selling price, as it eventually was described in the instructions, echoed William Greeley's description:

> Selling price...should be taken as the average price at which the product is billed less actual freight [or scheduled freight with underweights adjusted]... [H]igher forms of finish will not be included unless necessary to arrive at a satisfactory valuation. [It was] the average invoice price of the various grades manufactured, f.o.b. cars at the mill or nearest common carrier shipping point. (Emphasis added.)

These instructions have since governed all Service appraisals.

The selling price of products other than lumber, such as railroad ties, shingles, and telephone poles, was to be ascertained in the same manner as the selling price of lumber.

Log prices were to be used only as a check. The period represented by prices was discussed in some detail. "As a general rule," the manual advised, "no prices should be used which do not represent the average lumber market during at least one year." Further, "The prices used should represent normal conditions in the lumber market. This can be done most practicably by averaging the prices received during a period of two years...."

"Fair profit" received considerable attention in the manual:

> Appraisals should not offer large speculative profits. [They should provide] compensation for time and ability, and an industrial rate on the capital required,...and a reasonable margin against unforeseen losses....Profit is not guaranteed,...but the basis of all appraisals is a margin between cost and price under normal industrial conditions which will satisfy a prudent operator... the advantages of buying Government timber being considered. (Emphasis added.)

Profit was defined as the money returned from sales over and above depreciation of fixed investments, operating costs, and payments for stumpage. It warned that profit must be differentiated from "margin for profit," in that the Service appraisal provided not only for profit, but for unforeseen losses and risks as well. The manual permitted the profit to be calculated three ways:

1) As a percentage return on the money invested (the investment method).

2) As a flat rate (judgment basis) per unit manufactured (the compensation for personal services method).

3) As a percentage of the total unit cost of production (the overturn method).

It should be noted that the three suggested methods were not necessarily methods of appraisal; they were all "residual value" appraisals. Only the method of allocating the conversion return (differences between selling prices and costs) into stumpage and profit differed in the three methods. See example of investment and overturn methods in table 5.

The Investment Method

About the investment method, the 1914 manual said:

> This method of reckoning profit, known as the 'investment method,' will be standard in the Forest Service. It should be employed uniformly in appraising the larger chances and in appraising the smaller bodies of timber wherever it is applicable. (Emphasis added.)

In addition, the manual said:

> ...the investment method is seldom adapted to the smaller and shorter lived operations....The energy and ability of the purchaser are the main factors upon which the enterprise is conducted. Similar conditions often apply to special products like railroad ties or mining timbers, which require comparatively little capital.

The method involved two steps: determination of the average capital invested and determination of an appropriate percentage to be applied to that figure to determine the appropriate total profit to apply.

Investment Method Formula

$$X = SP - (LC + MC + D) - \frac{(\% \text{ of } (A+W))}{\text{cut}},$$

where,

X = stumpage.
SP = selling price.
LC = logging cost.
MC = manufacturing cost.
D = depreciation of fixed investment.
% = percent of profit.*
A = average fixed investment.
W = working capital.

*The manual estimated that 15 to 20 percent was a fair margin.

Return for Personal Services Method

For small operations, the profit margin could be based partly on a return on money invested and partly as pay for the operator's time and enterprise. The latter element could be based on a salary per year or month, adequate for the management and direction of the business.

Return for Personal Services Method Formula

X = SP minus (LC + MC + D) minus (% of A+W) minus O, where:

X = stumpage.
SP = selling price.
LC = manufacturing cost.
MC = manufacturing cost.
D = depreciation of fixed investment.
% = percent of profit.
A = average fixed investment.
W = working capital.
O = operating salary.

The Overturn Method

The manual provided:

> Another method of reckoning profit is to take a percentage of the total operating cost and depreciation, or 'overturn'....Operating costs, which make up most of the overturn, are usually ascertained more easily than investments. The overturn method is thus safer for appraisers who are not

Table 5.--Examples of investment and overturn methods of timber appraisal, 1914

(National Forests timber sales)

Investment Method

Items	A small operation in the Rocky Mountains	Mid-sized operation in the Blue Mountains, Oregon	A large operation in the Idaho Panhandle
	Dollars	Dollars	Dollars
Logging cost[1]	6.02	3.68	5.54
Manufacturing cost[2]	6.80	8.04	5.40
Selling price[1]	19.80	19.21	20.86
Average profit-bearing investment	15,300.00	107,505.00	557,260.00
Profit[1]	2.55	2.42	3.68
Depreciation[1]	.93	1.02	1.27
Stumpage[1]	2.80	2.97	3.56

Overturn Method

Items	Small southern pine operation in Arkansas	Loggers' sale in northern Montana
	Dollars	Dollars
Logging cost[1]	3.83	4.27
Manufacturing cost[2]	3.78	5.60
Lumber haul to railroad[2]	2.50	1.00 (log drive)
Selling price[1]	16.00	16.80
Average profit-bearing investment	24,990.	16,950.
Profit[1]	2.44	2.48
Stumpage[1]	2.95	2.64

[1]Per M log scale basis.
[2]Per M lumber tally basis.

Source: U.S. Department of Agriculture, Forest Service, Instructions for Appraising Timber on National Forests (Washington D.C.: Government Printing Office, 1914).

> expert in calculating the investment features of lumbering operations. It may also be used...when it is necessary to deal separately with the parts of an operation [logging and manufacturing]. (Emphasis added.)

Overturn Method Formula

X = SP minus (LC + MC + D) minus % (LC + MC + D), where:

> X = stumpage.
> SP = selling price.
> LC = logging cost.
> MC = manufacturing cost.
> D = depreciation of fixed investment.
> % = percent of profit.

Under the overturn method, the profit is returned every time the working capital included in operating costs is expended and the products sold. Because of this feature, the manual suggested that "with more frequent [than once a year] turns, lower percentage rates should be used." A range in profit percentages under the oveturn method suggested 20 percent for low-risk chances and as high as 35 percent for high-risk chances.

The "overturn" was described as the total cost of each M-board-feet log scale. "Overturn plus profit and stumpage," the manual said, "equals the selling price of the manufactured product." Today the Service uses the term "total production cost" plus stumpage to describe the "overturn."

Recognizing lack of information as a major problem facing appraisers, the manual qualified the instructions:

> The rates of profit given in these instructions are necessarily tentative. Final rates can be established only by experience in studying and analyzing actual returns from many different operations. It is therefore essential to check the profit margin indicated by current or past bids in the same region, as showing the basis upon which operators are willing to buy stumpage.

Early timber sale contracts did require purchasers to make their books available to Forest Service specialists for this purpose. Checks were to be made using any of the three suggested methods of reckoning the profit margin.

The manual also observed:

> As the lumbering industry develops in new regions and becomes more stable, operators are willing to purchase at lower profits [i.e., higher stumpage]. This is shown by the course of stumpage values in the older manufacturing regions.

The manual stated that, as a general guide, "under average conditions of investment and risk, a profit margin of $2 to $3 per M board feet is adequate." Such a "money profit per thousand feet" could be used as a check upon appraisals.

Frequency of the turnover was also an important factor in the working capital required and hence in the profit margin. "Where an annual log drive is required," the manual pointed out, "working capital may be turned but once a year. With railroad logging and quick sales it may be turned as often as once a month."

Interest was important to those who drafted the first manual. As defined in the 1914 manual, interest:

> ...is neither one of the regular costs nor a part of the returns of the business....The term will be used only to mean interest on money invested in improvements during the period before cutting begins, which will be made a part of the fixed investment...when logging commences....No distinction should be made between investments of borrowed and unborrowed capital.... Capital obtained by credit does the same work and is entitled to the same return as capital owned by the operator. ...[Also] the cost of obtaining capital...[enters] into the margin for profit; and where this cost is high...the profit margin may properly be increased. (Emphasis added.)

The straight-line method for depreciation was acceptable, according to the manual; appraisers were to be guided by industrial experience. Because depreciation included amortization of roads and railroads, the manual provided that "private timber which it is reasonable to believe will [be used] logically and economically by the same set of improvements should carry its proportional part of the total depreciation." Where there were existing plants, the residual value of such plants was to be entered into the calculated investment.

The manual authorized use "in regions where costs have been standardized...of average figures" for depreciation, as well as for other cost elements:

> The aim will be to strike a fair average under which the inefficient operator must stand the losses due to his inefficiency, while the exceptionally able lumberman will make a higher profit on account of his special skills or ability.

Recognizing the benefits of time studies, the manual advised that "checks by sections of the work, such as the cost of loading, hauling...should be obtained from going operations in similar timber wherever possible." However, it cautioned:

> ...men watching going operations are inclined to figure too closely, taking standards which are not practicable in a season's run and overlooking the delays and losses of close connection which occur between the constituent portions of the work....

"Jobbing rates" for contract logging or manufacturing, if authentic, were advocated as a check.

The subject of extra costs of Forest Service requirements came up for frequent discussion. This was especially applicable to standardized costs which might include substantial private timber. Costs which were required on Service timber, but not on private timber, included cutting diseased trees, cutting snags and firebreaks, and piling and burning slash.

Overrun was given status as a technical principle, rather than as a form of chicanery by sawmills. Overrun, the manual said:

> ...results from inaccuracies of log scale, use of thinner saws since prevailing scale rules were devised, from closer utilization of short lengths and narrow widths, from cutting dimension stock instead of inch boards, and other features of manufacturing. [It] ordinarily runs from 4 to 30 percent, depending on the size, taper, and soundness of the timber, the thickness of the saws and other matters of mill equipment, exact dimensions to which lumber is sawed, and the class of timber manufactured.

The manual advised that reduction in grade during seasoning as well as losses in quantity between sawing and shipping should be considered.

Ponderosa pine lumber values for 1914 at western local mills were listed in the manual as shown in table 6.

Table 6.--Sample Ponderosa pine lumber values at local western mills, 1914

Ponderosa pine grade	Percentage yield by weight	Prices per MBF	
		Price by grade	Weighted average
		Dollars	Dollars
B and better select	2	46.	0.92
C select	8	34.	2.72
Subtotal	10	36.40	3.64
Moulding and better	--[1]	--	--
#1 shop and #3 clear	15	24.	3.60
#2 shop	20	16.	3.20
#3 shop	25	12.50	3.12
#2 and better common	25	13.60	3.40
#3 common	5	10.	.50
#4 common	--	--	--
#5 common	--	--	--
Standard and better dimension	--	--	--
Utility dimension	--	--	--
Economy dimension	--	--	--
Box	--	--	--
Total	100	--	17.46

[1]-- = not applicable or not available.

Source: U.S. Department of Agriculture Forest Service, Instructions for Appraising Timber on National Forests (Washington, D.C.: Government Printing Office, 1914).

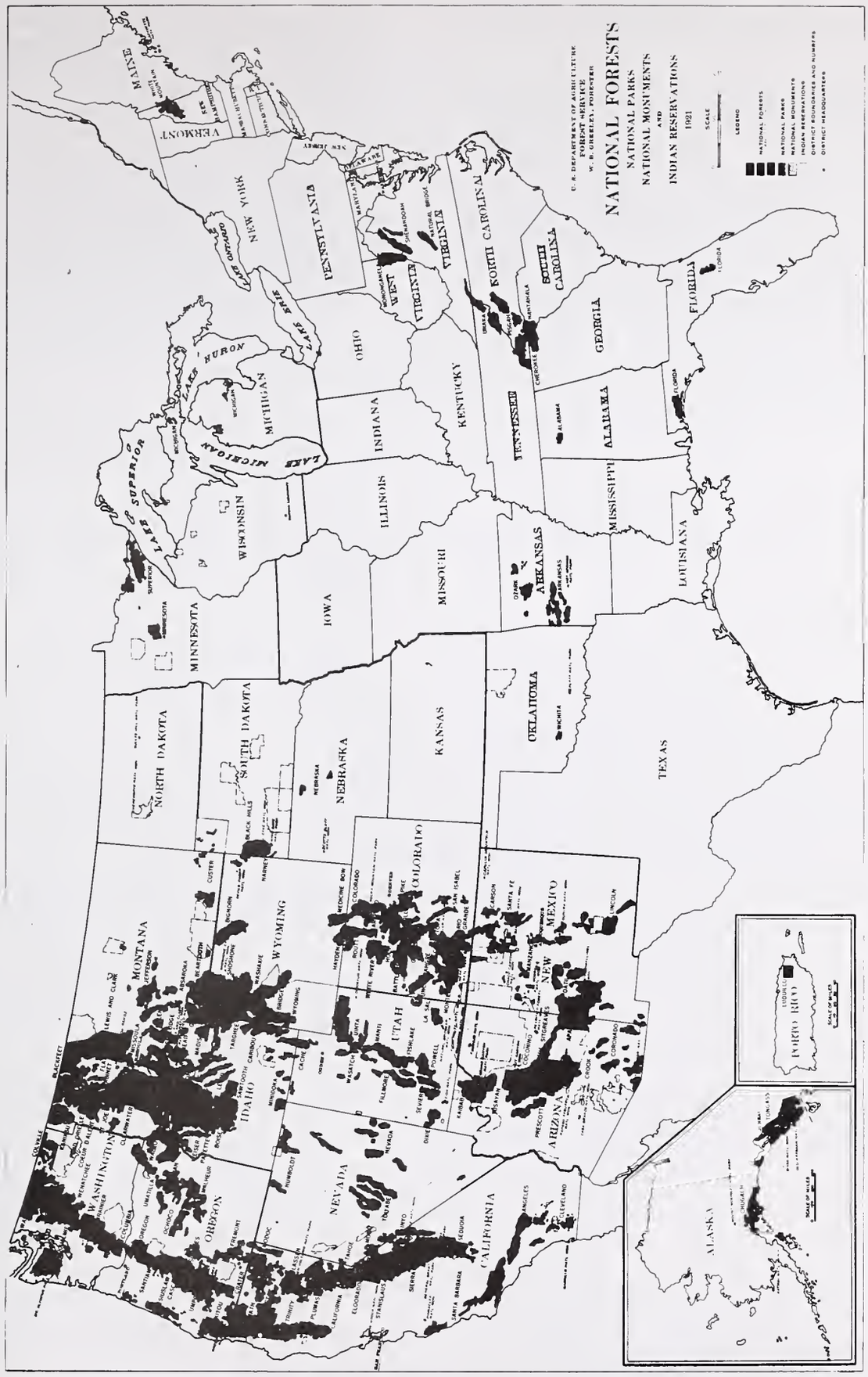


Figure 2.--National Forests, National Parks, National Monuments, and Indian Reservations as of July 1, 1921. National Forests east of the Great Plains were in District (Region) 7, which was set up in 1914, except those in Minnesota and Michigan, which were in District (Region) 2. Unmarked lightly shaded areas are Indian Reservations.

(Forest Service and Geological Survey)

For comparative purposes, ponderosa pine lumber values for 1979 are shown in table 7.

The 1915 Use Book reflected several new developments in appraisal procedures.[59] This Use Book provided for, among other things, the establishment of minimum prices "to define the points at which it is...wise public policy to whthhold timber from sale rather than dispose of it at current market prices." It also provided for the sale of timber to homesteaders at cost, which at that time was between 25 cents and 50 cents per M board feet. Regulation S-6 closed up one long-term loophole by providing that "All sales exceeding 5 years in duration must contain a provision for reappraisal or readjustment of stumpage prices....." The Use Book also called for the decentralization of sales authority beyond that established by the 1907 Use Book. Classes of timber were to be divided for sales among various Forest Service personnel, according to the following plan: class A, up to $100 (Ranger sales); class B, up to $300 (Supervisor sales); class C, up to 3 MM feet (Supervisor sales); class D, up to 30 MM feet (Regional Forester sales); and Class E, over 30 MM feet (Chief Forester's sales).

Table 7.--Sample ponderosa pine lumber values at northwestern mills, 1979

Ponderosa pine grade (coast & inland north)	Percentage yield by weight	Prices per MBF		1914 Weighted average at 1979 prices
		Price by grade	Weighted average	
		Dollars	Dollars	Dollars
B and better select	--[1]	--	--	--
C select	--	--	--	--
Subtotal	2.5	1,367.68	34.19	136.77
Moulding and better	6.4	857.32	54.87	--
#1 shop and #3 clear	6.4	437.51	28.00	65.63
#2 shop	14.3-	468.05	66.93	93.61
#3 shop, stained shop & shop outs	14.5	284.03	41.18	71.01
#2 and better common	8.2+	400.61	32.85	100.15
#3 common	22.2	272.15	60.42	13.61
#4 common	9.3	182.47	16.97	--
#5 common	1.1	109.70	1.21	--
Standard and better dimension	9.8	239.58	23.48	--
Utility dimension	2.1	145.19	3.05	--
Economy dimension	1.6-	86.01	1.38	--
Box	1.6+	199.28	3.19	--
Total	100	--	367.72	480.78

NOTE: The fact that the 1979 average pine value was $367.72 (up from $18.59 in 1914) masks the real increases over the 55-year span. The 4 and 5 common grades and dimension grades of lumber were not even used in 1914. The grades that were used in 1914 would be worth $480.78 per M at 1979 prices--another $112 per MBF.

[1]-- = not applicable or not available.

Source: Bulletins of the Western Wood Products Association, Coast and Inland North District.

For many years, class A and class B sales could be sold without advertising. In 1925, $500 worth could be negotiated without advertising, and the limit was raised to $2,000 in 1952 by the 82d Congress.

Other revisions were in the making in the next decade, until eventually, in 1922, a revised Timber Sales Manual, also entitled "Instructions for Appraising Stumpage on National Forests," was published by U.S. Government Printing Office. It contained major changes in appraisal policy and procedure. The basic tenets of the appraisal system that are set forth in the 1914 manual, however, were not changed in 1922, and, indeed, are still the basis of the modern system.

The 1922 Timber Appraisal Manual

The year 1922 saw two important developments in Forest Service timber sale and appraisal policies --a conference held at Cooley, Ariz. and the issuance of the revised Timber Appraisal Manual.[60] Cooley was renamed McNary in 1924 after James G. McNary of the Cady Lumber Co., which built a mill there.)

At the Cooley Conference in November 1922, committees made reports and recommendations, most of which were approved by Chief Forester William B. Greeley. The committee rosters contained names of many famous foresters:

Appraisals Committee: G. H. Cecil--Chairman; B. F. Heintzleman, J. W. Girard, J. A. Donery, D. M. Lang, J. H. Price, B. E. Hoffman, S. W. Stoddard.

Silviculture Committee: R. H. Rutledge--Chairman, Elers Koch, M. W. Thompson, Quincy Randles, S. H. Marsh.

Timber Surveys Committee: A. S. Peck--Chairman, T. C. Woodbury, J. W. Girard, E. W. Loveridge, W. F. Ramsdell.

Policies and Plans Committee: P. G. Redington--Chairman, Elers Koch, Fred Ames, F. B. Agee, F. W. Reed, T. D. Woodbury.

Organization for Sales Work Committee: F. C. Pooler--Chairman, C. H. Flory, M. W. Thompson, C. B. Morse, B. E. Hoffman, J. A. Fitzwater.

Administrative Committee: F. W. Morrell--Chairman, R. E. Marsh, Fred Ames, R. M. Evans, D. N. Rogers.

Also involved were John F. Preston, Inman F. Eldredge, and Thornton T. Munger.

Specific recommendations set forth at the Cooley Conference included the following:

1. Some appraisals in the past had not complied with the 1914 manual instructions because of inadequate data. This tendency had to be rectified.

2. When removal of inferior species was optional, the extra (fixed) costs were to be taken into account in the appraisal of more highly valued species.

3. Appraisals were to be made known to the individual Forests, with assistance of Regional logging engineers.

4. Standardized Regional costs should be compiled by classes of mills. Logging costs varied more than mill costs and should be compiled (or checked) by using time studies and output studies with local wage scales.

5. Appraisals were to be made to average efficiency, even though the only probable bidder is inefficient.

6. Reappraisals must be based on the "entire chance," just as though the chance were being offered as a new sale.

7. Base periods for selling prices and costs should be determined from recent, reliable data. Significant peaks or low points were to be omitted if clearly abnormal.

Chief Greeley approved most of the conference recommendations, but not all.[61] For example, the majority recommended the use of preferential awards to local mills in order to "stabilize communities." The minority report, by Elers Koch, held out for a prime obligation to sell a sustained yield of timber. Stability should be fostered, it said, by regularity in selling to meet local needs.

Greeley also approved the minority report. "The general policy," he wrote, "must be to encourage competition rather than to prevent it."

In general, the revision of appraisal instructions issued in 1922 reaffirmed the tenets of the 1914 original.[62] The author, Jim Girard, who had served on the Appraisals and Timber Surveys Committees at the Cooley Conference, incorporated much of the thinking at that conference into his revised manual. Some of the important revisions and additions follow.

First, concerning the use of judgment in making appraisals:

> It is the duty of the appraiser to ascertain the value of the timber, under the principles outlined in these instructions, by a thorough examination and calculation. The results will constitute the appraisal report and form a part of the permanent record. If he believes that this rate [is not right] it is because there is some factor which, in his judgment has not been properly taken care of....In such cases the appraiser should clearly [set] forth his reasons

> for recommending a different rate.... With these data...[the approving officer] can determine...the appraised value of the timber.

Costs, the 1922 manual stated, were to be recognized only to the point where selling values were computed. "It must not be assumed that certain costs will be offset by certain indefinite returns and hence that both can be eliminated," the manual affirmed.

As for overruns, the revised manual stressed the difference between log input scale and lumber outturn. It suggested that overrruns should be obtained by mill scale studies, using species of logs, soundness, sizes, types of mills, and kind of lumber produced, and that losses between the headsaw and lumber shipment should be accounted for. The bases for lumber prices were to be 3-year averages, with severely abnormal years omitted.

The 1914 term "profit" became "margin for profit and risk" in the new instructions. The "overturn method" of estimating appropriate profit and risk was suggested for small sales, as before, but it was also recognized as appropriate where standardized regional costs, including depreciation, were compiled. Using the overturn method, the manual advised that profit and risk should be "carefully adjusted to the frequency of the turn. With more frequent turns, lower rates should be used."

Interest on borrowed capital was to continue as part of the profit and risk.

> No distinction will be drawn between bonds, notes, or other loans, and capital stock or other funds advanced directly by the operator. Most operators, after paying their annual interest charges from the proceeds of the business, enter the remainder as profit earned by their own capital. In Service appraisals, which treat borrowed and unborrowed funds alike, the margin includes any such carrying charges on part of the capital as well as the net returns, averaged for all of the money used in the business. (Emphasis added.)

When inferior species had to be removed along with the better species, "for silvicultural reasons," the manual explained, they could be "automatically relieved of profit and depreciation, and the charge upon the other timbers for these items proportionately increased."

The 1931 Forest Management Manual and Regional Appraisal Manuals

Several Regional versions of the manual appeared after 1922. The instruction manuals, including the timber sales sections, supplanted the Use Books, which were phased out. By 1923, the manuals were the official dispenser of advice to Forest Service officers. By 1931, it was officially recognized that all timber appraisals "will be made in accordance with 'Instructions for Appraising Timber on National Forests,' hereafter referred to as the appraisal manual," newly revised.

The 1931 edition of the Forest Service's Forest Management Manual contained several revisions of the 1922 version in appraisal procedure.[63] It suggested that each Region should prepare its own set of standard timber appraisal instructions to be used by Regional Foresters. It also suggested that timber sale contracts should require purchasers to make books and records available to the Forest Service if requested for appraisal. And, it suggested that sales lasting more than 5 years should be subject to reappraisal, and that in such cases, purchasers' costs should be given consideration, but that averages were still the most important factor. The averages (prices and costs) of the past 3 years were "usually desirable," but the average of the past year would do for small sales.

Julian Rothery's 1947 Draft

Shortly before he retired in 1947, Julian Rothery prepared a 56-page draft revision of the appraisal manual. In transmitting the draft to the Regions for review, Ira J. Mason's transmittal letter noted that it "covers primarily general principles...supplemented by (Regional) inserts...."[64]

Rothery generally followed the 1922 manual's outline, but expanded on it in several areas. For example, he recognized that "log or tree grading, good mill scale studies, grade recovery tables, and grade item prices are indispensable for estimating selling prices."

He also devoted attention to the subject of ratios. "In themselves, ratios are not very illuminating, but when compared to well recognized standards, they are of great value...." He advocated use of "current ratio"; the "operating ratio"; the "profit ratio"; and the "depreciation reserve ratio."

"The appraiser is referred," Rothery wrote, "to the 'Accountant's Handbook, 2nd edition, 1938," for aid in financial analysis and further explanation of the ratios.

His comment on the end product of appraisal is familar today:

> ...for the most valuable product to which it is suited and for which an established market exists,...Timber will ordinarily be appraised to the most advantageous point of manufacture, though...the Forest Service may select points where the benefits to the community through the establishment of a new plant or the continuation of an old one will be given a great deal of weight....

Rothery cautioned appraisers, in collecting data from mills, to exclude interest, profit, or loss

not related to timber manufacture or sale; unreasonable depreciation charges; and distortions due to inventory changes.

With typical Rothery insistence on examining all approaches to appraisal, he also cautioned appraisers against the use of averages. "Standing alone," he wrote, "the average conceals more than it reveals...." The simple, the weighted, and the median, he said, should all be used, compared, and evaluated.

Again, the cost and price data had, of necessity, to be based upon the past. However, said Rothery, "if the present and future appear quite different from the past, the averaging of past data will not furnish a logical value."

Rothery's 1947 draft sparked little interest, however, and although it no doubt influenced later revisions, it was never adopted.

The 1954 Draft

In 1954, Russell McRorey from Region 5 (San Francisco) and Joel Frykman from Region 4 (Ogden, Utah) were brought to Washington for a 2-month special assignment. They drafted a revised manual, which was proposed as chapter 5 of title 7 of the Forest Service Manual.

Among the "new" items in this draft were:

1. Discussions of past cost and price basing periods vs. present costs and trends.
2. New cost grouping proposals.
3. Profit and risk guidelines.
4. Road amortization principles.
5. Treatment of conversion value deficits.
6. Use of "sliding scale" adjustments.

Acceptance of the new manual proposals was slow. The Regions, although they felt strongly that new instructions were urgently needed, wanted more clarification of certain points.

The diligence of the Forest Service and McRorey and Frykman was not entirely the result of in-Service desires for new instructions. Congressional hearings in 1955 and 1956, including field investigations by a Senate committee, led to published reports which were critical of Service appraisal procedures. Senator Richard E. Neuberger's subcommittee report to the Committee on Interior Affairs complained of "a completely unrealistic appraised price."[65] Neuberger's complaints, however, were addressed to the Bureau of Land Management and the Bureau of Indian Affairs, as well as to the Forest Service.

The Department of Agriculture responded that:

> ...determination of appraised price consistent with fair market value of timber, as established by competitive bids for comparable timber, is...the principle used in appraising national forest stumpage...[T]here appear to be differences in emphasis...[as to] the weight which should be given to some types of extraordinarily high bids....

The committee report had played down the influence of "preclusive" or "desperation" bidding, the Department said. The Department conceded, however, that "more frequent and thorough mill scale and related type studies are needed...." This 1950's commitment to more frequent and thorough mill scale studies was followed by similar commitments after the Worrell Report (1960's) and the Joint Appraisal Study Group (1970's). Personnel involved in these studies benefited from the experience and training they received. These commitments appear to have been honored in recent years; however, more in the breach than in performance.

Title 7 Instructions

By 1956, the parent instructions for timber sale appraisals were contained in volume 3, title 7 of the Forest Service Manual (FSM).[66]

Part 3, FSM 203.33, of that Manual stated: "The appraisal of national forest timber for sale will be done in accordance with standard Forest Service procedures, supplemented by regional instructions."

The Manual in 1956 also included FSM 203.49, "Considerations in Rate Redeterminations," and FSM 203.37 "Stumpage Rate Adjustment." The latter stated:

> Due consideration will be given to the purchaser's actual costs and selling values, but, as in appraisals, average figures for reasonably efficient operations of the same kind should be used so far as they are applicable, irrespective of whether the purchaser is more or less efficient than the average.

The wording implies, of course, that each Region must have its own Regional average costs and selling prices, against which it will compare the purchaser's data.

Stumpage rate adjustment was well advanced in the 1950's, as FSM 203.37 demonstrated:

> In the area covered by the Western Pine Index, regional foresters may authorize the inclusion in timber sale contracts of stumpage rate adjustments, geared to that index.... Each advertisement and contract containing the adjustment feature must contain a base rate and a base index figure. The rates actually paid... are the bid rates adjusted by 50% of the difference between the base index ...and the...index for the quarter in which the timber is scaled.

The instructions also alerted appraisers to comparisons of stumpage rates:

> It is very important in appraisals and in rate redeterminations that the index, the basic appraisal data, and the margin for profit and risk be considered together. Comparisons with other current and recent sales usually will indicate a profit ratio which is equitable for appraisal purposes. Unless the other sales have the same basic appraisal data and the same index, it will be necessary to make adjustments to put them on a comparable basis.

Minimum and standard price provisions were standardized by the 1950's. Regional Foresters were instructed to establish, by species and area, prices:

> ...below which it is...wise public policy to withhold timber from sale rather than to sell for...temporary low values. These minimum prices are the lowest rates at which timber will be sold, even if standard appraisal computations indicate lower figures. (FSM 203.55, 1957)

The absolute minimum (for commercial sales) was "what it should cost to prepare and administer sales...$1.00 per M...."

"Standard prices" were established as a labor saver, "for use where the volume involved is too small to justify detailed appraisal calculations." But no sale, no matter how small, was to be sold below standard rates without a detailed appraisal.

Road amortization figures received considerable attention during this period. FSM 203.62 provided for use of "accelerated amortization" to write off road construction costs over a volume less than the estimated total timber volume. Stumpage prices would increase after the roads were written off. These provisions, installed after critical GAO reports in 1955, were often misunderstood by timber purchasers. The Worrell Committee recognized this later, in 1963, and one of its recommendations led, in 1965, to the use of "gross" (i.e., stumpage plus road costs) figures for advertisements and bid prices. This permitted accelerated road cost write-offs automatically, against the "stumpage minus base rate" margin.

This period also saw a change in stumpage rate adjustment provisions. Appraisers had recognized an inequity in escalation formulas, which raised the bid price on timber sold at minimum prices when appraisals showed less than minimum, or even negative, values. They overcame this by use of two base indexes for deficit-valued species:

1. A low-base index, which was the standard base index in use for the species for the period.

2. A high-base index, which was the sum of the low base plus the deficit.

This provision, too, was examined by the Worrell Committee. At the committee's recommendation, a procedure called "equal escalation" was adopted. This procedure called for only one base index, but prices could not rise through escalation by an amount greater than they could fall (i.e., the difference between base (or minimum) rate and bid rate).

The 1954 and 1955 draft versions were never officially implemented. They did, however, have unofficial impacts and were, in practice, implemented where they suited the needs of field appraisers.

A 1959 draft included many of the previously defined principles, toning down Rothery's ideas on analysis of fixed-per-acre and variable costs, and providing more detail about quarterly stumpage rate adjustment. It proposed a high-and low-base index procedure to neutralize escalation until any deficits in appraised prices (i.e., appraisals below minimum rates) were absorbed.

The 1959 draft did not permit full compensation in prices of high-value species for subnormal profit margins in low-value species.

Both the high- and low-base index procedure and the species adjustment principles were later changed when Secretary of Agriculture Orville Freeman accepted the major recommendations of the Worrell Report.

The Section 2423 Instructions

The fifth appraisal draft of the series came in April 1960 when section 2423, "Appraising National Forest Timber," was issued as a separate instruction pamphlet, pending issuance in the parent Forest Service Manual and Handbook.[67]

"To Be Written" sections, as the "separate" publication described them, were Mill Scale Studies, Log Transportation Studies, Road Cost Studies, and Logging Engineering Studies.

Each of the five drafts issued from 1947 through 1960 followed the guidelines of the 1914 and 1922 manuals. An observer could not really say that the appraisal system had changed in principle. The changes merely tended to focus on specific details.

In 1962, the instructions in the appraisal manuals were officially replaced by instructions in section 2423 of the Forest Service Manual and Handbook. The latter supplemented the Manual by detailing specific procedures. The handbook contained detailed instructions for collecting and averaging cost and price data, for verifying the data, for applying price indexes for escalation and basic data adjustment, and for updating costs. In the 1970's, the Manual and Handbook were merged.

It is a tribute to the authors of the original 1914 manual and its revised 1922 edition that the instructions lasted for nearly 50 years, and are still basically valid today (1982).

Reference Notes

In the following notes, the expression NA, RG 49, GLO, Division R means that the item was located in the National Archives, Washington, D.C., in Record Group No. 49, Records of the General Land Office, U.S. Department of the Interior (USDI), in the Correspondence File of Division R, Forestry Division (which includes records of the preceding Division P, Special Services Division). The subheading of this file is labeled "Press Copies of Letters Concerning Sawmill Cases, Timber Permits, and Forest Reserves, 1891-1908." Some Division R timber sale records are also filed in the National Archives under Record Group 95 (RG 95), Records of the Forest Service (FS), under Records of the Division of Timber Management (TM), Records Relating to Timber Sales, 1898-1905 (Series 69), and are so indicated below. Regional timber sale records from 1905 to 1908 and from 1938 to 1952 are in Series 64, and from 1908 to 1937, in Series 70.

1. 26 Stat. 1093-1103. Section 24 is a 68-word sentence, inserted as a last-minute addition to the General Land Law Revision Act by the Senate-House conference committee on the bill. Section 24 is often called the Forest Reserve Act of the Creative Act. The first six Reserves were the Yellowstone Park, White River Plateau, Pikes Peak, and Plum Creek Timberland Reserves (all in Colorado except Yellowstone (Wyo.) and the Pecos River (N. Mex.) and Bull Run (Oreg.) Reserves. Four other Reserves were created in December 1892, five in February 1893, and two in September 1893. No Reserves were created in 1894, 1895, or 1896.

2. The Department of the Interior issued a special unnumbered circular in 1891 to carry out the amended section 8 (26 Stat. 1093, 1094). It was entitled "Rules and Regulations Governing the Use of Timber on the Public Domain." See S. V. Proudfit, ed., Decisions of the Department of the Interior and General Land Office in Cases Relating to the Public Lands, from January 1, 1891, to June 30, 1891, Vol. XII (Washington, D.C.: Government Printing Office, 1891), pp. 456-459. (Copy in USDI Library, Washington, D.C.) This authority was extended by the Act of February 13, 1893 (27 Stat. 444), and the Act of March 3, 1901 (31 Stat. 1436).

3. The other permits issued were 16 in Colorado, 8 in Wyoming, and 1 in South Dakota. Report of the Commissioner of the General Land Office to the Secretary of the Interior for Fiscal Year 1893 (Washington, D.C.: Government Printing Office, 1893).

4. Report of the Commissioner of the General Land Office to the Secretary of the Interior for Fiscal Year 1903 (Washington, D.C.: Government Printing Office, 1903).

5. Report of the Commissioner of the General Land Office to the Secretary of the Interior for Fiscal Year 1896 (Washington, D.C.: Government Printing Office, 1896).

6, 7. Letter from Commissioner Binger Hermann to Secretary of the Interior, Feb. 7 (1896), in Report of the Commissioner of the General Land Office to the Secretary of the Interior for Fiscal Year 1896 (Washington, D.C.: Government Printing Office, 1896).

8. The official title of the full Act was the Sundry Civil Expenses Appropriation Act for Fiscal Year 1898. Section I of this Act provided for the sale of timber from the Forest Reserves.

9. Report of the Commissioner of the General Land Office to the Secretary of the Interior for Fiscal Year 1897 (Washington, D.C.: Government Printing Office, 1897).

10. NA, RG 49, GLO, Division R, Forestry Division, letter from Commissioner Binger Hermann to Superintendent B. F. Allen, May 6, 1899. There was one superintendent for Forest Reserves in each of the 11 Western States.

11. NA, RG 49, GLO, Division R, Forestry Division, letter from Commissioner B. Hermann to Superintendent W. T. S. May, Jan. 7, 1902. The Forest Reserves were shifted to the new Division R in 1901.

12. NA, RG 49, GLO, Division R, Forest Reserve Case No. 165 documents a sale on Dec. 18, 1904, of 50 cords at 50 cents per cord.

13. NA, RG 49, GLO, Division R, California Case No. 2, Public Timber Sale, submitted by R. F. Grant on March 5, 1898. Case numbers were assigned permanently when petitions were accepted, by State, not by District within States, nor by year. The same number was not used again.

14. NA, RG 49, GLO, Division R, letter from Commissioner B. Hermann to Superintendent B. F. Allen, May 8, 1899.

15. NA, RG 49, GLO, Division R, correspondence includes actions taken on applications for timber sales in most of the Western States.

16. NA, RG 49, GLO, Division R, letter from Commissioner B. Hermann to Supervisor H. G. Hamaker, June 6, 1899.

17. NA, RG 49, GLO, Division R, letter from Commissioner B. Hermann to Superintendent C. W. Garbutt, reporting receipt of a bid from Homestake Mining Co. on Oct. 20, 1899.

18. NA, RG 95, Records of the Forest Service (FS), Timber Management (TM) Records Relating to Timber Sales, 1898-1905 (Series 69), Division R (GLO), letter from B. Hermann, Commissioner of the General Land Office to Secretary of the Interior Ethan Allen Hitchcock, Sept. 14, 1898.

19. NA, RG 49, GLO, Division R, public advertisement of timber sale and letter from Commissioner of General Land Office to Receiver of Public Monies, Rapid City, S. D., Nov. 3, 1899.

20. NA, RG 95, FS, TM, Series 69, Division R (GLO), letter from Commissioner B. Hermann to Secretary of the Interior Ethan Allen Hitchcock, Sept. 14, 1898.

21. Forest Reserve Manual For the Information and Use of Forest Officers (General Land Office), approved by the Secretary of the Interior, April 12, 1902 (Washington, D.C.: Government Printing Office, 1902).

22. Note the difference from today's "short-log," 16-foot Scribner scale, in which logs longer than 16 feet are split for computation purposes into two logs of approximately equal length.

23. Report of the Commissioner of the General Land Office to the Secretary of the Interior for the Fiscal Year 1904 (Washington, D.C.: Government Printing Office, 1904).

24. USDA, Forest Service, The Use of the National Forest Reserves, Regulations and Instructions, Issued by the Secretary of Agriculture (Washington, D.C.: Government Printing Office, 1905).

25. The Report of the [Chief] Forester for [Fiscal Year] 1908 listed on page 36 the first six executive and inspection Districts (Regions) and the respective District (Regional) Foresters.

26. NA, RG 95, FS, TM, Timber Sales, 1908-37, Series 70.

27. USDA, Office of the Secretary, The Use Book of the National Forest Reserves, Regulations and Instructions (Washington, D.C.: Government Printing Office, 1906). However, a number of timber sales were awarded at cost of sale preparation and administration, without appraisal, when deemed advantageous, from the early days into the 1940's, at prices ranging from 50 cents to $1 per MBF, under the so-called "Nelson Amendment."

28. NA, RG 95, FS, TM, Timber Sales, Series 64, letter from William T. Cox to E. E. Carter, Chief of Management (Silviculture), 1907.

29. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from W. T. Cox to District 5, Feb. 9, 1909. C. G. Jorgensen, a grazing major graduate from Washington State College proved an outstanding exception to this generally sound rule. He was for a number of years in charge of timber management in Region 6, although he had no previous timber sales experience in the woods.

30. NA, RG 95, FS, Office of the Chief, Series 8, Minutes of the Service Committee, Meeting No. 385, Nov. 10, 1910.

31. USDA, FS, The National Forest Manual, Regulations of the Secretary of Agriculture and Instructions to Forest Officers Relating to and Governing Timber Sales, Administrative Use, Timber Settlement, and the Free Use of Timber and Stone (Washington, D.C.: Government Printing Office, 1911.

32. USDA, FS, The National Forest Manual (Timber Sales), 1911. Log scaling in the Forest Service has traditionally been "short-log" scaling, using Scribner or Scribner Decimal "C" rule, in which logs longer than 16 feet in length are split for scaling purposes into two or more logs. In the Douglas-fir region (and southeastern Alaska) the maximum has been 40 feet instead of 16 feet, a procedure yielding approximately 15 percent less scaled volume (40-foot basis) than that yielded from short-log scaling of identical logs. Short-log scale was modified in the 1960's to provide 20-foot instead of 16-foot maximum log lengths. In the Northeast and Middle Atlantic States, International ¼-inch log rule, with 16-foot maximum log lengths, has been standard. Units other than Scribner board feet have been used for specific products (cords, tons, linear feet, etc.). Region 9 adopted cubic feet as its standard in the 1970's. Steps have been taken to convert both board feet and cubic feet to cubic meters as the standard, sometime in the near future. Canada converted to cubic feet in 1952, and to cubic meters in 1979.

33. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from the [Chief] Forester H. S. Graves to the District Forester, Portland, Oreg., Dec. 5, 1911.

34. This reflects W. B. Greeley's thinking on clear cutting, as expressed in his Aug. 29, 1911, letter to [Chief] Forester Graves. It was reaffirmed in a Jan. 9 1922, letter, while Greeley was [Chief] Forester, to Secretary H. C. Wallace, explaining that it was best to clear cut in Alaska, because of heavy rainfall and dense stands, and to encourage regrowth of spruce, the most valuable species there. These reasons, along with slash disposal for reasonable protection from fire, were given to press for clear cutting of coastal Douglas-fir. (NA, RG 95, FS, TM, Timber Sales, Series 64.)

35. USDA, FS, The National Forest Manual (Timber Sales) 1911, pp. 73-76, Standard Contract Form 202, Timber Sale, Section 37.

36. Books and records of the purchasers have been subject to verification by Forest Service professional cost accountants since the 1960's. Purchasers who refuse to make information available for inspection and verification may be barred from bidding on National Forest timber under present regulations (1982).

37. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from W. B. Greeley to the [Chief] Forester H. S. Graves, Aug. 29, 1911.

38. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from Coert DuBois to the [Chief] Forester H. S. Graves, Nov. 28, 1911.

39, 40. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from [Chief] Forester H. S. Graves to District Forester, Portland, Oreg., Dec. 5, 1911.

41. NA, RG 95, FS, TM, Timber Sales, Series 70, circular letter from [Chief] Forester H. S. Graves to District Foresters, Feb. 12, 1912.

42, 43. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from G. H. Cecil to [Chief] Forester H. S. Graves, June 1, 1912.

44, 45. NA, RG 95, FS, TM, Timber Sales, Series 70, memorandum from A. Cary to W. B. Greeley, May 1, 1912.

46. NA, RG 95, FS, TM, Timber Sales, Series 64, U. S., Bureau of Corporations, Special Examiner William B. Hunter, "The Valuation of Stumpage." May 15, 1912. [The Bureau of Corporations was the predecessor of the Bureau of Domestic Commerce, Department of Commerce.]

47. NA, RG 95, FS, TM, Timber Sales, Series 64, H. H. Chapman, "Suggestions on Method of Determining Stumpage Appraisal of National Forest Timber," Forest Service, 1912.

48. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from Assistant [Chief] Forester W. B. Greeley to District 6 (Portland, Oreg.), Sept. 4, 1912.

49. NA, RG 95, FS, TM, Timber Sales, Series 70, Greeley to District 6, Sept. 4, 1912.

50. Greeley to District 6, Sept. 4, 1912.

51. Greeley to District 6, Sept. 4, 1912.

52. Greeley to District 6, Sept. 4, 1912.

53. Greeley to District 6, Sept. 4, 1912.

54. Greeley to District 6, Sept. 4, 1912.

55. Greeley to District 6, Sept. 4, 1912.

56. Greeley to District 6, Sept. 4, 1912.

57. NA, RG 95, FS, Office of the Chief, Series 8, Minutes of the Service Committee, Meeting No. 527, July 16, 1913, noting the appointment of: District 1, Messrs. Skeels and Ellard; District 4, Mr. Seery; District 5, Mr. Ormsby; District 6, Messrs. Andrews and Woodcock; Washington Office, Mr. Cary.

58. USDA, FS, Office of the [Chief] Forester, Henry S. Graves, Instructions for Appraising Stumpage on National Forests, (Washington, D.C.: Government Printing Office, 1914).

59. USDA, FS, The Use Book of the National Forests, Regulations and Instructions, (Washington, D.C.: Government Printing Office, 1915).

60, 61. USDA, FS, Office of the [Chief] Forester, "Report of the Forest Management Conference at Cooley, Arizona, Oct. 30-Nov. 4, 1922," 1922. Among the policies adopted:

a. Management plans should stress that the Forest Service's principal job is to grow trees.
b. Project inventories are needed to pinpoint areas that need planting.
c. Greater effort is needed to gather Regional average cost data.
d. Data should be adjusted at least annually.
e. Appraisals should be made to average efficiency.

62. USDA, FS, Office of the [Chief] Forester, W. B. Greeley, Instructions for Appraising Timber on National Forests, (revised) Washington, D.C.: Government Printing Office, 1922).

63. USDA, FS, Forest Management Manual, Washington, D.C.: Government Printing Office, 1931).

64. NA, RG 95, FS, TM, Timber Sales, Series 64, circular memorandum from I. J. Mason to all Regions re: Manual revisions; reply requested Dec. 1. June 16, 1947.

65. Two congressional reports were apropos to the issue:

a. U.S. Congress, House, Federal Timber Sales Policies, Report No. 2960, Committee on Government Operations, July 27, 1956. Finding and conclusion no. 2 said:

> The appraisal procedures employed by all three agencies(Forest Service, Bureau of Land Management, and Bureau of Indian Affairs) result in a completely unrealistic appraisal price. While the agencies maintain that their estimates...are the equivalent of fair market value, the record clearly discloses that they do not even approximate...bid values.

b. U.S. Congress, Senate, Responses by Federal Agencies to the Report on Federal Timber Sales Policies, Aug. 22, 1958. The congressional conclusions ignored the very strong possibility that bid prices in themselves were not "fair market value" because the bidders were not willing buyers not under compulsion to buy. The Forest Service maintained that its appraisals were estimates of fair market value under an assumption of no compulsion being involved. Thus the appraised price could be a better measure of fair market value than the bid price, given no major error in the appraisal.

66. Hard cover, looseleaf binders of the Manual instructions were furnished to all Ranger District, Forest Supervisor, and Regional Offices.

67. USDA, FS, Amendment No. 43 to Forest Service Manual 2420, a "Separate" of Forest Service Appraisal Procedures, April 1960.

Section II:

Significant Sawtimber Sales and Reappraisals

In the early years of the Forest Service, timber was sold from the National Forests according to systems that varied considerably from sale to sale and from Forest to Forest. Each sale demonstrated anew the need for a formal timber appraisal system sufficiently standardized to apply Servicewide, yet flexible enough to accommodate the variables of individual sales. The challenge of devising such a system occupied the Forest Service for many years.

Even more than the first sales, long-term sales and reappraisals made the need for an appraisal system apparent. The pressure to make long-term sales was the principal influence in the creation of the first formal appraisal system, contained in the 1914 Timber Appraisal Manual and, to a degree, in its precursor, the 1911 National Forest Manual.

As sales grew in volume, the importance of the appraisal system also grew. Table 1 shows the volume of timber sold by Region in 4 formative years of the appraisal system. Table 2 shows the volume sold by Region the following 8 years, when the number of Regions had risen from six to eight.

By the 1920's, individual sales had grown considerably in volume. In the first half of the decade, there were several sales of more than 250 MM feet (see table 3), and sales of this size continued until the effects of the Depression became manifest in the timber industry (see table 4). The early 1920's also witnessed several large sales of lodgepole pine railroad ties (see table 5).

During the 1920's, such large sales comprised a larger proportion of total sales than at any period since then. Acting Chief Forester Edward A. Sherman foresaw that, although individual sales volume might not increase, total volume of timber sold would increase as the demand for timber escalated in the years to come. In 1923, he wrote:

> ...[I]t is obvious that in the next 20 years there will be a great pressure to cut from the National Forests...somewhere between 8 and 12 billion feet. Even the smaller of these two figures is a larger amount than anyone has yet had the nerve to predict can be produced from the National Forests on the basis of permanent output. Unquestionably, 8 billion feet can be produced under intensive management and good fire protection, and possibly as much as 12 billion feet can be produced. A cut 20 years hence ten times as great as is being cut now is not only a probability, but apparently almost a certainty.[1]

Sherman's dates were not accurate, but the gist of his prophecy was. Table 6 gives a 76-year overview of the volume of timber sold from

Table 1.--National Forest timber sales by Region: volume and prices, fiscal years 1911-14.

	Region 1		Region 2		Region 3		Region 4		Region 5		Region 6	
Fiscal Year	Volume	Price per MBF	Volume	Price per MBF	Volume	Price per MBF	Volume	Price per MBF	Volume	Price per MBF	Volume	Price per MBF
	MMBF	Dollars	MMBF	Dollars	MMBF	Dollars	MMBF	Dollars	MMBF	Dollars	MMBF	Dollars
1911	269	3.39	75	2.16	128	2.91	38	2.39	111	2.65	264	2.14
1912	253	1.75	92	2.02	60	2.47	31	2.26	109	2.14	201	2.06
1913	254	2.21	72	2.24	218	2.55	45	1.96	1065	2.18	484	1.65
1914	559	2.55	348	2.65	194	2.12	47	2.38	80	1.91	270	1.52
Total	1335		587		600		161		1365		1219	
Weighted Avgs.		2.50		2.44		2.48		2.24		2.20		1.79

Source: National Archives, Record Group 95, Record of the Forest Service, Division of Timber Management .

Table 2.--National Forest timber sales by region: volume and prices, fiscal years 1915-22

Fiscal Year	Region 1		Region 2		Region 3		Region 4		Region 5		Region 6[1]		Region 7[2]		Region 8	
	Volume	Price per MBF	Volume	Price per MBF	Volume	Price per MBF	Volume	Price per MBF	Volume	Price per MBF	Volume	Price per MBF	Volume	Price per MBF	Volume	Price per MBF
	MMBF	Dol.	MMBF	Dol.	MMBF	Dol.	MMBF	Dol.	MMBF	Dol.	MMBF	Dol.	MMBF	Dol.	MMBF	Dol.
1915	138	1.83	90	2.03	96	2.31	35	2.31	32	1.94	635	2.73	25	2.92		
1916	107	2.16	108	2.12	87	2.71	101	2.80	152	2.02	256	1.20	22	2.82		
1917	443	2.30	91	1.99	230	1.80	23	2.00	122	2.35	943	1.45	46	2.83		
1918	100	2.29	168	2.14	349	2.27	32	1.97	375	2.50	254	1.93	141	2.84		
1919	80	2.10	97	2.36	85	2.13	43	1.77	239	2.36	172	2.27	60	3.12		
1920	147	2.80	207	2.37	50	2.46	198	2.16	338	2.54	232	1.84	57	2.98		
1921	319	3.29	38	2.92	26	2.81	35	2.80	360	3.42	313	1.50	22	4.59	8	1.37
1922	46	2.70	79	2.59	23	2.10	32	2.09	1709	3.17	179	2.51	26	3.35	13	1.62
Total	1380		878		946		499		3327		2984		399		21	
Weighted avgs.		2.53		2.26		2.21		2.29		2.90		1.89		3.03		1.52

[1]Alaska was in Region 6 through 1920; then was Region 8, until 1933.
[2]Region 7 encompassed the Southeastern States at this time.

Source: National Archives, Record Group 95, Records of the Forest Service, Division of Timber Management

Table 3.--Individual large timber sales, National Forests, Regions 2, 3, 5, 6: 1922-25

Year	Sale unit name	State	National Forest	Region	Volume	Logging cost per MBF	Mfgr. cost per MBF	Selling value per MBF	Stumpage price per MBF	Major Species
					MMBF	Dollars	Dollars	Dollars	Dollars	
1922	Bear Valley	Oreg.	Malheur	6	890	10.62	10.61	30.90	2.75	Yellow pine[1]
1922	Herman Creek	Oreg.	Umpqua	6	376	10.62	12.24	29.10	2.00	Douglas-fir
1922	Fruit Growers Supply (Pine Creek)[2]	Calif.	Lassen	5	994	13.18	11.99	32.50	3.47	Yellow pine
1923	Dolores	Colo.	Montezuma	2	253	12.18	14.34	33.91	2.50	Yellow pine
1923	North Fork Willamette	Oreg.	Cascade	6	625	9.14	12.00	27.80	2.40	Douglas-fir
1924	Deer Springs	Ariz.	Sitgreaves	3	287	12.08	12.51	31.43	2.50	Yellow pine
1924	East Side	Oreg.	Mt. Hood	6	253	--[3]	--	--	2.00	Yellow pine
1924	Marks	Oreg.	Ochoco	6	426	11.75	12.36	33.94	3.75	Yellow pine
1924	West Fork Mill and Lumber	Oreg.	Mt. Hood	6	330	10.58	10.64	27.41	1.20	Douglas-fir
1925	Lassen Lumber & Box	Calif.	Lassen	5	391	10.63	12.21	35.50	4.75	Yellow pine

[1]Yellow pine = ponderosa pine.
[2]Originally a 1916 sale.
[3]-- = not applicable or not available.

Source: National Archives, Record Group 95, Records of the Forest Service, Division of Timber Management, "Typical Timber Appraisals," 1926 summary.

Table 4.--Individual large timber sales in effect, National Forests, Regions 3, 5, 6: 1921-30[1]

National Forest	State	Region	Purchaser	Date of sale contract	Volume
					MMBF
Crater	Oreg.	6	Pelican Bay Lumber Co.	Nov. 4, 1914	382
Sierra	Calif.	5	Sugar Pine Lumber Co.	June 2, 1921	597
Lassen	Calif.	5	Fruit Growers Supply	Apr. 3, 1922	994
Sitgreaves	Ariz.	3	W. M. Cady Lumber Co.	June 15, 1925	287
Sierra	Calif.	5	Madera Sugar Pine Co.	July 8, 1926	270
Malheur	Oreg.	6	Hines Western Pine Co.	June 1, 1928	890
Modoc	Calif.	5	Pickering Lumber Co.	Sept. 14, 1928	400
Umpqua	Oreg.	6	Anderson and Middleton	Nov. 1, 1928	374
Olympic	Wash.	6	Schafer Brothers Logging Co.	Dec. 10, 1929	852
Snoqualmie	Wash.	6	Puget Sound Pulp and Timber Co.	Jan. 7, 1930	511
Olympic	Wash.	6	Simpson Logging Co.	Oct. 30, 1930	288

[1]In addition, in 1930, there were three sales which had been tentatively awarded, but for which contracts had not yet been executed:

Rio Grande/San Juan	Colo.	2	Trans-Mississippi Development Co.	1,200 MMBF
Tongass	Alaska	10	George T. Cameron	5,000 MMBF
Tongass	Alaska	10	Zellerbach Brothers	5,000 MMBF

Source: National Archives, Record Group 95, Records of the Forest Service, Division of Timber Management

Table 5.--Individual large sales of lodgepole pine railroad ties, National Forests, 1921-25

Year	Unit name	National Forest	State	Region	Railroad ties	Logging cost	Selling value	Stumpage price
					Millions[1]	------Dollars per tie[1]-----		
1921	Moose Creek	Targhee	Idaho	4	1.8	0.50	0.66	0.070
1924	Mullen Creek	Medicine Bow	Wyo.	4	1.5	.54	.81	.135
1924	Warm Spring Creek	Washakie	Wyo.	4	3.1	.79	1.00	.108
1925	Michigan River	Arapaho	Colo.	2	2.6	.65	.86	.076

[1]To determine the per-MFB-equivalent, multiply by 30 (30 ties at 33-1/3 board feet per tie).

Source: National Archives, Record Group 95, Records of the Forest Service, Division of Timber Management, "Typical Timber Appraisals," 1926 summary.

Table 6.--Total annual volume of timber sold[1] and average bid, National Forests, fiscal years 1905-80

Fiscal year	Volume sold	Average bid per MBF	Fiscal Year	Volume sold	Average bid per MBF
	MMBF	Dollars		MMBF	Dollars
1905	114	1.49	1946	2,687	3.95
1906	330	1.52	1947	3,786	5.80
1907	1,033	2.45	1948	3,742	8.09
1908	386	1.90	1949	2,615	11.14
1909	287	1.98	1950	3,434	9.60
1910	575	2.44			
			1951	4,913	12.31
1911	830	2.56	1952	12,975	16.17
1912	830	2.56	1953	4,801	11.86
1913	2,137	2.09	1954	5,368	11.25
1914	1,526	2.32	1955	9,627	10.43
1915	1,070	2.48			
			1956	6,837	18.91
1917	1,981	1.86	1957	6,533	17.01
1918	1,424	2.31	1958	12,293	8.47
1919	773	2.34	1959	9,359	14.21
1920	1,294	2.34	1960	12,167	14.05
1921	1,121	2.81	1961	8,857	14.13
1922	2,106	3.05	1962	10,326	12.94
1923	2,268	3.62	1963	12,175	12.61
1924	1,975	2.88	1964	11,682	14.72
1925	1,303	2.51	1965	11,511	17.22
1926	1,727	2.51	1966	11,383	19.86
1927	1,366	2.70	1967	11,655	17.90
1928	776	2.69	1968	11,652	23.54
1929	2,649	2.97	1969	18,931[2]	26.52
1930	2,751	3.10	1970	13,382	23.71
1931	1,638	2.86	1971	10,636	20.24
1932	242	1.88	1972	10,339	31.77
1933	338	1.95	1973	10,199	62.37
1934	442	2.40	1974	10,241	88.14
1935	651	2.36	1975	10,824	60.72
1936	968	2.44	1976	10,287	68.81
1937	1,472	2.39	1976T[3]	1,535	61.23
1938	1,075	2.90	1977	9,920	99.54
1939	1,821	2.52	1978	10,996	120.81
1940	1,755	2.65	1979	11,330	173.22
			1980	11,250	172.60
1941	1,441	3.20			
1942	2,839	2.89			
1943	3,696	4.38			
1944	2,858	4.24			
1945	2,391	4.38			

[1]"Sold" means timber sales contracts awarded. Because such contracts are for periods of 1 to as many as 50 years, the sold values are a mixture of short- and long-term bid prices. A companion table for timber "cut" by years can be constructed. The "cut" values, too, would be a mixture of bid prices for small sales and reappraised and "escalated" prices (the latter in quarterly stumpage price adjustment contracts).

[2]Includes 8,750 MMBF in the Juneau Unit sale, which was canceled in 1975.

[3]The 1976 transition quarter (3d quarter calendar year 1976, when the fiscal year-end was changed from June 30 to September 30).

Source: U.S. Department of Agriculture, Forest Service, Annual Reports of the Chief (Washington, D.C.: Government Printing Office, 1905-80).

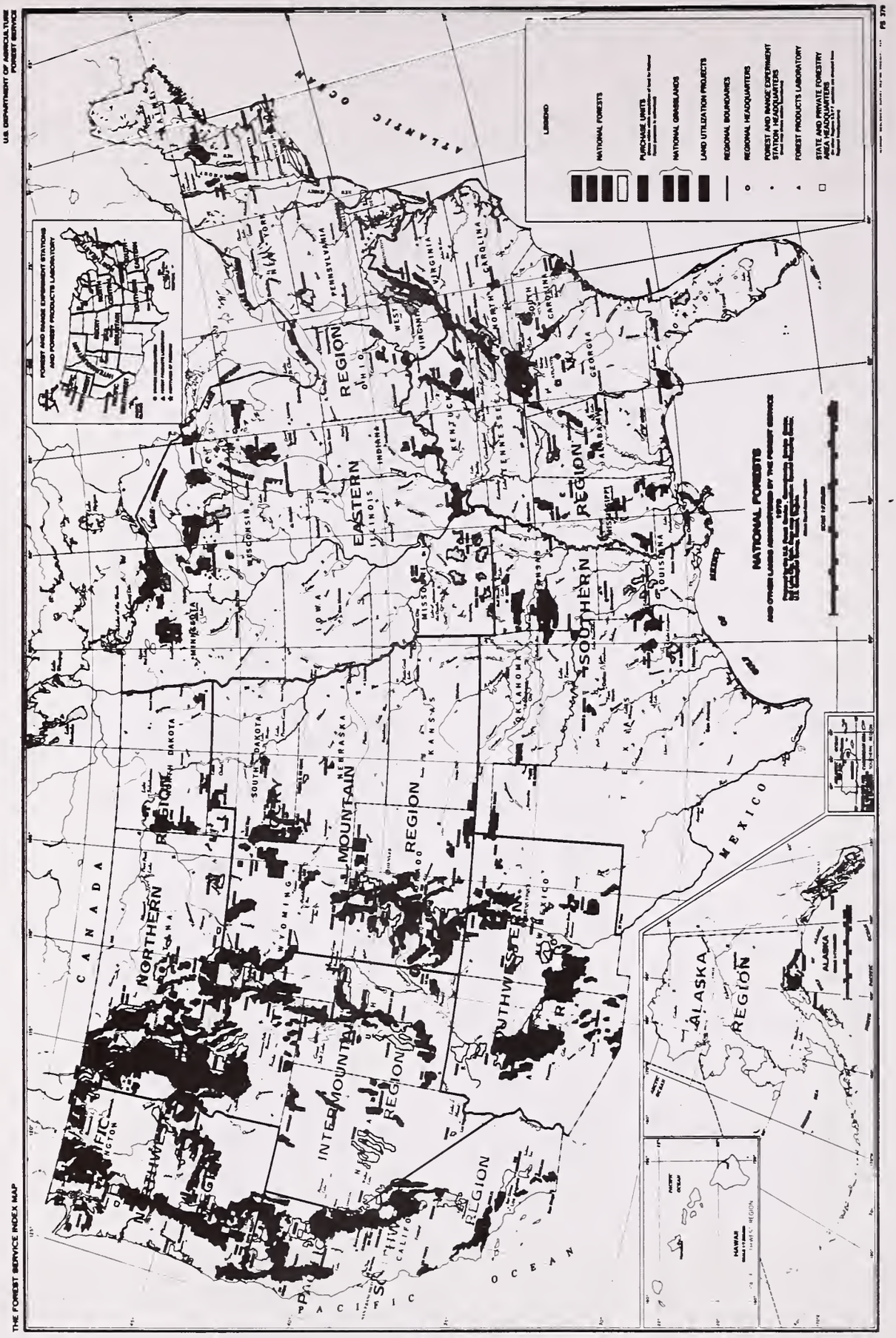


Figure 3.--National Forests and National Grasslands in 1979. Areas of Purchase Units and Land Utilization Projects were insignificant. The Eastern Region (7) and North Central Region (9) had been combined, and Kentucky and Virginia shifted to the Southern Region (8) in 1966.

(Forest Service and Geological Survey)

the National Forests and the average bid per fiscal year.

Although these figures are totals from all National Forests, the characteristics of each sale were determined in part by the special features of the Region in which they occurred. Each Forest Service Region made its own contribution to the modern timber appraisal system; therefore, the following history of significant timber sales and reappraisals is organized by these Regions.

Table 7 lists total volume of all wood products sold, by Regions, during 1979, converted to board feet. Table 8 gives a breakdown of major appraisal cost elements for all sawtimber sales, by Regions, during 1979.

Region 1--Northern Rocky Mountains

Probably no Region of the Forest Service influenced early developments of the appraisal system more than Region 1. William B. Greeley, the first Regional Forester at Missoula, Mont., had been the Forest Service's Chief Forest Management Inspector in California. His interest in costs and prices as they affected forestry and forest products had been nurtured by observing the huge demand for lumber that followed the 1906 San Francisco earthquake. When he was transferred to Missoula in 1908, he came with a keen interest in timber sales, which influenced Service activities throughout his career as Assistant Chief Forester (1911-20) and Chief Forester (1920-28).

Through an inspired staff, Greeley's influence reached beyond Region 1 to the entire Forest Service. Robert Y. Stuart and Ferdinand A. Silcox, his assistants, who both followed Greeley as Regional Forester, Assistant Chief Forester, and Chief Forester, completed a chain that stretched from 1920 to 1939. Others on the staff included David T. Mason, Donald Bruce, and James W. (Jim) Girard, who later became partners in Mason, Bruce & Girard, an influential forestry consulting firm in the Pacific Northwest. Logging Engineer Dorr Skeels later became dean of the University of Montana School of Forestry.

The holocaust fires of 1910 had killed some 5 to 10 billion board feet of mature timber in Idaho and western Montana. Heroic efforts were made to salvage the dead timber. A large number of new sawmills would have been needed to salvage most of the burns. The market outlook, however, discouraged financing for many sawmills; the lumber markets at the time could not have absorbed the production. In the end, only 1 billion feet were actually sold and cut.

After the fires had taken their toll, Greeley formally alerted his Supervisors to the need for practical appraisals of values of salvaged dead and dying timber:

> Since an enormous quantity of timber has been killed by fire on the various forests in the District this season, it is obviously the duty of the Forest Service to realize upon the values of this timber by sale before its deterioration....One of the most important points to be weighed in the disposal of firekilled timber is its appraisal....I will approve the advertisement and sale of firekilled timber if no more than half of its value as green timber can be secured, and will accept even greater reductions in the case of the less valuable species if necessary to secure their utilization.[2]

Greeley also approved cancellation of current contracts to allow firekilled timber to be used in lieu of the contracted timber.

Even before the need to appraise the enormous losses from the holocaust fires focused attention on appraisals, Acting Regional Forester Silcox had addressed the subject. In early 1910, he attacked the minimum and maximum stumpage rates that Chief Inspector Sherman had recommended in 1908, calling them too stringent:

> An attempt to place a stumpage rate... on the basis of a minimum rate previously established, rather than [on] factors peculiar to [each] area, serves as a hindrance in many cases to the consummation of the sale.[3]

Then came the fires, and soon afterward, salvage sales began to roll in. One such sale was Rainy Creek on the Lolo, 100 MM board feet at $2 per M; another was Big Creek, 200 MM board feet at $2 per M for white pine and 50 cents per M for other species.

Throughout the early years, and particularly following the holocaust fires, it was apparent that a standard conversion measure into board feet was as necessary as a standard appraisal system. In 1912, Region 1's Robert Y. Stuart recommended a standard conversion table for converting eight common timber units to board feet:[4]

1 cord = 500 board feet
1 post (7 feet) = 5 board feet
1 shake = 1½ board feet
1 tie (8 feet) = 33 board feet
1 linear foot of pole = 3 board feet
1 mine prop = 10 board feet
1 stull = 60 board feet
1 telephone pole = 100 board feet

The conversion factor of 33 board feet per tie was not entirely accurate, however, because 8-foot ties came in varying widths and thicknesses. (See Moose Creek Plateau sales, Region 4, this section.)

Later in that year, Silcox recommended Dorr Skeels, Supervisor of the Kootenai National Forest, to conduct a study of logging and milling costs and product prices. An implication of bureaucratic friction shows in Silcox's explanation of his action:

Table 7.--Total National Forest wood volumes sold by Regions, all sale sizes, all convertible products, all units (board feet, Ccf[1] and cords), converted to millions of board feet, 1979

Regions	Sawtimber	Pulpwood	Fuelwood[2]	Cull logs	Posts, Poles, etc.	Total
	MMBF					
1	1,020.5	28.0	8.7	--[3]	40.9	1,098.1
2	317.9	26.9	24.0	.4	13.1	382.3
3	319.1	.7	44.2	--	4.3	368.3
4	290.0	14.9	14.0	--	11.3	330.2
5	1,994.2	.7	--	19.1	37.8	2,051.8
6	4,971.8	34.9	--	294.5	63.7	364.9
8	700.0	619.4	6.0	--	1.7	1,327.1
9	223.6	362.5	2.7	--	4.3	593.1
10[4]	128.1	3.8	.2	--	.1	132.2

[1]CcF = 100 cubic feet.
[2]Does not include free fuelwood permits.
[3]-- = not applicable or not available.
[4]Region 10's sold volume does not include long-term sales made in the past. Thus its cut volume in 1979 was much larger (459.5 MMBF) than its sold volume (132.2 MMBF).
Source: Washington National Records Center, Records of the Forest Service, Division of Timber Management.

Table 8.--Appraisal cost elements, National Forest sawtimber sales, all Regions, 1979

Volume of sawtimber	Regions											
	1	2	3	4	5	6	6 east	6 west	6 other	8	9[1]	10
sold (MMBF) →	940.50	286.30	307.10	248.00	1,695.90	5,191.00	1,655.00	3,411.90	124.10	553.60		127.70
Costs per MBF[2]	Dollars per MBF											
Stump-to-truck[3]	83.51	61.19	33.70	73.80	50.68	37.23	38.61	36.07	50.72	28.30		60.60
Transportation[4]	29.70	24.93	23.95	29.69	33.00	29.41	27.49	29.54	51.52	22.44		39.17
Environmentals[5]	12.86	5.76	15.99	10.89	16.41	17.17	15.93	17.49	25.08	1.98		.60
General logging overhead[6]	6.53	11.18	10.78	10.73	13.64	16.90	17.86	16.38	18.18	7.89		14.09
Temporary roads	.73	.68	1.19	1.42	.38	.97	.57	.66	14.63	2.70		11.89
Subtotal logging costs[7]	133.33	103.74	85.61	126.43	114.11	101.68	100.46	100.14	160.12	63.44		135.35
Specified (permanent) roads[8]	32.90	19.76	33.20	20.41	24.03	23.24	21.07	24.63	14.13	.35		62.12
Manufacturing	151.06	134.21	122.18	153.18	122.97	152.52	147.11	155.03	155.33	79.37		206.38[9]
Total Production costs	317.29	257.71	240.99	300.02	261.11	277.44	268.64	279.82	329.59	143.16		403.85
Product selling prices	375.99	300.58	381.45	382.12	355.90	433.05	--[10]	--	--	296.82		450.94
Avg. log hauling distance (miles)	36	30	46	42	42	37	34	38	35	22		39

[1]Region 9 sells all its timber in cubic feet, not board feet; data not applicable.
[2]All figures are per MBF log scale (Scribner or Scribner decimal C).
[3]Falling, bucking, skidding, loading.
[4]Hauling, rafting, towing, road maintenance.
[5]Slash disposal, erosion control, snags, etc.
[6]Includes logging depreciation, supervision, office expenses, etc.
[7]Excluding specified (permanent) roads.
[8]All products (sawtimber, pulp, etc.) averaged.
[9]Manufacturing in Region 10 is approximately 50 percent market pulp and 50 percent rough green timbers (export cants). In 1972, it was adjusted to log prices.
[10]-- = not applicable or not available.
Source: Washington National Records Center, Records of the Forest Service, Division of Timber Management.

> I realize that it was this task [that was behind] the assignment of Mr. [Austin] Cary to this District [Region] last year, but in all frankness very little has been obtained from the time ...Mr. Cary was able to give to this subject.[5]

Silcox's judgment may have been premature; Cary eventually put together most of the 1914 appraisal manual.

The business of sales from the National Forests continued to expand, and Skeels was involved in many of the appraisals of that time. In early 1913, Chief Forester Henry S. Graves approved the Somers Lumber Co. sale on the Flathead National Forest for 100 MM board feet of timber at $2 per M and wrote: "I wish to commend Mr. Skeels highly in connection with this sale for getting such a good offer from the company."[6]

This sale was canceled in 1917 after being only partly cut. The remaining timber was included in a new sale, a common technique of extending contracts during this period. Contracts were also canceled for other reasons, however. A 1916 Lightning Creek sale on the Pend Oreille National Forest, 82 MM board feet to Dover Lumber Co., was canceled in 1920 for non-performance.[7]

Among the common frustrations of the period were the failure of applicants to bid on the sales they had asked for. The Yaak River pulpwood sale proposed on the Kootenai National Forest was a case in point, although in general, pulpwood sales had their own set of problems. (See section III, Significant Pulpwood Sales.) Montana Pulp and Paper Co., the applicant, wanted a 1-million-cord sale. It proposed a combination sawmill and pulpmill, the sawmill to process 100 M board feet per day, the pulpmill, 100 tons per day.

When Dorr Skeels prepared the appraisal in 1913, he reported that much of the timber was cat-faced and defective from old fire damage. He noted that the best timber was:

> ...on such occasional areas as were burned clean by one of the old fires and reproduced to a uniform age class. Many areas of even-aged larch, about 100 years old, are found in this condition, and some slopes are uniformly covered over areas of 2 or 3 square miles by lodgepole pine in pure, nearly even-aged stands of from 50 to 100 years of age.[8]

Skeels' appraisal showed $7.24 per M logging cost by railroad logging or $6.04 per M by flume logging. The latter method, although cheaper than railroad logging, was more dependent on weather conditions, hence more risky. Stumpage was valued at $2.03 per M. Pulp manufacturing costs at that time were $16.03 per ton for groundwood, $32.76 for sulphite, and $34.76 for newsprint. One rough cord of wood yielded 0.85 ton of groundwood or 0.5 ton of sulphite pulp. (See table 9.)

The appraisal was approved; a 20-year contract period was approved by Secretary of Agriculture David F. Houston; and the sale was advertised. No bids were received. It was not until 40 years later that a pulpmill was built by Hoerner-Waldorf Paper Co. at Missoula--still the only pulpmill in Region 1 in 1982.

Silviculture in Region 1 was complicated by the great variety of timber. In 1915, Forest Examiner Donald R. Brewster made a series of policy recommendations for harvesting, specific to each type of timber:[9]

White pine	Larch/Douglas-fir
Mature stands, clearcut	Heavy selection or seed tree clearcut
Immature stands, shelterwood	
Yellow [ponderosa] pine	**Douglas-fir**
Selection cut	Clearcut with seed trees
Cedar, hemlock, white fir	
Not merchantable	

Appraisals had to reflect these systems and their relative costs. That year, Silcox reported that logging costs averaged $6.44 per M board feet in white pine and $4.33 per M board feet in Larch/Douglas-fir.

An appraisal for a 1915 Fishhook Creek sale on the St. Joe National Forest showed a manufacturing cost of $8 per M feet, within the range for that time. (See table 10.) The appraisal for this sale--which did not sell--also contained several interesting wage figures, with per-day rates--for days that were probably 10 or 11 hours--that were substantially lower than per-hour rates are today:[10]

Position	Rate per day
Donkey engineer	$4.92
Fireman	3.00
Rigging or landing man	2.75
Bucker or "whistle boy"	2.50

Correspondence about a large sale on the Cabinet National Forest in 1916 indicates that the Washington Office was taking its review function more seriously than it did for the McGinnity and Biggs sale. (See Region 2 discussion below.) McGinnity and Biggs, of New Mexico Lumber Co. had trespassed on National Forest timber in Region 3 at the same time that they were trying to buy yellow (ponderosa) pine in Region 2--at a price lower than the value of the Region 3 pine.

The Cabinet National Forest appraisal of the 63-MM board feet Burnt Cabin Creek sale by Dorr Skeels was $2.61 per M for white pine. A revised appraisal by Jim Girard was a somewhat higher

Table 9.--Pulpwood costs in the Lake States, 1902-08

Year	Pulpwood cost per cord
	Dollars
1902	3.15
1903	3.40
1904	3.60
1905	4.10
1906	5.15
1907	7.40
1908	7.42
Average	4.88

Source: National Archives, Record Group 95, Records of the Forest Service Division of Timber Management.

Table 10.--Region 1 average lumber manufacturing costs, 1916-38

Year	Average manufacturing cost per MBF	Year	Average manufacturing cost per MBF
	Dollars		Dollars
1916	6.50	1928	11.22
1917	7.90	1929	11.09
1918	9.80	1930	12.38
1919	10.99		
1920	13.13	1931	12.15
		1932	12.21
1921	13.81	1933	10.38
1922	10.79	1934	12.22
1923	11.75	1935	11.54
1924	11.71	1936	11.74
1925	10.97	1937	13.08
1926	11.08	1938	14.39
1927	11.18		

Source: National Archives, Record Group 95, Records of the Forest Service Division of Timber Management.

price of $3.06. When he reviewed the appraisals, Assistant Chief Edward E. Carter called Girard's report "poorly arranged" and revised it upward to $3.71. The bid of $4.15 by Dover Lumber Co. justified Carter's judgment.

Seven years later, the sale was allowed to expire and readvertised. The bid by Ohio Match Co. startled Forest Service appraisers by going to $11.40 per M for white pine advertised at $4.50. In approving the sale, Acting Chief Forester Leon F. Kneipp commented: "The results raise questions as to whether our appraisal was correct, or whether the Forest Service has overlooked some bet...."[11]

Kneipp failed to note two important factors: that the selling price in the appraisal was not current (probably a 1917-22 average), and that the overbid of $6.90 could have been absorbed in the $8.85 per M appraised profit margin.

Jim Girard, who was involved in the Ohio Match Co. sale, might have been thinking of these two cases when he defended the price for the Bear Valley sale to Herrick Lumber Co. (See section III, Significant Pulpwood Sales, Region 6.)

Although some observers of the day questioned the adequacy of Forest Service appraisals, they must have been fairly reliable. In 1923, lumberman Philip Neff wrote to the Coeur d'Alene National Forest about Coeur d'Alene Mill Co., which took over the Ohio Match Co. sale in mid-1923: "Forest Service stumpage is selling quite a bit higher than state or private stumpage of the same quality and accessibility."[12]

The Keeler Creek Sale

One major sale showing a progression of appraisal changes came in 1940. The Keeler Creek sale on the Kootenai National Forest (table 11) spanned a 22-year period of changed timber sale procedures and seven reappraisals from its initial sale in 1940 to E. C. Olson Lumber Co. until its completion in 1963 by St. Regis Paper Co.

The original advertisement for the sale offered 40 MM board feet of white pine; 21 MM board feet of spruce; and 17 MM board feet of larch, cedar, hemlock, and white fir--a total of 78 board MM feet, plus 17,000 cedar poles. The final cutting report at the end of 1962 listed 121 MM board feet of sawlogs cut and about 10,000 cedar poles.

The sale had first been cruised in 1927. In his 1940 appraisal, Logging Engineer Philip Neff noted that, since 1927, the timber had sustained considerable mortality: "The heavy stand of snags, averaging 15 to the acre on the whole area, and the heavy windfall...increase the cost of skidding." This comment is evidence of heavily overmature stand conditions and previous insect epidemics. It is also evidence that the cruise may have discounted growth since 1910, which could have offset some of the mortality.

Neff estimated what he considered to be unusually high slash disposal costs for the area and justified them with the following explanation:

> The Saturday half holiday and liberal annual and sick leave regulation...has tended to increase the cost of slash disposal [20 percent]....Due to these conditions and the further fact that the lowest wage paid in the woods by the J. Neils Company and other responsible operators is 62½¢ an hour, the following amounts will be necesary.[13]

Neff also reported that fuelwood dealers were selling 4-foot cordwood to Spokane, 60 miles distant, for $5 per cord, delivered.

The contract provided that the successful bidder had to manufacture the timber within the Kootenai Management Plan unit, within which the main applicant was the J. Neils Lumber Co. mill at Libby, Mont. Shock waves echoed throughout Montana, therefore, when the timber, offered at $3.25 per MBF for white pine plus $1 Knutson-Vandenberg Act (K-V) deposit for timber sales area betterment (to cover planting and seeding costs), was bid at $3.81 by E. C. Olson Lumber Co. The Neils bid was $3.30.

The award was made to Olson, despite protests from Libby interests and a personal inquiry from Senator Burton K. Wheeler of Montana. Olson, however, did not cut any timber under the contract. On February 1, 1941, he applied for cancellation for the purpose of transfer to the Neils firm at the high bid price. Thereafter, the Keeler Creek sale became the J. Neils Lumber Co. sale of February 3, 1941. There is no mention in the record as to whether Olson received any payment for relinquishing his contract.

Rate determinations were scheduled at 3-year intervals, and the sale was set to expire in 1949. The first reappraisal came in 1944, after 23 MM board feet had been cut, and raised the rates for white pine to $6, plus $1 K-V deposit.[14] Julian Rothery in the Washington Office reviewed the reappraisal. Some of his appraisal preferences are apparent in his comment on this particular reappraisal:

> The forest presented a very clear appraisal and summary, which Mr. Neff revised by increasing direct logging costs by $1.00. The point was, I think, well taken. If increases in costs can be figured it is more direct and simple to do so than to allow more generously in the margin for profit and risk--and after all we would have to estimate the probable increase in costs to increase the margin logically.[15]

In the years that followed, several major events hit the sale. Spruce bark beetle infestations, epidemic throughout Region 1, reached Keeler Creek; salvage required taking some of the spruce that otherwise would have been left for seed

Table 11.--Appraisal history of the Keeler Creek timber sale, Kootenai National Forest, (Mont.), Region 1, 1940-62

Year	Data base period	Selling price log scale (Scribner rule)[1]		Logging Cost	Conversion	Stumpage prices and K-V	K-V[2]	Escalation base index
			Dollars	Dollars	Dollars	Dollars	Dollars	
Original (1940)	1937-39	WP	39.04	14.53	--[3]	3.85	1.00	--
		ES	26.40	10.13	--	-1.38	.75	--
		LDF	24.00	10.13	--	-1.28	.50	--
1944	1943	WP	53.68	21.40	13.25	7.00	1.00	--
	OPA ceiling	ES	40.80	17.50	5.78	2.00	--	--
		LDF	38.75	16.70	5.18	1.50	--	--
1947	1946	WP	65.76	23.95	15.77	7.00	2.00	--
	plus 10%	ES	53.68	do.	8.98	3.00	1.00	--
		LDF	49.75	do.	7.65	2.00	--	--
1950	1947-48	WP	106.75	34.93	39.71	21.25	5.00	--
		ES	86.55	--	20.27	7.35	3.00	--
		LDF	77.82	--	10.78	3.75	--	--
		HWF	72.29	--	9.86	2.25	--	--
1953	1952	WP	152.34	41.74	58.66	38.00	8.75	--
		ES	105.49	--	20.45	6.00	2.50	--
		LDF	94.66	--	16.78	5.00	2.00	--
		HWF	84.44	--	7.65	2.00	--	--
1956	1955	WP	154.16	38.42	62.73	40.75	8.00	--
		ES	98.97	--	22.92	8.50	2.50	--
		LDF	99.39	--	21.59	8.25	--	--
		HWF	87.11	--	10.42	4.00	--	--
1959	1958	WP	119.45	36.47	37.19	27.25	8.00	108.22
		ES	89.83	--	16.32	7.50	2.50	81.49
		LDF	83.03	--	12.05	3.80	--	71.45
		HWF	72.75	--	3.00	2.25	--	64.47 (low) 70.92 (high)
1962	Fourth quarter 1961 and low quartile)[4]	WP	110.31	34.95[5]	34.39	25.00	8.00	104.13
		ES	81.12	--	10.56	6.60	2.50	78.92
		LDF	72.11	--	2.76	3.45	--	71.96
		HWF	62.74	--	-7.24	2.25	--	71.26

[1]WP = white pine; ES = Engelmann spruce; LDF = larch, Douglas-fir; and HWF = hemlock, white fir.
[2]Knutson-Vandenberg Act deposits for timber sale area betterment (to cover planting and seeding costs).
[3]-- = not applicable or not available.
[4]Fourth quarter 1961 for white pine and hemlock-white fir; low quartile for spruce and larch-Douglas-fir.
[5]Note decrease in costs of logging from 1953 to 1962.

Source: Washington National Records Center, Suitland, Md., Records of the Forest Service, Division of Timber Management, reappraisal reports.

sources. In 1947, minimum diameters for required utilization were reduced from 14 inches to 12 inches for white pine; from 18 inches to 14 inches for spruce; and from 22 inches to 14 inches for larch, Douglas-fir, hemlock and white fir. The expiration date was extended from 1949 to 1953, but additional extensions were required until the cutting was finally completed in 1963.

A provision for quarterly stumpage rate escalation was included in the contract with the 1959 reappraisal. It included "high-low base indices" for white fir and hemlock. Under this system,

the white fir and hemlock had been appraised below the minimum rate of $2.25. The deficit amounted to $6.45 per M; therefore, $6.45 was added to the base index of $64.47 for the species to make $70.92 the "high-base index." This procedure meant that the $2.25 stumpage would be frozen until the white fir index exceeded $70.92.

The final reappraisal in 1962 followed revised practices for deficit sales. Road costs were amortized over a volume less than the total, and stumpage was to be increased when unamortized balances were amortized. High-low base indexes were abandoned, but "road amortization rate deficits" were substituted. This provision established a procedure for writing off any deficits in the reappraisal that were caused by road costs, before any increase in stumpage paid could take effect.

The 1962 reappraisal also used the "quartile" procedure for estimating lumber selling values. It used a lumber price higher than the bottom of the market, which had occurred in 1960-61, with compensating profit ratio adjustments. The purchaser appealed the rates, but the appeal was later dropped when it was clear that the established rates were the base rates for the contract.

The high-low base index, road deficit, and quartile procedures were all abandoned by the Forest Service about the time of the Worrell Committee review in late 1962, too late to be of influence in the Keeler Creek case. Most Forest Service appraisers, and perhaps the Worrell Committee, too, believed that the procedures had not been unjust, but that their complexity had led to misunderstandings.

The Keeler Creek sale is notable for the cross-section of Forest Service reviewers who were involved in the reappraisals during its 22-year term. Julian Rothery reviewed the original appraisal and the 1944 and 1947 reappraisals at the national level; Philip Neff reviewed them at the Regional level. Burnett H. Payne (Washington) and Paul Logan (Region) reviewed the 1950 reappraisal. In 1953 and 1956, the reviewers were A. W. Sump (Washington) and M. D. Oaks, R. A. Smart, and Herbert Flodberg (Region). In 1959, Thomas Glazebrook (Washington) and M. D. Oaks and Russell Lockhart (Region) made the review. The final reappraisal in 1962 was the responsibility of Alfred A. Wiener (Washington) and Herbert Flodberg (Region).

These seven reappraisals span the World War II period and its aftermath, and illustrate the cost and price trends during that era. (See table 11.)

Region 2--Central Rocky Mountains

The New Mexico Lumber Co. Affair

In 1909, Gifford Pinchot's last year as Chief Forester, an event occurred that must have had a profound influence on people whose duties included timber sales and appraisals. Known within the Forest Service as "the New Mexico Lumber Company affair" or "the Burch case," the situation developed innocently enough.

That year, Gifford Pinchot wrote to his Regional Foresters, urging them to take action to increase receipts from the National Forests:

> At present, much more timber is rotting in the woods each year than is being cut. I want you to set vigorously to work upon plans for greatly increasing the timber sales business of your district....I want you to strain a point to get it done well, both in quantity and in manner of cutting...[16]

In a later letter, he added to this sentence: "but not...at the expense of future growth....."[17]

The Forest Service took Pinchot's directive to heart. On May 19, 1909, S. L. Moore appraised a 12-million-foot Coyote Park and Spillers Canyon sale on the San Juan Forest for New Mexico Lumber Co., the applicant. The appraisal included a lumber selling price of $18 per MBF, the mill run average at Denver. The stump-to-pond costs were typical of the times:

	Cost per MBF	
Felling	$0.90	
Skidding	.50	
Brush disposal	.30	
Wagon haul to railroad	2.00	(3 trips per day)
Loading on cars	.30	
Railroad haul to mill	2.50	
Total stump-to-pond	6.50	(at Edith, NM)
Manufacturing	2.50	
Lumber haul:		
Edith to Lumberton	.20	(6 miles)
Lumberton to Denver	4.50	

After a profit margin of $2.30, the residual stumpage price was $2--the recommended stumpage.[18] Five days after the appraisal date, Edward Earl Carter confirmed a telegram from Assistant Forester William T. Cox to Region 2 Forester Riley that said simply: "Moore's prices approved."

Reflecting the urgency of Pinchot's circular, Carter wrote: "The point is...that we must make sales at once and we have great confidence in Moore's judgment."[19]

Carter no doubt was constrained to write a special letter on this point, because he had written to Riley early in May to warn him not to approve any application from New Mexico Lumber Co. "until cases against McGinnity and Biggs had been settled." Biggs, the president of New Mexico Lumber, had been indicted for stealing Government timber.

Carter's uneasiness was later confirmed when he instructed Riley to "withdraw authorization." Biggs was sentenced to jail, but pardoned.[20] By October 5, Gifford Pinchot, himself, was writing to Riley that, at Department of Justice request: "this timber is not for sale at the present time for any price."[21] Action was thus suspended until completion of the Justice Department civil suit.

This was the situation when M. C. Burch, Special Assistant to the Attorney General, entered the scene in 1910. Burch wrote:

> It has been brought to my attention that a tentative arrangement had been arrived at between [Region 2 and]... the New Mexico Lumber Co. and Pagosa Lumber Co...both defendants...in 3 suits [over approximately] 180 million feet of timber illegally cut.

The stumpage price was $2 per M feet, and Burch minced no words in expressing his displeasure:

> With this preface, we find substantially that the timber in question is of fair quality and would be of desirable ownership to any lumberman...; that the close monopoly established by these companies... has mainly prevented others from bidding...; that having created such monopolies these companies [try to] impress upon the officials of the Government its dependence upon them for the disposal of such timber to save great waste if not total loss; that...they cannot make what they call a reasonable profit at a greater price than $2.00 or $2.50..., the Government should reduce its minimum figure for that sale. Strong statements, tantamount to threats [are made] that they will pull their mills, railroads, and camps unless we accede to their terms in price. It seems to us that the Forest Reserve people are perhaps unwittingly ministering to these unhealthful and improper conditions...to practically prohibit ordinary competition in bidding....We amply justify the above...in this way: That our recovery in the suit...will depend on the price for which this timber is sold....On this very Reserve [San Juan], I am informed that the uniform basis of sale has been $3.50 per M. As recently as [today] a sale was made (in the area) of 980 thousand feet at $3.50 per M....[N]ot long since in the immediate vicinity ...the State of Colorado [sold a sale] for $6.00.[22]

Meanwhile, Cox, who had telegraphed the quick approval of the $2 rates a year earlier, was having second thoughts. He wrote to Riley: "The impression I gather by reading the report without knowing the whole of the situation is that it conveys such a criticism of our methods...as to deserve a full investigation and answer."[23]

The timber sale proved, in the end, to be completely star-crossed. After Cox left the Service in May 1911 to become State Forester of Minnesota and was replaced by William B. Greeley, it came up again. With grudging approval from the Justice Department, it was advertised at $2.50. No bids were received, and the sale was dropped.

The trespass cases involving the Justice Department were on the Jemez Indian Reservation and the present Carson National Forest in Region 3. The San Juan sale was across the Colorado-New Mexico State line in Region 2. Being somewhat more accessible, Region 3 timber sales were being appraised higher than Region 2 sales at the time. In this particular area, however, there was little, if any, difference between timber appraisals and accessibility in the two Regions.

The New Mexico Lumber case thus demonstrated clearly the need for standard appraisal instructions. It may, in fact, have provided the final impetus for preparation of the first national appraisal manual.

Region 2's lack of formal appraisals had caused concern not only within the Region, but in the Washington Office as well. Assistant Forester Cox wrote to Region 2 Forester Smith Riley about the problem:

> I wish you would write a circular letter to all supervisors in your District emphasizing...that minimum rates must not be used as an arbitrary basis for determining the value of timber. Most of the timber sold should, of course, bring prices considerably over the minimum set for that Forest....When timber is sold for less than the minimum, of course, the Supervisor must state very fully why this is done.[24]

By the next spring, the matter had not yet been resolved. Carter, who succeeded Cox as Assistant Forester, wrote to Riley that fixing minimum stumpage was no longer necessary or desirable:

> When the practice was begun in 1907 it was necessary on account of the great discrepancy between the prices paid on neighboring forests for the same classes of material, when sometimes the only reason for the difference was the personal characteristics of the supervisors.[25]

By 1910, the situation had changed. Carter's instructions were to do away with minimum rates, but to maintain for each Forest "a schedule of standard prices for sawtimber of average accessibility...or cordwood."[26]

Region 2 and the 1914 Manual

Region 2 made at least two concrete contributions to the first national appraisal manual. When it was published in 1914, the manual contained several sample appraisals based on actual cases. Two such cases were the September 15, 1913, Carbon Timber Co. sale on the Bighorn National Forest; the other, the January 7, 1914 Fox Park unit sale on the Medicine Bow National Forest.[27]

A 1914 circular by Greeley highlights one of the important topics of debate before publication of the 1914 manual--the relative merits of the investment, operating, and overturn methods of appraisal. Greeley suggested using either of the first two methods. In case he were overruled, however, he also recommended that if the overturn method were retained, interest should not be included in the operating costs figured in the overturn; otherwise, there would be a profit on profit.

An appraisal of this period shows the difference between two of these methods. An appraisal of the 46-million-foot Fox Park Lumber Co. sale of June 15, 1914, showed an appraised value of minus 76 cents per M by the investment method and a minus $2.15 per M by the overturn method.[28] The difference was in the "normal" 30 percent profit margin used by the two methods. Had the appraiser recognized that a lower profit margin--perhaps 20 percent--was appropriate under the overturn method, the difference between the two appraisals and appraisal methods would have disappeared.

Even after publication of the 1914 appraisal manual, the Washington Office had reservations about Region 2 appraisals. In 1915, Assistant Forester Greeley wrote a sharp letter to Regional Forester Smith Riley on the subject:

> It is absolutely essential that the appraisal report representing the best judgments of the appraiser on the various items entering into the calculations be not altered or 'jiggled'....The record must contain an absolutely uninfluenced statement of what the stumpage is worth in accordance with the appraisal methods of the Service and judgment of the appraising officer, regardlesss of what may be offered....It is understood that the appraisal and the recommended price are entirely distinct. They may or may not be the same...when his final determination of value of the timber is made, that should stand in the record unchanged, and the reasons for adopting a different figure set forth in supplemental papers....A procedure for such cases is definitely provided on page 11 of the appraisal instructions.[29]

The 1914 Fox Park Lumber Co. appraisal showed a slim profit margin that was typical of Region 2 at the time. Fourteen years later, the situation was not much changed. In 1928, an appraisal of 42 MM board feet on the Upper Douglas Creek unit was $1 per M for sawtimber and 9 cents per tie for 860,000 hewed ties.[30] At a conversion factor of 30 ties per MBF, the stumpage for ties was appraised at $2.70 per M. These were evidently either minimum prices or the appraiser's judgment, because the appraised price--using 25 percent of costs as the profit margin--came out minus 2 cents per tie. Despite this discouraging figure, the sale was bought June 29, 1928, by Wyoming Timber Co. (successor to Carbon Timber Co.), which was perhaps willing to accept a profit of less than the 25 percent of costs used in the appraisal (assuming that the figures of 92 cents per tie selling price and 75 cents per tie costs were correct). If the company figured profit at 10 percent of costs rather than 25 percent, stumpage would have been 9 cents per tie--the company's bid--rather than minus 2 cents per tie.

This sale was not particularly large by standards of the day. Table 12 shows major early sales in Region 2, all of them considerably larger than the 1928 Wyoming Timber Co. sale, and all in Wyoming.

Carbon Timber Co. Problems

The Carbon Timber Co. figured prominently in a confidential memorandum to the Chief Forester in late 1914. Forest examiner J. H. Potts reported that the company had begun buying Government timber in 1906 on the Medicine Bow (then Cheyenne) Reserve and had been involved in trespasses that year and the next. Since 1907, the company had bought several sales, but by 1914 was believed to be in imminent danger of bankruptcy. It was not known whether the company's precarious financial position was because of its Government stumpage, private stumpage supply, or loss of markets.[31]

Railroad tie sales, and particularly those bought by Carbon Timber Co., gave Region 2 appraisers many problems in the early days, especially in Wyoming lodgepole pine. The 165-million board foot Douglas Creek sale of May 2, 1906, predated the formation of Regions (Districts). After going bankrupt in 1915 or 1916, Carbon Timber's assets were taken over by creditors, who formed the Wyoming Timber Co., which operated during World War I and after.

Carbon Timber Co. was one of the first to settle Forest Service damage claims made against performance bonds: for failure to complete cutting, failure to perform satisfactory slash piling and burning, and failure to repair damaged fences. Two 1913 sales on the Hayden National Forest were involved. (The Hayden was divided between the Routt and Medicine Bow in 1929.)

Christopher M. Granger, Assistant Regional Forester, in a memorandum to the record dated August 2, 1917, hints at the frustrations felt by the Forest Service about the company's successor. He wrote that the January 5, 1917, White Swan

Table 12.--Major early timber sales, Region 2, 1908-28

Purchaser	Sale Name	Forest (all in Wyoming)	Date	Advertised Size
				MMBF
Bighorn Timber Co.	South Fork Tongue River	Bighorn	Dec. 19, 1908	100
Webster Brothers	Tensleep Unit	Bighorn	Apr. 13, 1928	73
Wyoming Timber Co.[1]	--[2]	Medicine Bow	Dec. 20, 1917	97
Wyoming Timber Co.[1]	--[2]	Medicine Bow	Aug. 2, 1919	110
Wind River Timber Co.[3]	Warm Springs	Bonneville[4]	Aug. 23, 1912	125

[1]Formerly Carbon Timber Co.
[2]-- = not applicable or not available.
[3]Name of company changed to Wyoming Tie and Timber Co. (of Riverton) in 1916.
[4]Became part of Washakie in 1916; Washakie became part of Shoshone in 1945.

Source: National Archives, Record Group 95, Records of the Forest Service, Division of Timber Management.

sale (51,000 ties at 11½ cents) was not taken in Wyoming Timber's own name, but in the name of three tie hacks:

> Active supervision was left to Victor Strandquist, an ex-saloon keeper whom the forest officers report spent most of his time playing 'Sluff,' instead of getting out and looking after the operations.[32]

This, as might have been expected, resulted in many marked trees being left and in unacceptable brush piling. The bad habits of Carbon Timber Co. were being maintained by the new company.

In 1918, P. J. Quealy, president of Wyoming Timber Co., showed that the feeling was mutual. He went political, enlisting the aid of Senator John P. Kendrick of Wyoming on an appraised price problem.

Quealy objected to a 15-cent per tie stumpage price for the proposed Sourdough unit sale. He argued that, while it was true that the Union Pacific Railroad had raised the price it paid for ties, it was also a fact that costs had gone up just as much.

Albert F. Potter, Acting Chief Forester, wrote to the Regional Forester on December 31, 1918, suggesting that "while no discredit was intended to Mr. Hutton, the appraiser, we [believe we] should advertise at 12¢." Among the reasons, it was mentioned that there were some maximum prices of ties to contend with. Maximums were set by the Railroad Administration in a form of World War I price controls. A review by E. E. Carter said: "If the maximum prices are applied, selling value is reduced from 89¢ to 83.4¢ per tie." Clinton G. Smith, Carter's assistant, on the other hand, defended the appraiser's recommendation in a December 2, 1918, letter to the Chief Forester. Smith noted that there really was no hurry to process the case, because it was common knowledge that the company preferred to do winter cutting on private lands in the locality. There was no requirement to cut short stumps (no higher than 14 inches) on the private lands, but there was such a requirement on the National Forest.[33]

Region 3--Southwest

The Sitgreaves Sale

Two early sales in Region 3 were noteworthy in the annals of the Forest Service. The first was a major sale on the Sitgreaves National Forest in central Arizona. The second involved one of the Region's early "problem customers."

In 1909, Eugene S. Bruce, Expert Lumberman, first broached a plan for sale on the White Mountain unit of the Sitgreaves National Forest. The promoters wanted 400 MM board feet at $2 per M to justify construction of 60 miles of railroad from Holbrook to Bear Springs, Ariz. Bruce recommended 200 MM--100 MM near Pinedale and 100 MM near Heber Wash--at $2.50. Chief Forester Pinchot's handwritten response on Bruce's memo was: "I am in thorough accord with you."[34]

On April 1, 1911, Navaho Lumber & Timber Co. won a contract for 300 MM board feet at the suggested price of $2.50 per M. The date--April Fool's Day--was prophetic. The contract was never executed.[35] Two years later the company reapplied and the offer was accepted, but once

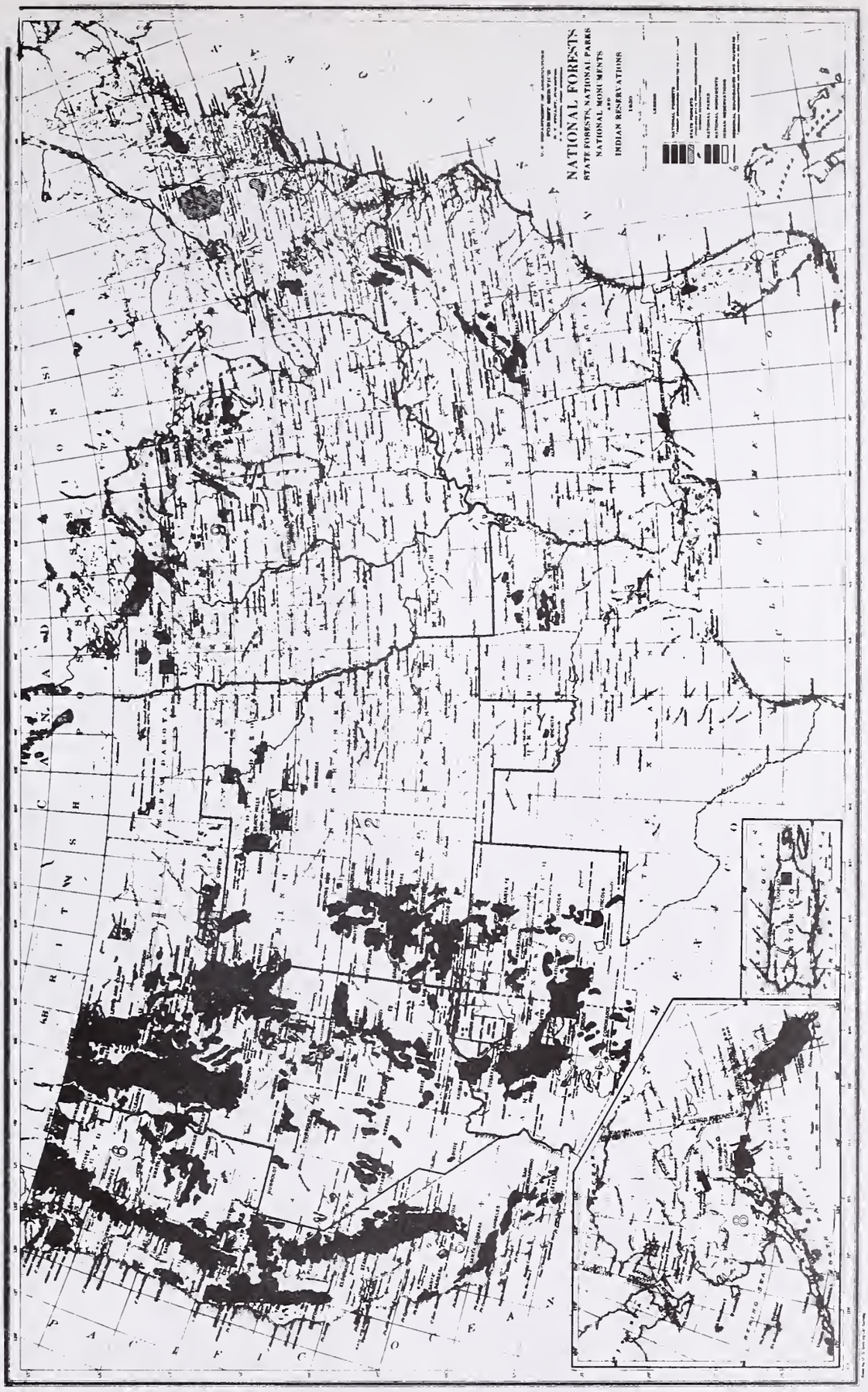


Figure 4.--National Forests, State Forests, National Parks, National Monuments, and Indian Reservations as of May 1, 1930. The Forest Service had just separated the Midwestern States from the Eastern and Southern States to form its North Central Region (9).

(Forest Service and Geological Survey)

again the deal was not completed.[36] The sale was finally consummated in 1917 when Apache Lumber Co. bought 235 MM board feet at $2.25 and an additional 400 MM board feet of Fort Apache Indian Reservation timber in the area, making the arrangement a joint sale.

The company proceeded to cut on its sale. Meanwhile, the 1921 market slump had hit Navaho Lumber. The company had been taken over by a securities company and then resold for $3 million to Cady Lumber Co. of McNary, La. In 1924, Cady Lumber closed the original Navaho Lumber sale and proceeded where Apache Lumber had left off.

By 1924, when the sale changed hands, Forest Inspector Quincy Randles' reappraisal showed that Apache Lumber had cut 17 MM board feet of Forest Service timber and 50 MM board feet of Indian timber, had built 74 miles of railroad, and had built a three-band electric sawmill.[37] The company had also erected the town of Cooley, Ariz., site of the 1922 timber sale conference. When Cady Lumber Corp. took over the sale in 1924, it changed the name of Cooley to McNary, after the company's vice president, James G. McNary.

The optimism shown in the change of the town's name was not borne out by later events. By 1934, when the cutting was completed, the company was in receivership. It had, however, managed to operate through the worst years of the Depression, when most other mills in the Southwest had been forced to close. From 1924 to 1934, Cady Lumber Corp. operated through three reappraisals with no change in the original contract price of $2.50 per M board feet.

This sale, which passed through several hands and reappraisals in its long history, was described by Joseph A. Fitzwater, E. E. Carter's assistant, in the Service Bulletin in 1934 as "one of the largest and most interesting timber sales ever made from the National Forests,"[38] and as "one of the few sales of this size in the Forest Service which have been brought to a successful completion without serious modification of the initial prescription."[39]

Tusayan (Saginaw & Manistee)

The same year that Navaho Lumber & Timber Co. first applied for the Sitgreaves National Forest sale, Saginaw & Manistee Lumber Co. applied for a 75-million-foot sale on the Tusayan, now the South Kaibab, National Forest in northern Arizona. Saginaw & Manistee caused Region 3 considerable problems in the early years over appraised prices. Early appraisals in Region 3, like those in other Regions, were influenced by minimum rates, a practice that did not please Assistant Forester Greeley. A proposed sale to Saginaw & Manistee prompted Greeley to make the following suggestions to Regional Forester Arthur C. Ringland:

> It will be advisable...,in making further stumpage appraisals on the Colorado Plateau, [to ignore] the precedent of $3.50 as the established rate for that portion of the district, and determine the price for each block on its own merits, based on a close calculation of grades, logging costs, and other factors which affect the stumpage price....I think it advisable to use an operating profit of 15% in the appraisals on the Colorado Plateau. As nearly as can be ascertained, this is consistent with the stumpage prices of $3.50 previously charged, for the more accessible timber....I will be glad to have you recheck the cost estimates and stumpage appraisal in the proposed sale to the Saginaw & Manistee Lbr. Co. in accord with the foregoing....[40]

Greeley asked that, in reappraising the proposed sale, Ringland particularly consider factors such as mill overrun, interest and depreciation, interest on mill inventories, insurance, and taxes.

To help Region 3 carry out his instructions, Greeley arranged for Ringland's staff to borrow Dorr Skeels from Region 1. Ringland did not altogether appreciate Greeley's gesture, as seen in a 1913 memo in which he complained that "Mr. Skeels' appraisals will, if accepted, upset the stumpage rates...."[41] Ringland was also worried that the Panama Canal would depress lumber prices by creating competition from waterborne lumber from the Pacific Coast.

The Regional Forester's concern over appraisals, if not over the Panama Canal, must have abated. He later told Greeley that after Skeels finished his current appraisals, he wanted Skeels to remain and reappraise the first Navaho Lumber & Timber Co. application of April 1, 1911.[42]

One of the sales Skeels appraised while on loan to Region 3 was the Tusayan National Forest sale to troublesome Saginaw & Manistee. The July 2, 1911, sale was approved only after lengthy negotiations over marking rules. After that problem was resolved, the sale was cruised and appraised as follows:[43]

Selling value	$18.00
Logging cost	5.50
Milling cost	5.60
Profit margin	3.40
Stumpage	3.50

The contract on this sale was notable in that it included conversion factors for railroad ties, a controversial issue before conversion factors were adopted formally:

> 7 in. by 9 in. by 8 ft. ties, equivalent to 25 ties per MBF
>
> 8 in. by 7 in. by 8 ft. ties, equivalent to 27 ties per MBF

8 in. by 6 in. by 8 ft. ties, equivalent to 50 ties per MBF

6 in. by 6 in. by 8 ft. ties, equivalent to 50 ties per MBF.

The following year the appraisal was revised by Athol Wynne to $3 per M board feet. About this time, Acting Regional Forester Alpheus O. Waha wrote a plaintive memo to the Chief Forester: "An attempt was made to figure the stumpage value according to the Timber Sale Manual, Page 39, paragraph 4, but couldn't, due to investment in intermingled private timber."[44]

Once again, with help from Skeels, the appraisal was revised. In 1913, the sale was advertised at an appraised value of $2.50 per M board feet, but it failed to sell. Finally, in early 1916, Quincy Randles developed an appraisal that showed production cost and stumpage differentials for three units.

Again, the sale was advertised, but no bids were received. Unit 1, the best unit, was sold privately to Saginaw & Manistee in early 1917 for $2.70 per M board feet.[45] To guide sale administration, a marking board was convened to set up a sample marking area. The board's sample included 73 percent cut volume and 27 percent leave volume.[46] In September 1917, the company bought the other two units and combined them with unit 1, reducing stumpage to $2.25.[47]

The company proceeded with its cutting for 3 years. Then, in 1920, George M. Humphrey, who had inherited Saginaw & Manistee from his father, asked that an 8-MM-BF segment of the sale be eliminated from the contract as being uneconomic.[48] Supervisor Frank C. W. Pooler refused on the grounds that such an action would be "high-grading." An appraisal by Duncan Lang and Quincy Randles confirmed the costs in the problem area to be $1.16 per M board feet higher than the sale average. Although Humphrey went to Washington, D.C., his threats to carry his complaint to Congress failed to budge the Forest Service from its position.[49]

The matter was resolved shortly thereafter. Early in 1921, Humphrey cabled E. E. Carter: "We have sold our [mill] at Williams," thus closing out the operation.[50]

Only 4 years later, Region 3 made one of its most important long-term sales. In mid-1925, the 25-year Deer Springs sale was made to W. M. Cady Lumber Corp., the same company that finally completed the complicated Navaho Lumber & Timber Co. sale of 1911.

Deer Springs Unit

The Deer Springs unit was first appraised in 1924 by Inspector Quincy Randles. Twenty years later Randles, then Assistant Regional Forester, approved the reappraisal report.[51] The original conception of the transaction included a mill and finishing plant on the Apache Railroad at or near Taylor, Ariz. to be connected with the unit by logging railroad. In 1925, Cady Lumber Corp. bought the timber for $2.75 per M board feet, 25 cents more than the advertised price of $2.50 per M.

The company never built the proposed mill at Taylor, but bought an existing mill at Standard instead, which later closed because of the Depression. During that period, the mill burned, and the company continued operations with two portable sawmills.

An interesting experimental revision of the Deer Springs contract was made in 1939. The purchaser had requested revised marking by an economic selection method, based on a 55 percent mark as worked out in a study by Mason and Bruce called the Rock Top Report.[52] In 1941, the old contract was allowed to expire and was resold to the company, as was the custom then. At that time, the company requested that the revision be dropped and that it return to the old method of a 66 2/3 percent cut under the new contract.

This brief experiment, which the company deemed unsatisfactory, illustrates the pitfalls that arise when economic analysis is used to determine which logs pay their way and which do not. As Julian Rothery often pointed out, economic analysis depended on rational definitions of what "fixed costs" really were and was also subject to extreme variations in market prices of lumber; logs that are considered marginal one year may be merchantable the next, and vice versa.

When the contract expired in 1941 and was resold to the company, the price remained $2.75 per M board feet. When the sale was reappraised in 1944, the appraiser assumed the company would use two semiportable mills and that rough green timber would have to be trucked to Snowflake, Ariz., to be dried and planed.

The appraisal recommended an increase from $2.75 to $3.30 per M board feet.[53]

	1941-43 average	1943 only
Logging costs and 5.5 mile log haul	$8.02	$9.85
Manufacturing (10 percent overrun	5.39	6.44
Rough lumber haul to Snowflake	2.75	3.14
Snowflake expenses (drying, planing, shipping, etc.)	9.98	13.57
Depreciation	1.88	1.88
	28.02	31.74
Selling value (including 10 percent overrun)	36.93	39.99
Conversion return	8.91	8.25

The 1944 contract was modernized and modified in a number of aspects. One of the new clauses was of an experimental nature:

> Sec. 25. Purchaser hereby agrees to furnish each year on January 1 the amount sold and average grade prices f.o.b. mill [for 14 grades of lumber]:
>
> | | | | |
> |---|---|---|---|
> | Clear | #1 shop | #1 common | #1 ties |
> | Select | #2 shop | #2 common | #2 ties |
> | | #3 shop | #3 common | Timbers |
> | | | #4 common | Box |
> | | | #5 common | |

These 14 grades were later to be referred to in the Southwest as "the 14 pure grades," although in retrospect it appears that they were selected as a matter of convenience for reappraisal purposes in 1944.

Also required by contract section 25 were: "Total lumber sold, volume and value; total box lumber sold; total ties and timbers sold; total by-products sold; and inventory volume of each grade of yard and shed stock."

Julian Rothery's May 1, 1944, review of the reappraisal gave one of his rare compliments:

> This reappraisal is complete and well supported throughout. Mr. Lang gives the valuation factor for 4 other sales, and as a recommended price divided the [conversion]of $8.25 [1943 date] into $4.95 profit and risk and $3.30 stumpage, an increase of 55¢ over the present price. All of this is thoroughly set forth, checked and compared, and I believe the recommendation... is sound and proper.[54]

The company did not share Rothery's enthusiasm. On June 16, 1944, it filed an appeal over "the so-called 33 1/3 percent clause, which was abandoned--we had hoped for all time--back in 1933 or 1934."[55] An official of Southwest Lumber Mills, Inc., a descendant of Cady Lumber Corp. claimed:

> It is, more often than not, economically unsound to require a logging operation to waste transportation and manpower on the handling of cull and worthless material ....This proposal would indirectly increase our stumpage costs; therefore, we protest this change.[56]

The appeal was rejected. When the sale was reappraised in 1947, recommended stumpage rose again. The reappraisal was based on averages from the years 1944-46. On the basis of 3-year averages, total costs rose to $34.81 with a selling price of $48.93. Conversion was thus $14.12, and proposed stumpage was $5.65 per M board feet.[57]

In the report to the Chief Forester, the Regional Forester wrote: "Admittedly there is not now and has not been since the removal of price controls a stable lumber price."[58] Nevertheless, H. E. Ochsner, reviewing the report for the chief of Timber Management, recommended approval, despite a hint that the profit ratio of 20.9 percent might be a little high.[59]

Again, the company disagreed. Later its president, James G. McNary, protested to Senator Clinton P. Anderson, who, as Secretary of Agriculture, had been responsible for the Forest Service until May 1948.[60]

This appeal, too, was unsuccessful. The sale was finally completed in 1950.

Region 4--Great Basin

Region 4 has been unique among the Regions from the beginning: It is bounded on all sides by other Regions--Region 1 on the north, Region 2 on the east, Region 3 on the south, and Regions 5 and 6 on the west. Forced to adapt its appraisal methods to the, at first, widely differing methods of its neighbors, Region 4 became an early proponent of standardization. The problems caused by its special position were recognized as early as 1909, when Assistant Chief Forester William T. Cox wrote to the Region 4 Forester: "Although no site has yet been selected for an Experiment Station in your District, I believe one should be established as soon as possible."[61]

An incident several years later highlighted the need for a standard appraisal system, particularly within Region 4. In 1912, a dispute arose between Region 4 and Region 6 when the sample of selling prices and costs collected in each area put the Boise, Payette, Weiser, and Sawtooth Forests in Region 4 at a disadvantage compared to the Whitman Forest across the Snake River to the west in Region 6.

One of Region 4's major species was lodgepole pine, heavily used for railroad ties. An early lodgepole pine sale on the Targhee National Forest resulted in one of the first Forest Service cases requiring performance bonds to mitigate damages. The railroad tie sale, 4 MM board feet to Big Springs Lumber Co., was bid at $3.51 per M in 1910. By the expiration date in 1913, the bidder had gone bankrupt with only 400 M cut.[62]

The railroad tie market was an important factor in sales of Region 4's lodgepole timber. To assist in the creation of a uniform appraisal method for lodgepole pine for various products, Chief Forester Greeley requested a report on the use of railroad ties in the Region. The 1913 report yielded the following information:

Railroad	Ties Used (MM per year)
Denver & Rio Grande	.5
Oregon Short Line	.8
Union Pacific	1.7

At that time, one of the largest producers of railroad ties was Standard Timber Co. of Evanston, Wyo., which had an annual river drive of 200,000 ties and costs as shown:

Contract logging cost per tie	$0.40
Zinc chlorite treatment	.12½
Transportation	.08
Stumpage	.08-.10
Selling value	.73-.94

After reviewing the report and considering the matter, Greeley proposed a solution in a letter to Regions 2 and 4:

> The Forester has decided that the minimum price at Union Pacific delivery points, to be used in appraisals of tie stumpage, shall be 60¢ per tie for all stumpage on the Medicine Bow and Hayden forests in district [region] 2, and 56¢ per tie...on the Ashley, Uinta, Bridger and Wyoming forests in district [region] 4....Higher figures should be used if the actual market...at any time exceeds the rates specified.[63]

The following year, Logging Engineer Daniel F. Seerey made an interesting reappraisal of the Blacks Fork timber sale on the Wasatch National Forest. Seerey estimated outturn as 22 percent sawed ties (7 in. by 8 in. by 8 ft.), 58 percent hewn ties, and 20 percent mine props and arrived at 10 cents per tie as the reappraised price. In Washington, Forest Inspector Robert Y. Stuart, who reappraised the 86-million-foot sale, reported costs of 36.81 cents per tie and 26 cents per mine prop. By the investment method, the return was 25.3 percent; by the overturn method, 20.2 percent.[64]

Around this time, Standard Timber Co. of Evanston, Wyo. was awarded a series of sales in the Blacks Fork area. These sales, in 1913, 1914, 1915, 1917, and 1918, were not entirely separate because of the prevailing practice of canceling partly completed sales and incorporating them into new sales of additional timber.

Moose Creek Plateau Sales

Probably the longest running timber sales in Region 4's extensive lodgepole pine stands were on the Moose Creek area of Targhee National Forest in southeastern Idaho. Logging Engineer Jim Girard made a 1921 timber sale report in which he used measurements of diameter at breast height to divide his estimates into timber appropriate for railroad ties (11 to 16 inches) or sawtimber (more than 16 inches). The tie market of the time considered only trees 11 to 14 inches in diameter to be desirable. Purchasers resisted larger trees until a special rate of 3 cents per tie from larger trees was approved.[65]

Girard's appraisal manufacturing points were: ties to the railroad at Moose Creek crossing, lumber to Idaho Falls, and mine props to Kemmerer, Wyo. The appraisal developed advertised prices of 5 cents per tie, 50 cents per M board feet for sawtimber, and one-fourth cent per lineal foot for mine props. These rates were approved by Forest Supervisor Lyle Watts at the Regional level and by W. B. Greeley at the national level.

On May 9, 1923, Montana & Idaho Co. was awarded the sale on a bid of 8.5 cents per tie. The following conversion factors were used to count material other than sawlogs: railroad ties, 33 1/3 board feet per tie, and mine props, 1 board foot per lineal foot.[66] The bidder's offer thus came to $2.55 per M board feet, a reasonable stumpage for the times.

Four years later, the sale was reappraised using 1926-27 average prices of 85 cents for grade-1 hewed ties, 75 cents for grade-2 hewed ties, and 50 cents for grade-3 hewed ties; sawed ties were all grade 1. After the appraiser took all factors into consideration, the reappraised stumpage came out only 3.7 cents per tie, which was lower than the advertised rate. No change in stumpage was recommended. Only 3 years later the old contract was canceled and a new sale was made on the area at 8.5 cents per tie for the remaining uncut volume, plus additional timber.[67] By 1936, however, Regional Forester Richard H. Rutledge reported that the sale area had supported no operations since 1932, when the railroads had discontinued purchase of ties. Rutledge noted that "the same includes a part of the...Yellowstone insect epidemic on which...all efforts at control have been abandoned."[68] His comment recalled Jim Girard's appraisal report of 15 years earlier in which he has stated that "a large part of the timber is overmature and decadent."[69] In light of the condition of much of the Moose Creek timber and the inactivity in the area, Rutledge recommended cancellation of the contract under the "Depression" Act of April 17, 1935. Acting Chief Forester Joseph A. Fitzwater approved cancellation of the sale.[70]

In his 1921 appraisal report, Girard had written that the Moose Creek Plateau "forms a natural logging...tributary to one river driving point...."[71] Six years later, however, Logging Engineer U. S. Swartz, in his 1927 reappraisal report, wrote that the Moose Creek river drive had proved to be a failure.[72]

Moose Creek Plateau shared its river driving problems with other Rocky Mountain timber sales. Many sales from the Black Fork, for instance, used river drives to transport the timber. The practice had a high degree of risk, as seen in Regional Forester Leon F. Kneipp's 1917 report that "the Blacks Fork drive had approximately 220,000 ties. About 1/3 of the ties went through Granger, and the balance was abandoned between Ft. Bridger and Lyman on Aug. 2."[73] In the early Region 4 sales, companies were forced to brave the risks of river drives in the Rocky Mountains for two reasons. First, the value of the products was not sufficient to carry the long road construction projects needed to gain safe access. Second, the volumes per acre needed to cover fixed road and other costs were even further reduced by the fact that only mid-sized trees were usable for railroad ties, the primary product market; sawmills were not available to

process the larger logs, nor were markets available for the smaller logs.

After the Montana and Idaho sale was canceled in 1936, there was little activity of any sort on the Moose Creek Plateau. By the 1950's, the timber that had been overmature and decadent in 1921 had become even more decadent as trees succumbed to concentrated bark beetle attacks at an estimated rate of 50 million trees per year.[74] The lack of sawmills that had forced use of river drives in earlier years made salvage of the dead and dying timber a serious problem. To alleviate the problem, the Forest Service offered a 318-million-foot sale in 1960 with the stipulation that the successful bidder build either a sawmill or a pulpmill. The lodgepole pine was appraised at $6 per M board feet; however, the Washington Office reviewers wrote that "the economic facts of life are that this sale is too small and...too short to amortize" a pulpmill.[75] The high bidder for the sale evidently agreed. Idaho Stud Mill, Inc.--later Hines Lumber Co.--bid $13.70 per M, more than double the advertised price, plus $1.40 per M cooperative slash disposal deposit. At least 60 MM board feet had to be paid for at the bid rate before reappraised prices, if lower, could prevail.

The first reappraisal in 1965 reported mixed progress. Only 4.8 MM board feet had been cut, but a new sawmill had been built at St. Anthony, Idaho. The stumpage price was reduced to $3 per M, subject to the cutting of 60 MM board feet at not-less-than-bid rates. The reappraised rate never took effect because the required cut was not achieved until the 1974 reappraisal.

The changes in selling prices, costs, and overruns shown in table 13 highlight the dramatic changes in markets, costs, and efficiency since the 1960's. When he approved the rates in 1971, the Chief Forester wrote to the Regional Forester about the need to revise the reappraisal: "The amount of the change indicates that major errors were detected in the review. It appears that controls [on your part] may be needed to avoid such occurrences in the future."[76]

The most dramatic change occurred in the slash disposal deposits and was caused by the heavy losses from insect-killed trees. Although these trees were rotting to the stage of being unusable, they had to be piled and burned to reduce fire hazard and prepare the site for replanting.

Region 5--California

As early as 1909, the Washington Office was paying particular attention to Region 5, and to the need for scientific information about timber. Assistant Chief Forester William T. Cox expressed his concern with reforestation there: "I am exceedingly anxious, and I am sure Mr. Pinchot is also, that experimental planting in District 5 receives a good deal of thought and attention."[77]

Only 2 years later, several large sales alerted appraisers to the need for accurate cost and price data and demonstrated the urgent need for a standard appraisal method.

One of the first early large sales in Region 5 was the Pacific Power & Light Co. sale of November 4, 1911, a 230-million-board-foot sale advertised at $3 per M board feet for sugar pine, $2.75 for yellow (ponderosa) pine, and $1 for incense cedar and true firs. This contract on revised form 202 contained a new clause requiring that books be open to inspection by Forest Service officials.[78] The Chief Forester's annual report for that year noted a particularly large sale during the same month, the Sierra Sugar Pine Co. sale for 800 MM board feet of timber. This was a sale by amount, meaning that a volume of 800 MM board feet was virtually guaranteed.[79] The more usual sale volume was described as "more or less [than the estimate] as shall be determined by actual scale."[80]

Eastern Redwood Lumber (M. A. Burns) Sale

Closing out a big year in Region 5 was the 182-million-foot Eastern Redwood Lumber Co. sale of December 11, 1911, on the Shasta National Forest. Regional Forester Coert DuBois wrote of this sale, also known as the M. A. Burns sale:

> [In California]...No. 2 common is the lowest grade recognized as marketable. Orders for carload or cargo lots of lumber, mill run, contain no No. 3 common, and not over 15% of No. 2 common....No 3 common is synonymous with what is known as 'mill cull'... and sells for $4 to $5 per M.[81]

The initial rates recommended by Forest Examiner Swift Berry on this sale had been sugar pine, $3.50; yellow pine, $2.50; Douglas-fir and red fir, $1.50; and white fir, $1. Later, DuBois recommended increasing logging costs from $8.91 to $10.28, with a corresponding decrease in stumpage value to $2.75 for pine and 50 cents for white fir.

By 1916, however, DuBois conceded that his revision of Berry's appraisal of the M. A. Burns sale had been in error:

> [In 1911] the Service was just starting its inquiry into scientific methods of sale appraisal. In fact, it was this very sale that started District 5's thinking on the subject. If in 1911 we had perfected our practice of stumpage appraisal to where it is now, and had applied it to this timber, the prices would have been about what Berry recommended.[82]

In 1916, Berry reported that only 8 MM board feet had been cut on the 182-million-foot sale. He recommended that the old contract be canceled and a new one issued at rates more closely resembling those he had originally recommended: $3 for sugar

Table 13.--Moose Creek Plateau timber sale reappraisals, Targhee National Forest (Idaho), Region 4 1965-77

	1965	1968	1971	Revised 1971	1974	Revised 1974	1977	Revised 1977
Volume cut to reappraisal date	5 MMBF	10 MMBF	30 MMBF	--[1]	68 MMBF[2]	--	111 MMBF[2]	--
Selling value (dollars)	58.89	76.78	98.86	98.86	161.87	--	263.32	--
Overrun used (percent)	11	21	20	--	40	--	64	--
Milling cost (dollars)	28.70	27.21	31.39	31.39	48.02	--	86.71	--
Logging cost (dollars)	32.98	38.88	46.24	48.71	78.84	--	129.22	134.03
Conversion (dollars)	-2.79	10.69	21.23	15.12	35.01	--	47.39	42.28
Stumpage indicated (dollars)	--	1.86	11.44	5.33	15.10	--	17.11	12.20
Base index (dollars)	--	--	--	--	--	--	162.42	162.42
Stumpage price (dollars)	3.00[3]	3.00[3]	11.44	5.33	15.10	14.81[4]	17.11	12.20[5]
Normal profit ratio (percent)	12	13	11	11	14	--	13	13

[1]-- = not applicable or not available.
[2]Exceeds required cut at bid rates.
[3]Base rate.
[4]Plus $4.17 slash disposal deposit. An emergency appraisal in the 1975 recession reduced stumpage to $3 per MBF but raised slash deposits to $10.05.
[5]Plus $14.76 slash disposal deposit.

Source: Washington National Records Center, Records of the Forest Service, Division of Timber Mangement.

pine, $2.40 for yellow pine, $1 for Douglas-fir. He also recommended that the stumpage value for white fir remain at 50 cents and that the minimum log top diameter be increased from 8 inches to 10 inches.[83]

Fresno Flume & Lumber Co. Sale

In contrast to the M. A. Burns sale, which was reappraised at a decreased stumpage value that was eventually raised, the Fresno Flume & Lumber Co. reappraisal increased the stumpage price. The changes in both reappraisals, however, were made by the reviewer of the reappraisal report, rather than by the actual appraiser.

The Fresno reappraisal, the result of the company's application for an extension on a December 7, 1910, sale, showed operating costs of $12.21, selling value of $19.06, and depreciation and profit of $4.61. The appraised stumpage value reflected 1910 price levels: sugar pine, $3.75; yellow pine, $2.50; white fir, 90 cents; and cedar, $1.20.[84]

Austin Cary, then the logging engineer in the Washington Office, reviewed this reappraisal. Based on his judgment that the profit margin was too high, he recommended raising the stumpage for the first three types of timber to $4, $3, and $1, respectively.[85] In early 1914, Chief Forester Henry Graves instructed the Regional Forester to change the prices to Cary's suggested rates, but to "let the original stand if you have already notified the company."[86] The original rates applied, because the company had already been notified of them.

The Swift Berry Appraisal Handbook

At about this time, Swift Berry prepared a stumpage appraisal handbook for Region 5 that preceded the Forest Service's 1914 Timber Appraisal Manual by a year. This 1913 publication listed two appraisal formulas. The first, "percent of operating cost" or the "forester's formula," was essentially the profit ratio formula in use today. The second, the "Hunter formula," used investment costs and sinking fund interest factors.

Berry's handbook is of interest historically for the record it provides of prices and practices of the day:

	Crew cost per day
2 fallers @ $2.75 per day	$ 5.50
2 limbers @ $2.00 per day	4.00
3 buckers @ $2.25 per day	6.75
1/2 foreman @ $5.00 per day	2.50
Board at camp	5.25
Total	$24.00

Production @ 30 M = $0.80 cost per M

Berry also recorded the costs of yarding for Big Wheels on timber averaging 1-3/4 logs per M:

	Crew cost per day
2 bunching teamsters @ $3.00	$ 6.00
2 hookers @ $2.50	5.00
2 knotters @ $2.25	4.50
2 gophers @ $2.30	4.60
4 loaders @ $2.70	10.80
1 snatch teamster @ $2.70	2.70
7 wheel teamsters @ $2.70	18.90
1 barn man @ $2.50	2.50
2 road monkeys @ $2.25	4.50
20 horses @ $1.25	25.00
Total	84.50

Production @120 M = $0.70 cost per M

Plus:

	Cost per M
Tools	$ 0.08
Maintenance	.15
Swamping	.32
Total	1.25

In the years after Berry wrote his manual and the Forest Service published its own, appraisals became more uniform and sophisticated. A 597-million-foot sale on the Willow Creek unit in 1921 shows the following appraisal factors:

> Logging cost = $9.22 per M, including $3.15 for railroad operation and maintenance, and $7.70 milling cost (3% overrun). Profit and risk = 18% of mill and logging investments, plus 10% of railroad costs, plus 6% of working capital.

The stumpage was appraised at $4.25 for sugar pine, $3 for yellow pine, and $1.50 for fir and cedar, making the average stumpage value $3.11 per M board feet. The profit margin was $5.70 per M, for a valuation factor of $3.11/$8.71, or 36 percent.[87]

In 1932, the contract was modified to provide for minimum log sizes of 20 inches and 200 board feet for pine and 28 inches and 500 board feet for true firs. These large minimum-sized logs were based on an analysis of marginal log size and recommendations by David T. Mason, a former Forest Service officer with Region 1, who by then was a partner in the consulting firm of Mason & Stevens.[88] Going into the Depression, the marginal log size analysis became an emergency procedure. It caused difficulties in later years and was eventually abandoned, even in Region 5, where it originated. The problems with the procedure were the difficulty of identifying fixed elements in the various cost centers and the complications that arose from certain costs being fixed if timber supplies were unlimited, but not if supplies were limited.

The Granite Basin Sale

The Granite Basin timber sale on the Plumas National Forest in 1922 spanned a long period in Region 5 appraisal history. Originally appraised in 1916, the tract was reappraised in 1921.[89] The following year, it was appraised at $1.49 by the investment method and $2.02 by the overturn method, but it was advertised at $2.14 and sold at that price to Swayne Lumber Co. The company began as a bandmill in 1908 owned by Truckee Lumber Co. Bankrupt in 1916, the mill was bought by Swayne and moved to Oroville, Calif.

A 1925 reappraisal recommended no change in rates, as did later reappraisals in 1928 and 1932. At the time of the 1932 reappraisal, 67 MM board feet had been cut; 76 MM feet remained uncut.

The 1932 reappraisal was based on the previous 3-year average costs and prices, as had been the previous reappraisals, but it went one step farther. It computed "economic" minimum diameters. The utilization clause was revised to 18 inches for pine and 30 inches for white and red fir. Despite the large minimum log size, a 1935 reappraisal reported that there had been no cutting since 1932. The appraiser recommended decreasing the minimum log size to 18 inches for true firs and 10 inches for pines and other species.[90]

On January 6, 1936, Swayne Lumber Co. aplied for cancellation of the contract under Public Law 38. Ten days later, the company purchased a new sale composed of the remainder of its 1922 sale and an additional 109 MM board feet in Bear Gulch. The new sale was at reduced rates averaging $2.07 per M and increased minimum log sizes of 30 inches for white fir and 14 inches for pines and other species.[91]

Later Julian Rothery expressed irritation at the Region 5 procedure of shifting appraisals based on changed minimum utilization standards. Early in 1945, he wrote to Ira J. Mason, director of Timber Management:

> A careful reading of many R-5 appraisals, both those relating to National Forest timber and to private timber offered in exchanges...leads me to believe that the Region has...drifted into routine or perfunctory computations, often voluminous, but which to my mind...fail to get the relevant facts or present them clearly or convincingly as an approach to market value.[92]

Previously, Rothery had taken issue with the Region 5 analyses that caused very large white fir logs--28 to 30 inches in diameter--to be considered uneconomic, removable only at the option of the purchaser. In connection with an appraisal for a large sale on the Plumas National Forest, he wrote:

> We must differentiate between true negative value material and material

> which has what I call a marginal... value, or value on a byproduct basis. True negative value material has insufficient margin of conversion to make any return on the fixed investments and working capital... [Any] by-product material which will return the direct operating variable costs...plus any substantial amount toward the fixed costs...or to profit and risk, has in reality a value... because the total net return will be greater than if the material is left.[93]

This principle is much more persuasive when timber is in short supply than when it is not, as in pioneer times, when handling marginal material merely slowed the processing of the higher quality material that was readily available elsewhere.

Rothery defined three categories of fixed costs: fixed-per-acre costs, such as roads; fixed-per-year costs, such as insurance, taxes, and many other general expenses; and fixed-capital costs, such as plant and depreciation. His main criticism of the Region 5 policy was that it took into account only the fixed-per-acre costs and ignored the fixed-per-year and fixed-capital costs.

Region 6--Oregon and Washington

Despite its current pre-eminence in timber sales--almost half of all Forest Service volume sold today--Region 6 made a slow start in the timber harvesting business. Only a few sales were made before 1905, during the General Land Office era. The San Francisco earthquake and fire created the first big run on timber in Oregon and Washington, but mostly on private timber holdings. Sailing ships carried lumber from Puget Sound and Columbia River ports to rebuild San Francisco.

From this period through 1910, there were seven large sales from National Forests in Washington. Table 14 shows the volume and stumpage of these sales, and the pioneer operators who bought those early sales. This period also witnessed as many as 184 smaller sales, averaging about 300 M board feet. Only the larger sales, however, had to be reviewed and approved at the Chief Forester level after 1908. This Service-wide move to decentralize the sales process helped Region 6 considerably.

Region 6 sales raised the same questions as early sales in other Regions. Mill overruns were reported at 8 percent to as high as 20 percent.[94] Profit margin was also a Region 6 concern. Austin Cary, by then working on the 1914 manual, responded to a paper by Region 6 Forest Examiner W. H. Gibbons: "It seems to me that the percentages named in the typewritten [draft] manual on appraisal, 15 to 22%, ought really to cover the range of risks and chances.[95] W. B. Greeley, too, involved himself in Region 6 appraisal concerns by writing the Chief Forester that he favored appraisals based on the lumber market over those based on the log market, temporary overcutting of high-value species and undercutting of low-value species, inclusion of "silvical requirements" in appraisals, and unequivocal utilization clauses.[96]

Snoqualmie Forest Supervisor Burt P. Kirkland disagreed with Greeley on the log-versus-lumber-market issue. He argued that use of the lumber market appraisal basis "will, I believe, fall of its own way [sic] as soon as it is tried out." Regional Forester George Cecil agreed that lumber market-based appraisals would make sales difficult, eliminate loggers as bidders, and cause public criticism.[97]

Kirkland and Cecil won the dispute for the time. It was not until 46 years later, in 1957, that west side (of Cascade Mountains) appraisals shifted back to a lumber and plywood market basis.

Another question of the day involved freight rates on Region 6 Douglas-fir lumber. The following rates were compiled from "Northwest Producing Markets."[98]

	Rail rates per CWT	Ocean cargo rates per M
Seattle/Tacoma to:		
Chicago	$0.55	--
New York	.75	--
San Francisco	.28	4.00
Honolulu	--	5.00
Manila	--	7.56
Hong Kong	--	7.56
Yokohama	--	7.56
Portland to:		
Chicago	.50	(others same
New York	.75	as Seattle)
San Francisco	.17	4.00
Coos Bay to:		
San Francisco	--	3.75

Early stumpage rates of the Region followed standard price guides approved by the Regional Forester in 1909, as shown in table 15.[99]

The Salt Creek Sale

A 1914 appraisal on a 179-million-foot Salt Creek sale by W. T. Andrews on the Cascade (now Willamette) National Forest provides a good indication of costs of the time in the Oregon Douglas-fir region. (See table 16.)[100]

By today's standards, these 1914 expenses are amazingly low. Wholesale selling prices of classes and grades of lumber, based on a 3½-year average (fiscal years 1912, 1913, 1914, and half of 1915), were correspondingly low (table 17).[101]

The appraised selling values were adjusted for mill overruns and shipping underweights. Overruns were the difference between lumber recovery out of the mill and log scale into the mill. Underweights were the difference between estimated freight (collected by the shipping mill from the buyer) and the actual freight (paid by the shipper). This difference, or underweight, was retained by the mill.

Overrun was estimated to be 8 percent and underweights were estimated to be $1 per M board feet for Doulgas-fir and $1.50 for hemlock, bringing total selling values to $14.72 for Douglas-fir and $10.16 for hemlock.

The advertised stumpage prices were Douglas-fir, $1.25; hemlock, 50 cents; and cedar, $1.60 for this early Willamette Valley timber sale.

By 1915, World War I had spurred sales in the Region. Table 18 shows sales reported "sold and appraised" in fiscal year 1915 alone, all in Oregon, although only two of these sales were actually made in 1915. The stumpage rates in this sale differed little from the guidelines set forth in 1909. (See table 15.)

Table 14.--Large Region 6 timber sales, 1905-10

Operator/sale date	Volume	Major species	Price per MBF
	MBF		Dollars
Lake Chelan Box Factory Oct. 29, 1908	10,170	Yellow (ponderosa) pine	2.00
Wind River Lumber Co. Nov. 12, 1906	5,955	Douglas-fir	1.50
Wind River Lumber Co. May 18, 1909	23,856	Douglas-fir	1.50
Gold Basin Lumber & Shingle Co. Aug. 18, 1909	26,500	Redcedar	3.50
Hazel Mill Co. Apr. 13, 1909	12,830	Redcedar	2.50
Balcom Riley Logging Co.	44,985	Douglas-fir	2.40
Sauk Timber Co. Aug. 9, 1907	1,015	Dead Douglas-fir	1.00

Source: National Archives, Record Group 95, Records of the Forest Service, Division of Timber Management.

Table 15.--Region 6 standard timber price guides, 1909

Species	East side	West side	Alaska
	Dollars per MBF		
Yellow (ponderosa) pine	2.50	2.50	--[1]
Douglas-fir	2.00	2.50	--
Hemlock	--	1.75	1.00
White fir	1.50	1.50	--
Redcedar	3.00	3.00	--
Yellow cedar	--	10.00	2.50
Sitka spruce	--	2.50	1.00

[1]-- = not applicable or not available.

Source: National Archives, Record Group 95, Records of the Forest Service, Division of Timber Management.

Table 16.--Appraisal of costs, Salt Creek timber sale, Cascade (Willamette) National Forest, (Oreg.), Region 6, 1914

Logging costs	Cost per MBF	Logging costs	Cost per MBF
	Dollars		Dollars
Woods Costs		Railroads	
Felling and bucking	0.62	Construction and depreciation	0.38
Yarding	.78	Operating expenses	.51
Landings and loading	.33		
Subtotal	1.73	Subtotal	.89
Maintenance		Supplies	
Railroad	.20	Cable	.23
Railway equipment	.19	General	.03
Logging equipment	.05	Tools	.03
Subtotal	.44	Subtotal	.29
Aggregate general expenses (Supervision, engineering, office)	.34	Miscellaneous	
		Liability insurance	.06
		Taxes	.10
		Subtotal	.16
Depreciation			
Railway equipment	.15		
Logging equipment, camps	.11	Forest Service Site Requirements	.07
Railway steel and fastenings	.05		
Subtotal	.31	Total logging costs:[1]	4.23

Manufacturing costs	cost per MBF	Manufacturing costs	cost per MBF
	Dollars		Dollars
Manufacturing processes		Manufacturing overhead	
Operation	2.70	Shipping and selling	.60
Supplies, repairs	.60	Depreciation	.28
Overhead	.70		
		Subtotal	.88
Subtotal	4.00		
		Manufacturing overrun (Based on estimated 8% mill overrun average)	.37
		Total manufacturing costs[1]	5.25

[1]Total costs of the operation = $9.48 (rounded off to $9.50).

Source: National Archives, Record Group 95, Records of the Forest Service, Division of Timber Management.

Table 17.--Average wholesale selling prices for various Douglas-fir and hemlock lumber products, U.S. Pacific Northwest, 1912-15

	Percentage Yield	Lumber price per MBF
Douglas-fir		
No. 1 vertical grain flooring	3	$ 25.50
No. 2 vertical grain flooring	5	22.50
No. 2 & better flat grain flooring	3	14.50
No. 2 clear & better finish	5	25.50
No. 3 clear & better siding & rustic	4	16.50
No. 3 clear flooring	8	13.50
No. 1 shop	4	15.50
Car sills	6	16.00
Subtotal "uppers"	38	
Weighted average		18.21
Timbers	15	10.00
Dimension	28	8.75
Boards & shiplap	12	8.50
Dunnage	7	5.00
Subtotal other	62	
Weighted average		8.58
Total	100	
Total weighted average		12.25
Plus firewood slabwood (1/4 cord per M @ $2 per cord)		.50
		12.75
Hemlock		
Common dimension	35	8.50
Common boards	65	7.50
Total	100	
Total weighted average		7.75
Plus slabwood		.17
		8.02

Source: National Archives, Record Group 95, Records of the Forest Service, Division of Timber Management, Timber Sales, District 6, 1916.

Table 18.--Region 6 timber sales reported "sold and appraised," 1915

Forest	State	Area	Volume Sold	Major Species	Price per MBF
			MBF		Dollars
Cascade (Willamette)	Ore.	Salt Creek	178,700	Douglas-fir	1.75
Crater	Ore.	Fourbit Creek	87,500	Douglas-fir	.50
Crater	Ore.	Four-mile/Bear Creek	382,000	Yellow (ponderosa) pine	3.29
Crater	Ore.	Varney Creek[1]	103,500	Yellow (ponderosa) pine	3.25
Siskiyou	Ore.	Jacks Creek	66,000	Douglas-fir	.75
Umpqua	Ore.	Row River[2]	163,100	Douglas-fir	1.25

[1]Pelican Bay Lumber Co.
[2]U.S. Logging Co.

Source: National Archives, Record Group 95, Records of the Forest Service, Division of Timber Management.

Although these sales were all in Oregon, only a year later the Region 6 forests with the largest sales volumes--the Olympic with 131 MM board feet and the Snoqualmie with 61 MM feet--were not in Oregon, but in Washington. In actual harvesting of sales, though, the surprising leader was the Tongass National Forest in Alaska (then part of Region 6) with 56 MM board feet, followed by the Crater National Forest with 29 MM feet, and the Whitman National Forest with 25 MM feet, the latter two both in Oregon.

Region 6 offers an excellent index of prices and appraisal methods, because it includes both of the two largest volume species in the National Forests, the west side Douglas-fir and the east side ponderosa (western yellow) pine. Figures from the previously cited sales give a good indication of stumpage and costs for early sales in the Region. Region 6, however, was also the site of three crucial long-term sales and reappraisals, spanning a period from 1914 to 1972. An examination of these three sales therefore provides a 58-year overview of appraisal factors from the year of the first appraisal manual through the effects of four wars: World Wars I and II, Korea, and Vietnam. The three sales were Bear Creek-Pelican Bay (Rogue River National Forest); Bear Valley-Hines/Herrick, later Bear Creek-Calamity Creek (Malheur National Forest); and Satsop River (Olympic National Forest).

The Bear Creek-Pelican Bay Sale

The Bear Creek sale (Pelican Bay Lumber Co. sale of November 4, 1914) included 382 MM board feet of timber. Although other sales of similar size were made during World War I, this was one of very few ever to be completed.

The Pelican Bay sale was unusual in that it was advertised in two units at different prices:[102]

	Volume in MMBF	Price of ponderosa pine per MBF	Price of other species per MBF
Unit 1 (Four-mile, Crater N.F.)	85	$3.00	$0.50
Unit 2 (Bear Creek, Paulina N.F.)	297	3.25	.50

Pelican Bay Lumber Co. bid the advertised price for unit 1, but bid $3.375 per M board feet for unit 2 ponderosa pine and 51 cents per M for unit 2's other species. Rate readjustment was scheduled after 5 years and thereafter at 3-year intervals. The readjustments were to be based on mill run prices for other species, but pine rate readjustments were to be based on specific base weight points and grade prices:

Ponderosa Pine lumber grade	Base Weight in percent	Original base period lumber price per MBF
No. 1 and 2 clear	4	$35.50
C clear/export clear	4	32.50
No. 3 clear	3	30.50
C select	3	26.25
No. 1 shop	7	25.25
No. 2 shop	13	16.25
No. 1 common	2	20.25
No. 1 box	64	12.15
Total	100	
Average		16.48

Of the total, 64 percent was box lumber, and there was no #2, #3, #4, or #5 common or #3 shop lumber.[103]

The first readjustment, in 1919, used an average price period of 34 months (1917, 1918, and 10 months of 1919). The appraiser, W. H. Gibbons, determined that the company's 1917-19 prices were up $6.50 per M board feet from the base price, which technically justified a stumpage price increase of $3.25 or 50 percent of the price increase. However, he also found that costs were up by $11.69 per M, nearly twice their base cost. On the basis of these findings, he recommended no change in rates.[104] In the second readjustment report, in 1922, the appraiser, Bruce E. Hoffman, noted that 188 MM board feet had been cut on unit 1 and that 31 MM feet had been cut on unit 2.[105]

But the company was having difficulties. Although a new 60-million-foot-per-year box factory had been built, the sawmill had burned down in 1919, and there was a strike in 1922 against long hours. Also, in the spring of 1922, the appraiser estimated damage for 3.5 MM board feet of timber that should have been marked in unit 1, but was bypassed by the high-wheel-and-horses logging operation because it was too rough to log. Rather than force the logging of the 3.5 MM feet by a costly Clyde railroad skidder which was bought in 1918 but later abandoned as uneconomical, the Service decided to charge the purchaser for damages. Damages came to some $4,000.[106]

Despite all these problems, the 1922 reappraisal developed a stumpage increase from $3.375 to $3.85 per M, as shown in table 19.[107]

Long base periods for prices and costs were common during this period. In the 1922 appraisal, which was a "reappraisal" rather than a "readjustment," the years 1919, 1921, 1922 were used as the base period. The appraiser omitted 1920 because, he wrote, it was an abnormally high-priced year. The necessity for this kind of judgment undoubtedly contributed to the use of shorter current pricing periods in modern times.

The Pelican Bay sale spanned the 24-year period 1914 through 1938, with reappraisals, or readjustments, as shown in table 20.

Table 19.--Pelican Bay timber sale reappraisal, Crater and Paulina National Forests (Oreg.), Region 6, 1922

	Cost
	Dollars per MBF
Log cost to common carrier railroad	9.40
Freight, Kirk, Oreg., to mill	1.25
Manufacturing, depreciation and selling (7% overrun)	13.90
Total production cost	24.55
Selling value (assuming a 7% overrun)	31.99
Conversion return (31.99-24.55)	7.44
Profit & risk allowance	4.03
Stumpage value indicated (7.44-4.03)	3.41
Byproduct slabs & lath value	.25
Total estimated stumpage value	3.66
Rounded figure (5% allowance for error)	3.85

Source: National Archives, Record Group 95, Records of the Forest Service, Division of Timber Management.

Table 20.--History of Pelican Bay timber sale and reappraisals, Crater and Paulina National Forests, (Oreg.), Region 6, 1914-38

Reappraisal date	Base period	Selling value	Logging cost	Manufacturing cost	Profit Margin	Stumpage Price
		Dollars per MBF				
1914 (original sale)	1911, 1912, 1913	16.48	--[1]	--	--	$3.375 bid
1919	1917, 1918, 1919 (10 mos)	22.98	--	--	--	do.[2]
1922	1919, 1921, 1922[3]	31.99	10.65	13.90	4.03	3.85
1925	1922, 1923, 1924, 1925	32.88	10.50	12.94	4.62	4.75
1928	1926, 1927, 1928	28.57	8.35	12.14	4.08	do.
1929	First extension to 1931	--	--	--	--	do.
1932[4]	--	--	--	--	--	do.
1936[5]	--	--	--	--	--	3.75
1938[6]	--	--	--	--	--	--

[1]-- = not available.
[2]Costs up $11.69.
[3]1920 omitted, abnormal year.
[4]New sale, dated Jan. 1, 1932, awarded to Pelican Bay Lumber Co. for remaining 33 MMBF at $4.75.
[5]Reappraised at below $4.75, but above minimum, after cancellation (under a 1935 Act) and resale.
[6]Case closed, sale completed.

Source: National Archives, Record Group 95, Records of the Forest Service, Division of Timber Management.

The Pelican Bay sale emphasized several historic appraisal lessons. The 1919 readjustment showed why the old readjustment procedures were not good long-term features. Selling prices had risen by $6.50 per M board feet, but costs had risen much more. The inequity was apparent. A contract modification provided for full reappraisals later in the life of the contract.

The 1925 reappraisal occasioned another major concept change. Assistant Forester Edward E. Carter, reviewing the report, had this to say:

> The case illustrates very well the difficulties inherent in appraising to a specific [company] and confirms my belief that the system of using a regional average manufacturing cost [including depreciation], and computing a profit and risk margin on this manufacturing cost by the overturn method, is preferable.
>
> From the viewpoint of technique in appraisal work, this case is not satisfactory, although the recommendation is undoubtedly common sense and comes from a group of men who have consistently kept their feet on the ground in the past....The justification for the recommendation lies chiefly in the comparison with other sales in Eastern Oregon and Northern California and in the appraised prices for sales in the Klamath Indian Reservation adjoining it....If Mr. Hoffman [the appraiser] had followed the instructions in the first paragraph of the Appraisal Manual, had worked out his problem by one of the methods indicated in that pamphlet and had given as a check the material and line of reasoning embodied in his report, he would probably have arrived at the same recommendations...but the Forest Service would have much firmer ground on which to stand in defending its action.[108]

The sale was completed in the 1930's. The resale, which included additional timber, was a common process for long-term sales during this period. In a sense, it enabled the Government to modernize the contracts and adjust silvicultural requirements in exchange for starting over.

During the turbulent 1930's, Congress had passed the Act of April 17, 1935, permitting cancellation of uneconomic timber sale contracts. In one case during this period, the North Bend Timber Co. sale of July 25, 1930, the Assistant Forester authorized cancellation under the 1935 Act, with immediate informal advertising under regulation S-17 (A) at a reduced price. The case was of interest because of the people involved: the reduced rate came fro a reappraisal by Walter H. Lund, who was later to be in charge of timber management in Region 6 for many years; the field report and appraisal were by Ira J. Mason, who was later to be in charge of timber management in the Chief Forester's office for more than 20 years.

The Bear Valley-Hines/Herrick Sale

A second major influence on timber appraisals came from Region 6 in the form of a "development" sale in Bear Valley on the Malheur National Forest in the ponderosa pine area of eastern Oregon.

With the possible exception of the Juneau unit, pulpwood sale in Alaska (see section III, Significant Pulpwood Sales), no timber sale has had the publicity that the Bear Valley sale had in its early years. It inspired a memorial from the Oregon State Legislature and a full-scale Senate hearing.

The Bear Valley contract required the building of a sawmill near the town of Burns, Oreg. It also required the construction of 30 miles of main-line, common-carrier railroad from the direction of Idaho and another 50 miles of common-carrier railroad from Burns to Seneca, Oreg., plus many miles of logging railroad, which in the early days was the most common means of log transportation.

The sale was initially advertised at $2.75 for 770 MM board feet of ponderosa pine and 50 cents for 120 MM board feet of larch, Douglas-fir, white fir, and lodgepole pine.[109] When no bids were received at the bid opening in February 1923, the Forest Service heeded the complaint of the applicant, Brooks-Scanlon Lumber Co. of St. Paul, Minn., and readvertised the sale under more attractive terms, particularly the price, which was reduced to $2 on the ponderosa pine.[110]

Before the readvertisement, Jim Girard, who with Bruce Hoffman and George L. Drake had made the original appraisal, notified the Fred Herrick Lumber Co. of the upcoming sale. In June 1923, Brooks-Scanlon bid the advertised price of $2 per M board feet for ponderosa pine, but Herrick bid $2.80--5 cents higher than the initial price at which no bids had been received. The Herrick bid vindicated the initial appraisal, which itself had been considered a key appraisal of the period.

The origins of the Bear Valley sale were troubled, but the troubles did not end with the sale to Herrick Lumber Co. Fred Herrick had intended to build the mill and railroad out of profits on other mills in Idaho; however, he was unable to build the mill within the 2 years allocated for its construction.

Herrick had hired Jim Girard away from the Forest Service to supervise the railroad construction. Girard had performed his part of the job, and the railroad work was essentially on schedule. But land speculators in the Burns area were not happy that the mill was not yet built by 1926. Early in 1927, local area politicians pushed a memorial through the State legislature charging illegal influence by former Forest Service employees.[111]

The U.S. Senate hearing that followed took testimony from all concerned, from Chief Forester Greeley to Hoffman and Girard. The resulting report gave a clean bill of health to the Forest Service, with an admonition to tighten up Herrick's performance.[112]

The Service followed through. On December 1, 1927, Greeley wrote to Herrick:

> On December 15, 1927, I shall be obliged to cancel your contract unless:
>
> a. You can give assurance a responsible company will assume the obligations;
> b. They have $1.5 million available;
> c. They will execute the contract.[113]

Herrick could not get the assurances. The contract was canceled, and the sale was readvertised for bids opening June 1, 1928. On that date, the Hines Western Pine Co. bid 6 cents over the $2.80 advertised price for ponderosa pine, $1.05 for Douglas-fir, and 55 cents for the other species and was awarded the new contract for the nearly 1-billion-foot sale.[114]

Herrick forfeited the $50,000 deposit that he had been required to make and, despite heroic efforts to get it back, was never able to do so. He argued that the resale at 6 cents per M above his own earlier bid meant that the Government had suffered no loss. The argument was unsuccessful. Even a private bill, filed in the early part of the Depression after Herrick had taken bankruptcy, was not enacted.[115]

The Hines Company, going into the teeth of the Depression, moved slowly. There was no timber cutting in 1933. By 1935, however, when a reappraisal by O. F. Erickson recommended no change in rates, Hines had cut 87 MM board feet, of which 83 MM was ponderosa pine timber. In 1934, the contract was transferred from the Hines Western Pine Co. to its parent, the Edward Hines Lumber Co.[116]

The interrelationship of silviculture and stumpage appraisals showed up in a 1937 memorandum by E. E. Carter. A modification of contract was permitted to allow a test marking of the timber as a trial of new Keene Tree Classes. The new Keene system had been devised as a means of recognizing trees that carried higher than average risks of insect kill. The riskier trees were termed class 4 and class 3c and 3d. In the test, all class 4 trees and class 3c and 3d trees were to be marked. This meant a lighter, higher quality cut of older, larger, higher mortality trees.

Carter recorded privately that even though Axel Brandstrom, an authority on logging engineering, had estimated that the new marking increased value by $1.50 per M board feet, the General Counsel of the Department of Agriculture had approved a modification without rate change, but only as an experiment and only until the next reappraisal.[117]

The Bear Valley sale followed the pattern of most of the long-term sales of the era. Although it was not scheduled to expire until 1951, it was incorporated into a new package, the Bear Creek-Calamity Creek sale (Hines Lumber Co. sale of February 26, 1942). Although it was already 19 years since the initial advertisement, the Bear Valley sale was now a brand new sale.

Having a new sale made it easier, of course, to resolve reappraisal, marking, and other contractual issues. The volume in the new sale was 550 MM board feet--400 MM in Bear Creek and 150 MM in Calamity Creek. The cruise estimate was by Burnett Payne, who later became Associate Deputy Chief of the Forest Service. The 1941 appraisal for the new sale included the following:

	Per MBF	Notes
Selling value (ponderosa pine)	$24.67	($26.64 less 8% commission)
Logging cost	7.76	(Including $1.50 depreciation)
Milling cost	11.44	(Including $1.50 depreciation)
Conversion return	5.47	(Selling value less costs)
Margin for profit and risk	2.47	(12.9% of costs)
Indicated stumpage value	3.00	
Approved stumpage value	3.15	

The base period for the appraisal was the 5-year period from 1936 to 1940. Selling prices included a plus 21 cents for byproducts, a minus 59 cents for discounts and allowances, and a minus $1.97 for wholesale commissions.[118]

An inkling of the frustrations felt by Forest officers of the time can be seen in a 1942 letter:

> The Hines sale case is the only one of its kind in the U. S., which is something to be thankful for. As a result of years of negotiation and 'side agreements' we are pledged to allow [a fixed depreciation and profit percentage] up to 1955 [based on a Girard 1940 appraisal]....In the early days we used to [do this kind of thing] ...but we had to drop the idea because it did not work.[119]

By 1944, 75 MM board feet had been cut from the new sale. Here a new wrinkle in dealing with the Government showed up. The company had retained the Portland, Oreg., consulting firm, Thomas and Jackson, to represent it on logging engineering and reappraisal matters. The presence of an outside consultant evidently stirred the appraiser to extra effort; he made four reappraisals shown in table 21.[120]

By the 1946 reappraisal, 224 MM board feet had been cut; and the second reappraisal, based on 1943-45 figures, plus figures for 7 months of 1946, came to $5.35 per M for pine. This stumpage was up only 5 cents, but the prices of the inferior species were nearly doubled, from $1.35 to $2.20, which came within Office of Price Administration price controls during the period.[121]

From 1946 onward, reappraisals came annually, and "flat rates" continued to be the norm each year through 1953. Thereafter until the final reappraisal in 1962, rates were by quarterly stumpage rate adjustment. (See table 22.)[122]

As table 23 shows, the inferior associated species, fir and larch, generally followed the progression of rates shown on table 19 for pine, but at a lower level.

It might be noted that the upward and downward escalation of stumpage rates, using a base index, was begun in 1954; however, the prices of associated species did not escalate until 2 years later, in 1956.

In 1958 and again in 1961 and 1962, the associated species used a "low-base index and a high-base index," which were provided when a species was reappraised below base rates. Whenever the current quarter index fell between the high and the low index, the stumpage rate paid for the species would stay at minimum base rates. The stumpage paid would rise only if the quarterly index exceeded the high-base index. The difference between low and high was based upon the amount of the "deficit" in the reappraisal. Otherwise, whenever the current quarter's index was above or below the contract base index, the stumpage would rise or drop by 50 percent of the difference.[123]

The Satsop River Sale

The Bear Creek and Bear Valley long-term sales spanned and influenced appraisal techniques in the ponderosa pine region over a 48-year period (1914-62).

The Satsop River sale on the Olympic Peninsula of of Washington similarly influenced appraisal techniques in the Douglas-fir region. Its history shows, too, how practices differed between the ponderosa pine region and the Douglas-fir region. Spanning a 44-year period (1929-73), this sale lasted through the Depression, World War II, the Korean war, and the Vietnam war, and shows their influences on prices, demand, inflation, and controls.

The 852-million-foot Satsop sale on 14,690 acres was purchased by Schafer Bros. Logging Co. on December 10, 1929, heading into the depths of the Depression. By 1938, Schafer had built 20 miles of railroad, from the Chehalis River log dump to a junction with the Simpson Logging Co. railroad near Simpson's camp 5, but had logged only 4 MM board feet of timber.

Table 21.--Bear Valley-Hines Lumber Co. sale, first reappraisal, ponderosa pine, Malheur National Forest (Oreg.), Region 6, 1944

Appraisal no.	Description	Ponderosa pine stumpage value
		Dollars per MBF
1	Base period 1941-43 (3 years)	4.89
2	Base period 1944 (7 months)	5.47
3	Base period 1941-43 and 1944 (7 months) (3-7/12 years)	5.08
4	Appraiser's judgment[1]	5.30[2]

[1]Based profit and risk at 15 percent of costs.
[2]Other species were appraised at $1.35.

Source: National Archives, Record Group 95, Records of the Forest Service, Division of Timber Management.

Table 22.--Bear Valley-Hines Lumber Co. sale reappraisals, ponderosa pine, Malheur National Forest (Oreg.) Region 6, 1946-63

Year	Reappraisal no.	Appraiser	Cut to date	Base period	Ponderosa pine selling price per MBF	Production costs per MBF	Profit & risk ratio	Ponderosa pine stumpage and K-V[1]	
								Stumpage price	Base index
			MMBF		Dollars	Dollars	%	Dollars	Dollars
1946	2	Wright	224	1941-1944 (3-7/12 yrs.)	44.85	33.81	14	5.45	--[2]
1947	3	Wright	270	1 year	62.63	44.79	16	9.20	--
1948	4	Wright	307	10 mos.	83.09	50.31	12	17.90	--
1950	5	McPherson	331	6 mos.	--	--	12	18.10	--
1951	6	McPherson	--	3d qtr. 1950	96.54	52.68[3]	11.9	30.00	--
1952	7	McPherson & Hildman	--	4th qtr. 1951	108.68	66.38	12.3	32.50	--
1953	8	McPherson & Bates	--	2 yrs. (1952-53)	106.38	66.38	12	28.60	91.94
1954	9	McPherson & Bates	507	6 mos.	104.55	do.	do.	do.	do.
1955[4]	10	McPherson	550	4th qtr. 1954	--	66.65	--	23.50	86.98
1956	11	McPherson & Wiener	594	1955	107.73	67.23	10	29.00	90.74
1957	12	McPherson	628	1956	--	69.23	--	22.40	93.45
1958	13	McPherson	660	4th qtr. 1957	94.02	68.38	11	14.40	84.89
1959	14	McPherson	--	4th qtr. 1958	101.70	68.19	11	10.11[3]	91.62
1960	15	McPherson	--	1st qtr. 1960	103.01	69.46	10	20.40[5]	92.85
1961	16	McPherson	--	--	92.35	69.01	10	14.95	83.76
1963	17	Woolschlager	811[6]	--	84.95	62.35	12	13.50	82.81

[1]Knutson-Vandenberg Act deposits required for timber stand improvement, virtually all tree planting or seeding. Included except where noted.

[2]-- = not applicable or not available.

[3]Plus $3.25 K-V deposit.

[4]At this stage, the 1941 estimate of total volume, 550 MMBF, had been reached, but considerable volume was left to cut. It was obvious that an extension would be needed; therefore the 1955 reappraisal was made in conjunction with an early extension to 1962.

[5]Plus $3.80 K-V deposit.

[6]13 MMBF remaining.

Source: Washington National Records Center, Suitland, Md., Records of the Forest Service, Division of Timber Management.

Table 23.--Bear Valley-Hines Lumber Co. sale reappraisals, Douglas-fir and larch, Malheur National Forest (Oreg.), Region 6, 1941-62

Year	Douglas-fir and larch stumpage price and K-V[1]	Douglas-fir and larch base index
	Dollars	Dollars
1941	1.35	--[2]
1944	2.40	--
1946	2.20	--
1947	2.20	--
1948	2.40	--
1950	2.40	--
1951	3.00	--
1952	4.10	--
1953	2.50	--
1954	2.50	--
1955	2.00	--
1956	4.05	76.64
1957	4.15	73.61
1958	.65	66.27 low 72.67 high
1959	2.20	75.36
1960	1.35	73.81
1961	.75	64.41 low 72.67 high
1962	.75	65.97 low 71.63 high

[1]Knutson-Vandenberg Act deposits for timber stand improvement, virtually all tree planting or seeding.
[2]-- = not applicable or not available.

Source: National Archives, Record Group 95, and Washington National Records Center: Records of the Forest Service, Division of Timber Management.

The initial logging on the Satsop sale was with tractors on gentle ground, of which there is very little on the Olympic National Forest. For economic reasons, the selection method was used. The 1939 reappraisal reported the effect of economics: 35 percent of the Douglas-fir was sold as "peeler" logs (sawlogs peeled for plywood) for $28 per M. Douglas-fir sawlogs, those below peeler grade, were put in storage, unsold. Hemlock logs, which had to be cut from road rights-of-way, could be sold for only $9 per M.[124] At these prices, it is easy to see why only the best Douglas-firs were selected, leaving the hemlock and the average and poorer Douglas-firs on the sale area.

Schafer had problems getting started and in meeting contract schedules. The original contract's cutting schedule was rigorous, requiring that not less than 75 MM board feet be cut by the end of 1931. This limitation was extended several times, but it was not until 1940 that Schafer met the 1931 deadline volume of 75 MM feet. From then on,

production picked up, reaching 219 MM board feet by 1950.

The original appraisal for the sale was $4 per M for the valuable species--Douglas-fir, cedar, and white pine--and $1.25 per M for hemlock and silver fir. The high bids of $6.50 and $2.50, respectively, nearly doubled the advertised price.[125]

Because at that time prices could go up but not down and because the stumpage rates were high for the times, the reappraisals of 1934, 1937, 1940, 1943, and 1946 resulted in no changes in rates. All five reappraisals were based on log prices and costs for the 3 years preceding the reappraisal. Although no changes in stumpage rates were made during this 17-year period, an addition of 10 cents was made for timber stand improvement (reseeding and planting) under the 1930 Knutson-Vandenberg (K-V) Act.[126]

Access to the timber was a key early problem. In a 1937 letter, Peter Schafer of Schafer Bros. informed Chief Ferdinand A. Silcox that he had solved a big problem and had signed a long-term agreement for use of 20 miles of Simpson Logging Co. tracks. Logging in the main Satsop drainage began that same year.[127]

The service reply to Schafer's letter was not quite what he expected. The Assistant Regional Forester wrote that he was informed that Schafer "had a copy of the Timber Sale Report and Appraisal before you bid. Since these are confidential, they are not shown to prospective bidders, though certain features may be discussed." The leak of the report reflected adversely on the integrity of the Forest Service, he said. "Who furnished it to you?"[128]

The files do not indicate who the culprit was. The confidentiality requirement was changed later to permit specific review of appraisals or reappraisals.

The "long-term" railroad agreement with Simpson lasted only 5 years. The 1943 reappraisal noted that Schafer had switched to truck haul in 1942 and that selective logging had been abandoned in favor of clear-cutting. Also, the selling prices noted in the 1943 reappraisal were Grays Harbor District averages rather than Schafer's experience.[129]

The 1949 reappraisal resulted in the first stumpage price increases in the sale. Douglas-fir, white pine, and Sitka spruce were raised to $9.50 plus 20 cents K-V deposit; redcedar remained at $6.50; and hemlock and silver fir remained at $2.50.

The 1949 appraisal was noteworthy for another reason. For the first time, a reappraisal was prepared at the National Forest level.[130] The Regional Office did maintain its prerogatives, however, by overruling the initial recommendation for no change in rates. The revised appraisal, with the rate increase to $9.50, was approved at the Regional and at the National level.[131]

In 1951, a modification of contract provided that reappraisals would be based on "the sale-as-a-whole," rather that on the experience of the previous 3 years. This modification ushered in the use of Regional average costs in lieu of local costs. It also provided for annual, rather than 3-year, reappraisals.

The 1951 reappraisal raised prices dramatically--Douglas-fir from $9.50 to $23.30--as shown in table 24 which lists prices for commercial species from 1949 through 1969[132]

Several appraisal "events" occurred during the sale's lifetime after 1949.

In 1955, the contract was transferred by third party agreement to Simpson Industries.[133]

In 1958, there was a switch from Grays Harbor log prices to "pond values" based on end product lumber and plywood selling prices and costs, conforming to Regional practice.[134]

The pond values were intended to be the equivalent of log prices, but were actually the estimated total selling price for the lumber and plywood from each log grade and size class, reduced by the estimated manufacturing costs and by a normal profit on manufacturing. End product prices by grades of lumber and plywood were applied to the estimated grade outturns for each log grade: no. 1, 2, 3 peeler; no. 1, 2, 3 sawlog. The percentage of end products within each log grade were anticipated outturns determined by a series of lumber and plywood mill scale studies.[135] Because most sawlogs could be sawed into lumber or peeled into plywood, for appraisal purposes, the proportions of lumber and plywood were determined by surveys of actual industry usage.

Use of the new pond values was intended to make the data easier to handle in the field. The 1958 Satsop reappraisal uncovered a problem. A review at the Regional Office level revised the reappraisal to eliminate duplicated costs of booming and rafting, which were already deducted in manufacturing costs.

A request for emergency reappraisal due to severe market change was denied in 1960.[136]

In 1962, there was a change from "flat rate" to "escalation" prices, similar to the method used in the ponderosa pine region.[137] The escalation formula required that both lumber and plywood be incorporated in base and quarterly indexes. To accommodate this requirement, separate indexes were created for each species or group of species, based on its percentage of plywood ("peeler") logs. The letters attached to the indexes denote the percentage to be peeled into plywood, with "A" the lowest percentage. For example, the "A" in the hemlock index shows an estimate of less than 10 percent peeler logs; the "B" in the index for spruce, white pine, and silver fir shows 10 to 20 percent peeler logs; and the "E" in the Douglas-fir index shows 40 to 50 percent peeler logs. The high percentage

Table 24.--Satsop River timber sale reappraisals, Olympic National Forest (Wash.), Region 6, 1949-69

Reappraisal Date	Stumpage prices and base index figures							
	Douglas-fir		Redcedar	Sitka spruce and white pine		Hemlock (H) and Silver Fir (SF)		K-V deposit[1]
	Dollars							
1949	9.50	--[2]	6.50	9.50	--	2.50	--	0.20
1951	23.30	--	21.80	10.75	--	2.50	--	do.
1952	do.	--	do.	do.	--	do.	--	do.
1953	do.	--	do.	do.	--	do.	--	do.
1954	do.	--	6.50	do.	--	H 2.50	--	do.
						SF 3.25	--	do.
1955	38.95	--	9.00	16.75	--	H 3.15	--	do.
						SF 14.65	--	do.
1956[3]	45.25	--	27.80	26.25	--	H 15.25	--	do.
						SF 7.25		
1957	40.70	--	10.75	22.60	--	H 7.30	--	do.
						SF 5.10	--	do.
1958	30.40	--	9.75	14.00	--	H 5.20	--	.35
						SF 9.05	--	do.
1959	38.00	--	13.35	25.40	--	H 8.25	--	do.
						SF 13.80	--	do.
1960[4]	39.25	--	16.75	14.00	--	H 13.20	--	do.
						SF 6.70	--	do.
1961	31.70	--	9.65	12.20	--	H 6.26	--	.50
						SF 4.95	(96.68B)	do.
1962	24.55	(118.10E)[5]	6.75	6.70[6]	(96.68B)[7]	H 4.25	(89.54A)[8]	do.
						SF 5.75	(97.35B)	do.
1963	22.35	(114.36E)	6.95	6.70	(97.35B)	H 6.55	(91.55A)	do.
						SF 9.05	(99.55B)	do.
1964	24.55	(116.85E)	8.75	12.50	(99.55B)	H 8.65	(93.78A)	do.
						SF 8.25	(100.78B)	do.
1965	25.05	(118.25E)	8.35	11.35	(100.78B)	H 7.65	(94.96A)	do.
						SF 14.20	(101.10B)	do.
1966	35.25	(119.92E)	11.90	14.95	(101.10B)	H 12.60	(94.82A)	do.
						SF 15.36	(98.53B)	do.
1967	35.01	(111.66E)	11.55	11.28	(98.53B)	H 16.33	(94.15A)	do.
						SF 32.70	--	do.
1968	49.90	--	13.35	12.15	--	H 31.70	--	do.
						SF 56.57	--	do.
1969	95.62	--	34.79	31.66	--	H 55.33	--	do.

[1]Knutson-Vandenberg Act deposits for timber stand improvement, virtually all tree planting or seeding.

[2]-- = not applicable or not available.

[3]Third party agreement transfers contract to Simpson Industries, Inc.

[4]Request for emergency reappraisal denied.

[5]"E" base index used for species yielding 40-50 percent peeler (plywood) grade logs.

[6]Includes a $3.15 road amortization deficit.

[7]"B" base index used for species yielding 10-20 percent peeler grade logs.

[8]"A" base index used for species yielding 10 percent or less peeler grade logs.

Volumes cut prior to rate determinations included: to 1937, 0.7 MMBF; to 1939, 3.9 MMBF; to 1941, 76 MMBF; to 1948, 102 MMBF; and to 1951, 219 MMBF.

Source: Washington National Records Center, Suitland, Md., Records of the Forest Service, Division of Timber Management, Region 6 timber sales.

of peeler logs from Douglas-fir demonstrates the high quality of the Douglas-fir in this sale.

In addition, escalation in the Douglas-fir region differed from that in the ponderosa pine region, applying to timber cut during the 3 months following each quarterly index period rather than to the timber cut the previous 3 months, retroactively. This is one of the reasons that escalation was strongly opposed by industry and was dropped for new sales in the Douglas-fir region by 1967. Rates for 1968 and later reverted to flat rates.[138]

The period when escalation was used in the 1960's made certain refinements necessary. Western Pine Association (W.P.A.) and Western Wood Products Association (W.W.P.A.) lumber price indexes had been audited and recommended as acceptable for escalation in 1959.[139] Differences between west side log scaling and east side (pine) log scaling made it necessary to adapt the indexes to fit overruns—lumber outturn vs. log input--which tended to be more than twice as great on the west side (30 to 40 percent) as on the east side (10 to 15 percent) for the timber sizes involved.

Plywood indexes, obtained from the Bureau of Labor Statistics (BLS), turned out to have even greater "overruns" of approximately 150 percent (i.e., recovery ratios of 3/8" plywood of 2.5 times log scale).

To accommodate these ratios, monthly "Douglas-fir region indexes" were issued. These indexes were calculated using factors designed to approximate log scale equivalence:[140]

Douglas-fir lumber:	1.39 multiplied by W.W.P.A. index
Douglas-fir plywood:	1.7328 multiplied by BLS index

A further complication in 1962 was the $3.15 "road amortization rate deficit" for spruce and pine. This innovation meant that, at minimum or base rates, these species could not carry their share of road costs and at the same time yield a normal profit margin. To offset this deficit, the contract provided that rates for these species would not be increased by escalation until the accumulated deficit at $3.25 per M was amortized by escalated increases. This procedure was similar to that of "high-low base indexes" in the pine region, as used in the Bear Valley sale.

A request for emergency reappraisal was finally granted in 1970.[141] (See table 25.)

Table 25.--Satsop River timber sale, emergency reappraisals, Olympic National Foreset (Wash.), Region 6, 1970-72

Reappraisal date	Douglas-fir	Redcedar	Sitka spruce and white pine	Hemlock	Silver fir	K-V deposit[1]
	Dollars per MFB					
January 1970	48.50	20.45	22.38	31.77	27.38	0.50
June 1970	48.36	15.78	16.78	24.10	19.84	do.
1971	50.13	11.95	15.57	15.23	9.20	do.
1972	75.92	43.67	28.49	43.61	38.26	do.

[1]Knutson-Vandenberg Act deposits for timber stand improvement, virtually all tree planting or seeding.

Source: Washington National Records Center, Suitland, Md., Records of the Forest Service, Division of Timber Management, Region 6 timber sales.

The Sauk-Stillaguamish "6-22-22" Sale

The Sauk River Lumber Co. sale of June 22, 1922, was known throughout the Service during the 1920's, both for its euphonious "six, twenty-two, twenty-two" date, and for its role in developing the many young foresters who worked on it and then went on to top roles in timber management later in their careers. E. E. Carter and Raphael Zon, prior to the actual sale, used it as a discussion example in a key policy paper they delivered at a December 15, 1921, meeting of the Service Committee in Washington, D.C., the subject of which was timber sales to promote social goals, such as employment and community stability in rural areas.[142]

Located in Falls Creek and along the Sauk River south of Darrington, Washington (in townships 30 and 31 north, ranges 10 and 11 east, Washington Meridian), the sale contained 235 MM board feet of timber, over half of which was high-quality, old-growth Douglas-fir. The original appraisal, by Bruce Hoffman and George Drake (who later was a key figure in the Shelton Sustained Yield unit) was based upon some assumptions that were typical of the time:

1. Basis for costs and prices a 4-year average (1918-21).

2. A 10-year contract life, with reappraisals at 3-year intervals (1926 and 1929).

3. Minimum merchantable log diameter (10 inches) and minimum 33-1/3 percent sound for Douglas-fir, cedar, and pine; 50 percent sound for hemlock and silver fir.

4. Logging costs $10.55 per MBF, included 30 cents for Forest Service requirements; $1.80 depreciation; and 30 cents for train operation.

5. Milling costs $12.27 per M, included 10 percent overrun and 50 cents depreciation.

6. Shingle manufacturing, $1.55 per thousand shingles or $16.74 per MBF (at 10,800 shingles per MBF).

7. Profit and risk, in percentage of average profit bearing investment (APBI): railroad, 12 percent; logging equipment, 20 percent; milling, 20 percent; lumber and log inventory, 15 percent; accounts receivable, 8 percent; and cash, supplies, stumpage, 8 percent.

8. Underweights (lumber): cedar, 75 cents; other species, $1.00.

9. Byproducts (slabs, lath): Douglas-fir, 50 cents; other species, 25 cents.

The indicated stumpage came out $2.13 for Douglas-fir, $3.11 for cedar, and a negative $1.28 for hemlock and silver fir. The appraisers recommended $1.75 for Douglas-fir, $2.50 for cedar, and 50 cents for the other species, obviously compensating on Douglas-fir and cedar for the negative appraisal of other species. E. E. Carter's Washington Office review of March 15, 1922, recomputed the rates at $2.00, $2.75, and 50 cents, probably because the profit and risk margin of $4.25 (all species) was too far above the average stumpage of $1.76.

President Jamison of the Sauk River Lumber Co. personally delivered his bid to the Forest Service, and his bid, at the advertised price, was the only bid received.

The first of the two scheduled reappraisals, in 1926, was by Bruce Hoffman, who had worked on the original. He reported 42 MM board feet had been cut, and recommended raising the stumpage 50 cents on Douglas-fir and cedar. He was overruled, and no change was made.

George L. Drake made the second reappraisal in 1929. Drake recommended an increase of 35 cents for Douglas-fir, 15 cents for cedar and 5 cents for hemlock. Again the appraiser was overruled and no changes were made.

The 1929 reappraisal report contained a portion that was written by Ira J. Mason, then a junior forester, about the sale's volume estimate:

Original volume estimate	235 MM board feet
Less portion now unmerchantable	- 53
Elimination around Sauk Ranger Sta.	- 10
Net volume in sale	172
Cut to 1929	130
Estimated volume remaining	42

Mason's revised estimate was undoubtedly conservative, going into the Depression years. At any rate, Oliver Ericson's third reappraisal, in 1932 (when the contract was extended to 1936), reported 68 MM cut from 1929 to 1932 and 55 MM still uncut.

About this time Sauk River's logging engineer, E. T. Clark, reported that the company was getting a Reconstruction Finance Corporation (RFC) loan to help it through the Depression. Clark later became a top official in the Pacific Northwest Loggers Association.

The fourth reappraisal, in 1935, was again by Oliver Ericson, and again recommended no change in rates. It noted that 223 MM feet had been cut and 34 MM feet were left uncut. The sale was extended again and finally completed in 1941.

This sale, which eventually lasted for 19 years, had the distinction that despite four reappraisals its stumpage rates were never changed from the original advertised (and bid) rates.[143]

Reference Notes

(In the following notes, the expression NA, RG 95, FS, TM means National Archives, Washington, D.C., Record Group 95, Records of the Forest Service, Division of Timber Management. Regional timber sales records from 1908 to 1937 are mostly in Series 70, and those from 1938 to 1952 are mostly in Series 64. WNRC, FS, TM means Washington National Records Center, Suitland, Md., Records of the Forest Service, Division of Timber Management. Regional timber sales records after the year 1950, 1951, or 1952 are generally in the National Records Center in Suitland, and are so noted.)

1. NA, RG 95, FS, TM, Timber Sales, Series 64, letter from E. A. Sherman, Acting [Chief] Forester, to H. C. Wallace, Secretary of Agriculture, May 24, 1923.

2. The 33-board-foot-per-tie converting factor was not 100 percent accurate, because 8-foot ties came in various widths and thicknesses (see Moose Creek Plateau sale in Region 4). The 1914 appraisal manual used 32 board feet per tie in its example of a tie operation.

3. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from F. A. Silcox, Acting District Forester, to the [Chief] Forester, Feb. 26, 1910.

4. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from R. Y. Stuart, Assistant District Forester, to Forest Supervisors, Feb. 9, 1912.

5. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from F. A. Silcox, District Forester, to the [Chief] Forester, Jan. 18, 1912.

6. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from H. S. Graves to the District Forester, Missoula, Mont., Jan. 6, 1913. The Somers Lumber Co. sale of Jan. 3, 1913, was for 100 MM feet at $2 per M. A solicitor's opinion on this sale approved changes in periodic cutting requirements during the life of the contract if it caused no damages to the Government.

7. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from District Forester, Missoula, Mont., to the [Chief] Forester, Sept. 7, 1920. C. H. Gregory appraised the original Lightning Creek sale, June 30, 1913. D. Skeels supplemented the appraisal, Jan. 15, 1914.

8. NA, RG 95, FS, TM, Timber Sales, Series 70, Dorr Skeels, District 1, Report on Timber Sale Application, Montana Pulp & Paper Co., 1914.

9. NA, RG 95, FS, TM, Timber Sales, Series 70, Donald R. Brewster, District 1 Forest Examiner, Memorandum for Information of the District Forester, on Principles of Cutting, May 26, 1915.

10. NA, RG 95, FS, TM, Timber Sales, Series 70, St. Joe National Forest, District 1, J. W. Girard and Fred R. Mason, Prospectus, Fishhook Creek sale, November 15, 1915.

11. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from Leon F. Kneipp, Acting Chief Forester, to District 1 Forester, May 19, 1923. The original 63 MM sale had been appraised by Jim Girard and U. S. Schwartz, using 1913 data. It was again combined into a new package (a common procedure of the time) and taken over by Coeur d'Alene Mill Co., which had been the third high bidder at the 1923 bid opening.

12. NA, RG 95, FS, TM, Timber Sales, Series 70, memorandum from Philip Neff, lumberman, for Forest Supervisor, Coeur d'Alene National Forest, District 1, Oct 1, 1923. Neff noted as reasons for higher values: (a) less risk because of better sale engineering and (b) pay-as-cut provisions.

13. NA, RG 95, FS, TM, Timber Sales, Series 64, Kootenai National Forest, Region 1, P. Neff, "Appraisal Report," June 1, 1940.

14. NA, RG 95, FS, TM, Timber Sales, Series 64, Kootenai National Forest, Region 1, P. Neff and M. Ahlskog, "Reappraisal Report," Feb. 11, 1944.

15. NA, RG 95, FS, TM, Timber Sales, Series 64, Julian Rothery, Washington Office, "Reappraisal Review," Feb. 18, 1944. The review also noted that "selling prices are those permitted by recent O.P.A. regulations."

16. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from the [Chief] Forester, G. Pinchot, to District Foresters, March 2, 1909.

17. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from the [Chief] Forester, G. Pinchot, to District Foresters, May 8, 1909.

18. NA, RG 95, FS, TM, Timber Sales, Series 70, S. L. Moore, Washington Office, "Appraisal Report," May 19, 1909.

19. NA, RG 95, FS, TM, Timber Sales, Series 70, memorandum from E. E. Carter, Washington Office, to District Forester, Denver, May 24, 1909.

20. NA, RG 95, FS, TM, Timber Sales, Series 70, memorandum from E. E. Carter, Washington Office, to the [Chief] Forester, June 17, 1909.

21. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from the [Chief] Forester, G. Pinchot, to District Forester, Denver, Oct. 5, 1909.

22. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from M. C. Burch, Special Assistant to the Attorney General, to Attorney General G. W. Wickersham, Feb. 21. 1910.

23. NA, RG 95, FS, TM, Timber Sales, Series 70, memorandum from Assistant [Chief] Forester W. T. Cox to District Forester, Denver, June 11, 1909.

24. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from Assistant [Chief] Forester W. T. Cox to S. Riley, District Forester, Denver, June 11, 1909.

25, 26. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from Assistant [Chief]Forester W. B. Greeley to District Foresters, Feb. 9, 1914.

27. NA, RG 95, FS, TM, Timber Sales, Series 70, letters from Assistant [Chief]Forester, W. B. Greeley, to the District Forester, Denver, Sept. 1, 1914, and Aug. 21, 1914.

28. NA, RG 95, FS, TM, Timber Sales, Series 70, Forest Examiner, Earl B. Tanner, District 2, "Appraisal Report," Dec. 1, 1915. The Fox Park unit was estimated to contain 975,000 railroad ties (33 MM board feet) and 13 MM board feet of sawlogs.

29. NA, RG 95, FS, TM, Timber Sales, Series 70, memorandum from Assistant [Chief] Forester, W. B. Greeley, to District Forester, Denver, Oct. 2, 1915.

30. NA, RG 95, FS, TM, Timber Sales, Series 70, Logging Engineer, J. A. Donery, District 2, "Appraisal Report," Apr. 23, 1928.

31. NA, RG 95, FS, TM, Timber Sales, Series 70, confidential memorandum from Forest Examiner J. H. Potts, Region 2, to the [Chief]Forester, Nov. 7, 1914.

32. NA, RG 95, FS, TM, Timber Sales, Series 70, C. M. Granger memorandum to the record, Region 2, Aug. 2, 1917.

33. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from Clinton G. Smith to the [Chief] Forester, Dec. 1, 1918.

34. NA, RG 95, FS, TM, Timber Sales, Series 70, memorandum from Eugene S. Bruce, lumberman, to the [Chief] Forester, May 22, 1909.

35. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from Associate [Chief] Forester A. F. Potter to Commissioner of Indian Affairs, Aug. 26, 1913. And, memorandum from E. H. Clapp, Forest Inspector, to the [Chief] Forester, H. S. Graves, July 2, 1913.

36. Memorandum from E. H. Clapp to H. S. Graves, July 2, 1913.

37. NA, RG 95, FS, TM, Timber Sales, Series 70, Q. Randles, Region 3, "Reappraisal [readjustment] Report," Dec. 21, 1923.

38. USDA, FS, Service Bulletin, Vol. 17, No. 6 (March 12, 1934): 1, 2.

39. NA, RG 95, FS, TM, Timber Sales, Series 70, memorandum from J. A. Fitzwater, Washington Office, to District Forester, Albuquerque, N. Mex., Jan. 11, 1934.

40. NA, RG 95, FS, TM, Timber Sales, Series 70, memorandum from Assistant [Chief] Forester W. B. Greeley to District Forester, Albuquerque, N. Mex., Nov. 27, 1912.

41. NA, RG 95, FS, TM, Timber Sales, Series 70, memorandum from District Forester A. C. Ringland to the [Chief] Forester, Feb. 17, 1913.

42. NA, RG 95, FS, TM, Timber Sales, Series 70, memorandum from District Forester A. C. Ringland to the [Chief] Forester, Jan 17, 1913.

43. NA, RG 95, FS, TM, Timber Sales, Series 70, S. G. Smith and A. B. Recknagel, "Appraisal Report," July 15, 1911.

44. NA, RG 95, FS, TM, Timber Sales, Series 70, memorandum from A. O. Waha, Acting District Forester, to the [Chief] Forester, Nov. 6, 1912.

45. NA, RG 95, FS, TM, Timber Sales, Series 70, E. E. Carter, Acting Assistant [Chief] Forester, "Report: History of the Case," Aug. 18, 1919.

46. NA, RG 95, FS, TM, Timber Sales, Series 70, Quincy Randles, "Report of the Marking Board," May 13, 1916. (The board members included Assistant District Forester Ovid M. Butler; Forest Supervisors C. H. Hinderer (Prescott); and John D. Guthrie (Coconino); and Forest Examiners Joseph C. Kircher, Gordon T. Backus, Clarence F. Korstian, and Randles). Randles wrote a humorous spoof of appraising in these early years; see "Fable of Stumpage Appraisals" in John Guthrie's Fables for Foresters (Washington: Forestry Enterprises, 1953) pp. 42-45.

47. NA, RG 95, FS, TM, Timber Sales, Series 70, memorandum from the District Forester, Albuquerque, N. Mex., to the [Chief] Forester, Sept. 17, 1917.

48. This appears to have been the same George M. Humphrey who was later Secretary of the Treasury in the Eisenhower Cabinet.

49. NA, RG 95, FS, TM, Timber Sales, Series 70, memorandum from Raymond E. Marsh, Acting District Forester, to the [Chief] Forester, Feb. 13, 1920, (Enclosed was the "Lang/Randles Report," Feb. 18, 1920, and the comment, "I concur.")

50. NA, RG 95, FS, TM, Timber Sales, Series 70, telegram from G. M. Humphrey to E. E. Carter, Feb. 2, 1921.

51. NA, RG 95, FS, TM, Timber Sales, Series 64, Gordon Bade, District Ranger, "Reappraisal Report," June 10, 1941. (Approved by F. J. Monighan and Quincy Randles).

52. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from J. G. McNary to Regional Forester F. C. W. Pooler, July 24, 1931. (McNary stated that the "Rock Top Report" took 2 years and cost $9,000.)

53. The base period for prices was the 3-year period, 1941-43. Costs in 1943 were $3.72 per M higher than the 3-year average, but selling prices, too, were $3.07 higher. This made the 3-year averge conversion return ($8.91) similar to the latest year ($8.25).

54. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from Forest Inspector J. Rothery to E. E. Carter, chief of Timber Management, May 1, 1944.

55, 56. NA, RG 95, FS, TM, Timber Sales, Series 64, letter from C. J. Warren, vice president of Southwest Lumber Mills, Inc., to Regional Forester F. C. W. Pooler, June 16, 1944.

57. NA, RG 95, FS, TM, Timber Sales, Series 64, Chevalon District Ranger Henry V. Allen, Jr., "Reappraisal Report," Apr. 25, 1949. (Approved by Otto Lindh, Assistant Regional Forester.)

58. NA, RG 95, FS, TM, Timber Sales, Series 64, letter from Regional Forester Phillip V. Woodhead to the [Chief] Forester, Apr. 29, 1947. (Woodhead noted that recent Indian Service sales had gone for $5.10 to as high as $13.26 per M.)

59. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from H. E. Ochsner, assistant chief, to I. J. Mason, chief of Timber Management, May 5, 1947.

60. NA, RG 95, FS, TM, Timber Sales, Series 64, letter from J. G. McNary, president of Southwest Lumber Mills, Inc., to Sen. Clinton P. Anderson, 1947 (n.d.)

61. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from Assistant Chief Forester W. T. Cox to District Forester, Region 4, Feb. 8, 1909.

62. NA, RG 95, FS, TM, Timber Sales, Series 64, letter from Edward A. Sherman, Assistant Forester, to the [Chief] Forester, Oct 11, 1913.

63. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from Assistant Forester W. B. Greeley to District Foresters (2 and 4), Denver and Ogden, Sept. 16, 1913.

64. NA, RG 95, FS, TM, Timber Sales, Series 70, D. F. Seerey, District 4, "Reappraisal Report," Mar. 27, 1915, and R. Y. Stuart, "Review Memorandum," Apr. 3, 1915.

65. NA, RG 95, FS, TM, Timber Sales, Series 70, memorandum for U. S. Swartz, logging engineer, Region 4,to Forest Management, Washington Office, Mar. 19, 1930, and memorandum from J. A. Fitzwater, Washington Office, to District Forester, Ogden, Utah, Sept. 29, 1928.

66. Compare the converting factors in clause no. 8 of the Timber Sale Contract dated May 9, 1923 (exp. date, Oct. 31, 1933) with converting factors used in Region 1.

67. NA, RG 95, FS, TM, Timber Sales, Series 70, letters from Acting [Chief] Forester L. F. Kneipp to Regional Forester, Ogden, Utah, Mar. 28, 1930, and Sept. 19, 1930. (The latter is an application for cancellation by Montana and Idaho Pole Co.)

68. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from E. Winkler (for R. H. Rutledge) to the Chief, May 19, 1936 (The title of Forester was changed to Chief in 1935.)

69. NA, RG 95, FS, TM, Timber Sales, Series 70, logging engineer J. W. Girard, District 1, "Timber Sale Report," Nov. 21, 1921. And, letter from Acting [Chief] Forester Albert F. Potter to Regional Forester, July 10, 1915. (The letter approved rates of 6.5 cents per tie; 0.5 cents per lineal foot for mine props; and $1 per M for sawtimber.)

70. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from Acting Chief J. A. Fitzwater to Regional Forester, Ogden, Utah, May 25, 1936.

71. See note 69, above.

72. NA, RG 95, FS, TM, Timber Sales, Series 70, U. S. Swartz, District 4, "Reappraisal Report," Sept. 18, 1927.

73. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from L. F. Kneipp to the [Chief] Forester, Aug. 17, 1917.

74. From personal conversations by the author with field personnel.

75. Washington National Record Center, Records of the Forest Service, Timber Management, Timber Sales, A. W. Sump and W. C. Callender, "Review of Appraisal," May 4, 1960, and, memorandum from Assistant Chief Edward P. Cliff (for Chief Richard E. McArdle) to Region 4, Mar. 15, 1960.

76. Washington National Records Center, Records of the Forest Service, Timber Management, Timber Sales, B. Brown and D. Marsolek, "Rate Redetermination Report," Apr. 30, 1971, (approved by R. H. Tracy and M. Galbraith). And, memorandum from Associate Deputy Chief J. W. Deinema to Region 4, May 10, 1971. And, memorandum from Deputy Chief E. W. Schultz to Region 4, July 21, 1971.

77. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from William T. Cox, Assistant [Chief] Forester, to District 5, Feb. 9, 1909.

78. The form 202 (revised Oct 15, 1911) contract for this sale is in NA, RG 95, FS, TM, Timber Sales, Series 70, District 5, Box 39, "Sierra National Forest Timber Sales."

79. USDA, FS, "Report of the [Chief] Forester for fiscal year 1913," (Washington, D.C.: Government Printing Office, 1913).

80. The standard "more-or-less" provision applies to what are known as "sales by area." The "sale by amount" contract, which is seldom used, provides a guaranteed volume, excepting only fire or natural catastrophic damage.

81. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from District Forester C. DuBois to the [Chief] Forester, July 22, 1912. (In 1979, no. 3 common and poorer grades accounted for more than 40 percent of the lumber produced from ponderosa

pine, which means that nearly half the material now used for lumber was considered "cull" in the early days, and was presumably burned. If early grading rules were tougher, the difference may have been even greater.)

82. NA, RG 95, FS, TM, Timber Sales, Series 70, District 5, letter from District Forester C. DuBois to the [Chief] Forester, Aug. 31, 1916.

83. NA, RG 95, FS, TM, Timber Sales, Series 70, S. Berry, District 5, "Appraisal Report," Aug. 2, 1916.

84. NA, RG 95, FS, TM, Timber Sales, Series 70, J. C. Elliott, District 5, and S. Berry, "Reappraisal Report," Dec. 11, 1913.

85. NA, RG 95, FS, TM, Timber Sales, Series 70, District 5, A. Cary, "Reappraisal Review," Jan. 7, 1914.

86. NA, RG 95, FS, TM, Timber Sales, Series 70, memorandum from H. S. Graves to the District Forester, Feb. 4, 1914.

87. NA, RG 95, FS, TM, Timber Sales, Series 70, J. H. Price, District 5, "Appraisal Report," June 29, 1920.

88. The contract was modified on July 20, 1932. The Mason and Stevens report os mentioned in the contract modification papers.

89. NA, RG 95, FS, TM, Timber Sales, Series 70, J. H. Price, District 5, "Appraisal Report," Dec. 14, 1921.

90. NA, RG 95, FS, TM, Timber Sales, Series 70, J. R. Berry, Region E, "Reappraisal Report," June 7, 1935. (Berry also reported 60 percent donkey logging and 40 percent tractor logging. His new estimate was for 70 percent tractor logging.)

91. NA, RG 95, FS, TM, Timber Sales, Series 70, C. L. Tebbe, Region 5, "Reappraisal Report," March 2, 1936.

92. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from Forest Inspector J. Rothery to I. J. Mason, Washington Office, chief of Timber Management, Jan. 24, 1945.

93. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from Forest Inspector J. Rothery to I. Mason, Jan. 30, 1942.

94. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from District Forester G. H. Cecil to the [Chief] Forester, June 1, 1912.

95. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from A. Cary to W. H. Gibbons, March 6, 1914.

96. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from W. B. Greeley to the Chief Forester, Aug. 29, 1911.

97. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from G. H. Cecil to the [Chief] Forester, Sept. 29, 1911.

98. Memorandum (author unknown) in files of Portland Office, Forest Service, May 16, 1911.

99. NA, RG 95, FS, TM, Timber Sales, Series 70, W. T. Andrews, "Appraisal Report," August 8, 1914.

100. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from District Forester, Portland, Oreg., to Forest Supervisors, June 17, 1909.

101. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from District Forester G. H. Cecil to the [Chief] Forester, Feb. 18, 1916.

102. NA, RG 95, FS, TM, Timber Sales, Series 70, District 6, Portland, Oreg., "Prospectus" and "Appraisal Report," Nov. 4, 1914.

103. In calendar year 1979, average inland ponderosa pine produced 40.8 percent common and 14.5 percent no. 3 shop grade lumber, but only 1.6 percent box grade lumber.

104. NA, RG 95, FS, TM, Timber Sales, Series 70, W. H. Gibbons, District 6, "Report on Stumpage Price Revision," Dec. 14, 1919. (The timber was appraised with a log haul to Kirk, Oreg., with a rail freight haul to the mill at the south end of Upper Klamath Lake.)

105. NA, RG 95, FS, TM, Timber Sales, Series 70, B. Hoffman, District 6, "Rate Reappraisal Report," Oct 20, 1922.

106. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from Acting District Forester E. N. Kavanaugh to the [Chief] Forester, Dec, 9, 1919. (Kavanaugh reported that the company would rather pay for the timber and leave it in the woods than go back after it.)

107. NA, RG 95, FS, TM, Timber Sales, Series 70, B. Hoffman, District 6, "Damage Appraisal Report," Mar. 18, 1922, and Oct. 20, 1922.

108. NA, RG 95, FS, TM, Timber Sales, Series 70, "Memorandum on 1925 Reappraisal," by E. E. Carter, Assistant [Chief] Forester, Dec. 31, 1925.

109. NA, RG 95, FS, TM, Timber Sales, Series 70, Bear Valley unit, District 6, "Sale Prospectus," 1922.

110. NA, RG 95, FS, TM, Timber Sales, Series 70, memorandum from District Forester, Portland, Oreg., to the [Chief] Forester, May 6, 1923. (The sale had been advertised for 6 months prior to the bid opening.)

111. U.S. Congress, Senate Resolution 332, 69th Congress, 2d session, Jan. 24, 1927.

112. U.S. Congress, "Senate Report on Herrick Timber Contract," Malheur National Forest, Oreg.,

Committee on Public Lands and Surveys, 69th Congress, 2d session, Mar. 3, 1927. See also Washington Evening Star, Mar. 2, 1927, "Senate Committee Exonerates Forest Service of Charge of Fraud in Awarding Herrick Contract."

113. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from [Chief] Forester W. B. Greeley to Herrick Lumber Co., Dec. 1, 1927.

114. NA, RG 95, FS, TM, Timber Sales, Series 70, statement by Blaine Hallock, attorney for Herrick Lumber Co., Dec. 31, 1931, summarizing the cancellation, new bid by Hines, and subsequent events.

115. U.S. Congress, House, H.R. 6089, 72d Congress, 1st session, Dec. 16, 1931; and U.S. Congress, Senate, S 2003, 72d Congress, 1st session, Dec. 16, 1931, and U.S. Congress, Senate, S3822, 72d Congress, 2d session, Feb. 24, 1932; and U.S. Congress, Senate, S 250, 73rd Congress, 1st session, Mar. 9, 1933; and U.S. Congress, House, H.R. 4967, 73rd Congress, 1st session, Apr. 12, 1933; and U.S. Congress, Senate, S 491, 74th Congress, 1st session, Apr 9, 1935. Also see letter from W. S. Bennett, attorney for Hines, to Blaine Hallock, attorney for Herrick, Dec. 8, 1931, NA, RG 95, FS, TM, Timber Sales, Series 70. (Bennett points out that Hines did indeed bid $2.86 for pine, and did post a $50,000 bond; replacing Herrick's previous bond.)

116. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from Ralph J. Hines, president of Hines Western Pine Co., to Fred Ames, District 6, May 31, 1934.

117. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from E. E. Carter, Assistant Chief, to the files, Mar. 22, 1937.

118. NA, RG 95, FS, TM, Timber Sales, Series 64, N. L. Wright, District 6, "Appraisal Report," Aug. 13, 1941. (400 MM were in Bear Creek and 150 MM in Calamity Creek.)

119. NA, RG 95, FS, TM, Timber Sales, Series 64, letter from E. E. Carter to the Acting Chief, Mar. 19, 1942.

120. NA, RG 95, FS, TM, Timber Sales, Series 64, Region 6, "Reappraisal Reports:" N. L. Wright, Nov. 15, 1946, Nov. 18, 1947, and Dec. 9, 1948; L. J. McPherson, Mar. 7, 1950, Mar. 21, 1951, Feb. 18, 1952. WNRC, FS, TM, Timber Sales, Region 6, "Reappraisal Reports," L. J. McPherson, Mar. 17, 1953, Mar. 4, 1954, Mar. 22, 1955, Mar. 12. 1956, June 7, 1957, Nov. 14, 1958, May 18, 1959, Apr. 14, 1960, May 16, 1961; H. Woolschlager, Mar. 30, 1962.

121. NA, RG 95, FS, TM, Timber Sales, Series 64, N. L. Wright, District 6, "Reappraisal Report," Nov. 18, 1947.

122. See note 120 above.

123. Indexes of Western Pine Association (later named Western Wood Products Association).

124. NA, RG 95, FS, TM, Timber Sales, Series 64, Region 6, W. D. Bryan, "Reappraisal Report," Mar. 2, 1939.

125. NA, RG 95, FS, TM, Timber Sales, Series 70, District 6, O. F. Ericson, "Appraisal Report," Aug. 19, 1929.

126. NA, RG 95, FS, TM, Timber Sales, Series 64, Region 6, Newell L. Wright, "Reappraisal Reports," Nov. 3, 1940; Oct. 23, 1943; and Dec. 1, 1946.

127. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from Peter Schafer to F. A. Silcox, Feb. 25, 1937.

128. NA, RG 95, FS, TM, Timber Sales, Series 70, Region 6, letter from F. H. Brundage (for District Forester C. J. Buck) to Peter Schafer, March 1, 1937.

129. NA, RG 95, FS, TM, Timber Sales, Series 64, Region 6, N. L. Wright, "Reappraisal Report," Oct. 23, 1943.

130, 131. NA, RG 95, FS, TM, Timber Sales, Series 64, Region 6, telegram from Chris Granger (by B. H. Payne) to the Regional Forester Nov. 28, 1949, approving the $9.50 rate. And, review memorandum by W. E. Bates, Nov. 28, 1949, reported that Olympic Forest recommended no change in rates, but that Bates recommended a raise.

132. WNRC, FS, TM, Timber Sales, letter from Thomas H. Burgess (for Regional Forester J. Herbert Stone) to Schafer Bros., May 30, 1951.

133. WNRC, FS, TM, Timber Sales, Schafer Bros. Logging Co. with Simpson Industries, Inc., a 3d party agreement, May 12, 1955.

134. WNRC, FS, TM, Timber Sales, letter from Walter H. Lund (for Regional Forester J. H. Stone) to Simpson Industries, Inc., May 26, 1958.

135. The studies were supervised by Elmer Matson, Edward Clark, Paul Lane, and others. Sponsored by the Pacific Northwest Forest and Range Experiment Station, the studies produced reports no. PNW 82 (lumber) and PNW 125 (plywood).

136. WNRC, FS, TM, Timber Sales, letter from Avon Denham (for J. H. Stone) to Simpson Industries, Inc., Aug 30, 1960.

137. WNRC, FS, TM, Timber Sales, letter from J. H. Stone to Simpson Industries, Inc., May 22, 1962. (The 1962 rates also provided, in section 3A-2d, that whenever downward escalation was inhibited by minimum rates, no increase would become effective until offset by credits equaling the previous ineffective downward adjustment.)

138. WNRC, FS, TM, Timber Sales, letter from Regional Forester Charles A. Connaughton to Simpson Industries, Inc., May 29, 1968.

139. Recommended by cost accountant Warren Anderson and the author.

140. The indexes are based on prices per M board feet (lumber) or per M square feet (plywood). Since they are applied to stumpage, which is measured in M board feet log scale, adjustments were needed because logs yield 2.4 M square feet of plywood (3/8 inch) per M board feet of logs.

141. WNRC, FS, TM, Timber Sales, letter from M. M. Johannesen (for J. H. Stone) to Simpson Industries, Inc., Jan. 6, 1970.

142. NA, RG 95, FS, Office of the Chief, Minutes of the Service Committee.

143. Sauk-Stillaguamish sale.

Section III:

Significant Pulpwood Sales

From the time of Gifford Pinchot on, Forest Service leaders were aware of the need for pulpmills in the vicinity of National Forests. Pulpmills prevented waste by providing a market for low-grade top logs that would otherwise be left on the ground to rot, to be deliberately burned as slash, or to create high fire hazards. Particularly in the West, where dry summers posed intolerable fire risks, such slash had to be burned after the first fall rains, when it was safe to do so, to preclude accidental holocausts.

Southeastern Alaska

Nowhere was the need for pulpmills felt more keenly than in Alaska, where 75 percent of the old-growth timber was defective hemlock. Until the 1950's, hemlock was considered an inferior species for lumber, even in Oregon and Washington. Lumbermen would take hemlock if forced to do so, but its value as stumpage was minimal--and often negative. Appraisals of pulpwood value were difficult, because pulpwood was often a byproduct left over from logging sawlogs for lumber mills. Usually, pulpwood was appraised at a minimum of 50 cents per M board feet, or 30 cents per 100 cubic feet (one "cunit"). To "carry" the loss on hemlock destined to be pulpwood, reductions were made to the appraised prices of the more valuable Douglas-fir. (See Satsop River Sawtimber Sale, Region 6, near the end of the previous section.)

Although plentiful and of comparable quality, Alaska's hemlock was of lower value than Puget Sound's because it was less accessible.[1] It was widely believed that pulpmills offered the only way to make use of it. Many proposals were received after the Government made known its interest in supplying raw materials for pulpmills. To be able to respond to early inquiries, the Government hired Henry E. Surface, an expert on pulp and paper. From 1914 to 1920, Surface investigated pulp opportunities and examined potential millsites in Alaska, and he produced a 56-page memorandum on "Conditions Existing for the Manufacture of Pulp and Paper in Southeast Alaska."[2] During the 1920's, when William B. Greeley was Chief Forester, even greater emphasis was placed on the need for pulpmills in Alaska. The year Surface left, Greeley summarized the history of Alaskan pulpmill efforts for the Secretary of Agriculture: "As early as 1910, when a pulp plant in Alaska was considered impracticable, the Service made examinations and compiled data in response to an inquiry by a man who believed it practicable."[3] Backed by Norwegian capital, the man demanded extraordinary concessions, such as a 99-year contract with renewable privileges, and no reappraisal for 25 years. Understandably, the Forest Service would not grant such concessions, and that proposal was rejected. Two years later, an application for 600,000 cords of pulpwood in the Stikine River drainage resulted in an advertised sale of that amount. The sale, however, was never made, because the applicant failed to get financial backing. Two other applications, for 2 million cords each on a 25-year sale, reached the contract stage, but they, too, fell through because of financing failures.

Finally, in 1920, the year Greeley wrote the report, a 100-MM-board-foot sale was bought by Alaska Pulp & Paper Co. Edward E. Carter reported that the company had "built a small pulpmill at the Tease Lake site on Port Snettisham."[4] The previous year he had written that:

> A. P. & P. was not operating their Port Snettisham plant....The price of pulp has been below the 1919 peak, and the company claims they cannot operate at a profit. It will be 5 years before any appreciable quantity of newsprint comes from Alaska.[5]

Carter's prediction proved to be optimistic; it was more than 40 years before Alaskan pulpmills produced anything in quantity, and the product was market pulp, not newsprint. In 1925, 3 years after market declines shut down the mill, the contract was canceled.

Two other pulpwood sale failures of this period were West Admiralty Island, 3.35 MM cunits, and Cascade Creek, 3.34 MM cunits, for which bids were opened January 14, 1921, and May 1, 1923, respectively. (A cunit equals 100 cubic feet.) Greeley's report noted that in each of these sales proposals:

> ...the initial stumpage price was 50¢ per cord for spruce and 25¢ per cord for hemlock [with] readjustments of stumpage prices...at 5-year intervals during the life of the sale...as a means of preventing speculation in Government property.[6]

Although Greeley gave no explanation of how the appraised prices of 50 cents and 25 cents per cord were determined, they were probably the minimum rates equivalent to $1 per M board feet for spruce and 50 cents per M board feet for hemlock. Early sales in Oregon and Washington indicate that these figures were tied to sales in those States. The 1916 West Fork Mill & Lumber Co. sale on Mt. Hood (West Fork Hood River-Oregon National Forest) had 50 MM board feet of hemlock at 50 cents per M, unchanged by 1921 and 1924 rate readjustments.[7] Similarly, the 1922 Sauk River Lumber Co. sale on the Snoqualmie National Forest had 55 MM board feet of hemlock, again at 50 cents per M. Subsequent reappraisals resulted in a rate increase of 5 cents to 55 cents per M in 1929 and none thereafter.[8]

A memorandum in the National Archives seems to confirm the minimum stumpage price hypothesis. It established minimum rates "in accordance with Regulation S-4 of the Manual" for Alaska with

spruce at $1 per M; hemlock, 50 cents per M; and cedar, $1 per M.

Greeley remained eager to foster a paper industry in Alaska, and price would obviously play an important role in the process. First, however, he had to find a successor to Henry Surface. In 1923, he wrote:

> We have got to get a paper industry established in Alaska within the next 3 or 4 years if it is humanly possible to do so. This is one of the major objectives of the Forest Service....We could do it if we had a real expert on Alaskan timber and on paper manufacturing [a successor to Henry Surface], constantly on the job getting in touch with people interested, following up prospects, keeping thoroughly posted on market and transportation conditions and functioning as an expert salesman in a legitimate and proper way.[10]

B. Frank Heintzleman was hired to continue the job Henry Surface had begun. He was successful in doing the job Greeley intended him for, but not in the 3 to 4 years Greeley had estimated. So well did Heintzleman eventually succeed, however, that he became Regional Forester in Alaska, and later Territorial Governor.

While Greeley was decrying the lack of an expert on Alaskan timber, Carter was updating Greeley's summary. He reported that a 2-billion-board-foot sale on Thomas Bay had been advertised, and that a bid had been received from Alaskan-American Paper Corp. on a 600-MMBF sale on Shrimp Bay.[11]

Throughout this early period in Alaska, stumpage prices in British Columbia were of particular interest as a basis for comparison. In the mid-1920's, Leon F. Kneipp wrote a memorandum that discussed the matter. He reported several categories of sales in British Columbia, and several stumpage rates by species:[12]

> 21-year leases: 50 cents per M royalty + 2 cents per M annual fee, all species.
>
> Timber licenses: 22 cents per acre + 2.5 cents protection fee, plus royalty of 87 cents per M (coastal) for all sawtimber species.
>
> Pulp licenses: one-half of timber license fee + 25 cents per cord.
>
> Stumpage (excluding royalties, protection, etc.): fir, $1.13 per M; hemlock, 22 cents per M; white pine, $1 per M; spruce, 70 cents per M.

As Kneipp noted, British Columbia added a protection fee to every sale. The Forest Service, too, was concerned about protection measures in Alaska, but demonstrated that concern in a different way. In 1928, logging was approved on Afognak Island, provided that a 150-foot strip was left along the main watercourses.[13] From that time, increasingly stringent protection requirements affected reappraisals.

The Ketchikan Unit Sale

In April 1927, the Forest Service received what appeared to be good news: it received bids for 8.35 MM cunits (5 billion board feet) each on the Ketchikan pulpwood unit (awarded May 15) and the Juneau unit (awarded May 25).[14]

Both sales were advertised at 60 cents per cunit for spruce and 30 cents per cunit for hemlock. At conversion rates of 6 board feet per cubic foot, these stumpage rates came to $1 per M for spruce and 50 cents per M for hemlock. A conversion factor of 5.5 board feet per cubic foot was later accepted as more accurate, and at that conversion, the sale price was $1.09 per M for spruce and 55 cents per M for hemlock.

The Ketchikan unit received two bids: one from International Paper Co. at 90 cents for spruce and 30 cents for hemlock; and one from I. & J. D. Zellerbach at 80 cents for spruce and 40 cents for hemlock. Because 75 percent of the sale comprised hemlock, Zellerbach's bid was the higher of the two.

The Juneau unit, which included all of Admiralty Island and most of Chichagof and Yakobi Islands, received one bid. George T. Cameron, published of the San Francisco Chronicle, submitted a joint venture bid with the Los Angeles Examiner at the advertised price.

Zellerbach and Cameron were given conditional awards subject to their receipt of power licenses from the Federal Power Commission. Both applicants seem to have pursued their licenses diligently; unfortunately, the commission, operating in a new area, became bogged down in bureaucratic delays. Although the Forest Service granted extensions, the applicants did not receive their permits until November 25, 1930 --42 months after they applied and well into the Depression. Market conditions were so depressed by the time they received their permits that both companies, despite the effort they had expended, declined to execute final contracts. Three years later the contracts were canceled, with the Forest Service retaining $5,000 damages on each.

The Depression and red tape thus aborted the first big push for pulpmills in Alaska. It was not until 1947 that the Ketchikan unit was advertised again. The appraisal for this attempt to move this timber brought together some of the most influential names from that Forest Service era: Jim Girard from the Washington Office, Newell Wright from Portland, and Julian Rothery. Girard thought the Ketchikan stumpage rate appraisals shoud be based on discounted Puget Sound log prices, with a reserved right to use end product pulp as the appraisal base:

> I have collected information from Western Oregon & Washington hemlock and white fir sales in 1941-43. The stumpage price [averaged] $2.25 per M ....I do not believe that the initial stumpage [in Alaska] should be over $1.50 per M or 75¢ per Ccf [cunit] for hemlock and $2.00 per M or $1.00 per Ccf for the small spruce [used as pulpwood]....[15]

Girard noted that the Ketchikan appraisal would have to be a a "shot in the dark" because of lack of information, but that if industry came later, the Region could "build up a sound basis for reappraisal from actual operating records."[16]

When the contract for this landmark sale was finally written, it contained certain proposals that Julian Rothery originally made to Region 10 Forester Frank Heintzleman. In 1944, Rothery wrote:

> ...a pulp or paper mill will locate in Alaska essentially for one reason... that the cost of logs will...be low enough to offset the disadvantage of a mill in Alaska, as compared to one, say, in Oregon or Washington....In my opinion...a purchaser would be justified in asking that in reappraisals increases [in stumpage] should not be made which would bring the total estimated cost of logs...to more, let us say, than 80 or 90 percent of the log price for pulpwood species in Puget Sound....[17]

In the same memo, Rothery cited "camp run" average hemlock prices for Puget Sound:

1937	$12.97 per M
1938	9.56 per M
1939	11.31 per M
1940	13.14 per M
1941	15.11 per M
1942	19.68 per M

Assistant Chief Forester Christopher M. Granger also considered the problem of keeping Alaska's pulpwood operations competitive with those in the more hospitable Puget Sound area. After discussions with Girard, Carter, and Ira Mason, he wrote to Region 10 about the proposed Ketchikan sale:

> It seems to us that we will pretty nearly have to carry reappraisal computations through the manufacture of pulp, as otherwise there seems no way of easily determining how much advantage the operator must have as to log cost over Puget Sound in order to offset the presumably higher cost of manufacturing pulp under Alaska conditions....[18]

The contract ultimately provided some "sideboard" guarantees to the purchaser to insure adequate compensation for the rigors of Alaskan operations. It provided that standard appraisal procedures would be used, with specific exceptions, one of which was that, through the 1969 reappraisal, log costs at Ketchikan--including stumpage--should be no greater than 75 percent of the equivalent costs to pulpmills in Puget Sound.

Newell Wright had made a somewhat different proposal. After a 1947 visit to Alaska, he noted that the estimated pulp manufacturing cost in Alaska was $63 per ton, compared to $58.50 in Puget Sound. He used this discrepancy to justify his proposal that, rather than a 75 percent factor, a 60 percent factor be used in the early stages of Ketchikan operations, changing to 75 percent later. Wright felt that the 60 percent figure would provide a "cushion for contingencies."[19]

Despite the lack of information on pulpwood stumpage in Alaska, it is possible that the stumpage value eventually set for the Ketchikan sale was influenced by stumpage prices on the South Hood Bay sale of the same period. Sold only 2 months after the 1947 Ketchikan sale that drew no bids, the South Hood Bay sale was for 45 MM board feet on the west side of Admiralty Island. For this sale, Sitka spruce was appraised and sold at $2.10 per M and hemlock at $1.15 per M ($1.16 per cunit for spruce and 63 cents per cunit for hemlock).[20]

The South Hood Bay hemlock appraisal included the following:

Selling price (pond value)		$23.98
Stump to truck	$11.10	
1.5-mile haul @ $1.60 per mile	2.40	
Camp and crew hand	1.45	
Supervision	1.00	
Boom and raft	1.75	
3.75 miles of road @ $29,700 per mile	2.50	20.20
Conversion return		3.78
Stumpage (valuation factor 30% of conversion)		1.14
Profit ratio		11%

Unlike the Ketchikan sale, the South Hood Bay sale proceeded in an orderly fashion and was completed by 1951.

After more than 3 years of appraisal discussions, the Ketchikan unit was offered for sale once again in 1947. When no bids were received on the December 15 bid opening, the Forest Service extended the bid period 4 months for possible private sale. Still, no bids came in. At the request of Puget Sound Pulp & Timber Co., the sale was readvertised for an August 2, 1948, bid opening.[21] In the interim, the applicant organized a joint venture with American Viscose Co., calling the new entity Ketchikan Pulp & Paper Co.

This time, a bid was received and a conditional award given again, as it had been in 1927. Again, the Forest Service was forced to extend the award's pulpmill construction deadlines--from 1948 to 1950, and ultimately to 1954. In exchange for the extensions, the company agreed to undertake certain effluent disposal measures. It also accepted an increase from 5 to 15 cents

per cunit for pulp material and from 10 to 20 cents per M for sawlogs.[22] (See table 1.) The increase covered Knutson-Vandenberg Act (K-V) sale area improvement costs, principally tree planting or seeding, and occasionally pruning or precommercial thinning.[23]

Puget Sound Pulp & Timber Co. had been the successful bidder on the failed 1929 South Fork Stillaguamish River sale on Mt. Baker National Forest. More than 2 decades later, the same company, under a new name, Ketchikan Pulp & Paper, was responsible for building Alaska's first pulpmill. Final award of the Ketchikan sale was made on July 26, 1951, and later that year, the company shortened its name to Ketchikan Pulp Co.

Pulp operations finally began in 1954 at the rate of 500 tons per day. Two years later, the contract was amended to convert from bid prices of 80 and 40 cents per cunit (hundred cubic feet) to prices per M board feet (40-foot, long-log scale). The final conversion factor was 5.5 board feet per cubic foot, or 550 board feet per cunit--the figure specified in the "Conditions of Sale" section of the Sale Prospectus.[24] The amendment was made to accommodate rules of the independent Log Scaling and Grading Bureaus of the Pacific Northwest because a check scale by George Jackson showed a 3 percent difference between Forest Service west side log scaling methods and those used by the bureaus which are universally accepted in that Region by major companies. Using revised weights of pulplogs and sawlogs, the conversion produced the following rates:

Spruce	$1.99 + 25 cents K-V =	$2.24
Hemlock	$1.57 + 25 cents K-V =	$1.82
Cedar		$1.50
Other		$2.00

From the time the pulpmill began operations in 1954 to the time of the first rate redetermination in 1964, more than 1 billion board feet had been logged, and production was up to 600 tons per day. Although the 1964 reappraisal was the first real reappraisal of a going pulp developmental sale, the result was anticlimactic: There was no rate change.[25]

The first stumpage rate increase on the Ketchikan sale came from the 1969 reappraisal, based on the standard appraisal method of the day. This method used local log prices as reported by the local companies. Most of the transactions were negotiated with local "gypo" loggers who were nominally but not completely independent of the pulp companies; therefore, the log prices tended to resemble what pulp companies were able to get loggers to accept, rather than an independent buyer-seller relationship.

Region 6 had noted a similar loss of independent buyer-seller relationships in the Puget Sound and Columbia River areas when it switched from log prices to lumber and plywood end-product appraisals in 1957.

M. E. Chelstad based his reappraisal on 1967 rather than 1968 prices, even though 1968 costs and prices were available to the Forest Service at the time. This, however, was the "standard method in use" by the Forest Service. The rates he developed were $17.03 for spruce and $3.64 for hemlock. The Chief's office lowered the rates to $16.73 for spruce and $3.49 for hemlock. The company subsequently used Rothery's contract formula to appeal the reappraised rates to the Secretary of Agriculture. Log prices in the Puget Sound area were relatively low in 1967. A

Table 1. Winning bid price, Ketchikan pulpwood sale, Alaska Region, 1948

Product	K-V[1]	Bid	Stumpage Plus K-V	Unit of measure
	----------Dollars----------			
1.5 MM cu. ft. of logs for pulp	0.05	0.85	0.90	Ccf[2]
Spruce sawlogs (26-inch+)	.10	3.00	3.10	MBF
Hemlock and other sawlogs	.10	2.00	2.10	MBF
Cedar logs	.10	2.50	1.60	MBF
Poles and piling				
to 95 feet	--[3]	.01	.01	lin. ft.
over 95 feet	--	.015	.015	lin. ft.

[1]Knutson-Vandenberg Act deposits for timber stand improvement, virtually all tree planting or seeding.

[2]--Ccf, also known as cunits, are equal to 100 cubic feet.

[3]--=not applicable or not available.

Source: National Archives, Record Group 95, Records of the Forest Service, Division of Timber Management.

comparison of Alaskan log costs to Puget Sound log prices that year showed Alaska's costs to be more than 75 percent of Puget Sound's domestic log prices. However, they were less than 75 percent of Puget Sound's 1968 log prices. Had Chelstad been allowed to base his reappraisal on 1968 figures, the reappraised prices would have been even higher than those the company appealed and would not have been appealable.

After an extensive review, by a three-person Rate Review Board (appointed under the 1951 contract's terms), followed by a second set of hearings by the Department's Board of Forest Appeals, it was concluded that the appraisal had correctly followed the "standard method," which at the time was based on 1967 data.[26] Nevertheless, under the terms of the original contract, prices could not be higher than 75 percent of Puget Sound's prices, and the reappraisal rates, however correctly determined, violated that provision. The decision was that rates should be lowered from the reappraised rates of $16.73 and $3.49, all the way back to the original base rates (bid rates) of $2.24 and $1.82.[27]

In developing his "Puget Sound differential," Newell Wright had estimated log grades at 5 percent no. 1 and 55 percent no. 2 grades. The 1969 reappraisal showed how Wright, on the basis of only one trip to Alaska, had seriously underestimated the quality of Alaskan timber:

	Production quality 1965-67		
	Wright's estimate (%)	Actual hemlock (%)	Actual spruce (%)
Select, peeler, No. 1	5	11	27
No. 2	55	57	51
No. 3	40	32	22
	100	100	100

The problems arising from the 1969 reappraisal spurred Region 10 to develop a system of end-product pulp and lumber prices, and the 1974 reappraisal was based on production of both pulp and lumber. That reappraisal, based on 1972 data, raised prices to $7.95 (net) for spruce, $1.92 for hemlock, $1.70 for redcedar, and $16.50 for yellow-cedar. Logging costs, which had been $30.95 in 1964, more than doubled to $75.89 in the 1974 reappraisal.[28]

In the later years of the Ketchikan sale, ownerships changed several times. Georgia-Pacific Corp. acquired Puget Sound Pulp & Timber Co., thereby acquiring its 50 percent interest in Ketchikan Pulp Co. Then, in the early 1970's, antitrust actions compelled Georgia-Pacific to split into two entities, Georgia-Pacific and Louisiana Pacific. The Ketchikan Pulp interests went with Louisiana Pacific. When the rayon and dissolving pulp markets later weakened, Louisiana Pacific bought the remaining 50 percent of Ketchikan Pulp from Food Machinery Corp., the parent company of American Viscose, to become the full owner.

The Ketchikan unit sale of 8.25 billion feet produced Alaska's first fully operational pulpmill by requiring its construction as part of the contract. Three other multi-billion-foot pulpwood sales in Alaska were noteworthy for a variety of reasons. Those sales were the Sitka Unit sale, 5.25 billion feet; the Pacific Northern Timber (P.N.T.) sale, 3 billion feet; and the Juneau Unit sale, 8.75 billion board feet.

The Sitka Unit Sale

The Sitka unit, 5.25 billion board feet, was the second successful pulp timber sale in Alaska. Although more detailed than the "shot in the dark" Ketchikan appraisal, the Sitka appraisal was still somewhat simplistic by modern standards. It divided the timber into two components, sawlogs and pulplogs. Sawlogs were the peeler and no. 1 sawlog grades of hemlock, and the selects were the no. 1 and half of the no. 2 sawlog grades of spruce. All of the no. 2 and no. 3 hemlock, all of the no. 3, and half of the no. 2 spruce sawlogs were considered pulplogs. Pulplogs were appraised on the basis of $32 per M log scale, derived by deducting a $16 towing cost from Puget Sound's price of $48 per M log scale. The sawlog appraisal was based on combined average prices for southeast Alaskan spruce and hemlock, f.o.b. mill, in 1954:[29]

Spruce and hemlock lumber grade	Selling price lumber tally
Clear	$137.77
Shop	87.14
No. 2 and better common	65.73
No. 3 common	45.13
Weighted average	78.06

On a log scale basis, the $78.06, extended by a 10 percent overrun estimate, was actually $85.87. The total was probably 80 percent hemlock and 20 percent spruce.

Using a profit ratio of 15 percent and logging costs of $26.38 per M, the appraisers developed appraised prices of $4.68 per M for spruce and hemlock sawlogs and $1.45 per M for spruce and hemlock pulplogs. These prices were converted to $2.90 for all grades of spruce and $1.75 for all grades of hemlock; the only species difference between spruce and hemlock was the percentage of sawlogs. The appraisals were converted on the assumption that no. 2 spruce logs were worth the same as no. 2 hemlock logs, because both would be pulped. This assumption later proved to be incorrect, largely because of the higher value of the spruce component made into lumber. After a review at the national level, the Sitka sale appraisal was approved for advertisement at $2.60 plus 30 cents K-V for spruce and $1.45 plus 30 cents K-V for hemlock.

The applicant, Alaska Lumber & Pulp Co. (A. L. & P.), was owned by a consortium of 25 Japanese trading companies under the parent firm, Alaska Pulp Co., Ltd., of Tokyo.[30] To meet Forest Service requirements, however, it had to be organized as a U.S. corporation.

In early 1956, A. L. & P., the only bidder, offered the appraised price for the Sitka unit. The final contract was signed September 25, 1957, and the mill at Sitka began production 2 years later, on November 25, 1959.

Reappraisals were scheduled at 5-year intervals after production startup. The Sitka unit sale was reappraised in 1971 and 1976.

The 1971 rate redetermination reflected the change in standards since 1959, the year the Sitka mill opened. Based on 1969 costs, road construction costs in the 1971 reappraisal were $15.14 pr M for temporary roads and $6.78 per M for permanent (specified) roads, a total of $21.92 for roads alone--an amount almost equal to the total logging costs, including roads, in the original appraisal.[31]

The contract was modernized to provide for "gross" stumpage plus roads, as the Worrell Committee had recommended in 1963. The gross redetermined rates were considerably higher than base rates:

	Redetermined Price per MBF	Base Price per MBF
Spruce	$5.52	$2.26
Hemlock	5.70	1.36
Alaska cedar	122.95	1.22

When reduced for roadbuilding credits, the rates became base rates. The 1971 reappraisal set a lower rate for spruce than for hemlock. This unusual appraisal result was apparently the result of longer towing distances to spruce sawmills than to hemlock pulpmills, and of a sizable volume of blown-down spruce. This reappraisal also reflected a shift from allotments B and H to allotment C to accommodate a "Land Use Study of West Chichagof and Yakobi Islands" caused by a Sierra Club appeal.

The 1976 reappraisal was appealed, but the appeal was rejected by the Secretary of Agriculture in 1980. That appraisal developed rates based on costs and prices for the end products of market pulp, export lumber, and pulp chip byproducts.[32] (See table 2.)

As in the 1971 reappraisal, the 1976 gross rates were stumpage value plus roadbuilding costs. The costs for permanent roads were $29.33 per M and for temporary roads, $5.81 per M, for a total of $35.14. This reappraisal put the hemlock net value below the base rate of $1.60 and utility logs at a negative rate. To bring hemlock up to its $1.60 base rate and utility logs up to their 50-cent minimum, spruce and cedar rates had to be reduced.

The adjustments recognized that many fixed costs such as insurance, taxes, depreciation, temporary road, and cable rigging costs continued whether or not the low-value timber was logged. For that reason, low-value logs reduce the fixed costs of more valuable logs. The adjustments were left to the judgment and discretion of the appraiser because of the complexity and variability of the factors involved.

The "P.N.T." Sale

In 1954, the Forest Service advertised a 3-billion-board-foot sale on Etolin, Wrangell, and Woronkofski Islands in southeastern Alaska. The sale was unusual in that it required construction of both a 40 MM-board-foot-per-year

Table 2.--Sitka pulpwood sale reappraisal, Alaska Region, 1976

	Gross Value per MBF	Net value per MBF[1]
	Dollars	Dollars
Spruce	55.31	25.98
Hemlock	30.69	1.36
Alaska cedar	246.37	217.04
Utility logs[2]	.50	-28.83

[1]Reduced by $29.33 per M to allow for roadbuilding costs.

[2]Utility logs are cull, less than 33-1/3 percent sound for lumber, but more than 50 percent usable for pulp. They include logs that become cull because of shake, shatter, breakage, or reasons other than wood rot.

Source: Washington National Records Center, Suitland, Md., Records of the Forest Service, Division of Timber Management.

sawmill and an 80-ton-per-day pulpmill. Failure to build the pulpmill would cancel out 75 percent of the sale or 2.25 billion feet.

Spruce was appraised in the traditional manner, using 1952 data:

Spruce selling value	$84.84	
Logging cost	25.45	(including $1 camp cost and $2.66 roads)
Manufacturing cost	41.11	(extended for 10.5% overrun)
Conversion return	18.28	
Profit margin	14.14	(20% profit ratio)
Stumpage value (spruce)	$ 4.00	

The hemlock "was not appraised," the report said, "because there is no basic data for the species in Alaska."[33] The judgment of the appraiser was used to set a price of $2 for hemlock.

Pacific Northern Timber Co. (P.N.T.) submitted the only bid on June 9, 1954. Thirteen years later, in 1967, a 2-billion-foot portion of the sale was canceled conditionally for failure to build the pulpmill as specified. The condition was construction of a veneer mill in lieu of the pulpmill.[34] Once again, however, a portion of the uncut balance of the sale--250 MM board feet --was canceled because of P.N.T.'s failure to build the veneer mill. The Alaska Wood Products Co. mill continued operations with the remaining 750 MM feet. This last section of the original sale was reappraised in 1972, based on 1969 data:[35]

	Gross Value per MBF	Net Value per MBF*
Sitka spruce	$14.93	$5.24
Hemlock	12.44	2.75
Redcedar	51.40	41.71
Alaska cedar	129.11	119.42

*Reduced by $9.69 for roadbuilding costs.

The reappraised rates were not approved until May 1974, but they were approved retroactive to 1972.[36] The delay resulted from the company's request for a review of the appraisal and from problems involving the company's qualifications for the reduced volume of timber. The contract was eventually acquired by Alaska Lumber & Pulp Co., which completed the sale.

The Juneau Unit Sale

The Juneau unit, sold initially in 1927 to a syndicate headed by the publisher of the San Francisco Chronicle, was canceled in 1933 because of Depression market conditions. The sale was revived more than 20 years later when a 7.5 billion-board-foot-sale was advertised. On August 17, 1955, Georgia-Pacific Corp. purchased the sale at advertised prices:

Spruce	$2.80 per MBF
Hemlock	1.70 per MBF
Cedar	1.70 per MBF

As in other appraisals of the period, the appraisers complained of the lack of good data. The report stated:

> Until about 3 years ago there was very little formal appraisal of timber in Region 10. Starting about 3 years ago the manufacturing costs and sales realizations of the larger mills in Alaska [contributed] data...for appraisal purposes..[but they were] limited to spruce lumber.[37]

In the absence of Alaska statistics, the appraisers used a a 2-year (1953-54) average of log grade percentages from Grays Harbor and log prices for Puget Sound. To compensate for ocean rafting costs from Alaska to Puget Sound, they deducted $10 per M. The appraisal used á logging cost of $26.67 per M and profit ratios of 16 percent for spruce and cedar and 15 percent for hemlock.

Once again, the sale seemed ill-fated. In 1961, Georgia-Pacific announced a plan to expand its Samoa, Calif., plant rather than build a mill at Juneau. The company forfeited its $75,000 deposit, and the sale was canceled on June 30, 1961.[38] This second cancellation on the Juneau unit was a disappointment to the Forest Service, which was concerned about the tendency toward monopoly in Alaska's pulpmill operations.

Four years later at another Juneau unit auction--this one for 8.75 billion board feet--St. Regis Paper Co. outbid U.S. Plywood/Champion Papers to obtain the preliminary award. The average of the advertised prices for spruce and hemlock was $3.30 per M (spruce, $3.85; hemlock, $3); the average bid was $5.65. But for the third time, the tentative award was never made final. St. Regis decided that mill construction costs were now higher than originally estimated, and, in 1967, forfeited its $100,000 deposit. Later that year, the contract was offered to U.S. Plywood/Champion Papers, which had been the second highest bidder at the 1965 auction, at the high bid price.[39] In early 1968, the Secretary of Agriculture announced tentative award of the Juneau sale to the Champion interests.

And still the sale was not to be consummated. The Sierra Club challenged it, alleging that the price was too low and that the sale was not environmentally acceptable.

In a 1970 trial in the Alaska U.S. District Court, the decision was in favor of the Forest Service. Remanded from the Ninth Circuit Court of Appeals, a rehearing was scheduled 3 years later on "newly discovered evidence" relating to the impact of timber harvesting on wildlife.

This time the Sierra Club did not contest the initial ruling on rates. Although the rehearing was held, the court never handed down a decision. Champion, dismayed by the inflationary costs caused by the legal delays and the possibility of inflated environmental protection costs, decided that the enterprise was no longer economic. In 1976, nearly half a century after it was first offered, the Juneau unit sale was canceled for the fourth time, this time by mutual agreement of the Forest Service and Champion.

Although Alaska played a major role in the Forest Service's pulpwood activities, it was not alone in providing timber suitable for pulpwood. The Colorado Plateau (Region 3), the South (Region 8), and the Lake States (Region 9) each contributed significantly according to the prevalent species and conditions existing in those areas.

The Colorado Plateau

The arid State of Arizona would seem an unlikely site for a pulpmill; water is in short supply, and disposal of wastes by conventional methods is very difficult. Despite these drawbacks, Arizona has a large belt of ponderosa pine forests (above 7,000 feet elevation) and is close to heavily populated Sun Belt markets in Los Angeles and Phoenix, a fact pointed out in the 1956 appraisal report for a sale on the Snowflake unit.

The Snowflake Unit Sale

The initial appraisal report for the proposed 30-year sale on the Snowflake unit noted strong interest by Ebasco Services, a "turnkey" consulting firm, one that built mills and sold them to operating companies. It also noted that Southwest Lumber Mills had applied for the sale.[40] The sale terms called for construction of a pulpmill in addition to an unsuccessful two-grinder groundwood mill that had been built at Flagstaff by Arizona Pulp & Paper Co.

The Snowflake sale was unusual in that it covered pulpwood on all National Forests within economic range of the pulpmill. Sawtimber sales could be superimposed, but the pulpwood had to be sold to the pulptimber purchaser, on a "first refusal" basis.

The appraisal for the 6-million-cord sale of ponderosa pine pulpwood was plagued by the same lack of comparable statistics that made appraisals of Alaska pulpwood sales difficult. The appraiser found that the most nearly comparable information was a price of $16.60 per cord for southern pine pulpwood in the Southeast. Despite the lack of information, or perhaps because of it, the Washington Office reviewed the appraisal expeditiously, approving an advertised price of $1 per cord plus 10 cents for slash disposal.

The only bidder was Southwest Lumber Mills, now known as Southwest Forest Industries, Inc., which entered the pulp manufacturing business with this bid. Tentative award was made on February 8, 1957, and final award on December 1, 1959. By 1966, the date of the first reappraisal, the pulpmill had been built, and 340,000 cords of timber had been cut.

The 1966 reappraisal did not alter the original stumpage price of $1 per cord, but did raise slash disposal deposits to 20 cents.[41] By an unusual contract requirement, the 1966 reappraisal also developed a "pulpwood price factor." Because there was no pulpwood price in Arizona that could compare with actual pulpwood transactions in the Southeast or elsewhere, the contract was tied to prices of unbleached sulfate pulp published each month as part of the Bureau of Labor Statistics' (BLS) Wholesale Price Indexes. At each 5-year rate redetermination, the pulpwood price would be a percentage to be determined in the 1966 reappraisal:

Weighted average experienced pulpwood costs	$18.54 per cord
Stumpage	+ 1.00 per cord
Total	19.54 per cord
Average BLS unbleached sulfate pulpwood price, 1962-65	- 120.86 per ton
	0.161675
Average BLS unbleached sulfate pulpwood price, 1965 only	multiplied by 123.75 per cord
Selling value	20.01 per cord

The Chief Forester's office approved the 1966 reappraisal at:[42]

Selling value	$20.01 per cord
Operating costs	-18.31 per cord
Conversion	1.70 per cord
Stumpage	1.00 per cord

By the time of the 1971 reappraisal, 690,000 cords had been cut. Again the rates remained $1 per cord, and again the slash disposal deposits were increased, this time to 65 cents per cord.

This reappraisal brought to light a serious problem. The Snowflake contract provided that material deemed more valuable for sawlogs than pulplogs would be appraised as lumber rather than as pulpwood. Accordingly, in 1971, the purchaser was advised that trees 12 inches and more in diameter were more valuable as sawlogs and poles than as pulpwood--if they were likely to survive for a reasonable length of time and if they were not too scattered to permit separate economic operation.[43]

The original cruise had shown that 56 percent of the 6-million-cord sale consisted of trees 12 inches and larger. This meant that half of the sale volume was no longer available at lower pulpwood stumpage prices. To reduce uncertainty and help systematic planning, a contract modification was proposed to specify which trees would be used as pulpwood. Before this plan could be

put into action, the Western Forest Industries Association filed a complaint on behalf of some of its members who were worried about the timber supplies available for other bidders. Congressman Henry Reuss of Wisconsin then asked that negotiations be halted pending an investigation. The General Accounting Office conducted an investigation, welcomed by the Forest Service, which concluded that although the arrangement was not desirable, circumstances called for a contract modification to resolve disputes.[44] The contract was then modified.

By 1976, more than 1 million cords had been cut, but yet another problem had arisen.[45] The Bureau of Labor Statistics had stopped publishing its softwood sulfate index and price series and thus eliminated the only approved source of selling price information for use in reappraisals.

The problem was not insurmountable. The contract had foreseen such a possibility, and had stipulated that, in such an event, the Forest Service could establish another suitable index.

After conferring with the Bureau of Labor Statistics, the Forest Service used the former sources used by BLS to estimate sulfate pulpwood prices. The process, based on prices in a pulp trade journal, Official Board Markets, provided the standard needed for the 1976 reappraisal:[46]

Unbleached sulfate pulpwood price, 1976	$333.75 per cord
	X 0.161675
Selling value	53.96 per cord
Operating costs	- 47.41 per cord
Conversion	6.55 per cord
Profit margin (8%)	- 3.99 per cord
Stumpage	$ 2.56 per cord
Slash disposal deposit	3.25

With only one pulpmill in the southern Rocky Mountains, there have been no actual open market pulpwood prices in that Region on which to base prices. Negotiations have been in progress to develop a substitute for the present pulpwood pricing formula that will be acceptable to both the industry and the Forest Service.

The Lake States

A number of large pulpwood sales were made on the Superior National Forest in Minnesota, and smaller pulpwood sales were made on other Lake States forests. One such sale was the West Tofte Block sale of 1959.

The West Tofte Block Sale

The West Tofte Block sale included 136,750 cords of pulpwood and 1.28 MM board feet of sawlogs. Unlike much larger pulpwood sales in other Regions, this sale did not require a pulpmill; mills were available already.

The initial appraisal was based on a combination of pulpwood, poles, and piling:[47]

Jack pine	77,750	cords pulpwood	@ $1.05
	4,000	cords poles and piling	@ 7.30
Total	81,750	cords	@ 1.35
Spruce	53,800	cords pulpwood	@ 2.85
Balsam	1,200	cords pulpwood	@ 1.00
Pine sawlogs	1,280	M board feet	@ 19.55

Initial appraised selling values of cord material were based on local jobbers' prices. Table 3 shows the appraisal summaries for pulpwood.

Because mills were available, only camps and roads had to be built for this sale; 30 percent of the operations were planned for summer logging, 70 percent for winter logging. Winter logging had its economic compensations; road costs were much lower because iced roads made hauling easier. Winter logging had the added benefit of keeping the noise of power saws and log skidders away from canoe travelers. Road construction for the West Tofte Block sale included 37 miles of summer roads at an average of $4,450 per mile, 84 miles of winter roads at an average of $750 per mile, 8 bridges at $1,000 each, and 20 winter stream crossings at $100 each.

The Washington Office authorized Region 9 to advertise the sale. The prospectus for the sale noted that jack pine and spruce were "up to 18 inches" in size on 12,586 acres; that average truckhaul to railroad was 32 miles to Sawbill Landing on the D. M. & I. railroad; and that there was one crossing of a canoe route on Frost River. Now power equipment was allowed within 2,640 feet of canoe routes.[48]

On July 13, 1959, St. Regis Paper Co. bid:

Jack pine	81,750 cords @ $1.35 per cord
Spruce	53,800 cords @ $2.95 per cord
Balsam fir	1,200 cords @ $1.00 per cord
Red and white pine	1,280 MBF @ $19.55 per M

In addition, the bid provided 50 cents per M for slash disposal for white and red pine and 20 cents per cord for each of the other species. The bid was 10 cents more than the advertised price for spruce and exactly the advertised price for the other species. Only 25 cents per cord and 50 cents per M was for stumpage; the balance was in K-V deposits for sale area improvement.

The sale also included aspen and paper birch at 75 cents per cord at the bidder's option. St. Regis elected not to bid on the optional material.

By the time of the first reappraisal in 1962, only 1,600 cords had been cut. No new camps were in use; the workers commuted from existing camps

Figure 5.--National Forests, National Forest Purchase Units, and Land Utilization Projects (LUP) in 1959. The LUP's became National Grasslands the next year.

(Forest Service and Geological Survey)

Table 3.--West Tofte Block pulpwood sale appraisal, Superior National Forest (Minn.), Region 9, 1958

	Species value per cord		
	Jack pine	Spruce	Balsam fir
	Dollars		
Selling price	19.00	26.50	20.00
Logging cost			
Stump to truck	10.02	11.92	11.62
Transportation	5.12	5.12	5.12
General	.86	.86	.86
Contractual	.24	.24	.24
Total logging	17.08	22.42	18.04
Conversion	1.92	4.08	1.96
Profit margin	.87	1.23	.96
Stumpage plus K-V[1]	1.05	2.85	1.00

[1]Knutson-Vanderberg Act deposits for timber stand improvement, virtually all tree planting or seeding.

Source: Washington National Records Center, Suitland, Md., Records of the Forest Service, Division of Timber Management.

on other timber sites. A local jobber was logging the spruce and shipping it to St. Regis' pulpmill at Sartell, Minn., and selling the other species wherever he could.

The 1962 reappraisal report developed rates below the original bid rates. The average reappraised price for all species was a negative $1.22 per cord.[49] The reappraisal report recommended reducing stumpage to base rates.[50] The Washington Office agreed, provided that 14,000 cords be cut at not less than bid rates, after which Region 9 was authorized to use base rates.[51]

It was not until the time of the second rate redetermination in 1965, however, that the required 14,000 cords had been cut. That reappraisal also recommended base rates, which were then established in 1965.[52]

By 1968, the cut totaled 23,200 cords, and once again, the reappraisal recommended base rates.[53] The technical termination date came 1 year later. By that time 25,000 cords had been cut; 18,000 were excluded because they were within an established "no-cut" zone of the Boundary Waters Canoe Area; and an estimated 96,000 cords remained uncut. The appraisal that year was for extension purposes, and it caused no change in rates. After the extension was granted, the contract was transferred by third party agreement to Northern Forest Products, Ltd.; St. Regis Paper wanted to dispose of the uncut balance because it contained too much jack pine for the company's needs.[54]

Five years later, in 1974, Northern Wood Preservers, Ltd., the former Northern Forest Products, Ltd., also sought an extension. Everything north of Frost River was eliminated from the sale to prevent a controversial crossing of a canoe route.[55] That same year, the sale became the subject of a lawsuit, Minnesota Public Interest Research Group (MPIRG) v. Butz, which had been filed to halt the sale. An environmental impact statement and management plan were prepared for the 90,000 cords that remained on the sale.

The lawsuit notwithstanding, the reappraisal was approved and extension granted.[56] Three years later, however, Northern Wood Preservers rejected an extensive environmental modification to the contract.[57] At that point, the Forest Service terminated the sale unilaterally and proposed a damage settlement based on the cost of replacing the timber, more than $800,000.

In the West Tofte Block sale, the Forest Service had been caught in a change of policy governing extensions. In 1971, the policy had been changed from one of "liberal extensions" dating back all the way to South Dakota Case No. 1, the 1899 Black Hills sale, which had been extended six times. Beginning in 1971, however, prospectuses warned bidders that extensions would be granted only when the Chief Forester determined that abnormal conditions justified extensions. Prolonged market recessions were considered adequate justification. Older sales were entitled to one "free" extension under the old policy if justified; court-related delay was such a justification. In the West Tofte Block sale, cancellation of the contract led to a costly damage case.

As shown in table 4, jack pine pulpwood was not in high demand in the early days of this sale. By the time of the last extension in 1974, however, trends had reversed and 1973-74 was actually a year of intense demand for pulp and paper. Unfortunately, the purchaser was simply unable to complete the logging on this large Lake States sale.

Table 4.--West Tofte Block pulpwood sale reappraisals, Superior National Forest (Minn.), Region 9, 1959-68

Appraisal date	Jack Pine						
	Selling Price	Development Costs	Other logging costs	Total logging costs	Conversion[1]	Profit Margin[2]	Stumpage value
	Dollars per cord						
1959 (original appraisal)	19.18	0.84	16.07	16.92	2.26	0.91 (5%)	1.35
1962	17.00	2.19	17.11	19.30	-2.30	loss (7%)	do.
1965	16.80	2.19	15.16	17.35	- .55	loss (8%)	do.
1968	18.93	--[3]	--	18.97	- .04	loss (6%)	do.

[1]Selling price minus logging costs.
[2]Conversion minus stumpage; resulted in losses for most of the sale period. Percentages listed are normal profit margins for each year.
[3]-- = not applicable or not available.

Source: Washington National Records Center, Suitland, Md., Records of the Forest Service, Division of Timber Management.

Reference Notes

(In the following notes, the expression NA, RG 95, FS, TM means National Archives, Washington, D.C., Record Group 95, Records of the Forest Service, Division of Timber Management; and WNRC, FS, TM means Washington National Records Center, Suitland, Md., Records of the Forest Service, Division of Timber Management.)

1. NA, RG 95, FS, TM, Timber Sales, Series 70, District 6. A comparison of Tongass National Forest average percentages of hemlock log grades and Mt. Baker and Olympic National Forest percentages showed similar grade percentages.

2. NA, RG 95, FS, TM, Timber Sales, Series 70, memorandum from H. Surface, District 6, "Conditions Existing for the Manufacture of Pulp and Paper in Southeast Alaska," Feb. 6, 1916.

3. NA, RG 95, FS, TM, Timber Sales, Series 64, W. B. Greeley, "The Forest Service and the Development of Pulp and Paper Projects on the Alaskan National Forests," May 5, 1920.

4. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from E. E. Carter to E. A. Sherman, April 10, 1923.

5. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from E. E. Carter to E. A. Sherman, July 13, 1922.

6. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from [Chief] Forester W. B. Greeley, "For Forest Management," Sept. 1, 1923.

7. NA, RG 95, FS, TM, Timber Sales, Series 70, District 6, W. T. Andrews and L. A. Nelson, "Report and Appraisal," on West Fork Mill & Lumber Co., Sept. 28, 1916. (Reappraisals by B. Hoffman on Mar. 22, 1921, and Feb. 28, 1924, did not result in price changes.)

8. NA, RG 95, FS, TM, Timber Sales, Series 70, District 6, Snoqualmie National Forest, B. Hoffman and G. Drake, "Report and Appraisal," on Sauk River Lumber Co., Jan. 7, 1922. (235 MM foot sale, with hemlock and white fir at 50 cents. Reappraisals: B. Hoffman, Feb. 18, 1926; G. L. Drake, Feb. 25, 1929; O. F. Ericson, Feb. 29, 1932, and Mar. 15, 1935.)

9. NA, RG 95, FS, TM, Timber Sales, Series 70, District 6, memorandum (author uncertain), May 15, 1922. Also, a letter from B. F. Heintzleman requesting permission to use K-V deposits to dispose of large redcedars and overmature hemlocks in order to encourage reproduction of spruce.

10. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from [Chief] Forester W. B. Greeley, "For Forest Management," Sept. 1, 1923.

11. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from E. E. Carter to E. A. Sherman, April 10, 1923. (Carter noted that Lake Kathleen was a good power source for a second 2-billion-foot sale.)

12. NA, RG 95, FS, FM, Timber Sales, Series 64, memorandum from L. F. Kneipp to Secretary H. C. Wallace, Oct. 23, 1925.

13. NA, RG 95, FS, FM, Timber Sales, Series 64, U.S. Department of the Interior, Bureau of Fisheries, Office of the Commissioner, letter from H. O'Malley, Commissioner, to W. B. Greeley, Jan. 18, 1928.

14. The Juneau unit was composed of allotment A of the pulpwood sale plan then in effect. The Ketchikan unit included allotments E and F.

15, 16. NA, RG 95, FS, FM, Timber Sales, Series 64, memorandum from J. Girard to C. M. Granger, Sept. 12, 1944.

17. NA, RG 95, FS, FM, Timber Sales, Series 64, memorandum from J. E. Rothery to B. F. Heintzleman, Feb. 2, 1944.

18. NA, RG 95, FS, FM, Timber Sales, Series 64, memorandum from C. M. Granger to Region 10, Sept. 14, 1944.

19. NA, RG 95, FS, FM, Timber Sales, Series 64, memorandum from B. L. Wright to the Chief, Apr. 23, 1947. (By 1947, average Puget Sound hemlock log prices were $32.11 per M. Wright based his recommendation on that price.)

20. Assumes 5.5 board feet per cubic foot. Forest Service long log (40-foot maximum scaling length) scale. Thus, 100 cubic feet = .55 M board feet, and 1 M = 1.82 cunits. $1.14 per M = 1.15/1.82 or 63 cents per cunit.

21. The prospectus described the sale as a 1.35-million-cubic-foot sale (8.25 billion board feet) in pulptimber allotments D-1, E, F, and G. The 1927 sale had included only allotments E and F. The buyer would have to provide a 125-ton-per-day mill for the first 10 years and a 525-ton-per-day mill for the remaining 40 years.

22. NA, RG 95, FS, FM, Timber Sales, Series 64, letter from C. M. Granger to Lawson Turcotte, president of Ketchikan Pulp & Paper Co., Aug. 1, 1948.

23. Act of June 9, 1930 (46 Stat. 527), drafted by Edward E. Carter, Forest Service Timber Management Chief.

24. WNRC, FS, TM, Timber Sales, justification statement, Feb. 15, 1954:

Spruce	43%	at sawlog rate	$3.20
	57	at pulpwood rate	1.82
	100		2.40
Hemlock	5	at sawlog rate	2.20
	95	at pulpwood rate	1.82
	100		1.85

25. WNRC, FS, TM, Timber Sales, the reappraised price came to a minus (-) $1.82 per M. Base rates, therefore, of $2.24, $1.82 and $1.75 were continued. (Log prices, hard to come by for appraisers, and of somewhat doubtful validity, were used as the basis for the reappraisal.)

26. Carl Newport of Mason, Bruce & Girard represented the purchaser. Harold Wise of Region 5 represented the Forest Service.

27. WNRC, FS, TM, Timber Sales. Although the Chief's review resulted in a slight reduction in the Region's initial recommended rates for the 1969 rate redetermination, the Board of Forest Appeals ruling resulted in a major rate reduction to base rates for the 1969-70 period--in the neighborhood of $4.5 million.

28. WNRC, FS, TM, Timber Sales, memorandum from C. A. Yates, containing "Reapraisal Report," June 14, 1974. (Temporary road costs, at $24.15 per mile, were a major component of the logging cost.)

29. WNRC, FS, TM, Timber Sales, John E. Shields and John E. Weisberger, "Appraisal Report," Sept. 30, 1955. (For the first operating period, 45 percent of the spruce and 9 percent of the hemlock were appraised as sawlogs and 55 percent of the spruce and 91 percent of the hemlock as pulpwood.)

30. WNRC, FS, TM, Timber Sales, J. Kobayashi, "Report on A.L.&P. Ownership," a letter to Regional Forester Arthur W. Greeley, Nov. 17, 1955.

31. WNRC, FS, TM, Timber Sales, "Rate Redetermination Report," (1971).

32. WNRC, FS, TM, Timber Sales, "Rate Redetermination Report," (1976).

33. WNRC, FS, TM, Timber Sales, J. F. Shields, "Appraisal Report," Oct. 15, 1953.

34. WNRC, FS, TM, Timber Sales, later reduced to 693 MM feet to accommodate switching from Forest Service long-log scale to Bureau scaling methods.

35. WNRC, FS, TM, Timber Sales, Chad Converse and Gary McCoy, "Reappraisal Report," Sept. 15, 1972.

36. WNRC, FS, TM, Timber Sales, memorandum from R. E. Worthington to Regional Forester Charles Yates, May 6, 1974.

37. WNRC, FS, TM, Timber Sales, "Appraisal Report," by J. F. Shields and John E. Weisgerber, Mar. 17, 1955.

38. WNRC, FS, TM, Timber Sales, letter from J. L. Buckley, president of Georgia-Pacific Alaska Corp. to Chief Richard E. McArdle, June 20, 1961.

39. WNRC, FS, TM, Timber Sales, letter from A. W. Greeley, Associate Chief, to G. Jackson, U.S. Plywood-Champion Papers, Sept. 21, 1967.

40. WNRC, FS, TM, Timber Sales, D. J. Kirkpatrick, "Reappraisal Report," Dec. 10, 1956.

41. WNRC, FS, TM, Timber Sales, M. C. Galbraith, "Reappraisal Report," June 27, 1966.

42. WNRC, FS, TM, Timber Sales, memorandum from B. H. Payne, Washington Office, to Region 3, June 22, 1966.

43. WNRC, FS, TM, Timber Sales, letter from W. D. Hurst to Southwest Forest Industries, Aug. 4, 1971. (Rates were established retroactive to July 1, 1971.)

44. U.S. Congress, General Accounting Office, Office of the Comptroller, Report of the Comptroller General: Proposed Changes in the Colorado Plateau Pulpwood Sale Contract (B173590), Jan. 25, 1972.

45. WNRC, FS, TM, Timber Sales, W. D. Hurst, "Reappraisal Report," June 4, 1976.

46. WNRC, FS, TM, Timber Sales, memorandum from A. A. Wiener to the files, Mar. 15, 1976.

47. WNRC, FS, TM, Timber Sales, "Appraisal Report," May 15, 1958.

48. WNRC, FS, TM, Timber Sales, "Prospectus," transmitted to Chief's office by Herbert Ochsner's memorandum of Apr. 1, 1959, approved by A. W. Sump for Chief E. P. Cliff, on May 21, 1959.

49. WNRC, FS, TM, Timber Sales, Hugo L. Sundling, "Reappraisal Report," Apr. 12, 1962.

50. WNRC, FS, TM, Timber Sales, memorandum from H. E. Ochsner to Chief, May 2, 1962.

51. WNRC, FS, TM, Timber Sales, memorandum from A. W. Greeley to Region 9, May 10, 1962. (Base rates in the contract were the original advertised rates.)

52. WNRC, FS, TM, Timber Sales, memorandum from B. H. Payne to Region 9, Apr. 8, 1965.

53. WNRC, FS, TM, Timber Sales, Wayne K. Mann, "Third Rate Redetermination Report," May 15, 1968.

54. WNRC, FS, TM, Timber Sales, "Extension, Rate Redetermination," May 15, 1969.

55. WNRC, FS, TM, Timber Sales, D. Schmidtman and J. L. Kernik, "Extension, Rate Determination." May 22, 1974.

56. WNRC, FS, TM, Timber Sales, memorandum from S. Undi to Region 9, June 13, 1974.

57. WNRC, FS, TM, Timber Sales, "Proposed Modification of Contract," July 27, 1977.

Section IV:

Investigations, Audits, and Reviews

A number of systematic reviews of the appraisal system were instituted as a result of industry complaints during the 1950's, 1960's, and 1970's when timber prices rose substantially. (See table 1.)

During this period, there was often a lag, sometimes up to 2 years, in the time it took to obtain available data for appraisal. The lag was often significant enough to influence prices; during recessions, the lag never caught up, and prices did not drop. This time discontinuum led a number of reviewers to advocate speeding up the data collection process or to index the data, as was done effectively in other industries.

The Weintraub Report (1958)

In 1957, the Forest Service sought the advice of "a professional economist of stature and reputation, with special competence in the area of price analysis," to review the stumpage appraisal system. The search led to Dr. Sidney Weintraub, an economics professor at the University of Pennsylvania graduate school. Weintraub had a background in the economics of public utilities rates.

The report Dr. Weintraub issued in mid-1958 as a result of his investigation caused a stir in segments of the forest industry.[1] Although his report generally validated the appraisal system, Weintraub postulated that criticism of the system arose from the:

> ...nebulous nature of the concept of 'fair value'....Unfortunately, this is one of the vaguest of terms and explains why economic analysis has generally dropped it despite its almost intuitive appeal. What is fair to one must, whenever there is a difference in opinion, be unfair to the other.

Weintraub proposed that price reflect the objectives of the activity. If the pricing system can "accomplish the forestry objectives, getting the timber cut in accordance with the principles of sustained yield, and providing the basic raw materials for wood products wanted by our population"--then it is effective. If it cannot move the timber it will "have to be adjudged a partial or complete failure." Weintraub further suggested that pricing should not be so high as to force segments of industry out of business, if such segments are needed to furnish future requirements.

He spent much of his time examining profits, costs, and prices. The lumber and wood products industry averaged 9 percent on sales from 1948 to 1952. This was comparable to stone, clay,, glass, paper, and allied products industry averages.

Weintraub also studied selling prices. "The appraisal hypothesis of assuming that past price will hold into the future," he wrote, "will be

Table 1.--Trends in stumpage prices in all Regions, 1950-75

	Stumpage bid price									
Year	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 7[1]	Region 8	Region 9	Region 10
	Dollars per MBF									
1950	5.73	3.41	5.42	6.60	11.65	10.12	8.46	16.62	5.26	2.37
1955	6.25	4.59	7.89	7.90	14.72	21.26	10.51	17.35	6.00	2.09
1960	10.00	9.28	2.42	7.30	16.98	24.15	15.91	24.96	7.67	2.86
1965	9.26	3.34	5.17	4.33	13.61	26.38	16.37	22.12	6.14	2.77
1970	14.36	10.06	17.60	8.92	24.67	32.32	--[2]	26.10	10.92	14.62
1975	17.29	4.49	19.42	12.40	51.96	96.81	--	33.23	15.29	25.41

[1]Region 7 was divided between Regions 8 and 9 in 1966.

[2]--=not applicable or not available.

Source: Washington National Records Center, Suitland, Md., Records of the Forest Service, Division of Timber Management.

most erroneous when the pace of price advance or decline is accelerating." Forest Service appraisers have tended to change profit ratios during such accelerations in pace, raising them on falling markets and lowering them on rising markets. Weintraub favored flexibility, believing uniformity of profit ratios to be undesirable.

He recognized that the industry was rapidly integrating, with each product competing for portions of stumpage sales.

Weintraub was intrigued by the idea of using transactional analysis to aid in establishing profit ratios. He was impressed by Julian Rothery's article, "Some Aspects of Appraising Standing Timber," and particularly admired Rothery's use of the profit ratio of the median, not the high, bid of a comparable tract recently sold.

In Weintraub's view, lumber prices should derive from "the very recent past, perhaps the last month, or where seasonal influences play a part, the last quarter year."

Weintraub also urged that efforts be made to track wage rates and costs with a similar concern for use of recent data.

Believing that additional information on profits was desirable, he suggested that the investment method, though it had its place, was not appropriate for widespread application.

Weintraub said that the approximate profit ratios then used by the Forest Service "conform reasonably well to what we might expect" from review of various industry data.

Weintraub approved the use of recent data, but cautioned that it might "overvalue stumpage on a falling market and undervalue it during a price rise." The correction of this tendency, he suggested, "lies in the use of judgment in applying the profit ratio."

Other Weintraub recommendations coincided with general prevailing sentiment among Forest Service personnel that maintenance of records of bidding transactions were necessary and that study of costs, prices, and profits in the forest products history should continue. Both recommendations were adopted. The first led to automatic data processing of reports for each advertised timber sale on the new form FS-950 and its successor, form 2400-17, and the second led to monitoring of profits.[2]

The Timber Appraisal Review (Worrell) Committee (1963)

In June 1963, the report of the first "Blue Ribbon" committee to cover the timber appraisal system of the Forest Service was published. This report was not the first review of the system, but it was the first comprehensive coverage of appraisals from a viewpoint outside the Service. The Timber Appraisal Review Committee was appointed in late 1962, by Secretary of Agriculture Orville Freeman, "to investigate appraisal policies and procedures employed by the Forest Service."

Secretary Freeman's action was in response to charges by the forest products industry, which was at that time struggling through a recession, that Forest Service policies had contributed to industry instability. Congressional hearings in 1962 had been instigated to determine the validity of those same charges.

The three-man committee was headed by Albert C. Worrell, professor of forest economics at Yale University. The others were A. N. Lockwood, past president of the American Institute of Real Estate Appraisers, and M. L. Lauridsen, a valuation engineer with the Internal Revenue Service. The committee report, written by Worrell, has come to be known as the Worrell Report.[3]

Committee efforts were directed primarily to examining industry allegations and determining their validity. The objectives of appraisals as defined in the Timber Appraisal Handbook (FSH 2423.12) were generally endorsed, although the committee noted that "the generally accepted definition of fair market value has become clouded with qualifications...." Objectives must be clearly known, Worrell said, "since the resulting estimate of value will be related to the objective."

As a generalization, this point was accepted by the Forest Service as valid. On the other hand, because objectives are quantified through contract terms, such as sale size, time limits, road and logging specifications, and restrictions on bidding, the Service was satisfied that the appraisals automatically reflected the influence of objectives.

"Industry has bitterly protested," Worrell wrote, "the use of transaction evidence in any form in the adjustment of profit ratios used in... appraisal....." (Emphasis added.) Industry's protest was based on the premise that the Forest Service had caused an abnormal market structure by dominating the timber being sold. Industry preferred the Rothery method of analyzing median bids (FSM 2423.64), based on sealed bid sales. In such a system, the median represented the "average" worth of the timber in each offering. (In oral auction bidding, the median bid tends to be meaningless, because only the top two bidders typically bid above the advertised price.)

The Worrell Committee's opinion of industry charges was that they were "unduly inflated."

All told, the Worrell Report included 37 identifiable recommendations, most of which tended to support Forest Service procedures. Of these, 34 were accepted by Secretary Freeman, and three were rejected.[4]

Worrell recommended improved training and improved career ladders for specialists in timber cruising, grading, check scaling, and appraising.

He suggested more emphasis on study of mill outputs from various grades of logs and trees.

Among the procedures that the committee endorsed was "current pricing" to the most recent calendar quarter. The report opposed use of "subjective pricing or future price prediction," calling it "defenseless against well-founded criticism." Also endorsed were Service procedures for handling discounts, commissions, overweights and underweights, and byproduct values.

One major recommendation adopted with a new contract format in 1965 was that permanent road construction costs should be added to the stumpage price for payment purposes. Purchasers would receive "purchaser credits" in the form of reductions in the price paid for stumpage, for roads built by them. They would pay "gross stumpage" if they did not build roads. Presumably, this would resolve situations in which timber could be hauled in more than one direction by building alternate roads.

Secretary Freeman supported the Forest Service in rejecting three of the Worrell Committee recommendations. He rejected the recommendation that appraisal values be an "acceptable price, rather than fair market value." Worrell's intent was to resolve the dilemma of appraised prices, which industry alleged were too high, but which frequently generated overbids. The Forest Service position on this point was that appraisals were its best estimate of what fair market value would be if the criteria for fair market value--willing buyer, willing seller, and no compulsion to deal --were met. Dependent buyers and sustained-yield controls were obvious limits on the buyer. Therefore, actual bidding, especially where large mill capacities and diminishing private timber sources were common, was abnormal and should not govern appraisals directly, in the Forest Service view. (This principle, too, might explain why direct transaction evidence is more appropriate in the Eastern States, where public timber is only a small component; in Western States, the reverse is true.)

Another recommendation Freeman rejected dealt with low-value inferior trees or portions of trees. The committee believed that purchasers should not be required to remove or pay for such material. Secretary Freeman agreed only that reduction in value of higher value materials to pay for removing low-value materials was proper. He would not agree to participate in the waste of a rapidly diminishing resource.

The Worrell group thought that "deficit sales" should not be made. These sales do not provide a full normal profit margin at minimum stumpage prices. Forest Service policy was to advertise such sales upon request by interested buyers. This policy was retained.

The committee recommended a change in price escalation procedures to "equal escalation," in which upward movement was limited to the amount of possible downward adjustment.

The Worrell group thought that appraisals were unduly complicated, mostly as a result of "leaning over backward" to accommodate various industry complaints. The committee report, however, does not specify ways to simplify the system.

The question of appropriate profit margins was judged by the committee as too complex for it to handle. A further study, by another outside committee, was suggested but never carried out.

The Forest Service issued a formal response to the Worrell Committee Report on November 7, 1963. The 20-page "Conclusions and Recommendations" spanned the gamut of the appraisal process. It divided the 37 Worrell Committee recommendations into 12 groups as follows:

Group 1.	General (background) Items
Group 2.	Statements of Objectives
Group 3.	Acceptable Value Versus Market Value
Group 4.	Profits
Group 5.	Roads
Group 6.	Personnel and Organization
Group 7.	Cruising, Scaling, and Marking
Group 8.	Sales Realizations
Group 9.	Logging Costs
Group 10.	Points of Appraisal
Group 11.	Escalation
Group 12.	Rate Redetermination

The 37 identified recommendations and the Forest Service conclusions follow (partly direct quotation and partly paraphrased):

Worrell Committee Recommendations and Forest Service Comments[5]

1. "While the concept of an operator of average efficiency is highly hypothetical, it is, nevertheless, a logical basis for the appraisal approach." (page 5)

Forest Service comment: This endorses established Forest Service practice.

2. "While the Forest Service Handbook does suggest the use of transaction evidence as one of the several guides in determining a possible need for adjusting the profit ratio, the Committee found that its use, during recent periods, has had but minor influence on the profit ratio. Industry charges of reliance by the Forest Service on transaction evidence seem to be unduly inflated in the light of the facts." (page 7)

Forest Service comment: This is in agreement with Forest Service views.

3. "Basically, the method which has been developed over the years for appraising national forest timber is satisfactory, although unduly complicated, and we cannot suggest a radically different and better method. What we do believe is that important modifications should be made in the existing framework." (page 9)

Forest Service comment: This is an acceptable conclusion.

4. Prepare and publish a firm statement of policy regarding the purpose of National Forest timber sales. (page 11)

Forest Service comment: This recommendation is acceptable. Forest Service Manual insert has been drafted. Basically this issue was settled last January through Secretary's amendment of regulation S-6.

5. "Since the preparation and administration of national forest timber sales require the expenditure of public money and since the maintenance of forests in an uncut condition provides intrinsic values, national forest timber should only be sold when it will yield some minimum amount of revenue. [Forest Service policy has always recognized that special circumstances may justify giving away limited amounts of timber.] It appears to the Committee that the $1.00, $2.00, and $3.00 miminum prices for different species described in Section 2430.71 of the Forest Service Handbook are reasonable and satisfactory for this purpose and should not be changed." (page 12)

Forest Service comment: This endorses the established minimum price schedule. However, the committee disregards its endorsement of minimum prices in its recommendations on sales with submarginal conversion returns as discussed on page 34. See item 31.

6. Make appraised price an "acceptable" or "upset" price (a trade term). "Market value" is too vague to be useful in view of the kind of market in which National Forest timber is sold. (pages 12 and 39)

Forest Service comment: Forest Service disagrees with this recommendation.

7. Make appraisals as if main access roads have already been constructed and use estimated road costs as credits on stumpage payments until roads are amortized. (page 14)

Forest Service comment: This recommendation is acceptable in general principle. It will be worked out with industry in connection with contract revision project, subject to minimum stumpage payments at all times, which is at variance with committee suggestion.

8. "The Forest Service should encourage and develop competition among buyers of national forest timber in order that the market may carry out its function of determining the selling price. This may consist of varying the size of the sale, the length of the sale period, the timing of offerings, and similar actions but should not include withholding timber from sale because of lack of competition." (page 13)

Forest Service comment: This recommendation is in line with Forest Service policy and practice.

9. Do everything possible to simplify appraisal procedure. (page 16)

Forest Service comment: This recommendation is acceptable and in line with Forest Service views.

10. Place greater emphasis on internal consistency in appraisals. (page 17)

Forest Service comment: This recommendation is acceptable.

11. Assign the work of cruising and scaling to specialized personnel who remain in one area and develop local competence in estimating grade and in allowing for defect and breakage. (pages 19 and 22)

Forest Service comment: Forest Service is working toward this recommendation. However, some use of professional personnel and movement of personnel between areas is advisable and necessary.

12. Develop better accuracy in woods log grading through more frequent checks and development of better external indicators of log grade. (page 19)

Forest Service comment: This recommendation is acceptable.

13. Continue study of volume tables for use in cruising National Forest timber. (page 20)

Forest Service comment: This recommendation is acceptable and in line with Forest Service policy.

14. Designate timber for cutting before advertisement and make volume estimates at the same time. (page 20)

Forest Service comment: This recommendation is acceptable and in line with Forest Service policy subject to exceptions for practical considerations.

15. Make sure that values assigned to trees and logs are those that actually can be realized under the conditions of the sale. (page 21)

Forest Service comment: This recommendation is acceptable and in line with Forest Service policy.

16. Improve accuracy of grade recovery and overrun determinations through improved techniques in mill scale studies and expanded use of "batch" or "input-output" studies. (pages 24-26)

Forest Service comment: This recommendation is acceptable and in line with Forest Service efforts.

17. Appraise to log markets when feasible. (page 25)

Forest Service comment: This recommendation supports established Forest Service policy.

18. "The Forest Service is presently using this method of current pricing and the Committee believes that the principle is entirely satisfactory." (page 26)

Forest Service comment: This supports Forest Service policy.

19. "Forest Service appraisals treat cash discounts and commissions as a reduction in the gross estimated selling values. Since it is standard industry practice to selling sic lumber and wood products on the basis of 'net price,' that is, after discounts and commissions, the present Forest Service procedure appears perfectly logical to the Committee. The Committee also feels that any income or costs attributable to underweights or overweights should be credited or charged to lumber selling values on a shipping tally basis." (page 26)

Forest Service comment: This supports established Forest Service procedure.

20. Include in the appraisal costs any returns received for byproducts, such as chips, when produced by the average operator in the local area. (pages 26-27)

Forest Service comment: This supports established Forest Service practice.

21. Expand efforts to obtain and use logging costs that fit the timber and terrain of the specific sale area. (page 27)

Forest Service comment: This recommendation is acceptable and in line with Forest Service effort.

22. Logging costs used in appraisals should be based on those experienced by operators cutting National Forest sales. (page 27)

Forest Service comment: This recommendation is acceptable and in line with Forest Service policy subject to practical considerations which, at times, make the use of some costs for logging of non-National Forest timber advisable.

23. "The Committee received practically no complaints about the costs used for the manufacture of lumber and veneer from logs. Apparently the methods followed by the Forest Service in obtaining such costs and the use made of them in the appraisal process are satisfactory." (page 27)

Forest Service comment: Forest Service practices are approved.

24. Tighten up on the application of "point of appraisal" policy. (page 28)

Forest Service comment: This recommendation is acceptable and in line with Forest Service policy.

25. Obtain adherence by field officers to instructions in section 2431.24 of the Forest Service Handbook on purchaser road construction policy. (page 30)

Forest Service comment: This recommendation is acceptable and in line with Forest Service policy.

26. Continue efforts to improve the reliability of road cost estimates. (page 30)

Forest Service comment: This recommendation is acceptable and in line with Forest Service policy.

27. Make a thorough economic study of profit margins through a competent research organization. (pages 32 and 33)

Forest Service comment: This recommendation is acceptable.

28. Use constant profit ratio of 10 percent for profit and a 0 to 5 percent range for risk. (page 12 and pages 32 and 33)

Forest Service comment: This results in the profit ratio range used by Forest Service for more than 10 years. Hence, committee conclusions are acceptable, but the Forest Service differs with the committee on technical details.

29. Use sale-as-a-whole concept in appraisals. (pages 12 and 33)

Forest Service comment: This recommendation is acceptable and has been followed by the Forest Service since mid-1962 through increasing profit margins for high-value species to make up for deficits in low-value species, but not as proposed by the committee through juggling costs.

30. "The Committee is not convinced that it would be prudent to attempt to base the profit ratio for Forest Service appraisals on the experience of a competing industry." (page 33)

Forest Service comment: This recommendation is acceptable. It is a rejection of a key feature of the NLMA Point II.

31. Exhaust every possibility, such as by increasing the sale area, increasing the proportion of stand being marked, redesigning roads, assuming the costs such as slash disposal, in order to obtain a conversion value at least equal to normal profit plus minimum stumpage. Offer timber, which does not appraise out at normal profit margin, at minimum prices only as a last-resort means of maintaining a dependent firm or community. (page 34)

Forest Service comment: Forest Service is opposed to using appropriated funds for slash disposal, snag felling, erosion control, and other measures needed to take care of debris and disturbance from logging, which have always been considered a part of the logging job, in order to bolster appraisal profit margins.

32. Continue use of 50 percent of change in lumber indices for quarterly stumpage rate adjustment (escalation). (page 35)

Forest Service comment: This supports established Forest Service procedure.

33. Abandon the concept of "basic appraised value." (page 36)

Forest Service comment: This recommendation is acceptable. Forest Service has been working with General Counsel's Office to establish a basis to eliminate the basic appraised value concept.

34. Explore the possibility of changing the present escalation method to provide that upward escalation from the bid price be limited to the amount equal to the possible downward adjustment set by the minimum prices. (page 36)

Forest Service comment: The Forest Service is willing to explore this possibility in connection with contract revision project, but we have reservations on equity and desirability of this change.

35. Keep sales with provision for rate redetermination to a minimum. (page 36)

Forest Service comment: This recommendation is acceptable and in line with Forest Service policy.

36. Use a constant bid premium in rate redetermination sales. (page 36)

Forest Service comment: This recommendation is acceptable and in line with Forest Service proposals to industry for contract revision.

37. Establish timber appraisal staff units in the Forest Supervisor Offices. (page 37)

Forest Service comment: This recommendation is acceptable in broad principle. Its application must be kept in line with the volume of business on the various Forests and practical administration and personnel management considerations.

It should be noted that recommendation no. 31 was accepted in part and rejected in part by the Forest Service, which also said in response:

> A large portion of available funds for forest development roads is being used for survey design and supplemental [road] construction ...to overcome [subnormal profit] difficulties...we will not...disregard essential silvicultural practices or safeguards for [other] National Forest values and uses [such as] slash disposal, snag felling, erosion control [or] other measures to [offset] disturbances from logging....We question the advisability of seeking appropriations in order to bolster appraisal profit margins. It could be [called] subsidizing the cutting of public timber.

Recommendation no. 28 was also accepted in part and rejected in part. The committee accepted the part that suggested a range of 10 to 15 percent profit ratios. "This is the range," the Forest Service concluded, "which has been [used] over the last 10 years."

The Service disagreed on arbitrary allocation of a fixed 10 percent profit and a variable 0 to 5 percent risk element. The profit and risk margin was believed to be a composite of a number of factors, many of which might raise controversies as to whether they were properly profit or risk.

A recommendation that was accepted in principle, but proved controversial in later years, was no. 27--to make a thorough economic study of profit margins through a competent research organization.

An outside study by the Internal Revenue Service was requested and completed in 1966. Also, the Division of Fiscal Control (now Fiscal and Accounting Management) was asked to compile annual profit-and-loss summaries from companies that buy National Forest timber. This has been a continuing project.[6] Both are discussed below.

Some industry associations pressed for a completely independent outside study, perhaps by a large consulting group like the Stanford Research Institute or the Battelle Institute. The Service, however, was reluctant to take on another expensive study of this type--especially since there was substantial risk of a subjective judgment by a large consultant without specific expertise in timber selling aspects of forestry.

Nevertheless, the issue arose once again in the 1970's when yet another committee, the Joint Industry-Forest Service-Bureau of Land Management Appraisal Study Group, undertook a review of appraisals.

As can be seen in table 2, which shows advertised and bid sawtimber prices, the actual bidding in 1965 and 1978 gave even less aid and comfort to those whose views were that appraisal profit margins were too low.

General Accounting Office Reports (1963-65)

By 1955, the total value of National Forest timber sold had reached more than $100 million per year. The General Accounting Office (GAO), an agency of Congress, attracted by increasing timber sale revenues from the National Forests, began a series of audits of Forest Service timber sale activities in the early 1960's. Most of these were in the "B-number" B-125053 series. The audits alerted appraisers to the possibility of other outside evaluations of their activities. The audits were also responsible for the hiring of cost accountants to verify confidential information collected from industry books and records in each Region.[7]

One of the audits to have a significant effect on appraisals was "The Special Report on Review of

Table 2.--National Forest sawtimber stumpage prices and volumes by Region and species, 1965 and 1978

All species	1965 Sold	1965 Advertised	1965 Bid	1965 Overbid	1978 Sold	1978 Advertised	1978 Bid	1978 Overbid
	Billion BF	-------Dollars per MBF------			Billion BF	--------Dollars per MBF---------		
Region (R) 1	1.4	5.59	9.09	+ 3.50	1.0	31.27	67.72	+ 36.45
2	.3	3.16	3.61	+ .45	.3	25.60	29.27	+ 3.67
3	.6	4.47	4.74	+ .27	.3	93.32	99.25	+ 5.93
4	.4	3.70	4.08	+ .38	.3	38.27	45.75	+ 7.48
5	2.2	9.01	14.63	+ 5.62	1.8	54.56	157.47	+102.91
6	4.4	14.94	27.64	+12.70	4.8	96.86	176.48	+ 79.62
7	.1	24.75	32.24	+ 7.49	--[1]	--	--	--
8	.5	24.83	31.26	+ 6.43	.6	84.89	127.50	+ 42.61
9	.1	12.24	18.31	+ 6.07	(.121)[2]	(28.50)[2]	(38.91)	+(10.41)
10	.3	3.13	3.47	+ .34	.2	13.53	35.35	+ 21.82
Major species								
R-1 Douglas-fir	.3	6.00	9.26	+ 3.26	.2	13.88	42.52	+ 27.64
R-2 Spruce	.1	2.76	3.01	+ .75	.05	34.05	39.28	+ 5.23
R-3 Ponderosa pine	.5	5.00	5.24	+ .24	.3	98.51	104.94	+ 6.43
R-4 Ponderosa pine	.2	5.52	6.09	+ .57	.1	63.76	77.52	+ 13.76
R-5 Ponderosa pine	.6	12.85	20.10	+ 7.25	.6	77.45	178.09	+100.64
White fir	.6	2.12	3.67	+ .55	.5	25.49	84.10	+ 58.61
Douglas fir	.6	9.43	17.96	+ 8.53	.4	45.04	134.51	+ 89.47
R-6 Douglas-fir (W)	1.9	21.39	42.64	+21.25	1.8	129.19	252.18	+122.99
Western hemlock	.7	9.08	19.39	+10.31	.7	54.12	113.63	+ 59.51
Ponderosa pine	.8	15.47	18.48	+ 3.11	.8	135.45	221.00	+ 85.46
Douglas-fir (E)	.3	5.36	9.83	+ 4.47	.4	54.60	80.96	+ 26.36
R-7 Miscellaneous hardwood	.03	29.00	39.43	+10.43	--	--	--	--
R-8 Southern yellow pine	.4	26.85	32.68	+ 5.83	.5	91.22	137.22	+ 46.00
R-9 Miscellaneous hardwood	.03	10.29	16.35	+ 6.07	(.022)[2]	(9.09)[2]	(13.19)	(+ 4.10)

[1] Region 7 was divided between Regions 8 and 9 in 1966. -- = not applicable.

[2] Region 9, in 1978, used cunits (units of 100 cubic feet) as its measurement unit. Total sales in 1978 were 121 M cunits, and sales of miscellaneous hardwood were 22 M cunits, or 0.121 MM cunits and 0.022 MM cunits, respectively. One MM cunits equal roughly 0.6 billion BF. The R-9 dollar figures for 1978 are per cunit; to convert to MBF, multiply by 1.67.

Source: Washington National Records Center, Suitland, Md., Records of the Forest Service, Division of Timber Management, and current records of the Timber Management Staff.

Timber Sale Contract Between The Wagner Lumber Products Company and the Forest Service." Issued on March 1, 1963, the audit involved a scheduled rate redetermination of a long-term contract on the Okanogan National Forest in Region 6. The key principle developed in this case, after an official appeal to the Secretary of Agriculture, was that reviews under appeals could be made de novo--that is, all elements of a reappraisal could be reviewed. Thus while certain of the appellant's alleged errors were ruled valid, other errors were also discovered. The net result was an increase of about 50 cents per M board feet over the rates that were appealed. GAO did not criticize the final result.

Another significant audit was "The Analysis of the Policy and Procedures of The Forest Service Regarding Quarterly Adjustment of...Rates," a report to Congressman Compton White of Idaho on October 3, 1963. GAO's conclusions summarized the issue:

> It would appear that a logger who had contracted for purchase of...Forest Service timber subject to the [escalation] procedure, but who had made a similar arrangement for selling the logs, could at times find himself at a financial disadvantage.... In our opinion, the [escalation] procedure of the Forest Service, which aim at equal sharing by the purchaser and the Government of the uncertainties of lumber market prices ...,is generally equitable to both the purchaser and the seller....In view thereof, and the fact that...the procedure is carried out...in a uniform manner, there does not appear to be sufficient basis for change....

An audit reported on November 23, 1964, to the Speaker of the House and the Speaker pro tempore of the Senate, unearthed embarrassing deficiencies in Region 8. The report, entitled "Deficiencies in Appraising Southern Pine Sawtimber in Region 8," pointed out failure to include value of byproduct chips; improper use of rough green lumber prices; an inadequate sample for costs and prices; and excessive log cost estimates caused by collecting of costs based on Doyle log rule, and applying them on Scribner, in Mississippi.

The Forest Service acknowledged the need to improve, but it objected to GAO's estimate of a $700,000 revenue loss in Mississippi. It turned out that the Mississippi National Forests had twice as many "no-bid" sales as any other Forest in the National Forest system. Higher appraised prices would have been expected to result in even more "no-bid" sales.

Another special report requested by Congressman White and entitled "Alleged Waste by The Forest Service" was issued August 3, 1965. It quoted allegations that there was $2 waste for every $1 appropriated to the Forest Service, but found no evidence to support the charge. GAO pointed out that it was currently operating an audit program and, quoting from previous reports of formal reviews of Forest Service work, noted that "the Forest Service has done a remarkable overall job of administering timber sales during the postwar years...." GAO concluded that,

> Although our reviews have disclosed instances... [of] need for improvement ..., we believe that neither our findings nor the evaluations...of the other two independent studies support the allegation that for every dollar given in Federal taxes to the Forest Service, $2 are wasted.[8]

The subject of discrepancies in appraisal systems between Government agencies prompted a GAO audit entitled "Need to Resolve Differences in Procedures Used by Federal Timber Management Agencies in Appraising Timber for Sale." As early as August 1956, a report by the Special Subcommittee on the Legislative Oversight Function of the Senate Committee on Interior and Insular Affairs jointly with the Subcommittee on Public Works and Resources of the House Government Operations Committee had detailed the discrepancies in systems between those two agencies.

In August 1961, interagency work committees were assigned. Their work was completed by late 1963 and reports were turned in by two of the three committees, those in Portland, Oreg., and Washington, D.C. The Portland report was updated in 1964. In March 1966, the Bureau of the Budget issued a letter and report declaring the difference resolved. Region 6 and the Portland Bureau of Land Management (Department of the Interior) Service Center issued an Interim Manual for Appraisal of Federal Timber in May 1969. This manual was approved by the Washington Offices of both agencies in December 1969. In 1971, the Forest Service had implemented the procedures outlined in the manual, but BLM had not.

On the subject of appraisals in Alaska, GAO issued an audit report on July 26, 1968, recommending abandonment of appraisals based on questionable log market prices, since these were of doubtful accuracy in Alaska. GAO recommended appraising to end-product pulp or to paper. This was finally done in 1972, after appeal of a 1969 reappraisal for one of the long-term pulpwood sales (Ketchikan Pulp) demonstrated the difficulties in supporting log prices in appeal situations.

Another GAO audit, dated February 18, 1969, criticized Regions 1 and 5 for not using plywood as an end product in appraisals, as Region 6 had been doing since 1957, even though plywood was occupying an increasing proportion of the end-product mix in Idaho, Montana, and California. Since that time, Region 5 has moved its system to pick up plywood values when they are significant; Region 1 has not.

Followup Studies on the Worrell Committee

Followups to the Worrell Committee Report took two courses. First, the Forest Service Division of Fiscal and Accounting Management instituted a system to monitor profit and loss data. Cost accountants from the various Regions were asked to submit all cost and price data they collected annually from their timber operations. Confidential averages were then computed annually in the Washington Office. A new manual of instruction was issued for collection and analysis of timer purchasers' cost and sales data, covering all aspects of appraisal data from confidentiality to overrun.

Under "Records Availability and Retention," the instruction book said that timber operators' data would not be available to:

> ...the general public, employees of the Forest Service and other agencies not having duties related to [Forest Service] timber appraisals...except as authorized by law, by the Chief, or by written permission from the operator.

A glossary of terms was provided for the use of cost accountants. For example, "overrun" is defined as "the excess of the outturn of the log scale." "Underweights" are defined as "any savings the mill can develop by drying to a shipping weight less than the industry average [and] accrue to the mill."

Cost accountants were to let purchasers know their findings and to discuss working papers with the sale operator, furnishing a copy if requested.

The standard list of costs that accountants were to identify included:

1. Costs of stumpage sold.
2. Costs and income not related to timber appraisal premises.
3. Nonbusiness costs not relevant to timber appraisal premises:
   a. Unreasonably high bonuses.
   b. Unreasonable gifts.
   c. Special awards or bonuses because of high profits.
4. Personal expenses of partners, etc.
5. Interest.
6. Credit and financing costs related to capital structure.
7. Duplicated costs (e.g., selling costs, commissions).
8. Home office overhead charges in excess of home office contributions.
9. Exorbitant rental expenses.

Second, the Internal Revenue Service was enlisted to conduct a study to analyze profits in the timber industry for the year 1962. The results were furnished to the Forest Service, which issued a report in 1966.

The report showed that profits of western timber companies were comparable to profits in all U.S. manufacturing companies at the time. (See table 3.) It further showed that eastern and western timber companies, both those dependent and those not dependent on public timber, realized substantial profits through capital gains. (See table 4.)

The "Four Point Report" (1962)

The chorus of industry complaints that had begun with the rising timber prices in the 1950's reached a crescendo in 1962 with the issuance of a letter from Arthur Temple, Jr., president of the National Lumber Manufacturers Association, to the Senate Committee on Commerce, which was holding hearings on timber at the time. The letter became known as the "Four Point Report" because it addressed four major issues: sale of full allowable cut, timber appraisal, improved appeals procedures, and improved sales contract form.

Industries located where the private timber supply was near depletion were, in the early 1960's, interested in increasing the amount of timber available for sale from the National Forests. Bidding was so high in these areas that it was obvious that available timber supply was the most pressing problem. On the other hand, industries that were more fortunately located could buy timber at advertised prices. They objected to timber appraisals and the advertised minimum prices.

The timing was right for complaints about price. The 10-year housing boom of 1950-59 had collapsed in 1960-61, and the lumber industry had been hurt. Mills needed some kind of assurance of stability to convince financial interests that they could justify investments of hard cash to modernize equipment and plants.

Several reviews of the system were made, and the Forest Service issued a new appraisal manual during these years; but with the exception of the timber sales contract issue, the basic appraisal system did not change markedly.

Costs and product prices were still collected by zones within each Region. The data were verified by cost accountants who examined actual books and records. Data were averaged so as not to subsidize the inefficient or penalize the efficient. Selling prices were adjusted to reflect quality. Costs were adjusted to reflect logging or manufacturing difficulty. Data were to be as "current" as practicable--if possible, from the previous calendar quarter. The difference between prices and costs, called the "conversion return," was divided between stumpage price and profit to the entrepreneur who bought the timber. A profit ratio at about 10 to 15 percent was applied as a "dividing" mechanism. It was considered reasonable to insist that certain minimum, or base, stumpage rates of $1, $2, or $3 per M board feet be charged for timber.

The Weintraub Report, the Worrell Report, and the "Four Point Report" all agreed that the timber sale contract needed improvement. The "202"

Table 3.--Net income of U.S. timber companies after taxes, 1962

	Percent of sales	Percent of total assets
Lumber companies	2.0	5.0
Plywood companies	1.0	4.0
Pulp and paper companies	7.4	6.8
Integrated companies	5.2	5.5
All U.S. multicorporations	3.2	5.3

Source: USDA, Forest Service, Profits in the Western Timber Industries. Washington: Government Printing Office, May 1966.

Table 4.--U.S. timber firm profits, 1962, by size class

	Firms with assets over $5 million	All firms
	Percent of sales	Percent of sales
Eastern firms	4.0	3.8
Western firms	4.6	2.8

Source: USDA, Forest Service, Profits in the Western Timber Industries. Washington: Government Printing Office, May 1966.

contract had been in effect since 1911. The major difference between the "202" and proposed alternatives centered around the issue of judgment. The "202" contract relied on the judgment of the Forest officer in charge in any conflict between buyer and seller, making it difficult to sustain appeals except where officers were blatantly capricious in their judgments.

A new contract "2400-5," issued in 1965, eliminated some reliance on Forest officer judgment by detailing as many circumstances as possible. As might have been guessed, this substantially reduced the flexibility of the contract. It also led to an increase in appeals to the Chief Forester; to the Secretary of Agriculture; and to the Board of Forest Appeals and its successor (after 1975), the Board of Contract Appeals. There are those who hypothesize that opening up the traffic in appeals was industry's main reason for fighting the "judgment of the forest officer" clause of the old "202" contracts.

Five other major contract changes made in the early 1970's affected appraisals and are now incorporated in the newest contract form, the "2400-6":

1. Escalation was changed in 1971 from "50/50" to "50/100" formulas. This means that stumpage prices no longer increased or decreased by 50 percent of specified price index changes. The latter formula had been criticized because, in the modern inflationary period, stumpage prices increased when lumber prices increased, but did not reflect cost increases, which were also substantial. The new formula provided two zones. When index prices were above the base index (at time of appraisal), the escalation formula was the same as it had been in the past (50 percent of the difference between base index and current quarter index.) But when the current index was below the base index, the escalation formula

would be 100 percent of the difference between base and current index. The rationale was that when prices drop, costs do not drop--indeed, fixed costs per unit may increase as production drops.

2. Removal of marginal species from the site became required instead of optional. Because softwood timber was in short supply, the Forest Service decided to require the removal of all material capable of being made into standard usable products, even though this might reduce the total value of the tract. Previously, this was done only if there was silvicultural necessity to remove the submarginal timber.

3. Time became "of the essence" in contracts. Extensions could be made only under certain specific circumstances, such as prolonged market recessions. Previously, the Forest Service had followed a liberal extension policy. However, with timber in short supply, it became necessary to discourage stockpiling of timber sales by bidders who did not intend to perform aggressively. Exceptions could be made if justified by serious economic recesions.

4. Higher base rates--that is, higher than minimum ($1, $2, $3)--were permitted if necessary to provide deposits for planting and sale area betterment under the Knutson-Vandenberg (K-V) Act of 1930.

5. Because of increasing sensitivity to environmental impacts, permission was obtained from the Comptroller General in 1971 to modify going contracts to require unforeseen environmental safeguards, while simultaneously making compensatory reductions in stumpage payments. The milestone case came about on the Flathead National Forest in Region 1 (on the Bunker Creek timber sale to Plum Creek Lumber Co.). The sale, adjoining the Bob Marshall Wilderness Area, was in an unusually sensitive area, and the Comptroller's ruling said:

   ...we can see no reason why, by agreement of the parties, the modification should not be accomplished under B8.31 prior to rate redetermination....We conclude that this contract may, by mutual agreement with the purchaser, be properly modified....Any such modification should be completely documented to show that concessions by the Government are reasonably related to, and justified by, increased costs of operation to the purchaser, and a copy of this decision should be attached to the modification.

Joint Appraisal Study Group (1973)

The recession of 1970-71 prompted the lumber industry to renew its complaints about the appraisal system used for public timber sales. As a result, a joint appraisal study group of forest industry, Forest Service, and Bureau of Land Management was established in late 1972 to review the system and recommend simpler, more accurate procedures.

The study group was composed of Cochairman George A. Craig, William F. Berry, and Nicholas J. Kirkmire, representing industry; Cochairman Alfred A. Wiener, Richard E. Leicht, and Emil M. Sabol, representing the Forest Service; and Hugh R. Shera, representing the Bureau of Land Management.

A final report was issued after five scheduled 2-day meetings, and reviews of a number of alternate appraisal systems. Fifteen recommendations were specified, many directed at the same issues the Worrell Committee had tried to resolve 10 years earlier. Most recommendations aimed at improving the basic data on selling prices, costs, profits, and risks. Others aimed at improving the career ladder for specialists. The report began:

> Increased complexities of operations, greater variety and value of products, changing technology, differences in treatment of various timber stands and land conditions, and growing costs have made the timber appraisal problem increasingly difficult.
>
> It appears that a refinement of the Forest Service system offers the best possibility for meeting the objectives....

Transaction evidence, the group concluded, was an acceptable method when timber and products were relatively homogeneous. "Otherwise...it appears that the Forest Service must continue to use the residual value approach...."

The report concluded:

> On the basis of this review...there are no great opportunities to simplify ...appraisals, particularly [for] old growth timber..., the bulk of the volume offered in the [West]...Timber purchasers and [Government] personnel are urged to cooperate in the accumulation of sound data....

Reference Notes

(In the following notes, the expression WNRC, FS, TM, means Washington National Records Center, Suitland, Md., Records of the Forest Service, Division of Timber Management.)

1. USDA, Forest Service, Sidney Weintraub, Report on Stumpage Appraisal, "An Examination of Some Economic Aspects of Forest Service Stumpage Prices and Appraisal Policies," (Washington, D.C.: Government Printing Office, 1958).

2. Form 2400-17 is an "Appraisal Summary." All advertised sales and all sales over $2,000 must be entered on this form. Entries are keypunched for electronic data processing.

3. USDA, Forest Service, Albert C. Worrell, Report of the Timber Appraisal Review Committee, "A General Review of U.S Forest Service Timber Appraisal Policies and Procedures," (Washington, D.C.: Government Printing Office, 1963).

4. WNRC, FS, TM, Timber Sales, USDA, Forest Service, Press release, "Summary of Action Status of the 37 Recommendations of the Timber Appraisal Review Committee," Jan. 3, 1964.

5. WNRC, FS, TM, Timber Sales, "Statement on Forest Service Conclusions" on the Worrell Report, Nov. 7, 1963.

6. Profit-and-loss summaries are confidential and therefore not available for complete citation.

7. U.S. Congress, General Accounting Office (GAO), Annual Reports of the Comptroller General.

8. USDA, Forest Service, Albert C. Worrell, Report of the Timber Appraisal Review Committee, "A General Review of U.S. Forest Service Timber Appraisal Policies and Procedures," (Washington, D.C.: Government Printing Office, 1963).

Section V:

Measurements, Reappraisals, and Escalation

Many complex issues must be considered in every timber appraisal: costs, and how they are determined; prevalent species and their comparative value; end-product use, such as sawlogs or pulpwood; and slash disposal and site improvement charges, among others. In the history of Forest Service appraisals, however, three other issues have been the source of most contention and change. These are the intertwined issues of utilization and measurement methods, grading methods based on mill scale studies, and rate readjustments. All are critical to the appraisal process.

Utilization

From the beginning, erratic utilization standards posed problems for appraisers, who had to know what proportion of a stand would be used before they could appraise the sale realistically. Although small logs cost more to handle and returned poorer grades of lumber than large logs, they increased the logging volume per acre and reduced fixed charges for roads, railroads, and slash disposal. However, market conditions sometimes induced purchasers to leave small or defective logs on the ground, even if they had to pay for the logs anyway.

As early as 1911, William B. Greeley noted that utilization by loggers was 10 percent poorer than anticipated in the appraisals because sawmills would cull the low-grade logs arbitrarily.[1] A letter from the Flagstaff Lumber Co. 3 years later helps explain the problem. The company complained that economic conditions forced it to leave small logs. The company wrote that it was hauling no minimum 8-inch logs to its mill, "simply making stulls of them and leaving them in the woods... [we] cannot afford to put them through the sawmill."[2] The Regional Forester may have sympathized with the company's plight; nonetheless, he charged penalty scale for the material left on the ground.

Utilization problems remained chronic, particularly during market recessions. In the mid-1940's, an attempt was made to resolve the issue of fixed and variable costs related to utilization, but met with a lukewarm response from the Regions.

In response to the effect of market conditions, contract utilization requirements have fluctuated, tightening when market activity was booming, loosening or becoming optional when the market was slack. Not only were small logs affected by the utilization issue; low-value species such as hemlock, inland Douglas-fir, and aspen were also touched by it, as were "utility logs," those considered cull for lumber but usable for pulp.

Over the years, Forest Service policy has been against reducing the total value of a tract merely to induce utilization of marginal species or products--unless silvicultural necessity required their removal. (See Region 3 Deer Springs sale, in section II, Significant Sawtimber Sales and Reappraisals.) By 1970, however, the Forest Service had decided that it could not tolerate poor utilization of a raw material approaching short supply. It began to require logs to be used and, to that end, subsidized use of low-value material to the extent practical. During this period, growing environmental awareness caused the Service to broaden the concept of "silvicultural necessity" to include landscape appearance, even if preventing waste meant lowering tract prices. Cull logs and debris look ugly, especially to observers who are inclined toward the recreational environment. Nationwide shortages of softwoods at the time kept the industry from making a concerted effort to defeat this change in policy; operators needed every bit of marginal timber they could get.

Appraisals continue to reflect this utilization policy. Because Regional average costs reflect the costs of handling whatever volume the timber industry uses each year, changes in utilization policy will cause costs to change from the experienced costs currently available. This discrepancy requires that temporary adjustments in profit ratios be made until the necessary information can be picked up in the data. Fortunately, the risk of inappropriate data can be estimated and incorporated into such temporary adjustments.

Measurement Methods

Timber that is sold must be measured in order to set the amount to be paid by the buyer. Measurement methods have an important bearing on both timber appraisals and timber utilization. The Forest Service uses one of two measurement methods: the log scale method or the tree measurement method. Generally, the Service has favored the log scale method, charging for its timber on the log scale of individual logs. The British Columbia Forest Service also sells primarily on log scale, using company employees who are "certified by the Forest Service" to do the scaling.[3] Under the log scale method, the logs are measured with a tape and scale stick on the ground in the woods, on trucks or railroad cars, in the mill pond, or on the mill deck.

The eastern Regions of the Forest Service, however, came to prefer the tree measurement method, finding it more appropriate to their National Forests where most tracts had been acquired in cutover condition, and trees large enough to sell have been small. Under this method, the trees are measured standing in the woods. The eastern Regions have used this method to measure both sawlogs and pulpwood.

Although most Regions use log scale, tree measurement is used for approximately 1.5 billion board feet per year, or about 15 percent of all

Forest Service sales annually. The breakdown is approximately 1 billion feet per year in the Southeast and and Gulf States (Region 8), and 500 MM board feet per year in the Northeast and Lake States (Region 9). The Bureau of Land Management (BLM), which annually sells about the same volume as the combined eastern Regions of the Forest Service, also uses tree measurement. BLM's timber sales occur primarily in Oregon and California.

The Rocky Mountain Regions of the United States and British Columbia (where small logs are common) both use an abbreviated "sample log scale" system. Under this method, a sample--maybe 5 to 10 percent of the logs, depending on timber values and variability--is scaled. The samples are usually randomly selected truckloads or batches of logs, often scaled in conjunction with weighing procedures.[4]

The measurement method used determines which party bears the risk in a sale. When tree measurement is used, payment is made on a lump sum basis. The seller bears the risk of an overcut of the cruise estimate; and the buyer bears the risk of an undercut. When log scale is used, actual scale is recorded, and the seller bears the risk of not having all the logs presented for scaling. Theoretically, the risk is slightly higher with tree measurement; however, bidding analyses have not been sensitive enough to detect any appreciable difference between the two methods.

Tree measurement is thought to encourage better utilization, because of the lump sum payment. Purchasers who must pay for the trees, whether they use them or not, might be more inclined to use marginal species and material than those who pay only for trees actually used. The lump sum payments of the tree measurement method can also make cruising errors more damaging to buyers than other payment methods, because they might be paying for either more or fewer trees than the sale advertised. To encourage full utilization, the Forest Service has applied a policy of careful sale inspection and penalty scales for unremoved material.

Log scale has been used from the earliest years of the National Forests, but tree measurement was also used as early as 1910. The first archival record of a Forest Service lump sum timber sale, based on tree measurement rather than log scale estimates, was for a 1910 sale of 685 M board feet of western redcedar on the Millicoma River in western Oregon. The Supervisor of the Siuslaw National Forest asked permission to use lump sum --tree measurement--methods. The Regional Forester supported the request on the grounds that tree measurement was more appropriate for this sale than log scale because:

1. The amount was small.
2. Contents of every tree had been carefully estimated.
3. The timber was scattered along 12 miles of riverbank.
4. The timber was expensive to scale.
5. The timber would bring $2.35 per M, a "good price."[5]

The Chief Forester approved the plan.[6]

Although tree measurement was used even before publication of the first appraisal manual, it did not become popular until many years later, when the eastern Regions began to favor it. A 1940 memorandum gives a vivid picture of one of the first tree measurement sales in Region 8:[7]

> The first tree measurement sale in second growth loblolly and shortleaf pine on the Sumter National Forest was made with considerable detail. We literally swarmed over each tree [like] a horse trader feeling out a bargain....

Mill Scale Studies of Lumber Quality Yields

From earliest days, timber appraisers were faced with the need to set standards for standing trees and for lumber outturn from logs of different quality and species. Eventually, two grading systems were developed; one to rate quality of standing trees in the forest, and one to rate quality of logs. Mill scale studies measured the lumber outturn at mills, from logs or trees of different grades, to provide the means of determining lumber selling value and, therefore, timber value. Table 1 shows the mill scale studies each Region favored in the 1960's for its various species.[8]

Western Pines

The greatest attention was paid to the high-value pine species in the West: ponderosa pine, sugar pine, and western white pine. Ponderosa, or western yellow pine, was the first and most valuable species to be exploited in the West, with a big range running from South Dakota to California, and from Arizona and New Mexico to eastern Washington, Idaho, and Montana. It soon became apparent that with such great differences in climate and geography, there were wide variations in log quality depending on the size, number, and kind of knots; the pervasiveness of wood rot; and the grain of the wood in the logs. By measuring the quantity and quality of outturn from logs, mill scale studies helped determine log grades.

Ponderosa pine log grades were determined by common industry techniques that rated the preponderance and importance of various log flaws. From the earliest days, the top, or no. 1 grade log, was a "select" log, which generally came from the lower (butt) portion of the tree where there were no knots. For that reason, a select log was "90% surface clear." A no. 1 log produced mostly B select, C select, and D select lumber, and was at least 30 inches in diameter at the small end.

Table 1.--Mill scale studies of lumber quality yields from softwood and hardwood logs in the United States, by Region and species, 1929-59

Region 1	Ponderosa pine, Lodewick 1940 study (west side)
	Ponderosa pine, Black Hills 1957 study (east side)
	White pine, Diamond/Gardner 1957 study
	Lodgepole pine, Belgrade 1957 study
	White fir, Twin Feathers 1957 study
Region 2	Lodgepole pine, Kremmling 1957 study
	Ponderosa pine, Black Hills 1957 study (South Dakota)
	Ponderosa pine, Flagstaff 1957 study (Colorado)
Region 3	Ponderosa pine, Flagstaff 1957 study for value
	Ponderosa pine, Rock Top 1937 study for overrun
Region 4	Ponderosa pine, Lodewick 1940 study
	Douglas-fir, Council/Cascade 1956 study
	Englemann spruce, McCall 1958 study
Region 5	Ponderosa pine, Susanville 1934 study (east side)
	Ponderosa pine, Standard 1929 study (west side)
	Sugar pine, Standard 1929 study
	Douglas-fir, PNW (Pacific Northwest Station) Bulletins 83 and 125 (Coast)
	Douglas-fir, Paskenta 1952 study (Mendocino)
	White fir, Dinuba 1955 study
	Redwood, Combined 1935, 1942 study
Region 6	Douglas-fir, PNW Bulletins 83 and 125 (Coast)
	Douglas-fir, Halfway-Enterprise 1954-55. Ardenvoir/Tygh Valley 1957-59 studies (east side)
	Western larch, Halfway-Enterprise 1954-55 study
	Sugar pine, Ellingson 1960 and Standard 1929 studies
	Hemlock and silver fir, Anderson-Middleton 1957 study (west side)
	Ponderosa pine, Lodewick 1940 and Lakeview 1955 studies
	Engelmann spruce, Twisp-Wagner 1955 study
Region 8	Slash and longleaf pine, Florida 1957
	Shortleaf pine, Ouachita 1957
	Forest Products Laboratory Bulletin (FPL) D-1737 for yellow birch, beech, cottonwood, sapgum, sugar maple, red oak, black oak, chestnut oak, white oak, yellow-poplar.
	Tennessee Valley Authority (TVA) Bulletin 52 for ash, basswood, cucumber, blackgum, hickory, red maple
Region 9	FPL Bulletin D-1737 for ash, elm, yellow birch, red maple, sugar maple, red oak, black oak, white oak.
	Purdue University Bulletin 516 for redgum, hickory, chestnut oak

Source: Private notes of the author from informal survey at national valuation meetings.

A no. 2 log was permitted a few more defects, and was described as "75% surface clear." It, too, had to be a minimum of 30 inches in diameter.

A no. 3 log was a "shop" quality log capable of producing a large proportion of "shop lumber"--lumber suitable for factory cuttings. In the Eastern States, shop lumber is called "factory lumber." No. 3 logs were "50% surface clear" and had to be at least 24 inches in diameter.

A no. 4 log was a small, knotted log, often of young growth.

A no. 5 log was a "common" log, producing high percentages of no. 2 and no. 3 common lumber, especially in the smaller sizes. Large no. 5 logs also produced sizable proportions of shop lumber.

A no. 6 log was a very knotty log, producing mostly low-grade common lumber.

After log grades were established, mill scale studies were conducted to help determine the quality of lumber outturn from various log grades, and to measure how much lumber of each grade was produced by logs of each grade. Boards were graded and tallied one of two ways: by batches of logs of similar size and grade or by individual log. The individual log method was favored over the batch method because it proved more adaptable and reliable for statistical analysis. The information about quality and quantity of lumber outturn by log grade was then compiled and analyzed, arranged in tables, and published.[9]

Mill scale studies revealed average lumber grade outturns by log grade. Those figures were multiplied by the selling price of the appropriate lumber grade to yield a weighted-average lumber grade value. After the cruise estimated the quantity of logs of each grade, those figures were multiplied by the log grade value to yield a weighted-average log value for the sale.

In 1960, Carl Newport issued a report listing influential mill studies of ponderosa and sugar pines. (See table 2.) Of these studies, those shown to have the greatest impact on quality grading methods in different Regions were the Lodewick Study in Regions 1, 4, and 6; the Standard and Pickering Studies in Region 5; and the Rock Top Study in Region 3.[3]

Table 2.--Major mill scale studies of lumber quality yields from ponderosa and sugar pine logs, 1915-57

Year	Mill or study	Location
1915	Delleker Sawmill	Plumas National Forest
1915	Verdi Sawmill[1]	Tahoe National Forest
1924	Lassen Lumber & Box Co.	Susanville, Calif.
1925	Standard Lumber Co.	California
1927	Madera Sugar Pine Co.[1]	California
1927	Mt. Emily Lumber Co.	La Grande, Oreg.
1928	Shevlin-Hixon Lumber Co.	Bend, Oreg.
1929	Pickering Lumber Co.[1]	Stanislaus National Forest
1934	Fruit Growers Supply Co.	Lassen National Forest
1935	Boise-Payette Lumber Co.	Idaho
1936	Cady Lumber Co.	McNary, Ariz.
1936	Lodewick Study	Oregon and Washington
1936	McCloud River Lumber Co.	California
1937	Rock Top Study	Arizona
1937	Meadow Valley Lumber Co.	Modoc National Forest
1937	Fruit Growers Supply Co.	Blacks Mountain
1939	Fruit Growers Supply Co.	Blacks Mountain
1941	Amador Lumber Co.	Martel, Calif.
1941	Lodewick Study update	Oregon and Washington
1951	Grizzly Creek Mill	Nevada City, Calif.
1953	Challenge Study	California
1953	Brooks Scanlon Lumber Co.	Bend, Oreg.
1954	Southwest Lumber Mills, Inc.	Flagstaff, Ariz.
1955	Lakeview Lumber Co.	Lakeview, Oreg.
1955	Southern Hills Lumber Co.	Black Hills, S. Dak.
1955	O'Connor Mill	Black Hills, S. Dak.
1955	Window Rock	Arizona
1955	Newberry	Black Hills, S. Dak.
1955	Croft-Pearson Mill	Panguitch, Utah
1956	Diamond Match Co.	Superior, Mont.
1956	Hallack & Howard	Winchester, Idaho
1957	Croft-Pearson Mill	Panguitch, Utah
1957	Pickering Lumber Co.	Standard, Calif.
1957	Harris Lumber Co.	Ardenvoir, Wash.

[1]Also included mixed conifer species; red fir, white fir, and Douglas-fir.

Source: Frances J. Flick, "Grade Yield Studies," a USDA Library bibliographic reference list, multilithed, 1955, for the Division of Forest Economics Research, Forest Service.

Newport evaluated four major log grading systems: the Lodewick or PNW system; the California west side system; the California east side system; and the Rocky Mountain system. He concluded that of the four, the Lodewick Study's PNW system yielded the most consistent results. Other mill scale studies of ponderosa pine, primarily early ones, are listed in table 3.[10]

Newport's high opinion of the Lodewick Study echoed Regional practice. Published by J. Elton Lodewick in 1941, the study was actually an aggregation of studies made in 12 different mills in Oregon and Washington from 1927-39 and was probably used in ponderosa pine appraisals more than any other mill scale study published from 1940-60. Based on outturns from many different mills, the Lodewick Study was as nearly representative a study as was available in the ponderosa pine regions. The tables it produced were easy to use and effective. The Lodewick Study's table 9 summarized log values for any given set of lumber prices. Prices developed by this method thus became known as "table 9" prices. Table 9 was typically updated annually by using the previous year's prices in place of those that were no longer current.

Table 4 shows the Lodewick Study's estimate of lumber outturn from no. 5 logs, revealing a sizable proportion of shop lumber from the larger logs and a high output of common lumber from 12-inch logs.[11]

West Side Douglas-fir

The species that accounts for the largest volume of National Forest timber sales is the west side, or coastal, Douglas-fir. In western Oregon and western Washington, this species produced 2 billion board feet of sales in 1978.

From 1957 through the 1960's, Region 6 used the Matson mill scale studies, two 1952 compilations of the Pacific Northwest Forest and Range Experiment Station, for its west side Douglas-fir.[12] Table 5 shows the Matson average lumber grade production from no. 1, no. 2, and no. 3 peeler grade Douglas-fir logs.

The Matson studies were later replaced with plywood recovery studies and new lumber production studies using the new grades: construction, standard, utility, and economy. These studies were made by a log and tree grade research group headed by Paul Lane. Use of the Matson and Lane lumber/plywood studies permitted appraisals to be based on plywood standards for peeler grade logs and lumber standards for other logs. The procedure weighted lumber and plywood for each grade, based on the experience of sawmills and plywood plants in the Region.

Hardwoods: FPL's D-1737 Report

While the western Forest Service Regions were working with the Lodewick Study for pines and other studies for other species, the eastern Regions were grappling with the need to measure timber quality differences in hardwoods. The Forest Products Laboratory (FPL) responded by compiling the results of a number of hardwood mill scale studies. Its first report on hardwood log grades, based on the sawing of 11,000 logs before 1940, was issued in 1949 and has been known as "D-1737.[13]

The study was a landmark in timber quality research. Reissued in 1953 and 1965, it has been used for appraising sawtimber values in Regions 7, 8, and 9 from its first publication through the 1970's. Weak spots were filled in during the 1950's by the Hardwood Log and Tree Grade Project.

D-1737 developed three log grades for hardwoods:

No. 1 grade produced 60 to 80 percent firsts and seconds (FAS), roughly equivalent to B and better in softwoods.

No. 2 grade produced 32 to 57 percent FAS, selects, and no. 1 common lumber.

No. 3 grade products 15 to 36 percent of the upper grades.

Hardwood factory lumber grades are based on the percentage of clear lumber cuttings obtainable by

Table 3.--Mill scale studies of lumber quality yields from ponderosa pine logs in Oregon, 1913-31

Year	Mill	Location
1913	Pelican Bay Lumber Co.	Klamath Falls, Oreg.
1913	W. H. Eccles Lumber Co.	Austin, Oreg.
1915	W. H. Eccles Lumber Co.	Austin, Oreg.
1916	Pelican Bay Lumber Co.	Klamath Falls, Oreg.
1916	Hilgard Lumber Co.	Whitman National Forest
1931	Mt. Emily Lumber Co.	La Grande, Oreg.

Source: Frances J. Flick, "Grade Yield Studies," a USDA Library bibliographic reference list, multilithed, Division of Forest Economics Research, Forest Service.

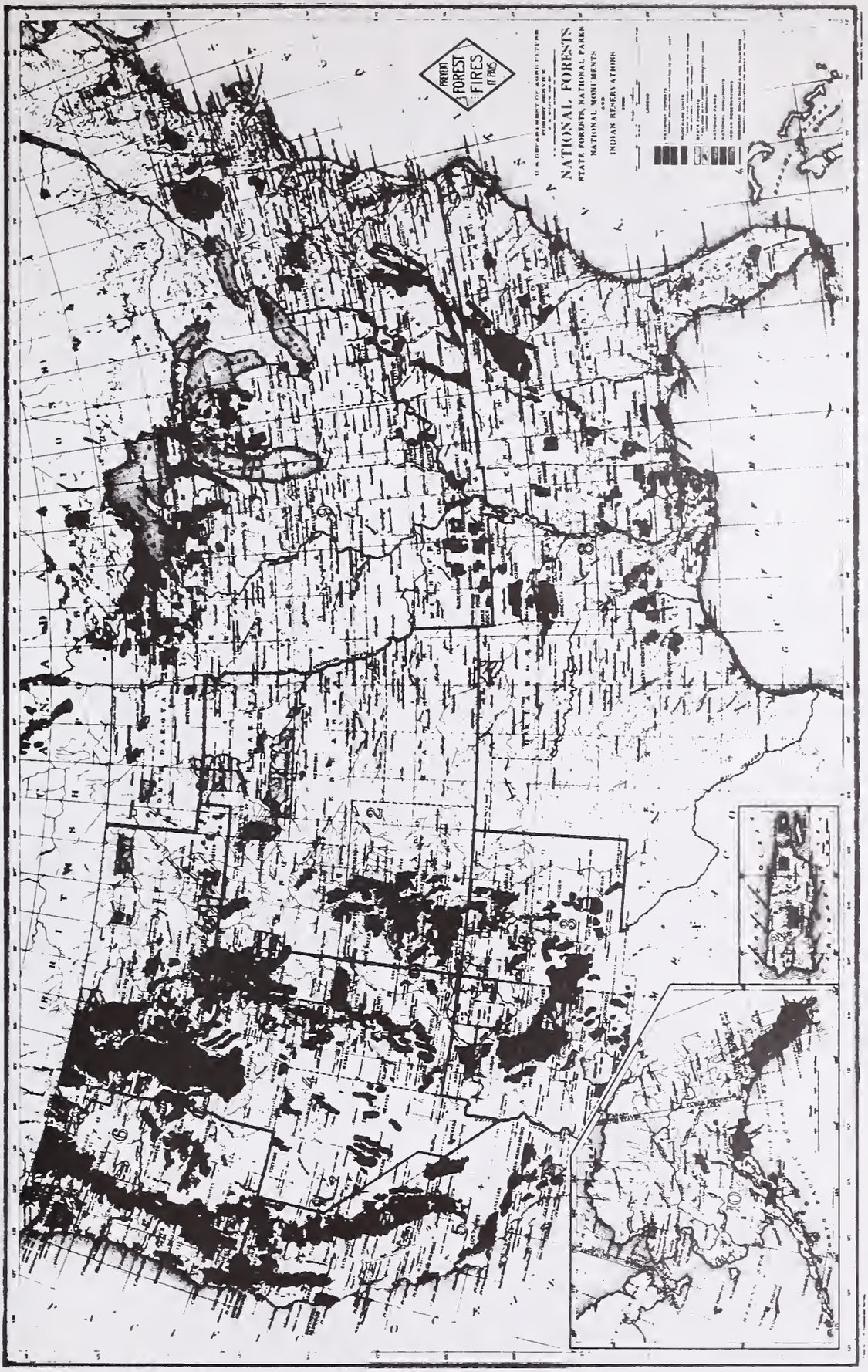


Figure 6.--National Forests, State Forests, National Parks, National Monuments, and Indian Reservations as of May 1, 1939. The Forest Service had separated the Southern States from its Eastern Region in 1934 to form Region 8.

(Forest Service and Geological Survey)

Table 4.--Average percentages of lumber outturn from no. 5 ponderosa pine logs in the U.S. Pacific Northwest, 1927-39

Lumber grade	Log diameters			
	12 inches	24 inches	36 inches	48 inches
C and better select	0.25	2.00	2.50	2.50
D select	1.00	2.75	3.25	3.25
Miscellaneous select	1.00	2.25	2.25	2.25
Subtotal select	2.25	7.00	8.00	8.00
No. 1 shop	--[1]	3.75	7.50	7.50
No. 2 shop	.25	12.50	17.75	18.00
No. 3 shop	.25	10.75	14.00	14.00
4/4 shop	1.50	3.75	4.25	4.25
Subtotal shop	2.00	30.75	43.50	43.75
Nos. 1 and 2 common	27.50	6.00	.25	--
No. 3 common	40.25	22.00	6.50	4.75
No. 4 common	14.00	14.50	12.75	13.25
No. 5 common	.25	.50	1.00	1.25
Subtotal common	92.00	43.00	20.50	19.25
Box and short common	3.75	19.25	28.00	29.00
Subtotal box, etc.	3.75	19.25	28.00	29.00
Total	100.00	100.00	100.00	100.00

[1]-- = not applicable or not available.
[2]One-inch, or "four-quarters"-inch thick shop.

Source: J. Elton Lodewick, Lumber Recoveries at a Representative Mill (Forest Service, Pacific Northwest Forest and Range Experiment Station, 1941).

Table 5.--Average lumber grade production from Douglas-fir peeler log grades, 1952[1]

Lumber grade	Log grades		
	No. 1 peeler	No. 2 peeler	No. 3 peeler
	Percent	Percent	Percent
B and better select	31.1	19.6	10.6
C select	22.6	24.3	16.9
D select	2.3	1.8	1.7
Select structural and select merchantable	15.5	20.2	27.8
No. 1 dimension[2]	12.3	15.4	22.1
No. 2 dimension[3]	6.0	7.3	9.6
No. 3 dimension[4]	7.2	9.0	9.0
No. 4 dimension[5]	3.0	2.4	2.3
Total	100.0	100.0	100.0
No. of logs 24-29 inches	--[6]	--	200
No. of logs 30-35 inches	35	35	33
No. of logs 36 inches +	16	9	13
Total logs studied	52	44	246

[1]Compiled by Pacific Northwest Forest and Range Experiment Station.
[2]Later renamed "construction" dimension.
[3]Later renamed "standard" dimension.
[4]Later renamed "utility" dimension.
[5]Later renamed "economy" dimension.
[6]-- = not applicable or not available.

Source: Elmer E. Matson, Research Note 83, Forest Service, Pacific Northwest Forest and Range Experiment Station, November 1952; Research Note 125, January 1956.

resawing larger pieces of lumber, making them similar to "shop" lumber grades in pine and other softwoods.

Eighteen species of logs were evaluated in D-1737:

Chestnut oak	Soft maple	Yellow-poplar
Lowland red oak	Sapgum	Cottonwood
Upland red oak	Black gum	Elm
Lowland white oak	Beech	Ash
Upland white oak	Basswood	Hickory
Hard maple	Yellow birch	Sycamore

Table 6, an excerpt from D-1737 for lowland white oak, illustrates the study's grade differentiation by grade and size classifications, using overrun based on Scribner decimal "C" log scale.

Prices vary widely by size, as well as grade, but the largest logs in each grade approach the values of the smallest logs in the next higher grade, and overruns decrease as log sizes increase.

Later Mill Scale Study Work

Many mill scale studies were conducted on various species before World War II (see table 7 for a partial listing), and great efforts were made to conduct more in the 1940's and 1950's. A 1958 report was such an effort. Like the Weintraub Report, this report by a Working Group for the National Log Grade Committee was timed to give a boost to mill scale study activities.[14] The report recommended establishing five field projects to study five major species and their associated species: ponderosa pine, Douglas-fir, Engelmann spruce and lodgepole pine, eastern white pine, and eastern oaks and other hardwoods. The report also proposed diagraming all trees and logs from which studies are made. The Working Group's recommendations were adopted and, through them, a large body of research was conducted until the work was curtailed in the 1970's.

Despite this research specifically aimed at mill scale studies, numerous reviews of Forest Service appraisal practices--from the Worrell Committee in the 1960's to the Joint Study Group in the 1970's--sought increased attention to mill scale studies and their application.

Quality Ratio Measurement

As mill scale studies became standardized, they tended to follow most of the patterns exemplified in the Lodewick and D-1737 Studies. Later studies added a step by photographing each log as it was sawed. Because large logs generally were composed of higher quality material than small logs, they were worth more, even though they yielded lower overruns. Users of these studies noticed that the relative values of log grades tended to remain remarkably constant, even though absolute values fluctuated with changes in overall market prices. This fact led to another application of mill scale studies. They began to be used to measure "relative" timber quality as well as average lumber grade outturn--a form of input/output analysis. Four steps were used to determine quality ratio:

1. Collect and compile Regional average selling value and overrun outputs experienced by a sample of mills in a Region.

2. Compile a Regional average of the log grades sawed in the mills from which experienced selling values and overruns were collected.

3. Apply the available mill study to evaluate both the Regional average log grade and the log grade of the timber stand that is to be appraised.

This process yielded a formula which, when multiplied by the Regional average output value (sales and overrun), became the beginning point for the specific appraisal:

4. Apply the formula:

$$\frac{\text{Mill study value, Proposed sale logs}}{\text{Mill study value, Regional average log usage}}$$

This system has been applied successfully in the ponderosa pine regions of Regions 2, 3, 4, and 6. Its advocates believe that it helps analytical appraisal yield a more valid estimate of fair market value.

Readjustment, Reappraisal, and Index Escalation

Long-term sales inherently raised issues that would not be relevant to short-term sales; one such issue was changes in bid price. A sale intended to continue through several decades could be expected to be affected by many conditions, leaving the operator vulnerable to economic hardship in some circumstances and the Forest Service to loss of revenue in others, if the sale tract were logged at bids 10 years old and older.

The earliest long-term sales recognized this problem but provided for only one method, rate readjustment, of changing the winning bid prices during the life of the contract. Under this method, a "base" lumber price was specified for a local area, originally a "mill run" local average. In later years, more specific bases were used. These later bases fixed certain percentages of lumber grades, and applied only changes in lumber grade price. The lumber prices were reviewed at 3-year intervals; and if they changed by more than a specified amount, perhaps $1 or $2 per M, the stumpage would then change by 50 percent of the difference between the specified minimum and actual price changes.

Rate readjustment did not solve all the problems attendant on long-term sales, because it recognized only upward changes in price, not changes in

Table 6.--Summary of several mill-scale studies showing lumber grade recovery for Lowland White Oak logs before 1940[1]

Log diameter	Scribner "C" overrun	FAS[2]	Sel.	#1 Com.	#2 Com.	SW[3]	#3 Com.	#3B Com.	Timbers, etc.	Lumber value per MBF[4]
Inches	Percent									Dollars
	Log grade 1									
15	18.0	24	9	28	20	1	10	6	2	101.75
21	5.5	28	6	38	14	--[5]	4	8	2	124.75
27	.5	37	2	37	16	--	--	8	--	142.00
	Log grade 2									
15	19.0	5	3	30	23	3	13	12	11	82.25
21	5.0	12	2	46	20	1	5	8	6	96.00
26	- 2.0[6]	7	3	47	30	4	2	7	--	102.75
	Log grade 3									
9	41.0	--	3	13	21	--	33	20	10	60.50
15	19.0	--	--	21	24	3	15	20	17	64.50
21	2.5	--	1	25	27	1	14	29	3	69.50

[1]Compiled by Forest Products Laboratory, 1949.
[2]Firsts and seconds; roughly equivalent to B and better in softwoods.
[3]Sound wormy (not defective, no deduction.
[4]1948 prices.
[5]-- = not applicable or not available.
[6]2 percent underrun.

Source: USDA, Forest Service, Forest Products Laboratory, Hardwood Log Grades for Standard Lumber, 1949.

Table 7.--Mill scale studies of lumber quality yields for logs of western conifers, 1915-34

Year	Mill Operator	Location	Species
1915	LaMoine Sawmill (Calif.)	Shasta National Forest	Mixed conifers
1915	Swayne Sawmill (Calif.)	Plumas National Forest	Mixed conifers
1915	Madera Sugar Pine Co. (Calif.)	Sierra National Forest	Mixed conifers
1912	West Oregon Lumber Co.	Linnton, Oreg.	Douglas-fir
1915	Walton Lumber Co.	Everett, Wash.	Douglas-fir
1917	Bryant Lumber & Shingle Co.	Fremont, Wash.	Douglas-fir
1934	Chambers & Son	Cottage Grove, Oreg.	Douglas-fir
	Southeast Portland Lumber Co.	Portland, Oreg.	Douglas-fir
1916	Not applicable	Shasta National Forest (Calif.)	Fire-killed pine, mixed conifers
1928	Sugar Pine Lumber Co.	Pinedale, Calif.	Knotty top logs
1923	Fruit Growers Supply Co.	Susanville, Calif.	White fir
1931	Fruit Growers Supply Co.	Susanville, Calif.	White fir
1932	Clover Valley Lumber Co.	Loyalton, Calif.	White fir
1935	Dolbeer & Carson Lumber Co.	Eureka, Calif.	Redwood
1936	Hammond Redwood Co.	Samoa, Calif.	Redwood

Source: National Log Grade Committee, Working Group, Log and Tree Grading as Means of Measuring Quality, a Recommended Research Program, May 1958.

costs, to the detriment of the operator. Full-scale rate redeterminations, or reappraisals, followed rate readjustment as the solution to the problem. These, too, had disadvantages, because they provided only for rate increases, not decreases. This prohibition was a formal one, culminating in a 1942 ruling by the Solicitor of the Department of Agriculture that rate reductions were not permitted.[15] After reconsideration of the issue, he reversed his decision the following year, ruling that the Forest Service could establish new rates, which were either lower or higher than the old bid rates. To accommodate this landmark change in reappraisal policy, two rates were set: (1) a long-term normal rate based on estimates of long-term risks, markets, and costs; and (2) a rate that included "an additional amount consistent with prevailing market conditions." The second rate provision would allow bids to recognize temporary abnormalities in the marketplace. The Solicitor did set a limit on reductions, however, stipulating that the ruling "would enable reductions to be made, after reappraisals to, but not below, the basic appraised rates."[16] It also paved the way for price index escalation.

Reappraisals, although an improvement over rate readjustments, were not problem-free. The 1943 ruling that rates could be reduced if warranted by circumstances left appraisers open to the possibility of tremendous industry pressures for reductions at scheduled reappraisal. One way to buttress reappraisals from such pressures was to standardize and justify reappraisal procedures. Uniform procedures supported by good cause would help both appraisers and reappraisals withstand the pressures of appeals or threats of lawsuits. The possibility of future rate reductions also affected the initial bidding in competitive long-term sales. Evaluation became difficult because of the possibility that bidders had bid high, counting on relief after the first rate reappraisal. This possibility resulted in sales having a stated minimum volume that would be paid for at not less than bid prices before rates could be lowered. Once again, the solution did not entirely correct the problem. It took the Worrell Committee, 20 years later, to resolve the issue with a recommendation that the bid premium --overbid--be added to all reappraised prices during the life of the contract. (See "The Timber Appraisal Review (Worrell) Committee (1963)" under section IV.)

The ability of reappraisals to adjust rates both up and down took into consideration some, but not all, of the problems of lumber market ups and downs. In effect, periodic rate adjustments made each long-term sale a series of sales at different prices for the 3-to-5-year periods between reappraisals. During these periods, the stumpage price paid was a flat rate, fixed for that period.

Quarterly Price Experiment

The need for more sensitive pricing led to an experiment proposed in 1949 by Ira J. Mason, Timber Management Chief of the Forest Service. The experiment provided for quarterly price changes, based on changes in specified lumber price indexes. On May 23, Mason sent a memorandum to the Regional Foresters suggesting a trial period, on short-term sales only, extending not beyond December 30, 1950. Long-term sales could be included in the experiment if their initial cutting period did not extend beyond June 30, 1950. Mason proposed that adjustments be based on Bureau of Labor Statistics indexes and reflect 87 percent of changes in selling price indexes and costs. Shortly thereafter, Regions 5 and 6 proposed using Western Pine Association (W.P.A.) lumber price indexes, eliminating the adjustment of costs, and dropping the price adjustment factor from 87 percent to "25 to 40% subject to Regional option."[17] These suggestions were accepted and became the basis for modern escalation formulas. In the experiment, 40 percent of the change in price (increase or decrease) was added (or subtracted) algebraically to the contract price and applied retroactively to all timber cut during the previous period. A news release announced the test with a headline that read "National Forest Timber Sales to be Adjusted to Market Prices."

In early 1950, the year the experiment was to end, Chief Forester Lyle F. Watts approved extending the trial period for quarterly rate adjustment for another year, through June 30, 1951. The notice of extension reported that there had been no conclusive results from limited use of interim price adjustment, as the experiment came to be called. It also included certain guidelines. Appraisal selling prices would use a base period of at least one year and possibly more whenever possible, but they could use a base period of less than one year when markets fluctuated rapidly. This provision was actually a significant change, because the original proposal had suggested use of data from a 2-year average base period. The base index would be the W.P.A. index for the 3 months preceding advertisement of the sale, which would not necessarily be a calendar quarter.[18]

"50/50" Method Lasted 20 Years

It was about this time that the adjustment formula was raised from 40 percent of index changes to 50 percent. This "50/50" method was followed for approximately 20 yars. Then in the early 1970's, a two-zone method was adopted. This adjusted for 50 percent of index changes above the base index and 100 percent of index changes below the base index. (See "Four Point Report," in latter part of section IV, Investigations, Audits, and Reviews.)

The Washington Office extension seems to have produced results. Toward the end of 1950, Watts noted that interim price adjustment had gained wide acceptance and authorized its use beyond June 30, 1951, as a permanent, but optional, procedure.[19]

Region 5 was grappling with its own index problems at the time. Also near the end of

1950, Mason authorized Region 5 to discontinue stumpage adjustment on the Klamath and Six Rivers National Forests for lack of an adequate index for the area. These were considered coast Douglas-fir forests, where much of the timber was sold in "surfaced-green" (i.e., planed, but not dried); western pine area species generally were sold surfaced-dry. The problem was solved temporarily when the Western Pine Association began issuing a green index for Douglas-fir. Years later, however, mill practices began to change. California coast mills began drying their lumber, making the new green indexes inapplicable and forcing a return to the original dry indexes.

The switch from green back to dry indexes caused a flurry of appeals, because the prices of lumber volumes sold green had become distorted shortly before the Western Pine Association stopped issuing its green indexes based on those volumes. The distortions were later corrected by adjusting indexes for periods longer than the preceding 3 months--in this case a period of 2 years.

This principle has been applied in other instances. Mill practices change gradually, and because they do, the Western Pine Association, now the Western Wood Products Association (W.W.P.A.) has had to change what it calls the "index log" from time to time. The index log is a hypothetical log composed of percentages of various lumber grades produced by the mills in a specific period.

Table 8 shows changes over the years in index logs for ponderosa pine and Douglas-fir and larch. Similar indexes and index logs have been maintained for sugar pine, western white pine,

Table 8.--Changes in "index log" values for ponderosa pine, Douglas-fir, and larch, 1933-76

Lumber grade[1]	Ponderosa pine				Lumber grade[1]	Douglas-fir and larch (dry)			
	1933	1954-56	1971	1975-76[2]		1933	1951-53	1957-60	1971
	----Percent by lumber grade-----					----Percent by lumber grade----			
Selects[3]	10.88	11.41	11.85	11.77	Selects	10.2	6.29	6.29	4.23
Shop[4]	15.16	22.42	27.62	28.01	Shop	--[5]	--	5.46	3.36
No. 3 & better common	23.27	28.78	20.74	27.52	No. 3 & better common	21.7	16.64	11.26	2.22
No. 4 common, No. 5 common & dunnage	8.96	18.77	9.60	9.72	No. 4 & 5 common	9.2	7.62	9.55	2.98
Other common	12.47	9.90	8.10	--	Utility & better & No. 3 & better dimension	51.3	63.34	58.47	55.97
Box & shop rejects	29.26	8.72	5.93	4.75	Economy dimension	--	--	6.31	6.38
Utility & better dimension[6]	--	--	14.76	16.80	Studs	--	--	--	20.30
Economy dimension	--	--	1.40	1.43	Timber & plank	7.6	6.11	2.66	4.56
Total	100.00	100.00	100.00	100.00	Total	100.00	100.00	100.00	100.00

[1]Lumber grades produced by typical logs in western lumber mills.
[2]Coast and inland north zone. A separate Rocky Mountain zone was created in 1980. The Rocky Mountain 1980 percentages: selects, 7.71%; no. 3 and better common, 20.48%; nos. 4 and 5 common, 15.44%; box, 2.25%; utility and better dimension, 4.93%; economy dimension, 3.96%.
[3]B and better, C, D, molding stock; stained, short, and pitchy selects.
[4]Nos. 1, 2, and 3 shop, and factory select (no. 3 clear).
[5]-- = not applicable or not available.
[6]Includes stud grade.

Source: Bulletins of the Western Wood Products Association.

Engelmann spruce, lodgepole pine, white fir, and green Douglas-fir. The index for green Douglas-fir was discontinued,as were those for spruce and lodgepole pine, which are now included in a "white woods" index (1974-75 basis).

Since 1933 the following indexes have been added or discontinued:

1944: white fir added
1952: Engelmann spruce added, green larch and Douglas-fir added
1960: green larch and Douglas-fir discontinued
1973: lodgepole pine added
1975: lodgepole pine discontinued; western white woods added (includes lodgepole pine)

Table 9.--Western Wood Products Association's annual lumber price indexes for ponderosa pine, Douglas-fir, and larch, 1933-80

Year	Ponderosa pine				Douglas-fir and larch			
	1933 basis	1954-56 basis	1971 basis	1975-76 basis	1933 basis	1951-53 basis	1957-60 basis	1971 basis
	Dollars							
1933	18.57				14.55			
1934	21.77				18.28			
1935	21.02				19.35			
1936	20.77				20.11			
1937	25.24				22.50			
1938	21.84				20.26			
1939	22.40				20.28			
1940	24.23				22.14			
1941	29.40				26.89			
1942	32.69				30.98			
1943	34.92				31.34			
1944	36.62				33.73			
1945	36.72				33.64			
1946	41.58				39.96			
1947	58.12				57.63			
1948	72.60				66.77			
1949	69.37				59.70			
1950	79.00				69.60			
1951	92.57				77.57	73.56		
1952	91.31				77.31	73.55		
1953	92.17				73.33	69.29		
1954	87.30				72.87	68.83		
1955	90.74				80.28			
1956	92.70				81.16			
1957	86.51	88.69			74.03	69.83		
1958	83.00	85.41			72.70	68.57		
1959	89.57	92.93			80.07	76.33		
1960	86.29	88.08			75.57	71.41		
1961		80.98					63.35	
1962		82.83					66.27	
1963		84.15					67.40	
1964		84.92					68.10	
1965		84.93					67.86	
1966		88.00					71.18	
1967		87.04					72.17	
1968		101.82					90.35	
1969		128.85					102.88	
1970		108.81					79.82	
1971		128.27					100.88	
1972		151.96					122.17	
1973		203.54	205.99				162.94	161.82
1974			205.49					142.56
1975			183.81					134.88
1976			241.89					170.59
1977			277.77	275.71				203.83
1978				349.66				233.72
1979				374.63				256.02
1980				338.16				214.38

Source: Bulletins of the Western Wood Products Association.

When index logs are changed, the Forest Service is obligated to adjust base indexes in each going contract to insure that the adjusted rate does not change to the Government's disadvantage. Each time it makes such an adjustment, the Forest Service has to review the data to avoid the kind of distortions and maladjustments that occurred in the California green indexes. The most successful indexes for use as "turning points" when index logs are changed have been those based on averages of the preceding 15 to 24 months. A base period that includes at least four complete quarters minimizes the effect of seasonal price variations by lumber grade.

As the index log has changed to conform to changes in industry practice, so has the index basis changed. Table 9, which shows annual W.W.P.A. indexes from 1933-80, also shows base changes.

Escalation of stumpage prices was used in the west side Douglas-fir section of Region 6 from 1961-65, based on composite indexes of lumber and plywood, with the plywood component derived from Bureau of Labor Statistics data. The west side formulas were unusual in that they applied forward into the next quarter, rather than retroactively into the preceding quarter. The industry was not pleased by this feature and asked that it be abolished. The Region complied in 1965.

The index method of escalation is now used only in Regions 1 through 5 and in the east side of Region 6 and thus applies to about half of National Forest sales volume. It is not used in the eastern Regions, Alaska, or the west side Douglas-fir section of Region 6. The feasibility of using indexes in Alaska based on Japanese lumber prices is being explored; much of the lumber and pulp produced in Alaska is sold to Japan.

Reference Notes

(In the following notes, the expression NA, RG 95, FS, TM means National Archives, Washington, D.C., Record Group 95, Records of the Forest Service, Division of Timber Management. WNRC, FS, TM means Washington National Records Center, Suitland, Md., Records of the Forest Service, Division of Timber Management.)

1. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from W. B. Greeley to the [Chief] Forester, Aug. 19, 1911.

2. NA, RG 95, FS, TM, Timber Sales, Series 70, letter from J. C. Dolan, president, Flagstaff Lumber Co., to A. Ringland, Regional Forester, Region 3, July 1, 1914.

3. Canada, British Columbia Forest Service, "Annual Reports of the British Columbia Forest Service," Victoria, B.C.

4. USDA, Forest Service, National Forest Log Scaling Handbook, (Washington, D.C.: Government Printing Office, 1964), amended July, 1970. Sample scaling is described in section 85.

5. NA, RG 95, FS, TM, Timber Sales, Series 64, letter from C. S. Chapman to the [Chief] Forester, Nov. 9, 1910.

6. NA, RG 95, FS, TM, Timber Sales, Series 64, letter from H. S. Graves to C. S. Chapman, Nov. 14, 1910.

7. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from Norman R. Hawley to Regional Forester, Nov. 30, 1940.

8. WNRC, FS, TM, Timber Sales, letter from I. J. Mason to the Regional Foresters, Feb. 7, 1961.

9. Most of the studies were issued by Forest Experiment Stations. The field work was a coopera-cooperative effort among National Forest and Regional Office personnel, industry cooperators, and research specialists.

10. WNRC, FS, Division of Timber Management Research, a 16-page multilithed bibliographic reference list of grade yield studies compiled by Frances J. Flick, (USDA Library, 1955) gives many other early mill scale studies. This list was transmitted by incoming Chief Richard E. McArdle in a memorandum to Regional Foresters and Station Directors on July 25, 1952. It was entitled, "The Grading of Logs and Trees, a Bibliography Compiled for the (Forest Service) Log Grade Committee." This committee met regularly at that time to review log grade studies.

11. J. Elton Lodewick, Lumber Recoveries at a Representative Mill (USDA, Forest Service, Pacific Northwest Forest and Range Experiment Station, 1941).

12. See Elmer E. Matson, Research Note 83 (for peeler grade logs) and Research Note 125 (for sawmill grade logs). (USDA Forest Service, Pacific Northwest Forest and Range Experiment Station, Nov. 1952 and Jan. 1956.)

13. USDA, Forest Service, Forest Products Laboratory, Hardwood Log Grades for Standard Lumber, 1949.

14. National Log Grade Committee, Working Group (Carl A. Newport, Charles R. Lockard, and Coleman L. Vaughan), Log and Tree Grading as a Means of Measuring Quality, a Recommended Research Program, May 1958. (The Working Group visited Forest Experiment Stations and reviewed available library materials.)

15. USDA, Office of the Solicitor, Opinion of the Solicitor, No. 4358, Aug. 11, 1942. (The decision was reversed June 1, 1943.)

16. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from E. E. Carter to Regional Foresters, June 2, 1943.

17. NA, RG 95, TM, Timber Sales, Series 64, two memoranda from I. J. Mason to Regional Foresters: (1) May 11, 1949 proposed use of BLS indices; and (2) June 1, 1949, recommending

W.P.A. indices with the lower (25-40%) adjustment factor.

18. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from C. M. Granger (for L. F. Watts) to Regional Forester, Jan. 30, 1950.

19. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from C. M. Granger (for L. F. Watts) to Regional Foresters, Sept. 8, 1950.

Section VI:

Special Situations

Price Controls

The 1943 ruling allowing rate redeterminations, in recognition of market fluctuations was perhaps influenced by the unusual market conditions prevailing at the time because of World War II. Wars have traditionally affected lumber markets and timber appraisals. In this century, they have caused price controls to be instituted three times: during World War II, during the Korean war, and during the Vietnam war. Limited controls were also applied during World War I.

World War II

World War II had a severe impact on timber sales, not only in funneling off people needed to perform the work, but in imposing rationing and price controls. Under the War Powers Act, the Forest Service was permitted to sell timber without competition; between 5 and 10 percent of sales were made under the no competition option. At the same time, the Office of Price Administration (OPA) imposed price ceilings.

In the year following the authorization, Edward E. Carter, Timber Management Chief, wrote: "Our records show that approvals have been issued to Regional Foresters for a total of 17 specific sales without competition, under the authority of [the War Powers Act of] Dec. 12, 1942."[1] The authorizations limited noncompetitive sales to not more than a 2-year supply to established mills. Even though such sales were noncompetitive, the Forest Service had to publish a notice of intent to sell in advance of the sale.

As demand for National Forest timber caused increased competitive bidding, Carter worried about the need for high standards in timber appraisal work:

> ...over the years, even with competitive bids received in only a small percentage of our total offerings of national forest timber, there have been practically no well-founded accusations brought against us for selling timber at less than its actual worth. But frankly, we have a reputation for our appraisal work which may be better than we deserve.[2]

Carter referred to one of Julian Rothery's publications on valuation problems, and advised the Regional Foresters that all appraisals should "be summarized and recast into the valuation factor" to facilitate comparisons.[3]

Carter also related the Forest Service's excellent reputation to price controls:

> One result [of the reputation] is that O.P.A. proposes to base their whole structure...on the appraised prices for publicly owned timber... [which] may be flattering to us but it also puts on us a responsibility for living up to our reputation.[4]

Shortly afterward, he sent a confidential memorandum to the Regional Foresters notifying them to expect an OPA order.[5] The order came, based on National Forest appraised prices. Bids could exceed advertised prices only by specified fixed amounts:

Forest Service Advertised price per MBF	Maximum allowable bid increase per MBF
To $1.50	+ $0.40
1.51 to 2.00	+ .50
2.01 to 3.00	+ .70
3.01 to 4.00	+ .90
4.01 to 5.00	+ 1.05
5.01 to 7.50	+ 1.35
7.51 to 10.00	+ 1.60
Over 10.00	+ 1.85

These limite were set in Maximum Price Regulation (MPR) No. 460, which stated that the advertised prices themselves had to be based on ceiling log or lumber prices. MPR 460 fixed prices west of the 100th Meridian. Each sale over $1,000 in value had to be reported to OPA. MPR 460 was amended several times to permit additions to ceilings for overtime, premiums for special expediting of peeler logs, and other exceptional reasons. Penalties for violations included criminal actions, and treble damage civil actions.

Logs and stumpage had been excluded from controls initially in 1941. In June 1942, however, MPR 161 put general price controls over western logs. Hardwood logs in the East also came eventually under controls through MPR 313 in February 1943. The following month, the price of all logs was frozen at September-October 1942 levels through MPR 346.

MPR 426, which first controlled western timber prices, used 1941 prices as ceilings. Controls on eastern timber under MPR 313 were similar, but used 1942 sales prices as a benchmark.

Because competition was modest at the time, the impact of price controls on stumpage probably was not great.

A typical western sale of the time was the 1945 sale on the Crater Creek unit of Columbia (Pinchot) National Forest. Carson Lumber Co. bought the 9.75-million-board-foot tract. The sale was in the Douglas-fir region, where log prices were the appraisal end product:

	Douglas-fir	Hemlock
Selling price (Columbia River log ceiling)	$ 26.04	$ 20.85
Logging cost	16.90	16.90
Conversion (selling price minus logging cost)	9.14	3.95
Valuation factor	.65	.55
Stumpage	5.95	2.15
Profit ratio	14%	9.4%

In addition to the stumpage, this sale entailed a K-V deposit of 35 cents per M. Although ceiling price regulations would have permitted a bid increase of $1.35 on Douglas-fir and 70 cents on hemlock, the extra margin was not needed because the bid was precisely the advertised price.[6]

The Korean War

Controls on stumpage prices were marked by uncertainty throughout the Korean war period. An item in January 1951, in Crow's Pacific Coast Lumber Digest, a prominent trade journal, noted that:

> ...although the largest lumber manufacturer in the business has rolled prices back to where they were on December 1, 1950, in keeping with a government request ....It is not thought likely that many [others] will follow the example....[7]

Later in the same month, the trade journal was struck by "the strange spectacle of manufacturers and retailers joining hands to force prices up...to [gain] a better bargaining position when ceilings are established."[8]

The expected controls were imposed on January 16, 1951, when the Economic Stabilization Agency set ceilings on wood products. As it applied to stumpage, the ceiling for each species was the highest stumpage rate in effect for a going sale between December 19, 1950, and January 15, 1951. The ceilings set were so high that they had little effect initially. In the west side Douglas-fir area, ceilings were $63.00 per M for Douglas-fir and $21.50 per M for hemlock. The ponderosa pine ceiling was $52.30 for sawlogs.[9]

By April 1951, the idea of controlling stumpage directly was abandoned, and stumpage was removed from the freeze; however, lumber and plywood price ceilings remained in effect. Manufacturer's ceilings varied according to each manufacturer's selling price for lumber or plywood during the base period. This lack of uniformity in ceilings was the source of considerable confusion and dissatisfaction until March 13, 1952, when new "dollars and cents" price ceilings were standardized.[10]

When Ceiling Price Regulation (CPR) No. 128 was issued for Douglas-fir, true fir, and hemlock at prices reported to be $5 to $15 above the market, unsympathetic trade journal reports called the reception of the ceiling "a temporary state of confusion."[11] CPR 152, effective June 30, 1952, set similar ceilings for ponderosa pine and associated inferior species. Again, market forces appear to have kept prices generally below ceilings, making the effect of price controls on appraisals minimal.[12]

The Vietnam War

Price controls imposed in 1971 were related indirectly to inflationary effects of the Vietnam war. In the middle of the year, President Richard Nixon reluctantly took a step toward stabilizing prices, rents, and wages and salaries by establishing an Office of Price Stabilization directed by a Cost of Living Council.[13]

The memorandum of instructions to Regional Foresters outlined the procedure to be followed:

> The Cost of Living Council has advised that agencies should freeze appraised prices of federal timber at common levels while the present price freeze is in effect. To assure that common appraisal levels are maintained...lumber and plywood prices no higher than June, July, August 1971 [may be used]. Quarterly escalation and bidding procedures will continue as in the past.[14]

The "common level" was a level equivalent to that used by the Forest Service and the Bureau of Land Management in the Department of the Interior.[15]

The last half of 1971 was called Phase I of the freeze. Later instructions to Regional Foresters informed them that Phase II continued the restrictions of Phase I, with one exception. Under Phase II, stumpage became an exempt raw material, which meant that lumber or plywood prices could increase to reflect cost increases, provided that profits did not exceed the average of the 2 higher profit years of the previous 3 years.[16] The instructions were to use fourth quarter 1971 prices, which for some species were higher or lower than the established common level:

	4th quarter	Common level	Change
Ponderosa pine	$137.08	$131.97	+ $5.11
Douglas-fir	105.76	107.18	- 1.42
White fir	100.39	98.57	+ 1.18

Subsequently, prices were increased normally to the first quarter of 1971, to the second quarter of 1971 (with a 1 percent increase in profit ratio), and to the third quarter 1972 (with another 1 percent increase in profit ratio).

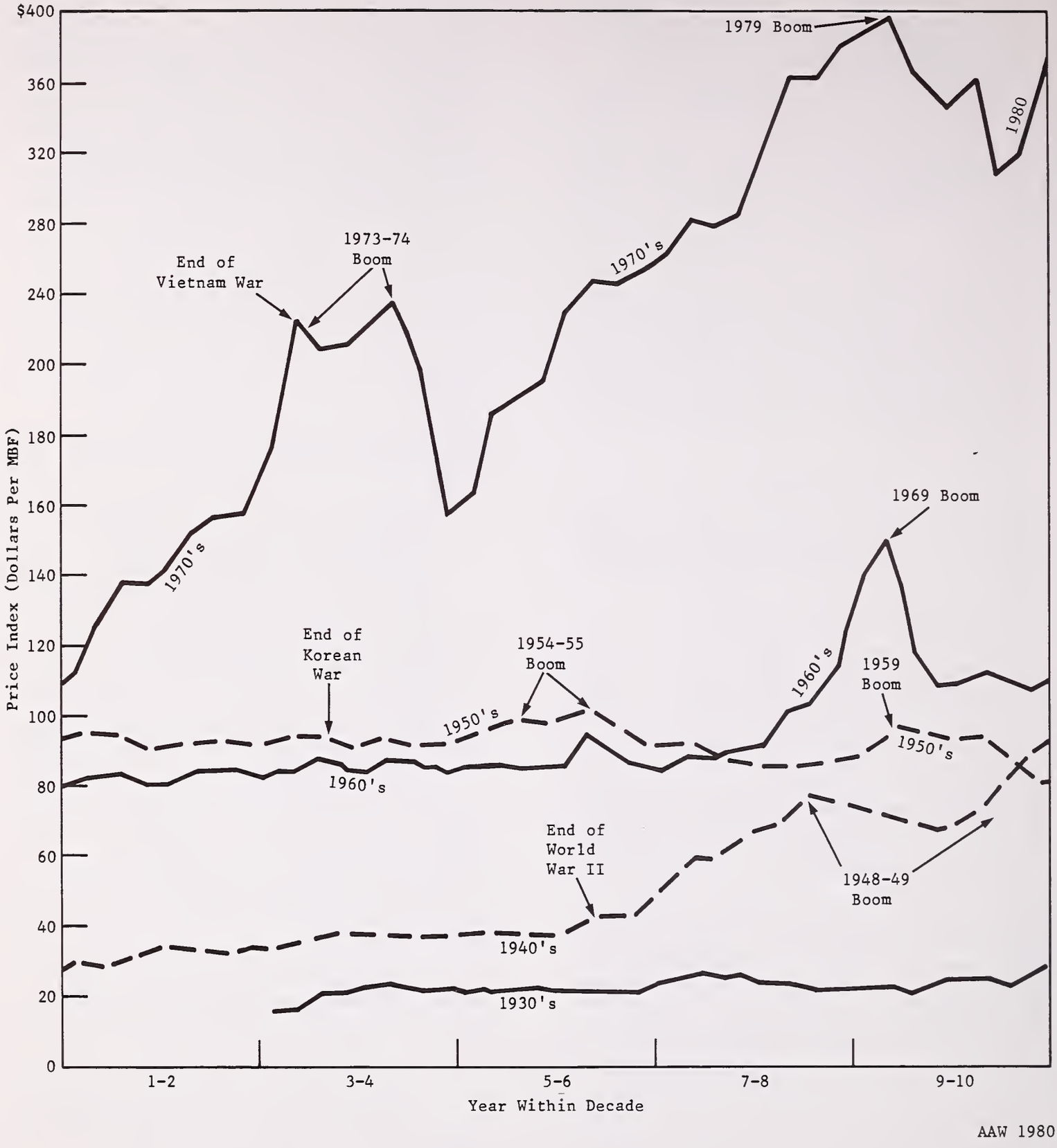


Figure 7.--Price indexes for ponderosa pine timber, 1930-80.

Then, with the end of cost controls, came an extremely rapid increase; prices rebounded as though suddenly unhooked from a huge spring. First, a "February Composite" and then a "March Composite" price base were used. Composite prices had been devised as a means of getting data more current than the previous calendar quarter.

Even before the Worrell Report, guidelines had called for use of the previous calendar quarter as a normal base period for prices. When prices reached extreme peaks and then plunged back to a low point in 1969, new guidelines were issued after review by the President's Council of Economic Advisors. Subject to judgmental checks, the new policy, issued in mid-1969, was:

> Normal markets--appraise to previous calendar quarter, as before.
>
> Abnormal rates ($5 per month) of change--appraise to rolling most recent 3 months.
>
> Extreme rates ($7.50 per month) of change--appraise to composite 2 or 3 months.[17]

The composite was a combination of the most recent 1-month or 2-month W.W.P.A. index and the latest month's Trade Journal Index (T.J.I.), maintained by the Forest Service. The T.J.I. used the same weights--percentages--of lumber grades as the W.W.P.A. indexes, but used price quotations from weekly trade journals rather than actual sales invoice prices. T.J.I. indexes tend to lead W.W.P.A. indexes by about 1 month. (See Figure 1.)

Land Exchanges

In the early years of the Forest Reserves and National Forests, numerous chunks of public land passed into private ownership through various mechanisms such as homesteading, mining claims, and railroad grants. The details of rights-of-way through public and private domains and many other elements of timber operations were complicated considerably by this segmentation of land, particularly in view of the fact that many of these private tracts were relatively small. The land exchange procedure was devised as a means of removing some of these complications and facilitating timber cutting activities for operators and administrators on intertwined Federally owned and privately owned lands.

In a land exchange, private owners simply trade parcels of their land for parcels of Federal land to create larger blocks of congruent land for both parties. This procedure diminishes the effect of piece-meal private holdings scattered throughout public lands.

Not all exchanges have been land-for-land. In the 1930's and 1940's, companies that had cut over their own lands exchanged their land for cutting rights to valuable species on National Forest land in a timber-for-land exchange. They would often leave on their land uncut timber that had little value at the time, such as white fir and inland Douglas-fir in the West, which would revert to the Forest Service when the land was traded. In later years when the timber they had left standing became valuable in its own right, some of these companies were forced to buy back from the Forest Service timber that they had formerly owned.

Because an exchange is for lands of equivalent value, not necessarily size, a careful appraisal of the value of both tracts involved in the exchange is of paramount importance. For this reason, appraisals of timber for land exchanges have been the source of disagreements among Forest Service appraisers for years. Particularly prevalent from the 1920's through the 1950's, land exchanges involved many of the same appraisers who handled timber sale appraisals.

One of the problems in land exchange appraisals is attributable to different payment methods used in National Forest commercial timber sales and in private sales or exchanges. "Pay-as-cut" terms, under which the buyer makes a series of payments as the timber is cut and scaled, generally apply in National Forest sales. In private sales or exchanges, however, "lump sum" transactions, in which the buyer pays or trades a total purchase price on a specified date, are the norm.

Values of lump sum transactions tended to be lower, because discounts were implicit to reflect the greater risks of loss from fires, insects, disease, or trespass. The purchaser who paid in lump sum also had to bear the burden of carrying charges for a single payment in full: interest on money tied up and costs of fire protection and caretaking.

In recent years, the differences between these two methods largely have been equalized by inflation, growing demand, and shrinking supply. Heavy demands for timber have coincided with timber supply shortages as private holdings have been cut out. In all but depression years, nearly insatiable demands for logs now make it possible for buyers to liquidate part or all of the timber they buy and get what are essentially pay-as-cut prices. If the same buyers wish to hold the timber for their own use or for speculation and the market is stable, the decision could cost them something akin to a discount.

The pressures of inflation make their own contribution to erasing the differences between payment methods. They have caused timber values to inflate even faster than the rest of the economy, giving lump sum timber a speculative value at least as high as, if not higher than, the value of pay-as-cut timber. Table 1 shows comparative volumes and values of timber cut from land exchanges and from commercial sales for several decades.

Despite the differences between lump sum and pay-as-cut transactions, timber values in land exchanges and commercial sales were comparable in price before 1940. Perhaps this was true because

selected timber in land exchanges was of higher quality than that in commercial sales and because timber sales were not competitive during that period. After that time, however, timber sale prices rose, perhaps because there was moderately competitive bidding in the 1940's particularly after World War II. Discounting may have become part of the process through standardized valuations of the lands, which were paid for by negotiating equivalent values of timber.

Table 1.--Comparison of timber cut on National Forest land exchanges with commercial timber sales, fiscal years 1928-65

Fiscal year	Cut on timber-for-land exchanges (National Forests)		Cut on commercial sales[1] (National Forests)	
	MMBF	Dollars per MMBF	MMBF	Dollars for MMBF
1928	104	2.88	1,151	2.77
1929	144	3.03	1,336	2.90
1930	165	3.72	1,470	2.94
Subtotal	413		3,957	
Weighted average		2.87		2.88
1931	180	2.55	1,030	2.79
1932	67	2.88	526	2.49
1933	84	2.83	372	2.21
1934	76	2.80	580	2.38
1935	84	2.61	649	2.62
1936	206	2.28	795	2.64
1937	194	2.32	1,078	2.53
1938	213	2.57	1,055	2.51
1939	273	2.53	999	2.67
1940	369	2.66	1,347	2.82
Subtotal	1,746		8,431	
Weighted average		2.56		2.61
1941	515	2.39	1,530	2.95
1942	645	2.46	1,540	2.93
1943	495	3.71	1,847	3.69
1944	493	3.52	2,821	4.39
1945	413	3.23	2,712	4.30
1946	260	3.84	2,470	4.25
1947	363	3.98	3,472	4.31
1948	307	3.94	3,451	5.75
1949	360	5.05	3,830	7.03
1950	307	5.30	3,195	9.10
Subtotal	4,158		26,868	
Weighted average		3.56		5.26
1951	266	4.82	4,422	10.52
1952	186	5.72	4,232	13.77
1953	179	4.97	4,982	14.00
1954	185	6.82	5,180	12.38
1955	103	6.34	6,225	11.26
1956	94	8.05	6,813	14.22
1957	68	7.01	6,910	16.64
1958	85	4.81	6,335	14.80
1959	79	4.96	8,262	13.74
1960	65	4.46	9,302	16.79
Subtotal	1,310		62,663	
Weighted average		5.70		14.11
1961	73	6.82	8,308	14.92
1962	86	4.53	8,946	14.37
1963	69	3.74	9,957	13.47
1964	43	8.44	10,911	13.81
1965	15	20.27	11,229	14.32
Subtotal	286		49,351	
Weighted average		6.34		14.15

[1]Commercial sales exclude sales at cost, 1928-45, and free use. After 1965, land exchange cuttings, which were dropping in volume, were included with commercial sales.

Source: Washington National Record Center, Suitland, Md., Records of the Forest Service, Division of Timber Management.

Damage or Settlement Appraisals

Timber appraisals have been needed for other purposes than for timber sales or land exchanges. Among these purposes are damage appraisals (fire, trespass, failure to complete contracts, etc.) and timber settlements (road or power line rights-of-way, reservoir clearings, etc.)

Values for damage or settlement transactions differ from other appraisals in that they are forced by circumstances. The circumstances may be forest fires, floods, hurricanes, insect epidemics, or theft. With timber settlement, the force applied involves development plans for reservoir construction or for road or powerline building. The element of force also causes these cases to face the threat of lawsuits if they cannot be settled amicably.

The essence of damage-type appraisals is the difference in value before the event and immediately afterward. To be sure that all factors are considered (in case of lawsuits), it is usually safest to use several appraisal approaches, in the manner advocated by Julian Rothery, and then select the most appropriate approach, giving cogent reasons for making the selection.

Standard appraisals in use for making commercial timber sales in an area should, of course, be the basis for the appraisals, with comparisons being made to other approaches, transaction evidence, or other.

Young growth timber values pose additional problems. Young growth may have a value for immediate conversion into commercial Christmas trees, poles, posts or other products, or small sawtimber. Or, it may have a higher potential future value, which should be discounted back to the present. If inflation is anticipated in the future, the inflation expectation should be offset by reducing the amount of the discount.

The intricacies of damage appraisals were appreciated by appraisers in the early years of the Forest Service. William B. Greeley, on April 27, 1925, wrote to alert the Regional Foresters about the problem:

> The importance of the fire-control job on the National Forests has been so great, and its prosecution so absorbing, that I think we have drifted into a habit of carelessness in the determination of our fire losses....This commonly recognized inadequacy and inaccuracy appears to have resulted sometimes in lack of conviction in putting the case for proper fire protection before the public, and more important, in a tendency to underrate the losses we sustain, and consequently to overvalue the effectiveness of our existing system of fire control.
>
> Future stumpage prices for wood will unquestionably be higher than they are today, and recognition of this fact is essential in valuation of young growth. For the past 80 years timber prices have advanced more rapidly than all-commodity prices, and this tendency will likely continue. The rate will probably be greater in the West than in the East, and 1 percent a year, the existing rate, seems none too high a value to assign to it. This means that in 70 years present stumpage values will double....[18]

Greeley's prediction was in the right direction, but it has proved extremely conservative over the 54 years since 1925. Average Forest Service stumpage sales came to $2.51 per M in that year. In 1979, 54 years later, the average was $173.22 per M.

In a letter written to the Regional Foresters on July 1, 1918, Edward E. Carter put the case for damage calculations on timber sale contracts about as clearly as it has been done since:

> It should be clear from the beginning that purchasers who abandon or breach their contracts with the United States must expect to pay such damages as result from such action or inaction....Naturally, if there has been no injury to the Government, no damages can be collected ....The attitude of the Government should be broad and just, not technical and harsh....But...[purchasers must realize their obligations]...[A]slack policy will result in irresponsible persons bidding in timber with the expectation of being let off if they get into trouble....

The kinds of damage listed by Carter were:

1. Failure to do required work. Damage is the cost of doing the work.
2. Failure to cut all marked trees. Predetermined or liquidated damages are specified in standard contracts.
3. Poorest timber uncut. Appraise remaining timber and compare with what should have been paid under the contract.
4. Cost of resale of the remaining timber.
5. Loss of bid premium would be damages.

"In certain cases," according to Carter, "even though there may be a technical damage to the United States, the circumstances may be such that from a standpoint of law and justice" charges of breach of contract should not be considered. Examples would be: absolute and complete loss of market; fires not caused by the purchaser; acts of Government, such as wars; or mutual misunderstanding.

Sustained Yield Units

The Act of March 29, 1944, the Sustained Yield Forest Management Act, authorized the Secretary of Agriculture (for the Forest Service) and the Secretary of the Interior (for the Bureau of Land Management) to establish two kinds of sustained yield units to "promote the stability of forest industries, of employment, of communities...."

One kind of unit was a "cooperative sustained yield unit," in which private forest land, of one or more owners, and Federal land are joined in one jointly managed unit. Because of strong and prolonged industry objections, only one of these was ever established. This was the Shelton Cooperative Sustained Yield Unit (December 12, 1946), on the Olympic Peninsula of Washington State. It was still in operation in 1982. Under the agreement, the cooperator committed his lands to a joint management plan. In exchange, he had "first refusal" on any public timber sales advertised for sale in the unit, at the appraised price. The allowable annual cut in the Shelton "Co-op unit" is 115.7 MM board feet from the Olympic National Forest, and 111.3 MM board feet from the private land.[19]

The second kind was termed a "Federal unit," composed entirely of federally owned forest lands. Five of them were established by the Forest Service:

1. Grays Harbor Federal Sustained Yield Unit 20 (November 2, 1949), Olympic (Pinchot) National Forest, Wash., adjacent on the west to the Shelton Cooperative Sustained Yield Unit.
   Allowable annual cut: 92.5 MM board feet.

2. Lakeview Federal Sustained Yield Unit (October 10, 1950), Fremont National Forest, Oreg.
   Allowable annual cut: 66.5 MM board feet.

3. Big Valley Federal Sustained Yield Unit (January 27, 1950), Modoc National Forest, Calif.
   Allowable annual cut: 8.8 MM board feet.

4. Flagstaff Federal Sustained Yield Unit (May 6, 1949), Coconino National Forest, Ariz.
   Allowable annual cut: 97.7 MM board feet.

5. Vallecitos Federal Sustained Yield Unit (January 1, 1948), Carson National Forest, N. Mex.
   Allowable annual cut: 3.5 MM board feet.

Appraisals in Federal units of any kind are made in the same manner as sales outside the unit. The principle was established early, but not without opposition from the industry affected.

For example, the purpose of the Shelton unit, established after public hearings, was to support the communities of Shelton and McCleary. The company had sawmills and insulating board plants at Shelton and a door plant and plywood plant at McCleary. Logs were hauled by railroad from the woods to Shelton and backhauled to McCleary.

The company argued that the cost of the backhaul should be allowed in appraisals. The Forest Service contended that appraisals should not take into account the special circumstances of the unit, but should be the same as if the unit were any other National Forest tract. The Forest Service argued that the company's ability to buy timber without normal competitive bidding provided ample protection without further price reduction or special considerations, and its view prevailed.[21]

A similar situation developed in the Flagstaff unit. Except for 15 percent that could be bought by "outsiders," the timber there had to be processed within the unit under the management plan. The unit's southern end was closer to mills at Winslow than to those at Flagstaff. Again, the Forest Service maintained that if the unit did not exist, the appraisal would be to the closest mill, in this case, to Winslow, and again its view prevailed.[22] This unit was cancelled in 1981.

The same principle applies to small business set-aside sales. Although the small business has preference as a bidder, the appraisal is to the closest mill--even if the closest mill is owned by a large business. If a sale stumpage price is reduced by the cost of the haul beyond the nearest mill, which is owned by a large business, and a small business declines to bid on the reduced price sale, the large business could buy the sale at less than its appraised value would have been if there had been no set-aside provision. In this process, there is much room for an arrangement between large and small businesses. In competitive areas, bid premiums of $50 to $100 per M above the advertised sale price are common. Restrictions on bidding tend to reduce premiums drastically, providing margins for behind-the-scenes arrangements, if they are not monitored or controlled.

BLM Sustained Yield Units

The Bureau of Land Management preceded the Forest Service in establishing Federal management units. The Secretary of the Interior had the authority to create both all-Federal and cooperative units under the O. & C. land reclassification and sustained yield Act of August 28, 1937 (50 Stat. 874). This Act embodied principles long advocated by Edward T. Allen, pioneer American forester and first Forest Service Regional Forester at Portland, who organized and was long manager of the Western Forestry and Conservation Association, and by David T. Mason, well-known timber consultant in the Northwest and member of the BLM advisory committee, and strongly pressed in Congress by Oregon Senator Charles McNary. However, no such units were established until after the 1944 Act.

The first BLM unit was the Siuslaw "master unit," formally approved in December 1946 and followed

by 11 others on the O. & C. lands in western Oregon a year later. They were similar to but not the same as the sustained yield units established by the Forest Service soon afterward.

(The two agencies, intense rivals, convinced that too many problems would result, never set up joint units as authorized by the 1944 Act.) BLM established marketing areas for each of its units, and timber cut had to be manufactured within these areas for the units. These units operated for about 10 years until some time after marketing area restrictions were canceled in March 1957. BLM encountered the same difficulties experienced by the Forest Service when it attempted to organize cooperative units. Although there was much interest and support from major companies with considerable land holdings, a group of small mill owners objected strenuously, charging favoritism and encouragement of longtime monopoly, and then resorted to legal tactics. Action on an application by Hult Lumber Co., begun in January 1947, was halted when the Forest Service refused to commit 8,000 acres of the Siuslaw National Forest to the project. Hult was one of seven companies that were to be involved in cooperative units under the Siuslaw master unit. BLM then turned to the projected Mohawk unit being discussed with the Fischer Lumber Co. of Marcola in the Willamette Valley. The draft of this agreement was repeatedly modified and became deeply mired in controversy and politics. Negotiations dragged on for several years, taking up more agency time and effort than any other single O. & C. case up to then, and finally foundered on questions of inadequate forestland ownership, roads, access, and rights-of-way.

After recommendations from experts that administration of marketing areas was "ponderous and antiquated," and that the principle was obsolete and should be eliminated (although master units should be retained), the marketing restrictions were abandoned by BLM in March 1957. The master units faded away not long afterward.[23]

Reference Notes

(In the following notes, the expression NA, RG 95, FS, TM means National Archives, Washington, D.C., Record Group 95, Records of the Forest Service, Division of Timber Management. WNRC, FS, TM means Washington National Records Center, Suitland, Md., Records of the Forest Service, Division of Timber Management.)

1. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from E. E. Carter, chief, Timber Management, to Regional Foresters, Aug. 7, 1943.

2. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from E. E. Carter to Regional Foresters, July 15, 1943.

3. NA, RG 95, FS, TM, Timber Sales, Series 64, Julian Rothery, Timber Valuation Problems in the Forest Service, memorandum for E. E. Carter, May 20, 1943. Transmitted to Regional Foresters by Carter's memorandum of July 15, 1943.

4. WNRC, FS, TM, Timber Sales, memorandum from C. M. Granger (for L. F. Watts) to Regional Foresters, Jan. 30, 1950.

5. NA, RG 95, FS, TM, Timber Sales, Series 64, confidential memorandum from E. E. Carter to Regional Foresters, Aug. 17, 1943.

6. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from J.E. Rothery to I. J. Mason, Apr. 3, 1945.

7. "Mills Ignore Price Control Threat," Crow's Pacific Coast Lumber Digest, Jan. 4, 1951.

8. "Fear of Controls Boosts Prices," Crow's Pacific Coast Lumber Digest, Jan. 18, 1951.

9. "Ceiling on West Side Douglas-fir $63," Crow's Pacific Coast Lumber Digest, Feb. 15, 1951.

10. Crow's Pacific Coast Lumber Digest, Mar. 15, 1952.

11. Fir Ceiling Prices Above Market," Crow's Pacific Coast Lumber Digest, Mar. 27, 1952.

12. "Price Ceilings on Pine Announced," Crow's Pacific Coast Lumber Digest, Mar. 27, 1952.

13. Office of the President, Executive Order 11615, Aug. 15, 1971. (And, Economic Stabilization Circular No. 101, implementing the order.)

14, 15. WNRC, FS, TM, Timber Sales, memorandum from J. W. Deinema to Regional Foresters, Oct. 4, 1971.

16. WNRC, FS, TM, Timber Sales, memorandum from Roy E. Bond (for Paul E. Neff) to Regional Foresters, Jan. 11, 1972.

17. WNRC, FS, TM, Timber Sales, memorandum from E. P. Cliff to Regional Foresters, July 11, 1969.

18. NA, RG 95, FS, TM, Timber Sales, Series 70, memorandum from W. B. Greeley, [Chief] Forester, to District Foresters, April 17, 1925.

19. As of 1980.

20. See Cooperative Forest Study of the Grays Harbor Area (Washington), E.T. Allen, ed., Portland, Oreg.: Western Forestry and Conservation Association, with assistance of Charles Lathrop Pack, 1929, item 12, pp. 78, 79.

21. USDA, Forest Service, Office of the General Counsel, Opinion, May 18, 1969.

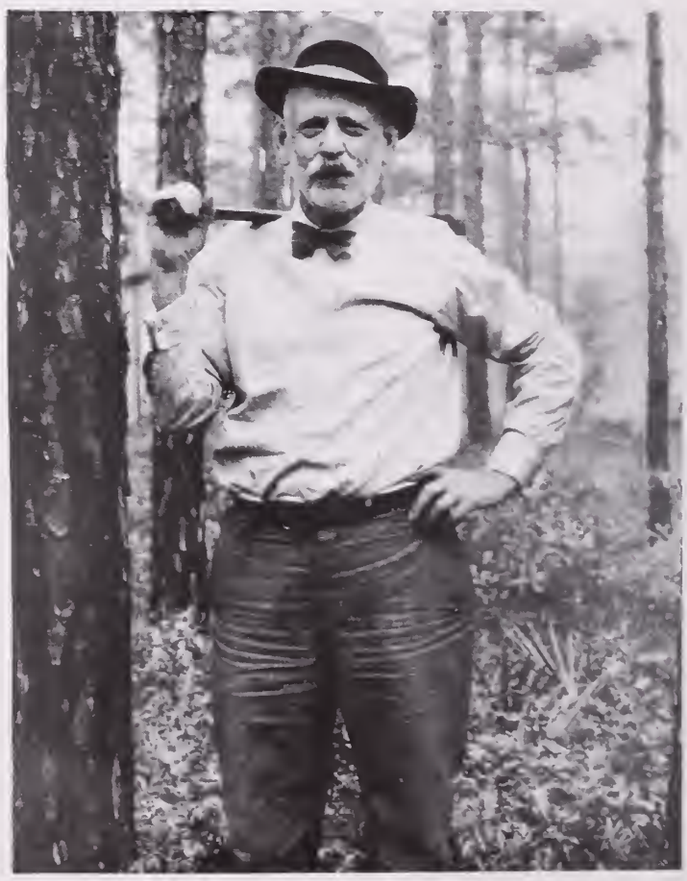
22. Personal recollection of the author.

23. The foregoing summary of BLM sustained yield units is based mostly upon a discussion in Elmo Richardson's history of Federal management of the revested Oregon & California Railroad lands in western Oregon, BLM's Billion-Dollar Checkerboard (Washington, D.C.: Government Printing Office, 1980), pp. 53-147.

James W. Girard

Julian Rothery

William B. Greeley



Austin Cary

Appendix I:

Appraisals in British Columbia

Since 1948, appraisal policy of the British Columbia Forest Service has followed the profit ratio system, which some Canadians have called the "Rothery System," a variant of the forester's formula described by Forester Julian Rothery in a Journal of Forestry article in 1945.[1] British Columbia's awareness of U.S. procedures is attested to by an August 18, 1922, circular to Forest officers, transmitting copies of the 1922 appraisal manual.

Official British Columbia forest appraisal policies have been greatly influenced by review commissions and committees. The Fulton Report in 1910 recommended the establishment of forest reserves, from which competitive timber sales were to be permitted.[2] The Forest Act of 1912 carried out the bulk of those recommendations, creating reserves out of the publicly owned forest lands. Considerable acreage had already passed into the hands of private owners by that time; however, much privately owned land, once logged, was returned to public ownership between 1912 and 1939. As a result, more than 90 percent of British Columbia forest land is publicly owned, and the appraisal of timber in the province is big business.

The Sloan Reports (1945 and 1956)

The 1945 Sloan Report, which came out the year after the U.S. Sustained Yield Forest Management Act, appears to have been influenced by political tides in the United States. It focused on the provision for assured supplies of raw materials through sustained-yield management and tenure assurances to industry.[3] It provided for the parceling out of large units of Government timber in "tree farm licenses" that were similar to "cooperative sustained yield units" in the United States, and in public timber sales.

Eleven years later, in 1956, the second Sloan Report endorsed the tenures that had been provided since the first report.[4]

Later, a Stanford Research Institute report, prepared under contract to the British Columbia forest products industry, criticized some aspects of sales procedures, including appraisal practices.

The Pearse Report (1974)

The Pearse Report of 1974 concentrated on timber appraisal procedures. One major recommendation of the report was that prices for tree licenses be changed. "Specifically we recommend," the report stated, "that fixed royalty fees charged [for] this timber, [now about] 16% of the current timber harvest in the Province, be abandoned [and that it be sold at] its appraised value."[5]

Appraisals were considered highly important for normal timber sales, as well as for the old tenures, because "competitive bidding is now very rare in British Columbia." The Pearse Report continued:

> ...the [B.C.] Forest Service follows procedures based on the 'Rothery system' developed in 1945 by the American forester of that name. Generally the net value of the stumpage is estimated by subtracting from the price of the products that can be produced from the forest all the necessary costs of production, including an allowance for the operator's profit and risk.[6]

Vancouver Log Prices Found Unreliable

The Pearse Report concluded, among other things, that Vancouver district log prices in were unreliable. The Forest Service in the United States, which used log price appraisals in the coastal regions of Oregon and Washington, arrived at the same conclusion in 1957 and switched to lumber and plywood appraisals in that year.

The report also concluded that industry grades should be substituted for statutory log grades as a way to measure relative timber quality. Some of the important differences between the appraisal systems of the Forest Service in the United States and the British Columbia Forest Service are outlined below.

Source of Data

B.C. Forest Service appraisers rely on voluntarily supplied, unverified lumber, and other product prices.[7] U.S. Forest Service appraisers, in contrast, have access, through contracts with their timber buyers, to books and records and can obtain verification of data by cost accountant auditors. Timber sale contracts provide, in extreme cases, for contract cancellation and debarment from bidding in the event of violation of the requirement to provide access.

Logging and Milling Costs

Again, B.C. official appraisers must depend upon data suplied voluntarily from industry; U.S. Government appraisers have contractual access to data.

Cost Trends

Costs in the interior of British Columbia are projected to the midpoint of the sale contract period, based on trend lines, using the average trend of the past 5 years. U.S. National Forests update cost data only to the date of appraisal, because selling prices are considered too variable to project in practice.

Species Appraisals

In British Columbia, each species is appraised separately. This, incidentally, was one of Julian Rothery's preferences. The Pearse Report,

however, recommended "sale-as-a-whole," the method used by the Forest Service in the United States, where removal of low-value species may be subsidized by reducing the prices of higher valued species.

Profit and Risk

A basic profit (10 percent of costs plus upset price on the coast and 12 percent in the interior), plus variable risk allowances, results in a range of 16 to 23 percent profit ratios in the B.C. appraisals. Forest Service apraisers in the United States use a composite "profit and risk" based on judgment of market trends and local factors, averaging from 9 to 18 percent for sawtimber appraisals, 3 to 10 percent on pulpwood appraisals, and 13 to 23 percent for market pulp end-product appraisals.[8]

"Sideboards" on Appraisals

Both appraisal systems are subject to certain specified minimum prices. In the United States, the Forest Service minimums are $1, $2, and $3 per M for low-, medium-, and high-valued timber. On the coast of British Columbia, the official minimum is whichever is the highest: the standard royalty, 40 percent of the conversion return, or 10 percent of the average (log) market price.

Thus, if the log price were $180 per M and the conversion return $40, the minimum would be $16 (under 2) and $18 (under 3).[9]

Log or Tree Grades

In British Columbia, a grading system called "old statutory log grades" is used by its Forest Service in the coastal districts. In the western coastal regions of the United States, Bureau log grades, as standardized and used at the Puget Sound, Grays Harbor, Columbia River, and Southern Oregon Log Scaling and Grading Bureaus, are used by the Forest Service. These four Bureaus are universally recognized and accepted by the West Coast timber industry in the United States.

In the B.C. interior, log grading is not done. In the United States interior, standard grades have been developed by the Forest Service in cooperation with industry, and are in use for ponderosa pine, white pine, and associated species. In Idaho and Montana, tree grades (as contrasted to log grades) have been developed for interior Douglas-fir, larch, and the true firs.

End Products

In the interior districts of British Columbia, lumber and pulp chips are the appraisal end products; in the United States, eastern Washington and eastern Oregon National Forests use lumber, plywood, chips, and factory remanufactured products and byproducts.

Logging Roads

B.C. appraisals include road costs as logging costs. In the United States, Forest Service appraisals since 1965 treat permanent (specified) road costs as a part of stumpage and give the timber purchaser road credits, at amounts specified in the contract, as reductions to the stumpage. In the United States, if purchasers do not build roads to standards acceptable to the Forest Service, they do not get the credits and must pay the full stumpage rates.

Escalation

Before 1967, British Columbia used a sliding scale system to determine stumpage charges. Prices changed when the selling price increased or decreased by 15 percent from the price on which existing charges were based. Since 1967, prices have changed when the selling price increased or decreased by $5 per M or more.

U.S. interior National Forest sales have provided for quarterly escalation (stumpage price adjustment) since about 1950. Stumpage prices are changed each quarter by a specified percentage of the difference between the quarterly index for a species of timber and the base index stated in the contract. The originally specified percentage was 40 percent, but from 1950 to 1971 it was 50 percent of lumber price index changes. Since 1971, the change has remained at 50 percent when the quarterly index is above the base index, but rises to 100 percent of the change when the quarterly index is below the base index. The variable feature was installed to compensate for the fact that prices--but not cost inflation--were taken into account in the escalation formula.

Perhaps the most thorough examination of the official British Columbia appraisal system and its relation to the system used by the Forest Service in the United States was made in 1962, around the time of the industry's "four-point" program for improving the status of the softwood lumber industry, discussed in section IV. Claims were being made at that time that expansion of the pulp, paper, and lumber industries in British Columbia proved that pricing policies in that province were more accurate and enlightened than in the U.S. National Forests.

In response to these charges, the Forest Service made a study of the matter. Prepared by Thomas B. Glazebrook and Alfred A. Wiener, the author of this book, it contained six major conclusions about the differences between the two appraisal systems.

Summary and Conclusions

1. Although the five administrative Provincial Forest Districts in British Columbia can be compared to somewhat similar areas in the National Forests in the Pacific Northwest States, the British Columbia Crown Forests generally have timber of lower quality, have a less desirable species composition, and are situated on more rugged topography than the most comparable National Forest areas. In addition to such natural differences, there are differences in methods of scaling, conditions of sale, and accessibility to

market, which must be taken into account to attain reasonable comparability for comparison of stumpage prices. Hence, comparison of stumpage prices is complicated and can only yield general indications and guidelines. Subject to the above qualifications, appraised stumpage prices in British Columbia and for the National Forests in the United States have been either at closely comparable levels or, where the levels have differed, they are readily explainable by quality or other discernible value differentials.

2. Since direct comparisons of stumpage prices between those in British Columbia and those in the National Forests in the United States must be used with caution, an examination of the objectives and methods of appraisal for public timber in British Columbia and the United States is also needed to judge comparative positions on raw material costs of U.S. and B.C. timber operators. The timber appraisal objectives of the British Columbia Forest Service and of the Forest Service in the United States are both to determine fair market value. Both appraisal systems are highly similar in general methods. Both agencies use a timber appraisal system in which stumpage is the residual value that remains when costs of operation plus a profit margin are subtracted from sales realizations at the manufacturer's shipping point.

3. Although there are numerous minor procedural differences between the two agencies' timber appraisal practices, the one difference of major significance is the method used to determine profit margins. Profit ratios used in British Columbia are typically 15 percent as compared to the 12 percent usually used in United States appraisals. However, use of profit ratio to fix profit margin in British Columbia is confined to a relatively narrow range of cost-selling value relationships, and when log or lumber values are low, profit margins are less for the British Columbia than for the United States National Forest system.

4. Under present market conditions, Provincial timber in British Columbia, after allowing for quality and accessibility differentials, is being advertised at prices higher than comparable timber on the National Forests of the U.S. Pacific Northwest. In the 1959-60 period, when lumber and plywood markets were relatively favorable, however, appraised stumpage prices for National Forest timber in the United States were higher than for comparable timber appraised by the B.C. Forest Service. (See tables 1 and 2.)

5. A highly significant factor in the cost of timber obtained from Provincial Forests of British Columbia as compared to National Forest timber in the U.S. Pacific Northwest is the difference in average spread between appraised and bid prices. In British Columbia, competitive bidding has been confined primarily to limited areas in the Vancouver Forest District, and even there has been moderate. In the Pacific Northwest portion of the United States, however, National Forest timber sales have been characterized generally by vigorous competitive bidding during the past 15 years. Although intensity has varied by locality, there are relatively few operating areas where competitive bidding has not been a significant factor in the final price of raw material to operators dependent upon National Forest timber. Established operators in British Columbia have enjoyed a great advantage in raw material costs over operators purchasing Forest Service timber in the United States, since they are usually able to purchase timber at appraised prices.

6. In the United States, there is virtually no unused cutting capacity for mill expansion in the National Forests of the Pacific Northwest. In British Columbia, there are still working circles where cutting capacity is below allowable cut. This ability to accommodate more industry is but one significant deterrent to excessive competitive bidding in British Columbia. Of at least equal signficance in British Columbia are the laws and policies establishing licensee priorities, quotas, and rights of a quota holder to preempt timber from a high bidder. This latter provision, which was first put into effect in 1960, is resulting in adjusting milling capacity to allowable cutting rates by means other than competitive bidding.

In short, the study determined that the two appraisal systems were quite similar, considering the lack of official coordination. The principal difference in sale price levels at the time was the presence of strong competitive bidding for National Forest timber in the United States and, essentially, the lack of it in British Columbia.

Marginal Material

B.C. sales have provided for what is commonly called "55-cent wood." Normal utilization of trees on the coast called for a 14-inch diameter stump (at 18-inch stump height) to an 8-inch top. Close utilization required using material to 9 inches in diameter (at 12-inch stump height) to a 6-inch top. The material between trees of 9-inch and 14-inch butt diameter was paid for at 55 cents per cunit, which is about $1 per MBF. In the interior, the 55-cent wood applies to those trees with between a 7-inch diameter at breast height and a 12-inch diameter stump.

In the United States, National Forest timber sales require utilization down to specific minimum sizes, which vary for different Regions in accordance with local economic criteria. U.S. National Forest timber sales in the coastal areas include "utility logs" or cull logs that are usable for pulp. Utility logs must be paid for on a lump sum basis, whether they are used or

Table 1.--Comparison of average stumpage prices bid for major timber production species in British Columbia with average advertised and bid stumpage prices in neighboring U.S. National Forests, 1958-61

Species and district	1958	1959	1960	1961
	----------Dollars----------			
Engelmann Spruce				
Bid--Prince George, B.C.	3.95	6.43	5.68	4.47
Advertised--north Idaho and western Montana National Forests	3.73	6.93	4.63	2.75
Bid--north Idaho and western Montana National Forests	6.73	11.81	6.69	6.60
Interior Douglas-fir				
Bid--Kamloops, B.C.	5.61	8.31	7.70	5.14
Advertised--Okanogan and Colville National Forests	3.50	10.53	7.99	3.87
Bid--Okanogan and Colville National Forests	6.33	15.72	10.93	7.88
Coastal Douglas-fir				
Bid--Vancouver, B.C.	9.74	13.98	15.24	10.96
Advertised--western Washington coastal National Forests	14.99	30.69	25.07	16.15
Bid--western Washington coastal National Forests	22.70	38.44	32.52	23.08
Hemlock				
Bid--Vancouver, B.C.	4.58	5.06	5.17	4.66
Advertised--western Washington coastal National Forests	3.82	9.17	7.35	7.39
Bid--western Washington coastal National Forests	7.56	11.31	9.95	10.29

Source: USDA, Forest Service, Stumpage Price and Pricing Policies in British Columbia, April 24, 1962.

Table 2.--Comparison of average timber stumpage sale values in British Columbia with average stumpage appraisals and sales on U.S. National Forests, 1958-61

Species and district (B.C.)	Species distribution by district (constant weighting) 1960 basis	Average Stumpage prices (U.S. log scale basis)											
		1958			1959			1960			1961		
		Per MBF U.S. scale			Per MBF U.S. scale			Per MBF U.S. scale			Per MBF U.S. scale		
		B.C.[1]	Comparable U.S.		B.C.[1]	Comparable U.S.		B.C.[1]	Comparable U.S.		B.C.[1]	Comparable U.S.	
			Advertised	Bid		Advertised	Bid		Advertised	Bid		Advertised	Bid
	Percent	Dollars											
Engelmann Spruce													
Prince George	57	3.95	3.73	6.73	6.43	6.93	11.81	5.68	4.63	6.69	4.47	2.75	6.60
Kamloops	14	4.19	4.53	4.86	5.49	13.74	14.15	6.09	10.84	11.69	3.29	4.16	5.65
Nelson	14	5.00	3.73	6.73	6.45	6.93	11.81	5.76	4.63	6.69	3.00	2.75	6.60
Sitka Spruce													
Vancouver	4	4.28	17.06[2]	17.52[2]	4.53	31.34[2]	31.34[2]	6.16	6.63	7.69	4.48	7.24	8.58
Prince Rupert	11	3.84	4.38	6.28	4.09	6.33	9.37	4.21	4.43	5.78	3.82	3.25	5.59
Average	100	4.13	4.45	6.85	5.97	8.79	12.65	5.61	5.56	7.33	4.03	3.18	6.44
Douglas-fir													
Prince George	7	4.04	2.77	4.30	7.61	5.75	9.05	6.34	4.07	7.03	6.02	2.13	7.31
Kamloops	48	5.61	3.50	6.33	8.31	10.53	15.72	7.70	7.99	10.93	5.14	3.87	7.88
Nelson	16	5.14	2.77	4.30	6.90	5.75	9.05	5.51	4.07	7.03	4.71	2.13	7.31
Vancouver	28	9.74	14.99	22.70	13.98	30.69	38.44	15.24	25.07	32.52	10.96	16.15	23.08
Prince Rupert	1	6.76	14.99	22.70	9.97	30.69	38.44	10.10	25.07	32.52	6.90	16.15	23.08
Average	100	6.59	6.66	10.61	9.64	15.28	20.77	9.39	12.04	16.29	6.78	7.03	12.16
Hemlock													
Kamloops	3	2.71	1.03	1.70	3.61	3.60	4.38	2.05	1.25	5.69	0.85	1.00	7.73
Nelson	8	2.69	1.01	1.18	4.23	1.69	3.11	2.50	1.10	2.17	2.19	1.00	1.41
Vancouver	67	4.58	3.82	7.56	5.06	9.17	11.31	5.17	7.35	9.95	4.66	7.39	10.29
Prince Rupert	22	3.75	1.37	1.47	3.15	2.22	2.39	3.95	1.34	2.06	3.43	1.31	1.53
Average	100	4.19	2.97	5.53	4.53	6.88	8.48	4.59	5.34	7.46	4.08	5.35	7.58

[1]B.C. stumpage rates are combined timber sales and tree farm licenses, from reports of the B.C. Forest Service. Most sales were at appraised prices. Rates in B.C. are stated in units of hundred cubic feet (Ccf). U.S. National Forest stumpage rates are from forms 2400-17. Conversion factors of 6.00 board feet per cubic foot for coastal areas and 5.80 board feet per cubic foot for interior areas (based on factor of 1.67 for converting to lumber tally in the interior plus 15 percent overrun for interior species) are used to obtain stumpage rates per MBF, U.S. log scale.

[2]Small volume in sample distorted these values.

Source: USDA Forest Service, Records of the Division of Timber Management.

not. In Alaska National Forests, where 50 percent of the wood is used for pulp, utilization of "utility logs" is mandatory, generally at 50 cents per M. This makes pulpable cull logs in Alaskan National Forests similar to B.C. 55-cent wood, except that their utilization is subsidized by higher valued products and species in Alaska, if necessary, by applying "sale-as-a-whole" principles to appraisals.

Table 3 is a comparison of major species prices for 1977 in the interior Kamloops and Nelson Districts in British Columbia, with prices in the Kootenai and Flathead National Forests of northwestern Montana/north Idaho (Region 1) and in the Colville, Wenatchee, and Okanogan National Forests of interior Washington (Region 6). Kamloops and Nelson are the southernmost interior districts of British Columbia, whereas Flathead, Kootenai, Colville, and Okanogan are the northernmost interior National Forests in the United States.

Also shown are major species in the Vancouver coastal district and similar species on the Mt. Baker-Snoqualmie and the Olympic National Forests of coastal Region 6, including Douglas-fir, hemlock, Sitka spruce, and cedar.

For rough comparison figures, one can assume 5.5 board feet, long-log scale, per cubic foot in the coastal (Mt. Baker, Snoqualmie, Olympic) areas, and 6.0 board feet, short-log scale, per cubic foot in the U.S. interior areas. Thus, 1977 coastal Vancouver Douglas-fir, valued at $7.82 per thousand cubic feet would average about $7.82 divided by $0.55, or $14.22 per MBF, compared with $141.09 bid on the Mt. Baker-Snoqualmie and $140.67 bid on the Olympic, both about 10 times as much as Vancouver.

Compare similarly the B.C. interior Douglas-fir valued at, say $4 per MBF, with U.S. east side Region 6 and north Region 1 figures of $67.18 and $72.87 bid per MBF, respectively. The U.S. sale prices are 17 to 18 times as much as the B.C. prices. However, these differences do not reflect quality and accessibility differentials. Table 4 gives an historical summary of average prices paid for timber stumpage, and volume harvested, of major species in British Columbia, from 1919 through 1981. Note how volume units have changed.

Table 3.--Comparison of average U.S. National Forest and British Columbia timber stumpage prices by geographical regions, 1977[1]

	Interior regions									
	British Columbia Kamloops		British Columbia Nelson		U.S., Region 1 Kootenai/Flathead N.F.			U.S., Region 6 Colville, Okanogan, Wenatchee N.F.		
	Volume	Price	Volume	Price	Volume	Price per MBF		Volume	Price per MBF	
Timber type	MMCcf	per Ccf	MMCcf	per Ccf	MMBF	Advertised	Bid	MMBF	Advertised	Bid
		Dollars		Dollars		---Dollars---			----Dollars----	
Douglas-fir	0.16	2.03	0.11	1.97	35	27.32	56.49	98	43.77	61.27
Larch	.02	1.46	.08	1.60	98	56.35	86.78	11	51.55	69.90
Engel. Spruce	.42	1.36	.35	1.38	46	52.67	82.39	2	37.27	37.89
Hemlock	.17	1.10	.14	1.10	4	3.34	33.81	12	74.57	95.38
True firs	.19	1.10	.18	1.10	24	6.97	41.38	27	37.81	44.59
White pine	.02	8.08	.02	10.56	14	110.29	135.23	7	144.50	172.01
Lodgepole pine	.33	1.11	.34	1.10	72	9.09	58.52	7	11.00	19.58
Cedar	.16	1.11	.17	1.46	6	57.08	106.09	7	55.28	75.34
Other	--[2]	--	.01	1.10	11	32.24	52.86	32	75.10	80.36
Total	1.47		1.39		310			203		
Average		1.36		1.46		34.05	72.87		52.83	67.18
	Coastal regions									
	British Columbia Vancouver				U.S., Region 6 Mt. Baker-Snoqualmie N.F.			U.S., Region 6 Olympic N.F.		
Douglas-fir	.18	7.82	--	--	60	119.03	141.09	100	119.32	140.67
Hemlock	.67	4.79	--	--	190	54.22	75.93	150	46.93	59.37
True firs	.47	4.62	--	--	10	42.76	56.23	10	31.67	31.67
Sitka Spruce	.04	12.45	--	--	--	--	--	--	--	--
Cedar	.24	5.29	--	--	30	95.16	150.35	20	92.80	109.28
Other	.05	4.70	--	--	20	30.82	30.82	20	42.56	42.56
Total	1.67		--		310			300		
Average		5.33		--		68.98	92.44		73.78	88.06

[1]U.S. figures are for advertised sales sold in 1977. British Columbia figures are from permits issued under timber sale harvesting licenses and timber sales, 1977. Most B.C. sales are at appraised prices. Totals will vary because of rounding of individual items.

[2]-- = not applicable or not available.

Source: USDA Forest Service, Records of the Division of Timber Management.

Table 4.--Average prices bid for timber stumpage in British Columbia, 1919-81[1]

Year	All species Volume Billion BF	All species Price $Per MBF	Douglas-fir Volume Billion BF	Douglas-fir Price $Per MBF	Hemlock Volume Billion BF	Hemlock Price $Per MBF
1919	0.25	1.38	0.06	1.48	0.03	0.73
1920	.44	1.84	.90	2.04	.07	1.06
1921	.19	1.46	.05	1.65	.04	1.08
1922	.25	1.39	.06	1.43	.04	1.01
1923	.34	1.68	.08	1.72	.04	1.14
1924	.30	1.74	.08	1.73	.03	1.21
1925	.18	1.78	.04	1.78	.03	1.03
1926	.29	1.66	.06	1.67	.04	1.01
1927	.32	1.53	.06	1.63	.03	.96
1928	.32	1.40	.06	1.51	.05	.85
1929	.59	1.29	.10	1.65	.07	.82
1930	.19	1.32	.05	1.52	.04	.91
1931	.22	1.22	.05	1.39	.04	.84
1932	.18	1.12	.04	1.19	.04	.76
1933	.15	1.08	.05	1.16	.02	.73
1934	.25	1.11	.10	1.26	.05	.73
1935	.26	.97	.09	.96	.05	.70
1936	.36	1.12	.16	1.16	.06	.65
1937	.45	1.13	.18	1.31	.08	.70
1938	.42	1.21	.15	1.46	.07	.72
1939	.44	1.25	.12	1.49	.06	.76
1940	.55	1.33	.18	1.57	.08	.81
1941	.62	1.50	.22	1.79	.06	.83
1942	.72	1.76	.20	1.84	.10	1.03
1943	.80	2.17	.26	2.21	.12	1.42
1944	.87	2.15	.26	2.06	.10	1.47
1945	.91	2.19	.26	2.36	.16	1.57
1946	1.25	2.39	.45	2.55	.20	1.68
1947[3]	.59	2.80	.19	3.08	.09	1.99
1947[3]	.80	4.36	.24	4.86	.13	3.34
1948	1.89	4.36	.55	4.96	.31	3.11
1949	1.24	4.05	.41	4.75	.18	3.04
1950	1.62	5.19	.56	6.33	.22	3.42
1951	2.90	7.89	.93	9.54	.45	5.62
1952[4]	2.00	9.33	.70	10.84	.29	9.21
1952[4]	5.53	4.22	1.17	4.95	0.80	2.70
1953	4.30	3.56	1.52	3.91	.64	2.56
1954	5.12	3.49	1.69	4.43	.77	2.90
1955	7.44	5.07	2.48	5.39	.91	4.78
1956	8.14	6.87	2.06	8.72	1.16	5.87
1957	6.02	3.88	1.56	5.28	.98	3.48
1958	6.82	2.98	1.54	3.96	1.40	2.61
1959	7.39	4.03	1.75	6.23	1.39	3.02
1960	6.87	3.55	1.42	5.56	.85	3.06
1961	8.74	2.53	2.17	3.65	1.17	2.40
1962	6.17	3.01	1.19	5.50	1.20	2.51
1963	7.69	3.36	1.58	6.44	.88	3.00
1964	8.98	4.09	2.33	5.82	1.07	4.55
1965	5.59	4.20	1.50	5.23	.50	5.74
1966	3.26	4.25	.80	6.70	.26	4.47
1967	4.23	3.21	.89	5.48	.42	3.25
1968	3.87	6.26	.89	9.55	.48	5.89
1969	3.42	9.02	.55	14.01	.51	7.52
1970	2.37	4.28	.34	9.10	.40	4.26
1971[5]	14.10	3.87	1.55	8.08	1.48	3.06
1972	12.85	7.74	1.29	13.48	1.36	3.79
1973	11.35	15.45	1.17	24.43	1.17	8.77
1974	10.61	8.39	.93	15.70	1.30	6.50
1975	10.01	2.15	.96	3.13	1.28	3.25
1976	13.89	1.98	1.50	3.23	1.50	1.56
1977	15.11	4.19	1.76	7.61	1.80	3.16
1978	16.03	13.06	1.36	20.90	1.46	3.86
1979[6]	43.99[7]	7.57[8]	3.09[7]	12.04[8]	4.60[7]	3.06[8]
1980[6]	49.87[7]	5.54[8]	3.49[7]	8.80[8]	6.18[7]	6.19[8]
1981[6]	41.87[7]	2.05[8]	3.44[7]	3.37[8]	5.09[7]	2.23[8]

[1]Table does not include volumes cut under tree farm licenses, which are not bid on. Note also that nearly all bid prices are identical with official appraised values; competitive bidding is highly restricted. All prices are in Canadian dollars.

[2]Ccf = 100 cubic feet (one cunit).

[3]In early 1947, price is without royalty; balance of year includes royalty.

[4]In 1952, part of volume sold was in MBF and part in Ccf.

[5]From 1971 on, data include (in addition to timber sales) the appraised rates on cutting permits (sale harvesting licenses and sale licenses).

[6]Unit of measure was changed in 1979 from 100 cubic feet (Ccf) to cubic meters.

[7]Million cubic meters (MMm^3).

[8]Per cubic meter (m^3); 1 Ccf = 2.847 m^3.

Source: Annual Reports of the British Columbia Forest Service.

Reference Notes

1. Julian E. Rothery, "Some Aspects of Appraising Standing Timber," Journal of Forestry 43 (July 1945), pp. 490-498.

2. Canada, British Columbia, Final Report of the Royal Commission of Inquiry on Timber and Forestry, 1909-10, (Victoria: King's Printer, 1910).

3. Canada, British Columbia, Report of the Commissioner Relating to the Forest Resources of British Columbia, 1945, (Victoria: King's Printer, 1945).

4. Canada, British Columbia, Report of the Commissioner Relating to the Forest Resources of British Columbia, 1956, (Victoria: King's Printer, 1956), 2 vols.

5, 6. Canada, British Columbia, First Report of the Task Force on Crown Timber Disposal: Crown Charges for Early Timber Rights, Royalties and Other Levies for Harvesting Rights on Timber Leases, Licenses and Berths in British Columbia, (Victoria, King's Printer, Feb, 1974), and Second Report of the Task Force on Crown Timber Disposal: Policies and Procedures for Evaluating Crown Timber in British Columbia, (Victoria: King's Printer, July 1974).

7. Canada, British Columbia, British Columbia Forest Service, Annual Report, 1952, p. 52.

8. USDA, Forest Service, Stumpage Price and Pricing Policies in British Columbia, April 24, 1962.

9. USDA, Forest Service, Stumpage Price and Pricing Policies in British Columbia, April 24, 1962.

Appendix II:

Forest Service and Bureau of Land Management Appraisal Systems Compared

The Bureau of Land Management (BLM) and its predecessor agency, the General Land Office (GLO), U.S. Department of the Interior, have managed timberlands on the public domain for many years. GLO acquired control of substantial acreage of timberlands when the Oregon and California (O. & C.) Railroad grant lands were revested to the Federal Government in 1916 and the Coos Bay Wagon Road (C.B.W.R.) grant lands were reconveyed to the Government about the same time. Both the O. & C. and Coos Bay lands are in western Oregon.

Timber sales have been authorized on these lands in western Oregon since 1918 and on public domain in Oregon and other States since 1949. Since 1937, sustained yield management has been required on the O. & C. and C.B.W.R. lands.

BLM appraisals have traditionally used residual value analytic methods similar to those used for Forest Service appraisals. BLM, however, has not based its appraisals on collected average experienced data. Instead, it has constructed hypothetical operations in which typical logging and milling operations were set up and priced at current cost levels. Selling values were quite similar to Forest Service selling prices except that current price levels were obtained from trade journal sources instead of from collections from sample operations. BLM estimated standard wage rates, equipment use rates, and productivity rates, and applied these factors to the model.

The BLM approach has been used by the Forest Service from time to time, when experienced costs were unavailable, but the Service has opted for actual cost and price records as soon as such data have become available. Undoubtedly the Forest Service was encouraged to do this by the large number of long-term sales it made in early years and by the need for making reappraisals at intervals during the lives of such sales.

Use of a 50 percent valuation factor was standard in BLM for 15 or 20 years after the Forest Service (which used a variable valuation factor, between 30 and 70 percent of the conversion return) had switched to use of the profit ratio method. Julian Rothery, who insisted that several approaches be compared in each appraisal, influenced Forest Service procedures.

The Forest Service and BLM drew close together in the 1960's, when, at the urging of the Bureau of the Budget (BOB), they coordinated many procedures. Complete uniformity was never achieved, however, and when the Office of Management and Budget (BOB's successor) did not retain its keen interest in the matter, the effort lagged.

BLM, FS Prices Not Comparable

Stumpage prices on an all-species basis have not been directly comparable between BLM and the Forest Service in western Oregon for several reasons:

1) BLM timber is located on the average at lower elevations, where high valued Douglas-fir is a larger component of timber stands. BLM sales generally run between 80 and 85 percent Douglas-fir. The west side of Region 6, by comparison, in 1978 had only 57 percent Douglas-fir.

2) BLM timber is also closer to the mills. Thus it enjoys shorter average log hauls, which means lower logging costs.

3) BLM timber is measured in M board feet of "short log" (Scribner log scale). This is the same scale used by the Forest Service in eastern Oregon and other parts of the West. In western Oregon, however, the Forest Service, conforming to standard industry practice in the area, uses "long log" scale. Depending on log size, form, and taper, short log can be 15 to 20 percent greater scale than long log, for the same logs.

4) BLM sells its timber by the lump sum method based on measurement in the standing trees. The Forest Service sells most of its western Oregon timber on log scale measurement performed by the four independent log scaling and grading bureaus that operate in the Douglas-fir region, mentioned in appendix I. The Forest Service sells around 1 billion board feet each year on tree measurement in the Eastern States, but continues to use log scale in the West.

BLM issues appraisal schedules, similar to Forest Service Regional Office instructions, every 2 to 3 years. They provide for variance in costs and prices by log size, tree size, stems per acre, defect, and yarding distance from trees to roads. Selling values are revised every 3 months and more frequently when price changes are rapid.

Schedule 14 (1964), for example, explained that average investment had to be computed for the operation that could process a timber stand. The formula given was:

$$AI = \frac{(I + R)}{2} + \frac{(D)}{2}$$ (half the initial cost plus residual value plus half a year's depreciation)

AI = average investment.
I = initial cost.
R = residual value.
D = depreciation.

Other appraisal elements were tied to this figure. Insurance, for example, was 85 cents per $100 on 80 percent of the average investment. Taxes were 2 percent of the average investment.

Schedule 17 (1972) included similar data for logging costs. But it also provided total manufacturing costs per M based on log diameter and

usage for plywood and lumber--in a manner quite similar to that used by the Forest Service.

Table 1 gives a historical summary of BLM average stumpage prices and total volume sold in western Oregon (about 80 to 85 percent Douglas-fir) from 1918 through 1980.

Table 1.--U.S. Bureau of Land Management, average timber stumpage prices in western Oregon, fiscal years 1918-80[1]

Fiscal year	Volume Sold	Average Price per MBF	Fiscal year	Volume sold	Average Prices per MBF
	MMBF	Dollars		MMBF	Dollars
1918	106	1.38	1951	416	21.65
1919	65	1.48	1952	419	25.05
1920	108	1.57	1953	552	22.81
1921	210	1.94	1954	615	18.73
1922	120	1.84	1955	645	28.45
1923	289	2.21	1956	665	37.64
1924	473	1.95	1957	629	30.30
1925	374	2.10	1958	761	25.78
1926	342	2.30	1959	902	32.62
1927	312	2.15	1960	1,006	34.19
1928	304	1.88	1961	992	26.48
1929	319	2.22	1962	918	24.72
1930	421	1.81	1963	1,567	22.96
1931	168	1.66	1964	1,569	26.42
1932	66	1.67	1965	1,226	34.31
1933	222[2]	1.60[2]	1966	1,224	36.35
1934			1967	1,353	37.60
1935	177	1.59	1968	1.348	38.29
1936	188	1.63	1969	1.094	72.65
1937	431	1.72	1970	1.662	49.39
1938	294	1.94	1971	1,235	42.02
1939	344	1.92	1972	1,186	55.76
1940	595	1.43	1973	1,225	105.70
1941	494	2.22	1974	1,233	172.41
1942	482	2.81	1975	1,159	160.14
1943	394	3.80	1976	1,122	152.33
1944	368	3.46	1976-T[3]	375	148.36
1945	435	4.22	1977	1,160	176.59
1946	345	4.35	1978	1,140	190.45
			1979	1,097	275.79
			1980	1,121	326.27

[1]These include the so-called O. & C. lands, which were subject to marketing area restrictions from 1947 to 1957.

[2]Figures for 1933 and 1934 are combined.

[3]1976 transition quarter (July 1- Sept. 30).

Source: Annual Reports of the Bureau of Land Management.

Appendix III:

Julian Rothery and the "Rothery System"

The name Julian Rothery appears over and over again in the annals of the Forest Service and the history of its timber appraisal system. Julian E. Rothery graduated from Yale University in 1908 and went to work for the Forest Service. After 4 years in the Service, he began a consulting career that was to extend over 23 years, during which he became vice president of a timber-owning subsidiary of the International Paper Co.; he was also in charge of that company's Forestry Department. He reentered the Forest Service in 1935 as a Forest Inspector in the Washington Office under E. E. Carter. During the period of expanding timber sales that followed the Great Depression, Rothery gave the agency the benefit of his broad experience in commercial forestry, making a name for himself as a leading expert in the field of timber appraisals. Eventually, his description of the modern USDA Forest Service appraisal system, in which he had a major influence, was cited by the Canadian Task Force on Crown Timber Disposal, and his description and recommendations became the foundation of the official British Columbia timber appraisal system. It should be noted here that Rothery's role was mainly publicizing the basic system which Austin Cary, William B. Greeley, Swift Berry, Jim Girard, and others had set up many years before.

During his career, Rothery was the author of at least four important and widely disseminated articles pertaining to appraisals. The first of these, written in 1936, was entitled, "The Valuation of Standing Timber From the Investment Viewpoint."[1]

The 1936 article reflects Rothery's background in private industry. It is also demonstrative of the issues that arose as a result of a boom in timber sales after the end of the Depression. It is addressed "to determining value for investment or lump sum purchase, as distinguished from royalty value, such as is required when stumpage is sold on a basis of payment when cut." The 1936 article included these recommendations:

> More training background for appraisers.
> Cruise theory training for cruisers.
> More milling cost research.
> Price and trend studies.
> More mill scale studies.

It was also of interest for its listing of 15 kinds of value, based upon:

> Cost.
> Book (historic cost plus taxes, interest, etc.).
> Market (comparable transactions).
> Replacement.
> Reproduction.
> Expectation (varies with interest rate).
> Speculation.
> Intrinsic worth.
> Specialties (i.e., art works, etc.)
> Nuisance.
> Liquidation.
> Going concern.
> Loans (funding).
> Assessment.
> Appraisal judgment and analysis.

Rothery observed:

> In small or weakly held tracts, the shrewdness, or lack thereof [of buyer or seller] may give rise to variations difficult to reconcile. However, if the data on a large number of free and fair transactions, occurring in a stable period...are available, fluctuations in price tend to compensate, and the market value thus determined by competent buyers and sellers falls within a remarkably close range of values. (Emphasis added.)[2]

Rothery also acknowledged in the 1936 article that:

> [This] does not conflict with the principles set forth in 'Instructions for Appraisal of Stumpage on National Forests' [1922] but carries the annual stumpage...royalty developed in that Manual through the 3rd required step, [which Rothery defined as] the value, capitalized, of a terminable series of earnings....[3]

Some foresters, particularly those in Region 6, disagreed with Rothery's advice. O. F. Ericson, Assistant Regional Forester for timber management, Region 6, wrote this memo in response to Rothery's first article:

> Several years ago our appraisals were based on mill investments [as Rothery suggests]. It was found that the investments varied so much that we decided to use the actual average of a large number of mills. The Overturn method was used for determining the profit and risk. This is a quick and equitable method.[4]

Another Rothery attempt at solving problems of the appraisal system was a 1945 article entitled, "Some Aspects of Appraising Standing Timber,"[5] By then Rothery had had 10 years of experience working with Forest Service appraisals made under the 1922 appraisal manual. He made a clear distinction in the article between two kinds of market value: The "en-bloc or wholesale value, where the timber can be converted only over a period of years," and "pay-as-cut or retail value." His 1945 article was confined to the pay-as-cut approach, because Forest Service timber sales were paid for on that basis. Rothery proposed five ways of approaching a public appraisal:

> A percent of the selling price.
> Conversion return (the residual of selling

price minus costs) minus a percent of the costs for profit and risk.

Comparison with similar transactions, with appropriate adjustments.

Conversion return minus a percent of the average investment for profit and risk.

Combination: "A modification which combines some of the elements of the comparison with similar transactions has long been in use and is particularly applicable.... [for] existing mills whose fixed investments are not readily available."

This last "combination" method, which Rothery termed "method of comparable analysis" involved a standard price minus costs appraisal. He then developed a profit and risk margin by the use of a "valuation factor" (percent of conversion return). This figure was then expressed in two other terms: as an "operating ratio" (percent of costs), and as a "profit ratio" (percent of costs plus stumpage). The appraiser then scrutinized the three ratios and chose one.[6]

The weakness of the valuation factor became evident when it was applied to high-value and low-value species. Forest Service appraisers had made allowances for the difference in value of species, even before Rothery's time, by varying the factor and using a higher percentage on low-value species. Rothery also analyzed the low-value species in a tract to see whether the aggregate profit margin was improved by including or leaving the marginal species, and recommended leaving submarginal material on the ground to be burned.[7]

Differences of opinion with Region 6 surfaced again in 1941 and 1942. Edward E. Carter, chief of the Division of Timber Management, made it clear in 1942 that:

> ...no one is ready to throw away entirely the Overturn method of appraisals [including the profit ratio]....
>
> Whenever the Appraisal Manual gets revised, one of the things that needs to be hammered [sic] is that one of the key points of the appraiser's job is to recommend a fair division of the estimated gross realization [conversion return], between profit margin and stumpage,...Also, Rothery and I.... believe that...division of the gross realization on the basis of wide experience with similar cases in the same general area will prove to be so valuable a check that it will practically control decision.[8]

Rothery had written a memo to E. E. Carter in 1943, which he titled "Timber Valuation Problems in the Forest Service." "The 1922 Appraisal Manual," he said, "has been changed in one respect. A purchaser will no longer be compensated for removing unprofitable material [trees or logs] by marking down the price of the more valuable material...." (The pendulum of policy later swung back to the original concept after Rothery retired. See discussion on Utilization at the beginning of section V. Rothery's article went on:

> Another change has been in the great increase of state and Federal income taxes and the imposition of new levies such as workmens' compensation and Social Security payments....
>
> No appraiser can be an infallible prophet, but with a clear appreciation of the fact that value depends on the anticipated future returns, he can allow for the trends...as realistically as the well-informed buyers and sellers with whom the Forest Service deals.[9]

The disagreements among appraisers were not without a touch of humor here and there. Rothery wrote to Carter in 1943:

> Accepting value in its usual economic and business meaning, if Mr. Lund [Region 6] can set values which will stand the test of simple arithmetic, without using a discount process... or can show some simpler or sounder approach than I have, I will gladly buy him the best dinner in Portland. On second thought...I will include the entire Division of Timber Management...and Mr. Andrews is invited as Master of Ceremonies.[10]

Walter H. Lund responded to his boss, Regional Forester H. J. Andrews:

> I do not disagree essentially with anything in either Mr. Carter's letter or Mr. Rothery's memorandum, except the inferences that I do disagree and that I am unwilling to accept new ideas or use methods that 'involve brain work.' The only reason there has been a difference of opinion in this case is because I have not been willing to accept a formula uniformly in 'damage appraisals.'[11]

Carter, in a memo to Regional Foresters in 1943, wrote:

> Altogether we need a cold and dispassionate review of the quality of our appraisal work and to take immediate remedial action to correct any tendency...toward the substitution of stereotyped action, or failure in other ways to deserve our position of leadership in timber valuation work. The old Appraisal Manual in its two editions [1914 and 1922] formed the basis for that leadership...
>
> Julian Rothery has submitted a paper which has cleared up my own ideas on appraisals very greatly. I want to urge that it be required reading for

every officer...who handles appraisals. Rothery reemphasizes the idea that appraisal is the job of using judgment based on such guides....[He shows] the need for the immediate correction of certain...practices which [are aimed at] reducing appraisal work, towards...computations which any clerk could handle, instead of recognizing that it involves the exercise of trained brains.

As a minimum, appraisal computations... must have the results summarized and recast into the valuation factor hereafter....Where available, the valuation factors shown by the appraised and bid prices in recent sales of comparable timber should be stated.[12]

Rothery's quarrels with Region 6 were soon settled amiably. Certain disagreements with Region 5, however, persisted. The subject of negative value in appraisals in Region 5 particularly bothered Rothery. He wrote about an appraisal for Quincy Lumber Co. in June 1942:

[We] must differentiate between true negative value material...and material which has what I will call a marginal or cost-contributing value, or value on a by-product basis.

The true negative value material has not sufficient margin of conversion to make any return on the fixed investments and working capital necessary in its removal....[A] certain percentage of such material is often intermingled with positive value material whose removal requires and will return fixed (per acre, per year, or capital) costs ...[which] are incurred as total sums, regardless of moderate variations in the value handled....[13]

He used an example from another Region of Douglas-fir with a conversion return of $1.85 per M and a negative indicated stumpage with a normal profit margin. "A stumpage of $.50 per M without any adjustment in the pine rate, will leave the operator financially better off than if the fir were omitted," he wrote.

More recent policy, and later appraisal review committees, would agree with Rothery on this point only if the material were optional for removal. In Rothery's time it was quite common to make marginal material optional for removal. With recent strict utilization requirements, the policy is to reduce the high-value species stumpage rate to provide a full profit margin on all species where utilization is not optional.

He had still not reconciled matters with Region 5 by 1945. In January of that year, Rothery wrote:

A careful reading of many Region 5 appraisals leads me to believe that the Region has not a clear concept of the principles required, but has drifted into routine and perfunctory computations, often voluminous, but which to my mind often fail to get the relevant facts or present them clearly and convincingly as an approach to market value.[14]

In 1946, the year he retired from the Forest Service, Rothery wrote a fourth paper, "Some Aspects in the Reappraisal of National Forest Stumpage." In this article, he identified seven important differences between an initial appraisal and a reappraisal:

Volume estimates improve.
Cost and price data improve.
Technology changes and risks become more apparent.
Previous experience is available on the specific area.
Operator records are available (and are indispensable).
The "entire tract" basis requires careful examination of haul and road costs.
Extension reappraisals allow reconsideration of terms, but the remaining volume continues to be part of the original sale as a whole.[15]

Rothery pointed out that the Regional average, the basis for appraisal, could be compared line by line to highlight any significant differences, which could then be examined to determine whether changes were justified.

"There is no rule by which mathematics alone," he wrote, "can be substituted for knowledge and judgment. [This] makes the task of the appraiser difficult."[16]

Number 6 is important because the average hauling distance is often short during the early years of a long-term sale and long during the later years, making sale-as-a-whole average costs difficult to determine. Quality of timber may also change at different elevations. These varying factors can be accounted for in a contract clause that provides for "ensuing period" appraisals in place of sale-as-a-whole appraisals.

Number 7 is important because sale-as-a-whole extensions tend to prevent purchasers from "high-grading" a tract, and then negotiating for the remaining timber, or "leavings" at the time of the extensions.[17]

Rothery continued to write even after his retirement. In 1952, he completed A Study of Forest Taxation in the Pacific Northwest[18] His works were widely read in Canada, and Rothery himself was incorrectly credited by the British Columbia Forest Service with the creation of the Forest Service appraisal system in the United States. The "Rothery System" formed the basis of the 1960 Forest Act, which governed the appraisal of timber on all Crown lands.

Rothery was fond of quoting Justice Oliver Wendell Holmes in his works. One of his favorite citations is pertinent to the continuing struggle to place a fair value on timber:

> ...the value of property at a given time depends on the relative intensity of the social desire for it at the time, expressed by the money it would bring in the market. Like all values as the word is used by the law, it depends largely on more or less certain prophecies of the future; and value is no less real at that time if later the prophecy turns out false, than when it comes out true.[19]

Reference Notes

(In the following notes, the expression NA, RG 95, FS, TM means National Archives, Washington, D.C., Record Group 95, Records of the Forest Service, Division of Timber Management.)

1. NA, RG 95, FS, TM, Timber Sales, Series 64, general correspondence. This summary of 29 pages was circulated to Regional Foresters in a memorandum from the Washington Office in April 1936. For further information about Rothery's philosophy, see "Appraising National Forest Timber Values: A Concept Reexamined," Journal of Forestry: 79:6 (June 1981), 372-376.

2. NA, RG 95, FS, TM, Timber Sales, Series 64, "The Valuation of Standing Timber from the Investment Viewpoint."

3. "The Valuation of Standing Timber."

4. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum on Rothery's inspection Trip from O. F. Ericson, Dec. 9, 1936.

5. Journal of Forestry: 43 (July 1945), 490-498.

6. Journal of Forestry: 43 (July 1945), 490-498.

7. Journal of Forestry: 43 (July 1945), 490-498.

8. NA, RG 95, FS, TM, Timber Sales, Series 64, E. E. Carter, memo to Regional Foresters, Jan. 5, 1942.

9. NA, RG 95, FS, TM, Timber Sales, Series 64, J. E. Rothery, memo to E. E. Carter, June 12, 1943.

10. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from J. E. Rothery to E. E. Carter, Mar. 30, 1943. The reference is to Horace J. Andrews, Regional Forester in Region 6.

11. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from W. H. Lund to H. J. Andrews, June 15, 1943.

12. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from E. E. Carter to Regional Foresters, July 15, 1943.

13. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from J. E. Rothery to E. E. Carter, Jan. 30, 1942.

14. NA, RG 95, FS, TM, Timber Sales, Series 64, memorandum from J. E. Rothery to I. J. Mason, Jan. 24, 1945.

15. NA, RG 95, FS, TM, Timber Sales, Series 64, General Correspondence. Memo to Regional Forester, 1946, 11 pp.

16. NA, RG 95, FS, TM, Timber Sales, Series 64, General Correspondence. "Some Aspects in the Reappraisal of National Forest Stumpage."

17. "Some Aspects in the Reappraisal of National Forest Stumpage."

18. Published in Portland, Oreg., by Industrial Forestry Association; 47 pp., illus., tables.

19. Oliver Wendell Holmes, Ithaca Trust Co. v. U.S. 279 U.S. 151, 1929.

Appendix IV:

Notes Relating to Timber Sales From Forest Service Committee Reports (1905-32)

During Gifford Pinchot's tenure as Chief Forester, he instigated the practice of having weekly meetings with his staff. Attendees at these meetings were called the Service Committee, and the minutes were circulated widely throughout the Service to keep Supervisors, inspectors, and Regional overhead staffs informed of top-level decisions on issues of the day. Key issues and highlights from the Service Committee Reports are listed in this appendix. Full names are given where possible.

July 12, 1905 (meeting no. 141). Pinchot announces some personnel assignments in organization of the Forest Service, including: Forest measurements: Overton W. Price, C. A. Kolb, E. A. Ziegler; Dendrology: Clayton D. Mell; Forest Management: A. K. Chittenden, A. W. Cooper, J. B. Satterlee; and Forest reserves: William T. Cox, Frederick E. Olmsted, Coert DuBois, Frank Tompkins, and Albert F. Potter.

May 4, 1910 (meeting no. 358). W. T. Cox: 73-MM-board-foot sale on the Plumas approved, largest sale ever made in Region 5. Sugar pine $4; yellow pine $3; incense cedar, etc. $1.50.

June 1, 1910 (meeting no. 362). Cox: Region 3 hopes to "close" a 50 to 100-MM-board-foot sale at $3. The company offers only $2.50.

January 1, 1911 (meeting no. 393). Potter: A 2-month furlough was given to Forest Assistant A. E. Oman, to give a course in forestry at the Utah Agricultural College. Also given, a 10-day detail of Supervisor Julian Rothery to help Oman get started.

January 11, 1911 (meeting no. 394). Fred Ames: Three applications received for review: Utah Southern Railroad--425 MM board feet; Whitman National Forest, Region 6--75 MM board feet; and Coeur d'Alene National Forest, Region 1--100 MM board feet.

January 25, 1911 (meeting no. 396). Cox: A 150-MM-board-foot application, Crater National Forest, Region 6, approved. Graves suggests using the term "manual" instead of "code" for a new basic publication, which will bear the name "National Forest Manual."

February 1, 1911 (meeting no. 397). Leon F. Kneipp: Eight additional timber trespasses on the Alamo National Forest in Region 3.

February 8, 1911 (meeting no. 398). O. T. Swan: New Panama Canal freight rate will save $2.10 per M on freight rate of Douglas-fir lumber to New York.

February 23, 1911 (meeting no. 400). Cox: Two applications received: White Lumber Co., Sierra, Region 5--1 billion BF; Malheur, Region 6-- 1 billion BF.

March 1, 1911 (meeting no. 401). Milwaukee Lumber Co. has arranged for cutting in advance of bid on a 100-MM-board-foot firekill sale on the Coeur d'Alene.

April 14, 1911 (meeting no. 407). T. S. Woolsey, Jr.: Secretary James Wilson aproved delegations of sale authority (Regional Foresters--20 MM board feet; Supervisors--1 MM board feet). Also, revision of contract forms 202A and 202B.

May 3, 1911 (meeting no. 410). Henry S. Graves: William T. Cox to become State Forester of Minnesota. William B. Greeley will replace him.

May 17, 1911 (meeting no. 412). Greeley: Many new sale applications coming in.

August 16, 1911 (meeting no. 425). Earle W. Clapp: Eccles Lumber Co. is high bidder on an 80-MM-board-foot sale on the Whitman, Region 6.

September 6, 1911 (meeting no. 428). Clapp: A 600-MM-board-foot sale on the Apache-Sitgreaves ready to advertise, Region 3.

September 13, 1911 (meeting no. 429). Clapp: White Lumber Co. (Sierra) application for 500 MM board feet being reviewed. A proper readjustment clause needed for this 15-year sale.

September 20, 1911 (meeting no. 430). A. K. Chittenden leaving Forest Management to become Forester, Office of Indian Affairs, Department of the Interior.

November 1, 1911 (meeting no. 440). Ramy Creek sale of 40 MM board feet of dead timber (Colorado).

November 29, 1911 (meeting no. 444). Greeley: Application for 40 MM board feet on the Tahoe, Region 5, is the first readjustment case. Also an application for 60 MM board feet on the Whitman.

December 27, 1911 (meeting no. 448). Application for 200 MM board feet on Shasta National Forest.

January 3, 1912 (meeting no. 449). Greeley: Another Region 1 fire salvage application brings total to 340 MM board feet to date.

January 31, 1912 (meeting no. 453). Clapp: Bid on 300-MM-board-foot Apache-Sitgreaves sale, by Navaho Lumber & Timber Co.

June 17, 1912 (meeting no. 473). Greeley: Application by Mt. Graham Lumber Co. for 50 MM board feet at $2 per M with readjustment clause, Region 3.

June 10, 1912 (meeting no. 475). Greeley: Sale to Verde Lumber Co., Region 5.

July 31, 1912 (meeting no. 478). Greeley: Contract for 182 MM board feet on the Shasta National Forest executed by M. A. Burns Co.

August 14, 1912 (meeting no. 480). Greeley: Largest sale in history--800 MM board feet--about to be made on the Sierra.

September 5, 1912 (meeting no. 483). Greeley: The Secretary approves the Wind River Lumber Co. contract. Columbia National Forest, Region 6--62 MM board feet--Douglas-fir at $2.50 and hemlock at $.50.

November 20, 1912 (meeting no. 494). Clapp: Application to buy several hundred MM board feet from Alaska for paper pulp. Sierra Lumber Co. signed contract for 800 MM board feet.

December 18, 1912 (meeting no. 498). Greeley: Proposed new 320-MM-board-foot sale on Kaniksu National Forest, Region 1.

January 9, 1913 (meeting no. 501). R. Y. Stuart: Applications approved for Brown Lumber Co., Umpqua National Forest, Region 6--163 MM board feet at $1.25 for Douglas-fir and cedar and $.50 for hemlock; and for Hilgard Lumber Co., Whitman National Forest--72 MM board feet at $2.85 for yellow pine and $1 for "associated species." Also, Michigan and Minnesota National Forests transferred from Region 1 to Region 2 (Denver).

February 5, 1913 (meeting no. 505). Greeley: Plan for a conference on pulp sales in Alaska. New solicitor's ruling allows Secretary of Agriculture to issue water power permits if not sold as commercial power.

March 26, 1913 (meeting no. 512). Greeley: Good prospects for pulp sales. Applications approved for: Kootenai National Forest, Region 1--700 MM board feet and Alaska--700 MM board feet.

April 9, 1913 (meeting no. 513). Stuart: Bids received on three sales in Region 1: Upper West Branch and Lower West Branch (Priest River National Forest) and River unit (Kaniksu).

June 19, 1913 (meeting no. 523). Clapp: One bid received on Alaska pulp sale, from Alaska Pacific Pulp & Paper Co. Estimated cost of $150,000 to $250,000 for pulpmill; $500,00 to $600,000 for papermill.

July 9, 1913 (meeting no. 526). Stuart: Three more sales approved: Somers Lumber Co., Flathead National Forest, Region 1--85 MM board feet at $2; LaMoine Lumber Co., Region 5---28 MM board feet; and Saginaw & Manistee Lumber Co., Region 33--24 MM board feet.

July 16, 1913 (meeting no. 527). Stuart: Seven new logging engineers appointed to handle appraisals.

October 15, 1913 (meeting no. 540). Clapp: One bid on Apache-Sitgreaves sale, from Navaho Lumber & Development Co.

December 26, 1913 (meeting no. 550) Clapp: Plan to cancel Flagstaff Lumber & Timber Co. sale, Coconino National Forest, Region 3. Cutting for 4 years, but losing money. Will cancel for failure to cut.

December 3, 1914 (meeting no. 598). Clapp: Two applications approved on Crater National Forest, Region 6--300 MM board feet at $3.25 and 82 MM board feet at $3.

June 3, 1915 (meeting no. 623). Greeley: Bid by Pelican Bay Lumber Co., Crater National Forest, for 383 MM board feet at $3.75 per M for yellow pine.

December 9, 1915 (meeting no. 660). Stuart: Recently consummated sales: Spanish Peak Lumber Co. (Wahponsic sale), Plumas National Forest--106 MM board feet at $3.25 for sugar pine, $2.60 for yellow pine and $.80 for Douglas-fir. Requires 10 miles of aerial tramway. Standard Timber Co., Blacks Fork, Wasatch National Forest, Region 4--81 MM board feet at $.10 per standard tie. At 33 ties per M, this is $3.30 per M.

June 16, 1916 (meeting no. 684). E. E. Carter: Deer Creek, Pend Oreille National Forest, Region 1--130 MM board feet sold. Three bids, white pine at $5 and spruce at $1.20.

October 25, 1917 (meeting no. 753). C. G. Smith: Sitgreaves--235 MM board feet sold, bid at $2.25 per M. Bid $3 for more accessible adjacent Indian timber.

December 27, 1917 (meeting no. 762). Franklin W. Reed: Locust stumpage going for $5 to $15 per cord due to demand for tree nails for wooden ships. Carter: Spruce sale pending in Tongass National Forest, Alaska, for airplane material.

February 17, 1917 (meeting no. 710). Potter: Public Lands Committee hearing on extension of expired Saginaw & Manistee contract.

August 2, 1917 (meeting no. 741). Carter: Approval to advertise an important sale on purchase area (Cherokee-Georgia)--yellow pine at $8 and chestnut oak ties at $.15 each.

November 22, 1917 (meeting no. 757). C. G. Smith: Bid on Norval Flat-McCoy sale, Lassen National Forest by California Packing Corp.--230 MM board feet at $2.75 and $3 for yellow pine and $.50 for fir.

January 10, 1918 (meeting no. 764). C. G. Smith: Sale on Tusayan and Coconino, Region 3, to Saginaw & Manistee Lumber Co.--40 MM board feet at $2.25.

January 18, 1918 (meeting no. 765). C.G. Smith: Contract approved on sale to Apache Lumber Co., Region 3--235 MM board feet.

February 7, 1918 (meeting no. 768). Potter: Bill passed extending Saginaw & Manistee contract, Tusayan and Coconino National Forests.

February 27, 1919 (meeting no. 827). C. G. Smith: Sale in Region 4, Cottonwood Chance, has "the unusual provision for periodic reappraisal instead of readjustment of the stumpage prices."

August 14, 1919 (meeting no. 847). Robert Y. Stuart: Swift Berry, logging engineer, returns from military duty, but will not return to the Forest Service. He has accepted a position with Mr. Mason in Internal Revenue. Also two bids on a Kaniksu sale--$7 from a local operator and $7.30 from an outsider.

October 30, 1919 (meeting no. 858). C. G. Smith: Clover Valley Lumber Co. bid on 234--MM-board-foot Plumas National Forest sale.

January 20, 1920 ((meeting no. 864). Greeley: Reorganization. Branch of Silviculture to become Branch of Forest Management, with Stuart to head the Western Division and Carter to head the Eastern Division, assisted by C. G. Smith and Girven Peters, respectively.

February 29, 1920 (meeting no. 868). Greeley: Regulation S-9 revised to permit award of timber to local bidders even if their bid is lower than outside bids. The Calhoun sale, Region 1, was readvertised at highest bid received at original opening, plus a requirement to manufacture on the western part of the Kootenai National Forest.

April 8, 1920 (meeting no. 878). Greeley: Dover Lumber Co. appeal rejected by Secretary of Agriculture. Canceled for failure to cut.

April 16, 1920 (meeting no. 879). Greeley: Carter promoted to Assistant Forester in charge of Forest Management.

April 22, 1920 (meeting no. 880). Stuart: Takes job as Deputy State Forester of Pennsylvania under Gifford Pinchot.

August 19, 1920 (meeting no. 897). J. F. Preston: Application by Gastineau Pulp & Paper Co. for half a billion board feet on Tongass National Forest.

November 24, 1920 (meeting no. 911). Preston: Report is in from Region 6 on a 2-billion-board-foot sale on the west side, Admiralty Island, Tongass National Forest.

February 27, 1925 (meeting no. 1093). Carter: Herrick contract, Region 6 (Malheur), modified to extend time to start cutting.

July 16, 1925 (meeting no. 1108). Harold Irion: Cady Lumber Co., Deer Creek sale--Sitgreaves 287 MM board feet advertised at $2.50, bid at $2.75.

December 23, 1925 (meeting no. 1125). Carter: "Plan of Work" to include a bulletin on Tongass timber resource by Heintzleman and a "Check of Service Practice in Appraisals & Reappraisals."

April 9, 1926 (meeting no. 1137). Greeley: Sutherland Bill passed. Allows export of National Forest timber from State in which grown. Has been permitted heretofore in each annual appropriations bill.

June 24, 1926 (meeting no. 1148). Irion: Sale to Hallock & Howard Lumber Co. (Modoc, Region 5, Fandango unit)--194 MM board feet, pine at $3.65, other at $.50. Conference with Mr. Herrick and his superintendent, Jim Girard. Forest Service will extend, if Herrick deposits $50,000 as liquidated damages for failure to meet deadlines.

July 15, 1926 (meeting no. 1151). Irion: Sale to Webster Brothers, Bighorn National Forest, Region 4--1.75 million ties at 10 cents per and 35 MM board feet of sawlogs at $2.25 per M.

January 16, 1927 (meeting no. 1172). Greeley: Forest Service about to advertise two large units near Juneau and Ketchikan.

March 3, 1927 (meeting no. 1179). Joseph C. Kircher: Herrick Senate hearings closed; Forest Service exonerated.

April 21, 1927 (meeting no. 1186). Kircher: Ketchikan unit--5 billion board feet. Received two bids: I. & J. D. Zellerbach--80 cents for spruce and 40 cents for hemlock. International Paper Co.--90 cents for spruce and 30 cents for hemlock.

May 5, 1927 (meeting no. 1187). Carter: Juneau unit, tentative award to George T. Cameron, president of San Francisco Chronicle. Joint venture with Mr. Chandler of Los Angeles Times.

June 4, 1927 (meeting no. 1192). Kircher: Competition on Fandango unit, Modoc. Crane Creek Lumber Co. bid $4.59 for yellow pine advertised at $3.50, 54 cents on white fir advertised at 50 cents, and 52 cents on incense cedar advertised at 50 cents.

May 3, 1928 (meeting no. 1225). R. Y. Stuart takes over office of Forester. Also, G. H. Collingwood resigns from Extension forestry work to become Forester for American Forestry Association.

June 7, 1928 (meeting no. 1228). Conditional award of readvertised Bear Valley, Malheur National Forest, contract to Hines Lumber Co. at 6 cents above advertised price for pine and 5 cents above for other species.

September 13, 1928 (meeting no. 1241). Pickering Lumber Co. bid on Badger Spring, Modoc, sale at $2.25 for pine and 50 cents for other species.

May 16, 1929 (meeting no. 1270): James W. Girard returns to Forest Service after 6 years.

September 12, 1929 (meeting no. 1286). Joseph A. Fitzwater: Four large sales in for approval: Satsop River, Olympic National Forest--852 MM board feet at $4 for Douglas-fir, $1.25 for

hemlock; South Fork Stillaguamish, Mt. Baker National Forest--511 MM board feet at $3 and $1; China Hat, Deschutes National Forest--95 MM board feet at $3.25 for pine, all in Region 6; and Dolores unit, Montezuma National Forest, Region 2--211 MM board feet at $2 for pine.

November 7, 1929 (meeting no. 1294). Carter: Dolores unit sold to New Mexico Lumber Co. and China Hat sold to Brooks-Scanlon Lumber Co.

December 12, 1929 (meeting no. 1297). Carter: Satsop sold to Schafer Brothers Logging Co. at $6.50 for Douglas-fir and $2.50 for other species.

August 22, 1931 (meeting no. 1364). Raymond E. Marsh: Burt P. Kirkland is transferred to the Washington Office to work on analysis of selective logging costs.

October 29, 1931 (meeting no. 1371). Stuart: New depression curtailment order rules issued--no new sales over $500 (but still all right to make larger sales for existing mills).

November 5, 1931 (meeting no. 1372). Howard Hopkins: Dunning introduces new tree classes in California.

February 4, 1932 (meeting no. 1383). Bill in Congress to reduce stumpage prices by one-third for 3 years. Estimate 8 billion board feet at present under contract.

Index

Accelerated amortization (road costs), 24
Acceptable price, 87-89
Accountant's Handbook, 22
Act of June 4, 1897, 1
Act of March 3, 1891, 1
Advantages of National Forest stumpage, 14
Afognak Island, 73
Agee, F. B., 21
Ahlskog, H., 66
Alaskan-American Paper Corp. (Shrimp Bay), 73
Alaska Lumber & Pulp Co., 77
Alaska, need for pulpmills, 72
Alaska Pulp & Paper Co., 72, 77
Alaska Pulp Co., Ltd., 77
Alaska Wood Products Co., 77
Allen, B. F., 25
Allen, E. T., 26, 118, 119
Allen, H. V., Jr., 68
Ames, Fred, 21, 70
American Viscose Corp., 74, 76
Amortization of roads and railroads, 23, 24, 122
Anderson, Sen. Clinton P., 46, 68
Anderson & Middleton Lbr. Co., 30
Andrews, H. J., 132, 134
Andrews, W. T., 69, 83
Analytic appraisal (see Residual Value appraisal)
Apache Lumber Co., 44
Appeals, 46, 76, 77
Appraisal Manual, (1914) 2, 13, 21, 27, (1922) 21, 22, 27
Appraisal system (early rudimentary), 1
Appraised value, 1, 2, 23
Appraiser's judgment, 14, 21
Appraisal schedules, (BLM), 129
Arizona Pulp & Paper Co., 79
Automatic data processing, 87
Average efficiency concept, 14, 27, 88
Averages, simple or weighted, 23
Backus (Forest Examiner), 67
Bade, Gordon, 67
Balcom-Riley Lbr. Co., 52
Base index (See Escalation)
Base rate (See Escalation), 23, 96
Base period, 11, 21, 67, 22, 87
Bates, W. E., 60, 70
Battelle Institute, 91
Bear Creek (Rogue River), 55, 57
Bear Valley (and Bear Creek/Malheur), 57-59, 69
Berry, John, 69
Berry, Swift, 12, 48, 49, 50, 69,
Berry W. F., 96
Bids (within one year of opening), 3
Bid premium, constant, 91
Bighorn Tbr. Co, 42
Big Springs Lbr. Co., 46
Big Valley S.Y.U., 118
Black Hills, 2
Blacks Fork sale (1915), 47, 48
"BLM's Billion-Dollar Checkerboard," book by Elmo Richardson, 119
Board of Forest Appeals, 76, 84
Books and records (availability), 11, 17, 26
Boundary Waters Canoe Area, 82
Brewster, D. R., 35, 66
Brandstrom, Axel, 58
British Columbia appraisals, 73, 110, 121-128
Brooks-Scanlon Lbr. Co., 57
Bruce, Donald, 33
Bruce, Eugene S., 42, 67
Brundage, Fred H., 70
Bryan, W. C., 70
Buckley, J. L. (Pres. Georgia-Pacific Corp.), 84
Buck, C. J., 70
Bull Run Timberland Reserve, 25
Burch, M. C., 42
Bureau of Fisheries (Afognak Island), 73
Bureau of Labor Statistics (BLS), 64, 80
Bureau of Land Management (BLM), 118, 119, 129-130
Bureau scaling, 84
Bunker Creek (first environmental modification,) 84, 96
Burns, M. A., 48
Burns, Oregon (see also Hines/Herrick sale), 57
Burnt Cabin Sale (Cabinet), 35
Butler, Ovid, 67
By-product values, 90
"B"-number (GAO) reports, 80, 91-93, 97
Cady Lbr. Co., 21, 30, 44, 45
Callender, W. C., 68
California Case 2, 2, 25
California 1834 stumpage price, 2
Cameron, George T., 30, 73
Cancellation of contracts, 33, 47, 50, 57, 58, 78
Capital Gains taxes, 94
Carbon Tbr. Co., 41
Career ladder for specialists, 87, 89
Carter, E. E, 26, 33, 37, 39, 40, 42, 45, 47, 50 57, 58, 65–70, 72-74, 78, 110, 112, 117-119
Cary, Austin, 12, 13, 27, 49, 51, 69
Case 1, Black Hills, 2, 3
Cecil, G. H., 12, 13, 21, 27, 51, 69
Ceiling prices, 112-114, 119
Chapman, C. S., 110
Chapman, H. H., 12, 27
Champion-International Corp., 78
Chelstad, M. E., 75
Clarke, Edward, 70
Clark, E. T., 65, 75
Clear (clean) cutting, 11, 26
Clapp, Earle, 67
Cleveland, Grover, 1
Cliff, E. P., 68, 85
Clyde railroad skidder, 55
Coeur d'Alene Mill Co., 37, 66
Colorado Case 5, 2
Colorado Plateau, 85
Commissioner, General Land Office (GLO), 2, 3, 6, 25, 26
Committee on Government Operations (1956), 27
Competitive bidding, 89
Comparison of stumpage rates, B.C. and U.S., 121
Composite base period, 115
Comptroller General (GAO), 85, 96
Confidentiality of data, 11
Connaughton, C. A., 70
Conservative calculations, 14
Constant bid premium, 91
Contract logging, 18
Contract, timber sale, 26, 95, 96
Converse, Chad, 84
Converting factors, 33, 44, 45, 66, 84
Cooley, Arizona, conference, 21, 27, 44
Cooperative sustained yield units, 118, 119
Coos Bay Wagon Road lands, 129
Cost accountants, 91, 94
Cost of Living Council, 113
Cost trends, 87, 121

Costs of logging and manufacturing, 121, 133
Cox, William T., 9, 11, 26, 39, 40, 42, 46, 48, 66, 68
Craig, George A., 96
Crow's Pacific Coast Lumber Digest, 113, 119
Cubic foot measurement, 26, 126, 127
Cubic meter measurement, 26, 127
Damage appraisals, 117
Debarment from bidding, 26
Deer Springs sale, 29, 45-46
Deficit sales, 23, 39, 88
Deinema, J. W., 68
Depreciation costs, 13, 15, 17
Desperation bidding, 23
Diagramming logs, 105
Discounting lump sum appraisals, 115, 116
Discounts and commissions, 88, 90
Districts (the original 6), 6, 26
District 7 (organized 1914), 19, 29, 32, 43, 81, 86, 92
Dolan, J. C., 110
Dolores Unit, 29
Donery, J. A., 21, 67
Douglas Cr. sale, 41
Douglas-fir Region Monthly Index (DFRMI), 64
Dover Lbr. Co., 35, 37
Drake, George L., 57, 65, 83
DuBois, Coert, 11, 26, 48, 49, 68, 69
Duplication of costs, 12
D-1737 (Hardwood mill scale studies), 102, 105, 106, 110
Eastern Redwood Lbr. Co. (M. A. Burns sale), 48
East Side Unit, 29
Effluent disposal measures, Ketchikan Unit, 74
Eldredge, I. F., 21
Elliott, J. C., 69
Emergency reappraisal (Satsop Sale), 11, 64
End products, 122
Environmental contract modification, 96
Equal escalation, 88, 91, 95
Ericson, O. F., 58, 65, 70, 83, 131
Errors in appraisals, 48
Escalation,
  general, 23-24, 38, 62, 90-91, 95, 107-110, 122
  Hines sale, 60
  Deer Cr. sale, 38
  Satsop sale, 62
  1954 Manual (see)
  2423 Manual (see)
  Title 7 Manual, 23
  Worrell Committee (see)
  "50/100" (see)
  "Equal," 88, 91, 95 (see)
  G.A.O. (see)
  British Columbia (see)
Evans, R. M., 21
Extension of contracts, 3, 5, 6, 96, 133
Export from state or territory prohibited, 9
"Fables for Foresters," book by John Guthrie, 67
Factory lumber grades, 102
Fair market value, 23, 24, 27, 86, 87
"Fairness should be left to the philosophers" (see Weintraub Report)
Federal Power Commission, 73
Federal Sustained Yield Unit appraisals, 118
Federal Sustained Yield Units, Forest Service, 118, 119
Federal Sustained Yield Units, BLM, 118, 119
Firekilled timber, 9, 33
Fires (5 to 10 billion feet killed, 1910), 9, 11
Fishhook sale (St. Joe), 35
Fitzwater, J. A., 21, 44, 47, 67, 68
Fiscal and Accounting Management (formerly Fiscal Control), 93, 94
Fischer Lbr. Co, 118, 119
Fixed costs, 24, 45, 51
Flagstaff Lbr. & Mfg. Co., 98, 110
Flagstaff S.Y.U., 118
Flodberg, Herbert, 39
Flory, C. H., 21
Food Machinery Corp. (FMC), 76
Forest Act (B.C.), 121
Forest Products Laboratory (see D-1737)
Forest Reserves, 1-3
Forest Reserve Manual, 6, 26
Forest Service Manual, 9
Forestry Division (Division "R"), GLO, 25
"Forester's Formula," 12, 13, 49
Forfeiture of deposits, 58, 78
"Former Method" (see Forester's Formula)
Formulas,
  Investment method, 15 (see Appraisal Manual, 1914)
  Overturn method, 17
  Return for personal services method, (see Appraisal Manual, 1914)
Fort Apache Indian Reservation timber, 44
Fourbit Cr. sale, 54
Fourmile-Bear Cr. sale, 54
"Four Point" Report, 94
Fox Park Unit, 41, 67
Free use permits (GLO), 1, 3, 5
Freeman, Orville, 24, 87, 88
Freight rates, 51
Frequency of the turn (see Appraisal Manual, 1914), 17
Fresno Flume & Lbr. Co, 49, 50
Fruit Growers Supply Co., 29, 30
Frykman, Joel, 23
Fulton Report, 121
GAO (see General Accounting Office)
Galbraith, M. C., 68, 85
Garbutt, C. S., 25
General Accounting Office (GAO), 80, 91-93, 97
General Land Office, 1, 25, 129
Georgia-Pacific Corp., 76, 78
Gibbons, W. H., 51, 55, 69
Girard, J. W., 21, 33, 35, 37, 47, 57, 58, 66, 68, 73, 74, 84
Glazebrook, Thomas, 39, 122
Gold Basin Lbr. & Shingle Co., 8/18/09, 52
Grading systems (see log grading systems)
Granger, Christopher, 41, 67, 70, 74, 84, 11, 119
Granite Basin sale, 50,
Graves, H. S., 11, 13, 21, 26, 27, 33, 40, 41, 44, 46, 47, 51, 58, 66-70, 72, 73, 83-85, 98, 110, 117
Grays Harbor S.Y.U., 118
Greeley, W. B., 11, 13, 21, 26, 33, 40, 41, 44, 46, 51, 58, 66-70, 72, 73, 83-85, 110, 117
Green Douglas-fir index, 108, 110
Gross stumpage, 24, 88
Guarantee of profits (see Appraisal Manual, 1914, 1922)
Guthrie, John D., 67
Hallock, Blaine, 70
Hamaker, H. G., 25, 26
Hardwood log grades, 102, 105, 106, 110
Harrison, Benjamin, 1
Hawley, Norman R., 110

Hazel Mill Co. 4/13/09, 52
Heintzleman, B. F., 21, 73, 83, 84
Hemlock log grades, 75, 76, 84
Hemlock left on the ground, 61
Herrick, Fred, Lbr. Co., 57, 58, 69, 70
Hermann, Binger L. (Commissioner, GLO), 1-4, 6, 7, 25, 26
High and low base index, 24, 38, 39, 59
High bidding (extraordinarily), 23
High grading, 133
Hildman, Carl, 60
Hinderer, C. H., forest supervisor, 67
Hines Lbr. Co., 48
Hines Western Pine Co., 30, 70
Hitchcock, E. A. (Secretary of Interior), 25
Hoerner-Waldorf Paper Co., 35
Hoffman, Bruce E., 21, 57, 58, 65, 69, 83
Holmes, Oliver Wendell, 134
Holy Terror Mining Co., 2, 3, 4
Homestake Mining Co., 2, 3, 4
Houston, D. F. (Sec. of Agriculture), 35
Hult Lbr. Co, 118
Hunter, Wm. B. (wrote the "Hunter Report"), 12, 13, 27, 49
Humphrey, George, 45, 67
Idaho Stud Mill, Inc., 48
Index log, 108, 109
Index adjustments (see also Escalation), 107-110
Independent ("gypo") logger, 75
Indices, Western Pine region, 70, 71, 107-111
Industry costs in B.C., 121
Inferior species, 14, 21, 22
Insect-killed trees, 48
Inspection for books and records, 11, 17, 26
Instructions for Appraising Stumpage..."
(1914), 13-21
(1922), 21-22
Interim price adjustment (see also Escalation), 107-110
Interest as an expense, 12, 17, 22
Internal Revenue Service (Profit Study), 94, 95
International Log Rule, 26
International Paper Co., 73
Investment method of appraisal, 15, 16, 41, 87; by BLM, 129, 131
Ithaca Trust Co. v. U.S. (lawsuit over market value), 134
Jacks Creek, 54
Jackson, George, 75
Jackson, Gerald (Champion-International), 84
Jackson, Ray, 59
Jemez Indian Reservation, 40
Johanneson, M. M., 71
Johnson, W. H. (See Juneau Unit, Sitka Unit, Ketchikan Unit)
Joint Appraisal Study Group, 91, 96
Joint Industry-Forest Service Contract Review Committee, 91
Jorgensen, C. G., 26
Journal of Forestry, 121, 131, 134
Judgment appraisals, 14, 21, 41
Justice Dept., (New Mexico Tbr. Co. case), 40
Kavanaugh, E. N., 69
Keeler Creek sale (Kootenai), 37-39
Keene tree classes, 58
Kendrick, J. P. (Senator), 42
Kernik, J. L., 85
Ketchikan Pulp & Paper Co., 74
Ketchikan Pulp Co., 75
Ketchikan Pulpwood Unit, 73-77, 84
Kircher, Joseph C., Forest Examiner, 67
Kirkland, Burt P., 51
Kirkmire, Nicholas J., 96
Kirkpatrick, Dahl, 85
Klamath Indian Reservation, 57
Kneipp, Lee F., 37, 47, 66, 68, 73, 84
Knutson-Vandenberg (K-V) Act, 37, 83, 96
Kobayashi, J., 84
Koch, Elers, 21
Korstian, Clarence F., 67
Lake Chelan Box Factory, sale of, 10/29/08, 52
Lake States pulpwood sales, 80-83
Lakeview S.Y.U., 118
Land exchange appraisals, 115, 116
Lane, Paul, 70
Lang, Duncan L., 21, 46, 67
Lassen Lbr. & Box Co., 29
Lauridsen, M. J. (Worrell Committee), 87
Leavitt, Clyde, 26
Leicht, Richard E., 91, 96
Lindh, Otto, 68
Local communities, 6
Lockard, C. R., 110
Lockhart, Russell, 39
Lockwood, A. N. (Worrell Committee), 87
Lodewick Study, 102, 110
Logging costs, 14, 90, 121
Logging engineers (first appointment), 13
Log market appraisals, 13, 51, 84, 89, 93
Log grades 83, 110
Logan, Paul, 39
Logging engineering studies, 90
Log grading:
Douglas-fir, 122
General, 89, 122
Hardwood (D-1737), 102, 105
Old Statutory (B.C.), 122
Pine, 122
Log prices, 15, 121
Log scale (see also Scaling), 6, 26, 84, 98
Louisiana Pacific Corp., 76
Loveridge, E. W., 21
Lumber and wood products industry profits (see Internal Revenue Service Profit Study)
Lumber Grades, 13, 14, 18, 19
Lumber maufacturing costs, 14, 36
Lumber Prices, 14, 15, 18, 19, 20, 51, (1912-1915), 54
Lumber price indices, 107-110
Lump sum sales, 115, 116, (values) 129
Madera Sugar Pine Co., 30
Mann, Wayne K., 85
Manufacturing costs, 36, 90
Marginal material, 98, 133
Marketing areas (BLM), 118, 119
Marketing point, (most advantageous, 22), 90
Marking board, 67
Marks Unit, 29
Marsh, R. E., 67
Marsh, S. H., 21
Marsolek, D., 68
Mason & Bruce, 45
Mason, Bruce & Girard, 84
Mason, David T., 33, 50, 118
Mason, Fred R., 66
Mason, Ira J., 50, 65, 68, 69, 74, 110, 119
Matson, Elmer, 70, 110
Maximum price regulations, 112
Maximum prices, 42
May, W. T. S., 25

McArdle, R. E., 68
McCleary (Shelton Unit), 118
McCoy, Gary, 84
McGinnity & Biggs, 35
McNary, Arizona, 44
McNary, James G., 44, 46, 67, 68
McNary, Sen. Charles, 118
McPherson, Lester G., 60, 70
McRorey, Russell, 23
Measurement methods, 98
Median bids, 87
Method of Comparable Analysis (Rothery), 132
Michigan River Unit, 30
Minimum log sizes, 38, 50
Minimum price, 10, 14, 24, 40, 47, 72, 89
Minimum volumes cut at bid rates, 48
Minnesota Public Interest Group v. Butz (environmental lawsuit), 82
Mississippi National Forests (GAO report), 93
Millicoma River (first tree measurement), 99
Milling costs, 121
Mill scale studies 100, 101, 102 (include the following):
- Ardenvoir
- Anderson-Middleton
- Black Hills
- Belgrade
- Combined Redwood
- Diamond-Gardner
- Dinuba
- D-1737
- Ellingson
- Enterprise
- Florida
- Flagstaff
- Halfway
- Kremmling
- Lakeview
- McCall
- Ouachita
- Paskenta
- Purdue 516
- Pickering
- Rock Top
- Research notes 83/125
- Standard
- Susanville
- Twin Feathers
- TVA 52
- Twisp-Wagner
- Tygh Valley

Mill scale studies, need for, 23, 105
Mohawk co-operative sustained yield unit, proposed (BLM), 118, 119
Montana Pulp & Paper Co., 66
Monopoly, prevention of, 13
Monighan, F. S., 67
Monitoring profits, 87
Montana & Idaho Pole Co., 47, 48, 68
Moore, S. L., 39, 66
Moose Cr. (Targhee), 30, 47, 48
Morrell, F. W., 21
Morse, E. B., 21
Most valuable product, 22
Mullen Creek, 30
Multiple Use, 6
Munger, T. T., 21
National Forest Manual (1911), 9, 10, 26
Navaho Lbr. & Tbr. Co., 42, 44, 45
Need for mill scale studies, 23, 105
Need to Develop Uniform Procedures...Forest Service and BLM (GAO), 93
Neff, Philip, 37, 66
Negative values, 50, 51, 133
Neils, J. Lbr. Co., 37
Nelson Amendment, 26
Nelson, L. A., 83
Neuberger, Richard E. (Senator), 23
New Mexico Lbr. Co., 35, 39, 40
Newport, Carl, 84, 101, 102, 110
No-bid sales (GAO), 93
North Bend Tbr. Co. (see Cancellation)
Northern Forest Products, Ltd., 82
Northern Wood Preservers, Ltd., 82
Norway Pine (Black Hills), 4
Norwegian proposal for Alaska pulpmill, 72
Oaks, M. B., 39
Objective of appraisal, 87
Objective of forest reservations, 1, 10
Ochsner, Herbert, 44, 68
"Official Board Markets," 80
Ohio Match Co. 5/18/23, 37
Olmstead, F. E., 26
Olson, E. C. Lbr. Co., 37
O'Malley, H. (Bur. of Fisheries), 84
Operating ratio, 22
Operator records, 133
Optional (marginal) material, 133
O. & C. land reclassification and sustained yield Act of 1937, 118
Oregon and California (O. & C.) Railroad grant lands, 118, 119, 129
Oregon State Legislative Memorial (1927, Herrick case), 57
Overrun, 12, 13, 15, 18, 22, 51, 52
Overturn, 15, 17, 41, 131, 132
Pacific Northern Timber Co. (PNT), 77
Pacific Power & Light Co., 48
Past price will hold into the future, 86
Pay-as-cut values, 115, 131
Payne, Burnett, 39, 58, 70, 84
Pearse, Peter H., 121
Pearse Report (B.C.), 121
Peck, A. S., 21
Pecos River Forest Reserve, 25
"P" Division (GLO), 3, 25
Peeler logs, 61
Pelican Bay Lbr. Co., 30, 55-57
Performance bonds, 41, 46
Petitions for timber sales, 2
(to include estimate of value by petitioner), 2
Pettigrew, R. F. (Senator), 3
Pickering Lbr. Co., 30
Pikes Peak Timberland Reserve, 25
Pinchot, Gifford, 6, 9, 10, 39, 40, 66
Plum Creek Timberland Reserve, 25
Plum Creek Lbr. Co. (Bunker Cr. sale), 96
Plywood indexes, 64
Plywood/lumber appraisals, 62, 93
"PNT" sale, 77
Point of appraisal, 90
Pond value, 62
Pooler, F. C. W., 21, 45, 67, 68
Potter, A. F., 42, 67, 68
Potts, J. H. 42, 67
Preclusive bidding, 23
Prediction in appraising (see Worrell Report)
Preston, John F., 21
Price, J. H., 21, 69
Price controls:
- World War I, 42
- World War II (OPA), 112-113
- Korean War, 113, 119
- Vietnam War, 113, 115, 119

Product values, 15
Profit in appraisals, 12-15, 17, 22, 86, 88, 90, 91, 94, 122
Profit and risk, 23, 27, 122
Profit margin, 14, 15, 17, 51, 91
Profit study, 88, 90, 91, 94, 95
Profits in the Western Timber Industries (IRS study), 94, 95
Pro-rating fixed costs, 13
Pro-rating profit, 14

Pro-rating depreciation, 15
Provincial districts in B.C., 122
Prudent operator concept, 15
Public timber permits (GLO), 1
Puget Sound Pulp & Timber Co., 30, 74, 75
Puget Sound log prices, 75, 76, 84
Pulp Timber in Alaska (GAO report), 93
Pulp sale efforts (early), 72
Pulp end product appraisal, 76
Pulpwood costs, Lake States 1902-08, 36
Purchaser Credit, 88
Quality Ratio, 105
Quarterly adjustment...., analysis of (GAO), 93
Quarterly adjustment (see also Escalation), 59, 90, 107-110
Quartile procedure, 39
Quealy, P. J., 42
Quincy Lbr. Co., 133
Railroad and ocean freight rates, 51
Railroad tie sales, 46
Rainy Creek (Lolo), 33
Ramsdell, W. F., 21
Randles, Quincy, 21, 44, 45, 67
Ranger sales, 6, 20
Rate readjustment, 55, 105, 106
Rate redetermination (see Reappraisal)
Ratios in appraisals, 22
Readjustment (superseded by Redetermination), 9, 13, 55, 105, 107
Reappraisal (1943 Solicitor ruling), 107
Reappraisals (see also Readjustment and Redetermination), 6
Significant cases (see each case):
Bear Cr. Bear Valley/Calamity Cr.
Satsop River
Deer Springs
Keeler Cr.
Ketchikan Unit
Sitka Unit
Colorado Plateau
West Tofte Block
Pelican Bay
Receiver of Public Monies, 25
Records availability, 94
Redetermination of rates (see Readjustment, Reappraisal)
Redington, P. G., 21
Reed, F. W., 21
Regional average costs and prices, 21, 23
Regional Forester sales, 20
Reserves, 1, 2
Residual value appraisals, 12
Reuss, Henry (Representative, Wisc.), 80
Richards, W. A., 6
Richardson, Elmo, 119
"Right kind of bulletin..." (H. S. Graves), 12
Riley, Smith, 26, 39, 40, 66
Ringland, Arthur C., 26, 44, 67, 110
Risk, 14
Road amortization, 23, 24, 122
Road amortization rate deficit, 64
Rock Top report, 45, 67
Rogers, D. N., 21
Rose Consolidated Mining Co., 2
Rothery, Julian, 12, 22, 23, 37, 39, 45, 50, 51, 66-69, 73-75, 84, 112, 121, 129, 131-134
Row River sale, 54
Royalty fees, 121
Rules & Regulations (Dept. of Interior), 1-6
Rutledge, R. H., 21, 47, 48
Sabol, Emil M., 96
Saginaw, Manistee Lbr. Co., 44, 45
Sale-as-a-whole appraisals, 62, 90, 122, 135
Salt Lake City conference, 1913, 13
Salt Creek sale, 51, 53
Sample log scaling, 99
San Francisco earthquake and fire, 6, 11, 53
Satsop River sale, 59, 64
Sauk-Stillaguamish sale, 65
Sauk Tbr. Co., 52, 71, 83, 88, 89
St. Regis Paper Co., 37, 78, 80
Sale by area or amount, 68; at cost, 26 29
Scaling method, 6, 26, 84
Schafer, Peter, 70
Schafer Bros. Log. Co., 30, 59-64
Schedules 14 and 17 (BLM appraisal guidelines), 129
Schmidtman, D., 85
Schultz, Edward W., 68
Scribner rule, 26, 129
Seerey, Dan, 47, 48
Seneca, Oregon, 57
Service Committee reports (notes from), 26, 67, 135-138
Shera, Hugh, 96
Sherman, E. A., 28, 33, 66, 68, 83, 84
Shelton Cooperative, S.Y.U., 118
Shields, John F., 84
Short log scale 26, 129
"Sideboards," 122
Sierra Club, 78, 79
Significant sales:
Dist. 1, 33-39
Dist. 2, 39-42
Dist. 3, 42-46
Dist. 4, 46-48
Dist.5, 48-51
Dist. 6, 51-55
Region 9, 80-83
Region 10, 72-79
Silcox, Ferdinand, 33, 35, 66, 70
Silviculture, impact on appraisals, 58
Simplification, 88, 89, 96
Simpson Logging Co. (Simpson Industries, Inc.), 30, 59, 70, 71
Sitka Unit, 76, 77
Siuslaw master unit (BLM), 118, 119
Skeels, Dorr, 12, 33, 35, 44, 45, 66
Sliding scale (see Escalation and Quarterly Adjustment)
Sloan Reports (B.C.), 121
Small Business set-aside sales, 118
Smart, Robert A., 39, 66
Smith, Clinton, 42, 67
Smith, Stanton, 67
Snowflake unit pulpwood sale, 79, 80
Solicitor (Dept. of Agriculture) ruling, 66, 107, 110
Somers Lbr. Co., 35, 66
Southwest Forest Industries, Inc., 85
Southwest Lbr. Mills, 46, 68, 79
South Hood Bay sale, 74
Spruce bark beetle, Keeler Cr., 37
Standardized costs, 14, 17, 21
Standard prices, 24, 52
Standard Tbr. Co., 46, 47
Standard contract form, 26
Standard procudures, supplemented by Regional instructions, 23
Stanford Research Institute, 91, 121

Stone, J. H., 70, 71
Studies:
Joint Appraisal Study Group, 91, 96
Mill scale studies, 24, 91, 96
Log transportation studies, 24
Road cost studies, 24
Logging engineering studies, 24
Profit studies, 94
Stump heights (1918), 42
Stumpage value, 2, 7-9, 28, 31, 34
Stumpage prices (servicewide 1905-80), 31
(regional 1904), 4; 1906-10, 7; 1911-14, 28
Stumpage rate adjustment (see Escalation)
Stumpage prices (in B.C.), 124-127; (BLM), 130
Stuart, R.Y., 33, 66
Sugar Pine Lbr. Co., 30
Sulfate pulp prices, 80
Sump, Albert, 39, 68, 85
Sundling, Hugo, 85
Supervisor sales, 6, 20
Surface, H., 72, 83
Sustained Yield, 6, 88, 121, 129
Sustained Yield Forest Management Act of 1944, 118
Sustained Yield Units, 118, 119
Swartz, U. S., 47, 66, 68
Swayne Lbr. Co., 50
S-12 Regulation (originated in 1901 to handle late bids), 3
Table 9 (Lodewick Study), 102
Tanner, E. B., 67
Targhee National Forest, 46, 47
Temple, Arthur, Jr., 34
The Forester (early title of the Chief of the Forest Service)
Third Party Agreement, 62, 82
Thomas & Jackson (Consultants for Hines), 59
Thompson, M. W., 65
Timber appraisal manual (see Appraisal Manual)
Timber sale manual (1911), 9
Timber Appraisal Review (Worrell) Committee, 87-91
Timber Permits, 1
Timber sold:
1905-80, 31
by Districts, 1915, 22
products, 1979, 34
Time studies, 17
Tracy, R., 68
Trade Journal index, 115
Trade Journal lumber prices, 129
Training of appraisers, 89
Transaction analysis, 87
Transaction evidence, 2, 6, 87, 88, 96
Transfer to U.S.D.A., forest reserves, 6
Trans-Mississippi Development Co., 30
Tree Farm Licenses (B.C.), 121
Tree grades (D.-fir, larch, true firs in Region 1), 122
Tree measurement, 99, 99
Trends in costs, 87
Trends in stumpage prices, 86
Trespass problems, 1, 40
Turcotte, Lawson, 84
Turnover of capital (overturn), 12
Typical sales, 1921-1930, 30
Underweights, 51
Unduly complicated appraisals, 88
Unduly inflated charges, 88
Uniformity project (BLM-FS), 91-93, 129
Union Pacific Railroad, a leading market for ties, 42, 46, 47,
Unrelated costs, 22, 23
Upset price, 14
Use Books, 6, 9, 20, 26, 27
U.S. Plywood/Champion Papers, Inc. (predecessor of Champion, Int'l.), 78
U.S. Senate investigation of Herrick case, 58
Utilization, 96, 98, 126, 135
Utility logs, 98, 126
Vallecitos S.Y.U., 118
Valuation factor, 129, 132
"Valuation of Stumpage, The" by W. B. Hunter, 12, 27, 49,
Vancouver, B. C. log market, 121
Varney Cr. sale, 54
Vaughan, Coleman, 110
Volumes based on "more or less," 68
Volume estimates, 133
Wage rates
1913, 49, 50
1915, 35
1940, 37
Wagner Lbr. Products Co., review by GAO, 93
Waha, A. O., 45, 67
Wallace, H. C. (Sec. of Agriculture), 26, 84
Warm Springs Creek Unit, 30
War Powers Act, 112
Waste, alleged (GAO), 93
Watts, Lyle, 47, 111
Webster Bros., 42
Weisgerber, John, 84
Weintraub, Sidney, Report, 86, 87, 96
West Chichagof Island Land Use Study, 77
Western Forest Industries Assn. (WFIA), 80
Western Pine (species) indices, 23, 70, 107-110
Western Wood Products Assn. (formerly Western Pine Assn.), 64
West Fork Mill & Tbr. Co., 29, 72, 83
West Tofte Block, 80, 81
Wheeler, Burton K., 37
White Mtn. Unit, 42
White River Plateau Timberland Reserve, 25
White Swan sale, 41, 42
Wickersham, G. W. (Atty. General), 66
Wiener, A. A., 39, 60, 96, 122
Willing buyer/willing seller (fair market value), 23, 27, 86, 87
Willow Cr. Unit, 50
Wilson, James (Sec. of Agriculture), 6, 10
Wind River Tbr. Co., 42
Wind River Lbr. Co. (sales of 11/12/06; 5/18/09), 52
Winslow (appraisal point, Flagstaff Unit), 118
Wise, Harold, 84
Woodbury, T. D., 21
Woodhead, Philip V., 68
Woolschlager, Harvey, 60, 70
Worrell Committee Report, 24, 87-91, 94, 97
Worthington, R. E., 84
Wright, Newell, 60, 70, 73, 74, 76, 84
Wynne, Athol, 45
Wyoming Tbr. Co. (Wyoming Tie & Tbr. Co.), 41, 42
Yaak River pulpwood proposal, 35
Yakobi Island, 77
Yates, C. A., 84
Yellowstone insect epidemic, 47
Yellowstone Park Timberland Reserve, 25
Zellerbach Bros., 30, 73
Zon, Raphael, 65

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ERRATA SHEET FOR THE FOREST SERVICE TIMBER APPRAISAL SYSTEM

1. Page 20, column 1, line 7: "withhold" is misspelled.

2. Page 23, column 2, next to last line in paragraph 1: semicolon should be comma.

3. Page 25, Note 10: add at end, "(two in California)."

4. Page 37, column 1, third full paragraph: last two lines should read, "(See Section II, Significant Sawtimber Sales and Reappraisals, Region 6.)"

5. Page 57, column 1, fourth line from botton: the letter "m" has been omitted from the word "from".

6. Page 72, column 2, first full paragraph, line 4: insert "in 1923" after "reported".

7. Page 79, column 2 (table): fourth line on right side should start with a "divided by" sign instead of a minus sign.

8. Page 80, column 2, third paragraph after table: last sentence should begin with "No" instead of "Now".

9. Page 82, footnote to table: should read "Vandenberg" instead of "Vanderberg".

10. Page 86, column 2, fifth line from end: delete extra comma at end of line.

11. Page 90, column 1, note 19, end of fourth line: the word "sic" should be surrounded by brackets.

12. Page 118, column 1, indented item No. 1, line 2: the figure 20 should be elevated to make it a footnote.

13. Page 121, column 2, line 2 under subheading: delete the word "in" after "log prices".

14. Page 143, column 2, "Sale by area or amount": last number should be "89", not "29".