

## The Postwar Development Era, 1946-1959

Due in part to the vastly increased demand for wood products and the construction of new homes, the postwar national forest managers were active in opening vast forest areas to timber management. Until then, the timber industry viewed the national forests as huge timber sources that needed to be kept off the market so that the timber industry could keep private timber prices high. The timber industry now sought cheap national forest timber to supplement or replace heavily cutover private forest lands. The opening of the national forests to timber harvesting and road development after World War II would have consequences that we are still feeling today.

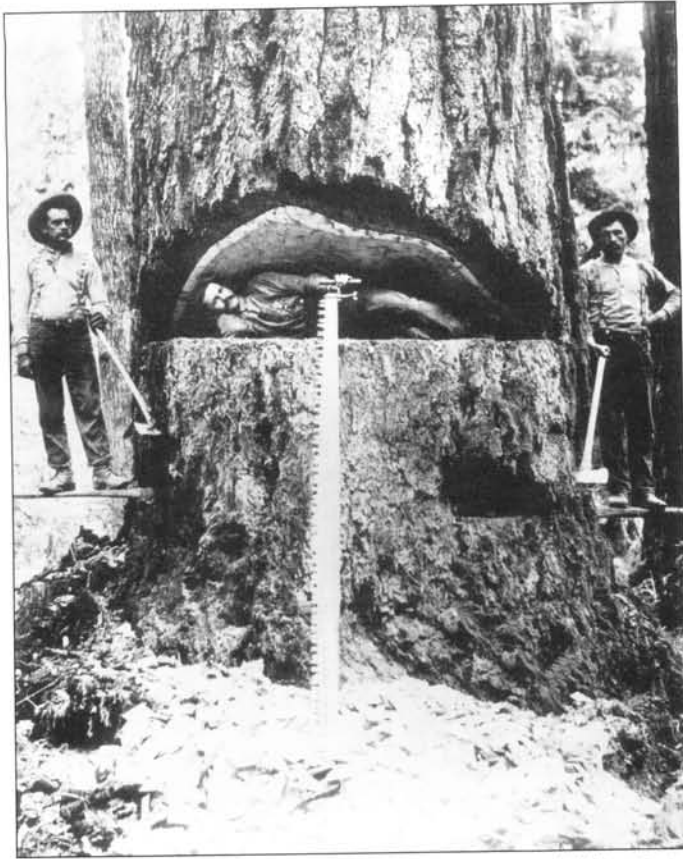
### Timber Management

The technology of extracting timber from the woods changed dramatically. Before the Depression and war, much lumbering was done with axes and crosscut saws, but after the war, everyone was using the new, highly efficient chainsaws. Log transportation evolved from horses, oxen, floating logs down rivers, and railroads to the new systems of roads and trucks, and even balloons and helicopters by the 1970's. With the increased emphasis on timber production, the number of timber sales jumped. Forestry schools around the Nation were training thousands of new foresters who were dedicated to finding more efficient and intensive methods of managing the national forests. The Forest Service was entering what has been called the "hard hat era." Intensive forest management was beginning in earnest. Congress passed the Tongass Timber Act on July 27, 1947, which authorized four 50-year timber sales on Alaska's Tongass National Forest.

*Logging truck on Pole Road, Clearwater National Forest (Idaho), 1935*



USDA Forest Service



*A Large Douglas-Fir Tree Being Felled by Ax and Crosscut Saw in Western Washington, circa 1899*

USDA Forest Service



*Early Chainsaw (Gas) Felling Sugar Pine, Stanislaus National Forest (California), 1948*

USDA Forest Service

## TREE CUTTING TECHNOLOGY

Adapted from *Encyclopedia of American Forest and Conservation History* (1983)

Tree cutting (logging) technology has undergone extensive changes in the last 200 years. When colonists arrived on the eastern seaboard, the ax was the only method to fell trees to clear farmland, build houses, and provide firewood for the hearth. Yet early settlers were faced with many problems in the New World, including the fact that the trees were very large and very tall, unlike the trees the settlers had left in Europe.

By 1789, the American felling ax evolved to meet the settlers' needs. This unique ax was single-bitted with great balance which gave more power to the stroke. Its short, heavy, wedge-shaped blade was both durable and easily extracted from the wood. Curved handles became standard during the 19th century. Some time around 1850, loggers began using a double-bitted ax. This new invention proved to be very popular. The ax had the advantage of having two cutting edges, yet still possessed the balance and durability of the single-bitted ax. By the 1880's, Americans were making these blades of cast steel—rather than iron with a steel cutting edge welded on.

American settlers also modified European cutting or chopping techniques. Instead of making V-shaped cuts at almost the same level on opposite sides of a tree trunk, Americans made one cut lower than the other (the undercut) and made both cuts flat on the bottom. This method gave the feller greater control over the direction the tree would fall and reduced the time-consuming use of wedges and levers.

Beginning in the 1870's, crosscut saws were adapted to felling trees—a major innovation. Crosscut saws had long been used to cut logs once they were on the ground, but now the saws were used in the horizontal position to cut the trees down. Two crosscut saw developments helped this major advance: The invention of raker teeth, which when coupled with cutting teeth and gullets carried away the sawdust, and resulted in a saw that could cut green standing trees without binding the blade. The other invention was the adoption of the tempered steel blade which was stronger than previous saws and would remain sharp through hours of use. Use of crosscut saws, especially the two-man saws, spread rapidly and became the industry standard for many years. By the turn of the 20th century, new saw designs with different teeth had been developed for use on different tree species. In the 1920's, the bucksaw replaced the crosscut saw in the Northeast and Canada. The bucksaw was lighter, but not suitable for large trees.

The springboard was introduced in the far West and in cypress logging in the South. Essentially, springboards were metal-tipped planks that were inserted into notches chopped into the tree trunk. These springboards served as platforms on which the fellers stood, allowing them to be above

the dense undergrowth and above the swollen base of the old-growth trees, which were often pitch-laden and full of rotten wood.

During this period, logging operations were often along the edges of streams and rivers, making the transportation of logs downstream to the mill a relatively easy task—river log drives. As harvesting proceeded, logging operations moved farther and farther away from the river's edge, creating a problem—how to move the heavy logs. Loggers responded by cutting smaller length logs or, in the case of redwoods and other large trees, by splitting (riving) the logs lengthwise.

Yarding or skidding of the logs also changed over the decades. The most difficult aspect was moving the logs from where they were felled to a place where they could be transported to the mill. Log moving technology progressed quickly in the United States from the human effort applied through brute force and primitive tools to oxen and horses. In the Northeast and Lake States, logs were very often hauled during the winter months when horses could easily pull heavily laden sleds over the ice and snow.

Mechanization came to the woods in the form of high-wheel logging where logs were suspended under an arch that connected a set of large wooden wheels. High wheels, as they were called, were pulled by horses or oxen, and later steam powered tractors. Beginning in the 1880's, railroads with special geared locomotives were used to transport the logs from the forest to the mill. Three well-known gear driven locomotives were manufactured by Shay, Climax, and Heisler. Many of the first Forest Service timber sales were railroad operations. A great improvement on hauling logs to transportation sites was the invention of the stationary steam-powered Dolbeer donkey engines to yard (pull) logs from where they fell to a central location. The process was referred to as ground lead logging.

The crawler-type tractor, first powered by gasoline, then diesel engines, was used beginning in the 1920's to pull logs along the ground or used with big wheels, arched steel axles, and A-frame logging arches. In the 1920's, with the invention of the cable-operated blade by Forest Service employees in Portland, Oregon, the "cat" was ready to replace the donkey engine to haul logs or build roads in almost any terrain. Gasoline- then diesel-powered logging trucks were used in the forests beginning around World War I, but their main impact came shortly after the end of World War II. Since that time almost all logging operations on national forests have used logging roads and trucks to carry logs from the forest to the mill.

Newer technological inventions, such as high-lead logging with a spar tree, skyline full-suspension systems with one or more spar trees or towers, balloon, and helicopter operations, allowed logs to be carried high over the forest with very little dragging of the logs through the often steep, rugged country with fragile soils. Many of these new systems would become

required on the steep mountainous country that was characteristic of many national forests.

The first power saw was built in the 1870's when the Ransome steam tree-feller was designed. What may have been the first gasoline-powered chain saw was tested in 1905 at Eureka, California. These early experiments were followed by air- and electric-powered models. Moderately successful drag (reciprocating) saws were used to cut fallen logs to length and to make short bolts for shingles. All of these experimental models proved to be too cumbersome, too heavy, and too undependable. Then in 1927, Andreas Stihl of Stuttgart, Germany, built a portable, gasoline-powered chainsaw that revolutionized the industry. But because of the Great Depression, power saws remained relatively rare until after World War II.

The chainsaw soon replaced the crosscut and bucksaws for felling trees, as well as the remaining ax work. The chainsaw also made new felling techniques possible. In the big timber country, the Humboldt undercut was used. After an initial horizontal cut on the tree trunk, a second angle was sawed up to the horizontal cut; then the "wedge" of wood between the two cuts was removed from the stump. The tree trunk was then cut from the backside along the horizontal cut on the frontside until it would fall down. This would leave the butt end of the log with a square end.

By the 1940's, hydraulic shears appeared that could cut through standing trees when pressure was applied to heavy-duty blades. By the 1960's, a variety of tractor-mounted shears were in use, with many machines designed not only to cut the trees, but also to remove the bark and limbs, cut the tree to desired lengths, and stack the logs. These new systems worked very well on relatively flat terrain and with small-diameter trees. Another advantage was that they could operate during either the day or night.

Other inventions have played roles in the evolution of logging technology, some of which have come into widespread use—others limited use. With increasing pressure from the Federal agencies to reduce ground erosion during and after logging operations, restricting the use of heavy equipment has become the norm. Full-suspension of logs, use of low-pressure tire-tractors, selective cutting, directional felling, and aerial removal of logs are all measures that may be required of logging companies in order to log on national forests or Bureau of Land Management lands today. In any case, the new techniques and equipment are easier on the land, usually more efficient, but also more costly.

## Research Builds

During the same period, national forest research came of age. Research stations and new experimental forests conducted studies to find better ways to harvest trees, construct new roads, and measure the effects of logging and roads on streams and watersheds. A system of multifunctional research centers was established in 1946, with each center concerned about its own assigned research territory, and a new program was designed to address local forest and range problems, with applications to regional and national issues.



*H.J.  
Andrews  
Experimental  
Forest  
Willamette  
National  
Forest  
(Oregon),  
1953*

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The BLM in the Department of the Interior was formed in 1946 from the Grazing Service and the GLO. The BLM currently manages some 264 million acres of Federal land—mostly grazing land with the exception of the old O&C Railroad Grant land in western Oregon, which is heavily timbered.

## Forest Protection

The Forest Pest Control Act of 1947 paved the way for increased protection from pest outbreaks. The act encouraged Federal, State, and private cooperation in the prevention, control, and even eradication of forest insects and diseases that reduced tree growth or killed trees. In 1948, the Forest Service became involved in the Yazoo-Little Tallahatchie Flood Prevention Project—the largest tree planting program the country has ever known—with some 621,000 acres planted. The project was designed to rehabilitate severely eroding lands—with some gullies as much as 50 feet deep—in Mississippi. The USDA Soil Conservation Service (now called the Natural Resources Conservation Service), as well as other Federal, State, 19 counties, and many local agencies, cooperated in this extensive project until it ended in 1985. New technology in every field became very important in managing the forests.



## Richard E. McArdle— Eighth Chief, 1952-1962

Richard Edwin McArdle was born on February 25, 1899, in Lexington, Kentucky. In 1952, McArdle became Chief of the Forest Service. As the first Chief to hold a Ph.D. and to have been a researcher, he felt the need for balanced management of the national forests. During his tenure as Chief, *The Timber Resource Review* was published; it evaluated the total timber resources in the United States. The landmark Multiple-Use Sustained-Yield Act of 1960 established policy for the broad development and administration of the national forests in the public interest.

McArdle was successful in increasing intensive management of the national forests, as well as providing for reforestation of logged and other lands, curbing mining and grazing abuses, and accelerating various recreation projects. During his tenure, the Forest Service was assigned the management of 4 million acres of western plains lands designated as national grasslands. McArdle also was instrumental in upgrading Forest Service personnel, hiring new specialists to bring about intensive management, and increasing the professionalism of employees. He improved relations with the timber industry by backing away from earlier proposals to regulate timber harvesting practices on private lands.

Richard E. McArdle wrote:

Farm woodland and other small private forests hold the key to this Nation's future timber supply. These lands, generally in poor condition, are the greatest potential source of wood fiber. Producing more wood on these lands requires concerted effort by State and Federal forests, forest industries, and the landowners.

## New Specialists and Land

During the 1950's, forest engineers, landscape architects, and silviculturists became common in the Forest Service. In 1954, the agency became responsible for managing approximately 4 million acres of "land utilization projects" (referred to as L-U lands), which were basically grazing lands on the Great Plains. These lands, acquired by the Federal Government during the Depression years of the 1930's, were in many cases relinquished or abandoned farms. In 1960, the earlier land utilization projects became the first national grasslands.

In 1953, the Department of Agriculture transferred forest insect and disease research and control work from other Department agencies to the Forest Service.



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Little  
Missouri  
National  
Grassland,  
Custer  
National  
Forest  
(North  
Dakota),  
1995

## NATIONAL GRASSLANDS

Adapted from Terry West's Essay on National Grasslands

The origin of the USDA Forest Service-administered national grasslands begins with the disposal of public lands in the early 20th century. The Enlarged Homestead Act of 1909, for example, offered free land to those who would cultivate the Great Plains. Market demand for wheat during and after World War I further motivated “sodbusters” to settle previously bypassed grassland areas and plow them for cultivation.

The removal of the grass that held down the soil down on these marginal farm lands contributed to the erosion of the “dustbowl” in the drought years of the 1930's. In that decade, an estimated 2½ million people abandoned their small farms, mainly on the plains. Many of them migrated to the west coast to work in the fields. The young author John Steinbeck was so affected by the sight of these families pouring into California to work the fruit harvests that he immortalized them in the novel *The Grapes of Wrath*. The economic and ecological plight of the Nation spurred Government action to address the effects of the Depression, especially in the “dustbowl” area of the Great Plains.

In 1931, a national conference entitled “Land Utilization” called for a survey of submarginal lands. Once these lands were identified, the Government began to purchase them under the authorization of the National Industrial



Recovery Act of 1933 and Emergency Relief Appropriations Act of 1935. The aim was to control erosion, produce more forage, and ensure economic stability for rural residents who had remained. Depleted cropland was planted with grass and the grazing of cattle and sheep on the public rangelands changed from year around grazing to grazing on a rotating basis. Various government programs undertook water and soil conservation projects.

The purchased lands were called Land Utilization (L-U) projects after the title of the 1931 conference. The Government obtained title to 11.3 million acres in 45 states for \$47.5 million (about \$4.40 an acre) by voluntary sales. After the L-U lands were purchased, they were used for practical demonstrations of the best soil conservation techniques to set an example for adjacent private landholders. Between 1933 and 1946, there were 250 L-U projects that focused on grazing, forests, recreation, wildlife, and watershed protection. During the Depression years, relief agencies hired unemployed locals to work on L-U soil conservation projects, enabling many who stayed on the land to survive. Specific projects of the Soil Conservation Service (SCS) (now Natural Resources Conservation Service) included building stock water ponds and reservoirs, planting trees, seeding grasslands (with crested-wheatgrass, a bunchgrass originally imported from Siberia), and controlling erosion and fire.

The lands were first administered by the U.S. Resettlement Administration, later called the Farm Security Administration. The Bankhead-Jones Farm Tenant Act of 1937 gave custody of the L-U lands to the Secretary of Agriculture and authorized more extensive conservation efforts. In 1938, the SCS was given the task of managing the L-U lands. The period after World War II was one of intense range rehabilitation by the SCS.

By Secretary of Agriculture Administrative Order dated December 24, 1953 (effective January 2, 1954), management of the L-U lands was transferred from the SCS to the Forest Service. The original intent was that the Forest Service act as interim manager pending final disposal of these acquired lands. At the time, there were over 10 million acres of L-U lands, most located on the Great Plains. Discussion over the future of these lands continued until 1958, when a revised policy transferred around 6 million acres to States and colleges.

The Forest Service retained most of the remaining 4 million acres. On June 20, 1960, some 3,804,000 acres were designated as the 19 national grasslands. The Forest Service was now responsible for the permanent retention and management of the grasslands. The 1960 order stated that the national grasslands were to be administered as part of the National Forest System under the Bankhead-Jones Farm Tenant Act and that the Forest Service was to manage these lands for outdoor recreation, range, timber, watershed, and wildlife and fish. This new task created some internal confusion about the place of the national grasslands in the agency and their national function.

When the Forest Service took over management of the grasslands, existing SCS policies were not readily accepted by the Forest Service. The Forest Service had managed rangeland for 50 years and many of its range staff felt that the new national grasslands should abide by established agency practices. One area of difference was working with grazing associations. In 1939, the SCS had entered into cooperative agreements with Great Plains States' grazing associations and districts. These associations originated on the Great Plains as early as 1931 when stockmen organized to request that Congress withdraw public domain land from homesteading and permit it to be leased on a long-term basis.

Forest Service officials were reluctant to surrender to grazing associations control of activities such as issuing permits, collecting fees, and controlling trespass and fires. However, the mass transfer of SCS employees in Montana and the Dakotas to the Forest Service in this transition period led to the eventual acceptance of many of the SCS practices. The current policy is to rely on grazing associations where practical. This arrangement is most common in the larger L-U range lands in the northern Great Plains. By the 1970's, national grasslands in northern New Mexico, Oklahoma, and Texas ceased to have grazing associations. Instead, the Forest Service issued individual grazing permits and fenced off grassland units to make separate pastures. The change was a logical adaptation to the region's ecology and land use patterns. (The L-U lands purchased in New Mexico-Oklahoma-Texas area were smaller than those on the northern Great Plains. For example, the Black Kettle [Texas] allotments ranged from 30 to 1500 acres.)

The national environmental focus of the 1970's and 1980's on the national forests spilled over to the national grasslands. District rangers on both national grasslands and national forest districts found that local concerns over specific project impacts were transformed into national issues. On the grasslands this has meant the employment of more wildlife biologists and an increased stress on noncommodity resources.

In the late-1990's, management of the national grasslands in the Dakotas was given greater emphasis when they were given the same management treatment as the national forests—one supervisor's office to manage several grasslands. Future management of the national grasslands will involve many more specialists, ecosystem management, collaborative stewardship, and cooperative efforts between all the special interest groups. It will not be an easy task.

## **Mining**

In 1955, the Multiple-Use Mining Act helped prevent abuses of mining laws and curtail mining abuses that interfered with managing national forest lands. An important feature of this law was that, after proper notice, mining claimants could be requested to prove the validity of their mining claims. This procedure

quickly eliminated thousands of abandoned mining claims on the national forests.

The year 1956 saw the first practical airplane tanker airdrop of water and chemicals on a forest fire. Many of the airplanes were converted World War II bombers, now with their bomb bays were full of Borate and other mixtures rather than bombs.

*Air Tanker  
Dropping  
Chemical on  
a Fire*



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## MINING ON THE NATIONAL FORESTS

Adapted from Terry West's  
*Centennial Mini-Histories of the Forest Service* (1992)

"Prosperous mining is impossible without prosperous forests," Forest Service Chief Gifford Pinchot told the mining industry in 1901 in his quest for support for forest conservation and Federal forest reserves. The linkage between the fortunes of mining and forests in the United States grew following discovery of the rich Comstock silver lode at Virginia City, Nevada—large underground mines needed mine timbers to support the tunnels. Between 1860 and 1880, an estimated 600 million board feet of timber from Sierra Nevada forests were used in the Comstock. Many new sawmills were built around the country to supply mine timbers from local forests.

Pinchot was after more than just asking miners to conserve lumber when he told them about the relationship between forestry and mining. Miners and prospectors had been early opponents of the proposed Federal forest reserves. They worried that mining would be restricted on such reserves and voiced their concerns in the congressional debate over the Organic Act of 1897.

The General Land Office's (GLO) first timber sale (Case No. 1) was made in 1898 to the Homestake Mining Company for timber from the Black Hills Forest Reserve. Homestake purchased 15 million board feet at a dollar per thousand. The contract required that no trees smaller than 8 inches in diameter be removed, and that the brush resulting from the harvest be "piled."

The Federal Government's regulation of mining was not a critical issue in Congress until the California Gold Rush of 1849 and later rushes in Colorado, Nevada, Idaho, and Montana. These "finds" resulted in claims being worked on public domain lands. After the Civil War, Congress passed a number of laws intending to establish some semblance of order to the mining industry. Two of these laws—the Lode Law of 1866 and the Placer Act of 1870—merely legalized what had been the unofficial "law of the land."

The General Mining Law of 1872 consolidated the earlier laws and confirmed the principle that minerals found on public domain land belonged to the person who found (located) them. The 1872 law also:

- Set standards for making mineral claims on public land
- Set no royalty fees for production
- Set fees for transfer of the land from public to private ownership (\$2.50 per acre)
- Set the size of the claims
- Allowed a claimant to hold the land indefinitely as long as minimal work was completed (\$100 value per year) on the claim

A claim was set at 20 acres, with no limit on the number of claims that could be filed. A person could hold his claim by performing \$100 worth of work each year or by obtaining permanent legal ownership of the minerals and land surface by paying a fee to "patent" the claim. Most importantly, the claimant was granted legal claim to the discovery of a valuable mineral deposit.

The transfer of the forest reserves from the Department of the Interior to the Department of Agriculture in 1905 removed much of the USDA foresters' impediment in regulating the forest reserves; however, mining remained under control of the Department of the Interior. Richard Ballinger, appointed in 1907 to head GLO and elevated to Secretary of the Interior in 1909, differed with Chief Gifford Pinchot over coal claims in Alaska. Ballinger wanted them patented, while Pinchot argued for Federal leasing. Pinchot feared a national coal famine would result if the private sector was allowed complete freedom to exploit coal fields without concern for future needs. The mining industry depicted Pinchot as out to curtail the citizen's right to engage in free enterprise—the "little guy" was being crushed by Government. By 1910, the dispute between Pinchot and Ballinger reached the point that President Taft fired Pinchot. Historians now note that the coal

debate was only a small part of the conflict between Pinchot, President Taft, and his cabinet over natural resource management policies.

In 1920, Congress passed the Mineral Leasing Act, which incorporated oil and natural gas, oil shale, phosphates, sulfates, carbonites, and other surface and subsurface resources under a system of rental and royalty fees. The Government still retained ownership of the land. The 1947 Materials Disposal Act set standards for the Federal Government to sell materials such as sand, gravel, building stone, clay, pumice, and cinders from Federal lands. Competitive bidding was an integral part of the act.

In the early 1950's, the Forest Service and several conservation groups launched a campaign to expose abuses found under the various mining laws. The resulting investigations found widespread problems—mining claims were being used as home and recreation cabin sites, excuses to cut the timber, fishing and hunting camps in remote areas, commercial businesses, and even trash dumps. Congress responded by passing the Multiple-Use Mining Act of 1955. As a result, the Forest Service was able to reclaim thousands of “mineral” claims that were never used for their authorized and intended purpose, others that had no minerals, and even more that had not lived up to annual work requirements on the claim.

The Federal Land Policy and Management Act (FLPMA) of 1976 changed the procedures for filing mineral claims—the paperwork had to be filed with the Bureau of Land Management (rather than the local county courthouse) and all claims needed to be refiled by 1979. As a result of FLPMA, the Federal Government found that some 1.1 million mining claims were located on Federal lands and also eliminated many fraudulent claims.

Legislation to “fix” the General Mining Law of 1872 has been proposed many times over the years, but every effort has been successfully blocked by the mining industry and western congressional delegations.

## **Recreation and Timber Demands**

Recreational demands on the national forests were increasing; millions of new visitors used the national forests and parks. “Operation Outdoors,” a 5-year program designed to improve and replace many of the older CCC-built structures, was launched in 1957 to expand the recreation facilities and opportunities on the national forests to meet demand.

In 1958, the Forest Service issued the results of the nationwide Timber Resource Review, “Timber Resources for America’s Future.” This extensive national study, begun 6 years earlier and prepared with the assistance of other Federal, State, and private organizations, found that the Nation needed to grow more timber to meet expected demands. The study was a preview of more extensive timber resource assessments that would be made in the future.

At the same time, there was a growing concern that the Forest Service was clearcutting too many areas that were also used for recreation. This issue and others about resource priorities would involve many outdoor groups, timber industry organizations, the Forest Service, and Congress, and would result in the Multiple-Use Sustained-Yield Act of 1960.



*Winter  
Olympics at  
Squaw Valley,  
Tahoe  
National  
Forest  
(California),  
1960*

USDA Forest Service

Most of the national forests were “opened up” through an extensive network of roads for timber, recreation, and protection activities. Many of the older trails were replaced by the growing road system used to access remote forest areas.