

## Chapter 11 - Grazing: Controlling Use to Maintain Productivity

Grazing sheep and cattle in the Southwest was introduced by the Spanish in the late 16<sup>th</sup> century. Pueblos and Spanish-American villages early adopted pastoral practices, including year-long grazing. The tradition of an open range endured for several hundred years before Anglo-Americans arrived in the Southwest, and when they came, the new arrivals expanded the traditional pastoral practices into modern range-cattle and sheep industries. In the Southwest, the national forests were of equal or greater importance to the people for their range resources as they were significant for timber, watershed, or mineral resources. Those newly arrived foresters in the Southwest soon found themselves preoccupied with grazing rights, grasslands, and range management.

Juan de Onate, a Spanish colonizer, brought sheep to the pueblos along the Rio Grande in 1598. Cattle, horses, and goats were also brought in early. Spanish-Americans had developed large cattle herds in New Mexico by the early 1800's.<sup>1</sup> The Navajo Indians owned extensive herds of cattle and sheep when the United States acquired the territory from Mexico. Americans were latecomers to the southwestern cattle industry. According to Charles F. Cooper, there were only three small herds of cattle owned by Anglo-Americans in Arizona in 1870.<sup>2</sup> However, the range cattle industry expanded greatly in New Mexico and Arizona after 1870. Estimates of livestock on the ranges of the Southwest vary widely. *The Western Range* estimated that in 1870 there were about 30,000 cattle on Arizona ranges, in 1880 about 142,000, and by 1886 over 502,000. On New Mexican ranges, there were an estimated 158,000 cattle in 1870, 545,000 in 1880, and 1,065,000 in 1886.<sup>3</sup> The number of cattle herds rose dramatically between 1870 and 1890 as Texas longhorn cattle flooded the Arizona and New Mexico ranges. By 1890 the ranges were overpopulated.



**Figure 27. Sheep grazing on the Santa Fe National Forest, 1903.**

As the number of livestock increased, the range deteriorated, and the deterioration was aggravated by drought and harsh winters. Thousands of cattle starved following a severe drought in 1886. Drought, deterioration of the range, and competition for grazing lands led to the fencing of private ranges and the end of open-range grazing on all but Federal lands. The last appreciable number of fat open-range cattle were sold in 1896. Thereafter, livestock production was concentrated on sheep and on steers sold as feeders. By the turn of the century, there were so many livestock grazing the public lands in both times of adequate and inadequate forage that signs of range deterioration began to appear even in “good” years.<sup>4</sup> Establishment of the forest reserves provided the opportunity for implementation of a range management program for the western livestock industry.

The factors that tend to control unmanaged populations of wildlife over long periods did not operate then for livestock. The numbers of livestock on a range after a particularly wet season often exceeded the carrying capacity of the range the following season. In addition, overgrazed ranges were susceptible to soil erosion, which further reduced their carrying capacity when periods of heavy rainfall or windstorms occurred. Management of the range and the allocation of livestock grazing rights had to be based on the occasional dry season and not for the typical season.

## Range Depletion

Numerous articles and books describe the changing rangelands in the Southwest. *The Western Range* indicated that by 1880 overgrazing was causing range depletion.<sup>5</sup> Thomas Farish, writing on the San Francisco Mountains, said, "In this mountain range are found fine valleys, formerly covered with a growth of wild rye which has been replaced by other grasses."<sup>6</sup> In 1893, the Governor of Arizona mentioned, "In nearly all districts, owing to overstocking, many weeds have taken the place of the best grasses."<sup>7</sup> Similarly, in 1901, overstocking of sheep on the southwestern forest ranges caused natural reproduction to come to a standstill. The forest floor in some places was "as bare and compact as a road bed."<sup>8</sup>

Theodore Rixon, one of the first foresters in the Southwest, observed that "grazing, the most important of the industries in this region, requires careful attention and supervision to prevent the almost inevitable result—the total destruction of the grass roots by overstocking."<sup>9</sup> By 1912, livestock pressures had penetrated the most remote timbered and mountainous areas:

At the beginning the mountains and heavily timbered areas were used but little, but as the situation grew more acute in the more accessible regions the use of these areas became more general and in course of time conditions within them were even more grave than elsewhere, for experience had demonstrated that they were the choice ranges and they were in strong demand. The mountains were denuded of their vegetative cover, forest reproduction was damaged or destroyed, the slopes were seamed with deep erosion gullies, and the water-conserving power of the drainage basins became seriously impaired. Flocks passed each other on the trails, one rushing in to secure what the other had just abandoned as worthless, feed was deliberately wasted to prevent its utilization by others, the ranges were occupied before the snow had left them. Transient sheepmen roamed the country robbing the resident stockmen of forage that was justly theirs.<sup>10</sup>

For the two or three decades prior to the creation of the forest reserves, ranchers had free, unregulated use of these lands for summer range, just as they did on all of the public domain. There was extreme competition for grass between the big sheep and cattle outfits and the homesteaders. Quick profits were legend, but losses often were heavy, too. There was little incentive for careful management of a business when the major resources of the business, the public lands, were external to the control of the livestock industry. Indeed, some "public land policies forced overgrazing upon the stockman and homesteader."<sup>11</sup> The livestock associations by the late 1890's began agitating for some effective control of the public domain. Political lobbying by the livestock industry may have contributed to the establishment of the forest reserves in the Southwest. However, after the Forest Service replaced the Department of the Interior as the managers of the reserves, free access and use by cattlemen was proscribed.

By the time the first forest reserves were proclaimed in 1891, the free use of public lands by cattlemen and sheepmen had become a way of life. They knew nothing of grazing capacity and

there was no fund of technical knowledge about forage management to rely on. Overgrazing could not readily be recognized until in an advanced stage. Thus, when the Forest Service came into being February 1, 1905, the most complex problems facing southwestern foresters related to grazing rights and range management. Instructions to foresters in the *Use Book* regarding grazing responsibilities were very simple: “Inform yourself as to what sheep and cattle men graze their stock upon your district, the number he actually owns, and whether or not he confines himself to the range described in his permit.”<sup>12</sup>

Early forest rangers were forced to change a way of life by allocating the use of range resources on the public lands. It was wise that the rangers selected were people from the very area where they were called upon to administer new laws and regulations to govern livestock use on the forest reserves. This did not eliminate the friction between the livestock people and the Federal employees, but it did prevent a “range war.”

## Two Types of Foresters

There were two types of foresters in the early days of the Forest Service: the trained foresters, schooled in the East, who knew little of the West of that day, and the untrained westerners, who knew the land and the people. Albert F. Potter, an Arizona stockman, became the chief architect of Forest Service grazing policies and regulations of the Southwest, and elsewhere. Potter came to Arizona for his health and entered the sheep business, but he sold his sheep in 1900. He accepted work with the Bureau of Forestry when Gifford Pinchot asked for his services. Pinchot had met him while investigating sheep grazing in Arizona. Potter was appointed “grazing expert” on October 17, 1901. Potter obtained assistance from such people as W.C. Clos, who only had a short tenure with the Forest Service but made significant contributions. Secretary of Agriculture James Wilson had personal knowledge of the history of range use and helped frame early grazing policies. Leon F. Kneipp assisted, as did Will C. Barnes, also an Arizona stockman. Barnes joined the staff in 1907, moved to Washington, DC, and soon became chief of the Office of Grazing Control. Arthur Ringland recognized, in addition, the contributions of John Kerr, who later became supervisor of the Lincoln National Forest, and Jose Campbell, a range staff officer, to the development of range management programs.<sup>13</sup>

Potter set to work with the Secretary of Agriculture and the western livestock growers to help develop basic principles of range management, which were incorporated into the bill transferring the forest reserves from the Department of the Interior to the Department of Agriculture. These included:

- 1) that priority in the use of the range would be recognized and the grazing privileges in the beginning allowed those who were already using the range;
- 2) that any changes found necessary either in the number of stock grazed or the methods of handling them would be made gradually after due notice had been given;
- 3) that small owners would be given preference in the allotment of permits and be exempted from reduction in numbers of stock;
- 4) that checking of damage to and improvement of the forest would be brought about so far as possible without total exclusion of the stock;
- 5) that the forage resources of the national forests would be used to the fullest extent consistent with good forest management; and

- 6) that the stockmen would be given a voice in the making of rules for the management of their stock upon the range.<sup>14</sup>

## Grazing Control

The grazing control system placed in operation by the Forest Service in 1905 was a remarkably advanced administrative and land management system, given the time and state of technical knowledge. In 1906, the era of free use of the forage resources of the forest reserves (which were renamed national forests the following year) came to an end. The new system required users to pay a fee for each animal grazed for a specific unit of time. The fundamental features of the system have remained unchanged up to the present, although there have been changes in detail and the method of calculating grazing fees.

The ranger districts of a national forest (based on its several uses) are divided for grazing purposes into allotments, which are the basic unit areas of forest grazing administration. Allotment boundaries are commonly drawn in conformance with physical features of the area. Each allotment is surveyed to determine approximately the quantity of forage produced annually and the period during which the allotment should be grazed. Initially, the allotments were very rapidly and sketchily surveyed, but today they are resurveyed frequently to observe changes or trends in such factors as vegetation growth and condition, intrusions of noxious weeds and poisonous plants, and evidence of accelerated erosion. The estimated annual production of forage on an allotment is reduced by an amount that is estimated for wildlife use and the baseline amount needed to maintain soil stability and watershed health, and sometimes an additional amount “required to maintain a pleasing environment.”<sup>15</sup> Since grazing by permit and fee discourages denuding an allotment, forage is more often available for grazing lease by range livestock ranchers.

From the beginning, the intent was to establish first priority for grazing permits for local residents. The grazing permit system favored the small operator. Required reductions in the stock grazed in any national forest would first be borne by the large cattle companies rather than the small operators. The Forest Service required that for those national forests with no year-long grazing available, livestock owners needed to have land for their livestock to graze on during the times they were not on the National Forest System lands. Thus, local permanent settlers could use grazing in the national forests to their benefit, and large cattle companies that did not own land near the national forest could not. As a result, the small settlers and their families became some of the best friends of the Forest Service.<sup>16</sup>

Forest Service policy emphasized that grazing was a privilege of use and not a permanent right to the property.<sup>17</sup> Only a few court cases tested the system and the decisions have sided with the Forest Service.<sup>18</sup> This has indicated that the policy was likely to be upheld should a large-scale test of the current system be attempted. In addition, grazing permits have not been assignable except at the discretion of the Forest Service. As Pinchot explained in *Breaking New Ground*:

In those [early] days grazing was a far more important question on the reserves than lumbering, and nowhere was the central idea of use better applied. The *Use Book* said “The Forest Service will allow the use of the forage crop of the reserves as full as the proper care and protection of the forests and the water supply permit. Every effort will be made to assist the stock owners to a satisfactory distribution of stock on the range in order to secure greater harmony among citizens, to reduce the waste of forage by tramping in unnecessary movement of stock, and to obtain a more permanent, judicious, and profitable use of the

range. On the other hand, the Forest Service expects the full and earnest cooperation of the stock owners to carry out the regulations.”<sup>19</sup>

According to Pinchot, grazing regulations were first put forth in 1907 in the *Use Book* and were very detailed, which was essential in organizing the control of a great industry which had hitherto run wild.<sup>20</sup>

Early grazing control on the forest reserves, according to Pinchot, was to achieve three results: ‘The protection and conservative use of all forest reserve land adapted for grazing; the best permanent good of the livestock industry through proper care and improvement of the grazing lands; and the protection of the settler and home builder against unfair competition in the use of the range.’<sup>21</sup> The Forest Service had made it immediately clear that most national crests had been overgrazed and that grazing pressure could be reduced. Reductions, however, were made gradually.<sup>22</sup> Sometimes overgrazing continued on many national forests in the early years because of the extensive image from past overgrazing and overestimates of grazing capacity by the Forest Service.

## Debate About Sheep Grazing

A great debate about grazing sheep occurred during the early days of the forest reserves and continued into the era when the Forest Service assumed management of the national forests. The Act of March 3, 1891, did not provide for [ministration of the forest reserves. This was corrected by the Act of June 4, 1897, which prescribed detailed principles r administration of the reserves. Secretary of the Interior Hitchcock, on June 30, 1897, issued a regulation that provided in part: ‘The pasturing of livestock on public lands in forest reserves will not be interfered with, as long it appears that injury is not being done to the forest growth, and the rights of others are not thereby jeopardized. The pasturing of sheep is, however, prohibited in all forest reserves except those in the states of Oregon and Washington.’<sup>23</sup> E.S. Gosney, Secretary of the Arizona Sheep Breeders and Wool Growers Association, obtained a suspension of the order for 1899 and lobbied for an on-site study of the situation.

A commission formed in 1900 to investigate the sheep grazing situation in Arizona included Gifford Pinchot, Chief of the Bureau of Forestry in the Department of Agriculture, Albert Potter, and Frederick Coville, a USDA botanist. After six weeks of travel and many conferences, Pinchot and Coville (who had made the examination of the cascade Mountain Reserve in Oregon) recommended that sheep grazing should be allowed, but that it needed to be controlled. As things in Federal bureaus often go, the situation had not been clarified by 1902. At the last moment, Pinchot intervened with President Roosevelt, who ordered that sheep grazing be allowed on the forest reserves in the Southwest, as stated in a letter to the Secretary of the Interior: ‘From information which has just reached me, it is my opinion that sheep should not be excluded from grazing on the San Francisco Mountains Forest Reserve.’<sup>24</sup> In 1902, the Secretary of the Interior announced that over a million sheep were to be allowed in the reserves. A cooperative plan published in 1902 under the name of Supervisor F.S. Breen of the San Francisco Reserve stipulated that sheepherders would have exclusive rights to 5-year permits, that residents were to have preference over owners from other States, that local cases were to be decided on local grounds, and that the government policy was based on regulation rather than prohibition.<sup>25</sup>

## Cattlemen Endorse Grazing Controls

Cattle owners also realized that grazing controls were needed. Federal control of grazing on the public domain was supported by a resolution of the Executive Committee of the National Live Stock Association, at its annual convention in Chicago in 1902. The resolution read in part, “Resolved, that this association approves and endorses the general policy for the regulation of grazing within the national forest reserves . . .”<sup>26</sup> Considerable discourse about the restriction of grazing on the forest reserves occurred in their early years. Much of this discussion took place in the pages of the *Williams News*, which reported that “by 1907 both parties generally recognized the value of the government’s grazing policy, . . . and the hostile criticism on the part of the stockmen—against both the government and each other—had subsided.”<sup>27</sup>

The Southwestern Stockman, Farmer and Feeder championed the cause of both the cattlemen and the sheepmen over the right to use the ranges on the forest reserves in opposition to the Forest Service plans to regulate stock numbers. But in the long run, the policy was supported. When one of the attempts to turn the National Forests over to the States occurred, an editorial in the edition of March 15, 1913, stated:

... We can conceive of no plan that would embody destructive statesmanship more than this. As a business proposition ... decentralization of control of the immense timber and grazing wealth of the country would almost certainly result in decreased returns and increased costs, from these resources.... Turn the forests over to the individual states and the present feeling of security and permanency will disappear ... the movement is fathered by the big timber and land grabbers.<sup>28</sup>

When it was first announced that grazing fees would be initiated, stockmen were visibly upset. Several of them were quoted in the Prescott, AZ, *Weekly Herald* in August 1905, saying that it would result in their losing money. Comments such as “There is little but oak brush on the reserves and to make us pay 35 cents a head for running our cattle there will be a pretty big burden,” or “The cattle men can’t pay 35 to 50 cents a head for grazing their stock on the reserve and make any money out of it.”<sup>29</sup>



**Figure 28. Cattle grazing on the Apache National Forest, 1960.**

There were no accurate records of the numbers of livestock using the new forest reserves. The rangers, who were local people, knew reasonably well what stock each rancher had, but since livestock numbers were used as the basis of *ad valorem* tax appraisals, the ranchers were not

inclined to acknowledge more cattle than they were being assessed. Attempts to discover the number of cattle or sheep being grazed on the forests only generated hostility. However, between 1911 and 1913, comments in the *Carson Pine Cone*, a newsletter of the Carson National Forest, indicated that counting corrals had been constructed and that herd roundups had been made. In this manner, accurate counts could be made, using tally counters for the stockman and the forester both to witness.

## Grazing Trespass Difficult to Control

Grazing trespass, that is, grazing without paying for the livestock use, was difficult to control during the early days of the southwestern national forests. Since most reserves did not have surveyed and marked boundaries, it was often futile to try to make a grazing trespass case hold up in court. One method of handling livestock trespass on the forest reserves was for the ranger to round up the offending livestock and drive them off the forest. Rangers had no power to make arrests, so this procedure just resulted in livestock being driven back on by the herders. Prompt and vigorous action in trespass cases reduced their number but did not eliminate them. When police powers were granted, the number of trespass cases was again reduced. Until the 1930's, there were no fences on the national forests, and this made it difficult to make a trespass case stick. Fencing only began in Arizona in the 1930's with the advent of the Civilian Conservation Corps.<sup>30</sup>

Grazing fees began to increase during the decade of 1910. By 1916, the annual rate was 48 cents per head of cattle (3.9 cents per month) and 12 cents per head of sheep (1.4 cents per month). Cattlemen demanded that the national forests be taken out of Federal control and put under State control. World War I intervened. Late in 1917, the Chief of the Forest Service announced that there would be no further increases in grazing fees. However, in 1919, the minimum fees for cattle went to 60 cents per year and the maximum to \$1.50.<sup>31</sup>

From time to time, the Forest Service was called upon to compare prices of goods and services sold from the national forests with those charged in the private market. In 1920, there was agitation in Congress to triple grazing fees, but the efforts were defeated. However, in the wake of this, a study was approved to evaluate grazing fees for the national forests on the basis of rentals for similar lands. It was published in 1924 and reported that on national forests grazing fees were about half what owners of comparable ranges were charging. It was recommended that fees for allotments be gauged according to accessibility, forage quality, water availability, and other factors. The report was criticized by livestock interests, and because of a slump in livestock prices, no increases in grazing fees were effected. Cattlemen wanted fees set at “the cost of administration.”<sup>32</sup>

After years of friction between livestock interests and the administrators of grazing on the national forests, the situation was addressed by Congress in 1925. A subcommittee composed entirely of Republicans seemed to side with the cattlemen. A bill—the Stanfield Bill (Senate Bill No. 2584)—would have given the livestock industry vested rights on the forests. The bill was designed to give more development, protection, and utilization of grazing resources on the national forests than any other use. The debate and the infighting were furious. Supporters of the Stanfield Bill even attacked the validity of range research that had been carried out, including the findings of the 1926 report by the Southwestern Forest and Range Experiment Station concerning damage done to young trees by livestock. Attempts were made to suppress the published results.

The Stanfield Bill was eventually defeated, but during the fight, the Forest Service's credibility had been threatened<sup>33</sup>

## Crisis in 1925

In 1925, there was a local crisis in Arizona national forests. Cuts of 6.5 to 30 percent in numbers of animals grazing on the Tusayan, Coconino, and Sitgreaves National Forests were planned. Seventy percent of the cuts were to be for the protection of forage and the stability of the industry and the remainder to protect young trees. District Forester Frank Pooler spoke to the Arizona Wool Growers Association in January and to the Arizona Cattle Growers Association in February to explain why the cuts were necessary. These associations, as well as the National Forest Permittees Association, were not pleased with the proposals and threatened political action. Forest Chief William Greeley wrote to Pooler on May 30, 1925, stating that applications by new permittees would not be allowed for the next 10 years and that, if new range became available, it would be accrued to the existing permittees.<sup>34</sup> In this case, as in so many instances, the original Forest Service stance on an issue was tempered by local action..

During the Depression, there was pressure to reduce grazing fees on the national forests, and they were reduced by 50 percent. Late in 1933 the Forest Service announced a new basis for computing grazing fees-indexing fees to livestock prices. This base for the computation of grazing fees was used into the 1960's, when pressure began to develop calling for the establishment of fair market values for grazing fees. In 1961, in response to President John F. Kennedy's message to Congress on natural resources, the Forest Service developed a statement of principles of its fee structures, including grazing fees, and in 1966, began a study of grazing fees in cooperation with the USDI Bureau of Land Management, as well as the USDA Statistical Reporting Service and Economic Research Service, and other agencies. The study resulted in the Secretary of Agriculture issuing regulations in 1969 calling for grazing fees on the national forests to be gradually increased to fair market value during a 10-year adjustment period.<sup>35</sup> Another effort to substantially increase grazing fees was begun in 1985.<sup>36</sup>

## Reducing Livestock Numbers

The Forest Service rangers readily observed the deterioration of the open range, but could not alter overnight what had been an unfortunate byproduct of a way of life for so long. The first forest experiment station in the United States was at Fort Valley near Flagstaff, and the timber management researchers there (notably G.A. Pearson) observed a deterioration of pine reproduction that was apparently caused by too heavy grazing. Since lumbering was also a vital industry in the Southwest, what happened to the timber resource concerned Forest Service personnel as much as what happened to the grazing resource. Research at Fort Valley demonstrated that overgrazing destroyed ponderosa pine seedlings. Therefore, around 1923, grazing was severely reduced on parts of national forests where ponderosa pine was the cash crop. A gradual reduction in the numbers of livestock along with fencing to separate sheep from cattle was planned, as was demonstration of the effects of overgrazing to farmers. In a few years, it was found that the sheep ranges were recovering faster than the cattle ranges, because the intensity of sheep grazing could be controlled easily by changing the length of stay of a sheep camp at one location.<sup>37</sup>



Each national forest had its own problems and met them in unique ways. The Carson National Forest was once one of the great sheep-raising areas of the West. When Aldo Leopold was supervisor of the forest before World War I, the first steps were taken to reduce the number of sheep because of heavy overgrazing. Large numbers of sheep were allowed during the war, but the flocks were reduced significantly thereafter. Abolishing grazing in high-impact areas such as Taos Canyon had a compound effect on recovery of the range, because erosion was also controlled.

The first phase of grazing administration on the national forests (1905-11) were devoted to establishing order and, in the beginning, to improving use of the range and increasing its value. The second phase of administration (1912-20), except for expanded use of the national forests for livestock in 1917 as a response to the war emergency, was a time of better allocation of livestock to match the quantity and quality of the range resource. Original estimates of grazing capacities, however, proved overly optimistic. Downward adjustment of animal numbers was necessary, requiring many meetings with livestock associations, groups, and individuals. Range forage management studies continued during the latter half of the 1920's.<sup>38</sup>

Range investigations and studies were by then producing results that aided in administering the range resource. These results became part of detailed "unit management plans" for grazing allotments. Data for starting grazing in each season were based on studies of "vegetative readiness," prepared by altitudinal or life zones. Many of the ranges in Arizona and New Mexico were grazed yearlong, so other rules to regulate numbers had to be formulated in these range types.<sup>39</sup>

Range research and reconnaissance led to downward revisions in grazing capacity, both reducing the animal numbers allowed and the number of months in which the ranges of the region should be grazed. The needed reductions were not accomplished on most national forest ranges by eliminating grazing entirely, but by gradually reducing grazing intensity while at the same time using common sense and tact and building up a region-wide system of sound range management. According to one functional inspection report:

Excellent progress is being made in adjusting stocking rates to capacity without creating a "cause celebre." This has been brought about by approaching the adjustment actions on a case by case basis.... Much of this success must be directly attributed to the efforts of Supervisors ... and Staffmen ... with the Rangers following the leadership of these individuals.<sup>40</sup>

Ever so slowly, the number of livestock grazing the forests in the Southwestern Region decreased. In 1909, 1,449,538 head of cattle, horses, sheep, and goats grazed the national forests of the region. The total was reduced to 1,397,618 by 1919 and to 830,485 by 1931.<sup>41</sup> The March 28, 1923, *Carson Pine Cone* stated that in 1912 one ranger district grazed as many sheep as would be on the entire forest in 1923. Also in this issue were two related statements: "The reduction of 110,000 sheep in ten years, according to local sheepmen, is due to the lack of winter range. Where sagebrush grew in thickets now we have the barren Rio Grande flats—overgrazed or deserted homestead." Since 1923, grazing on the national forests has continued to decline. Grazing use has been the most difficult activity the Forest Service has had to administer, and one can rightly conclude that there is no permanent or wholly correct solution.

## Grazing Capacity: Its impact

Without knowledge of grazing capacity, it was difficult for the early rangers to do much about limiting livestock numbers on the grazing allotments. Management of the forested ranges in the region began to take shape during the second decade of the century. In the early years, at the end of each grazing season, the supervisor was required to go over the grazing grounds, to examine the effect of grazing, and to make a full report to the forester (i.e., the Chief). According to Pinchot, “guesswork was out.”<sup>42</sup> The range surveys were rather informal arrangements at first—rangers would go on horseback to make notes on forage conditions, kinds of vegetation, herbage, water conditions, topography, and other items. They would put their information onto maps during the winter and then plan the grazing allotments for the next grazing season.

Grazing reconnaissance began in the Southwestern District (later Region) in 1910 on the Coconino National Forest.<sup>43</sup> For example, in 1912, Ranger Loveless on the Jicarilla District of the Carson National Forest prepared a grazing map of the district, which indicated the proper system of allotment. In a January 2, 1913, letter from District (Region) Forester Ringland to the Supervisor of the Datil National Forest, 6 of the 21 pages were devoted to range reconnaissance. Ringland urged the forest supervisor to undertake a study of the ranges to determine their “carrying capacity, proper season of use, class of stock to which each portion is best adapted, and the need of development.”<sup>44</sup> Another letter from Ringland, dated December 12, 1913, stated that he was “glad to learn that a beginning has been made on the Datil in this work.”<sup>45</sup> In the September 20, 1913, issue of the *Carson Pine Cone*, it is stated that further progress in range reconnaissance depended upon a systematic study of the grazing resources. This was needed to determine the class of stock to which each unit of range was best adapted, the period during which each unit could be grazed without injury to the range, forest, or watershed, and the number of stock each unit would carry. Four meetings were held during the summer of 1913 to familiarize the forest supervisors with the need for and the techniques of grazing reconnaissance.<sup>46</sup>

By 1913, the need for improved grazing maps for the Carson National Forest was recognized, and by March 1914, a forest-wide grazing map was being compiled. In 1916, when Paul Roberts was in charge of grazing in the region, he performed a range reconnaissance on the Sitgreaves National Forest that led to a grazing plan for each allotment.<sup>47</sup> Grazing reconnaissance was taking place on the Carson National Forest by 1920, and surveys were made during 1922 and 1923 on the Santa Fe National Forest. From surveys like these merged systematic analyses of grazing capacity and the development of plans to match livestock numbers with range capacity. By the 1920's, range surveys were a regular part of the work on the national forests; they led to developing long-term range management plans. One forester believed that when biologists replaced mathematicians, the southwestern forest ranges showed improvement.<sup>48</sup>

With the assistance of the Forest Service, and its concentration on scientific principles in the management of livestock and forest ranges, the livestock owners improved their herds and their condition. On February 6, 1925, the *Carson Pine Cone* observed that sheepmen in Taos and Rio Arriba Counties were investing in improved stock. “They seemed to be perfectly satisfied with their common scrubs, but that is now past history and Taos County in particular had made a fair start in the direction of improved animals. No doubt the influence of the Forest Service has done a great deal in bringing about this change, and our activity with Forest Stock Associations will be capable of still greater results.” By 1928, stock associations were very active on the Carson National Forest. They typically assessed their members to purchase salt for livestock, just as they had done for several years. They have continued to work with the Forest Service on problems of common interest.<sup>49</sup>

Range analysis began to produce better range conditions. One ranger cited the case of an area along the road from Grand Canyon to Cameron, along the Rim. He remembered that in the early 1920's it was seriously overgrazed and that later it was in good shape. In addition, he claimed that the earliest data on palatability were too high and that too many head of livestock were allowed on the forest ranges. The presence of a browse line (or highline), showing where vegetation has been cropped by livestock, is another indicator of overgrazing. One former ranger remembered that in 1937 there was a decided browse line on the North Kaibab Plateau and that 5 years later it was hardly noticeable, indicating that the range can recuperate when animal numbers are reduced.<sup>50</sup>

## The Range Management Work Load

The work load involved in managing the grazing resource on the national forests of the Southwest was a significant proportion of the total work. Processing time for grazing permits was shortened when the region adopted 5-year grazing permits in 1909 and eventually adopted 10-year permits. However, time-savings were still not optimal because many permits were still processed on an annual basis. By 1929, for instance, there were 922 10-year permits for 140,068 cattle and horses issued in the region, bringing the cumulative total to 2,951 permits and 275,175 head. In addition, 165 10-year permits had been issued for 399,626 sheep and goats, bringing these totals to 417 permits and 656,049 head. By 1934, 154,534 cattle and horses (51 percent of such animals under permit) and 265,890 sheep and goats (57 percent of such animals under permit) were under the long-term permit system.<sup>51</sup>



**Figure 29. Sheep grazing on the Apache National Forest, 1960.**

The percentage of time it took to monitor and administer the range work load on the forests did not change much over the decades, although it varied between forests. One report in 1911 on the disposition of time on the forest indicated that the range work load by the 13 men on the “statutory roll” was 25 percent of the total work load. A General Integrating Inspection (GII) report of the entire region, issued in 1954, indicated that 22 percent of the staff work load was range-related and that 33 percent of the rangers’ work load was devoted to range activities. A GII report of the Coronado National Forest in 1964 included the comment that “even now more than half the management effort is directed toward this [range management] activity.” A tabulation prepared for the GII report of the Santa Fe National Forest in the same year indicated that 34 percent of the hours worked during fiscal year 1964 was in range management<sup>52</sup>

Adding to the work load was the activity of moving livestock through the national forests back and forth between their winter and summer ranges. Sheep driveways were developed on the forest reserves. The cattlemen went along with the plan because they knew that the sheep would not

wander off onto the open range. Table 8 highlights the use of grazing leases on the national forests in the region in selected years.

## Range Types and Their Management

Each vegetation type has its own environmental and physiological requirements. These requirements must be understood and provided for in using the type for livestock grazing and maintaining the quality of other resources. A combination of range research on the two experimental forests in Arizona and New Mexico, together with research work and empirical studies conducted on the national forests of the Southwestern Region, has resulted in the evolution of “typical” management scenarios, or grazing systems, for these vegetative types. Even designating and defining the vegetative types themselves have had an evolutionary development. The Western Range lists ten types of virgin range; of these, the following were indicated on maps of Arizona and New Mexico: grass types—short grass, semidesert grass; shrub types—sagebrush-grass, southern desert shrub; forest types—pinyon-juniper and open forest.<sup>53</sup>

**Table 8. Yearly livestock grazing leases and numbers of livestock (selected years, 1909-58)**

Year	Cattle & horses			Sheep & goats		
	Permits	Arizona	New Mexico	Permits	Arizona	New Mexico
1909	3,376	235,946	131,621	943	512,130	569,841
1914	3,321	270,623	98,758	662	398,134	444,222
1919	3,590	366,520	180,288	736	371,457	479,353
1924	3,032	279,529	107,766	466	262,492	263,875
1929	-	183,076	84,425	-	352,618	254,936
1934	3,170	189,299	94,471	371	245,189	208,238
1939	-	171,976	91,148	-	199,886	173,199
1944	-	153,217	90,904	-	113,504	158,590
1949	-	-	76,529	-	-	107,431
1958	2,538	145,247	78,166	166	75,217	66,559

*Compiled from range management reports from Southwestern Region, 1909-1958.*

These evolved into different categories as time passed. For instance, the Prescott National Forest, Arizona, in 1983, listed seven vegetative types: high chaparral, low chaparral, desert shrub, pine and mixed conifer, riparian, juniper, pinyon-juniper, and wilderness. In 1984, the Carson National Forest in New Mexico listed nine vegetative types: conifer, aspen, pinyon-juniper, revegetated grassland, native grassland, sagebrush, oak/shrub, riparian, and wilderness conifer.<sup>54</sup>

Information about several range types in the Southwestern Region and the best method of utilizing them for livestock grazing are available in a series of reports:<sup>55</sup> As an example, the following information summarizes the situation in the pinyon-juniper range type. The type occurs from about 4,500 feet up to about 7,500 feet elevation, and occupies 32 percent of forest lands in New Mexico, with 46 percent of the Cibola National Forest being composed of the type. Grazing in this vegetation type has taken place yearlong during the past 400 years, and about half of the area of this type being grazed on the National Forests in the region is still grazed yearlong. Only in more recent years has rotation or deferred grazing been practiced in the type. The most notable successional change in the type has been the invasion of grassland communities by junipers. Due to the combination of overgrazing and absence of fires, trees not only encroached on the grasslands, but the original stands of trees became more dense. As a result, the average annual

grazing requirement for this type is about 70 acres per cow compared to about 29 acres per cow when the type is in virgin condition.<sup>56</sup> The Southwestern Region provides general guidelines for judging vegetative and range types and for evaluating management procedures.

Much has been written about the condition of the vegetation on the ponderosa pine ranges, especially that of the pine reproduction after heavy grazing. Supervisor William M. Drake reported this as early as 1910. It has been reported also as late as 1973 with the comment, “regeneration areas may require fencing or change in management practices to provide protection from livestock for a few years.”<sup>57</sup> It is now known that grazing and timber production are compatible in this vegetation type if grazing pressure is regulated. Large reductions in numbers of livestock were made in the ponderosa pine type on the Coconino and Tusayan National Forests in 1926 and 1927. A noticeable decrease in damage to pine seedlings followed the reduction in stocking. This was an early indication of the theory that is held today that in this range type, over concentration in grazing may both reduce long-term animal production and contribute to range deterioration. Rotational grazing and the complete removal of cattle for given time periods are now recommended for this ecosystem.

## Range Reconnaissance, Inspection, and Research

Effective range management requires reliable information. Reconnaissance, inspections, inventories, and research provide the necessary impact for management decisions. Range reconnaissance, or inventory, dates to the earliest days in the Southwestern Region, closely following the institution of timber reconnaissance. The first grazing reconnaissance party to take the field gathered at Flagstaff, AZ, in the summer of 1911 and worked on the Coconino National Forest. The reconnaissance mission is to prepare a map classifying the area examined into grazing types and to show for each type the location, acreage, topography, amount, and character of vegetation, the condition of the range, available watering places, and cultural features.<sup>58</sup> Range inspection, on the other hand, is less intensive than range reconnaissance. It provides a general evaluation of the utilization and fitness of the range. The inspection report evaluates the suitability of the type of stock being grazed to that best suited to the area, compares the intensity of grazing on different range units, and estimates maximum capacity. The inspection also assesses the adequacy of salting plans, damage by grazing to tree reproduction and erosion potential, and areas where more intensive reconnaissance is needed.<sup>59</sup> Inspections made late in the grazing season yielded better conceptions of utilization of forage and distribution of livestock, while early inspections had to rely on evidences remaining from the previous grazing season.

Range research began in the Southwestern Region at the Santa Rita Range near Tucson. In 1915, the Santa Rita Range Reserve and the Jornada Range Reserve were transferred to the Southwestern Region from the USDA Bureau of Plant Industry. According to Raymond Price:

An office of Grazing Studies in the Washington Office was established in 1910 with James T. Jardine in charge. In 1911, Regional Offices of Grazing Studies were established in Districts 2 and 3. The offices had three main assignments, namely, range reconnaissance and management plan development for areas covered, technical range administration, and grazing studies.

Chief Forester Henry S. Grave's Service Order 41, of January 2, 1912, set up a plan for Organization of Investigative Work. This Service Order created a Central Investigative Committee and District Investigative Committees. The Central Investigative Committee consisted of ... James T. Jardine, representing the Branch of Grazing ...

The District (now Region) Committees consisted of the District (Regional) Forester as chairman; ... Heads or Chiefs of the several Resources Offices or Divisions.... The Committee met annually.<sup>60</sup>

Grazing investigations began early in the Southwestern Region and were administered by the Office of Grazing Studies. According to Raymond Price, they included plant identification, revegetation and reseeding, and evaluations of grazing damage, uses of salt water, shrub ranges, and utilization studies.<sup>61</sup> Finally, in 1928, the McSweeney-McNary Forest Research Act authorized experiments in range management. The passage of this act marked the ending of the first period of range research and the beginning of a new epoch.

The Southwestern Forest and Range Experiment Station was established August 1, 1930. In range research, it was “to add and improve upon existing knowledge” and “to furnish answers to technical and practical problems arising in the administration of National Forests in Region 3. . .” The new experiment station coordinated the range research work already underway on several national forests and at the Santa Rita and Jornado Range Reserves in southern Arizona and New Mexico, respectively. The station initiated cooperative range utilization standards studies and shrub invasion control research in 1937. Scientists completed the Western Range Survey in 1938 and, in 1940, began collecting essential range resource data on range study plots throughout the region. Range research continued during the war years and in 1947 research was begun on noxious plants. Consolidation of the Southwestern Forest and Range Experiment Station with the Rocky Mountain Station with headquarters at Fort Collins, CO, took place in 1953.<sup>62</sup> Range research has continued in Arizona and New Mexico under this organization.

## The Three-Step Method

Kenneth W. Parker, a range conservationist (in research) explained the complex interrelationships that exist in determining range conditions and trends. “We are dealing,” he said, “not only with the influence of livestock, but with a complex set of factors relating to the vegetation, soil, and native animals both large and small and even micro fauna, especially in the soil, which are constantly changing from one growing season to the next.” Parker advised using a three-step method that had been heartily endorsed by the region’s administrative staffs. As defined by Parker, this method operates as follows:

The three-step method incorporates the best features of several measurement methods—reduced to as simple a record as practicable for the purpose of measuring trend. As the name implies it consists of three major steps. Step one is concerned mainly with the establishment on the range of permanently marked transects and the collection of the basic field data from these transects and from the site within which they are located. Step Two consists of the field analysis of these data, classification of condition at time of record and estimation of current range trend. Step Three is concerned with a permanent photographic record of range conditions on the site that is sampled ... all three steps are repeated and the results compared step by step in any subsequent examination in later years.<sup>63</sup>

In 1973, Reppert and Francis, of the Rocky Mountain Forest and Range Experiment Station staff, expanded on the Parker method by reporting on the development of a five-phase approach to interpret trends in range condition.<sup>64</sup>

The three-step method and other recommended procedures for managing the range resources of the Southwest evolved with the aid of range research. Other studies and recommendations have

shown that an abrupt decrease in the amount of photosynthetic activity of leaves, as occurs with overgrazing, causes a corresponding slowing down in root growth, which finally results in the death of the plant. Livestock graze selectively, because some plants are more palatable than others. Unwise grazing practices are not always apparent to the observer of range conditions; only by continued misuse will obvious changes in the plant community appear. Range administrators and range ecologists alike note that prolonged heavy grazing results in inferior forage plants replacing good forage plants. Forest Service researchers have also established reliable indicators of range conditions. Erosion, indicator species, plant vigor, presence of animals such as rabbits (the more rabbits, the worse the range), and past history of use are useful guides to the administrators who must determine grazing use. Forest Service Chief Lyle Watts, in a 1946 memo, wrote, “let the record stand for itself” that Forest Service personnel are qualified to judge range conditions. “The Forest Service,” he said, “has 40 years’ experience in managing range lands and its actions are guided by the findings of years of painstaking research.”<sup>65</sup> Range reconnaissance, inspection, and research made it possible for effective range management planning.

## Range Management Plans

In the early years, forest supervisors filed an annual report to the Chiefs office, and these reports eventually developed into annual grazing plans for their forests. At first, the supervisor’s grazing report included such items as numbers and category of stock admitted to the forest, their time of entrance and departure, and comments on the attitude of stockmen and their organizations toward the grazing program.

In subsequent years supervisors submitted a grazing plan for their forests. The plan was required to show grazing areas, the category of stock to be permitted, access trails to the open grazing area, and any trails across the forest to private grazing lands. Range divisions reflected proposed stock use. Sheep allotment areas, especially, had to be designated.. .

All things considered, the grazing plan was an effort at land classification representing an early land-use plan for the forest.<sup>66</sup>



**Figure 30. Assistant ranger talking to a grazing permittee, Cibola National Forest, 1960.**

Periodically, for almost 70 years, each national forest and ranger district has prepared a range management plan. *The Western Range* in 1936 outlined the range management planning process, stating that the basic planning unit was the individual allotment, although general plans were

prepared at the national forest and ranger district level. As much of the information as is possible is shown on maps, including “grazing capacity, period of use, movements of the stock on the range, location of salt grounds, present and needed range improvements, and deferred and rotation grazing systems.” Range management plans also contain information on (a) the grazing system, (b) grazing capacity, (c) season of use, (d) distribution of stock, (e) the need for special rehabilitation measures, and (f) any special provisions needed for watershed protection, wildlife, or recreational use.<sup>67</sup>

The Loveridge-Cliff Gil report on the Southwestern Region in 1945 mentioned that the region was placing emphasis on preparing comprehensive range management plans for each ranger district--15 up to that time. The current ones were judged to be good; earlier ones, prepared in 1939 and 1940, needed revision.<sup>68</sup> The 1953 plan for the Williams District of the Kaibab National Forest was eight pages. It had written sections of introduction, history of use, distribution of grazing privileges, permit turnover, and correlation of range use with other uses, along with tabular sections on actual use, range improvements, schedule of making an allotment analysis and permittee plans, and an actual use record. On the Coronado National Forest during the late 1960's, the rangers were given guidelines to prepare range management plans every 3 to 6 years.<sup>69</sup>

In addition to range management plans, the new National Forest Plans being prepared on each national forest in the region contain range management sections. The *Proposed Coronado National Forest Plan*, for example, includes all the uses of the national forest. Those sections of the forest plan dealing with the range resource include segments on supply and demand, goals, projected program outputs and costs, management prescriptions by management area, and a monitoring plan. Some of these are prepared on an annual basis and others at 5-year intervals. The companion document, the *Draft Environmental Impact Statement, Proposed Coronado National Forest Plan*, also dated 1982, has four sections on the range resource: purpose and need (including a list of public issues related to range), alternatives including the proposed action (with the range resource included in separate listings), affected environment (with a separate section on range), and environmental consequences (also with a separate section on range).<sup>70</sup> These EIS plans are quite general, but offer a significant data base.

## Grazing Inspections

Reviewing reports of functional and general integrating inspections is a good means for evaluating the progress of administration of the multiple uses of the national forests. We examined several reports from the 1920's to the 1960's. The evidence is that reconnaissance reports, inspections, and research recommendations are incorporated into field management practices. For example, in answering the response to a 1924 inspection of the Apache National Forest, Quincy Randles, District Forest Inspector, indicated that, to get satisfactory reseeding in advance of timber cutting, sheep would have to be excluded from a timber sale area. He further advised that the ranger work with the advisory board the following winter to make the exclusion work and to indicate good faith in view of the pending 10-year permitting system. Subsequently, reducing the number of sheep was noted as effective in ending damage to virgin timber.<sup>71</sup>

On the Coconino Plateau, in a 1926 memorandum for District Forester Pooler, Assistant Forester E.E. Carter expressed encouragement over the prospective savings of tree seedlings on the plateau by setting up drift fencing, because he observed that the fencing had resulted in protection of reproduction.<sup>72</sup> In an inspection report of the Gila National Forest, for an inspection made



August 8-12, 1932, Assistant Regional Forester Hugh G. Calkins mentioned the great improvement in grass, herbs, alders, and willows along stream courses in four areas of the Gila because of programs that reduced stocking and removed cattle from the sheep range.<sup>73</sup>

In the Loveridge-Cliff report of the 1945 regional GII inspection, one-fourth of the total pages contained some critical statements or recommendations regarding range management in the region. The inspectors traveled across more than 100 grazing allotments and got a good cross-sectional view of most of the major range types. They concluded that the region “is falling far short of meeting its responsibility to the public for properly managing national-forest forage and watershed resources.” They mentioned that a large majority of the allotments sampled were in unsatisfactory condition and many still were deteriorating. Sheet erosion was still taking its toll, erosion gullies were conspicuous, and many stream channels and water courses were choked with erosion debris. Their observations from the Carson to the Coconino Plateau were that the cattle ranges were in worse shape than the sheep ranges. Some allotments were observed to be improving, including those on the Lincoln, Coronado, Tonto, Coconino, Sitgreaves, and Santa Fe National Forests. In their report, they particularly cited ranges on the Greer District of the Apache National Forest as being the best. Loveridge and Cliff recommended immediate reductions in grazing use. Overstocking and overgrazing were, in their view, thought to completely mask the relationship of weather cycles and variation in annual and seasonal rainfall in the region to the quality of the range resource.<sup>74</sup>

Their recommendations for corrective action were numerous and heavy-handed. The most telling was that the rangers and foresters had not reduced the grazing load enough in the past and were called upon to make those changes no matter how difficult the choices of whose stock numbers would be limited. A pithy comment like “. . . we left the Region with a strong conviction that the field organization as a whole is still not sufficiently realistic in sizing up range conditions” was followed with a list of reasons why the comments were made. Topics hit were fencing, yearlong versus seasonal grazing, ranger district and allotment management plans, salting, nonuse, excess stock policy, private land permits, inspections, reseeding, and range research. ‘Range-inspection effort has been inadequate at all levels from the Regional office down to the Ranger District . . .’<sup>75</sup> is a typical comment.

A GII report of the Santa Fe National Forest, inspected on June 1-25, 1948, included 4 days at the supervisor’s office and visits of from 1-1/2 to 4-1/2 days to each ranger district. The conditions of most ranges on the Santa Fe were unsatisfactory, brought on by very heavy demands on the national forest for summer forage and a lack of fencing for control. In fact, the inspection team estimated that 91 miles of fence were needed to control erosion and 180 miles to control dual use, at an estimated cost of \$500,000. Although several actions were needed, the report indicated that good work was being done in a large number of trespass cases and in range reseeding on a project basis.<sup>76</sup>

The estimated grazing capacity in 1947 was 37,000 cow-months, a reduction of 80 percent from the 189,000 cow-months estimated after the 1922-23 range reconnaissance on the forest. During the same period, the actual use had been reduced from 91,000 to 64,000 cow-months, or 30 percent. It was obvious, the inspectors stated, that in 1947 the capacity was being exceeded by 73 percent. An additional criticism was that new allotment plans had not been made and that the old plans had not been kept current. This inspection report mentioned that in addition to the large population of flocks and herds dependent on forage on the Santa Fe National Forest, demand on the national forest ranges was greater because two local timber companies no longer allowed grazing on their lands. It also reported on the livestock associations, there being ten local ones on

the Santa Fe in 1948, and the positive nature of the close cooperation of the associations and the Forest Service personnel.<sup>77</sup>

A lengthy GII report for the Kaibab National Forest, June 8-24, 1953, indicated past overgrazing and evidence that some ranges were improving. Range management plans were current on the national forest. A good report on the percent reduction of livestock during the period from 1943 to 1952 was cited. Like Loveridge and Cliff, the inspectors found that range inspections and followup by district rangers were inadequate. Range reseeding and juniper eradication measures were discussed.<sup>78</sup> The following year, a GII report for the Gila National Forest had much the same comments as the Kaibab inspection report. The pace of allotment analysis had lagged. Reductions in range livestock use had been at a slower rate than reductions in estimated grazing capacity. The inspection team recommended developing cooperation with livestock growers. Fencing needs were also cited, and the cost of fence construction was mentioned.<sup>79</sup>

A general integrating inspection of the Coronado National Forest was made in 1964. The inspectors took the national forest staff to task for not directing enough of their effort in range management toward people management. More public relations, in their estimation, was necessary, especially in publicizing the role of the range resource in multiple-use management. The inspectors contrasted the Forest Service Experimental Range, which was managed at 40 percent utilization under a rest/rotation system, with the Coronado ranges, which were grazed as high as 80 percent. The forest officers were given good marks, however, in cooperation with range permittees.<sup>80</sup>

The report of the 1964 GII of the Santa Fe National Forest noted that livestock were overstocked by 20 percent. Recommendations to correct the problem included dividing the national forest into logical management areas, requesting increased funds for range improvement and revegetation, and a program to increase per-cow return.<sup>81</sup> A GII report of the Lincoln National Forest, issued in 1965, praised the forest for good progress in range management, especially in developing a positive attitude through cooperative work with range permittees to improve the quality of the range on the forest. In contrast to what the inspectors found on the Coronado National Forest, 38 percent of the allotments as of the end of 1964 employed rest and rotation grazing practices, and plans were in place to increase this to 70 percent within 5 years. Additional improvement was needed in reducing permitted use, in trespass control, and in prepayment of grazing fees.<sup>82</sup>

The Coronado National Forest was the site of a general functional inspection made in 1967 and 1968. The inspectors noted the “very satisfactory job” being done in range activities, such as adjusting permitted use to the carrying capacity of the ranges. They noted, however, that many areas of the national forest were in unsatisfactory condition. Range analysis work was lagging, they noted, adding that the “mechanics of producing the analysis and plans maps on the Forest is apparently not good.” In the maintenance of range allotment management plans, the record also was unsatisfactory; less than a third of the allotments had satisfactory management plans. By 1970, the forest had corrected or was making progress in correcting most of these insufficiencies.<sup>83</sup>

## Recent Range Administration

During the decades of the 1970's and 1980's, range management on the national forests in the Southwestern Region has evolved into an attempt to balance plant communities, livestock numbers, and season of use. Much more regulation and administrative control appear to be needed before range deterioration can be allayed, and greater effort still before the ranges can be

restored to optimum productivity. While challenges to range management policies and personnel were great in the past, future challenges are greater still in this time of intense scrutiny of the land and resource management policies of the Forest Service and its sister agencies.

Now, by the mid-point of the eighth decade of the century, demand for outdoor recreation is putting a dampening effect on the use of the national forests of the Southwest for grazing. Moreover, increases in timber density and area of timber under management plan have reduced the land base available for grazing. Demands by the expanding urban population of the two States for more and higher quality water may also conflict with future grazing use. Once more, the battle lines to abolish or severely limit the granting of grazing privileges are being drawn. Evidence of this was the call (in a special view column in the *Journal of Forestry* in 1984) to abolish grazing on all public lands.<sup>84</sup> Renewed concern from some quarters about the claimed "below cost" prices of the marketed resources of the national forests, including grass, is being heard in 1986. Grazing privileges are a rich heritage in the Southwest. Sound planning and efficient management are necessary for the traditional livestock industry of the Southwest to retain its historic social and economic role in the years ahead.

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## Reference Notes

- <sup>1</sup> The Western Range: *A Great But Neglected Natural Resource* 74th Congress, 2nd Sess., Senate Doc.199 (Washington, DC: Government Printing Office, 1936), p.11; and Paul H. Roberts, *Hoofprints on Forest Ranges* (San Antonio: Naylor, 1982), p.13.
- <sup>2</sup> Charles F. Cooper, "Vegetation Changes in Southwestern Pine Forests Since White Settlement," Ph.D. dissertation, University of Florida, Tallahassee, 1959, p. 27.
- <sup>3</sup> *The Western Range*, p.11.
- <sup>4</sup> Roberts, in *Hoofprints on Forest Ranges*, p.13, states: "The nester, mostly coming from the Central and Prairie States, attacked the heart of the range lands. First they 'took up' the arable, productive bottoms along stream courses, and in the draws, and next the flats. In so doing they captured the best grass lands and many of the best watering places of the large outfits." See also Lowell A. Harrison, "The Cattle-Sheep Wars," in *American History Illustrated* 3(6) (1968): 20-27.
- <sup>5</sup> *The Western Range*, p.16.
- <sup>6</sup> For additional information on grazing and the range cattle industry, see Thomas S. Farish, *History of Arizona* (8 volumes) (1915).
- <sup>7</sup> Arizona, *Report of the Governor* (1893).
- <sup>8</sup> J.W. Tourney, "Our Forest Reservations," *Popular Science* 59 (1901):128.
- <sup>9</sup> Theodore F. Rixon, *Forest Conditions in the Gila River Forest Reserve, New Mexico* (Washington, DC: USDI Geological Survey, 1905), pp. 14-15.
- <sup>10</sup> Roberts, *Hoofprints on Forest Ranges*, p.15.
- <sup>11</sup> Phillip O. Foss, *Conservation in the United States: A Documentary History* (New York: Chelsea Publishers, 1971), p.11.
- <sup>12</sup> USDA Forest Service, *The Use Book* (Washington, DC: USDA Forest Service, 1907).
- <sup>13</sup> See Roberts, *Hoofprints on Forest Ranges*, pp. 1-44; William Rowley, *U.S. Forest Service Grazing and Rangelands: A History* (College Station, TX: Texas A&M University Press, 1985), pp. 1-70; and Arthur C. Ringland, "Conserving Human and Natural Resources," an interview conducted by Amelia R. Fry, Edith Mezirow, Fern Ingersoll, and Thelma Dreis (Berkeley, CA: Resources for the Future, 1970), pp. 36-37.
- <sup>14</sup> Roberts, *Hoofprints on Forest Ranges*, p. 44.
- <sup>15</sup> See R.M. DeNio, "Principles Governing Grazing Fee Determination on Lands Administered by the U.S. Forest Service," *Proceedings, Society of American Foresters* (1962), p. 80; and letter to author from William D. Hurst, Bosque Farms, NM, August 21, 1985.

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- <sup>16</sup> William D. Hurst added these observations in his letter of August 21, 1985: "Pinchot once said, 'Better help a poor man make a living for his family than help a rich man get richer still.' He further stated that the foregoing statement is 'our battle cry and our rule of life.'"
- <sup>17</sup> Lyle F. Watts, Chief of the Forest Service, Memorandum to the Secretary of Agriculture, "National Forest Range Administration," Washington, DC, January 7, 1946, p.1, Federal Records Center, Denver, 095-57A, 0093.
- <sup>18</sup> Two early cases were the Fred Light case in Colorado in 1909 over both grazing fees and fencing issues and a case in California in 1907 over nonpayment of fees claimed to be administered by the Secretary of Agriculture as the administrative agent, rather than by Congress, the lawful entity. On May 1, 1911, the U.S. Supreme Court ruled for the government in these two cases. For a more complete report of these cases, see Rowley, *U.S. Forest Service Grazing and Rangelands: A History*, pp. 66-68. This was upheld in *Osborne vs. The United States*, 145 (2nd), 892, November 24, 1944, Federal Records Center, Denver, 095-57A0093.
- <sup>19</sup> It is interesting to contrast this with a statement in Will C. Barnes, *Apaches and Longhorns* (Tucson, AZ: University of Arizona Press, 1982), p. 206, where, at the end of his career he wrote, ". . . and I will admit, also that the cattle industry must be secondary to the primary purpose for which the Forests were created—the production of timber and the protection of the great watersheds of the west"; Gifford Pinchot, *Breaking New Ground* (New York: Harcourt Brace, 1947), p. 269.
- <sup>20</sup> *Ibid.*, p. 269.
- <sup>21</sup> *Ibid.*, p. 269.
- <sup>22</sup> *Ibid.*, p. 269.
- <sup>23</sup> Roberts, *Hoofprints on Forest Ranges*, p. 30.
- <sup>24</sup> *Ibid.*, p. 30.
- <sup>25</sup> *Annual Report of the Secretary of Interior*, 1902, 57th Congress, 2nd Sess., 1902-1903, House Doc. 5, vol. 18, p. 22; Roberts, *Hoofprints on Forest Ranges*, pp. 30-32.
- <sup>26</sup> Roberts, *Hoofprints on Forest Ranges*, p. 32.
- <sup>27</sup> *Williams News*, Williams, Arizona, 1907.
- <sup>28</sup> *Southwestern Stockman, Farmer and Feeder*, March 15, 1913.
- <sup>29</sup> Edwin A. Tucker manuscript, Regional Archives, Albuquerque, NM, p.124.
- <sup>30</sup> Roberts, *Hoofprints on Forest Ranges*, p.128-130; see DeNio, "Principles Governing Grazing Fee Determination," p. 80.
- <sup>31</sup> *Ibid.*
- <sup>32</sup> "Grazing of National Forest Lands in New Mexico," typescript, Federal Records Center, Denver, 09562A421, Box 1.
- <sup>33</sup> Grazing files and memoranda, Federal Records Center, Denver, 095-57A0093, Boxes 1-3, and 09557A0090, Boxes 3 and 4.
- <sup>34</sup> *Ibid.*
- <sup>35</sup> Roberts, *Hoofprints on Forest Ranges*, p.130; DeNio, "Principles Governing Grazing Fee Determination," pp. 81-82; W.L. Dutton, "History of Forest Service Grazing Fees," *Journal of Range Management* 6:6 (November 1953): 396; Edward P. Cliff, *Grazing Policies on Forest Lands-A Look at the Next 20 Years* (1967), p. 9 (also in *Congressional Record* 113 (75) (May 15, 1967): S6816-18); and see Rowley, *U.S. Forest Service Grazing and Rangelands*, p. 242.
- <sup>36</sup> *Albuquerque Journal*, Editorial, May 10, 1985.
- <sup>37</sup> Rowley stated the following in his study: "To protect the range Potter's instructions provided that sheep should be kept moving and not bedded down in the same place too long. The sheep camp should move every two to three days; otherwise severe damage occurred to the forage and young trees in the vicinity." Rowley, *U.S. Forest Service Grazing and Rangelands*, p. 70.
- <sup>38</sup> In April 1917, Will C. Barnes recommended to District Foresters that temporary grazing permits be issued to allow livestock owners to have additional stock on national forests to minimize financial losses under expanded wartime production goals. Will C. Barnes, Letter to District Foresters, All Districts, n.p., April 17, 1917, 1 p. (in the personal files of William D. Hurst); and see Roberts, *Hoofprints on Forest Ranges*, p.115.
- <sup>39</sup> Memoranda and reports relative to appraisal of ranges and descriptions of range capacities, Federal Records Center, Denver, 095-57A00900, Boxes 3 and 4.

- <sup>40</sup> Frank J. Smith and Dale A. Jones, "Report on Functional Inspection-Range and Wildlife Management, Coronado National Forest, March 17-19,1967 and April 29-May 3,1968," n.p.,1968, pp. 2, 7, Federal Records Center, Fort Worth, 095-74A0044.
- <sup>41</sup> USDA Forest Service, *Annual Reports*, 1909-1931.
- <sup>42</sup> Pinchot, *Breaking New Ground*, p. 270.
- <sup>43</sup> Cliff, *Grazing Policies on Forest Lands*, p. 2.
- <sup>44</sup> Rosedale Ranger Station early-day files at the Cibola National Forest headquarters, page 1 of letter.
- <sup>45</sup> *Ibid.*, page 1 of letter.
- <sup>46</sup> The files of the *Carson Pine Cone* are in Carson National Forest Archives.
- <sup>47</sup> Edwin A. Tucker and George Fitzgerald, *Men Who Matched the Mountains: The Forest Service in the Southwest* (Washington, DC: USDA Forest Service, 1973), p. 107.
- <sup>48</sup> Federal Records Center, Denver, 095-57A0090, Box 3.
- <sup>49</sup> There were 800 advisory groups in 1944 in the United States, Federal Records Center, Denver, 095-57A0093, Box 3.
- <sup>50</sup> *Ibid.*
- <sup>51</sup> *Ibid.*
- <sup>52</sup> *Ibid.*; J. Morgan Smith and Ernest H. Taylor, "General Integrating Inspection Report, Coronado National Forest, April 13-24,1964," n.p.,1964, p.11; and Fred H. Kennedy, Regional Forester, Memorandum to Division Chiefs and Supervisor, Santa Fe National Forest, "Inspection-Santa Fe GII," Albuquerque, New Mexico, November 19,1964, Appendix Table VIII, Federal Records Center, Fort Worth, 095-74A0044.
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- <sup>54</sup> USDA Forest Service, Southwestern Region, Prescott National Forest, *Analysis of the Management Situation, Prescott National Forest*, n.p.,1983, p. 88; USDA Forest Service, Carson National Forest, "Draft Environmental Impact Statement, Proposed Carson National Forest Plan," Albuquerque, NM, 1984, p. 98.
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- <sup>59</sup> *Ibid.*, p. 79.
- <sup>60</sup> Raymond Price, *History of Forest Service Research in the Central and Southern Rocky Mountains Regions*, 1908-1975, Gen. Tech. Rep. RM-27 (Fort Collins, CO: USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, 1976), pp. 7-8.
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- <sup>62</sup> *Ibid.*, pp. 16, 22, 27-33, 50.
- <sup>63</sup> Kenneth W. Parker, Range Conservationist, *A Method for Measuring Trend in Range Condition on National Forest Ranges* (Washington, DC: USDA Forest Service, 1951), pp. 1-26, 3.
- <sup>64</sup> Jack N. Reppert and Richard E. Francis, *Interpretation of Trend in Range Condition from 3-Step Data*, Res. Pap. RM-103 (Fort Collins, CO: USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, 1973), pp. 14-15.
- <sup>65</sup> *Ibid.*; Lyle F. Watts, Memorandum to the Secretary of Agriculture, p.1.

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- <sup>68</sup> "Excerpts from the 1945 Loveridge-Cliff G.I.I. Report--Region Three--and Chief Watts' Letter of Transmittal," n.p., 1946, pp. 1-39, Federal Records Center, Denver, 095-62A0252.
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