

Theodore Roosevelt, who, in a message to Congress on December 6, 1904, declared:

All the forest work of the Government should be concentrated in the Department of Agriculture, where the larger part of that work is already done, where practically all the trained foresters of the Government are employed, where chiefly in Washington there is comprehensive first-class knowledge of the problems of the reserves acquired on the ground, where all problems relating to growth from the soil are already gathered, and where all the sciences auxiliary to forestry are at hand for prompt and effective cooperation. \* \* \*

Since 1911, however, there have been repeated efforts to transfer administration of the national forests back to the Department of the Interior. No less than a dozen bills have been introduced into Congress to this end or to transfer the national forests to a new Department of Conservation. The most recent of these—H. R. 7712 and S. 2655 pending before the Seventy-fourth Congress—propose to change the name Interior to "Conservation" and to pave the way for the transfer of national-forest administration to the newly named Department. With a public range administration agency in each department, it becomes a matter of deciding in which Department the work should be grouped.

In order to lead to a clear understanding of the problem and to a sound answer to this question it is necessary first to consider what the public forest and range lands really involve and whether or not there is any valid cause for abandoning the reasoning which led to the transfer of the Forest Service in 1905.

#### RELATION OF FEDERAL RANGE TO OTHER AGRICULTURAL RESOURCES

The national forests and grazing districts are not merely so much range land which the Government has to protect and rent to the public, as a landlord holds a farm or range which he is willing to let to some qualified user. The ranges, as clearly shown in an earlier section of this report, are an inseparable part of western agriculture. The public range resources, for the most part, merely supplement the crops or wild forage grown on other agricultural lands. The products of these lands enter into the regular channels of distribution along with the products of all other agricultural lands. In the West, also, crop growing is dependent upon irrigation. The character and quantity of water supply in turn depends upon the protection of the mountain watersheds—the sources of the stream flow—which are mostly within the national forests—and upon the protection against erosion on the grazing-district lands, problems intimately related to the use of the land. Most of the wood supply used on farms and ranches comes from the national forests. There is also an intimate relationship in wildlife conservation between public range lands and other agricultural lands. Altogether the protection and use of the resources of the public lands play a definite and decisive part in the whole agricultural economy of the West.

How forestry and pasture management are related to other forms of agriculture is demonstrated by the situation on other than public lands throughout the United States. More than 2.5 million farmers derive part of their cash income from woodlands and forests on their farms. As shown in figure 83, the acreage in forest and grazing land on farms is greater than the acreage of all other farm

Relation range to agricul. people

crops. Further, the forest and grazing land on farms far exceeds the total area of national forests, grazing districts, unreserved public domain, and other Federal range land in the continental United States combined.

The public forest and range lands, in view of the intimate relation with all the other problems in agriculture, are inseparable from other lands in developing a national agricultural program. The need for such a program has grown greater and greater, as pointed out by Secretary Henry A. Wallace, who declared:

Ever since the end of the World War, agriculture has been groping for a way to adjust production to demand, a way to promote sound land use and

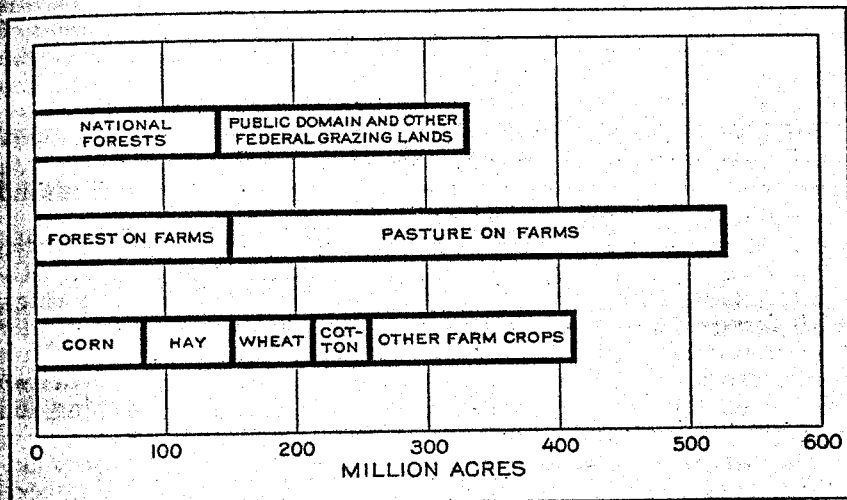


FIGURE 83.—FORESTS AND GRAZING INSEPARABLE FROM AGRICULTURE OVER IMMENSE AREAS.

Forests and pasture on farms occupy half again as much area as the national forests and other Federal range lands combined, and take up much more farm acreage than corn, hay, wheat, cotton, and all other crops.

discourage land misuse, and a way to build a satisfying rural civilization which might serve as the greatest single stabilizing factor in modern democracy.

The Federal Government has a definite obligation to help agriculture develop a sound program. The Department of Agriculture has embarked upon such a program as one of its major undertakings. Whatever is done must deal with adjustments in land for farming, grazing, forestry, and wildlife. It will involve public land as well as privately owned farm, forest, or range land. In the West especially, public lands, in a large measure, are the very key to the needed adjustments.

#### FOREST AND RANGE LAND MANAGEMENT A FUNCTION OF AGRICULTURE

The management of range and forest lands is purely and simply a function of agriculture. It deals with soil, interrelations of soil and water, with plants and animals, with diseases and insect pests of plants and animals, with the planting, growing, and harvesting of crops—in fact with all the “problems relating to growth from the

The value of nitrogen and organic material in determining the quantity and quality of plant growth produced on a given soil has been amply demonstrated in agricultural practice. Their reapplication to soils already robbed of them by erosion and leaching resulted in a greater than 4-fold average annual increase in vegetation, over a period of 9 years, in recent tests in Utah (137). Of vast importance in range-forage production, they are the first elements of the soil to be lost through erosion.

In Idaho, in a survey of the Boise River watershed, soil samples taken from moderately depleted ranges, where erosion was barely under way, contained only 77 percent as much nitrogen and organic matter as soil from the virgin range; and soils from heavily depleted ranges already badly eroded contained only 61 percent as much nitrogen and 55 percent as much organic matter. In Utah, studies showed surface soils from an overgrazed, eroded area contained an average of 31 percent less nitrogen and 38 percent less organic matter than soils from the adjacent protected Salt Lake City watershed. When wheat was grown on both eroded and noneroded soils, but otherwise under exactly the same conditions—5.5 pounds of dry plant material was produced on a unit tract of eroded soil and 12.1 pounds on noneroded soil. Nitrogen and organic matter in surface soil from lightly, moderately, and heavily eroded areas in Davis County, Utah, were on the average 51 and 60 percent, 61 and 70 percent, and 75 and 84 percent deficient, respectively, as compared with noneroded soil.

When the surface soil and its litter and humus layers are partially destroyed, restoration of the range cover through the process of plant succession is exceedingly slow; since each stage in the succession must have increasingly better soil conditions until at last the climax range cover is attained. This slow process of soil building through plant development is, however, not hopeless except in severe cases of gullying and stripping where only geologic time can bring about reclamation. Examples of the slow progress of rehabilitation can be seen on certain areas on the national forests, which were badly eroded at the time the forests were created and even after more than 20 years of protection are still far from regaining the grazing capacity of the virgin range. One of the main reasons for this lag in productivity is deficient soil fertility.

#### IRRIGATION WATER SUPPLY AND IMPROVEMENTS THREATENED

Agricultural development of the West has been based largely on the cultivation of the semiarid, fertile, and arable lowlands supplied by life-giving streams from the more humid mountain areas (fig. 71). Any modification of rate and quantity of run-off upon which agricultural development is based is reflected in crop production, and as agriculture is built for the most part upon the best possible stream flow from the virgin watershed, the changes which have taken place are inevitably for the worse. If little water from melting snows is absorbed, extremely high peak flows result in the spring, at a season when irrigation is not needed. Indispensable irrigation water is poured out onto the waste lands or into the sea and lost. If the run-off from summer storms rages forth from the canyons as floods, farms

and communities, which by force of circumstances are located in floodable areas, will be devastated.

In other words, irrigated farming is based on usable run-off and if adequate reservoir capacity is not available, requires naturally controlled stream flow to sustain it properly. Natural flow of streams, however, by no means furnishes sufficient water to make all the fertile



FIGURE 71.—PLANT COVER ON MOUNTAIN SLOPES VITAL TO LOWLAND AGRICULTURE AND INDUSTRY

Lowland valleys such as shown in this aerial view of a section of Davis County, Utah, rely on a constant and usable supply of irrigation and domestic water from the more humid, steep mountain watersheds. To obtain this supply of water and at the same time avert the danger of floods, the plant cover of the watersheds must not be depleted. Where vegetation is destroyed, as on the headwaters of the center canyon here shown, floods and mud-rock flows will wreak great havoc in the agricultural lands below. That undepleted plant cover will furnish the desired protection to the lowlands is shown by the fact that no floods have come from the canyon to the right, where the cover has been maintained.

desert land blossom into productivity. Frequent water shortages occur in all Western States. Efforts are being made to overcome these shortages as rapidly as possible by building storage facilities where suitable reservoir sites are available to catch and hold surplus stream flow when it is not needed and release it when the parching fields require more than would otherwise be provided. The very considerable regulation of stream flow brought about by these improvements has been the means of stimulating agricultural development in many sections where it would have been impossible otherwise. Diver-

sion ditches and canals to conduct the water from rivers and streams help complete the reclamation undertaken.

These irrigation structures of one kind or another in the range-land States made possible the production of crops valued at nearly \$900,000,000 (159) in the single year of 1929. The maintenance of the tremendous investment (table 59) in these works at maximum efficiency is a paramount consideration. A greater share of the stream flow upon which the irrigation depends is from the high mountain areas (fig. 72), many of which have been under national-forest administration for 30 years, thus insuring a measure of protection to the natural stream flow. The resources of the intermediate and lower and in some localities the higher elevational zones, however, have not been under administration. These have suffered much depletion of their plant cover from overgrazing and fire. As a consequence both the permanent and intermittent streams issuing from them are silt laden.

TABLE 59.—*Acres of irrigated land, together with value of land, buildings, and machinery, and the value of irrigation improvements for irrigated farms in Western range-land States*<sup>1</sup>

State	Irrigated area	Value of land, buildings, and machinery	Value of reservoirs and distribution systems
	<i>Acres</i>	<i>Dollars</i>	<i>Dollars</i>
1. Arizona.....	575, 590	157, 290, 710	73, 328, 197
2. California.....	4, 740, 032	2, 535, 075, 018	450, 967, 979
3. Colorado.....	3, 393, 019	414, 180, 910	87, 663, 240
4. Idaho.....	2, 181, 250	316, 648, 034	84, 500, 354
5. Kansas.....	71, 290	13, 085, 069	1, 685, 682
6. Montana.....	1, 594, 912	205, 027, 415	50, 319, 204
7. Nebraska.....	532, 617	91, 773, 733	21, 386, 319
8. Nevada.....	480, 648	63, 998, 051	15, 457, 931
9. New Mexico.....	527, 033	93, 190, 485	19, 834, 380
10. North Dakota.....	9, 392	1, 452, 335	1, 267, 314
11. Oklahoma.....	1, 573	1, 771, 383	160, 099
12. Oregon.....	898, 713	171, 918, 001	28, 754, 548
13. South Dakota.....	67, 107	11, 576, 300	4, 502, 117
14. Texas.....	798, 917	190, 141, 304	49, 022, 164
15. Utah.....	1, 324, 125	212, 258, 249	35, 669, 819
16. Washington.....	499, 283	208, 738, 027	40, 561, 895
17. Wyoming.....	1, 236, 155	129, 692, 056	35, 153, 187
Total.....	18, 944, 856	4, 817, 799, 078	1, 010, 174, 399

<sup>1</sup> From Fifteenth Census (159).

#### CRITICAL CONDITIONS IN THE SOUTHWEST

At the present time a most critical situation from the irrigation and maintenance of irrigation improvement standpoints exists in the Southwest. This is true for three broad reasons: First, because such large portions of the southwestern watersheds are in the zones which have been badly depleted by unrestricted grazing; second, because the prevailing soil types are very susceptible to erosion; and third, because so many storage dams and diversion works are needed, creating an immense capital investment in the irrigation enterprise. Two of the most active expressions of the situation are seen in the devastating floods which occur and the growth of silt deposits in reservoirs and other irrigation works.

In this region small floods frequently wipe out individual farms and homes, and larger floods that inundate and spread destruction over entire communities are comparatively frequent. The irrigation

district in the Palo Verde Valley (148) on the Colorado River in California is often menaced by floods, a single one in 1922 causing damage estimated at \$1,000,000. To combat the flood threat this district had, up to 1931, spent \$2,400,000 on flood-protection work. The

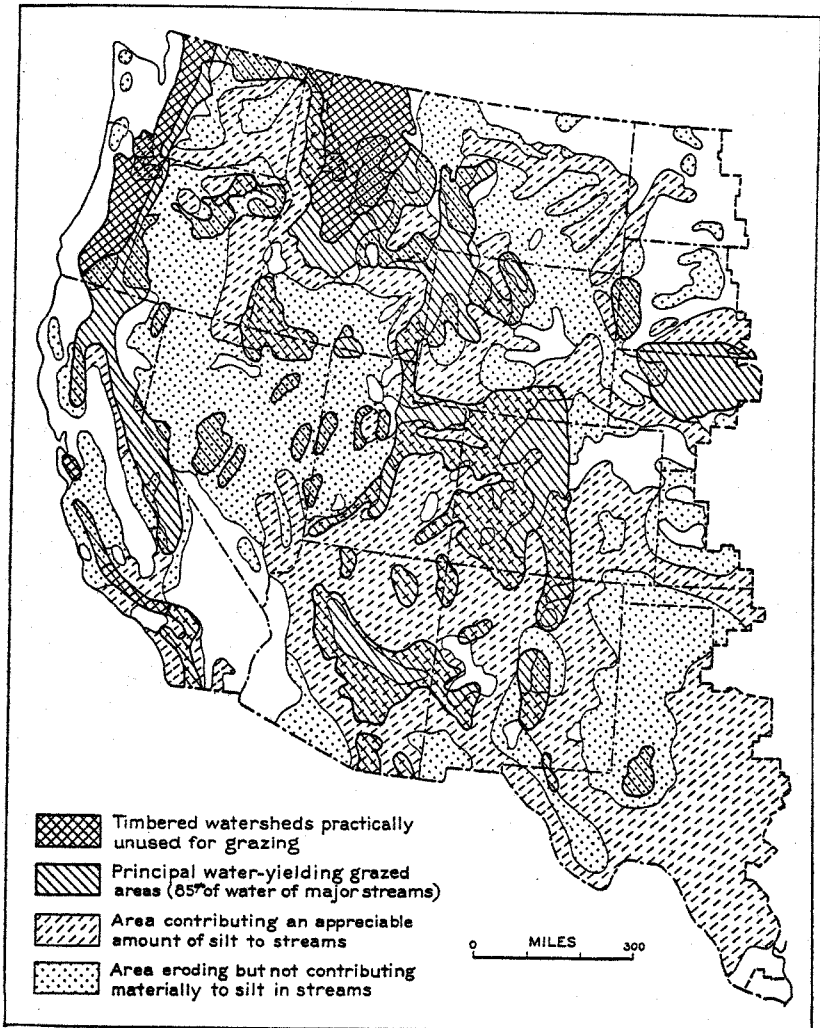


FIGURE 72.—IMPORTANT WATER-YIELDING AND SILT-PRODUCING AREAS.

Of the area yielding 85 percent of the flow of major streams, approximately 183,000,000 acres is grazed, 60,000,000 acres of which is contributing an appreciable amount of silt to streams. An additional 292,000,000 acres of range lands are also contributing appreciable quantities of silt to major streams. This means that the watershed utility is being impaired and that river beds, storage reservoirs, ditches, and canals are filling and clogging until their efficiency is seriously threatened.

lower Rio Grande Valley (151) in Texas and Mexico suffers also from floods at more or less frequent intervals. One occurring in 1932 practically wiped out flood-protection improvements costing approximately \$5,000,000 and caused damage to other property estimated at \$1,000,000 on the American side of the river alone.

Sept 17, 1980

Hormay

## Water Conservation in California

California Dept of Water Resources, Sacramento

Bulletin No 198 May 1976 95p 18 Fig.

29 Tab. 18 Ref, 2 Append.

### Water use in state

1.	Agriculture	84.69 %
2.	Urban	13.47
3	Power plant cooling	0.10
4.	Fish, wildlife, recreation	<u>1.74</u>
		100.00

Conservation measures proposed for  
1. and 2. above