### Table 63.—Numbers and trend of big game on national forests within the range area, 1924–34

<table>
<thead>
<tr>
<th>Species</th>
<th>1924</th>
<th>1925</th>
<th>1929</th>
<th>1927</th>
<th>1929</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black and brown bear</td>
<td>37,752</td>
<td>39,640</td>
<td>40,563</td>
<td>43,275</td>
<td>44,265</td>
</tr>
<tr>
<td>Grizzly bear</td>
<td>724</td>
<td>603</td>
<td>814</td>
<td>880</td>
<td>947</td>
</tr>
<tr>
<td>Deer</td>
<td>492,702</td>
<td>543,411</td>
<td>604,981</td>
<td>630,613</td>
<td>670,144</td>
</tr>
<tr>
<td>Elk</td>
<td>65,268</td>
<td>71,320</td>
<td>82,323</td>
<td>74,043</td>
<td>75,075</td>
</tr>
<tr>
<td>Moose</td>
<td>4,661</td>
<td>5,510</td>
<td>5,142</td>
<td>5,592</td>
<td>5,421</td>
</tr>
<tr>
<td>Mountain goat</td>
<td>8,344</td>
<td>8,887</td>
<td>9,418</td>
<td>9,584</td>
<td>9,798</td>
</tr>
<tr>
<td>Mountain sheep</td>
<td>12,033</td>
<td>11,643</td>
<td>11,263</td>
<td>11,243</td>
<td>11,924</td>
</tr>
<tr>
<td>Antelope</td>
<td>5,938</td>
<td>7,602</td>
<td>9,942</td>
<td>7,662</td>
<td>5,494</td>
</tr>
<tr>
<td>Total</td>
<td>613,339</td>
<td>685,171</td>
<td>761,478</td>
<td>783,445</td>
<td>835,968</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Species</th>
<th>1930</th>
<th>1931</th>
<th>1932</th>
<th>1933</th>
<th>1934</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black and brown bear</td>
<td>40,651</td>
<td>40,557</td>
<td>41,961</td>
<td>45,258</td>
<td>43,706</td>
</tr>
<tr>
<td>Grizzly bear</td>
<td>870</td>
<td>747</td>
<td>664</td>
<td>721</td>
<td>672</td>
</tr>
<tr>
<td>Deer</td>
<td>786,548</td>
<td>833,280</td>
<td>849,300</td>
<td>834,065</td>
<td>874,944</td>
</tr>
<tr>
<td>Elk</td>
<td>95,763</td>
<td>96,763</td>
<td>103,715</td>
<td>105,745</td>
<td>116,974</td>
</tr>
<tr>
<td>Moose</td>
<td>4,904</td>
<td>4,491</td>
<td>4,533</td>
<td>4,521</td>
<td>5,500</td>
</tr>
<tr>
<td>Mountain goat</td>
<td>11,565</td>
<td>11,262</td>
<td>11,736</td>
<td>11,588</td>
<td>12,742</td>
</tr>
<tr>
<td>Mountain sheep</td>
<td>11,446</td>
<td>11,032</td>
<td>10,900</td>
<td>10,426</td>
<td>11,602</td>
</tr>
<tr>
<td>Antelope</td>
<td>11,142</td>
<td>12,725</td>
<td>13,150</td>
<td>14,458</td>
<td>15,913</td>
</tr>
<tr>
<td>Total</td>
<td>955,260</td>
<td>1,030,907</td>
<td>1,038,219</td>
<td>1,086,855</td>
<td>1,084,147</td>
</tr>
</tbody>
</table>

The unmistakable trend of increase in wildlife population under natural environment, even with the handicap of ill-considered State laws, is in sharp contrast to the general trend of decrease on the more heavily depleted lands in other ownerships and under other managements. This long-term and widespread experiment, although the results simply confirm well-known biologic and ecologic laws, yet points the way to a fresh start in wildlife management.

**Major Problems in Wildlife Management**

A fresh start toward restoration of wildlife populations—particularly of game birds and animals, and of fish—requires, first of all, more general acceptance of established biologic and economic facts. These include the following:

1. **Wildlife is a product of environment and each species can succeed only under a specific environmental pattern, made up of determinable and (except for climate and elevation) controllable elements.**

2. **Management of wildlife starts with and is limited by management and manipulation of environment.**

3. **Lacking established legal power to force conservative management of land and environment, attempts to manage wildlife solely under restrictive game laws can succeed only to the degree that environment is independently maintained and improved. The key to wildlife management rests with land ownership.**

4. **The legal theory which places title to wildlife in the State, leaves little direct incentive to private or other public owners to manage land in a way to favor wildlife.**

5. **Game species must be handled on a crop basis, with the annual take adjustable to and definitely set on the basis of annual increase. The problem differs not at all in this respect from that of maintaining continuously productive flocks and herds of domestic birds and animals.**
6. In addition, successful wildlife management is a problem in applied biology, and requires, first of all, a factual basis, and secondly, professionally trained men to apply the facts. For game species, such questions as sex ratio, best season for taking, desirable degree of predatory control, and needed environmental changes, must be handled on a flexible basis, adapting action to needs of particular areas at particular times.

7. Given a suitable environment, and management on a crop basis, most wildlife species can succeed on lands used by other wildlife species, and by man and his domestic animals. If handled as a part of conservative multiple-purpose land management, wildlife populations can be maintained or increased. Deliberate attention to such things as reservation of feed for wildlife, both on summer and winter range, are simply a part of good land management.

8. The logical outcome of theories and methods of wildlife management which depend on detailed and rigid laws, as heretofore applied, is further reduction in population.

Restoration of far larger, more widely spread, and more readily available populations of game birds, animals, and fishes, is the heart of the wildlife problem. Hunting and fishing available to all, have been a part of the American tradition. Maintenance of this opportunity for the tens of millions of actual or potential hunters and fishermen who cannot afford to travel far, nor to pay high fees for the privilege, is of increasing importance in the face of increasing leisure.

Inevitably, public lands, managed to produce takable crops of game and fish, must furnish the major opportunity for free public hunting and fishing. The guides to future and effective restoration programs are clear. Restoration of environment, whether of range or forest—a function of land ownership—is the key to restoration of wildlife. Management of wildlife as a crop, in accordance with biological facts and laws, by professionally competent men, is inseparable from management and manipulation of environment and is therefore also a function of land ownership.
THE MAJOR RANGE PROBLEMS

$1,000,000 damage since 1923. The La Crescenta flood of 1934 took a toll of 30 lives and did $5,000,000 damage.

The loss of almost irreplaceable soil on the western range is as widespread as range depletion itself. In the mountains of all the western States accelerated sheet and gully erosion are stripping and cutting slopes and channeling meadows. Southwestern valleys are being trenched with great arroyos often 100 feet in depth and 300 or more feet wide, and both mesa lands and mountain meadows are being ruined. The silt loads of the rivers of the Great Plains and the "black blizzards" of the last few years, with their threat to farm and industrial values and health, bear testimony to ravaged lands.

Silt deposits filled the small Austin Dam Reservoir in Texas in 13 years. The Elephant Butte Dam is filling at the rate of about 20,000 acre-feet annually. The McMillan Dam in New Mexico is now valuable only for diversion. The same thing is happening in greater or less degree in most of the reservoirs throughout the West.

The grazing value of range watershed lands may not often exceed $3 per acre. The watershed value is much more difficult to determine. Some indication of relative values may be gained, however, from a consideration of dependent investments. More than 5.8 billion dollars is invested in irrigated land and improvements, as compared with about 4.1 billion dollars in range livestock and related ranch properties. Each of the 475 million acres of range land yielding water or contributing silt to streams supports an investment of $12.27 in irrigation works, lands, and facilities, and this figure would be still higher if the investments for power and municipal water supplies were added.

Another measure of the value of the range cover can be obtained by considering the loss in the productive capacity of the soil from erosion as a result of depletion. The fertile top layers go first. Several hundred million acres have already lost 1 to several inches, and the productive capacity may have been reduced by one-fourth or one-half or more. These layers can be replaced only very slowly, as shown by investigations under the more favorable conditions in the East which indicate a rate of about 1 inch per 1,000 years.

Fortunately, man is not helpless in this situation, black as the picture now is. On many of the protected municipal watersheds of the West and on the managed watersheds of the national forests are examples of arrested erosion and controlled floods which are the direct result of range restoration. Not only has the production of forage been increased but the services which watersheds should render in maximum flows of usable water for dependent crop agriculture, in municipal water supplies, in power, in clear fishing streams, and in greater security to life and property have followed as a matter of course.

IN WILDLIFE

Wildlife is one of the natural products of the range. Its present annual economic value is estimated at more than $90,000,000. To evaluate its economic significance, however, expenditures exceeding $40,000,000 by hunters and fishermen should be added, and, in part also, those by recreationists of over $155,000,000, because one of the
intangible but chief values of wildlife is the increased recreational attraction and enjoyment which it affords.

No one familiar with wildlife requirements will question the statement that the range with little or no impairment in its value for other uses could support a vastly larger wildlife population. So far, in fact, have numbers been reduced that any recital of what remains is in itself an indication of both tangible and intangible social and economic losses.

A few outstanding examples will suffice. The former millions of buffalo have declined to the few thousand on reservations; the thirty or forty million antelope to about 65,000; the few mountain sheep, goats, moose, and grizzly bear left are barely holding their own; the scattered remnants of upland game birds and fur bearers are still declining; the reduction of waterfowl has become a matter of national concern. Most of the big-game animals have been crowded off their original range into much less favorable conditions.

The chief factors and causes which are responsible for the present situation, discussed in detail later, need only be listed here:

1. The deterioration of the habitat through range depletion which has destroyed both food supplies and cover for land animals and birds and silted fishing streams.

2. Complications growing out of the passage of large areas of land to private ownership under a policy which offers no incentive to the owner to protect and maintain wildlife.

3. Maladjustments in land use, such as swamp drainage, that have attempted but failed to use for agricultural crop production land which would render its highest social and economic return in wildlife production.

4. Unrestricted or poorly controlled hunting and fishing.

5. A series of ill-advised or poorly handled constructive measures such, for example, as game preserves, transplanting, buck laws, etc., which have created almost as many problems as they have solved.

6. Protection alone defeating its own purpose by leading to overpopulation.

7. Wildlife agencies recruited on the basis of political rather than technical qualifications.

8. The lack of adequate technical knowledge.

9. The belated development of the basic concept that game management is required, having for its purpose production as a crop with provision for the annual harvesting of the production or surplus, this in proper correlation with other legitimate uses of the range.

The fundamental cause, however, is again the typical American philosophy of prodigal destruction rather than the conservation of natural resources.

Public interest in wildlife has increased very rapidly during the last few years, the direct result of the efforts of many sportsmen's and other associations and of State and Federal agencies. Although many of these activities have not reached the fundamental problems, nearly all have constructive aspects. Through them, for example, State agencies have contributed toward the rehabilitation of the wildlife resource. The Biological Survey has established a number of migratory bird and other reservations, controlled predatory animals injurious both to wildlife and domestic livestock, controlled range-
destroying rodents, and conducted research necessary as a basis for wildlife management. The Bureau of Fisheries and numerous State agencies have stocked many western streams and cooperated in their improvement.

The national forests have had a more important effect on the rehabilitation of wildlife in the range country than any other measure so far adopted, and are a concrete, although far from perfect, indication of the possibilities. National forest increases, which for big game animals alone are about 75 percent in the last decade, have been brought about with very little reduction in other forms of use, such as livestock grazing. The reappearance of wildlife has undoubtedly been one of the factors responsible for over 38 million visitors in the national forests in 1934 as compared with 3 million in 1917. These increases have not come without difficulties growing out of rigid State laws which stood in the way of reducing surpluses regardless of whether feed was available to keep the game from starving, or of the legitimate requirements for livestock or other forms of use, nor without other difficulties in working out effective cooperation between State and Federal agencies.

IN RECREATION

During the past half century public opinion regarding the social necessity of outdoor recreation, not alone for the favored few but for all, has undergone as radical a change as that regarding bathtubs and night air. People generally have learned that modern life makes demands for which the most practical remedy is periodic association with nature. The needs and the benefits are both physical and mental.

If increased opportunity for wholesome outdoor activities is not provided, existing play areas will be so crowded that only partial returns for expenditures of time and money can be obtained, and greater leisure time may not as it should contribute to health and happiness. The American people have developed a mobility which dwarfs into insignificance the outdoor spaces that can be dedicated exclusively to recreation.

Range lands, as well as others, possessing the qualities sought by outdoor recreationists have thus acquired economic values which often exceed those for other services. They are capital assets of their communities. They draw large sums of money that otherwise would not be received; money which contributes as fully to economic security as that from any other source.

People do not as a rule pay directly for the privilege of enjoying scenic charm or other recreational values, but they do pay indirectly through purchases of commodities and services for which there otherwise would be no local market. The recreational use of lands means that the market is brought to the resource without cost of transportation.

The serious depletion of most range areas, the reduction in wildlife, the erosion and silting of streams, have all been reflected in impaired recreational values. Where originally the mind was inspired by views of grass-covered and flower-studded slopes, it is now depressed by the sight of a terrain scored and dissected by
lowest forage values, the reduction in grazing capacity for the range country as a whole is even less than the percentage of total area required for nonuse. It is calculated at 0.3 percent of the total cattle-range capacity and 1.17 percent of the total sheep.

As a matter of fact, so unstable and susceptible to damage are some of the range types that, even though no consequential watershed conservation problem existed, there would be a question whether they should be used for domestic livestock. Establishing a business on such an unsure and vulnerable basis is hardly to be regarded as desirable, either for the individual or the community.

The removal from range use of the 11.5 million acres will for all practical purposes not affect the industry or the economy of the range country.

In many places winter range for big game is the indispensable key to maintaining specific game herds. On the vast majority of the range area, moderate stocking to domestic animals, within the true grazing capacity of the range, will leave room for wild animals, and no blanket removal of livestock is necessary or desirable.

A part of the problem is to remove from range use key areas urgently needed for recreation or game, where the pressure of these inescapable demands is so severe as to make any combination with domestic livestock and other uses impracticable. Where there is heavy camping or other recreational use, for example, or where there is a heavy concentration of hunters, even for a short period, the range livestock business inevitably suffers. Moreover, stock interferes with human use and occupancy, and the unavoidable tension and conflict must on such key areas be resolved by excluding domestic stock. Considerable parts of the high Sierra in California, for example, have for years been without domestic stock for this reason.

Removal of such lands from domestic livestock use in particular localities has been and is inevitable, as competing and inescapable public demands of growing population and growing outdoor recreation develop. For example, 4,240,000 acres of usable range on the national forests have been closed for exclusive use for wildlife and recreation. Some additional areas may need to be closed from time to time as specific problems develop. Other areas, as conditions on adjoining ranges change, may no longer be required for exclusive use and may be opened for multiple use. The areas so affected form a relatively small part of the whole range area, but are critically important where they do exist. Most acute at the present time is the need for shifting from heavy use by domestic livestock which in turn practically excludes use by wildlife, to multiple use on certain areas needed to supplement existing multiple use range. Especially important is the need for additional winter range to supplement the present summer game range on the national forests in many places in the West. This involves both public domain and privately owned lands. Where privately owned range is involved public acquisition usually is necessary. In table 72 are given the best available estimates, both for private and for Federal lands, of the additional area needed to support specific population of game along with lighter use by livestock. The estimates for game, both for public and private land, are by the Forest Service; those for waterfowl areas are by the Biological Survey.
Wildlife is one of the natural products of the range. Its present annual economic value is estimated at more than $90,000,000. To evaluate its economic significance, however, expenditures exceeding $40,000,000 by hunters and fishermen should be added, and, in part also, those by recreationists of over $155,000,000, because one of the

with high public values which cannot or will not be safeguarded by private owners.

(A) How provide for the consolidation of Federal lands into workable administrative units.

(i) How reconcile the existing difference between national forests and grazing districts in the Federal contribution to States, etc., in lieu of taxes and place it on an equitable basis.

(j) How provide for an effective working relationship between the Federal Government and the States in the handling of wildlife on Federal lands.

(k) How carry a long-term affirmative program, particularly if it cannot be made self-liquidating.

6. A sixth group of major problems centers in the social and economic aspects of integrated range and crop agriculture.

How prevent further human wastage and insure reasonable standards of living and social and economic security for the maximum number of people that the combined range and cropland resource can support. The handling of all lands regardless of ownership is involved.

7. A seventh group of major problems centers in basic knowledge.

(a) How obtain the basic information needed by both private and public owners on the biological, social, and economic phases of the conservation and use of the entire range resource.

(b) How insure the application of this knowledge by private owners and public-land managers.

In briefest form the lines of action of greatest immediate urgency and importance are—

1. For the range and soil resource.—To stop further soil and forage depletion, start both on the upgrade, reduce excessive stocking, and place all range lands under management.

2. For land ownership and use.—To rectify existing maladjustments and obtain a sound distribution of ownership between private and various public agencies, build up economic private and public units, balance and integrate crop and range use, and correlate the livestock, watershed, forest, wildlife, and recreation forms of range land uses and services.

3. For privately owned range lands and livestock.—To relieve private owners of submarginal and high watershed and other public-value lands, obtain a recognition of the responsibility of stewardship, reduce excessive stocking, place lands under management, restore cheap range feed, build up economic units, and minimize or remove various other financial handicaps.

4. For State and county lands.—To reconcile range conservation and the financial needs of State institutions, place lands under administration and management by agricultural agencies, solve the tax delinquency problem, and share the acquisition of submarginal and high public-value lands.

5. For Federal range lands.—To transfer the grazing districts to the Department of Agriculture; place all remaining lands under administration and management; to interpret and probably amend the Taylor Grazing Act to provide for a sound distribution of grazing privileges, prevent the establishment of prescriptive rights, and provide for the correlation of various grazing uses; and share the acquisition of submarginal and high public-value lands.

6. For social and economic security.—To prevent further human wastage and insure social and economic security for the population dependent on the combined range-cropland resource.

7. For basic knowledge.—To obtain and apply the information necessary for the conservation and wise use of the range resource for public benefit.

Implicit in these problems and lines of action is the question of the desirability or necessity, if Federal obligations are to be fully redeemed, for the full concentration of responsibility for public action in a single agency. A similar question holds for the States.
Wildlife

A PROGRAM FOR WILDLIFE

That wildlife in America—animals, fish, and birds—has not received the recognition which its importance justifies is now realized. Hunting, fishing, trapping, and the recreational opportunities so closely interwoven into their enjoyment are major factors in the social and economic development of the West. Fortunately, if properly managed, the environment required by this valuable resource of range lands can be maintained without serious interference with use for other essential purposes.

"Single use" for game will be necessary on only a limited area. Even on game refuges and bird sanctuaries, watershed protection will be furnished and recreation may be allowed with some restriction. Use by domestic livestock should not, however, be allowed on some limited areas of especial importance to wildlife, such as: (1) Nesting and feeding refuges for migratory waterfowl located at key points along the paths of flight, (2) winter range for big game where there is a critical shortage of feed for this season, (3) special areas to preserve species in danger of extinction. Closure to domestic stock because of such exceptional requirements for single use, cannot be determined from information now available. Undoubtedly part of the 20.5 million acres proposed for public acquisition for wildlife, as previously discussed, will need to be closed. Approximately 2.8 million acres are already closed for wildlife on national forests. In the aggregate the area requiring closure, however, will probably not exceed 1 or 2 percent of the range land.

REFUGES AND SANCTUARIES

The management program must include maintenance of wildlife numbers in balance with the available feed and other environmental factors. Refuges should be of a temporary rather than permanent character and under flexible regulation so as to permit prompt adjustments with changing needs. The same basic principles for the protection of the range will apply as for domestic livestock, including proper stocking, proper class of stock, proper seasonal use, and distribution. Many small refuges usually are preferable to a few large ones in effecting wider distribution of game, in securing a
It is doubtful that anyone today can conjure up the sight, smell, sound and feel of the Great Plains prior to the coming of the white men.

A partial requirement would be to envision an estimated 30 to 60 million bison wandering and feeding over this vast grassland along with 4 to 8 million antelope and extensive bands of deer, elk, big horn sheep, wolves, cougars, bears and other wild animals (Larson 1940:117; Gates 1965:114-116).

On August 29, 1806, Lewis and Clark observed 20,000 bison feeding on an open plain near the Big Bend of the Missouri.

Osborne Russell, an American trapper, found that on his arrival in the Powder River Valley on February 7, 1838, the buffalo had consumed all the grass along the river bottoms and his party was forced to feed their horses cottonwood bark (Russell 1955:81).

A modification of the environment specifically attributed to the bison was produced by an important grooming activity known as "wallowing." It resulted in saucer-shaped depressions scattered over the rolling plains. Buffalo wallowing (or rolling on one side and then the other on wet or dry ground) may have been induced by insect irritation, rutting activities, or perhaps merely to remain cool despite the summer heat.

Another important effect of the bison was to mark the plains with a vast network of well-worn trails, usually between the tablelands and water-
courses (Arthur, ). On steep slopes, the deeply eroded trails
...occasionally acted as drainage canals to lower the water table in
uphill areas and thus eventually produce a change in vegetation (McHugh
1958:37)."

Bison undoubtedly had a major influence on the character of the western
plains before livestock were introduced. They overgrazed certain areas
of the grasslands, but their wandering nature would probably have resulted
in their leaving the area for "greener pastures," and not returning for
an extended period of time. During this time the range would recover
(England and DeVos 1969). Thus, intense grazing followed by deferment
or rest seems to have existed on the grasslands.
FIRE

It is clear that the Indians were very knowledgeable about the use of fire and its effect on both the grassland and bison. Perhaps the most significant use of fire by the Plains Indians was in controlling the movements of game, particularly bison. They literally herded the animals to a predetermined point from distances of up to 40 miles through the skilled use of fire.

Although the Indians have often been accused of carelessly firing the plains for trivial reasons, the fires they started not only helped maintain the plains in a short grass condition but fires deliberately set during one season brought benefits during a later one.

On March 29, 1805, Lewis and Clark reported near the mouth of the Yellowstone River that: "the Plains are on fire in view of the fort on both sides of the River, it is said to be common for the Indians to burn the plains near their villages every Spring for the benefit of their horses, and to induce the Buffalo to come near to them (Lewis and Clark 1969:1:279)."

The bison and other grazing animals apparently preferred the tender young grass that grew in those areas that had been recently burned. Also, plants on recently burned areas began growing 2 to 3 weeks earlier than plants on unburned areas.
THE ARRIVAL OF WHITE MAN

Lewis and Clark's Expedition opened the way for subsequent penetrations of the west by trappers, fur traders and miners with gold dust in their eyes. The mining camp of Bannack flourished and in 1864, when Montana Territory was organized, became the site of the first territorial legislature.
CATTLE

With the establishment of mining camps came the cattle herds to supply necessary food. The main trails for livestock from the West Coast and southwest were through the Monida Pass south of Dillon and through the Powder River country in eastern Montana. By 1876, the cattle kingdom was fully established in Montana.

In 1880 Granville Stuart, scouting for new range in Montana, wrote: "...No grass here, eaten into the ground. I wonder that the cattle here did not all die last winter. ...I certainly would not select this for a cattle range but I presume there are five thousand cattle in here now."
CATTLE/BUFFALO COMPETITION

The vast buffalo herds were in competition with livestock for the forage, so in order to graze cattle and sheep and to plant crops, the buffalo were eliminated. By 1879 hide hunters were working out of Miles City. Excerpts from the Yellowstone Journal, the newspaper at Miles City, show the results:

January 17, 1880

"Jas White, the boss buffalo hunter came to town Thursday to dispose of his hides, 2,000 of which he secured this season."

October 15, 1881

"Twelve hundred tons of hides were shipped from Montana this year by H.C. Tilhaghast and Co., of Chicago.

According to one contemporary account, the era of open plains changed so abruptly that the transition could almost be measured as a matter of months. Granville Stuart, familiar with the Musselshell Area and with Montana in general, provided the following summary:

"It would be impossible to make persons not present on the Montana cattle ranges realize the rapid changes that took place on these ranges in two years. In 1880 the country was practically uninhabited."
One could travel for miles without seeing so much as a trapper's bivouac. Thousands of buffalo darkened the rolling plains. There were deer, antelope, elk, wolves and coyotes on every hill and in every ravine and thicket. In the whole territory of Montana there were but 250,000 head of cattle, including dairy cattle and work oxen.

"In the fall of 1883 there was not one buffalo remaining on the range and the antelope, elk, and deer were indeed scarce...."
WINTER FEED REQUIREMENT

With the Indians on the reservation, the buffalo gone, and the railroad at Miles City, the range was opened to large scale ranching. The Federal government bought local beef to feed the Indians, thereby creating a new cattle market close at hand. Cattle numbers boomed, the luxurious grass from unusually favorable years attracted even more trail herds. In 1884 a drought hit and continued through 1886. The winter of 1886–1887 was a disaster. More than half of the cattle perished. Stockmen learned their lesson; they were forced to put up hay and feed their cattle during the winter.
The Homestead Act of 1882, and the enlarged Homestead Act of 1909 brought about the conversion of thousands of acres of native rangeland to cropland.

Conflicts soon arose between the cattlemen, sheepmen and homesteaders over the use of the land. Barbed wire was developed so that the landowner could define his "territory." Homesteaders, or "sodbusters" as they were called, fenced their farms to prevent roaming cattle from destroying their crops. In later years, cattlemen also began fencing their grazing areas. This caused heavy concentrations of livestock. With the cattle confined, they could not migrate to ungrazed areas and thus continually grazed the same land. In time, ranchers realized that if the fenced ranges were to remain productive, it was imperative that the land be prudently stocked and properly managed.
HORSES

The establishment of early farming necessitated a tremendous influx of horses to pull the plows and other farm equipment.

By the early 1920's there were great numbers of unclaimed and estray horses in Montana. They played havoc with cultivated lands; tore down fences, drove sheep and cattle from water and competed with domestic livestock for forage. Much of today's deteriorated rangelands can be attributed to the thousands of horses which escaped the early homesteads, soon abandoned by a series of droughts.
CONTINUED DETERIORATION

Competition between users for forage was great in the late 1920's. There was no incentive to manage the land good, because someone else would reap the benefits. The resources were seriously deteriorated and livestock production was poor. Howard (1959) reported the following: "There were 4,000 cattle, 2,000 horses and millions of prairie dogs on the 108,000 acres between Mizpah and Pumpkin Creeks."

Under the guidance of a county extension agent with support of the local range users, in June 1927, the U.S. Congress passed legislation to develop the Mizpah-Pumpkin Creek Grazing District to provide for controlled cooperative livestock grazing. The Mizpah-Pumpkin Creek District proved to be a success. Range condition was improved in a relatively short period of time. Thus in 1933, the Montana legislature adopted a grazing district law, and one year later the U.S. Congress passed the Taylor Grazing Act.
TAYLOR GRAZING ACT

The Taylor Grazing Act was enacted in June 28, 1934, to stop injury to the public grazing lands by preventing overgrazing and soil deterioration to provide for their orderly use, improvement and development, to stabilize the livestock industry dependent upon the public range, and for other purposes.
The Bankhead-Jones Act was passed in 1937 following the droughts of the 1930's, when submarginal farms (mostly dryland) were purchased by the Federal government. Most of these lands were reseeded to prevent erosion and again used for livestock grazing.
GRAZING SERVICE

The Grazing Service was organized in 1939 to manage the public lands in accordance with the Taylor Grazing Act.
In 1946, under a Presidential Reorganization Plan, the Grazing Service and General Land Office were combined to form the Bureau of Land Management. During the early years (1939-1951) Advisory Boards provided government personnel invaluable assistance in controlling grazing use on the public lands. During this period positive action was taken toward trespass livestock and large herds of horses were rounded up.
The Federal Land Policy and Management Act of 1976 was enacted by the Congress declaring that it is the policy of the United States that:

"...management be on the basis of multiple use and sustained yield...."

"...the public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use...."
a grazing system for wildlife

Most livestock grazing systems have one goal—to produce the highest financial return. Whether that return is short-term or long lasting depends on the system and its manager.

Recently, such single-purpose management—especially on public lands—has received its share of badmouthing. As a result, many grazing plans now contain the phrase, "... and it's good for wildlife."

"Wildlife" means birds, mammals, reptiles and fish, and, of course, feeding habits of all species differ. When tacking on this phrase to assure readers of the plan's multiple purposes, planners sometimes forget to mention which wildlife species is benefited—and how. We think these planners should look up the definition of "lip service."

When tempted to add that phrase, land
managers should first ask, “What is it that’s good for which species of wildlife?” In pursuing the answer, the manager may conclude he was about to say something which is unsupported by fact.

At this point, the planner is probably asking, “What livestock grazing system can benefit wildlife?” The best answer, to date, came in 1970 from Gus Hormay of the Bureau of Land Management: rest-rotation grazing.

In a report about this grazing system, Hormay wrote, “High-level production of livestock and other values on western rangelands depends on the production of desirable, vigorous plants on the entire range.” Previously, he noted, a major factor in the deterioration of these plants was overstocking. Many managers, after acknowledging the need to preserve range productivity, reduced their herds hoping to bring back the plants. “However,” Hormay points out, “assumption that plants can be grazed to a proper level through regulation of stocking is unrealistic because of the grazing habits of livestock.”

Instead of using the vegetation uniformly, grazing animals concentrate on more desirable plants. Thus, according to Hormay, animals “constantly graze the more palatable plants and accessible areas closely and, invariably, beyond proper-use level . . . . So under continuous grazing at any stocking level, the more palatable and accessible plants are gradually killed out.”

His solution to this dilemma breaks up this continuous use by “resting” parts of the range. Under this system, the land is divided into pastures or units which are systematically rested. Not only does this system give plants a chance to recover their vigor, it also allows seeds to ripen and seedlings to establish. The result is a more productive range for domestic livestock and wildlife.

To illustrate, consider this generalized formula for a grazing system to benefit a desirable plant in the Missouri Breaks, bluebunch wheatgrass. Assuming the land manager establishes or sets up four similar fenced pastures in the system, he could plan his long-term grazing policies like this:

<table>
<thead>
<tr>
<th>FIRST YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pasture A</strong></td>
</tr>
<tr>
<td>Rest (don’t graze at all this year)</td>
</tr>
</tbody>
</table>

| **Pasture B** | **Pasture C** |
| Graze, but only after seeds are ripe (maybe July 15) so the cows will trample and “plant” the seeds | Rest until root growth is complete (maybe July 1), then graze |

(A grazing allotment—can be virtually any size—depending on vegetation type, land ownership, etc.—Ed.)

A land manager who is concerned about wildlife on the land he manages (in the case of public land, laws dictate that concern) can plan a similar system to benefit wildlife habitat. For example, rabbitbrush is a prime mule deer browse plant in eastern Montana. If a manager wishes to improve mule deer habitat, he can plan his system to benefit rabbitbrush.
However, rest-rotation will work only if it provides for the needs of the vegetation. The plants must be grazed only when they are ready. When is a plant "ready"? One example is the date the plant matures—when the seeds ripen. If grazing waits until then, the animals will knock off and then trample the seeds, or in short, "plant" them. Another example allows the seedlings to become established before grazing is allowed.

How does this grazing system affect purported needs for artificial treatments such as brush control? Horman believes managers should let their rest-rotation system work a few years before determining the need for brush control. Then—if the need is proved—treat only the acreage required. "In doing so," he reminds managers, "keep aesthetic and all other multiple-use values in mind.”

Unfortunately, few Montana grazing managers have followed Horman’s criteria completely. Thus, most Montana grazing systems, at this point, do little for wildlife.

Possibly the most common deviation from Horman’s guidelines is brush control. Instead of allowing perfectly managed rest-rotation systems to alleviate the need for brush control, some managers have already controlled or apparently misinterpreted or misused the rest-rotation system to justify control. What do such deviations mean for wildlife? Bad news.

For example, the importance of wildland shrubs such as sagebrush to many big game and upland birds—especially antelope, mule deer, elk and sage grouse—is well documented. Wildland shrubs are also important in many other parts of the world, not just Montana.

In his article for the publication, "Wildland Shrubs—Their Ecology and Utilization," S.L. Everist wrote, "It is inevitable that wildland shrubs and trees should have greatest value to livestock in semiarid and moderately arid regions [of Australia] and have least value in humid regions . . . ."

H.N. Le Houèrou came to the same conclusion concerning arid and nonarid Mediterranean and African countries. "All shrubs native to these regions are useful," he wrote in a technical report.

"Many species are browsed and often constitute the only feed reserve during recurrent periods of drought; they thus enable survival of millions of animals that otherwise would perish . . . . Unfortunately, shrubs and trees are seriously mismanaged and are receding rapidly in the face of population pressures."

Since the intermountain region of the western United States is basically classed as semiarid, the findings of these two researchers strike home. But what do Montana land managers think about wildland shrubs like sagebrush? Instead of managing them, some managers seem to have a mania for ridding the landscape of them.

Or, in the words of Alberto Soriano, professor at the University of Buenos Aires, Argentina, "Man has progressed less in learning how to manage shrubs than he has in managing either herbs or trees." In Montana, mountain mahogany and antelope bitterbrush, for example, have been subjected to brush control simply because they were unfortunate enough to grow next to sagebrush.

Paced with objections to brush control, land managers have some interesting responses. One recently stated, "The [Montana Department of] Fish and Game says sage grouse and antelope need sagebrush. Well, there ought to be millions of both of them because we have a lot of sagebrush."

When referring to an area sprayed for sagebrush, another said, "The sage grouse population is down because . . . [hunting] seasons have been too liberal the last year or so."

Such statements reflect a negative, almost antagonistic, attitude toward the biological relationship that must exist naturally between wildlife, the land and the vegetation. It does exist—it’s not instigated by biologists, land managers or anyone else.

When it comes to public lands, there’s an especially important case in point. Sometimes there seems to be a misunderstanding about the intent of two public laws which state, in essence, National Forests and Bureau of Land Management lands shall be administered for livestock grazing, timber, watershed, wildlife, fish and recreation purposes and for preservation of public values under principles of multiple-use sustained yield production (emphasis added).

Obviously, the private landowner presents a different situation. He must extract a livelihood from his land. Nevertheless, most private landowners should realize (many do) that vegetation is the foundation of any livestock operation. A cow or sheep is simply energy derived from the plants, wrapped in a hide and sold at the marketplace.

So the benefits of rest-rotation grazing systems—for livestock, for wildlife, for man, for the land—are obvious, and right now, mostly avoided. Let’s get with it.—Joe Egan