

FOREST WILDLIFE MANAGEMENT ON COOPERATIVE AREAS

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The North Carolina Wildlife Resources Commission and the United States Forest Service cooperatively manage eleven wildlife areas on the Pisgah and Nantahala National Forests (Table 1). The game management on nine of these areas is discussed in this paper.

Table 1. North Carolina Wildlife Resources Commission and United States Forest Service Cooperative Wildlife areas.

Management Area	Size (acres)	Big Game ^a Species Hunted	Small Game ^a Species Hunted	Refuge Managers Assigned to Area
Nantahala National Forest				
Santeetlah	37,168	bear, boar	grouse, squirrel, raccoon	2
Fires Creek	13,720	deer, boar	grouse, squirrel, raccoon	1
Standing Indian	28,432	deer	grouse, squirrel, raccoon	1
Wayah	11,284	deer	grouse, squirrel	1
Pisgah National Forest				
Sherwood	30,875	deer, bear	grouse, squirrel, raccoon	2
Pisgah	100,000	deer, bear	grouse, squirrel, raccoon	4
Mt. Mitchell	25,200	deer, bear	grouse, squirrel	3
Daniel Boone	46,500	deer, bear	grouse, squirrel, raccoon	3
Rich Laurel	15,700	deer	grouse, squirrel, raccoon	1

^a *Ursus americanus*, *Odocoileus virginiana*, *Sus scrofa*, *Procyon lotor*, *Sciurus hudsonicus*, *Sciurus carolinensis*, *Bonasa umbellus*.

The Pisgah Preserve, which is a Federal Game Preserve, was formerly part of the Vanderbilt Estate and deer were stocked here between 1890 and 1900. Practically all of the deer in Western North Carolina, as well as several adjoining states, came from this herd. Between 1929 and 1935, the Wayah, Mt. Mitchell, and Daniel Boone Areas were stocked, and during the period 1937 - 1940, all the other areas except Rich Laurel had deer releases. The Rich Laurel Area was set up in 1948 around a small herd of deer released a few years previously.

These areas are in very mountainous country with even the lower valleys above 2,000 feet and with peaks ranging up to nearly 6,700 feet. The more prevalent cover type is mountain hardwood, with the dominants being red, white, and chestnut oaks, and hickory. Considerable cove hardwood type is found with the

dominants being yellow poplar, yellow birch, black birch, hemlock, and various magnolias. Other forest types found in limited amounts are beech-maple and spruce-balsam; the latter being found on the Pisgah National Forest at elevations of 4,500 feet or more. The most prevalent understory trees and shrubs are dogwoods, sourwood, rhododendron, mountain laurel, dog hobble, and buckberry.

About ten years previous to the beginning of the present Pittman-Robertson development project (1949), the Pisgah Preserve had been through a tremendous build-up of deer with an estimated top population of approximately one deer for each five to ten acres. While apparently no deer starved to death, this overpopulation did cause a food shortage and heavy browse line to develop. Heavy hunting, trapping, and several years with serious outbreaks of hemorrhagic septicemia reduced the herd to the present estimated 2,000 to 3,000 deer.

Deer herd and forage conditions on all other management areas are normal, although some signs of an overpopulation are appearing on the Mt. Mitchell and Daniel Boone Areas. The only other occurrence of hemorrhagic septicemia on the management areas was reported in 1939 from the Wayah Area.

This year's big game hunt on the Pisgah Preserve will be the 16th annual hunt. The Mt. Mitchell and Daniel Boone Areas were first hunted in 1940 and the other areas have been hunted since 1948.

Formerly, the take of big game on all areas was limited by the number of permits sold. This year, however, the number of hunters on the Wayah and Standing Indian Areas will not be limited, and permits will be sold at the checking stations. On the other areas hunts for deer, bear, or boar must be applied for in advance, and where applications exceed the assigned quotas, a public drawing is held. All deer are taken by still hunting and individual permits are issued. Bear and boar hunting is by parties of 15 to 25 men who are allowed to take ten dogs. On areas which are convenient and close to population centers, a drawing usually is necessary; on other, more inaccessible areas, this is necessary only for certain dates.

In the past, hunts have been of two and three days duration, with a hunter success percentage of 10% to 25%. One handicap of the system has been, that while many hunts have not filled up as to the total hunter quota, the first date has usually been heavily oversubscribed. This year, in an effort to overcome this tendency, the first hunt will be two days, the second three days, and third four days, with the same fee being charged for each. It is felt that limited quota hunts can be done away with in the future as more deer herds are made available to the public. On all small game hunts, the number of hunters permitted in the area is not limited.

The Cooperative Agreement between the Wildlife Commission and the Forest Service provides that the Forest Service shall furnish all installations such as protector's stations, game and fish checking stations, signs, etc. The Wildlife Commission furnishes personnel, equipment, and supplies for protecting, managing, and developing these areas. The proceeds from all hunts amount to roughly \$26,000 annually, and one-half this amount is donated to the U. S. Forest Service, which is used for maintenance and to conduct a limited amount of wildlife development work, such as seeding roads and log landings with grass and clover. To supplement and enlarge upon this development, Pittman-Robertson Project 28-D was initiated in 1949. The objectives of this project are to mark the boundaries of the management areas permanently and to improve forest game habitat by

distributing salt, controlling predatory animals, planting permanent pasture and honeysuckle, creation and maintenance of small openings, cutting timber for browse, pruning fruit trees, and increasing rhododendron sprout growth.

BOUNDARY LINE MARKING

At the beginning of the project, it was decided that a more permanent method of painting and posting the management area boundary lines was needed. A high grade of orange enamel paint was applied in two horizontal four inch stripes about four inches apart on trees at approximately shoulder height. Two types of aluminum signs were used; a small one which was spaced about twenty-five to the mile, and a larger type which was placed at trails, campgrounds, and other public-use areas. The small (5" × 8") sign reads, "Wildlife Management Area Boundary Line. U. S. Forest Service and NC Wildlife Resources Commission Cooperating." The larger (14" × 17") reads, "You are in a Wildlife Management Area. Hunting and Fishing by permit only. Guns and dogs prohibited. U. S. Forest Service and NC Wildlife Resources Commission." At first, the smaller signs were fastened to trees with small aluminum nails, which were driven in to within one-fourth inch of the head to allow for tree growth. However, it has been found that one-fourth inch is not enough to allow for tree growth, and eight penny conventional nails are now used, two to the sign, and leaving one inch for tree growth. The larger signs were backed with three-quarter inch boards.

The original plan called for a crew of two men to paint and post two miles per day. When the work began, it was found that they could more than double this if the old line was easily located.

In the three years that these signs have been up, the weather has had no visible effect on them. However, they are easily torn or cut, and several have been destroyed by vandals. A few cases have occurred in which bear have torn the signs down.

CONTROL OF PREDATORY ANIMALS

Control of predatory animals is a controversial subject and was undertaken with some misgivings. It was decided that since game species were managed for harvesting, the predaceous animals should be kept under control. Species trapped were wildcats, foxes, and skunks.

Progulske (1952), in his work on wildcats in North Carolina and Virginia, states that deer, raccoon, and squirrels all rate high on the food list of wildcats, and all three of these species are hunted on the management areas. Wildcat and fox are reported as turkey predators by Mosby and Handley (1943). Fox and skunk are listed by Darrow (1947) as two of the most destructive natural enemies of the ruffed grouse.

Each of eighteen full-time refuge managers put out a trap line of approximately twenty-five traps and checked them every other day. The traps were kept out for thirty to forty-five days. The catch for the period 1950-1952 is shown in Table 2.

The number of bobcats taken is so small that it does not appear to have any appreciable effect on the deer herd. On the Pisgah Preserve only 28 were taken on 100,000 acres over a three year period and their sign is very scarce now. For the

Table 2. Predatory animal control.

Area	Bobcats	Foxes	Skunks
Santeetlah	6	17	39
Fires Creek	8	10	48
Wayah	10	18	27
Standing Indian	9	10	28
Sherwood	24	34	30
Pisgah	28	119	273
Rich Laurel ^a	1	1	3
Mt. Mitchell	37	48	20
Daniel Boone	21	25	107
Total	144	282	575

^a Trapped 1952 only.

years 1950, 1951, and most of 1952, only twelve wildcat deer kills were reported. Known deer kills by dogs were several times this number.

A total of 282 foxes and 575 skunks were taken during this same three year period. In contrast to the bobcat control, the control of foxes and skunks appeared to have a salutary effect on the grouse population and harvest. Before control of these predators in 1949, only 64 grouse were harvested on four areas; following trapping operations, 99 were taken the next year. After two seasons of trapping, the take climbed to 127 birds. No such direct correlation was found between squirrel numbers and predator control.

Another result of trapping operations is a sharp increase in the rabbit population. These animals no doubt act as a buffer between grouse and their natural predators.

SALT DISTRIBUTION

Salt, at the rate of approximately one 50 pound block to each 1,000 acres has been put out each year. These stands are refilled in the late winter and appear to be an effective holding factor. The heaviest use is in the spring; and if salt is not available, the deer tend to move out to the pastures and fields where cattle are salted. Such movements away from the protection of the management area makes them very vulnerable to out-of season hunters and dogs.

HABITAT IMPROVEMENT

The actual habitat improvement will be discussed separately, as it pertains to the different species being managed. Most of our management practices concern food only, as the extensive and almost impenetrable laurel and rhododendron thickets obviate the necessity for creating cover.

Rhododendron Slashing

The slashing of rhododendron has been found to be one of the most effective methods of providing winter deer feed. This practice is used where the rhododendron

has grown or been browsed beyond reach, thus bringing the green tops within reach of the deer and stimulating growth of sprouts.

In slashing, the cut is made about three feet above the ground and the stem is not completely severed, allowing the bush to split down and remaining attached to the stump. These bushes stay green indefinitely and sprouts appear on the stem as well as the stump. This work is not done during extremely cold weather, as the wood is brittle and tends to break off completely rather than split.

Experiments conducted by the State of Pennsylvania (1931), in which deer were fed a diet of rhododendron and laurel, showed that deer tend to lose weight rapidly when fed this diet exclusively. However, Ruff (1938), working with the Pisgah deer herd, states that, "The principal forage during the winter period has been found to be the green parts of the several species of evergreen rhododendron." He states further that "Deer feed to a very small degree on rhododendron throughout the entire late spring and summer." An analysis of five stomachs collected on March 15 showed the 75% of the contents were rhododendron leaves and stems. No doubt much of this heavy use of rhododendron is due to necessity as it is the most readily available green plant in the forest, except mountain laurel, which is very rarely taken. Quoting again from Ruff, "The palatability of a species in winter is overshadowed to a large extent by availability."

At the time Ruff made his study, winter forage conditions were such that very little browse was available other than rhododendron, dog hobble, and mountain laurel. Since then, however, it has been noted that deer on other areas where a wider variety of browse is available, make heavy use of rhododendron, although not as heavy as on the Pisgah Preserve. As most of the deer on these newer areas were stocked from the Pisgah herd, it would seem that use of rhododendron as a winter browse has become a characteristic of this particular strain of deer. From casual observation, the deer on the Pisgah Preserve stand the winter as well as the deer on some of the areas where a wider variety of winter forage is available. At any rate, whether through necessity or preference, the deer on all of the management areas take rhododendron readily and apparently do very well on it.

Standard practice in slashing is to use several men who spread out a hundred yards a part and cut as they go, scattering the cuttings rather than concentrating in one place. If it were in a close thicket, it is estimated that each man-day of cutting, including travel time, would amount to one-half acre. An estimated 152 acres have been slashed on the Pisgah Preserve and Mt. Mitchell areas since the project started. Plans this year call for doubling the 50 acres which is normally cut. On several occasions it has been noted that two to four acres cut in a certain section will be browsed completely bare in less than a week.

Creation of Small Openings

In an effort to increase forest edge and keep a certain amount of area in the early stages of plant succession, numerous small clearings were created and maintained. As a matter of economics, old home sites, saw mill sets, log landings, etc., were first utilized. Later, however, in order to get better location and distribution, openings were created in the forests. Clearings range in size from about two tenths of an acre to one acre and are scattered as widely as practical. The growth of briars, grasses, and browse-size woody vegetation is encouraged.

Trees and shrubs cut when the clearings are created, sprout immediately and provide considerable browse, and when this grows out of reach they are cut again.

Use of these clearings by deer, bear, turkey, grouse, and wild boar has been extensive. Grouse and turkey use has been particularly heavy in the spring and summer when the young birds utilize the insect populations of the clearings and all birds take advantage of bare spots for dusting. Bear, turkey, and grouse feed on the blackberries, which take over many of these areas, and deer browse heavily on the shoots of these plants. On several occasions, signs of wild boar, apparently rooting for grubs, has been noted. In all probability, the presence of these clearings has had some effect on the increased grouse kills as they make the birds more accessible to the hunters.

Honeysuckle Planting

Japanese honeysuckle (*Lonicera japonica*), which has a very high palatability rating and which stays green in all except the coldest weather, is another valuable deer browse species. It had been planted rather extensively by the CCC's as a road bank stabilizing agent. This work was continued by this project as a habitat improvement measure. In the beginning, individual plants and foot square "sods" of plants were tried. The former method was soon found to be ineffective, and subsequent planting was confined to the sod method. As an added improvement, a double handful of commercial fertilizer was put under each sod. Different fertilizers and planting sites were tried with varied results and an experiment has been set up to ascertain the best fertilizer and amount needed and the best sites and planting dates. It has been found necessary to cover the plantings with brush in order to protect them from the deer until they get a start. Plantings on steep banks have the same effect as brushing, as the deer rarely feed on extreme slopes, but take the stems as they become accessible below and above the plant.

A total of about 6,500 sods have been planted each year on the Pisgah Preserve and the Mt. Mitchell Area. This planting has been slow due to the large amount of handling needed, and also due to the fact that pick-up trucks were the only means of conveyance available, necessitating many trips to and from the source. Plantings so far have been almost exclusively on road banks, and this too contributes to the high cost. Planting of honeysuckle is planned for old fields too poor or stony for grass and clover. The land will be harrowed and a two-ton truck will be driven into the fields with large loads of honeysuckle sods, which will be tossed from the truck as it moves slowly through the field, speeding up the work considerably. This should cut in half the cost of planting an acre. Even though costly, the practice of planting road banks is good, as it utilizes bare ground which is not suitable for any other type of development.

Pruning and Releasing Apple Trees

While the management areas are generally in very mountainous terrain, most of the valleys were farmed at some time, and numerous house places and logging camp sites can still be found. Around most of these are a large number of apple trees and individual trees can be found scattered over many of the areas. Several abandoned orchards are located inside the area boundaries. The pruning and

release cutting of the trees has resulted in a tremendous increase in the apple crop. To date, almost 1,500 apple trees of various sizes have been pruned and release cut on seven of the areas. An estimated 500 trees remain to be treated. A considerable number of apple and red haw trees have been girdled by the large numbers of rabbits which are present as a result of predator control measures. The apple crops have been very valuable as a holding factor for deer, bear, and wild boar. When the mast crop fails, it is quite common for bear and boar to travel long distances in search of food, often leaving the managed area entirely and making them completely unavailable when the hunting season opens inside the areas. When a good crop of apples is present, many will stay to feed on these. Bear seem to prefer to climb the tree and eat the green apples rather than take them after they fall. The probable reason for this is that they feed on these apples after the berries are gone and before the mast is edible. This is the only management practice being used which has any effect on bear.

Timber Cutting for Browse Production

The newest type of development work is the browse cutting on the Pisgah Preserve (Table 3). Browse Cutting Plan I, conceived by the U. S. Forest Service, at first called for completely clear-cutting (leaving only four to six seed trees per acre) 1,000 acres each year for 100 years, by which time the whole 100,000-acre preserve would be cut over. The plan was to sell saw logs, pulpwood, and everything else merchantable, leaving only small saplings and brush, after which Knutsen-Vandenberg and Pittman-Robertson funds would be used to clean off the remainder. The first area cut to these specifications showed that the plan could not be carried out as scheduled, due to the lack of a market for hardwood timber smaller than saw logs. In order to check the browse producing capacity of Browse Cutting Plan I, however, a crew paid out of Pittman-Robertson funds, cut 70 acres during 479 man-days. After approximately 15 acres were cut, it was decided to modify the plan by leaving 20 to 30 seed trees per acre and the remaining 55 acres were cut in this manner.

Immediately following the cut, mil-acre plots were set up in order to check on browse production of these cuttings. It was decided that this type cut was too expensive, and subsequent evaluation of data obtained from the mil-acre plots proved that cuts of this intensity are unnecessary. Consequently, Browse Cutting Plan II was evolved as listed below.

Browse Cutting Plan II

1. No trees will be cut that now contain or will produce a merchantable saw log, except where it has been determined that thinning is advisable.
2. No dogwood will be cut that now contains or will produce a shuttle bolt.
3. No locust will be cut that now contains or will produce fence posts.
4. All rhododendron, laurel, sourwood, silverbell, blackgum, serviceberry, sassafras, or any shrubs are to be cut.
5. No trees will be cut within 50 feet of any trout waters.
6. Dead trees are not to be felled.
7. Trees or debris will not be felled on telephone lines or left on traversable roads.

Browse Cutting Plan II was used in 1951. Observations revealed that the composition of almost pure thickets of mountain laurel are not affected by clear cutting. Browse Cutting Plan II was modified in that dense laurel thickets are not clear cut but a 20 foot passageway is opened to the next patch of woods. Large trees are girdled or poisoned rather than cut. The addition of these modifications to Browse Cutting Plan II resulted in Browse Cutting Plan III, which was used in 1952 and will be used in all future browse cutting.

Table 3. Location, acreage, and cost of three types of browse cuts.

Cutting Unit	Browse Cut Type	Date Cut	Cost	
			No. Acres	Per Acre (\$)
Grassy Ridge Unit I	I	1950	70	42.82
Grassy Ridge Unit II	II	1951	84	17.48
Fage Osteen Cove Unit I	II	1951	38	17.48
Fate Osteen Cove Unit II	II	1951	27	17.48
Fate Osteen Cove Unit III	II	1951	25	17.48
Bradley Creek	III	1952	54	11.55
Slate Rock	III	1952	72	11.55
Yellow Gap	III	1952	89	11.55
Wash Creek	III	1952	68	11.55
Total			527	

Cutting is done in the period January through March, as this is the slack period between the hunting and fishing seasons, and since this makes the tops of trees available to deer during the critical period. Deer make intensive use of these tops; crews working often observed deer feeding a few hundred feet away on trees cut the day before. As the regenerating sprouts and seedlings grew more dense on the section cut under Browse Cutting Plan I, deer ceased to penetrate deeply into the more thickly covered portions of the cuttings but fed along the edges and trails. As the area cut under Browse Plans II and III have not developed into such an impenetrable thicket of new growth, utilization has been more complete and evenly distributed. These cuts seem to be favored at all times of the year and deer use is very heavy. The large numbers of dogwood and sourwood sprouts received the greatest use, although shoots of all species are taken.

Table 4 gives the results of the 1951 mil-acre plot measurement. For comparison, plots were also set up on areas cut under standard Forest Service sale procedures, followed by timber stand improvement work amounting to approximately \$5.00 per acre.

Table 4. Stems per acre for three types of browse cuts.

Type of Cut	Date Cut	Stems Per Acre		Total Per Acre
		Good Browse ^a	Poor Browse ^a	
Browse Cutting Plan I	1950	10,612	14,062	24,674
Browse Cutting Plan II	1951	11,462	5,712	17,174
Standard Timber Sales	1949	8,619	4,988	13,603
Cut plus TSI ^b				

^a Classified according to palatability ratings set up by Ruff.

^b Timber Stand Improvement.

As indicated above, the original plan called for this work to be done following Forest Service timber sales and allowable TSI. Results of the mil-acre plot measurements indicated that this cutting in itself was producing a fair amount of browse and that the regular browse cutting would be more advantageous on areas where no lumbering has been done or is planned within a ten year period. Units are located for the most part on ridges and steep slopes where no other habitat improvement can be practiced and in order to insure a more even distribution of the deer herd.

Permanent Pasture Planting

On sections of the management areas formerly supporting small farms, many old fields were in existence; some were still in the old field stage, while others were so nearly reverted to forest that bulldozer work was necessary to reopen them. Some management areas had no old fields and new ones had to be created. One objection to the old fields was that they were too centralized and mostly were in the valleys and coves, thereby tending to concentrate the deer into widely separated pockets. The new fields, however, can be located as desired which adds considerably to their value. The first year of this project annuals were planted in these fields, but this was abandoned as being too expensive. In 1950, the second year, planting of orchard grass-ladino clover, fescue-ladino clover, and rye grass was begun, and at present 230 acres of this permanent pasture have been established. In addition to these fields, the Forest Service plants many miles of old logging roads in grass and clover each year. As the old fields had not been tended for many years, heavy lime and fertilizer applications were needed. On the average, 600 pounds of 2-12-12, 600 pounds of phosphate, and 1½ tons of dolomitic lime per acre were applied.

In order to insure a good stand, the normal recommended planting mixture of ten pounds of grass seed and two pounds of clover seed per acre was increased to fifteen pounds of grass and three of clover. Both spring and fall plantings are made with good results from both. However, no fall planting should be made at these elevations after the last of August. Some difficulty has been experienced with fields at extremely high elevations (4,500 ft. and over) in getting a stand. With proper care in fertilizing, liming, planting, and observing planting dates, it is possible to get fair stands even under these adverse conditions. Good stands were obtained from the beginning, except in some few places where late planting, heavy deer grazing, or a combination of the two made replanting necessary. It was found that fields of less than one acre in size were more successful if planted in the spring as heavy use can cause a complete failure on small fields. Most of the fields planted were from one-half to three acres in size, with one acre being considered the optimum size.

The fields are top dressed every other year with 300 to 400 pounds of 0-14-14 per acre. Ladino clover proved very prone to smother if not mowed regularly; a few of the fields produced pure stands of grass and had to be resowed with clover. Mowing twice a year, however, seems to keep them in good shape and is absolutely essential to maximum production of grass and clover. Fescue-ladino clover has proven to be the best combination for winter forage. Although orchard grass is normally more palatable, it will not tolerate cold weather, nor recover as quickly from severe freezes as fescue. Rye grass has been discarded completely

because its yield is lower than the others and is not utilized as heavily by deer.

As is the case with salt distribution and the pruning of apple trees, one of the most important aspects of the pasture planting is its value as a holding factor. Prior to the initiation of this practice, deer have been very prone to leave the woods in the late winter and feed in the fields of cover crops on farmlands bordering the management areas. Complaints were received concerning the damage done, and unlawful deer killing was a common practice. While a number of deer still frequent these farm fields, considerably less complaints have been received in the last two years, indicating that a large number of these deer are being held by pasture planting and other management practices.

Another use made of these fields was the planting of chufas as a wild turkey food. These grew well when planted on well-drained sites; but when the soil was wet, the tubers rotted soon after growth was completed. It was found that in order to develop a good stand it was necessary to mow the weeds above the chufas when the chufas attained six inches in height. Much difficulty was encountered when chipmunks and other rodents began digging the sprouts in the spring. Two methods of control were used; rat traps baited with peanut butter worked fairly well, and corn treated with strychnine and covered with a board on two low rocks also was successful.

Most species utilized ladino clover more intensively than other food planted in these fields. Deer, turkey, grouse, and wild boar feed on the clover regularly. During a severe mast shortage last winter, several broods of young wild boar existed almost completely on large fields of clover and grass. Orchard grass seems to be preferred slightly over fescue. Observations indicate that when individual deer or boar begin using a certain field they return time after time. As would be expected, heaviest use by deer is in the dead of winter. During the summer, there is very little deer sign in the fields, but use picks up about October 1 and reaches a peak during the early part of January. This use remains very heavy until the first early spring plants appear during late March, after which it drops off quickly.

Grouse utilize the fields in two ways; by bringing their young into the edge of the field to feed on insects, and by adult birds feeding on clover. Probably the latter practice is the more prevalent of the two.

Although chufas were originally planted as a turkey food, it was soon noticed that raccoons were getting most of them. As the raccoon is a more important game species in the mountain area than the turkey, chufas are now being planted as near to creeks and branches as possible for the benefit of the 'coons.

It is difficult to ascertain the exact cost per acre of pasture plantings, as the men performing the labor are on salary and most of the planting is done with equipment purchased for the project. Clearing and planting procedures vary widely from one location to another, but on the average, one man with a tractor can prepare and plant an acre per day. At the prevailing rate of \$28.00 per day, the total cost of permanent pasture establishment comes to about \$80.00 per acre. Maintenance consisting of mowing and fertilizing costs approximately \$11.00 per year. The comparative costs of the various food producing practices is presented in Table 5.

Table 5. Cost of forage production.

Type of Treatment	Cost Per Acre		Total Cost Per Acre (\$)
	Labor (\$)	Materials (\$)	
Pasture Planting	28.00	52.00 ^b	80.00
Browse Cutting	10.55 ^a	0.20 ^b	10.75
Rhododendron Cutting	12.00	0.20 ^c	12.20
Honeysuckle Planting ^d	132.00	5.00	137.00
Creating Small Openings	5.00 - 25.00 ^e	0.20	5.20 - 25.20

^a This is actual cost per acre; all others are estimated.

^b Covers cost of axes, files, etc., per acre.

^c Fertilizer, hauling, tools.

^d An acre of honeysuckle is figured at the rate of one sod (1 ft. square of plants) each four feet.

^e Depends on size and condition.

Of the five treatments described, permanent pastures are the most attractive to practically all types of forest game. Small openings are also utilized by several species, whereas browse cutting, rhododendron cutting, and honeysuckle plantings are used almost exclusively by deer. Permanent pastures also produce the greatest volume of high grade feed per acre, but for each dollar expended, browse cutting and rhododendron slashing furnish a much larger amount of deer forage.

SUMMARY

The posting and painting of boundary lines with aluminum signs and orange enamel paint has proven satisfactory.

The taking of 144 bobcats, 282 foxes, and 575 skunks during the past three years has evidently had no effect on the deer herd, although the legal kill of grouse has doubled since this trapping started.

The creation of small clearings has increased edge effect and furnished feeding and dusting spots for forest game species.

The distribution of salt has been helpful in holding the deer inside the management areas.

The most valuable methods of forage production have proved to be rhododendron slashing, browse cutting, and pasture planting. Rhododendron tops and sprouts receive heavy use during the winter months, even though other acceptable forage may be present. Slashing rhododendron has been found a highly satisfactory method of creating a preferred winter deer food by making the tops available and stimulating sprout growth. Browse cutting practices consisting of cutting all unmerchantable trees and shrubs off patches of 30 to 100 acres has proven the cheapest and most practical method of creating large amounts of high quality deer browse.

Permanent pasture plantings of ladino clover, orchard grass, and fescue are heavily used by most species of forest game, including deer, turkey, grouse, and wild boar. Planting Japanese honeysuckle is a practical method of producing deer browse on road banks and rocky fields which are not adaptable to other management practices.

Using various combinations of these methods forest game production can be substantially increased.

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