BIRNEY—DECKER WILDLIFE STUDY

Progress Report No. 2

Spring and Summer
(March 1975 — August 1975)

Research Conducted By:

Montana Department of Fish and Game
Environment and Information Division

Sponsored By:

Bureau of Land Management

Lark Sparrow Nest With Young

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Since this is a progress report only, results presented herein are not necessarily final, and may be subject to change. For this reason, the information contained in this report may not be published or used for other purposes.

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INTRODUCTION

This is the second semi-annual progress report of the Birney-Decker Wildlife Study and contains information gathered during the period from March to August 1975. The Bureau of Land Management provides funding for this study which was initiated in August 1974.

The long-term goals of this study are:

(1) To develop techniques to quantify the fish and wildlife resources, including game and nongame species, either directly or through habitat quality and population productivity indices to allow reasonable predictions to be made on the effect of development on the fish and wildlife resource.

(2) Ascertain key ecological requirements of fish and wildlife resources to provide a basis for reclamation and revegetation guidelines.

(3) To develop plans and procedures for mitigating and/or compensating any loss of wildlife or habitat through the surface mining process.

Activity during the past six months was the same as for the first report period, with emphasis being placed on obtaining baseline data on seasonal distribution, habitat use, food habits, productivity indices and breeding areas of game and nongame wildlife.

STUDY AREA

Location

The Birney-Decker area encompasses about 900,000 acres in southeastern Montana (Figure 1). It is bordered on the north by the Northern Cheyenne Indian Reservation and the town of Ashland, on the east by the Otter Creek drainage, on the south by the state of Wyoming, and on the west by the Crow Indian Reservation. The area includes portions of Big Horn, Powder River and Rosebud Counties, a part of the Custer National Forest and BLM land. Private ownership holds 69 percent of the land, Forest Service 17 percent, BLM 9 percent and the state 5 percent (Decker-Birney Resource Study 1973). The principal use of the area is for livestock production. The human population is approximately 1000. The communities within the area are Ashland, Birney, Decker, Kirby, Quietus and Otter.

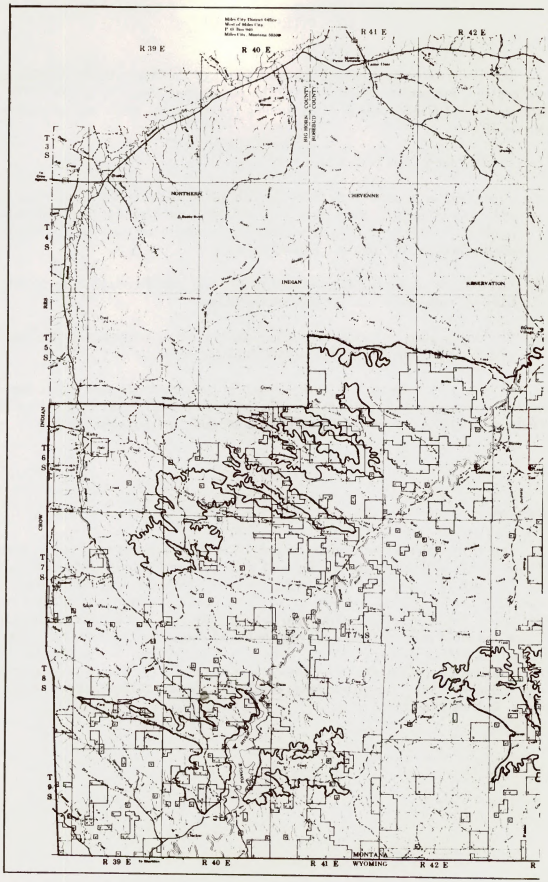
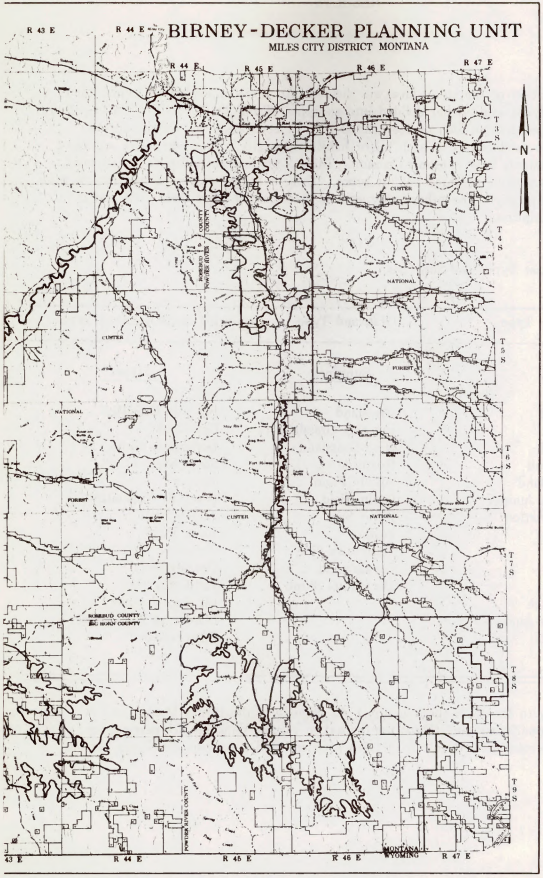


Figure 1. Study area with five potential coal lease areas.


BIRNEY-DECKER PLANNING UNIT
MILES CITY DISTRICT MONTANA
R 43 E
R 44 E
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T 6 S
T 7 S
T 8 S
T 9 S
N
CUSTER
NATIONAL
FOREST
BIG HORN COUNTY
POWDER RIVER COUNTY
MONTANA
WYOMING

RESULTS

Vegetation

The vegetation of the study area was divided into three major habitat types, then each of these types was further divided into subtypes (Table 1). The three broad vegetation/habitat types give an idea of the general type of ecosystem the wildlife species inhabit, but the subdivisions of each major habitat type give a more definitive aspect of wildlife requirements from season to season. Table 2 gives quantitative data for seven major subtypes within the three habitat types. These subtypes cover the majority of the area and floral variety. The other subtypes can be discerned from their titles and/or qualitative description.

Table 1. Habitat Types and Subtypes.

Ponderosa Pine Type	Grassland Type	Big Sage-Grassland Type
Subtypes	Subtypes	Subtypes
Ponderosa Pine	Grassland	Big Sage-Grassland
Grassland Park	Big Sage-Grassland	Grassland
Rhus-Grassland	*Rhus*-Grassland	Deciduous Shrub
Deciduous Shrub	Roadside	Silver Sage
Big Sage-Grassland	Alfalfa Field	Juniper
Ponderosa Pine-Juniper	Grain Field	Roadside Vegetation
Roadside Vegetation	Silver Sage	Alfalfa Field
Silver Sage	Pasture	Grain Field
Alfalfa Field	Ponderosa Pine	Pasture
Grain Field	Greasewood	Greasewood
Pasture	Deciduous Shrub	Ponderosa Pine
Snowberry Patch		Big Sage-Juniper
Ponderosa Pine-Juniper-Big Sage Mix		Ponderosa Pine-Juniper
Juniper		*Rhus*-Grassland

According to the BLM (pers. comm.), 42 percent of the Birney-Decker area is covered with ponderosa pine *(Pinus ponderosa)* in varying densities, 31 percent big sagebrush *(Artemisia tridentata)*, 26 percent grassland and 1 percent deciduous bottom.

Table 2. CONSTANCY, PERCENT CANOPY COVERAGE AND FREQUENCY OF LOW-GROWING TAXA FOR VEGETATION TYPES AS DETERMINED BY EXAMINATION OF TWENTY 2I5 DECIMETER PLOTS ON EACH OF 41 SITES.

	PONDEROSA PINE ZONE				GRASSLAND ZONE	BIG SAGE-GRASSLAND ZONE	
Taxa[1]	Grassland Park Type 11 Sites	Ponderosa Pine Type 6 Sites	Rhus-Grass Type 5 Sites	Creek Bottom Type 4 Sites	Grassland Type 8 Sites	Big Sage-Grassland Type 4 Sites	Grassland Type 5 Sites
GRASS AND GRASS-LIKE PLANTS:							
Agropyron smithii	73/9/50[2]	83/5/35	80/4/16	25/tr/1	100/10/68	75/17/54	100/17/77
Agropyron spicatum	27/2/10	50/5/21	60/3/19	25/3/13	13/tr/3	50/8/38	--
Agropyron spp.	9/2/9	--	--	75/2/9	--	--	--
Andropogon perardi	27/1/5	67/18/41	--	25/tr/1	38/4/15	--	--
Andropogon scoparius	--	17/1/4	--	--	13/1/3	--	--
Aristida longiseta	18/tr/1	17/tr/1	20/1/1	--	13/tr/1	--	--
Bouteloua curtipendula	45/5/18	83/9/30	80/7/25	--	38/3/15	25/7/20	--
Bouteloua gracilis	64/3/14	--	20/1/4	--	88/7/34	75/22/41	33/3/15
Bromus japonicus	73/5/26	50/4/18	40/3/17	25/tr/1	75/13/53	75/12/43	67/16/65
Bromus tectorum	55/24/45	33/tr/6	100/34/75	25/1/6	25/1/3	50/11/24	67/7/27
Carex filifolia	--	17/1/3	20/1/6	--	13/tr/1	--	--
Carex spp.	73/9/47	83/9/47	20/2/6	50/5/23	100/27/94	--	--
Elymus cinereus	--	--	--	25/1/3	--	--	--
Festuca idahoensis	36/4/14	83/19/60	20/7/13	50/12/30	38/7/25	--	--
Festuca octoflora	9/tr/tr	--	--	--	13/tr/2	50/1/6	33/1/3
Koleria cristata	55/5/23	83/3/23	40/1/6	75/2/9	100/8/59	50/3/20	67/9/33
Poa secunda	64/5/36	33/tr/8	40/1/11	25/1/5	63/6/43	25/1/10	33/tr/2
Poa spp.	9/6/9	--	--	--	--	--	--
Stipa comata	55/5/24	100/8/37	60/6/30	--	75/10/36	50/4/19	33/2/32
Stipa viridula	64/4/28	83/5/23	--	100/8/34	100/5/28	25/2/16	100/8/30
Unidentified Grass	--	17/tr/13	20/tr/2	100/29/60	13/tr/1	--	--
Total Grass and Grass-Like	100/87/99	100/93/98	100/73/98	100/64/100	100/104/99	100/88/98	100/73/100
FORBS:							
Achillea millefolium	55/2/14	83/3/26	40/1/6	75/3/25	38/2/9	25/tr/5	33/-/33
Ambrosia artemisiifolia	73/9/47	50/1/14	80/2/18	--	63/2/19	--	--
Antennaria parvifolia	18/1/6	33/2/14	--	--	63/2/11	50/tr/3	--
Artemisia dracunculus	18/tr/3	33/tr/3	20/1/2	25/tr/1	13/tr/1	--	--
Artemisia frigida	55/1/10	17/tr/2	40/1/6	25/tr/3	63/2/16	75/1/13	33/1/5
Artemisia ludoviciana	45/2/15	83/6/26	20/1/4	50/3/33	75/3/22	25/tr/1	--
Aster oblongifolius	55/3/19	83/2/16	--	50/2/14	75/2/11	50/tr/4	--
Aster ovalifolia	--	--	--	25/1/8	--	--	--
Aster spp.	--	33/2/8	--	--	--	--	--
Balsamorhiza sagittata	9/tr/tr	--	--	50/3/13	--	--	--
Chenopodium album	9/1/4	--	--	--	--	--	--
Collomia linearis	--	33/tr/7	--	--	13/tr/1	--	--
Cruciferae	36/1/5	17/1/5	20/tr/2	--	13/tr/1	50/1/19	--
Eurotia lanata	--	--	--	25/tr/3	--	25/1/5	--
Gaura mollisa	64/1/10	50/1/5	20/tr/1	--	88/3/18	--	33/tr/3
Gaura triflora	--	33/tr/3	--	25/1/4	--	--	--
Gayophytum diffidata	--	17/1/8	--	--	13/tr/1	--	--
Gutierrezia sarothrae	9/tr/2	17/tr/1	--	25/tr/1	38/2/8	50/6/34	--
Helianthella uniflora	--	17/1/4	--	--	--	--	--
Kuhnia eupatorioides	9/1/3	--	--	--	--	--	--
Lactuca serriola	27/3/16	17/tr/3	60/tr/7	--	--	--	--
Lappula redowskii	9/tr/tr	33/tr/3	20/1/4	--	--	--	--
Linum perenne	18/tr/1	33/tr/3	20/1/5	25/tr/1	--	--	--
Lactuca spp.	18/1/3	50/tr/3	--	--	13/tr/3	--	--
Lygodesmia juncea	--	33/tr/3	20/tr/2	--	13/tr/1	25/1/5	33/1/10
Monarda fistulosa	--	--	--	25/1/1	--	--	--
Potentilla pensylvanica	27/1/5	--	--	--	25/1/3	--	--
Potentilla spp.	27/tr/3	33/2/7	--	--	13/tr/1	--	--
Phlox hoodii	45/3/19	17/1/3	--	50/tr/5	63/2/10	75/6/25	--
Phlox longifolia	36/2/16	33/2/18	20/1/8	50/1/5	13/2/11	25/1/5	--
Psoralea argophylla	45/2/15	50/1/13	20/1/8	--	63/4/33	--	--
Psoralea spp.	18/tr/1	--	--	--	25/1/7	--	--
Ratibida columnifera	18/tr/1	--	--	50/1/5	13/tr/3	--	--
Stanleyea pinnatifidum	9/1/2	--	40/1/8	--	--	--	33/6/20
Sphaeralcea coccinea	45/1/9	33/tr/8	60/1/9	--	100/4/40	50/tr/10	67/1/8
Tanacetum spp.	9/tr/tr	--	--	--	13/1/6	25/tr/3	33/3/18
Tragopogon dubius	27/tr/4	33/tr/4	40/tr/3	25/tr/1	38/tr/5	25/tr/1	33/tr/2
Yucca glauca	9/1/1	17/3/5	60/3/5	--	--	25/1/1	--
Unidentified Forbs	45/1/5	50/1/5	40/tr/4	75/2/14	25/tr/2	25/tr/1	33/tr/3
Total Forbs	100/38/84	100/30/89	100/15/60	100/20/73	100/33/87	100/18/49	100/17/68
SHRUBS:							
Artemisia cana	--	--	--	50/3/15	13/tr/3	25/tr/5	33/tr/2
Artemisia tridentata	--	--	20/tr/1	--	--	75/5/20	--
Berberis repens	--	17/tr/1	--	50/2/13	--	--	--
Pinus ponderosa	--	33/2/5	--	25/1/1	--	--	--
Prunus virginiana	9/tr/tr	--	--	100/9/34	--	--	--
Rosa arkansana	45/1/9	67/3/17	--	100/15/65	38/1/7	25/tr/1	--
Rhus radicans	--	--	--	25/1/5	--	--	--
Rhus trilobata	45/4/8	50/2/4	100/23/42	100/11/19	--	--	--
Ribes aureum	--	--	--	50/1/6	--	--	--
Ribes cereum	--	--	--	25/1/4	--	--	--
Symphoricarpos spp.	27/tr/4	50/5/24	--	75/17/53	13/tr/6	--	--
Total Shrubs	64/5/19	67/12/38	100/23/42	100/61/91	38/1/11	100/5/51	33/tr/2
BARE GROUND:	91/17/77	100/9/59	80/3/35	100/8/36	100/14/81	100/12/61	100/21/83

[1]Includes those taxa with a canopy coverage of .5 percent or greater or a frequency of 5 percent or greater in at least one type. Others are listed in Appendix.

[2]Constancy (percent occurrence among sites)/canopy coverage (percent of area covered)/average frequency (percent occurrence among plots).

[3]tr = trace; a value less than .5 percent.

Ponderosa Pine Type

This type is found around the edge of plateaus, extending down into coulee heads and along divides, especially north slopes. This type was divided into 14 subtypes.

Ponderosa Pine Subtype

The overstory is ponderosa pine varying from a dense canopy coverage with little understory to doghair thickets to extremely sparse, savannah-like coverage. Important shrubs are snowberry *(Symphoricarpos* spp.) and rose *(Rosa arkansana)* in the mesic coulee heads and skunkbush sumac *(Rhus trilobata)* which becomes more prevalent in the sparse pine stands. Major forbs include yarrow *(Achillea millefolium)*, cudweed sage *(Artemisia ludoviciana)* several asters *(Aster* spp.) and scarlet gaura *(Gaura coccinea)*. This type had one of the most varied forb composition of any type. The most common grasses are Idaho fescue *(Festuca idahoensis)*, a sedge *(Carex* spp.), side-oats grama *(Bouteloua curtipendula)*, needle and thread *(Stipa comata)*, green needlegrass *(Stipa viridula)*, bluebunch wheatgrass *(Agropyron spicatum)* and western wheatgrass *(Agropyron smithii)*. (Table 2) (Figure 2)

Grassland Park Subtype

The open parks within the pine forest occur on plateau tops and gently sloping sidehills. This type was as varied in floral composition as the ponderosa pine subtype. The only major shrub was skunkbush sumac. Rose was sparsely scattered throughout the type. Prevalent forbs are ragweed *(Ambrosia artemisifolia)*, yarrow, cudweed sage, aromatic aster *(Aster oblongifolius)*, wild lettuce *(Lactuca serriola)*, Hood's phlox *(Phlox hoodii)*, scarlet globemallow *(Sphaeralcea coccinea)* and silverleaf scurfpea *(Psoralea argophylla)*. The important grasses are western wheatgrass, Japanese chess brome *(Bromus japonicus)*, downy chess brome *(Bromus tectorum)*, sedge, bluegrasses *(Poa* spp.), green needlegrass, needle and thread and side-oats grama. (Table 2) (Figure 3)

Rhus-Grass Subtype

This type was found on gentle-to-steep slopes. The only significant shrub is skunkbush sumac. Forbs were rather scarce except for occasional local concentrations. Ragweed and soapweed *(Yucca glauca)* were the predominant forbs. The more prevalent grasses were downy chess brome, Japanese chess brome, side-oats grama, Idaho fescue and needle and thread. (Table 2) (Figure 4)

Deciduous Shrub Subtype

Cottonwood *(Populus deltoides)* and green ash *(Fraxinus pennsylvanicus)* are dominant trees. Serviceberry *(Amelanchier alnifolia)*, snowberry and rose are the most prevalent shrubs with skunkbush and chokecherry *(Prunus virginiana)* being fairly common. Forbs and grasses vary with the type of creek bottom where most of this type is located. (Table 2) (Figure 5)

Big Sagebrush-Grassland Subtype

This subtype is found on steep slopes and in small parks scattered throughout the ponderosa pine. The dominant shrub is big sagebrush. Major forbs are fringed sagewort

Figure 2. Ponderosa pine subtype within the ponderosa pine habitat type.

Figure 3. Grassland park subtype within the ponderosa pine habitat type.

Figure 4. *Rhus*-grassland subtype within the ponderosa pine habitat type.

Figure 5. Deciduous shrub subtype with alfalfa field subtype in foreground, and ponderosa pine subtype in background. All are within the ponderosa pine habitat type.

(Artemisia frigida), Hood's phlox and snakeweed *(Gutierrezia sarothrae)*. Prominent grasses are western wheatgrass, blue grama *(Bouteloua gracilis)*, downy brome and Japanese brome.

Ponderosa Pine-Juniper Subtype

This type is often an ecotone between the ponderosa pine type and the big sage-grassland type. Rocky Mountain juniper *(Juniperus scopulorum)* grows on rough, rocky breaks down into the coulee bottoms. Various degrees of association exist between shrubs, forbs and grasses within this subtype. Within the ponderosa pine type, juniper is in association with and dominated by ponderosa pine. Understory plants are skunkbush, soapweed, Hood's phlox, asters, scarlet gaura, scarlet globemallow, bluebunch wheatgrass and green needlegrass. Further down the ridges and coulees, juniper gains in abundance and in places occurs as almost pure stands. Understory vegetation is sparse. At the lower end of this ecotone, juniper is found in association with big sagebrush and other species such as fringed sage, Hood's phlox, snakeweed, blue grama, western wheatgrass and bluebunch wheatgrass. (Figure 6)

The limits of this ecotone are ill-defined due to patches of juniper occurring on favorable exposures extending up into the pine type or down into the sage-grassland.

Silver Sage Subtype

Areas of silver sage *(Artemisia cana)* are usually linked to mesic sites such as flood-plains, coulees and sidehill benches. (Figure 7)

Roadside Subtype

A mixture of pioneering forbs that grow on disturbed areas make up this subtype. It provides an abundance of food for seed-eating birds and cover for birds that utilize the roads looking for insects or picking up grit. (Figure 8)

Snowberry Patch Subtype

Snowberry is an important fall food for deer and at that time of year is used rather extensively. Since snowberry is also a couple of feet high, it may be used by a doe to have her fawn and/or hide one while it is young.

Ponderosa Pine-Juniper-Big Sagebrush Mix Subtype

Even though this subtype is put under the major ponderosa pine habitat type this is arbitrary since this subtype is often an ecotone. The title implies that there is a relatively even distribution of pine, juniper and sagebrush. There is too much sagebrush for this subtype to be classified as pine-juniper and the sagebrush is not limited to pockets within the woodland but dispersed throughout it. (Figure 9)

Figure 6. Ponderosa pine-juniper subtype within the ponderosa pine habitat type.

Figure 7. Silver sage subtype in foreground. Snowberry patch subtype in midground. on edge of ponderosa pine habitat type.

Figure 8. Roadside vegetation subtype within ponderosa pine habitat type.

Figure 9. Ponderosa pine-juniper-big sagebrush mix subtype.

Juniper Subtype

This is simply patches of pure juniper. (Figure 10)

The remainder of the ponderosa pine habitat subtypes are self-explanatory by title.

Grassland Type

This occurs mainly in the tops of plateaus, and sometimes as part of valley floors. This type has been divided into eleven subtypes.

Grassland Subtype

The major grass species are western wheatgrass, little bluestem *(Andropogon scoparius)*, blue grama, Japanese brome, sedge, Idaho fescue, junegrass *(Koeleria cristata)*, sandberg bluegrass *(Poa secunda)*, needle and thread and green needlegrass. Some of the more common forbs are cudweed sage, scarlet globemallow, silverleaf scurfpea, yarrow, ragweed and pussytoes *(Antennaria parvifolia)*. Rose was the only shrub of any significance. (Table 2) (Figure 11)

Greasewood Subtype

This subtype is composed of small areas of greasewood *(Sarcobatus vermiculatus)*.

The rest of the subtypes have been described under the ponderosa pine subtypes.

Big Sagebrush-Grassland Type

This type occurs mainly in the southern part of the Birney-Decker area at the head of Tongue River, Hanging Woman and Otter Creeks and the land in between. This type also occurs on the floodplains of major drainages and steep, south-facing, scoria slopes. (Table 2) (Figure 12) It has been divided into 14 subtypes.

The subtypes have been described.

Figure 10. Juniper subtype in background on hill.

Figure 11. Grassland subtype of the grassland habitat type.

Figure 12. Big sagebrush habitat type.

Big Game

Mule Deer

Distribution

Mule deer *(Odocoileus hemionus)* are found throughout the study area. The five potential coal lease areas were studied most intensively, so comments will be confined mainly to these areas (Figure 1). During this report period over 1,400 mule deer were classified as to sex and age. Spring and summer distribution are shown on the maps of the various lease areas. Each circle represents a group of deer ranging from 1 to 40 animals per group. Averaged out, this would be 3.7 deer per circle.

In the previous progress report I talked about Canyon Creek lease area as a wintering area. Data collected this spring and summer lends more credence to that theory. The number of deer seen this spring and summer has decreased considerably. The area is flown the same way each time and usually only on sunny days. Last October, only 13 mule deer were sighted; in December, 72 were seen; in January, 108; in April, 42; in June, 13; and in July, 9. It is hard to conclude what these numbers really mean when one is aware of the number of variables involved in observing deer, but it does seem to show the trend stated earlier. The area appears to be used mostly as a wintering ground.

Mule deer in the Ashland lease area were hard to observe in spring and early summer due to the abundant vegetation. Deer that were seen in spring were mostly in the valley as opposed to being on the ridges and hills of the Custer Forest as during winter. During summer deer were well spread out (Figure 13). Mature bucks preferred to stay on the secluded high ridges. There is probably deer movement from the pine forest to the valley floor for feeding, and back to the cover of the pines for resting.

The other lease areas showed no particular distribution or seasonal movement.

Use of Habitat Types

Ashland Lease Area

Spring: During this season 86 observations of mule deer were made. Thirty-seven percent of these observations were in the big sage-grassland subtype of the major big sage-grassland habitat type. Also, 15 percent of the deer observed were utilizing big sage-grassland parks within the ponderosa pine habitat type. Therefore, over 50 percent of the deer observed were utilizing some sort of big sage habitat. Six and 14 percent of the deer were utilizing the silver sage subtype within the big sage-grassland and ponderosa pine types, respectively. For such a large percentage (20 percent) of the total observations to be in a relatively small and scattered subtype shows a definite preference for the silver sage community and the silver sage plant in particular.

Twenty-eight percent of the observations were in the grassland subtype of the grassland habitat type and 29 percent were in the overall ponderosa pine type (Table 3).

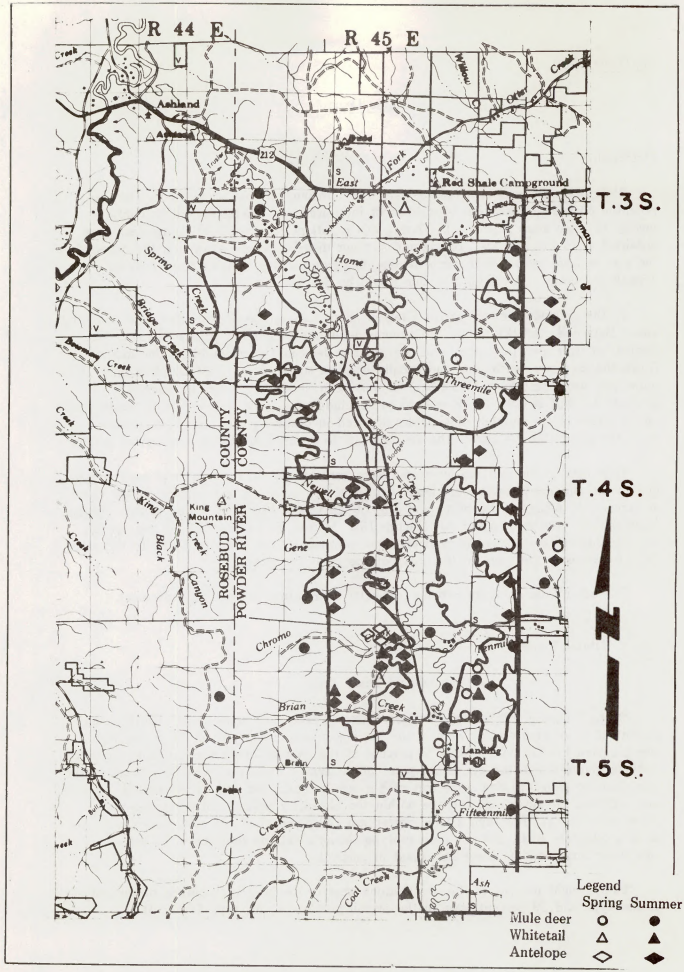

Figure 13. Big game spring and summer distribution Ashland lease area.

Table 3. Seasonal use of habitat types in the Ashland lease area by mule deer from 118 ground and aerial observations.

Habitat Types	Spring (86)1/	Summer (32)
Ponderosa Pine Habitat Type		
Ponderosa Pine Subtype	-	38
Deciduous Shrub Subtype	-	22
Big Sage-Grassland Subtype	152/	3
Ponderosa Pine-Juniper Subtype	-	3
Silver Sage Subtype	14	-
Alfalfa Field Subtype	-	13
Subtotal	29	79
Grassland Habitat Type		
Grassland Subtype	28	9
Ponderosa Pine Subtype	-	3
Deciduous Shrub Subtype	-	3
Subtotal	28	15
Big Sage-Grassland Habitat Type		
Big Sage-Grassland Subtype	37	6
Silver Sage Subtype	6	-
Subtotal	43	6

1/ Sample size for the season
2/ Percent of the seasonal observations

This is quite a change in habitat use from the winter when 100 percent of the deer were observed in the ponderosa pine type (Knapp 1975). But it is interesting to note that during winter 15 percent of the deer were in the silver sage subtype, which is almost exactly the same percentage noted this spring in that subtype within the ponderosa pine type.

Summer: Seventy-nine percent of the deer observation was in the ponderosa pine type, 38 percent in the ponderosa pine subtype and 22 percent in the deciduous shrub subtype (Table 3). The increase in use of the pine type is probably related to the need for shade during the hot months. The deciduous shrub subtype appears to be especially important at this time of year. It appears to be used for fawning and/or hiding young fawns that are not strong enough to follow the does. This is not to say that the deciduous shrub subtype is the only habitat component used for fawning but it does appear to be favored. The brush is also ideal for shade and avoiding flies.

Upper Otter Creek Lease Area

Spring: Ninety-eight percent of the observations were in the big sage-grassland subtype of the big sage-grassland type. During the past winter only 39 percent of the observations were in this type, and 39 percent were in a timber type.

Summer: During this season 45 percent of the observations were in the ponderosa pine habitat type. Twenty percent of the observations were in the ponderosa pine subtype and 18 percent in the grassland park subtype of the ponderosa pine type. Only 32 percent of the observations were in the big sage-grassland subtype of the big sage-grassland type (Table 4) (Figure 14).

Table 4. Seasonal use of habitat types in the Upper Otter Creek lease area by mule deer from 242 ground and aerial observations.

Habitat Types	Spring (122)[1/]	Summer (120)
Ponderosa Pine Habitat Type		
Ponderosa Pine Subtype	-	20
Grassland Subtype	-	18
Deciduous Shrub Subtype	-	2
Big Sage-Grassland Subtype	2[2/]	4
Silver Sage Subtype	-	1
Subtotal	2	45
Grassland Habitat Type		
Grassland Subtype	-	1
Rhus-Grassland Subtype	-	1
Subtotal		2
Big Sage-Grassland Habitat Type		
Big Sage-Grassland Subtype	98	32
Grassland Subtype	-	1
Deciduous Shrub Subtype	-	13
Silver Sage Subtype	-	6
Ponderosa Pine Subtype	-	1
Subtotal	98	53

1/ Number of deer observed
2/ Percentage of seasonal observations

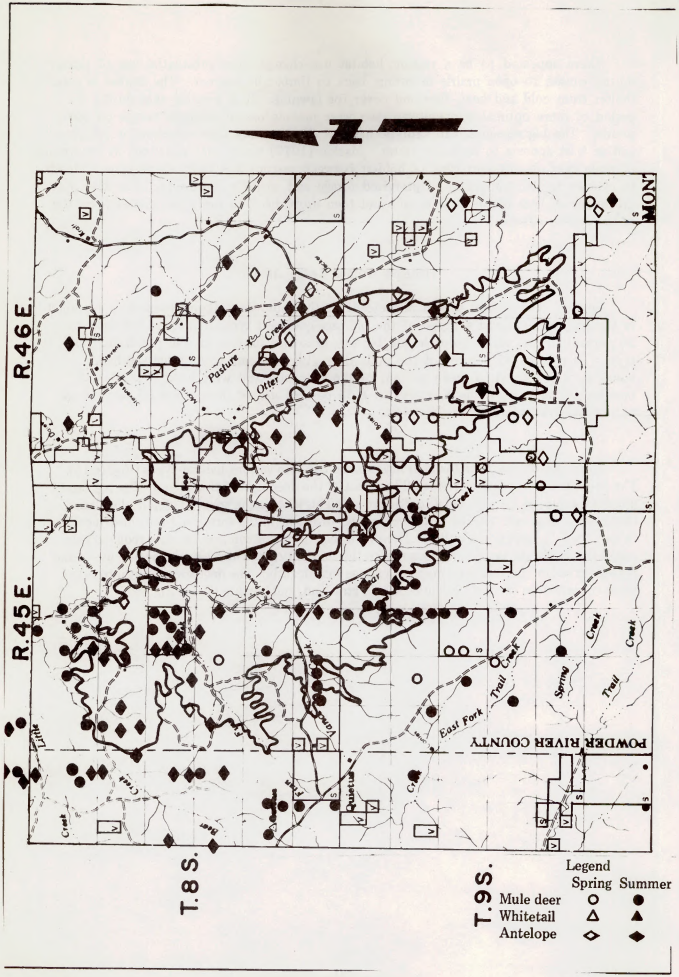

Figure 14. Big game spring and summer distribution Upper Otter lease area.

There appeared to be a distinct habitat use change from substantial use of timber during winter, to open prairie in spring, back to timber in summer. The timber is good shelter from cold and heat, flies and cover for fawning. It is possible that during the period of more optimal temperatures deer were making use of available forage on open prairie. The big sage-grassland subtype has less floral variety than other major subtypes and at least appears to desiccate faster. Mackie (1970) noted that variations in occurrence of mule deer on different type of habitat between seasons and years corresponded closely to changes in the availability of preferred forage and weather conditions. The deer may utilize forage here before it dries out and then move back to the more sheltered habitat as the season advances.

Hanging Woman Lease Area

Spring: During this season 58 percent of the mule deer observations were recorded in the big sage-grassland subtype of the big sage-grassland type. This was followed by 26 percent of the observations in the big sage-grassland subtype of the ponderosa pine type. This yields 84 percent of the mule deer utilizing some sort of big sagebrush community (Table 5). Fifteen percent of the deer observed were using a ponderosa pine-juniper subtype. This compares to a 34 percent use of timber and 66 percent use of big sage-grassland subtype last winter.

Summer: By this time the deer have spread out into various habitat types (Figure 15). The combined timber types yielded 23 percent of the deer sighted this season. The big sage-grassland subtypes have dropped to 38 percent. This is the same trend as seen in the Upper Otter Creek area, with the use of timber habitat dropping in the spring and the consequent rise in use of the big sage communities. Then with the coming of summer the deer reduced this use of the sagebrush prairie and returned to the timber types. However, the overall use of the big sage-grassland habitat type may not change significantly. The deer spread out into other plant communities such as deciduous shrub, grassland, and pasture (Table 5).

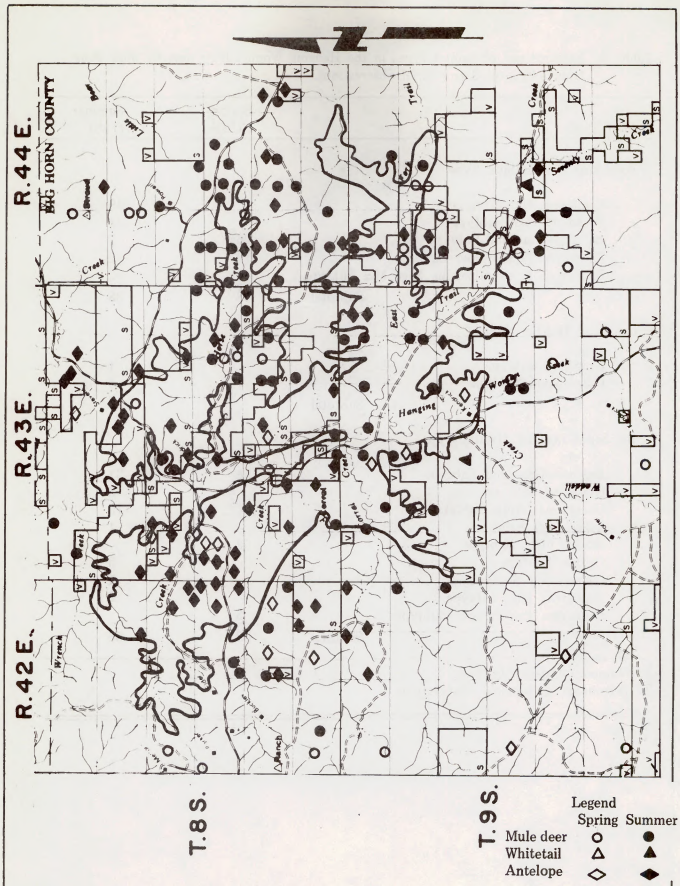

Figure 15. Big game spring and summer distribution Hanging Woman lease area.

Table 5. Seasonal use of habitat types in the Hanging Woman lease area by mule deer from 449 ground and aerial observations.

Habitat Types	Spring (314)[1/]	Summer (135)
Ponderosa Pine Habitat Type		
Ponderosa Pine Subtype	-	16
Grassland Park Subtype	-	11
Big Sage-Grassland Subtype	26[2/]	7
Ponderosa Pine-Juniper Subtype	12	2
Ponderosa Pine-Juniper-Big Sage Mix Subtype	-	2
Subtotal	38	38
Grassland Habitat Type		
Grassland Subtype	-	1
Greasewood Subtype	-	4
Subtotal		5
Big Sage-Grassland Habitat Type		
Big Sage-Grassland Subtype	58	31
Grassland Subtype	-	5
Deciduous Shrub Subtype	-	10
Silver Sage Subtype	-	1
Alfalfa Field Subtype	2	-
Pasture Subtype	-	5
Greasewood Subtype	-	1
Ponderosa Pine Subtype	-	3
Ponderosa Pine-Juniper Subtype	3	-
Subtotal	63	56

1/ Number of deer observed
2/ Percentage of seasonal observations

This lease area and Upper Otter Creek also showed a similarity of use of the grassland subtype. In both lease areas the grassland subtype of the ponderosa pine type and big sage-grassland type were not used during the spring, but during summer the use by mule deer totaled 19 and 16 percent of the total observations for Upper Otter and Hanging Woman respectively. The bulk of this grassland subtype use is the grassland park within the ponderosa pine type. This use coincides with the increased deer summer use of the timber types.

In the Ashland, Upper Otter and Hanging Woman areas the summer use of the deciduous shrub subtype appears to show a pattern. In the Ashland area there was no spring use of the deciduous subtype by mule deer but by summer 25 percent of the observations were in this subtype. This may be overrated since only 32 observations of mule deer were recorded for the Ashland area during this season. But in the Upper Otter Creek area the trend was similar. In the spring there was no use of this subtype, but by summer 15 percent of the deer observations were in this habitat. In Hanging Woman, no mule deer were observed in the deciduous shrub during spring, but 10 percent of the summer mule deer sightings were recorded in this subtype. This trend did not apply to Decker.

Decker Lease Area

Spring: Ninety percent of the mule deer observations were in the various subtypes of the big sage-grassland habitat type. Sixty-nine percent of all the observations were in the big sage-grassland subtype community. The timber habitat subtypes followed with 23 percent of the deer observations. Most of these observations were in the juniper subtype of the big sage-grassland type.

Summer: The use of the big sage-grassland subtype dropped to 43 percent. The timber type habitats use rose to 38 percent but most of it was associated with ponderosa pine or ponderosa pine-juniper subtype. The timber subtypes are combined from both the ponderosa pine habitat type and the big sage-grassland habitat type (Table 6).

This lease area did not have the same trend of deer use of the timber types. Here use of timber increased from winter through summer with at least some change in the type of timber utilized. Use of the big sage-grassland subtype of the big sage-grassland type was about the same from winter to spring, but did drop during the summer (Table 6) (Figure 16).

Another interesting factor is the apparent seasonal difference in observability of deer. The Decker lease area was flown May 3 and 266 mule deer were seen. The deer were still bunched up at this time. On July 1 the same area was flown again but only 75 mule deer were observed. Both days were clear and sunny. It seems that the reason for this difference in number of deer observed is that the winter groups have broken up by July. Does were often alone getting ready to fawn or tending a new born. They are dispersed throughout many habitat types in new growth vegetation or timber. During winter the ground vegetation is relatively sparse and possibly covered with snow and deer are in larger herds. However, it is possible that this area has more deer during winter. In my first progress report (Knapp 1975) I stated, "It may be that this heavy sagebrush area is a wintering ground and thereby has an influx of does and fawns this time of year. This will have to

Table 6. Seasonal use of habitat types in the Decker lease area by mule deer from 504 ground and aerial observations.

Habitat Type		Spring (429)[1/]	Summer (75)
Ponderosa Pine Habitat Type			
Ponderosa Pine Subtype		-	7
Grassland Park Subtype		-	1
Big Sage-Grassland Subtype		2[2/]	-
Ponderosa Pine-Juniper Subtype		3	4
Grain Field Subtype		3	-
Juniper Subtype		1	8
	Subtotal	9	20
Big Sage-Grassland Habitat Type			
Big Sage-Grassland Subtype		67	43
Deciduous Shrub Subtype		-	3
Agricultural Subtype		-	5
Silver Sage Subtype		-	1
Juniper Subtype		19	3
Alfalfa Field Subtype		4	7
Ponderosa Pine Subtype		-	11
Big Sage-Juniper Subtype		-	1
Ponderosa Pine-Juniper Subtype		-	5
Rhus-Grass Subtype		-	3
	Subtotal	90	82

1/ Number of deer observed
2/ Percentage of seasonal observations

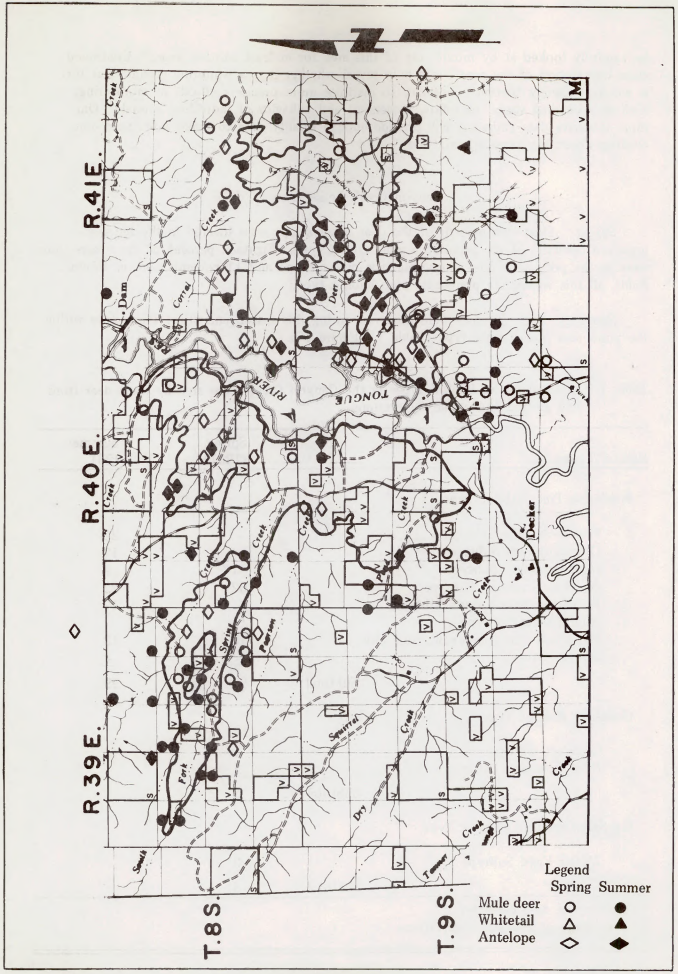

Figure 16. Big game spring and summer distribution Decker lease area.

be carefully looked at by monitoring of this area for at least another year." Continued close observation of the area could help reveal whether it is a wintering ground, but this is where it usually becomes necessary to institute more precise methods of monitoring, such as a banding study, to follow movement and behavior of individual animals. Only more intensive data gathering will provide enough quality data to make substantial conclusions about big game seasonal use.

Canyon Creek Lease Area

Spring: Sixty-two percent of the deer observations were located in the big sage-grassland openings of the ponderosa pine habitat type. Eighteen percent of the observations were in the ponderosa pine-juniper-big sage mix subtype and 11 percent more in alfalfa fields, all this within the ponderosa pine habitat type.

Summer: Only 23 deer were observed during this season and all of them were within the ponderosa pine habitat type (Table 7) (Figure 17).

Table 7. Seasonal use of habitat types in the Canyon Creek lease area by mule deer from 143 ground and aerial observations.

Habitat Types	Spring (120) 1/	Summer (23)
Ponderosa Pine Habitat Type		
Ponderosa Pine Subtype	-	22
Grassland Park Subtype	-	17
Rhus-Grassland Subtype	3 2/	4
Big Sage-Grassland Subtype	62	22
Ponderosa Pine-Juniper Subtype	-	17
Alfalfa Field Subtype	11	-
Ponderosa Pine-Juniper-Big Sage Mix	18	13
Juniper Subtype	-	4
Subtotal	94	99
Grassland Habitat Type		
Grassland Subtype	1	
Rhus-Grassland Subtype	2	
Subtotal	3	
Big Sage-Grassland Habitat Type		
Alfalfa Field Subtype	3	
Subtotal	3	

1/ Number of deer observed
2/ Percentage of seasonal observations

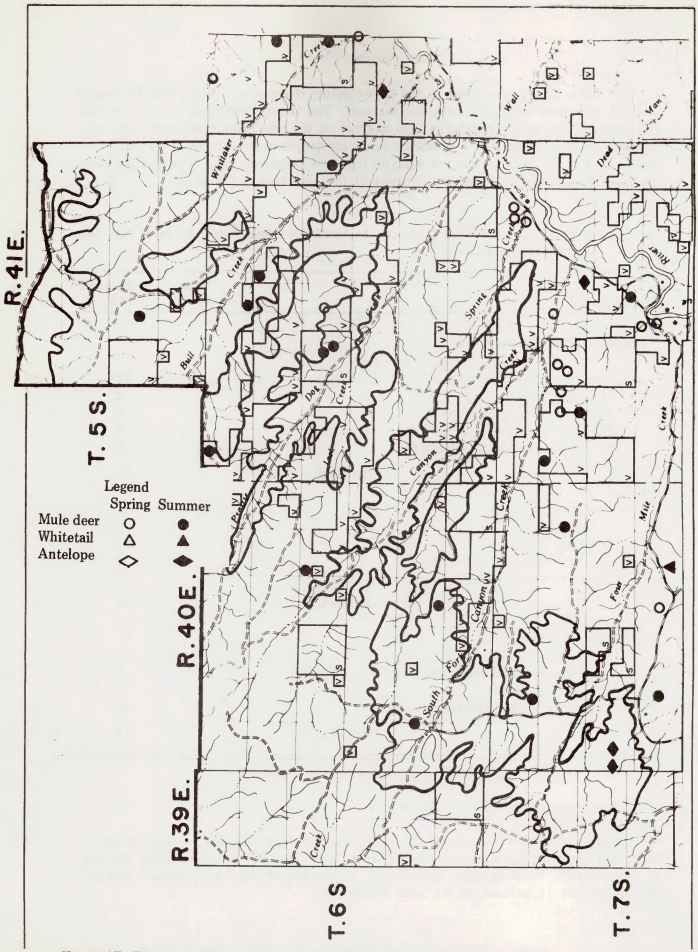

Figure 17. Big game spring and summer distribution Canyon Creek lease area.

Custer National Forest

No observations were made on the forest during the spring. There were 49 observations of mule deer recorded during the summer. The largest percentage of observations (37 percent) were in the ponderosa pine subtype of the ponderosa pine type. This was followed by 27 percent of the observations on the grassland subtype of the grassland habitat type. The deciduous shrub subtype from the ponderosa pine type and big sagegrassland type combined yielded 16 percent of the observations (Table 8).

Table 8. Seasonal use of habitat types on the Custer National Forest by mule deer from 49 ground observations.

Habitat Types		Summer (49)
Ponderosa Pine Habitat Type		
Ponderosa Pine Subtype		37
Grassland Park Subtype		2
Deciduous Shrub Subtype		6
Big Sage-Grassland Subtype		4
Ponderosa Pine-Juniper Subtype		6
	Subtotal	55
Grassland Habitat Type		
Grassland Subtype		27
Big Sage-Grassland Subtype		2
Rhus-Grassland Subtype		2
	Subtotal	31
Big Sage-Grassland Type		
Big Sage-Grassland Subtype		2
Grassland Subtype		2
Deciduous Shrub Subtype		10
	Subtotal	14

Mule Deer Activity and Use of Topography

Spring: Fifty-five percent of the deer observed were standing. Many of these were probably carrying on some other activity, such as feeding, before being disturbed by the observer. Feeding came second with 15 percent of the observations. Bedded deer comprised 11 percent of the total (Table 9).

Table 9. Mule deer activity from 709 observations.

	Walking	Standing	Bedded	Feeding	Running	Playing
Spring (496)1/	112/	55	11	15	8	-
Summer (213)	8	75	9	2	4	2

1/ Number of deer observations
2/ Percent

Sixty-nine percent of all the deer were observed on flats. A flat could be the open, sagebrush prairie, a wide divide or a wide valley bottom. Plateaus accounted for 14 percent of the observations and hillsides 11 percent (Table 10).

Table 10. Mule deer seasonal use of topography (479 observations)

	Flat	Plateau	Sidehill	Coulees	Creek	Ridgetop
Spring (307)1/	692/	14	11	6	-	tr
Summer (172)	27	19	27	17	5	4

1/ Number of deer observed
2/ Percentage

Summer: During this season standing deer comprised 75 percent of the total observations. Feeding deer comprised only 2 percent of the total and bedded animals 9 percent (Table 9).

Only 27 percent of the deer were observed on flats during this season as compared to 69 percent during spring. Whereas hillsides held only 11 percent of the observations during spring, it now rose to 27 percent. Coulee went from 6 percent in spring to 17 percent in summer. Creek bottom accounted for 5 percent of the deer observations (Table 10).

The change in use of topography seems to show the same pattern as habitat use shifts from spring to summer. Changing from flats to sidehills and coulees coincides with leaving the sagebrush terrain for the timber types and deciduous shrub subtype.

Food Habits

The food habits data are a composite of work done by this author during the summers of 1970 and 1971 on the Custer National Forest and stomach samples collected by biologist Charles Eustace in Rosebud County during the spring of 1971.

Spring

Only two rumens were collected each month so the data have been combined. Shrubs comprised 41 percent of the spring diet of mule deer. Box elder *(Acer negundo)*, silver sage, big sage, and snowberry each comprised about 7 or 8 percent of the diet

followed closely by rose at 5 percent (Table 11). The only forb of any importance was common salsify *(Tragopogon dubius)* comprising 13 percent of the diet. Members of the buttercup family made up another 6 percent. Grass comprised an unusually high percentage of the diet, 39 percent. Grass is the first plant species to green up in the spring. Since the new growth is succulent it is attractive to deer who have been eating dried forbs and shrubs during winter. As soon as forbs begin to appear, deer use of grass dwindles to almost nothing.

Summer

In June skunkbush and rose were the only shrubs seen to be fed upon, comprising 27 and 12 percent of the diet, respectively. Forbs made up the bulk of the diet with common salsify comprising 45 percent. Alfalfa and soapweed both accounted for 4 percent of the June diet. In July, use of skunkbush increased to 47 percent of the forage consumed. Salsify dropped to 11 percent of this month's diet and wild lettuce provided 21 percent. Alfalfa and milkvetch each accounted for 9 percent of the diet. In August skunkbush was still the major constituent of the diet, comprising 49 percent. Rose accounted for 11 percent. Note that in June rose was 12 percent but in July only 1 percent. It does not seem reasonable for rose to disappear from the July diet like that. The feeding sites obtained were most likely not representative enough to show the true use on rose. Chokecherry comprised 7 percent of the August diet and alfalfa 23 percent.

White-tailed Deer

No data were collected on this species during the report period.

Table 11. Spring and summer food habits of mule deer.

	Mar-May 6 Rumens (Eustace, 1971)	June 11 Sites[1]/ (768)[2]/ (Knapp 1972)	July 11 Sites (972) (Knapp 1972)	August (13 Sites) (1515) (Knapp 1972)
SHRUBS				
Acer negundo (box elder)	7	tr		
Artemisia cana (silver sage)	8			
Artemisia tridentata (big sage)	7			
Chrysothamnus nauseosus (rubber rabbitbrush)	1			
Juniperus horizontalis (creeping juniper)	2			
Pinus ponderosa (ponderosa pine)	tr			
Prunus virginiana (chokecherry)	1			7
Rosa arkansana (rose)	5	12	1	11
Rhus trilolata (skunkbush)		27	47	49
Symphoricarpos spp. (snowberry)	8			
Unidentified shrubs	2			
Total Shrubs	41	39	48	67
FORBS				
Aster occidentalis (western aster)				2
Aster spp. (an aster)				1
Astragalus spp. (milkvetch)		3	9	1
Collomia linearis (narrow leaved collomia)		1		
Geum triflorum (prairie smoke)	1			
Lactuca serriola (wild lettuce)		2	21	1
Medicago sativa (alfalfa)		4	9	23
Phlox spp. (phlox)	2			
Senecio canus (woolly groundsel)				6
RANUNCULACEA (buttercup family)	6			
Tragopogon dubius (salsify)	13	45	11	tr
Yucca glauca (soapweed)		4		
Unidentified forbs	2	1		
Total Forbs	24	60	50	34
Grass	39	-	-	1

1/ Number of feeding sites
2/ Total instances of use (bites)

Pronghorn Antelope

Distribution

The Ashland, Upper Otter Creek, Hanging Woman and Decker lease areas are apparently summer range for antelope *(Antilocapra americana)*. Winter and spring observations were quite limited but summer observations increased substantially. If one looks at the antelope year-round distribution maps, it is obvious that the antelope use these areas mainly in summer and fall. The wintering areas are not known.

Almost 1,400 antelope were classified during this report period. Each symbol on the map represents a group of antelope which may vary from 1 to 30. The group size averages out to 6 animals.

Use of Habitat Types

Ashland Lease Area

Spring: Only 28 antelope were seen during this season and they were on the grassland subtype of the grassland habitat type.

Summer: Fifty-four percent of the antelope observations were on the grassland subtype of the grassland type. Another 6 percent of the antelope were utilizing the grassland parks within the ponderosa pine type. Twenty-three percent of the antelope were on the big sage-grassland subtype of the big sage-grassland habitat type, 11 percent on the big sage-grassland subtype of the grassland habitat type, and 2 percent on the big sage-grassland subtype of the ponderosa pine habitat type. Altogether this makes for 36 percent of the antelope utilizing a big sagebrush-grassland subtype (Table 12).

Upper Otter Creek Lease Area

Spring: Only 83 antelope were observed during this season. Eighty-one percent of the observations were in the big sage-grassland subtype of the big sage-grassland type. Another 10 percent of the animals were utilizing the big sage-grassland subtype of the ponderosa pine type. The last 10 percent of the animals were in alfalfa fields within the big sage-grassland type (Table 13).

Summer: The majority of the antelope, 82 percent, were sighted in the big sage grassland subtype of the big sage-grassland type. Another 5 percent of the antelope were in the big sage-grassland subtype and 7 percent in the grassland parks of the ponderosa pine type.

Table 12. Seasonal habitat use by antelope on the Ashland lease area from 161 ground and aerial observations.

Habitat Type		Spring (28)[1/]	Summer (133)
Ponderosa Pine Habitat Type			
Ponderosa Pine Subtype			4
Grassland Park Subtype			6
Big Sage-Grassland Subtype			2
	Subtotal		12
Grassland Habitat Type			
Grassland Subtype		100[2/]	54
Big Sage-Grassland Subtype			11
	Subtotal	100	65
Big Sage-Grassland Habitat Type			
Big Sage-Grassland Subtype			23
	Subtotal		23

1/ Number of antelope observed
2/ Percent of seasonal use

Table 13. Seasonal habitat use by antelope in the Upper Otter Creek lease area from 406 ground and aerial observations.

Habitat Type		Spring (83)[1/]	Summer (323)
Ponderosa Pine Habitat Type			
Ponderosa Pine Subtype		-	2
Grassland Park Subtype		-	7
Big Sage-Grassland Subtype		10[2/]	5
	Subtotal	10	14
Grassland Habitat Type			
Grassland Subtype		-	2
	Subtotal		2
Big Sage-Grassland Habitat Type			
Big Sage-Grassland Subtype		81	82
Grassland Subtype			1
Alfalfa Field Subtype		10	-
Grain Field Subtype			1
	Subtotal	91	84

1/ Number of antelope observed
2/ Percent of seasonal use

Hanging Woman Lease Area

Spring: Antelope in this area were found on only two habitat types. Sixty-six percent of the observations were in the big sage-grassland subtype of the big sage-grassland type and the other 34 percent in the grassland subtype of the grassland type.

Summer: The grassland subtype of the grassland type held 36 percent of the antelope observed during this season. Another 9 percent of the antelope utilized the grassland parks of the ponderosa pine type. This netted a total percentage of 45 percent of the animals using a grassland subtype.

Thirty-four percent of the animals were in the big sage-grassland subtype of the big sage-grassland type, 14 percent in the big sage-grassland subtype of the grassland type and 6 percent in the big sage-grassland subtype of the ponderosa pine type. This yielded a total of 54 percent of the animals on a big sage-grassland subtype (Table 14).

Table 14. Seasonal habitat use by antelope on the Hanging Woman lease area from 488 ground and aerial observations.

Habitat Type		Spring (83)[1/]	Summer (405)
Ponderosa Pine Habitat Type			
Grassland Park Subtype		-	9
Big Sage-Grassland Subtype		-	6
	Subtotal		15
Grassland Habitat Type			
Grassland Subtype		34[2/]	36
Big Sage-Grassland Subtype		-	14
Rhus-Grassland Subtype		-	tr
Greasewood Subtype		-	1
	Subtotal	34	51
Big Sage-Grassland Habitat Type			
Big Sage-Grassland Subtype		66	34
	Subtotal	66	34

1/ Number of antelope observed
2/ Percent of seasonal use

Decker Lease Area

Spring: Eighty-five percent of the antelope observations were in the big sage-grassland habitat type with the bulk, 67 percent, in the big sage-grassland subtype and 12 percent in the grassland subtype. The ponderosa pine-juniper-big sage mix subtype of the ponderosa pine type contained another 15 percent of the observations (Table 15).

Table 15. Seasonal habitat use by antelope on the Decker lease area from 303 ground and aerial observations.

Habitat Type		Spring (193)[1/]	Summer (110)
Ponderosa Pine Habitat Type			
Grassland Park Subtype		-	2
Big Sage-Grassland Subtype		-	8
Ponderosa Pine-Juniper-Big Sage Mix Subtype		15[2/]	-
	Subtotal	15	10
Grassland Habitat Type			
Grassland Subtype		-	1
	Subtotal	0	1
Big Sage-Grassland Habitat Type			
Big Sage-Grassland Subtype		67	66
Grassland Subtype		12	8
Alfalfa Field Subtype		3	-
Grain Field Subtype		3	-
Pasture Subtype		-	1
Ponderosa Pine-Juniper Subtype		-	4
Big Sage-Juniper Subtype			10
	Subtotal	85	89

1/ Number of antelope observed
2/ Percent of seasonal use

Summer: Sixty-six percent of the observations were recorded in the big sage-grassland subtype of the big sage-grassland habitat type and 8 percent in the big sage-grassland subtype of the ponderosa pine type. Another 10 percent of the antelope were recorded in the big sage-juniper subtype of the big sage-grassland type (Table 15).

Canyon Creek Lease Area

Very few antelope were found using this area.

Activity and Use of Topography

Spring

Sixty-eight percent of the antelope observed were standing and 16 percent were running. Feeding and bedded animals each accounted for 7 percent (Table 16). All the antelope that were recorded as to topography were on flat terrain.

Summer

During the summer 38 percent of the antelope were seen running, 36 percent standing, 17 percent bedded and 6 percent feeding (Table 16).

Eighty percent of the antelope were observed on flats, 15 percent on plateaus and 5 percent on hillsides (Table 16).

Table 16. Seasonal activity and topography use by antelope.

Activity: 807 Observations

	Run	Stand	Walk	Feed	Bedded
Spring	16[1/]	68	2	7	7
Summer	38	36	3	6	17

Topography: 535 Observations

	Flat	Plateau	Hillside	Coulee
Spring	100	-	-	-
Summer	80	15	5	1

1/ Percent of seasonal use or activity.

Food Habits

No food habit data have been collected for the Birney-Decker area. The following is a component of food habits research done in other areas of eastern Montana.

In early spring (March) antelope are still utilizing shrubs. Big sagebrush comprised 78 percent of this months diet. Other shrubs of importance were silver sage, rubber rabbitbrush, and snowberry. The only forb utilized in this instance was fringed sagewort. In April, shrubs only comprised about half the diet. Big sagebrush comprised 15 percent of the diet while silver sage rose to 36 percent. With spring growth of forbs coming on two species of lomatium *(Lomatium* spp.*)* made up 39 percent of the diet for this month, grass comprised 2 percent. In May, big sage dropped to 12 percent of the diet. Yarrow, toadflax *(Comandra umbellata)* and lomatium made up almost two-thirds of all the forage consumed.

By June, shrubs were only a trace in the diet. Fringed sage, three-leaved milkvetch *(Astragalus gilviflorus)*, daisy *(Erigeron pumilus)* and yellow sweetclover *(Melilotus officinalis)* were the important forbs. Yellow sweetclover comprised a full third of the diet. By July shrubs again became significant in the diet. Big sage and rubber rabbitbrush each comprised 6 percent and rose an additional 8 percent. However, three-leaved milkvetch, alfalfa *(Medicago sativa)* and yellow sweetclover made up the bulk with yellow sweetclover comprising over one-third of the diet in itself (Table 17). In August, rubber rabbitbrush comprised 12 percent of the monthly diet and big sage 8 percent. Fringed sage, longleaf

sage *(Artemisia longifolia)* and yellow sweetclover made up two-thirds of the forage consumed.

Production

An antelope survey was flown during the summer of 1974. In hunting district 742, production was 56 fawns per 100 does and 44 males per 100 females. This summer I flew part of district 742 again. Production had fallen substantially to 43 fawns per 100 does and 27 males per 100 females.

In 1974, hunting district 740 had 56 fawns per 100 does and 38 males per 100 females. I flew a portion of district 740 this year along lower Otter Creek and came up with 18 fawns per 100 does and 25 males per 100 females.

Due to the low production figures, hunting permits were reduced severely for the 1975 season.

Table 17. Spring and Summer Food Habits of Antelope.

Taxa	March (7)[1] (Bayless 1969)	April (8) (1144)[2] (Campbell 1970)	May (9) (1835) (Campbell 1970)	June (6) (582) (Wentland 1968)	July (16) (1990) (Wentland 1968)	August (12) (1567) (Wentland 1968)
SHRUBS						
Artemisia cana (silver sage)	11[3]	36				
Artemisia tridentata (big sage)	78	15	12		6	8
Chrysothamnus nauseosus (rubber rabbitbrush)	5				6	12
Gutierresia sarothrae (snakeweed)			1			
Rosa arkansana (rose)					8	2
Sarcobatus vermiculatus (greasewood)			3	tr		
Symphoricarpos occidentalis (snowberry)	3	2				
Total Shrubs	97	53	16	tr	20	22
FORBS						
Achillea millefolium (yarrow)		2	19		tr	
Allium textile (wild onion)			tr			
Antennaria parvifolia (small leaf pussytoes)			tr			
Arnica fulgens (arnica)			2			
Artemisia frigida (fringed sage)	3			17	1	17
Artemisia longifolia (long leaf sagebrush)					3	28
Aster spp. (aster)			6			
Astragalus gilviflorus (three-leaved milkvetch)				29	12	
Astragalus missouriensis (Missouri milkvetch)				1		
Besseya wyomingensis (kittentail)		1				
Comandra umbellata (toadflax)			18			
Erigeron pumilus (daisy)				17		
Gaura coccinea (gaura)					2	
Lomatium foeniculaceum (lomatium)		26	20			
Lomatium macrocarpum (lomatium)		13	5			
Medicago sativa (alfalfa)					12	3
Melilotus alba (white sweetclover)					1	4
Melilotus officinalis (yellow sweetclover)			1	33	35	18
Monolepis nuttalliana (monolepis)			2			
Opuntia polycantha (prickly pear)					4	
Petalostemon purpureum (purple prairie clover)			tr	4		
Polygonum aviculare (prostrate knotweed)					5	
Psoralea argophylla (silverleaf scurfpea)			2			
Psoralea tenuiflora (slimflower scurfpea)					1	
Ratibida columnifera (prairie coneflower)			1			tr
Tragopogon dubius (common salsify)						8
Vicia americana (American vetch)		tr	2		tr	
Unidentified forbs		2		1	1	
Total Forbs	3	45	83	100	80	78
Grass		2	1	tr		

1/ Number of feeding sites
2/ Total instances of use (bites)
3/ Percentage of diet

Small Game

Sharp-tailed Grouse

Two hundred and sixty grouse *(Pedioecetes phasianellus)* observations were recorded during the last six months. The circle on the small game maps represents groups of sharptails. A group ranges from 1 to 22 birds.

Use of Habitat Types

Spring

Forty percent of the sharptails were observed on the big sage-grassland subtype of the big sage-grassland habitat type. The grassland subtype of the grassland habitat type received 24 percent of the observed usage and the grassland park subtype of the ponderosa pine type yielded 14 percent of the observations. The use of these open types is in contrast with habitat use during the winter when 88 percent of the observations were in some subtype of the ponderosa pine habitat type and 45 percent of the total observations were in the ponderosa pine subtype.

Summer

Forty-three percent of the observations were in the big sage-grassland subtype of the big sage-grassland habitat type. The birds were well dispersed in many types since the mating season is over. Eleven percent of the sharptails were seen in the ponderosa pine subtype of the ponderosa pine type. Roadside vegetation accounted for 20 percent of all the birds seen in this subtype throughout all three major habitat types (Table 18).

Activity and Use of Topography

Spring

Eighty-six percent of the observations were of sharptails dancing on their breeding grounds. Eighty-two percent of the birds were seen on flats and the other 18 percent on plateaus. This is what one would expect since these birds place their courting grounds in open areas.

Summer

Fifty-five percent of the sharptails were observed walking, 22 percent perched and 11 percent flying. Eighty-five percent of the birds were on flat terrain, 59 percent on flats and 26 percent on plateaus (Table 19).

Table 18. Habitat use by sharptails during spring and summer from 260 ground and aerial observations.

Habitat Type	Spring (173)[1]	Summer (87)
Ponderosa Pine Habitat Type		
Ponderosa Pine Subtype	-	11
Grassland Park Subtype	14[2]	3
Agricultural Subtype	5	-
Roadside Vegetation Subtype	1	7
Ponderosa Pine-Juniper-Big Sage Mix Subtype	1	-
Subtotal	21	21
Grassland Habitat Type		
Grassland Subtype	24	5
Big Sage-Grassland Subtype	-	6
Roadside Vegetation Subtype	1	6
Silver Sage Subtype	-	7
Subtotal	25	24
Big Sage-Grassland Habitat Type		
Big Sage-Grassland Subtype	40	43
Silver Sage Subtype	-	2
Roadside Vegetation Subtype	-	7
Alfalfa Field Subtype	7	-
Grain Field Subtype	4	-
Pasture Subtype	-	3
Ponderosa Pine Subtype	4	-
Subtotal	55	55

1/ Number of sharptails
2/ Percent of seasonal use

Table 19. Activity and use of topography by sharptails during spring and summer.

Activity: 287 Observations

	Walk	Perched	Fly	Dance	Stand
Spring	-	3[1]	8	86	2
Summer	55	22	11	6	6

Topography Use: 183 Observations

	Flat	Plateau	Road
Spring	82	18	-
Summer	59	26	16

1/ Percent

Food Habits

Pepper (1972) has some data on spring food habits of chicks. "Animal material composed all food taken by chicks until two weeks of age and other foods made up only 1.4 percent by volume of the three to four week old's diet. For chicks from five to ten weeks of age, animal material still comprised approximately 60-70 percent of total food by volume. Plant material, largely comprising cultivated crops and weedy species constituted a rapidly increasing percentage of chick food in the older age classes. . .grasshoppers (ORTHOPTERA), bettles (COLEOPTERA), leaf hoppers (HOMOPTERA) and various HYMENOPTERANS including ants, wasps and bees were the most important animal foods over all. Of the vegetative material, hard wheat *(Triticum aestivum)* and green leaves were of the most importance. . . Rose, snowberry and wild buckwheat *(Polygonum* spp.*)* berries or seeds were less important volumetrically but occurred frequently in gizzards."

Hillman and Jackman's (1973) work in South Dakota showed adult sharptails preferring dandelions in spring. This was followed in importance by cultivated crops. Alfalfa, rose, crickets and grasshoppers were also important.

By summer, grasshoppers were number one in the diet followed closely by cultivated crops. Rose, prickly lettuce, alfalfa, dandelion, western snowberry and goatsbeard were also significant. Hillman and Jackson (1973) stated that "preference indices for food items taken by 48 adult sharptails during summer indicated selectivity for rose hips, snowberry, and prickly lettuce. Short-horned grasshoppers were consumed in approximate proportion to their availability."

A year-round food habits study is something that should be done in the Birney-Decker area for sharptails. It would help set up guidelines for wildlife foods that should be incorporated in reclamation plantings. However, the process of collecting birds for crop analysis is time consuming and would dictate extending this present study.

Breeding Areas

This spring much time was spent locating sharptail dancing grounds. Twenty-four such grounds were located. The pinpointing of such grounds is an important first step in understanding the requirements of this bird. The dancing ground appears to be the center of the birds' life activities. Often times the birds winter close to breeding areas. According to Brown (1967), hens often nest within one-half mile of the breeding ground, and they have brood ranges of 0.6 to 1.25 miles from the ground for up to eight weeks of brood development. In various banding studies where sharptails are killed due to predation or hunting the birds are often found no more than one to two miles from their dancing ground.

The following is a list of the known sharptail grounds in the Birney-Decker area. Figures 18-22 give breeding ground distribution.

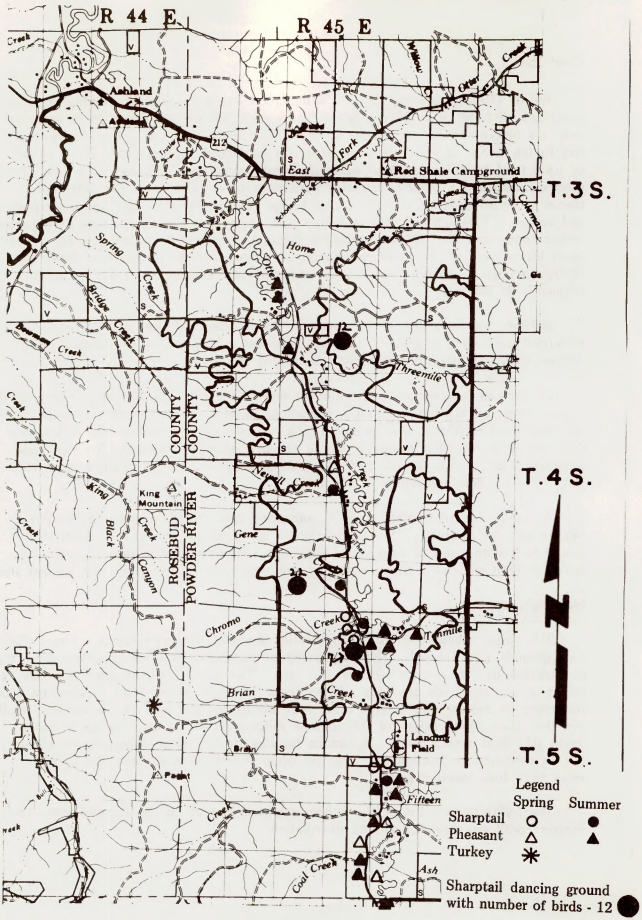

Figure 18. Small game spring and summer distribution Ashland lease area.

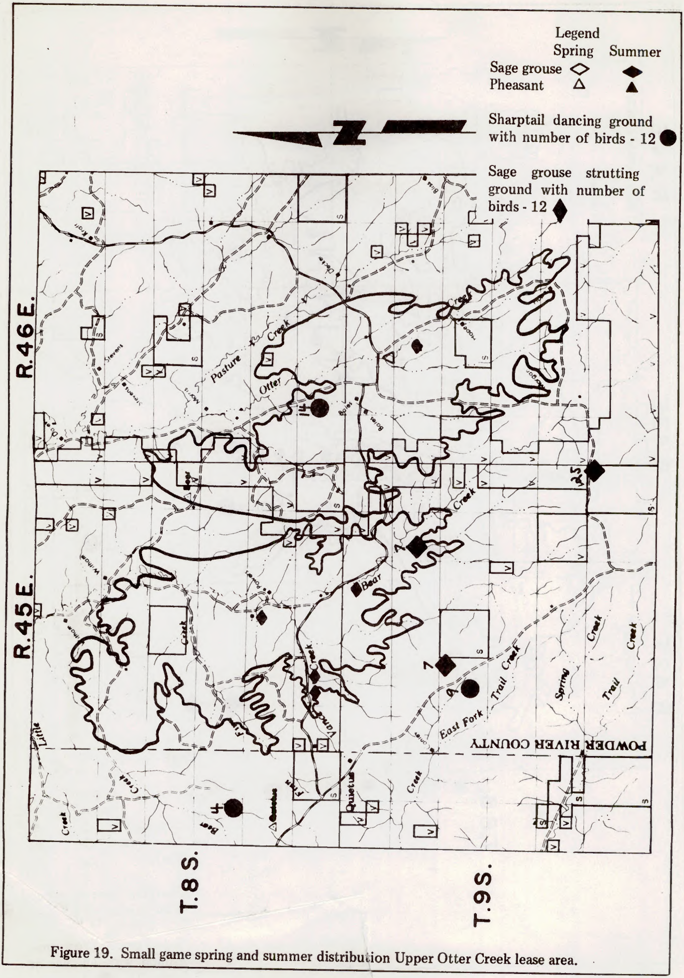

Figure 19. Small game spring and summer distribution Upper Otter Creek lease area.

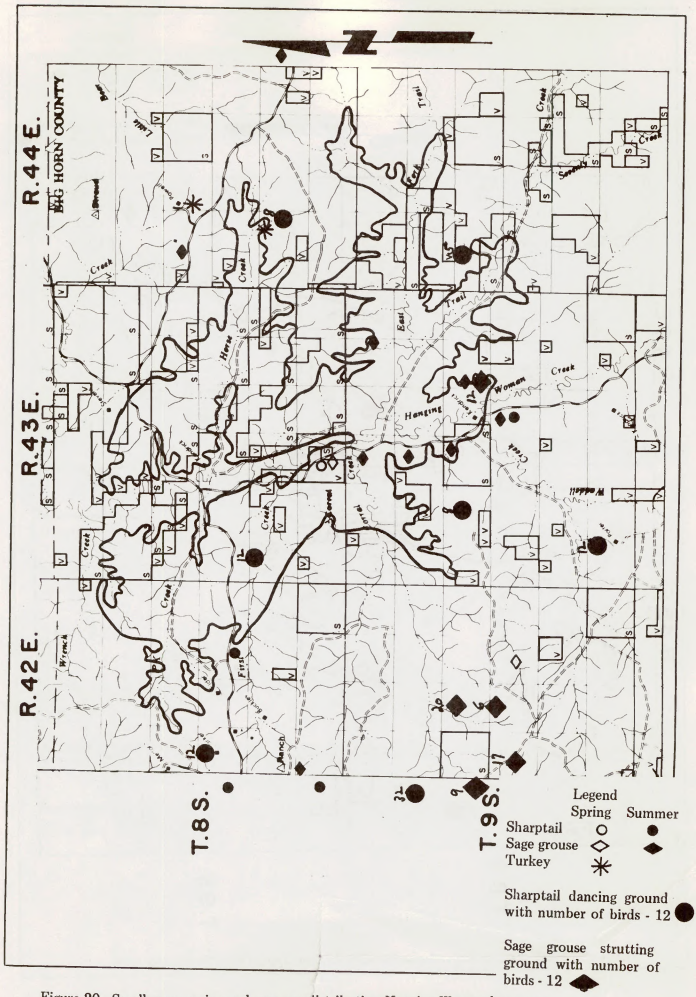

Figure 20. Small game spring and summer distribution Hanging Woman lease area.

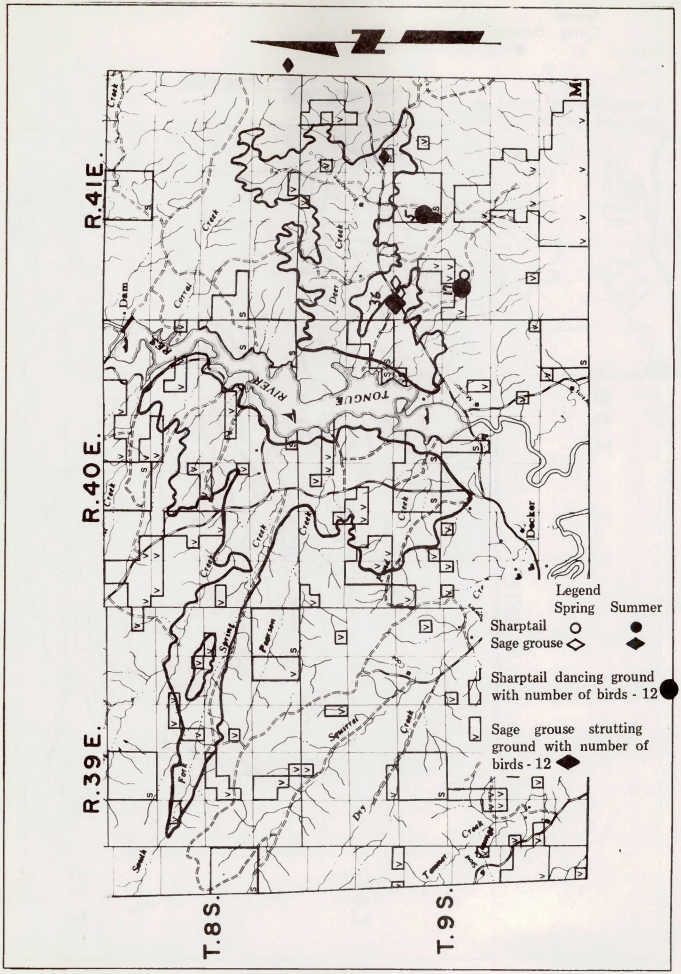

Figure 21. Small game spring and summer distribution Decker lease area.

Figure 22. Small game spring and summer distribution Canyon Creek lease area.

Ground Number	Date Located	Approximate Number Birds
1	Mar. 5, 1975	12
9	Mar. 31, 1974	13
10	April 3, 1974	11
11	April 5, 1974	3
12	April 5, 1974	18
37	Mar. 21, 1975	8
38	Mar. 25, 1975	12
39	April 2, 1975	22
40	April 2, 1975	7
41	April 3, 1975	12
42	April 4, 1975	20
43	April 14, 1975	4
44	April 14, 1975	7
45	April 19, 1975	32
46	Mar. 11, 1974	12
47	May 1, 1975	12
48	May 1, 1975	8
49	May 1, 1975	5
50	May 1, 1975	8
51	May 14, 1975	14
52	May 14, 1975	9
53	May 14, 1975	4
54	May 3, 1975	12
56	June 6, 1975	5

The average number of birds per ground was 11. The number of birds seen on a ground depends on various factors such as time of day, weather and amount of disturbance. Most of the birds seen are males but to accurately determine the number and sex of birds using a ground, each ground should be checked several times each season.

Figure 23 shows a typical sharptail ground. It is usually a small rise or knoll in an open area with good visibility. Figure 24 is a closeup of the ground showing the shortness and sparseness of the vegetation.

Figure 23. The hill in the foreground is a typical example of a sharptail dancing ground.

Figure 24. Closeup of a sharptail ground. Vegetation is short and sparse.

Some grounds are called "satellite grounds" meaning they are extra grounds only used during years of high grouse populations. By watching these breeding areas and checking the number of birds per ground and the use of satellite grounds, biologists can establish trends in grouse populations and expected productivity.

Recently Rippin and Boag (1974) in Canada established that a population of nonterritorial males existed in the population studied. If this is true for every dancing ground then spring population densities of sharptails may be grossly underestimated. This is a subject that deserves serious investigation. A study of this sort in the Birney-Decker area is imperative in order to establish the extent of this resource and the seriousness of any impacts it may encounter.

Sage Grouse

Two hundred and eight-five observations of sage grouse *(Centrocercus urophasianus)* were recorded in the last six months. The diamond symbol on the distribution map represents groups of sage grouse. A group may range from 1 to 35 birds.

Use of Habitat Types

Spring

All 157 observations were recorded in the big sage-grassland subtype of the big sage-grassland habitat type.

Summer

During this season the sage grouse spread out into more types. The big sage-grassland habitat type held 69 percent of the observations divided among three subtypes — the big sage-grassland, 29 percent; the silver sage subtype, 27 percent and the deciduous shrub subtype, 13 percent. One-third of all the observations were in the silver sage subtype of the pine and big sage-grassland types combined (Table 20).

Activity and Use of Topography

Spring

Sixty-one percent of the birds were strutting. Another 27 percent were flying and 10 percent feeding. All birds were on flat terrain (Table 21).

Summer

Activity was dispersed for this season. Twenty-nine percent of the birds were feeding and 32 percent walking. All birds were seen on flat terrain (Table 21).

Table 20. Spring and summer habitat use by sage grouse from 285 observations.

Habitat Types		Spring (157)[1/]	Summer (128)
Ponderosa Pine Habitat Type			
Silver Sage Subtype		-	5
	Subtotal	-	5
Grassland Habitat Type			
Grassland Subtype		-	7
Greasewood Subtype		-	19
	Subtotal	-	26
Big Sage-Grassland Habitat Type			
Big Sage-Grassland Subtype		100[2/]	29
Deciduous Shrub Subtype		-	13
Silver Sage Subtype		-	27
	Subtotal	100	69

1/ Number of birds seen
2/ Percent

Table 21. Seasonal activity and use of topography by sage grouse.

Activity: 147 Observations

	Feed	Walk	Sit	Stand	Fly	Strut
Spring	10[1/]	-	2	-	27	61
Summer	29	32	12	14	13	-

Topography: 111 Observations

	Flat	Plateau
Spring	100	-
Summer	99	1

1/ Percent

Food Habits

Big sagebrush is without doubt the most important item in the diet of sage grouse. But during spring and summer forbs do contribute significantly to the diet. Peterson (1969) studied the summer food habits of juvenile sage grouse in southcentral Montana. He found dandelion and salsify to be the two most important plant items in the diet. Five other commonly utilized plants appeared to be more periodic in their occurrence in the diets of chicks. Prairie pepperweed *(Lepidium densiflorum)* was very important in the younger age classes. Fringed sagewort, curlcup gumweed, prickly lettuce, and alfalfa were not utilized to any extent until the fifth or sixth week. Animal matter, primarily insects, was the most important constituent of the diet during the first week of age. Grasshoppers, beetles and ants were the most important insects. Peterson believed that forbs were quite important to juvenile sage grouse. The availability of, and seeming preference for parts of certain forbs, played an important role in the seasonal use of these plants as well as the distribution of the birds. The seed pods of prairie pepperweed were a very important constituent of the diet of the youngest grouse. The small size of this plant placed these pods within easy reach. Availability also appeared to be the main factor governing the use of prickly lettuce. Although a few leaves of this plant were taken earlier, the flower buds became available near the end of July and were heavily utilized by August. Alfalfa was not utilized to any extent until later in the summer when many birds began feeding on hay meadows. Even then, alfalfa never became more than the third most preferred plant food item or comprised more than 3 percent of the volume in any given age group.

Breeding Areas

This spring nine sage grouse strutting grounds were located. The following is a list of these grounds. Figures 18-21 show approximate distribution.

Ground Number	Date Located	Number Birds
2	March 24, 1975	16
2 rechecked	April 20, 1975	19 males, 17 females
3	April 19, 1975	1 male, 8 females
4	May 3, 1975	Approximately 20
5	April 4, 1975	6
6	April 4, 1975	17
7	May 1, 1975	Approximately 12
8	May 14, 1975	Approximately 25
9	May 14, 1975	6 males, 1 female
10	May 14, 1975	Approximately 7

Most of these grounds were discovered by plane which accounts for the approximate count on several grounds and not differentiating males from females on others.

A research project has been started on sage grouse ground number 2 located on the East Decker lease area. Next spring females will be banded on the strutting ground and then followed throughout summer and winter to establish their brood-rearing and wintering areas. If a strip mine is opened up on the East Decker lease area, this will

either obliterate or severely disturb the breeding ground. However, if the brood-rearing and wintering areas are not impacted the grouse may set up a new breeding ground. This is what we want to find out.

Pheasant

One hundred and seventeen observations of pheasant *(Phasianus colchicus)* were recorded in the last six months. The triangle symbol on the distribution map represents groups of pheasants. A group ranges from one to eight birds.

Use of Habitat Types

Spring

Only nine observations were recorded during spring.

Summer

Two-thirds of the pheasants were observed within the major ponderosa pine habitat type. This is because most of the time was spent looking in this type. Combining the most used subtypes from all three habitat types shows the deciduous subtype to comprise 29 percent of the observations and roadside vegetation another 47 percent. Agricultural land accounted 19 percent of the observations. It is obvious that roadsides, creek bottoms and agricultural land is where to find pheasants (Table 22).

Table 22. Seasonal habitat use by pheasants from 117 ground observations.

Habitat Type		Spring (9)	Summer (108)
Ponderosa Pine Habitat Type			
Rhus-Grassland Subtype		11	-
Deciduous Shrub Subtype		22	20
Big Sage-Grassland Subtype		11	-
Roadside Vegetation Subtype		44	28
Agricultural Subtype		-	19
	Subtotal	88	67
Grassland Habitat Type			
Grassland Subtype		-	3
Big Sage-Grassland Subtype		-	1
Roadside Subtype		11	-
Greasewood Subtype		-	1
	Subtotal	11	5
Big Sage-Grassland Habitat Type			
Deciduous Shrub Subtype		-	9
Roadside Vegetation Subtype		-	19
	Subtotal	-	28

Activity and Use of Topography

No data was collected during the spring. In summer, 85 percent of the birds observed were walking and 15 percent standing. Eighty-five percent of the birds were on flat terrain and 15 percent in creek bottoms (Table 23).

Table 23. Seasonal activity and use of topography by pheasants.

Activity: 85 Observations		
	Walk	Stand
Summer	85	15
Use of Topography: 85 Observations		
	Flat	Creek
Summer	85	15

Food Habits

One of the better quantitative studies of pheasant food habits was done by Hiatt in 1947 in the Big Horn and Yellowstone River Valleys. There is much more grain production in these valleys than in the Birney-Decker area but the study will give some idea of pheasant food habits.

In March, wheat, barley and oats made up 73 percent of the diet. Some of the natural food utilized was Russian thistle *(Salsola pestifer)*, grasshopper eggs and pods and prickly lettuce root fragments. In April, wheat, barley and great burdock comprised 70 percent of the diet. Sweetclover comprised another eight percent and chokecherry seven percent. In May, wheat, barley and corn accounted for 47 percent of the diet. Dinghy cutworm *(Feltia ducens)* comprised 19 percent of the food taken.

By June wheat and barley were 60 percent of the month's diet. Natural foods were dinghy cutworm, 3 percent, grasshopper nymph, 2 percent, dandelion, 1 percent and earthworm 1 percent. In July wheat, barley and beans made up 75 percent of the diet. Grasshopper nymphs comprised 5 percent of the menu.

By August wheat and barley were 58 percent of the diet. Grasshoppers were 9 percent, yellow bristlegrass *(Setaria lutescens)* 7 percent, pea 6 percent, wild oats 4 percent, common sunflower *(Helianthus annus)* 3.3 percent, and field cricket nymphs 2.4 percent.

As is obvious the pheasants are depending heavily on the domestic grain. In areas of less intensive agriculture like the Birney-Decker area the pheasant must depend heavily on natural foods such as weed seeds and insects.

Population Index

Pheasant crow count routes were run on Otter Creek and the Tongue River from Birney to Ashland in 1974 and 1975. The total number of pheasant "crows" heard during a two minute period is recorded for each stopping point (one mile intervals) along the route. The resulting figure provides an index to the male pheasant population. An average number of calls per two minute stop ranging between 10 and 20 is indicative of a fair to good pheasant population.

In 1974 the Tongue River section had a crow count of 6.7 and in 1975 it was 7.7. This is indicative of only a fair pheasant population.

In 1974 the Otter Creek crow count was 37.0. This is excellent. However, back in 1971 and 1972 the crow count on this creek was only 11.0 and 19.9 respectively. Evidently there has been a strong rise in the pheasant population on this drainage.

Turkeys

Four groups of turkeys *(Meleagris gallopavo)* were seen during this report period. In April a group of three gobblers were seen in the Canyon Creek lease area. They were seen on a big sage plateau at the head of Whittaker Creek.

In May four gobblers were seen on a grassland plateau within the ponderosa pine type on the east edge of the Hanging Woman lease area. In August five gobblers and five hens were spotted just two miles farther north in the ponderosa pine subtype of the ponderosa pine type.

In July five gobblers were spotted in the ponderosa pine subtype of the ponderosa pine type on the Custer Forest about two miles west of the Ashland lease area (Figures 18, 20 and 22).

Waterfowl

Canada Geese

In the spring of 1974 the Tongue River was flown to determine the number of breeding pairs of Canada geese *(Branta canadensis).* Sixty such pairs were identified.

In May of 1975 the river was flown again including the Tongue River Reservoir. Fifty-seven pairs of geese were identified on the river. This is about the same number as seen in 1974. This could mean that all the suitable goose nesting habitat is filled. Besides the breeding pairs of geese, groups of geese totaling 68 birds were also seen. These are either immature birds or unsuccessful breeders. Canada geese usually do not nest until two or three years old. The reservoir had nine pairs of geese concentrated at the upper end in the shallows of the dead cottonwoods.

Altogether 23 goose broods were observed totaling 81 young. This is an average of 3.5 young per brood. This is about the same brood size as found on the Yellowstone River. Clutch size on the Yellowstone is 5.5 eggs (Hinz 1975). When this survey was

conducted some birds were still nesting. The high water this spring may have caused a higher nest loss than usual. It should be realized that all pairs and all broods were not sighted.

Nongame

Songbird routes were started this spring. The only area where this was done intensively was on the Ashland lease area (Figure 25). The rest of the bird data were too sparse to show on a distribution map, but it was used to show habitat preference. There were more species identified than the four shown on the Ashland map, but these were the most common.

Bird distribution is presented here according to Skaar's latilong. "A latilong is defined as the area between lines of latitude and longitude (parallel and meridians)" (Skaar 1975). With this method the state of Montana is divided into 47 latilongs. The Birney-Decker area is the shaded portion of latilong number 43 (Figure 26). Birds which have been sighted in latilong number 43 are listed. This is not a complete list, but it is the best available at the present time.

In order to better understand the habitat requirements of birds in the Birney-Decker area this progress report will begin to give basic life history information on some common species. This will continue in subsequent progress reports.

Red-tailed Hawk *(Buteo jamaicensis)*

In April of 1974 I flew the Tongue River looking for raptor nests. Eighteen red-tailed hawk nests and three great horned owls nests were located. Seven of the hawk nests and one owl nest were located between the reservoir and Ashland. There are probably more nests than I observed.

The red-tailed hawk lays 2-4 eggs, usually 2. Incubation takes 28 days and is shared by both sexes. Both parents assist in the care of the young which remain in the nest for about six weeks. The nest is a large and bulky structure generally placed well up in a tree 40-80 feet above the ground, constructed of large sticks and lined with smaller twigs and bark. The same nest is used year after year.

Some of the prey that redtails feed on are gophers, ground squirrels, meadow mice, young cottontails, gopher snakes and rattlesnakes (Pearson 1917; Bent 1937, Vol I).

Of the 31 observations of redtails classified to habitat types, 55 percent were in the ponderosa pine type, 26 percent in the grassland type and 20 percent in the big sage-grassland type. This raptor appears to be a bird of the woods more than prairie.

Marsh Hawk *(Circus cyaneus)*

The nest is built on the ground, very often in marshy places and commonly in low shrubby vegetation, tall weeds or reeds. It is built by the female. On dry ground the nest may be a small structure of reeds, grasses and small sticks no more than an inch or two thick, but on wet ground is usually more substantial, up to three feet across.

W = winters in the latilong
B = breeds in the latilong

		1.	Common Loon *(Gavia immer)*
		2.	Eared Grebe *(Podiceps nigricollis)*
		3.	Western Grebe *(Aechmophorus occidentalis)*
		4.	Pied-billed Grebe *(Podilymbus podiceps)*
		5.	White Pelican *(Pelecanus erythrorhynchos)*
	B	6.	Double-crested Comorant *(Phalacrocorax auritus)*
	B	7.	Great Blue Heron *(Ardea herodias)*
		8.	Whistling Swan *(Olor columbianus)*
W	B	9.	Canada Goose *(Branta canadensis)*
W	B	10.	Mallard *(Anas platyrhynchos)*
		11.	Gadwall *(Anas strepera)*
		12.	Pintail *(Anas acuta)*
		13.	Green-winged Teal *(Anas crecca)*
		14.	Blue-winged Teal *(Anas discors)*
		15.	American Wigeon *(Anas americana)*
		16.	Northern Shoveler *(Anas clypeata)*
		17.	Redhead *(Aythya americana)*
		18.	Ring-necked Duck *(Aythya collaris)*
		19.	Canvasback *(Aythya valisineria)*
		20.	Lesser Scaup *(Aythya affinis)*
W		21.	Common Goldeneye *(Bucephala clangula)*
		22.	Ruddy Duck *(Oxyura jamaicensis)*
W		23.	Common Merganser *(Mergus merganser)*
		24.	Turkey Vulture *(Cathartes aura)*
W		25.	Sharp-shinned Hawk *(Accipiter striatus)*
	B	26.	Red-tailed Hawk *(Buteo jamaicensis)*
		27.	Swainson's Hawk *(Buteo swainsoni)*
W		28.	Rough-legged Hawk *(Buteo lagopus)*
		29.	Ferruginous Hawk *(Buteo regalis)*
W	B	30.	Golden Eagle *(Aquila chrysaetos)*
		31.	Bald Eagle *(Haliaeetus leucocephalus)*
W		32.	Marsh Hawk *(Circus cyaneus)*
	B	33.	Osprey *(Pandion haliaetus)*
W		34.	Prairie Falcon *(Falco mexicanus)*
		35.	Sparrow Hawk *(Falco sparverius)*
W	B	36.	Sharp-tailed Grouse *(Pedioecetes phasianellus)*
W	B	37.	Sage Grouse *(Centrocercus urophasianus)*
W	B	38.	Ring-necked Pheasant *(Phasianus colchicus)*
W		39.	Gray Partridge *(Perdix perdix)*
W	B	40.	Turkey *(Meleagris gallopavo)*
		41.	American Coot *(Fulica americana)*
W	B	42.	Killdeer *(Charadrius vociferus)*
W		43.	Common Snipe *(Capella gallinago)*
		44.	Long-billed Curlew *(Numenius americanus)*

45. Upland Plover *(Bartramia longicauda)*
46. Spotted Sandpiper *(Actitis macularia)*
47. Greater Yellowlegs *(Tringa melanoleuca)*
48. Lesser Yellowlegs *(Tringa flavipes)*
49. Wilson's Phalarope *(Steganopus tricolor)*
50. Northern Phalarope *(Lobipes lobatus)*
51. Ring-billed Gull *(Larus delawarensis)*

W 52. Rock Dove *(Columba livia)*

B 53. Mourning Dove *(Zenaida macroura)*
54. Yellow-billed Cuckoo *(Coccyzus americanus)*
55. Black-billed Cuckoo *(Coccyzus erythropthalmus)*
56. Barn Owl *(Tyto alba)*

W B 57. Great Horned Owl *(Bubo virginianus)*

W 58. Short-eared Owl *(Asio flammeus)*
59. Saw-whet Owl *(Aegolius acadicus)*
60. Poorwill *(Phalaenopticus nuttallii)*
61. Common Nighthawk *(Chordeiles minor)*
62. White-throated Swift *(Aeronautes saxatilis)*
63. Belted Kingfisher *(Megaceryle alcyon)*

W B 64. Common Flicker *(Colaptes auritus)*
65. Red-headed Woodpecker *(Melanerpes erythrocephalus)*

W 66. Hairy Woodpecker *(Dendrocopos villosus)*

W 67. Downy Woodpecker *(Dendrocopos pubescens)*

W 68. Black-backed Three-toed Woodpecker *(Picoides arcticus)*
69. Eastern Kingbird *(Tyrannus tyrannus)*
70. Western Kingbird *(Tyrannus verticalis)*

B 71. Cassin's Kingbird *(Tyrannus vociferans)*
72. Say's Phoebe *(Sayornis saya)*
73. Least Flycatcher *(Empidonax minimus)*
74. Dusky Flycatcher *(Empidonax oberholseri)*
75. Western Wood Pewee *(Contopus sordidulus)*

W 76. Horned Lark *(Eremophila alpestris)*
77. Violet-green Swallow *(Tachycineta thalassina)*

B 78. Tree Swallow *(Iridoprocne bicolor)*
79. Bank Swallow *(Riparia riparia)*
80. Rough-winged Swallow *(Stelgidopteryx ruficollis)*

B 81. Barn Swallow *(Hirundo rustica)*

B 82. Cliff Swallow *(Petrochelidon pyrrhonota)*

W B 83. Black-billed Magpie *(Pica pica)*

W 84. Common Raven *(Corvus corax)*

W 85. Common Crow *(Corvus brachyrhynchos)*

W 86. Pinon Jay *(Gymnorhinus cyanocephalus)*

W 87. Black-capped Chicadee *(Parus atricapillus)*

W 88. White-breasted Nuthatch *(Sitta carolinensis)*
89. Brown Creeper *(Certhia familiaris)*
90. House Wren *(Troglodytes aedon)*

		91.	Long-billed Marsh Wren *(Telmatodytes palustris)*
		92.	Canon Wren *(Catherpes mexicanus)*
		93.	Rock Wren *(Salpinctes obsoletus)*
		94.	Gray Catbird *Dumetella carolinensis)*
		95.	Brown Thrasher *(Toxostoma rufum)*
W	B	96.	Robin *(Turdus migratorius)*
	B	97.	Eastern Bluebird *(Sialia sialis)*
	B	98.	Mountain Bluebird *(Sialia currucoides)*
W		99.	Townsend's Solitaire *(Myadestes townsendi)*
		100.	Cedar Waxwing *(Bombycilla cedrorum)*
W		101.	Northern Shrike *(Lanius excubitor)*
		102.	Loggerhead Shrike *(Lanius ludoviciana)*
W		103.	Starling *(Sturnus vulgaris)*
		104.	Solitary Vireo *(Vireo solitarius)*
		105.	Red-eyed Vireo *(Vireo olivaceus)*
		106.	Warbling Vireo *(Vireo gilvus)*
	B	107.	Yellow Warbler *(Dendroica petechia)*
		108.	Yellow-rumped Warbler *(Dendroica coronata)*
		109.	Ovenbird *(Seiurus aurocapillus)*
		110.	Yellowthroat *(Geothlypis trichas)*
		111.	Yellow-breasted Chat *(Icteria virens)*
		112.	American Redstart *(Setophaga Ruticilla)*
W		113.	House Sparrow *(Passer domesticus)*
W	B	114.	Western Meadowlark *(Sturnella neglecta)*
		115.	Yellow-headed Blackbird *(Xanthocephalus xanthocephalus)*
W	B	116.	Red-winged Blackbird *(Agelaius phoeniceus)*
	B	117.	Northern Oriole *(Icterus galbula)*
W		118.	Brewer's Blackbird *(Euphaga cyanocephalus)*
	B	119.	Common Grackle *(Quiscalus quiscula)*
		120.	Brown-headed Cowbird *(Molothrus ater)*
		121.	Western Tanager *(Piranga ludoviciana)*
		122.	Black-headed Grosbeak *(Pheucticus melanocephalus)*
		123.	Lazuli Bunting *(Passerina amoena)*
W		124.	Evening Grosbeak *(Hesperiphona vespertina)*
W		125.	Gray-crowned Rosy Finch *(Leucosticte tephrocotis)*
W		126.	Black Rosy Finch *(Leucosticte atrata)*
		127.	Pine Siskin *(Spinus pinus)*
W		128.	American Goldfinch *(Spinus tristis)*
W		129.	Red Crossbill *(Loxia curvirostra)*
		130.	Rufous-sided Towhee *(Pipilo erythrophthalmus)*
	B	131.	Lark Bunting *(Calamospiza melanocorys)*
		132.	Grasshopper Sparrow *(Ammodramus savannarum)*
		133.	Vesper Sparrow *(Pooecetes gramineus)*
	B	134.	Lark Sparrow *(Chondestes grammacus)*
W		135.	Dark-eyed Junco *(Junco hyemalis)*
W		136.	Tree Sparrow *(Spizella arborea)*
		137.	Chipping Sparrow *(Spizella passerina)*
		138.	Clay-colored Sparrow *(Spizella pallida)*
		139.	Brewer's Sparrow *(Spizella breweri)*
		140.	Song Sparrow *(Melospiza melodia)*

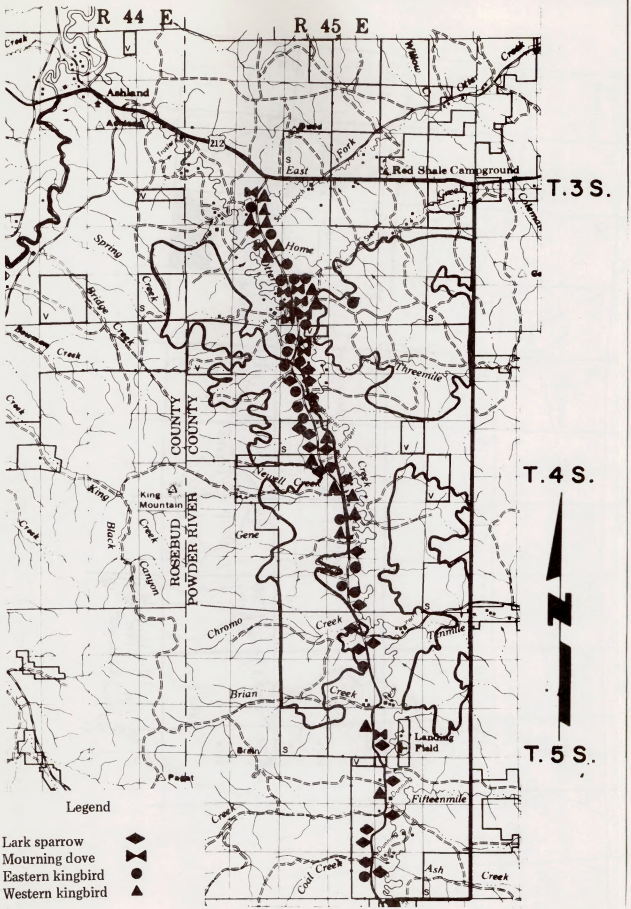

Figure 25. Nongame distribution Ashland lease area

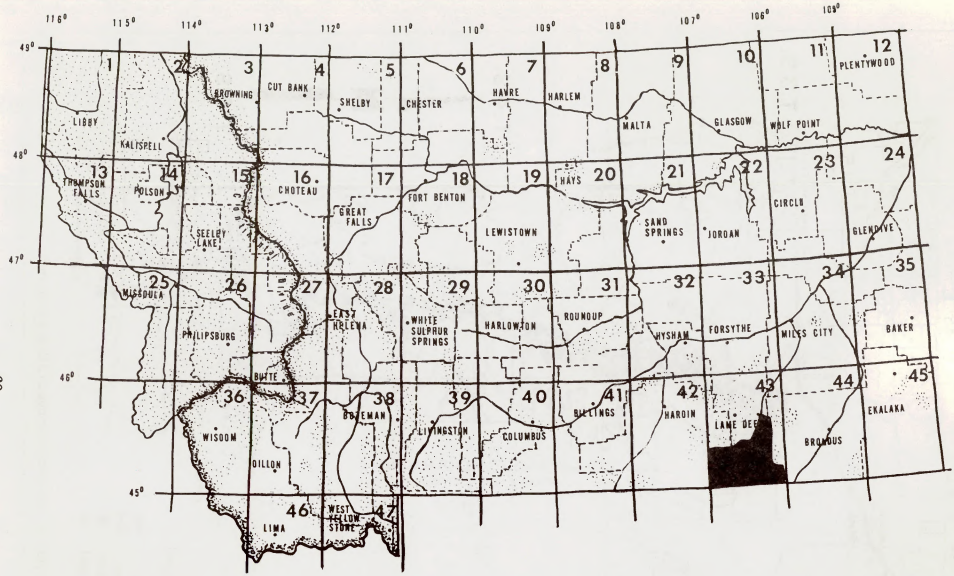

Figure 26. Latilongs.

Normal nests are 13-20 inches across and 3-10 inches deep. The same general area will be used year after year, but not the same nest. Several pairs may nest together in a sort of loose colony, 200 yards to one mile apart. The nesting range is about one square mile but an area of up to 650 yards in diameter is actually defended.

Eggs are laid at intervals of 48 hours or more with incubation beginning with the second, third or fourth egg. Clutch size is 4-6 with 5 eggs being most frequent.

The marsh hawk is on the wing soon after daybreak and then makes for a chosen hunting ground which is regularly used day after day. It flies its area systematically, flying about 10 to 30 feet above the ground. It is grounded by wet weather and in dry weather it fluctuates its hunting by perching on the ground, on stumps, a fence post and occasionally in trees. It is on the wing about 40 percent of daylight and perhaps flies about 100 miles every day of its life.

Average speeds recorded for the bird are 30-35 MPH over plowed fields; 25-32 over short grass pasture; 20-25 over wheat stubble and 12-18 over weeds — the rougher, the slower because the prey is harder to see.

At most times it is likely to be aggressive toward other birds of prey. It commonly kills birds wounded by human hunters (Brown and Amadon 1968).

Sparrow Hawk *(Falco sparverius)*

It nests in a hole which may be a natural tree crevice or an old woodpecker hole. Mating may precede egg-laying by as much as six weeks and is more frequent as the time for egg-laying approaches, but ends within a day after the last egg is laid. There are 3-7 eggs per clutch with an incubation period of 29 days. At three weeks of age the young weigh as much as the adults and leave the nest 30 days after hatching.

Banding records show an average annual mortality of 57% and a life span of 1¼ years. Aside from the larger birds of prey, the sparrow hawk has relatively few natural enemies. Man is the exception. One set of banding records showed the cause of death to be shooting 25% of the time.

Despite its name only 15% of its prey consist of sparrows and other small birds. The largest part of its diet, up to 80% is rodents, of which it is estimated a single bird may eat 290 in a year. Other prey would be grasshoppers, crickets, beetles, dragonflies and spiders (Riley 1975).

Forty-seven observations of sparrow hawks were classified to vegetation types. Forty percent of the observations were in the grassland habitat type, 32 percent in the big sage-grassland habitat type and 28 percent in the ponderosa pine type, especially the big sage-grassland subtype.

Great Horned Owl *(Bubo virginianus)*

It often uses old red-tailed hawk nests to raise its young. It starts nesting in February or the first of March. There are usually two eggs with an incubation period of 28 days. The young remain in the nest 6-7 weeks and are unable to fly until about 10-12 weeks old. They are voracious feeders and it is much easier for their parents to supply their needs before the summer foliage becomes too dense. It is middle or late June before the young are able to even partially fend for themselves.

The great horned owl is a ravenous feeder on a great variety of animal life. Where prey is plentiful it often kills more than it needs, eating only the choicest parts, but where food is scarce it often returns to its kill. Some of the mammals preyed upon are hares, rabbits, red squirrels, chipmunks, rats, mice, muskrats, ground squirrels, pocket gophers, minks, weasels, skunks, woodchucks, opossums, porcupines, domestic cats, shrews and bats. Birds eaten are Canada geese, several species of ducks, American bittern, small herons, coot, grouse, pheasant, domestic poultry, mourning dove, marsh hawk, red-tailed hawk, barn owls, flickers, long-eared owls, crow, starling, blackbirds, meadowlarks, robins, and sparrows. Also snakes, frogs, goldfish, bullheads, crayfish, crickets, beetles, grasshoppers, katydids, and scorpions (Bent 1937).

Osprey *(Pandion haliaetus)*

As it lives entirely on fish, it naturally prefers to live in the vicinity of some large body of water where it can find an abundance of its prey.

The nests vary greatly in size. Nests on artificial supports are usually very flat and are not built up from year to year as the tree nests are. Usually three eggs are laid with an incubation period of 28 days. The young remain in the nest about eight weeks. At first the young are helpless, lying prone in the nests and fed on regurgitated food. At about two weeks they are able to sit up and move about and are fed on bits of raw fish. By 5-6 weeks of age they are strong enough to stand up and feed themselves.

The nests are usually in the open exposed to the sun and the young could suffer heat prostration. The mother spends much time on hot days standing over the young with half open wings to shield them from the heat. After the young are well feathered, this protection is no longer needed.

The osprey is not a deep diver and catches only fish that swim on or near the surface or in shallow water. It hunts 30-100 feet above the water. When a fish is sighted, it plunges downward with half-closed wings striking the water breast first with wings extended upward, and seizes the fish in its talons. Usually it does not go much below the surface. The fish is invariably carried head first. It can probably carry fish weighing 4-6 pounds.

The bald eagle is an enemy (Bent 1937).

There is an osprey nest at the upper end of the Tongue River Reservoir. As of July 29 there were three young in the nest.

Golden Eagle *(Aquila chrysaetos)*

The golden eagle mates for life, but if one is killed the survivor seeks a new mate. They often have two nests which they use in alternate years. Usually two eggs are laid but one is common, with an incubation period of 28 to 35 days. Since the eggs are laid at 2-3 day intervals and incubation begins with the first egg, the older eaglet is larger. It gets most of the food and oftens kills the smaller bird. The male does

not assist the female in incubation, but feeds his mate on the nest and occasionally broods the young. The incubating female is easily frightened from the nest.

A young eagle is not able to tear food apart itself until nearly 6-8 weeks old and takes its first flight at about 11 weeks of age. Young eagles remain in the vicinity of their nest for a long time after leaving it. They are at least three months old before they gain the full power of flight. They are partially fed by their parents and are watched by them until they learn to hunt for themselves by early fall. The juvenile plumage is worn for one year. The full adult plumage is not complete until the bird is four years old.

Mammals taken by eagles include the following: lambs, dogs, cats, deer and antelope fawns, hares, foxes, ground squirrels, raccoons, prairie dogs, woodchucks, marmots, porcupines, opossums, skunks, weasels, gophers, rats and mice. The list of birds include great blue herons, turkeys, ducks, geese, red-tailed hawks, grouse, domestic poultry, plovers, kingfishers, meadowlarks and thrushes. Eagles also kill many snakes but mammals seem to be preferred (Bent 1937).

"Their much disputed lifting power cannot be much more than their own weight — a female weighing 9½ to 13 pounds, a male 7½ to 11 pounds. Under unusually favorable conditions, as in a take-off from a ridge with a strong updraft, a large eagle may be able to carry to its eyrie an animal weighing up to 18 pounds" (Grossman and Hamlet).

Tree Swallow *(Iridoprocne bicolor)*

They nest in dead tree trunks, woodpecker holes or boxes erected for its use. They lay 4-7 pure white eggs. Insects such as flies, beetles, bees, wasps, moths, grasshoppers, dragonflies, and spiders (Pearson 1917) are eaten.

All the swallows return each year to the nesting site of the previous year and the young to the place where they were raised. In general only when all the available nesting places have been taken will swallows pioneer (Audubon Nature Encyclopedia).

Red-Winged Blackbird *(Agelaius phoeniceus)*

They nest in colonies usually in a marsh but sometimes in pasture or brushland. They begin nesting in late April or first of May. The nest takes about six days to build. Incubation takes 14 days and the young remain in the nest 12 days. While the young are being raised, the usual diet of weed seeds changes largely to insects (Audubon Nature Encyclopedia). Of 81 observations of redwings, 42 percent were in the deciduous shrub subtype, 23 percent in alfalfa fields and 16 percent in greasewood.

Barn Swallow *(Hirundo rustica)*

The nest is a bowl-shaped hemispher attached to barns or other buildings or on sides of cliffs or caves. It is constructed of mud pellets mixed with straw and grass thickly lined with feathers. Three to six eggs are laid with an incubation period of 11-13 days. Brood time is 16 days with usually two broods raised each season (Pearson 1917).

It is felt by some that the proper nesting facilities may have been the chief limiting factor of this species. The plains, though abounding in insect life, offered few nesting sites until farms appeared. On islands near the sea, barn swallows occurred only in migration until Coast Guard stations and beach cottages were built (Audubon Nature Encyclopedia).

Cliff Swallow *(Petrochelidon pyrrhonota)*

The nest is a retort-shaped structure fastened to cliffs or under eaves of outbuildings at its large end and extending horizontally. It is made of mud pellets mixed with straw and lined with feathers. A clutch is composed of 3-5 eggs.

A study of the stomach contents from 123 cliff swallows showed virtually no vegetable matter. But ants, wasps and bees amounted to about 39% of the diet. Interestingly, the swallows only ate drone honey bees and not worker bees. Bee keepers do not regard the destruction of drones as injurious to the swarms. Assassin bugs, squash bugs, stink bugs, shield bugs, tree-hoppers, leaf-hoppers and jumping plant lice formed about 27 percent of the diet. Beetles of all kinds aggregated a little less than 19 percent. Gnats, dragon-flies, lace-winged flies and spiders completed the menu.

The young are fed exactly the same kind of food that the adults eat but in different proportions. The soft-bodied insects are more often chosen by the parents for the nestlings as they are more easily digested. Adult cliff swallows do not take gravel themselves, but they feed it to the young (Pearson 1917).

Of 26 observations, 69 percent were in the ponderosa pine habitat type and specificly in the deciduous shrub subtype. This is at least partially due to the fact that cliffs for nesting are often exposed along waterways, bridges are used for nesting, and insects are most plentiful near water.

Robin *(Turdus migratorius)*

Often the females return to mate with the same males of the year before. Blue-green eggs are laid, one a day, until there are four. Some males share in the incubation, but most females do it alone. Incubation takes 11-14 days and in 10-12 days the fledglings feather out. The male robin takes full charge of the brood at this time and stays with it for another week or two. The female prepares for a second brood by building a new nest or relining the old one (Audubon Nature Encyclopedia).

Robins prefer sparsely wooded areas and forest margins. This is backed up by my own observations of which 82 percent were in the ponderosa pine type.

Yellow Warbler *(Dendroica petechia)*

The yellow warbler is a bird of streams and willow bottoms. The nest is usually wedged into an upright crotch in a bush about 2-3 feet from the ground. In places where undergrowth is scanty, they nest as high as 60 feet in large trees.

One brood is raised each year and the young eat strictly insects, such as the caterpillars of the gypsy moth and the browntail moth, cankerworms, bark beetles, boring beetles, flies, plant lice, grasshoppers and spiders (Audubon Nature Encyclopedia).

Mourning Dove *(Zenaida macroura)*

This bird is among the earliest of spring arrivals. The breeding period extends virtually from May to September. Incubation occupies about two weeks and 2-4 broods may be raised. Each clutch contains 1-2 white eggs. The nest is poorly constructed and eggs sometimes roll out.

The young take their food, mixed with a light-colored fluid called "pigeon's milk" from the crop of the parent. The adults feed extensively on weed seeds, frequently eating insects especially grasshoppers but on the whole preferring a vegetable diet (Pearson 1917). Feeding areas are fields and other open weedy areas. It also visits watering places frequently. Pigweed, spurge and bristlegrass seeds are important in its diet (Martin et al. 1951).

Of 52 recorded observations, 73 percent were in the ponderosa pine habitat type and most of these were along roadsides or creeks.

Killdeer *(Charadrius vociferus)*

This bird is a true plover and a member of the shorebird family which are usually found near water but the killdeer occurs frequently in dry areas. It seems to be especially fond of freshly plowed fields where it feeds on worms, grubs and bugs.

It deposits four eggs on the bare ground, usually near water. When the incubating bird is flushed from her nest she resorts to the tactics of ground nesting birds, fluttering away with one or both wings dragging as if broken, sometimes rolling over, often stopping to gasp and pant as if exhausted and constantly screaming.

Killdeers eat many harmful insects such as mosquitoes, ticks, crane flies, grasshoppers, various weevils, wireworms and horse flies (Pearson 1917).

Western Meadowlark *(Sturnella neglecta)*

They make their nest entirely of grass under sagebrush or in tussocks of grass and roof them over with grass. They also build tunnels of grass which lead to the nest. Clutches range from 3-7 eggs with 5 being most common. Two broods are raised each year. Both sexes assist in the construction of the nest and also in incubation which lasts about 15 days. The young leave the nest before they are able to fly, depending for safety on hiding in the grass.

A food habits study based on 2,000 meadowlark stomachs showed the diet to be 63 percent animal and 37 percent vegetable. The animal matter was mostly ground beetles, grasshoppers, crickets, cutworms, caterpillars, wireworms, stinkbugs, and ants. The vegetable matter was grain and weed seeds. The meadowlark preys heavily on eggs of alfalfa weevil and Mormon crickets when such are abundant. In 1914 Bryant stated, "As a destroyer of cutworms, caterpillars, and grasshoppers. . .the western meadowlark is probably unequaled by any other bird. The stomachs of meadowlarks examined have averaged as high as six cutworms and caterpillars and 16 grasshoppers apiece. As the time of digestion is about four hours, three times the average must be consumed daily." (Bent 1958).

In turn, the meadowlarks themselves are food for many avian and mammalian predators.

Black-billed Magpie *(Pica pica)*

A magpie does most of its foraging on the ground. But a magpie's wings are built such that the bird cannot fly rapidly or far. Therefore, in order to avoid danger, it must stay in places where it can move rapidly into thick clumps of brush. These two circumstances tend to restrict magpies to places where there is open forage ground and where trees and bushes are close by. A further limitation is trees and bushes of sufficient strength to support the bulky nest.

Usually seven eggs are laid with an incubation period of 16-18 days. Only one brood is raised each year. Magpies build several nests each season but actually use only one. Nest building begins in March and requires about six weeks. The base and outer walls of the nest are composed of heavy sticks and other coarse material. Inside the base is a cup of mud held together with some vegetable material. Fresh cow dung sometimes is substituted for mud. Within the cup is a lining of rootlets, fine plant stems or horsehair. The dome is usually made of thorny twigs and has one or more openings in its side. Apparently the dome serves as a protection against the raids of predators. Old magpie nests are used by raptorial birds, especially night-hunting owls. The horned owl, long-eared owl, and screech owl make use of these nests for daytime hiding retreats. The sparrow hawk uses these nests for laying, but nearly always chooses nests that still have their roofs intact. An association between magpies and hawks has been observed frequently. Magpies evidently eat scraps fallen from raptor nests.

E.R. Kalmbach has made an extensive study of magpie food. His work is based on the examination of 547 stomachs of which 313 were adults and 234 were nestlings.

More than 94 percent of the food of young magpies was animal matter. Insects made up the greater part of the animal matter fed to nestlings. The groups best represented were caterpillars, grasshoppers and flies. This last group consisted chiefly of larvae and pupae of flesh flies that the parents obtained from carrion. The indications are that the adults visited the carrion for the pupae for the young even in preference to the carrion itself.

About 60% of the food of adults was animal matter, the greatest proportion was found in May, during breeding season. Insect food constitutes the predominant item for the magpie through the year. The species is more highly insectivorous than any other of the common species of the crow family. Grasshoppers form a conspicuous part of the diet during the late summer and fall. Insects associated with carrion are important in the magpies' food (Bent 1946).

Turkey Vulture *(Cathartes aura)*

The eggs, commonly two, are laid from February to June in a cave, a cavity between rocks, in a hollow log, or on the ground. The eggs are white or creamy, variously spotted with lavender or purplish brown blotches.

The food of the turkey vulture is mainly carrion, but it also eats snakes, toads, mice and occasionally young birds. It finds carrion by its sense of sight, not smell (Pearson 1917).

American White Pelican *(Pelecanus erythrorhynchos)*

This pelican lays usually two eggs with both sexes sharing incubation which lasts about a month. Only one brood is raised each season. The egg shell is thin, soft, brittle, lusterless and rough on the exterior, with calcareous deposit which cracks or flakes off. The nest is a depression in the earth with a rim of sticks, dirt and feathers. The young remain in the nest 2-3 weeks and are fed regurgitated food. This bird has been sighted at the Tongue River Reservoir.

The white pelican does not dive for its food like the brown pelican, but catches it on or near the surface by swimming or wading in shallow water. It frequently feeds on large fish, such as trout, bass, carp, catfish, suckers and pike (Bent 1922).

Double-crested Cormorant *(Phalacrocorax auritus)*

It nests on the ground, in cliffs overlooking water or in trees. There is a rookery at the upper end of the Tongue River Reservoir and this spring there were approximately 75 active nests. They lay 2-4 eggs, bluish-green with white chalky incrustation.

The cormorant lives almost entirely on fish which it captures underwater by swimming with both wings and feet. The young are fed by regurgitation (Pearson 1917).

Great Blue Heron *(Ardea herodias)*

They nest usually in tall trees along river banks. The nest is a large, bulky structure of limbs, twigs and some dry grass. The clutch is from 3-6 greenish-blue eggs.

Like most herons the Great Blue is a solitary bird in its habits except during the breeding season. At this time they show a marked gregarious instinct by forming colonies where they build huge nests and feed their young by regurgitation. Unless the birds are seriously molested they are likely to return in successive years to the same nesting site. There is a large rookery at the upper end of the Tongue River Reservoir containing about 100 active nests. Between the reservoir and Ashland there are three other small rookeries.

The herons' food is mainly frogs, crayfish, small snakes, salamanders, grasshoppers and meadow mice. At times they forage on hillsides, cultivated fields, and drier meadows in search of pocket gophers, ground squirrels, and field mice. Herons, like other flesh eating birds, digest their food rapidly and are disposed to gorge themselves when opportunity offers (Pearson 1917).

Whistling Swan *(Olor columbianus)*

It lays 4-5 dull white eggs with an incubation period of 35-40 days. The young stay with the parents for the first year. These birds are monogamous (Bent 1922).

Six whistling swans were seen this spring on the Tongue River Reservoir. Evidently they were resting and feeding on their way north.

Their food is mainly grasses, pondweed, horsetail, and burreed (Martin et al. 1951).

Red-headed Woodpecker *(Melanerpes erythrocephalus)*

This is a bird of the open country. It is a cavity nester preferring trees, fences, and telephone poles. It usually lays five pure white eggs. The incubation period is 14 days with both sexes caring for the young. Sometimes two broods are raised.

In 1895 Beal examined 101 woodpecker stomachs. Contents were divided 50-50 between animal and vegetable matter. Most of the animal matter was made up of ants, wasps, beetles, grasshoppers, crickets, moths and caterpillars. The vegetable matter was corn, dogwood berries, strawberries, huckleberries, blackberries, raspberries, chokecherries, grapes, apples, pears, and acorns. Woodpeckers will also suck eggs of small birds. They also eat large quantities of grasshoppers and have been known to store live grasshoppers in cracks in fence posts.

The redheads compete with other hole-nesting birds for the possession of nesting holes. They are jealous of their food supply and will drive other birds away from their feeding areas.

The redhead is generally considered to be a migratory species throughout the northern portion of its breeding range, but its movements seem to depend almost entirely on the quantity of its winter food supply. Montana (Lewistown, Fairview, Terry) is about the northern extension of its breeding range and west to Lewistown, Billings, and Kirby (Bent 1939). I have seen several redheads in the Birney-Decker area this spring.

Common Flicker *(Colaptes auritus)*

Favorite nesting sites are old rotten stumps of trees such as cottonwoods, junipers and pines. It also nests in holes in banks and gate posts. Five to twelve pure white eggs are laid with an incubation period of 11-12 days. Both sexes incubate. For nearly three weeks the young are fed by regurgitation and after that the insects are masticated by the parents.

In 1910 Beal examined 118 flicker stomachs. Ants comprised almost half the diet, with beetles, caterpillars, crickets, and spiders totaling another eight percent. Fruits made up another 32 percent of the diet, such things as apples, pears, cherries, elderberries, gooseberries and seeds of poison sumac (Bent 1939).

There are several other species of birds for which I have no life history information, but do have some field data on habitat use. They are as follows:

Mountain Bluebird *(Sialia currucoides)*

I recorded 87 observations of bluebirds. Ninety-four percent of the observations were in the ponderosa pine habitat type. Evidently this is a woodland species.

Western Kingbird *(Tyrannus verticalis)*

Of 31 observations, 65 percent were in the ponderosa pine type, especially along roadsides and creek bottoms. Thirty percent of the observations were in the grassland type.

Eastern Kingbird *(Tyrannus tyrannus)*

This ecologically similar bird showed very much the same trend as the western kingbird. Of 45 observations, 50 percent were in the ponderosa pine habitat type, especially along creek bottoms and alfalfa fields. Thirty percent were in the grassland type. Evidently the eastern and western kingbirds utilize both woods and open spaces, but prefer the grassland community over sagebrush areas.

Lark Sparrow *(Chondestes grammacus)*

Of 99 recorded observations, 68 percent were in the ponderosa pine habitat type and most of this was in roadside vegetation. Another 22 percent of the observations were in the grassland type also along roads.

Lark Bunting *(Calamospiza melanocorys)*

Of 72 observations, 58 percent were in the big sage-grassland habitat type and mostly in the big sage-grassland subtype. Obviously this bird is part of the sagebrush-grassland ecosystem. Another 30 percent of the observations were in the grassland type, mainly the grassland subtype.

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 SCREEN 1 OF 2
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ESC: I INT LVL:   DATES: 1977,
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  4 050 0    OL188 B .K57
  5 082      591.5/09786/3
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