

Dusky Grouse in Colorado: A Guide to Hunting and Viewing

Introduction

Dusky grouse, formerly known as blue grouse, can be found in suitable habitats in all of Colorado's mountainous areas. They inhabit at least portions of 43 of Colorado's 63 counties. Despite being Colorado's most widely distributed upland game bird, dusky grouse have never enjoyed much popularity or perhaps even respect as a game bird. They fly well (okay, most of the time), hold well to pointing dogs, and have a marvelous flavor when cooked, all of which should elevate them in stature as a sporting bird. Yet only about 6,000 hunters pursue them each fall in Colorado, fewer than chase mourning doves (about 13,000), pheasants (about 17,000), rabbits, or waterfowl (about 30,000). Contrast that with states in the upper Midwest, where on average 115,000 hunters bag about half a million ruffed grouse in Minnesota, or Wisconsin, where about 90,000 hunters shoot several hundred thousand ruffed grouse. I suspect part of this has to do with Colorado's lack of tradition associated with small game hunting, as opposed to say fishing or big game hunting.

Another aspect, which this publication was written to help with, is the habit dusky grouse have of moving seasonally which makes them unpredictable and hard to find. Whereas a ruffed grouse once established in an area is unlikely to venture more than a few hundred yards for the rest of its life, dusky grouse can easily move over 35 miles between seasonal habitats. Birds you locate while hiking in August or bow hunting in early September can't be found in October when you return to pursue them. Understanding the characteristics of these seasonal habitats, and when and why movements between them occur, is the key to making locating dusky grouse predictable. Learn these things, and finding dusky grouse is not difficult, regardless of whether you want to hunt them, add them to your life list, photograph them, or watch their breeding display.

Taxonomy and Distribution

Dusky grouse belong to the sub-family *Tetraoninae*, grouse and ptarmigan, itself a subset of the Family *Phasianidae* (chicken-like birds). Although previously linked to spruce grouse, another forest dwelling grouse that eats needles of pine and other coniferous trees in the winter, it is now generally conceded that sage-grouse are the closest relative to dusky and sooty grouse.

In 2006, the species formerly known as blue grouse was split by the American Ornithologists' Union, the professional group that deals with species nomenclature in birds, into two species, the sooty grouse and the dusky grouse. The sooty grouse (*Dendragapus fuliginosus*) inhabits the thick coniferous forests of the Pacific Northwest in both the U.S. and Canada. The dusky grouse (*Dendragapus obscurus*) inhabits shrub and forest lands within primarily the Rocky Mountains, although distributions of the two species converge in Washington state. The two species look somewhat different, utilize different habitats and behave somewhat differently, but they were split apart based on DNA evidence showing they had been separated as species for thousands of years.

Although it is going on six years since that split was made, I have to confess I have not warmed to the new name, and frequently revert back and call them blue grouse. Perhaps a better approach would have been to use the terms "Dusky" blue grouse" and "Sooty" blue grouse, which could then be conveniently shortened to the familiar blue grouse.

Whatever you call them, it is clear that Dusky grouse are an iconic western bird, as emblematic of our western forests as are elk, in fact probably more so as elk were initially a prairie species that took to the mountains upon human settlement. Fred Zwickel and Jim Bendell, two Canadian researchers who wrote the bible on blue grouse (*Blue Grouse, Their Biology and Natural History*) even proposed that dusky grouse originated in Colorado or somewhere in the southern Rockies from a sage-grouse/dusky grouse ancestor, and radiated north and west to occupy coastal habitats during and following Pleistocene glaciations. Today dusky grouse occur in mountainous regions of Washington, Oregon, Idaho, Montana, Wyoming, Utah, Colorado, Nevada, New Mexico, and Arizona. Colorado represents the eastern-most extension of dusky grouse range (Fig. 1).

Dusky grouse are amazing habitat generalists, who wander seasonally across large landscapes to find food and cover. Consequently they are doing much better in terms of distribution and abundance than their close mountain cousins, the sage-grouse and Columbian sharp-tailed grouse, both of which have been proposed for listing under the Endangered Species Act. The dependence of these species on declining sagebrush and

mountain shrub communities, respectively, puts them at risk as these habitats are lost.

Dusky grouse share habitats in Colorado, at least locally, with white-tailed ptarmigan, Columbian sharp-tailed grouse, greater and Gunnison sage-grouse, and in the extreme NW corner of Colorado, ruffed grouse. Colorado contains more grouse species than any other state because so many different habitat types or biomes converge here. Grassland species like Greater and Lesser Prairie chickens and plains sharp-tailed grouse reach their western and southern or northern (lesser prairie chicken) terminus in Colorado's eastern plains. Greater sage-grouse reach their southernmost distribution in Colorado's sagebrush basins, while Gunnison sage-grouse are found only in southwest Colorado and a small portion of adjacent southeast Utah. The montane distribution of ruffed grouse, common in forested regions of Montana, Wyoming and Utah, barely extends into Colorado and terminates on Hoy Mountain in Moffat County. Poor dispersers, ruffed grouse are unable to bridge large areas of sagebrush habitats which act as barriers and prevent them from colonizing similar forested habitats further south and east. Columbian sharp-tailed grouse, formerly common to the grass and shrublands of the Pacific Northwest and Rocky Mountains, are still common in portions of northwest Colorado, which is the southern and eastern terminus of their range. White-tailed ptarmigan occur in almost all of Colorado's alpine habitats. Dusky grouse in Colorado share breeding and some other seasonal habitats with both sage-grouse and Columbian sharp-tails, and hybrids of dusky grouse with both species have been found in Colorado.

Management

Dusky grouse are not actively managed by any western state or province, although considerable research on life history and habitat requirements has been completed over the years, particularly in Colorado. There is no useful inventory technique, so population status is not assessed. Most states conduct some sort of telephone or mail harvest survey to assess hunting participation trends and track harvest, but results of these surveys are not used in setting seasons or bag limits. For many years Colorado collected wings of hunter harvested dusky grouse (and sage-grouse and Columbian sharp-tailed grouse) to determine the sex and age composition of the harvest, from which estimates of productivity were derived. These were discontinued once enough years of information had been gathered to establish sex and age ratios, chick production rates, and variability over time.

Intensive inventory data is not necessary for dusky grouse, as harvest rates are low and thought to be well within the range where they are compensatory (replaced by) to other forms of mortality. This is probably generally true for juvenile birds, less so for adults, but it is still likely that most dusky grouse never see a hunter. Even if local over harvest does occur it is likely to be mitigated over time by dispersal from other areas.

Other forms of intensive management, such as transplants to vacant habitats (typical for turkeys for instance) are not necessary because dusky grouse disperse readily and will quickly occupy suitable habitats. Intensive habitat improvement efforts, often conducted for birds like pheasants or turkeys, have not been employed for dusky grouse in the past. There are probably many reasons for this; they are relatively abundant without treatments, there is limited demand from hunters, the scale of treatments needed would be large, and their large seasonal movements complicates where to treat and the degree to which they respond. At the same time, dusky grouse do respond to logging, brush clearing, and other habitat perturbations conducted for other purposes, so knowing how they are likely to respond will be helpful.

Habitat Requirements and Movements

Breeding Habitat

The term breeding habitat describes those areas where dusky grouse males establish territories, display to females, breed, and where hens nest and raise their young for at least the first few weeks after hatch. Both males and females will return to the same territories each spring to breed, although they don't form pair bonds or necessarily breed with the same mate each year. Dusky grouse breeding habitat occurs in a wide range of habitat types, at a range of elevations, aspects and slopes across the state. It is simpler to think in terms of what characteristics these diverse sites have in common than it is to describe all of them. Breeding sites are open areas within otherwise forested or shrub-steppe environments that are relatively snow free in April when birds return. Males need openings that are relatively snow free to display and attract females. Females typically nest under shrubs, or occasionally against the base of a tree, but in either case nests can't be established in areas where deep snows persist. A food source of some type must be nearby. That can be the buds and leaves of deciduous trees such as aspen, buds and leaves of shrubs like serviceberry or chokecherry, or the needles of

coniferous trees like Douglas-fir, lodgepole pine, limber pine, or ponderosa pine. The availability of early spring foods seldom limit territory establishment in forested areas, but probably limit how far into sagebrush habitats grouse can go. Unlike sage-grouse, dusky grouse can't or don't eat sagebrush leaves. Dusky grouse with territories in sagebrush stands have to travel back to areas with trees or shrubs to feed, and are not likely to go much more than ¼ to ½ mile for that purpose.

Glenn Rogers, a Colorado Department of Game, Fish and Parks researcher, was the first to describe vegetative characteristics of dusky grouse territories (breeding habitat) based on observations on the Grand Mesa and Uncompahgre Plateau. His booklet, *The Blue Grouse in Colorado*, published by the Department in 1968, stated "Displaying dusky grouse have been observed in aspen-ponderosa pine, mixed fir and aspen, open and dense aspen, mixed shrubs, sagebrush, wheatfields, and on roadbeds. Preference seemed to be for relatively open stands of trees or shrubs."

Zwickel and Bendell categorized dusky grouse breeding habitat into 5 types, based on vegetative characteristics. Groupings such as these can be a useful way to try and simplify the diversity and complexity of how dusky grouse use their environment. These can be collapsed into three primary habitat types used by dusky grouse for breeding in Colorado. These are, shrub-steppe-deciduous forest, shrub-steppe or grass meadow and coniferous forest, and subalpine/alpine meadow.

1. *Shrub-steppe – deciduous forest.* The highest density of breeding dusky grouse occurs in shrub steppe – deciduous forest habitat types, typically west of the continental divide. These areas are often characterized by extensive stands of mountain sagebrush, with either scattered clones of aspen within these stands, or where sagebrush stands blend into aspen stands above them. Other shrubs are often present, particularly in more mesic (wet) sites, such as serviceberry, chokecherry, rabbitbrush, snowberry, mountain maple, mountain mahogany, bitterbrush, etc. Stream courses or other wet areas may contain various species of willow, but these are unimportant to dusky grouse. Trees, typically aspen, but occasionally juniper or pine, may be a very minor component of overall vegetation, or shrubs may occur in openings within otherwise forested habitats. Where aspen clones occur in landscapes dominated by sagebrush, territories are often established in and adjacent to these aspen stands. As a general rule, areas with greater vegetative diversity seem to support more grouse, probably indicative of more moisture and more productive environments. Oakbrush communities represent a distinct shrub-steppe breeding habitat commonly used by dusky grouse. Oakbrush is usually found in association with aspen and other mountain shrubs such as serviceberry and chokecherry, which probably provide food for breeding grouse in the spring as they are not known to eat buds or leaves of oakbrush (although they do eat acorns).
2. *Shrub-steppe or grass meadow and coniferous forest.* Most commonly this type of breeding habitat consists of sagebrush or grass meadows within ponderosa pine or Douglas-fir (or both) stands. This is a fairly typical breeding habitat along the northern Front Range, portions of Middle and South Parks, and the southern mountains. Some breeding probably occurs within openings in lodgepole pine stands where a south exposure melts snow off, but most lodgepole pine occurs at elevations, slopes and aspects where deep snow persists too long in the spring to permit breeding. Pinyon-juniper woodlands are not used to any extent for breeding, although transitional areas where shrublands meet pinyon juniper woodlands may be.
3. *Subalpine/alpine meadows.* It almost seems counterintuitive that if snow depth limits dusky grouse breeding areas, that breeding could occur in alpine and subalpine meadow complexes that retain snow pack into July or August in some years. We know little about densities of grouse breeding in alpine and subalpine meadow complexes because these areas are very inaccessible in the spring, but the presence of territorial males and young broods in early summer is evidence that it occurs. Steep, often rocky south-facing alpine/subalpine slopes with grassy meadows where snow both blows off and melts early is where breeding is likely to occur at these elevations, which can reach 13,000 feet in the southern mountains. Alpine/subalpine meadow complexes that are flat, rolling, or have other than south-facing exposures are not likely to have breeding dusky grouse because of persistent snow, but may have breeding ptarmigan. Ptarmigan have adapted to snow rich environments by nesting later.

What is as instructive as where dusky grouse breed, is the habitat types and areas where they don't breed, which can comprise large portions of mountainous areas. Primarily because of snow depth, they don't breed in spruce-fir forests (usually Engelmann spruce and subalpine fir), and they don't breed in solid aspen or



Fig. 1. Snow may persist in early spring breeding habitats, but trees provide food and cover.



Fig. 2. Aspen-sagebrush edges are a very common shrub steppe-deciduous forest breeding habitat



Fig. . Aspen-mountain shrub breeding habitat, including sagebrush, serviceberry and oakbrush.



Fig. . Douglas-fir-sagebrush edges are a common shrub steppe-coniferous forest breeding habitat.



Fig. _. Typical Douglas-fir-sagebrush breeding habitat in Middle Park.



Fig. _. Ponderosa pine, grass meadow breeding habitat, typical of front range and southern Colorado



Fig. 1. Steep, south-facing subalpine slopes provide breeding habitat and brood-rearing habitat.



Fig. 2. Some breeding habitats contain sagebrush, mountain shrubs, and coniferous trees.

lodgepole pine stands. Probably because of low food availability they don't breed in the interior of large sagebrush flats (for example, North Park or the Gunnison Basin), in pinyon-juniper stands, or in the interior of large expanses of grassland within montane basins (for example, South Park).

Forest clearcuts are important areas for sooty grouse in the Pacific Northwest as they create openings for display in otherwise dense forest. Clearcuts are generally not important as breeding areas for dusky grouse in Colorado, both because natural openings are abundant in suitable habitats and clearcuts are often placed well above where most breeding occurs. However, clearcuts in otherwise suitable breeding habitats may attract and concentrate grouse, particularly later in the summer and fall.

Dusky grouse hens begin laying eggs (6-8) shortly after breeding, typically in shallow nests beneath a shrub, or against the base of a large tree trunk. Chicks hatch after about 25 or 26 days of incubation, and they leave the nest as soon as all have broken free of the egg. They are precocial, meaning they move about and feed themselves. The hen provides protection from predators and broods them to keep them warm until they can thermoregulate on their own. Hens and broods remain in the general vicinity of the nest for the first few weeks after hatch. Chicks subsist on retained egg yolk for the first day or two, but quickly take to feeding on insects. They are dependent on insects until their gut develops to the point where flowers, leaves and stems of plants, and seeds can be digested, and from that point until their first winter they eat a mix of insects and a variety of vegetative material. Insects, particularly those within reach of a small chick, are most abundant in diverse landscapes with shrubs, grasses, and forbs, and probably least abundant under closed canopy forests.

Hens that lose their nests during incubation may re-nest, although this appears to be a function of age and weather. First year (yearling) hens almost never re-nest, while adult hens may, but not in years when breeding is delayed by cold, wet and snowy spring weather. Once a hen has a brood of chicks, she will not re-nest that season if they are taken by predators.

Summer Habitat

Summer is a time when food is generally abundant. Given their habitat generalist nature, dusky grouse can get by almost anywhere from sagebrush flats at 6,000 feet elevation to subalpine/alpine meadows at 13,000 feet, and they do. The majority of birds however either remain in low elevation breeding habitat or they move to high elevation spruce fir forests (although almost everything in between can be used to some degree). Whether they stay or whether they go depends on their sex and age, and success at breeding. When they go depends on their sex and age, and the impact that rainfall or drought conditions have on vegetation and associated insects.

Low-elevation summer habitats

Long movements from breeding habitats to summer habitats are not typical for hens with broods, rather as the summer progresses and vegetation begins to dry out hens will move locally to wetter areas with better food and cover for chicks. Grass or shrub meadow areas, draw bottoms, riparian areas, old burns and/or clearcuts may be used if available. The variety of areas used defies any simple attempt to summarize, but hens will look for a lot of grass and forbs, often in a larger matrix of shrubs and/or scattered trees. Dusky grouse will find and use the best available local habitats, so look for the lushest and most diverse habitats available to them. Hens may make relatively short movements, usually uphill, to find moister environments as it dries out, or to escape intense grazing pressure from sheep or cattle. Habitat quality varies seasonally with changes in moisture, grazing, etc., so broods may use different areas in different years to some extent, but for the most part individual hens return to the same areas to raise their chicks each year.

Chicks grow rapidly during summer. These high growth rates are fueled by carbohydrates and protein. Berries, particularly of serviceberry, chokecherry, and gooseberry or currant (but not snowberry or juniper) and oakbrush acorns are particularly good sources of carbohydrate and birds may seek these shrubs out when berries are ripe. I have also noticed broods will concentrate in areas where grasshoppers are abundant, usually grassy meadows. Given a choice between spending time on a hillside full of berries, or a grass or grass/sagebrush meadow below with grasshoppers, broods always seem to choose the latter.

High elevation summer habitats

Adult and yearling males remain on their breeding territories at least until all possibility of mating with

hens attempting to re-nest is over. While some males remain in their breeding areas until movement to winter range in October, most undergo a two-stage migration and move to high elevation summering areas in July. They spend the balance of the summer in the high country before moving a shorter distance to a wintering area, usually in October or November. These movements typically average 6 or 7 miles, but have been documented to be as far as 35 miles and may be further. Females who have lost their nest and are not re-nesting, or hens that have lost their broods may remain in their breeding habitat for a month or so and then follow the males up to higher elevation summering areas, or they may remain on breeding habitats until movement to winter range in October.

Typically these high elevation summering areas occur in spruce-fir forests, and particularly in portions of those forests adjacent to alpine and sub-alpine meadows, clearcuts or other openings. Elevation is less important than the plant community at the site, but generally these high elevation summering areas are between 9,000 and 13,000 feet; higher in the southern mountains than in the northern and central. In the northern and central mountains *Vaccinium* (whortleberry, ...) is almost always a dominant component of the understory, and often gooseberry, or currant, or both is present in and near openings. In the southern mountains (Sangres, San Juans, south of Gunnison??) *Vaccinium* presence and abundance is much more variable, locally abundant in some areas and absent in others. Bearberry is occasionally present at these elevations in the southern mountains.

These are generally moist and productive environments, and food is plentiful. The leaves and ultimately berries of *Vaccinium* are a key food item for dusky grouse summering at these elevations, although a variety of leaves, seeds, and forbs, as well as an occasional insect, are eaten. Where present, dusky grouse make heavy use of the berries of gooseberry and currant when these ripen. Local, rather than long-range movements are typical for dusky grouse breeding in high elevation meadow habitats as well. Birds will seek out areas within a relatively small area where forbs, insects, and berries are abundant.



Fig. _ . A dusky grouse chick peers out from excellent brood habitat, a lush mix of shrubs, grass and forbs.



Fig. _ A chick male, also in excellent mixed grass and forb brood habitat.



Fig. 1. Dusky grouse chicks in sagebrush stand.



Fig. 2. Adult male in high elevation spruce-fir with *Vaccinium* in the understory.



Once birds have arrived at their summering areas, which they return to each year, movements are relatively small. Males and unsuccessful females may aggregate in loose flocks of 2-3 birds or as many as 6-7, but

Fig. _ Ground cover of extensive Vaccinium under spruce-fir overstory



Fig. _ Close-up of Vaccinium leaves and berries.

flocking behavior is not strong at this time of year. Males tend to be dispersed, using areas with solid canopies of spruce fir with *Vaccinium* in the understory, as well as meadow edges and clearcuts. Males often prefer areas along rocky talus slopes, or near steep ridges, as both afford quick and effective escape routes if flushed. Females are less likely to be in heavily timbered areas, usually preferring meadows and meadow edges. Females with broods, whether locally produced or those that have migrated in, are almost always found in and near meadow edges or clearcuts, where insects are likely much more abundant.

Winter Habitats

Dusky grouse begin to leave their summering areas and move to wintering areas when vegetation has dried up, or when snow accumulations preclude feeding on ground level leaves and berries. The distance moved certainly varies from area to area, but for most females using lower elevation summering/brood areas this is a relatively short uphill movement of a mile or less. Adult males travel considerably farther. Brian Cade and Rick Hoffman studied this with radio-collared dusky grouse in two areas of Middle Park, and found the median (middle; half were longer, half were shorter) distance moved from breeding territories to wintering areas by adult males was 6.5 miles, while the median distance moved by females was only 0.6 miles. Some individuals of both sexes traveled as far as 20 miles from summering to wintering areas.

Hens and broods begin to move towards wintering areas when vegetation has cured and begins to dry out, a process accelerated by hard frosts if lack of rain hasn't started it. If grasshoppers are abundant, or if there are berry or acorn producing shrubs nearby birds may stay longer, or may move up to where insects or berries are more abundant.

As mentioned previously, most adult males and some females who lost their clutch or their brood exhibited a two-stage migration, moving first to high elevation summering areas followed by a secondary movement to a wintering area. In Middle Park, this secondary movement from where they summered to where they wintered ranged from about half a mile to 3 miles in length, and typically occurred between early October and mid-November. Both sexes exhibited fidelity to wintering areas, returning each year to the same general area and in some cases to the same stands of trees in sequential winters. We captured one individual banded hen three winters in a row in the same stand of trees.

Although it is clear that movement patterns from breeding to wintering areas differ between adult males and females, it appears juvenile males don't undergo a 2-stage migration in their first fall. In other words they act like hens and move a short distance from a breeding to a winter area, and in their second year as yearlings most likely move a relatively long distance from breeding to a summer area, then a shorter movement to a winter area.

Wintering areas can differ markedly in elevation, slope, aspect, and tree species present. Cade and Hoffman documented a great deal of variability in the physical characteristics of Douglas-fir wintering areas in Middle Park. Dusky grouse used dense, relatively young stands (40-75 years old), 100-200 year old stands and open, old-growth stands that were 200-600 years old. Stands used ranged from Douglas-fir as the sole tree species, to Douglas-fir in association with subalpine fir, Engelmann spruce, lodgepole pine, limber pine, juniper, and quaking aspen. Elevations ranged from 8,300 to 9,711 feet, although wintering areas at higher elevations are likely, particularly in the southern part of the state. I observed dusky grouse wintering in stands containing lodgepole pine in association with subalpine fir, and also a stand containing limber pine and aspen in addition to the mixed Douglas-fir stands described above. There are very strong nutritional reasons that dusky grouse use particular stands.

Nutritional Ecology

Nutritional ecology is the science of studying strategies animals use to extract nutrients and energy needed to survive and reproduce in environments where the amount and quality of food can vary tremendously. Dusky grouse employ a variety of fascinating strategies to survive in a very challenging environment. In order to truly appreciate how well adapted they are to the Rocky Mountains, as well as understand how to find them, one must understand their nutritional ecology. Comparing how dusky grouse solve their nutritional challenges with other species in similar environments is helpful. Animals that eat plants for a living have two fundamental problems to contend with. First, much of the energy and some of the nutrients in plant leaves and stems, and to a lesser degree fruits, occur in the cell wall where they provide structure, analogous in some respects to the bones in our skeleton. Vertebrates do not produce enzymes capable of breaking down plant cell

walls, but bacteria do. Consequently many animals retain bacteria in their stomach or gut in a classic symbiotic relationship that benefits both. Bacteria get a warm, moist and stable environment to live, animals get to utilize the energy trapped in cell walls released by bacteria. Elk for instance, make a living in winter eating dried grass, a relatively abundant, but low quality food. They use their large size, and correspondingly large rumen to store large volumes of food for many days, time enough for the bacteria in their rumen to break down the fibrous cell walls in the plant material. The bacteria release the energy stored in the cell wall, which is absorbed into the bloodstream where it can be used. Horses have large ceca, as do grouse, where bacteria digest plant material after it has gone through the stomach and small intestine.

The second fundamental problem is that plants don't like to be eaten, as it is difficult to grow and reproduce if significant portions of you are removed. Over the course of evolutionary time plants have developed defenses to herbivory. Thorns are classic examples of strategies to avoid being eaten by browsers, but most defensive mechanisms are probably geared towards plant-eating insects, and are much more subtle. Plants have also evolved a variety of chemical defenses; compounds stored in leaves, seeds or stems that are released when the plant is chewed. The chemicals that produce the burning sensation in jabanero or jalapeno peppers are examples most of us are familiar with. If not detoxified in some manner these chemicals can create a broad range of negative physiological effects, even death (think night shade or hemlock), or kill or inhibit bacteria needed for digestion.

With that background we can consider the nutritional ecology of dusky grouse. Winter is the period when food quantity and quality is generally the poorest in temperate areas, and requirements during winter are most critical in shaping evolutionary strategies. Grouse as a group eat winter foods of generally poor quality and digestibility. They get by because of three primary adaptive strategies: 1) they are selective feeders, choosing the best among a poor lot; 2) they have grinding gizzards where gravel and muscular action act like teeth and grind food into small, more easily digested pieces; and 3) they have large cecum where bacteria aid in digestion. Unlike ruminants, grouse have a high intake, high rate of passage strategy, where food is passed through quickly (12-24 hours). The easily digested portion is either digested and absorbed in the small intestine or diverted into the ceca, and the less digestible fibrous portion is excreted to make room for more.

Within mountainous environments several winter strategies have evolved. Ptarmigan feed on buds and twig tips of willow in alpine and subalpine environments, a food of moderate nutritional quality but at least locally abundant. Columbian sharp-tailed grouse feed on buds and twig tips of a variety of deciduous shrubs and trees such as serviceberry and aspen. Sage-grouse on the other hand went all in on sagebrush leaves as a winter food source. Big sagebrush retains its leaves in the winter, so they are available for herbivores to feed on, and in fact are quite nutritious. But they are well defended by a host of plant defense compounds, and most herbivores, including deer and elk, have to limit the amount of sagebrush they eat. In fact pygmy rabbits and sage grouse are the only species that can eat a diet of 100% sagebrush leaves. Sage grouse have evolved to lose the grinding capacity in their gizzard, which is a double edged sword. By not grinding sagebrush leaves they prevent many of the toxic compounds from being released and absorbed, but they also greatly diminish their ability to digest the leaves. They compensate by eating an enormous volume, and by diverting much of the soluble portion of the leaves into an equally enormous ceca for bacterial digestion.

Dusky grouse exhibit a third strategy. They are completely dependent on needles of coniferous trees in winter. It is an abundant, but very low quality food source. Dusky, sooty, and spruce grouse are unique among grouse (and among a select few animals of any kind) in their capacity to derive enough energy and nutrients from conifer needles to survive. My research showed the way they do that is by being extremely selective in which tree species, and which trees, and even which needles from individual trees they choose to feed upon. Radio-collared dusky grouse were observed in stands containing Douglas-fir in association with subalpine fir, Engelmann spruce, limber pine and lodgepole pine, or in stands containing lodgepole pine and subalpine fir, and a few in stands containing only limber pine and aspen. In mixed conifer stands birds fed mostly (91%) on needles of Douglas-fir, with the balance of their feeding effort directed at needles of lodgepole pine and limber pine. Birds in the lodgepole pine/subalpine fir stand fed only on lodgepole pine, and birds in the limber pine/aspen stand fed only on needles of limber pine. Radio-collared birds did not feed on needles of subalpine fir or Engelmann spruce, even when these species were abundant. Birds did fly into subalpine fir trees to roost following feeding bouts.

Birds offered a choice in captive feeding trials rarely fed on needles from branches of Engelmann spruce or subalpine fir, and in fact showed a strong preference order: Douglas-fir was somewhat preferred over lodgepole pine needles, which were preferred over limber pine needles, all of which were strongly preferred to subalpine fir and Engelmann spruce needles.

These preferences were strongly related to the amount of energy that dusky grouse were able to extract from these needles. Dusky grouse in trials conducted with captive birds were able to maintain their body condition only on needles of Douglas-fir, and lodgepole pine (limber pine was not tested), and quickly lost weight when fed subalpine fir or Engelmann spruce needles. Grouse derived the most energy from needles of Douglas-fir. Compared to Douglas-fir needles, lodgepole pine needles yielded 4% less energy, but subalpine fir and Engelmann spruce needles yielded 16% and 36% less energy, respectively.

Dusky grouse were extremely selective even when feeding on Douglas-fir trees. Observations of radio-marked birds and in captive feeding trials showed dusky grouse primarily fed on 1-2 year old needles in the upper canopy of very old trees. This combination gave them the greatest amount of energy and protein. Some trees were fed in much more heavily than others of a similar size and age, a preference which seemed to persist from year to year. Lodgepole pine trees younger than about 100 years were almost never fed in, nor were Douglas-fir younger than about 200 years. We did not investigate a possible nutritional explanation for this pattern, but did note that large, old, and seemingly suitable Douglas-fir stands and trees at lower elevations on flatter slopes were not used, rather dusky grouse preferred Douglas-fir stands near the tops of individual mountains where it was steep and rocky.

Once dusky grouse reach wintering areas they are relatively sedentary. One rather extreme example of that was a radio-collared male that spent more than a month in the same tree, which had blown over and hung up on other trees so that the bird could walk almost horizontally along the trunk. When snow depths exceed 6 inches or so birds are rarely on the ground, spending almost all of their time roosting and feeding in trees. Feeding is restricted to 30 minutes or so after sunrise and at dusk, although morning feeding periods may be more protracted. Birds usually did not roost in the same tree they fed in, particularly in the evening, but rather flew to a different tree some distance away following feeding. Birds feeding in lodgepole pine never roosted in lodgepole, almost always choosing to roost in subalpine fir, presumably because of the thermal advantages of the denser foliage. Peter Pekins, a researcher studying dusky grouse energetics during winter in southeastern Utah, found in his mixed conifer stands dusky grouse preferred Douglas-fir during the day, and to roost in subalpine fir at night. Birds moved close to the tree trunk to roost to minimize their exposure to wind. We found some evidence that dusky grouse would snow burrow during periods of extreme, below zero, cold, but this was rare. Ruffed grouse make extensive use of snow burrows, flying head long into deep snow and then burrowing there until morning. All species of ptarmigan make extensive use of snow burrows, but more likely dig in with their feet. Snow acts as a tremendous insulating blanket, consequently snow burrowing reduces the amount of energy birds need to expend to stay warm. Pekins demonstrated that by roosting against the trunk in trees with dense foliage, such behavior is not necessary for dusky grouse except during extreme cold.

Life during winter is good for dusky grouse. The few predators that remain in mountainous environments during winter don't climb trees, so predation or other forms of mortality are very low. Food is abundant when you live in a grocery store, and energy expenditures to obtain it are minimal. One advantage to eating needles suspended on tree branches; even deep snow does not make food any less available or difficult to acquire. Energy expenditures for things like territorial display, breeding, or replacing feathers (molting) don't occur during winter. Dusky grouse don't need to burn calories to maintain body temperature until air temperatures drop below 15 degrees, a temperature common in mountain valleys where cold air sinks but less common at higher elevations. The food they eat is not very nutritious, but they compensate by being very selective, eating a lot of it, and minimizing energy expenditures by being sedentary. Juvenile birds continue to grow to adult size over winter, while adults maintain body size and replenish reserves lost during breeding.

Why do dusky grouse migrate?

The movement of dusky grouse to higher elevation winter areas is typical throughout their range, but is atypical for most species in montane habitats. A movement down in elevation to warmer and particularly more snow-free environments is more typical for species that don't go dormant during winter (for example, deer, elk, most passerines, etc.). Even migratory populations of their close relative the sage-grouse move to areas with less snow during winter, although these are not always at lower elevations. Documenting these seasonal movements by dusky grouse and when they occur is relatively simple with radio-telemetry, understanding why they occur is more difficult. Dusky grouse are uniquely adapted to eating needles of coniferous trees in the winter, and the absence of other suitable foods in winter makes them completely dependent on coniferous forests. It is easy then to understand that dusky grouse breed at lower elevations for the most part where snow depths are less problematic in the spring, and then must move up to coniferous forests in winter. Why



Fig. 1. Douglas-fir dominated wintering area in Middle Park, approximately 9,500 feet



Fig. 2. Limber pine/aspen wintering area in Middle Park, approximately 8,000 (?) feet



Fig. 1. Adult male dusky grouse feeding in lodgepole pine



Fig. 2. Lodgepole pine branch fed-upon by dusky grouse, note heavy clipping of needles at ends



Fig. 1. Adult male dusky grouse in Douglas-fir tree.

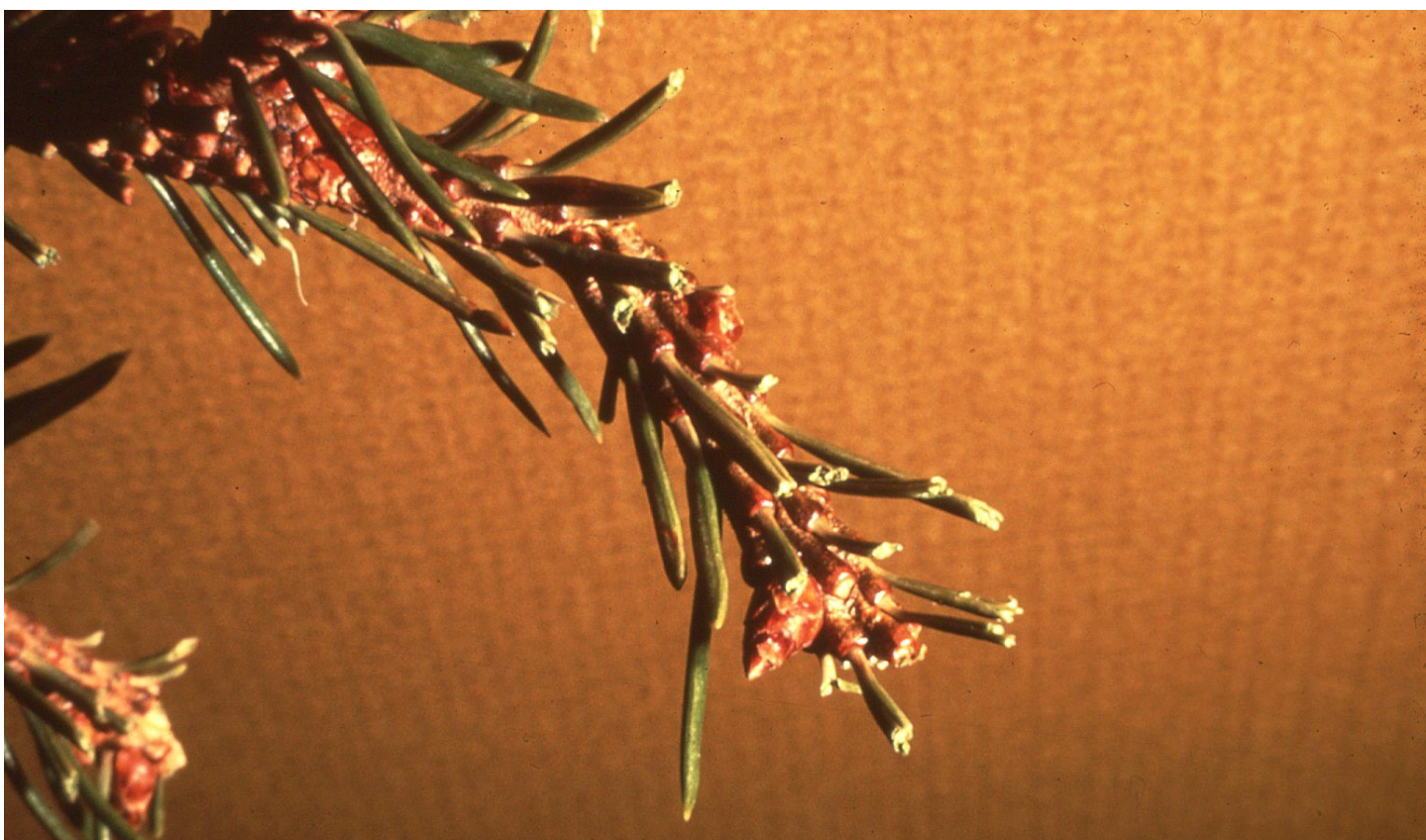


Fig. 2. Tip of Douglas-fir branch, showing feeding on younger needles and buds.

most males and unsuccessful females abandon territories and breeding range with abundant food and cover resources in July, months before lack of food would act as a trigger, is a mystery. The simplest explanation may be that they leave because they can. The areas they move into have abundant food and cover. Birds moving into these late summer habitats seem to experience little mortality during this period. Movements may be from relatively rich predator areas on low-elevation breeding habitat to lower predator densities in subalpine forests so they increase their own chances of survival. Conversely, by leaving breeding areas they reduce the overall density of grouse (prey), and may consequently make hunting grouse less attractive to predators. This may reduce the predation rate on their offspring. If they have to leave eventually (and incur the energetic costs of this migration) to reach a winter area, leaving earlier makes sense as long as mortality risk is not elevated.

Hunting and Viewing Dusky Grouse

Hunting dusky grouse in Colorado in the fall is one of those things that make living in Colorado special, although perhaps not quite as popular as watching the Broncos or pursuing elk. It is a breathtakingly beautiful time of year to be out hiking in the mountains, that alone is reason enough to get out. The good news is dusky grouse are widely dispersed throughout Colorado's mountains, so finding places to hunt is not difficult. The bad news is they are widely dispersed. Unlike other upland birds like pheasants, dusky grouse are common on public lands. All eleven of Colorado's National Forests, and all six BLM Districts contain dusky grouse, although it is also true that dusky grouse don't use much of these areas at all, or only seasonally. The key to finding dusky grouse to hunt or view is using your understanding of their biology to predict where they will be. Most interest in viewing grouse is in the spring or summer, whereas grouse can be hunted only between September 1st and the end of the big game seasons.

Although dusky grouse can be found anywhere from 6,000 to over 13,000 feet, and almost anywhere in between, there are two main strategies for hunting them; hunt low elevation breeding areas, or hunt high elevation summering areas. Finding grouse that are staging or moving between breeding and summering areas is very difficult, because there are lots of areas like this, and relatively few grouse at any given time to fill it. Dusky grouse can be hunted on wintering areas, but this is not for the faint of heart. It is the time of year when grouse are concentrated in the smallest area they will use all year, making these spots difficult to locate. Once snow blankets the ground, grouse are likely to spend most of their time in trees, making them difficult to find and flush. Dogs won't help in these situations.

Scouting

Regardless of where you intend to hunt, scouting in advance of the season will greatly increase your chances of success. By August, movements from breeding areas to summering areas will have occurred, and chicks are big enough to be visible. Most grouse will be where they are going to be during the hunting season. In addition to looking for birds themselves, keep an eye out for droppings and molted feathers. Juvenile birds and adults are replacing most of their flight and tail feathers this time of year, and these can tip you off to the fact birds are present, and for the knowledgeable, which sex and age. I always hike and hunt with my head down looking at the ground, and in addition to droppings and molted feathers I often observe dust bowls, where grouse dusted themselves in a patch of bare dirt or pocket gopher mound. To the uninitiated flicker droppings, which seem to be almost ubiquitous in Colorado mountains, look a lot like grouse droppings, but if tapped with a boot they usually disintegrate as they consist entirely of ant parts.

Don't look for grouse in trees this time of year. The only time you see a bird in a tree in August or September is if you, or something else, flushed it there. Birds will pick up grit, or clover on Forest Service roads, and driving these slowly when birds are active in the morning or late afternoon can help you locate areas they are using. This is a more useful technique in high elevation summer habitats where roads often run along ridge tops than it is down low, where roads generally cut straight through.

Hunting low elevation breeding habitat

Where to look? Because hens with broods, and some males and unsuccessful females, remain in breeding habitat typically until late September or early October this can be a fruitful area to hunt in September. We've plotted potential breeding habitat (based on elevation and habitat) in Figure __, as a starting point for where you are likely to find birds. This is a useful first approximation for where to start looking, but presence of birds

should be confirmed prior to hunting season to optimize your odds of a successful hunt.

Talking to experienced grouse hunters and archery deer and elk hunters about where they are seeing birds can be a very productive shortcut. In my experience both groups are generally pretty helpful, and I try to reciprocate by not hunting near their camps and by not hunting during the first hour or so of daylight when big game hunters have their best odds of success.

Two tools are essential for effective scouting, a GPS where the location of the vehicle as well as where you find birds and water sources for the dogs can be saved and stored, and a good map that shows public land ownership boundaries as well as general vegetation patterns. GPS technology has evolved to include mapping capability, which is useful, but not a replacement for paper maps in my opinion. I always save the location of the truck as a waypoint before I head out whether scouting or hunting, because after crossing a few ridges all of the country begins to look the same and it is reassuring to have that location as insurance as to the quickest way back to the truck, particularly if a rain or hail storm is moving in. It also gives you the confidence to try things like parking one vehicle down at the base of the mountain, then driving to the top and hunting your way back to the vehicle using the GPS to guide you. This can get you into country you wouldn't get to if you had to turn around and walk back uphill to the vehicle.

I generally use a combination of large scale, BLM (1:100,000) or USFS (1:126,720) maps at the district or Forest level to determine how to get to an area, and then smaller scale (1:40,680) National Geographic series maps to figure out land ownership and where to start hunting. The National Geographic series maps are frequently updated and do a very good at accurately depicting road numbers, road quality, road closures, hiking trails, etc. They also do a good job of showing forested areas and openings within forested areas such as subalpine meadows where grouse may concentrate. They are gridded with both Universal Transverse Mercator (UTM) and latitude-longitude coordinates so it is relatively easy with a GPS unit to determine exactly where you are on the map. They depict 50-foot contour intervals, not as good as a topo map but adequate for assessing steepness and looking for steep, south-facing slopes up high. Topo maps don't show ownership, and are zoomed in too tight to figure out how to get to the area.

What to look for? By late summer chicks are growing rapidly, and while they eat a wide variety of plant material and insects, the motivation for where they spend time seems to be locating foods that fuel growth. Insects, which are high in protein and berries which are high in carbohydrates, are sought out. Grasshoppers are the most common insect eaten, and abundant in areas where grass and forbs are abundant. This is why you should concentrate effort in meadow habitats early in the fall, whether that is a sagebrush-grass "meadow" at 6,000 feet, a grassy meadow on a south-facing slope surrounded by aspen at 8,000 feet, or a sub-alpine meadow at 10,000 feet. Grasshopper abundance seems roughly correlated with the amount of grass and forbs present, and birds will locate areas with higher than average grass and forb growth, whether that is below a seep, in a small bottom, or an old burn where competing trees and shrubs have been reduced.

Because people commonly see dusky grouse in forested habitats while hiking or hunting big game, there is a temptation to hunt in forested areas, and this is a big mistake when hunting low elevation breeding areas. The shrubs, and the grasses and forbs that grow in shrub-dominated landscapes, are far more important to dusky grouse hens and their broods, and any males that may be hanging around, than are trees at this time of year. Birds in sagebrush/aspen areas may be a substantial distance (several hundred yards) away from aspen stands if there is a good understory of grass and forbs, but are more likely to be found along the edge or inside aspen clones. Birds may move through, but generally don't use the interior of large stands of aspen. Birds will be actively feeding early in the morning and again in late afternoon, and are more likely to be found in open meadow areas at this time. Birds often retreat to the shade of trees or large shrubs during mid-day, particularly if it is warm and sunny.

Dusky grouse in mountain shrub communities with oakbrush, serviceberry and chokecherry, often in association with sagebrush and aspen clones, relate even less to trees in late summer and early fall than birds in aspen-sagebrush areas, because the tall shrubs provide shade and cover. Birds will feed on insects and vegetation in areas between shrubs, and feed on acorns or berries under the shrubs that produced them.

Willow or alder stream courses look like places birds would congregate, but I have rarely found this to be the case. Dusky grouse obtain their water from their food and produce it metabolically, and consequently do not need to go to ponds, streams or stock tanks to drink water. Birds may be found near water because of the effect the water has on vegetation however. I always record any water sources as waypoints on my GPS, as places to water and cool the dogs can be rare in low elevation breeding areas. I will make a point of hunting riparian areas if it is exceptionally dry and barren in upland areas, as birds may seek lush vegetation in

creek bottoms. I have also found broods concentrated along creek bottoms in Front Range breeding areas, where birds may move to creeks or other riparian stringers late in the summer. Bearberry berries can be a sought after food source, as can chokecherries common to stream banks.

Tactical considerations. When hunting a new area it is best to get an early start when birds are most likely to be active and moving around. This would be shortly after sunrise, although birds may delay activity if there is heavy dew or frost. Morning feeding periods are fairly protracted, so birds are likely to be active for a couple of hours before they roost under a shrub or tree.

Dogs are very helpful and even necessary in low elevation breeding areas, because birds can hide easily in the tall and dense grass and shrubs, and they will let you walk by without flushing. If you don't have a dog, or a friend with one, it may be better to hunt up high where dogs are less important, and even harmful at times. Hunting early is even more critical for hunters without dogs, as birds can be located while they are feeding in open areas where they are more likely to flush. Hunting without a dog should be done a lot like pheasant hunting without a dog; walk slowly, stop often, and change directions frequently to make birds nervous and more likely to flush. Replace the dog's nose with your eyes. Scan the ground looking for single droppings (indicating a bird feeding) or roost piles where a bird spent the night. Look for molted feathers, and dusting sites where birds took a dust bath in pocket gopher diggings or other areas of bare dirt.

If you find birds, great, note the characteristics of the habitat you are in for future reference as other birds in the area are likely using similar habitats. If you are finding fresh sign, meaning droppings that are moist and greenish in color, slow down and hunt the area thoroughly. If you find neither birds nor sign after an hour or so of effort it may be time to move. Is the vegetation dried out, forbs all cured or dead from frost? Are you flushing grasshoppers as you walk through the grass and shrubs? While you may not see them at day-break when temperatures are cold, if you don't see them later in the morning you need to look for areas with more grass and forbs. Usually that means moving higher up on the mountain, but it can also mean moving from a south-facing slope to another aspect that isn't as dry. Move closer to aspen clones or coniferous trees if present, or look for seep or spring areas with lush vegetation. Look around for berry producing shrubs, like serviceberry or chokecherry (occasionally wild rose and rose hips, or bear berry on the Front Range) as birds may have shifted over to berries if grasshoppers and forbs are not abundant. In very dry summers you may find situations where insects and forbs are scarce, and berries or oakbrush acorns did not develop, in which case you have little choice but to follow the grouse and move higher in elevation.

By mid-morning, birds will usually have finished feeding and moved under a shrub or tree. They are not laying down a scent trail, so dogs generally have to run close by to detect them. Scenting conditions usually deteriorate as it warms up and dries out. Moving slowly and hunting thoroughly is important. Birds may become active again around mid-day, and again for the last hour to two hours of daylight. On hot, sunny days birds will move out of grass and sagebrush areas with intense sun and look for effective shade and cooler sites, so hunt the edges and into the interior of aspen clones, Douglas-fir or other coniferous stands as it warms up. Stop often, as roosting birds that have not been detected by you or your dog may get nervous and flush or walk away from you and expose themselves.

Hunting high-elevation summer and breeding habitat

Where to look? High-elevation spruce-fir and meadow habitats are ubiquitous in Colorado's mountains, but most contain few if any grouse because they are located too far from breeding habitat. The highest densities of summering dusky grouse will be found in high elevation spruce-fir habitats that are relatively close, say within 10 miles, of high quality breeding habitat. As a first approximation to where to look for grouse who have moved into high elevation areas to summer, Figure _ depicts all spruce-fir forests and alpine/sub-alpine meadows that occur within 10 miles of the edge of low-elevation breeding habitat. Figure _ also shows potential high elevation breeding areas, where territorial males and females with broods may be located, by mapping alpine/sub-alpine meadows with south facing slopes that are greater than _ degrees.

What to look for? Look for high elevation ridge tops with spruce-fir overstories and understories dominated by *Vaccinium*, with openings in the trees that contain grass and forbs and currant or gooseberry as berry producing shrubs. Adult males and unsuccessful females that have moved out of breeding areas into these high elevation spruce-fir forests are almost invariably feeding primarily on the leaves and berries of *Vaccinium* and/or the berries of either currant or gooseberry. *Vaccinium* leaves of course are available anywhere the plant

grows, but berries are almost always produced in areas where sunlight hits the plant. That means berries are rarely found on plants inside the tree canopy, and most often found at the periphery of openings in the canopy. These may be small openings created by trees blowing down, or more commonly rocky areas or natural meadows or manmade meadows such as burns or clearcuts. Currant and gooseberry do not grow under solid tree canopies, rather they are found in meadow areas or as a ring around the base of trees at the edge of openings. For these reasons, solid timbered areas are seldom as productive as areas where spruce-fir stands are interspersed with meadows or other openings.

Birds, particularly males, seem drawn to ridge tops and the edges of talus slopes or boulder fields, where they take advantage of the openings and the slope to rocket downhill and away from trouble. As a general rule, I always drive to the top of the highest ridge I can get to from the road, then hunt along the ridge and drop off the sides to explore meadows or other openings.

Look for sign as well as birds. Birds are molting (replacing) wing and tail feathers this time of year, so molted feathers are often the first sign that you are in an area with birds. If you find feathers, it is highly likely there is a bird or birds nearby, as movements are fairly restricted this time of year. Dusting of snow, sometimes more, is not unusual this time of year in the high country, and this can be an excellent way to determine where birds are. Drive or walk forest roads around mid-morning following a fresh snow, and look for tracks crossing the road. At times birds can be spotted from the road while driving very slowly even without snow; concentrate on morning and evening feeding periods when birds are actively moving around, and look for silhouettes of grouse, particularly on logs or stumps they may have jumped onto to get a better view.

Tactical considerations. For the most part birds you are hunting up high were not produced there, rather they moved up from lower elevation breeding areas. Study Figure _ in relation to where you are hunting, and think about where the birds you are trying to hunt likely came from. They are more likely to be on the first high elevation spruce-fir ridge above their breeding area than they are many miles farther in. The ideal situation is to look for relatively small areas of spruce-fir forests surrounded by high quality breeding habitat on all sides. Under these circumstances a lot of birds will be moving into a relatively small area, and they will be concentrated. The converse, huge expanses of spruce-fir forest with very little breeding habitat nearby should be avoided like the plague. Cameron Pass between Larimer and Jackson Counties is a good example of this. The high elevation habitat is ideal but there is so much of it and it is so far from breeding areas that densities are exceedingly low and hunting poor.

If you are hunting with a dog, do your best to keep it in close, as birds flushed on the wrong side of a large spruce rarely yield shots and re-flushes are not common. I have found pointing dogs are not consistent at pointing dusky grouse either down low or up high this time of year, probably because of a lot of competing scents. Typically a bird bumped by a dog will fly up into a tree rather than rocketing down the hill which is often the case when flushed by a person, so try and get a glimpse as to which tree it may have flown into. Be alert for additional birds, as groups of 2 or 3 or even as many as half a dozen males can be encountered. Porcupines are fairly common in spruce-fir forests, so be alert to that possibility when your dog gets birdy. I carry a pliers just in case, and have had to use it more often than I care to remember.

If you don't have a dog, and this is not a great impediment up high where visibility is good, walk slowly and stop often. Scan the ground ahead of you for birds moving away from you or jumping up on logs or rocks to get a better look at you, and study the ground as you walk for molted primaries or tail feathers. Hunt along ridge tops and look for openings where *Vaccinium* berries or currant may occur. In most years *Vaccinium*, even in sunlit areas, produces few berries so be on the lookout for plants with a lot of berries which may draw birds. Hunt the edges of meadows, old burns, talus slopes, etc., but don't spend a lot of time working the interior of large meadows as adult males and unsuccessful females don't often get too far away from trees. The exception to this is areas with steep south facing slopes where birds may breed. In these locations I have found hens with broods in subalpine or alpine meadows hundreds of yards from tree cover. They are not feeding on *Vaccinium* or even currant in these locations, rather forbs and insects. If you do encounter hens with broods, it may pay to focus on the interior of meadow habitats where broods concentrate.

Persistence may be necessary when hunting up high. If you are in suitable habitat within 5-10 miles or so of breeding habitat there are almost certainly birds there, but exactly where can be elusive. I have hunted for hours without bumping a bird then run into six adult males and a couple of hens in one group. Keep trying different ridges and habitat combinations until you find berries and birds. A final note. When you do find birds up high be conservative in your harvest as these are usually adult birds that are not quickly replaced. They can be shot out of an area for a period of time, so it may pay to avoid areas near popular trailheads or

along roads. I typically don't hunt the same high elevation spots in consecutive years and never more than once in a year. Enjoy the challenge and thrill of finding new spots, and spread your harvest around.

Hunting at these elevations can present weather challenges. Afternoon thunderstorms are common in September, and snow is possible and even likely in late September and October. A little snow, say 2 inches or less, can be helpful as tracks can reveal where birds are, but hunting after a 4-inch or greater snowfall can be daunting. Besides making the ground and logs and rocks you step on slippery, snowfalls of this depth push birds up into the trees to roost and even feed, and they are nearly impossible to find and flush. Early snows will melt, and birds will come down to feed eventually as vegetation emerges from the snow, but persistent snowcover of 4 or more inches will cause birds to abandon summering areas, move to wintering areas and switch to a predominately conifer needle diet.

Hunting Wintering Areas

Where to look? Look for Douglas-fir, lodgepole pine, and/or limber pine stands at 8,500 feet in elevation or higher that are above but in close association to breeding areas (0.5-5 miles), or below but near (1-10 miles) high elevation summering areas. Stands meeting these criteria are mapped as potential wintering areas in Figure _ as a starting point for where to look. Birds generally seem to prefer feeding on trees at the highest elevation available within the stand, so keep climbing. Bear in mind that pine beetle mortality has occurred in many areas of the northern part of the state, particularly in lodgepole pine, but also in other species fed upon by grouse, and areas mapped as potential wintering areas may not have mature trees preferred by dusky grouse.

What to look for? Once stands containing the appropriate tree species at the appropriate elevational range near breeding or summering areas are found, look for tracks in the snow if snow depths are less than 6 inches or so, and look for signs of feeding below Douglas-fir, lodgepole pine or limber pine trees. Pay particular attention to the largest trees in the area, and in the case of lodgepole pine, trees that are growing in full sunlight away from competition from other trees and with live branches extending nearly to the ground. Evidence of feeding will include broken needles and twig tips, as well as droppings scattered below the tree. Birds feed intensively on some individual trees, so signs of feeding can be fairly obvious when you find the right tree. Birds may be alone, in small groups or in loose flocks of a dozen or more. Once sign is spotted look for birds feeding, particularly in the morning and evening, but also at midday, by scanning the top 1/3 of the tree and looking for movement out near the ends of the branches. On steep slopes with south exposures where snow melts off birds will drop to the ground and walk around, so look for that as well.

Tactical considerations. Hunting dusky grouse on their wintering areas is not for the faint of heart. These are most often high, steep, rugged areas, and at this time of year dusky grouse are using the smallest areas they will use all year. By definition snow is usually a factor, and vehicle access to many of these areas will be difficult if not impossible. Birds spend most, if not all their time in trees, and finding them requires a great deal of effort and patience. Shots in most cases will be of birds you have flushed from trees, which is difficult at best. Big game seasons will be in full swing, so others will be in the woods in these same areas. While I have spent a fair bit of time looking for wintering dusky grouse for research purposes, I have not attempted to hunt them during this period because I am not comfortable having my dogs in the woods during big game seasons, and the season closes concurrent with the end of the 4th rifle season.

But if you wish to hunt dusky grouse after mid-October, or mid-November in mild falls, you will likely have to look for them in wintering areas. If you are serious enough about hunting them to be in potential wintering areas shortly after daybreak or shortly after sunset, listen for birds flushing from a roost tree to a feeding tree in the morning and from a feeding tree to a roost tree in the evening. It is usually still at these times, and the sounds of their wing beats can be heard from a considerable distance. They do vocalize to each other when feeding, but you essentially have to be under the tree they are feeding in to hear this.



Fig. 1. Successful high-elevation grouse hunters.

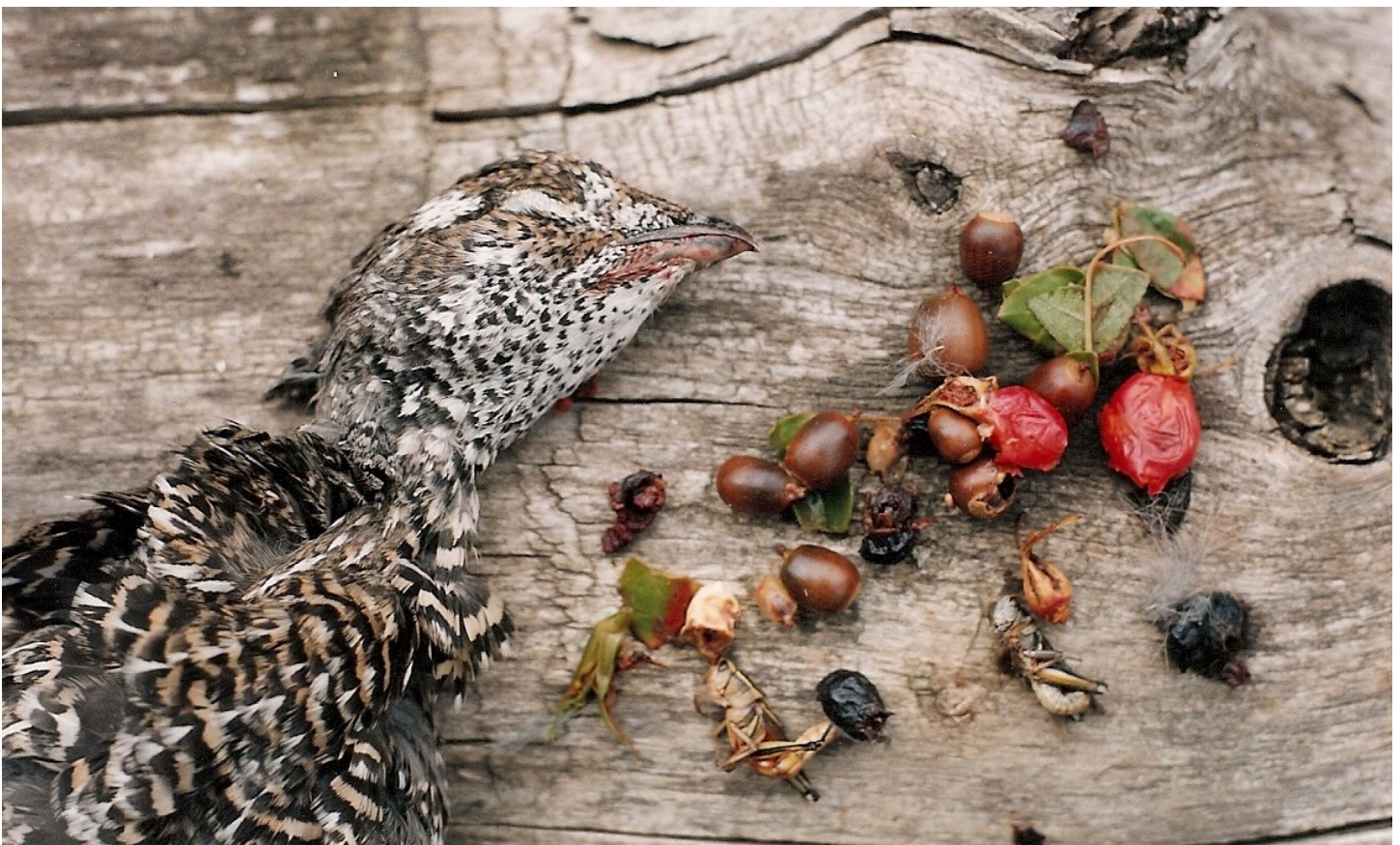


Fig. 2. Crop contents reveal what birds are feeding on; grasshoppers, acorns, rosehips and serviceberry berries.

Dictionary:

Adult— a grouse entering it's second year or older, generally older than 15 months.

Chick— describes a young grouse from date of hatch until it's first fall, at which point it is usually called a juvenile, until the next spring when it is referred to as a yearling.

Conifer—A general term for any of a number of species of needle bearing trees that retain those needles year-around, including spruce, fir, and pines, but generally not used to describe junipers.

Forb—a flowering plant, typically annual

Habitat type

Juvenile—a first-year grouse, classified as a yearling after the 1st of January.

Mountain shrub community— general term for an area where shrubs such as sagebrush, serviceberry, chokecherry, and oakbrush are a dominant part of the plant community. These shrubs may occur in association with some deciduous or coniferous trees, or without them.

Shrub-steppe

Stand— a group of trees, often of the same species and affected by similar climactic and historical trends.

Yearling—a grouse in it's first breeding season, generally used for grouse between 9 months and 15 months of age, after which it is considered an adult.

