



# Habitat Requirements of Wildlife: Food, Water, Cover and Space

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Fact Sheet 14

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Every wildlife species requires a general environment in which to live. To properly manage land for the benefit of wildlife, landowners must be aware of those things in the environment that wildlife need to survive and reproduce. The environment or natural home where a wild animal lives is called its habitat. Just like humans, wild animals have specific requirements that they get at home. Habitat for any wild animal must provide:

- cover (shelter) from weather and predators;
- food and water for nourishment; and
- space to obtain food, water, and to attract a mate.

This chapter is about understanding what habitat means to wildlife and how landowners can manage their property for wildlife.

The selection of habitat is a specialized process that has taken hundreds of years to develop. When an animal selects a certain place to call home, it often restricts itself to a certain type of area, and often will adapt for the particular combination of features found in that habitat. While shelter, food, and water are basic requirements, how wildlife obtain these requirements varies. South Carolina does not have pronghorn antelope because we do not have the wide-open spaces that these animals require. Similarly, South Carolina has an abundance of cottontail rabbits because the state has the type of habitat that rabbits require: a mixture of  $\frac{1}{3}$  grasslands,  $\frac{1}{3}$  croplands, and  $\frac{1}{3}$  shrubby or woody cover.

To understand how habitat affects wild animal populations, it is important to understand the basic components of habitat: food, cover, water, and space.



Photo by Brian Lockhart, USDA Forest Service, Bugwood.org

## Wildlife Need a Place to Hide, Rest, Move About, and Mate

Cover is any part of an animal's environment that provides protection and enhances the survival or reproduction of the animal. Often landowners, and almost everybody else, think of cover as something animals hide under. Actually wildlife cover has 2 components:

- it provides shelter from adverse weather conditions (winter or thermal cover), and
- it provides protection from predators (screening or escape cover).

Wildlife do need things in their environment to hide under, but cover also includes having something to hide behind, or some type of obstruction between the animal and a potential predator. Cover is three-dimensional and is related to the functional needs of animals. For example, many people in South Carolina have had the experience of seeing deer in an open field. If deer are disturbed, they will flee into any nearby woodlot. Often, the animals will stop and resume feeding once they have retreated back into the trees, even though you might be able to see it. The deer gets enough horizontal cover (space between the animal and you) to feel secure.

An overgrown fence line or weed-filled ditch may not look like good wildlife cover because the plants are not very tall, but the horizontal cover it provides may be all that foxes need to feel secure or that deer need to feel comfortable while feeding in surrounding fields.

Wildlife also need cover for nesting, escaping predators, breeding, rearing young, and loafing. For example, the general habitat and cover requirement for bobwhite quail is a mixture of 30 to 40% grassland, 40 to 60% croplands, and 5 to 40% brushy or wooded cover. Closer examination reveals that bobwhite quail require a wide array of cover types for different functions or activities throughout the year. These cover types can be classified as:

- nesting cover (moderately dense grass-broadleaf weed mixture with nearly bare ground around grass clumps);
- roosting cover (grasslands with short-statured vegetation approximately 2 feet high with an open canopy for uninhibited movement);

- screening or escape cover (low growing shrubby or woody areas such as brushy fencerows or field dividers);
- dusting cover (dry, powdery, bare ground);
- brood-rearing cover (insect-rich mixtures of legumes or herbs with bare ground for movement);
- loafing cover (similar to roosting cover where quail can escape potential predators easily); and
- thermal or winter cover (dense ground cover under a woody canopy).

Some wildlife are not very selective about what they use for cover. For example, opossums can live in almost any type of habitat, including towns and cities. Other animals are selective about the type of cover they require. Ruffed grouse in the mountains of South Carolina prefer overgrown fields, second-growth hardwood forests, small timber slashings, and mature hardwood forests. These are general cover requirements of ruffed grouse.

If a landowner removes or changes the amount or specific type of cover available to wildlife in that area, the local wildlife population may be affected. If a landowner decides to allow a forested property to mature, bobwhite quail populations may decline because feeding, nesting, and brood cover have been removed. However, gray squirrel populations may increase due to an increase in mature to overmature trees that provide mast (fruit) for food.

Providing cover for one wildlife species (in this case gray squirrels) is not without its problems because it may decrease the cover for another desirable species (bobwhite quail). However, in some cases, cover requirements between desirable species may be similar, and managing cover for bobwhite quail may result in benefitting cottontail rabbits and cardinals.

Given the interrelated cover needs of numerous wildlife species, it is probably impossible to manage cover for one species without influencing others. Whatever form it takes, cover contributes to the “patchiness” of plant life and often enhances the different types of wildlife found. Landowners must also consider what constitutes a proper breeding site (areas where wildlife can build a den, nest, or dig a burrow to give birth and raise young). Sometimes it may appear that the habitat provides everything wildlife need to survive and prosper, yet the population never seems to increase. This failure to increase in numbers may be related to a lack of breeding sites. Most landowners know the type of plants to leave as nest sites for turkeys or quail or the kinds of den trees raccoons are likely to use. With an awareness of the habitat needed by those species they wish to promote, farm and forest owners can provide needed habitat requirements.

One final aspect of cover that is important for landowners to understand is the concept of travel corridors. Travel corridors are areas of continuous or unbroken habitat that permit animals to travel securely from one habitat to another.

As environments become more broken up (fragmented) from road construction, urban sprawl, agricultural clearing, or industrial development, it is important to connect remaining wildlife habitats.

Travel corridors connect these islands, and should be maintained or created, if possible, because they allow wildlife to find and use the islands of suitable habitat.

## Food Requirements

Obviously, wildlife must have food to survive. Animals having adequate food and proper nutrition throughout their lives grow larger and remain healthier than animals that experience poor nutrition during part or all of their lives. Generally, wildlife in good condition have higher reproduction rates, are more resistant to diseases, and can escape predators better than animals in poor condition. Nutrition affects birth and death rates and is important in the overall survival of any wild animal population.

The availability of food varies over time (season) and space (geographic location). Food can be abundant in one area during one season, and in critically short supply in another area during other seasons.

In South Carolina, wildlife generally experience nutritional stress in late summer and late winter/early spring. During this period many of the natural food sources have been depleted or the quality of available foods has deteriorated because of the lignification (hardening of plant cells) of food plants making them less digestible and less palatable. Cold weather forces animals to consume more food to maintain body heat. If food supplies are the focus of a wildlife management plan, landowners should be sure to provide high quality food during late summer and late winter/early spring.

Diet selection in wildlife is driven by the quantity and quality of available food in concert with the nutritional needs of the animal. For instance, coyotes are carnivores adapted for eating a diet of small animals (mice, voles, etc.) during much of the year. However, when insects, fruits, and berries are abundant in summer, as much as 80% of a coyote’s diet will consist of these food items.

Likewise, wild turkey, bobwhite quail, and ruffed grouse are seed or grain eaters (granivores) much of the year, but they consume large amounts of insects (insectivores) during the reproductive season to meet their high protein requirements during this season.

Food availability to a predator means prey availability. Predators generally do not experience problems with diet quality because most animal matter is nutritionally complete and easy to digest. Even though carnivores expend a large amount of energy in searching for, chasing, capturing, and killing their food, this extra expenditure of energy is offset by the higher nutrient concentration found in animal matter.

Herbivores or plant eaters may become nutritionally stressed by a lack or shortage of food (quantity) or by a lack of highly nutritious food (quality). For example, in years when acorns are abundant, white-tailed

## Foods are classified as:

- **Preferred** if they are more abundant in an animal's diet compared to its abundance in the field;
- **Staple** if they are eaten on a regular basis and meet the nutritional needs of the animal (an animal's second choice);
- **Emergency** if they are eaten to fulfill short-term nutritional needs; and
- **Stuffers** if they are eaten because there is nothing else to eat.

deer are healthier because much of their diet consists of high energy acorns. During years when acorn crops are not very good, deer still have plenty of food to eat (tree twigs, grass, etc.), but they may become nutritionally stressed because these plants do not contain as much energy as acorns. Herbivores do not feed randomly in the environment, but show definite feeding patterns. These patterns are called food preferences (ranking a food according to how much is found in the diet in relationship to how much is found in the environment). This ratio of utilization over availability is a good indication of wildlife food preferences.

Everyone can appreciate that food is necessary for wildlife, but few landowners understand the difference between starvation and malnutrition. This is related to our perception that food appears to be available, yet food-related problems begin appearing in wildlife populations. Wild animals die from starvation because they do not get enough food to survive (a lack of food quantity). Carnivores typically die because they cannot catch enough to eat. If something has happened to reduce or eliminate rabbit or small mammal populations in an area, a red fox living in that region may starve.

Animals die from malnutrition because they cannot find food that meets their nutritional needs (a lack of food quality). Plant eaters sometimes suffer because of malnutrition. Deer in South Carolina usually do not die because they cannot find enough to eat. Their overall health deteriorates or they may perish because what they eat is either not nutritious enough to maintain their bodies or not able to meet the demands put on them by reproduction or mating.

Although the woods and fields may look green and be covered with lush plants, this does not mean deer and other herbivores have adequate food. A key to managing food for herbivores becomes one of matching the animals' food habits and needs with what the land can provide.

Winter malnutrition can adversely affect the next generation of young animals. Young, growing animals require more protein than adults. While milk supplies the protein needed by newly-born mammals, young carnivores often supplement the demand for protein with meat. For young herbivores, an adequate supply of milk is a necessity.

In white-tailed deer, the nutrient level in milk remains the same regardless of the doe's condition. However, the quantity of milk produced declines with malnutrition. Fawns born to does that struggled through a difficult winter may have little or no milk available to them, and may die.

Landowners and managers need to be especially aware of the problem of malnutrition. How landowners manage plant communities influences the likelihood of malnutrition for the animals in the area.

Eliminating plants with high nutritional value can have just as devastating an impact on an animal population as shooting them with a gun. Conversely, a landowner who manages land so that certain types of plants and plant communities flourish, or who plants high quality vegetation for animals (food plots), can improve the health, quality, and abundance of local wildlife populations.

Supplemental feeding of wildlife is not often economically feasible, so management efforts should concentrate on preventing nutritional problems before they occur. The best way to prevent nutritional problems is to provide high-quality natural foods. This is accomplished by managing the habitat.

## Water Requirements

Animals require water for several reasons: digestion and metabolism, reducing body temperature, and removal of metabolic wastes. Most wildlife can survive for weeks without food but only days without water. The supply of free-standing water in South Carolina is usually not a major concern. Springs, creeks, farm ponds, and other water sources provide adequate standing water for most species of wildlife.

Wildlife can also obtain water through a diet of green plants, from dew on leaves, or as a byproduct of the body breaking down fat and starches. Water requirements of animals vary, and sometimes the importance of free-standing water is over-estimated. However, the availability of properly distributed standing water usually enhances a wildlife population.

Growth, size, reproduction, and general body condition usually benefit from optimum water supplies. If water is lacking, a rule of thumb would be to provide permanent water sources every ½ mile.

When a wildlife species does require drinking water, its habitat must include a permanent water source, or the animal must move to areas with water during dry weather.

Wild animals will not inhabit areas too far from water, even if food and cover are abundant. Even though South Carolina's wildlife typically do not have problems with water availability, they do have problems with undisturbed access to water. Free-roaming dogs can create enough disturbance (such as chasing deer or other wildlife) to cause animals to abandon a watering area and search for a more secluded place to drink. As a final note, lack of rainfall indirectly affects wildlife by reducing the quantity and quality of available wildlife food plants.

## Space and Home Range Requirements

Each wildlife species requires a certain amount of space to move about, avoid or escape potential predators, locate a mate, obtain sufficient food and water for survival, and rest. This space is often referred to as the home range of an animal. Space requirements are behavioral and social responses that have taken hundreds of years to develop, ensuring an animal's well-being.

Wildlife space requirements vary by species, but generally, the amount of space required is determined by the quantity and quality of food, cover, and water (habitat) found in an area. Other factors affecting space needs of wildlife include:

- how large the animal is (larger animals require more space),
- the animal's dietary preferences (carnivores generally require more space than herbivores), and
- how well the animal can withstand crowded conditions.

Space requirements (as a function of habitat quantity and quality) essentially determine the carrying capacity of the site for wildlife. Often you can increase the carrying capacity of an area to support wildlife by increasing the quantity and quality of the habitat components. A long-term increase in a population can only be accomplished by increasing the habitat's carrying capacity.

## Additional Considerations

Knowing what animals need and trying to meet those needs is only half the battle for landowners who are interested in promoting wildlife on their property. Simply having considerable amounts of food, cover, or water does not ensure abundant wildlife.

Within any area, large quantities of potential food, water, or cover may be unused because they are too far apart in relation to the customary travels of the animals in an area. An animal could travel a long distance

to find water if necessary, but it would do little good if the animal was eaten by a predator along the way. Properly arranging the habitat's components is important to ensure that each component benefits wildlife. Accomplishing this goal requires an understanding of edge, interspersed, vertical layering, headquarters, and travel corridors.

Wildlife requirements for food, cover, and water vary according to:

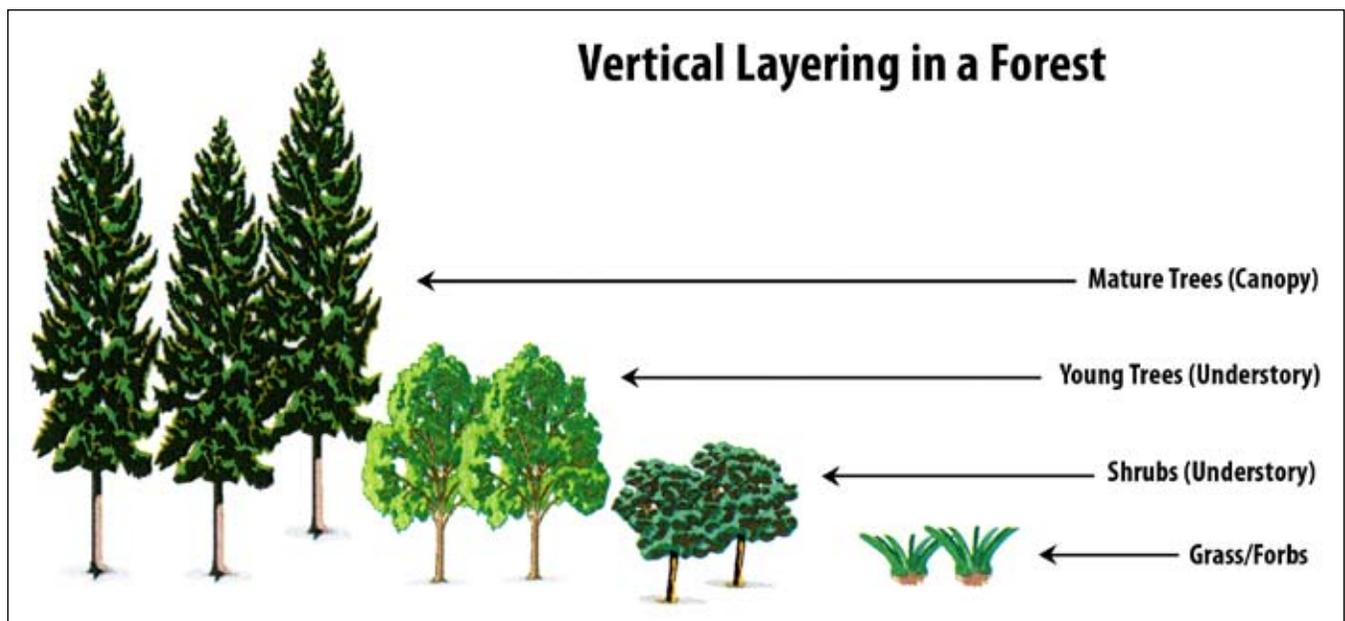
- wildlife species,
- age and sex,
- physiological condition (gestation, lactation, antler growth, etc.),
- time of year, and
- geographic location.

In addition, most resident wildlife (wildlife that do not migrate or travel large distances) rarely travel more than  $\frac{1}{4}$  to  $\frac{1}{2}$  mile from the place where they were born.

Because of these differences, the chances of meeting all the habitat requirements of various wildlife species are improved if you mix up or arrange each habitat component (food, cover, water) in a 160 - to 320-acre block. This mixing or arranging is called interspersed or horizontal arrangement. Stated another way, interspersed is the intermixing of different habitat types (forests, pastures, cropland, etc.) or plant communities on a given tract of land.

Think of it as a puzzle. All the pieces of the puzzle must be present and in the proper order for the puzzle to be complete. The greater the mixing of habitat types of an area, the greater the interspersed. This is important because many species of wildlife have a tendency to be more abundant in areas with high interspersed.

Within a forest community, how the plants grow in different layers is also an important type of arrangement called vertical layering. This is important because some wildlife species may use the ground layer



vegetation (herbaceous) for food, but also need the tallest layer (tree canopy) for shelter.

The middle layer between the tree canopy and herbaceous layer is comprised of shrubs (shrub layer). Every mature forest community has different vertical layering. Some may have a variety of layers comprised of grasses, broadleaf weeds (forbs), shrubs, small trees, and large trees; whereas, others may only have one distinct layer of tall trees. The latter would provide fewer habitats for wildlife compared to the forest stand with a variety of layers. The boundary where 2 or more different plant communities or successional stages (such as where a forest meets a pasture or cropland) meet is called edge. Sometimes there is an abrupt change between plant communities. Other times there is no sharp or distinct difference, but only a gradual change from one plant community to another. Edge is a mixture of both plant communities or successional stages in places where the gradual transition occurs. Gradual edges with strong vertical layering share characteristics of both plant communities; therefore, wildlife species can find a greater selection of food and cover necessary to meet their requirements in these areas.

Headquarters (often called covert or prime habitat cover) are points where more than three vegetation or habitat types meet. Headquarters are very attractive to wildlife because they provide a greater variety of habitat components in a small area. Management plans should

encourage a large number of headquarters since these areas provide many of the needs of wildlife.

Large amounts of edge and highly interspersed landscapes are not beneficial for all wildlife species. Some wildlife species need unbroken areas in a certain successional stage to provide some or all of their habitat requirements. For example, some songbird species (interior forest species) need unbroken tracts of mature forest to meet their habitat requirements.

Landowners who control large sections of land should consider trying to create a balance of edge with blocks of unbroken forest if they are trying to attract a diversity of wildlife species.

There is a simple way to measure the amount of edge and interspersed on a tract of land. Obtain an aerial photograph of the property from the USDA Farm Services Agency (used later to serve as a planning document). Draw two imaginary lines connecting each corner of the property boundary. Count the number of times the habitat changes along each line. Next add these two numbers together to get an interspersed index value. The higher the value, the better it is for quail, rabbits, and other wildlife species that like areas with high interspersed.

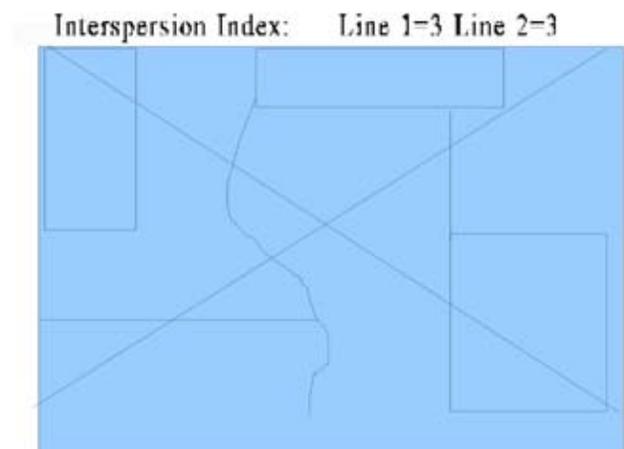
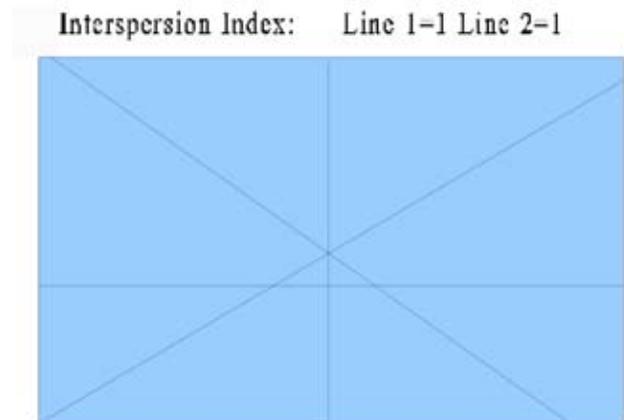
You can also circle each point where three vegetation types occur to obtain information on how many headquarters areas are on the property.



**Headquarters (prime habitat cover)**



A 160-acre farm broken up into smaller areas to create more interspersed.



An interspersed index.