The Maryland Envirothon

Wildlife Management Concepts

Before an individual can evaluate wildlife habitat and make management recommendations, some basic concepts about habitat and its relation to different wildlife species should be understood.

Wildlife management as with most natural resource fields, are both arts and sciences that deal with complex interactions among many possible variables.

Concept #1
Habitat Requirements:

Wildlife has life requirements that must be supplied by the habitat to insure their well being. These are known as habitat requirements. The four basic habitat requirements are food, water cover (shelter) and space. Each species has its own set of specific requirements. For example, the gray squirrel uses acorns for food while the woodpecker eats insects. Mallards use thick grass and forb cover for nesting, while thrashers nest in shrubs. Habitat requirements for wildlife change during the seasons of the year. The food they eat in the winter may be much different than what is eaten in the summer .The cover they need for nesting may be much different than the cover needed to survive a winter storm.

Concept #2
Featured Species:

There are two basic goals in wildlife habitat management. One is to provide the best habitat possible for specific (featured) wildlife species. The other, which is explained later under the concept species richness, is to provide habitat for as many different wildlife species as possible in an area.

When evaluating habitat for featured species, one must first decide which species are to be favored. This can be done in several ways. Landowners may have certain objectives for specific species, or, the general public may have concerns about particular game or endangered species. Once the species are selected identify the habitat requirements for each species and evaluate the capability of the environment to provide the requirements. If the area is unable to supply or only partially provides the necessary habitat requirements, management practices may be used to improve the areas ability in supplying needed requirements.

It is usually best to select management practices that provide the requirements that are in the shortest supply. For instance, if a species requires trees for cover with water nearby, and the

habitat you are evaluating has plenty of trees but no water, a management practice that supplies water will improve the habitat more effectively than planting trees.

When determining which management practices to apply, remember, management practices that improve habitat for some wildlife species may be detrimental to other wildlife species. It is impossible to manage habitat for anyone species without influencing other species in some manner.

Concept #3
Plant Succession and Its Effect on Wildlife:

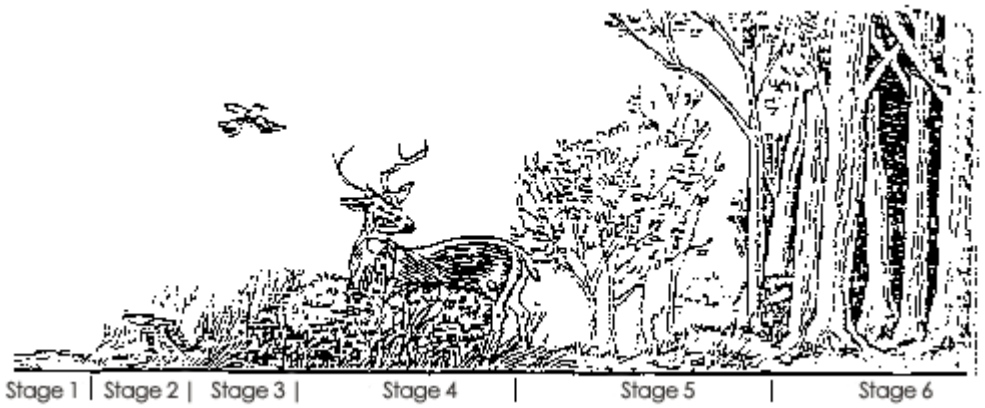
Vegetation and water are the basis of habitat management. Every acre of soil and water has a definite sequence in plant cover that occurs over time. The different stages of this sequence are called successional stages. We can usually predict the type of vegetation that will occur in each state until a final or "climax" state is reached. When not disturbed, the climax vegetation is stable and will remain the same for long periods of time. If humans or nature disturbs the soil or water level, succession may be "set back" and the cycle will continue forward from the new starting point.

Areas in different stages of plant succession are often referred to as areas with different vegetation types or habitat types. In general, the stages of plant succession that occur on land are as follows:

1.) Bare ground;
2.) Annual forbs and/or grasses;
3.) Perennial forbs and grasses;
4.) Shrubs;
5.) Young woodland or trees;
6.) Mature woodland or trees.

In some regions natural factors -such as the soil or climate will prevent succession from proceeding past a certain stage. For instance, in the short-grass prairie region, lack of precipitation often prevents succession from preceding past stage 3. In this case, stage 3 would be considered the climax stage.

A single step in this succession may take weeks, months, years, or even centuries depending on a variety of natural and human-caused factors. If vegetation is disturbed, succession will revert back to an earlier stage and begin again. Disturbance can be caused by natural factors such as insect or disease outbreaks, tornadoes, hurricanes, avalanches, or naturally occurring fires.



However, succession is more frequently altered by humans with plowing (agriculture), burning, cutting of forests, grazing, and clearing shrubby areas, which may in many cases mimic natural disturbances.

Nature never gives up. Even abandoned concrete parking lots are eventually taken over by plants. Plants first grow in the cracks and around the edges, then if left alone a concrete parking lot will eventually become "habitat" for some wildlife species.

Concept #4:
Arrangement and Interspersion:

An important concept in wildlife habitat management is how areas in different successional stages or vegetation types are arranged in relation to each other. This type of relationship is often referred to as horizontal arrangement.

Many wildlife species need areas in different successional stages to provide all of their habitat requirements. T o be of value the different areas need to be within a distance of each other that can be traveled safely by wildlife. Some species can have all of their habitat requirements provided by only one successional stage. The mixing of areas with different successional stages is called interspersion. Usually areas with high interspersion support a wide variety of wildlife. A way to measure interspersion is explained later.

Concept #5
Edges and Contrast:

The boundary where two or more different types of vegetation or successional stages meet is called edge. Sometimes there is an abrupt change were one type of vegetation stops and another begins. Or, it can be less distinct with a gradual transition from one stage to another. In places where a gradual change occurs an edge looks a little like both successional stages or vegetation types. Where abrupt changes occur, the edge is

narrow. Edges attract many different wildlife species because the variety of food, cover, and other habitat requirements are arranged close together.

Edges produced when successional stages have extremely different types of vegetation are defined as having high contrast.

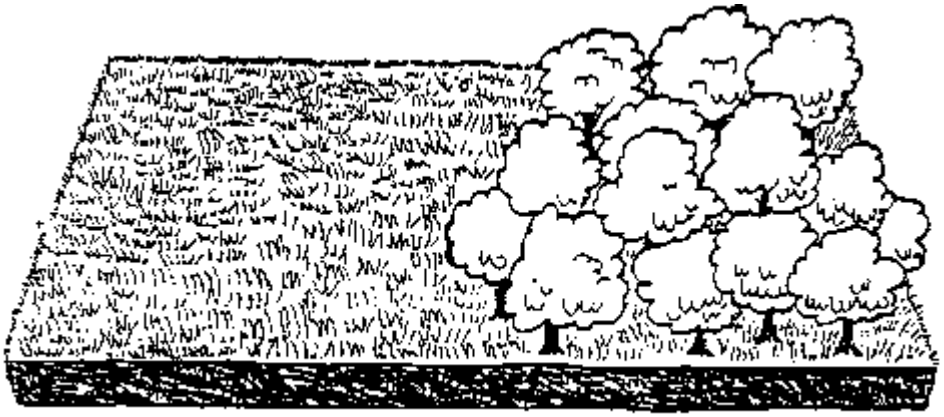


Fig 1. Abrupt edge with high contrast.

There is high contrast where an area in stage 2 (grass and forbs) meets an area in stage 6 (tall trees) of plant succession.

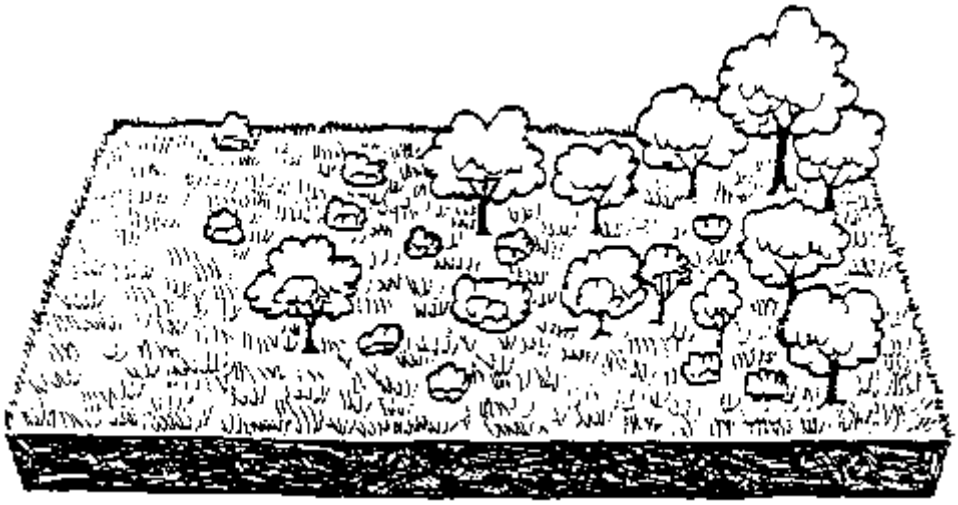


Fig 2. Gradual edge with low contrast

A boundary between stages 2 and 3 has low contrast. Generally, edges with high contrast have more species of wildlife than edges with low contrast.

Concept #6:
Amount of Edge and Size of Areas in One Successional Stage:

Edge is not beneficial for all wildlife. Some wildlife species need unbroken areas in a certain successional stage to provide some of all of their habitat requirements. A balance of edge with blocks of vegetation in one successional stage is desirable. Areas with unbroken blocks that are 50 to 100 acres in size are considered to have a good balance of edge and unbroken blocks.

Concept #7:
Vertical Structure (Layering):

Vegetation can be classified by how it grows. Grasses and forbs generally grow close to the ground and make up the ground layer. The next highest level is usually comprised of shrubs and is called the shrub layer. The tallest strata is made by trees and is called the tree canopy.

How vegetation in different layers are arranged in relation to each other is important to many wildlife species. For instance, some species may require herbaceous layer of food but also need a tree canopy for cover. Not all areas in a single stage of succession are alike. One woodland in stage 6 of succession may have a variety of layers comprised of grasses, forbs, shrubs, small trees and large trees, while another stage 6 woodland may have only one distinct layer of tall trees.

Concept #8:
Corridors:

Corridors are areas of continuous habitat that permit animals to travel securely from one habitat to another. As environments become more broken up (fragmented) from construction or roads, parking lots, urban areas, harvest of timber, clearing for agriculture, etc., small islands of vegetation remain.

Corridors allow animals to find and use the islands of suitable habitat. For example, in an urban area, relatively unbroken corridors found along riparian areas and ravines allow wildlife to move into parks, and other suitable habitats. Preservation, maintenance, and creation of un-broken corridors are very important in wildlife habitat management.

Concept #9:
Species Richness:

Species richness is defined as the number of different kinds of wildlife species that are found in an area. As discussed earlier, one goal in wildlife habitat management may be to provide habitat for as many species as possible.

Lands that are high in species richness usually have many of the following characteristics:

1. A mixture of areas in different successional stages
2. A balance of edges with unbroken blocks of vegetation in one successional stage
3. Unbroken block sizes of 50 to 100 acres
4. Edges with high contrast
5. A wide variety of vegetation layers present within each area containing only one successional stage

These characteristics can be used to estimate the relative number of different wildlife species that may be present in separate areas. They also may be used to identify management practices that could increase species richness. For example, consider an area that is in stage 5 of plant succession. It has been proposed to harvest the trees by clear-cutting 1/2 of the area. Clear-cuts in 50 acre blocks that leave adjacent unharvested blocks of at least 50 acres in size may be desirable to increase local species. On the other hand, if the area to be cut is the last stage 5 forest in this area of the landscape, it may not be desirable to increase species richness at the local level. Species richness should be considered at many scales or levels.

Strips or corridors of trees that link the larger unharvested blocks together could be left un-cut (see Concept #5 -Corridors).

Remember, when managing habitat for species richness it is often not possible to provide the best habitat for featured species. Instead of providing the best habitat possible for a few species, the goal is to provide some habitat for as many species as possible.

Concept #10
Migration:

Some wildlife travel during different seasons of the year and times of day. This requires that necessary habitats are available along the route. The movements are called migration. Migration distances may be short or very long depending on the species. For many species, corridors that provide areas for safe travel are very important during migration.

Here are three examples:

1.) Deep snow covers the vegetation used for food by mule deer and wapiti (elk) during the winter in the sub-alpine zone. To find food they travel to lower elevations (Intermountain Foothills or Intermountain Sagebrush Regions) where the snow is not as deep.

2.) Ducks that nest in the northern United States must fly south to warmer climates to find food sources and wetlands that are not frozen during winter.

3.) Many colorful songbirds such as Baltimore Orioles and the scarlet tanager nest in U .S. forests, but migrate to Central and South America and the Caribbean to spend the winter.

Concept #11:
Carrying Capacity:

There is a limit to how many animals the habitat can support. That limit is called the habitat's “carrying capacity.” The quantity and quality food, water, cover, and space determines the carrying capacity. If one basic requirement is in short supply, the carrying capacity is lowered. By adding the missing ingredient, a manager can increase the habitat's carrying capacity.

Carrying capacity varies from year to year and from season to season. It is usually greatest from late spring through fall. This is when most young are born and grow. With the coming of winter or summer drought, food and cover gradually diminish as does the habitat's carrying capacity.

More animals are produced each year than will survive to the next. When this happens, all extra or surplus animals will be lost in an existing habitat. Young wildlife and animals in poor health experience the highest death rates. The obvious way to increase the number of animals is to increase the number born and reduce the number that die. However, if the habitat cannot support any more animals, these efforts will fail.

A long-term increase in population can only be accomplished by increasing the habitat's carrying capacity.