THE AXE, PLOW, COW, FIRE AND GUN FOR MANAGING QUAIL HABITAT

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Abstract: Quail habitat consists of plants - the right kinds of plants in the right amounts, distributed evenly across the landscape. The manager must first know what great quail habitat looks like. Then he must be willing and able to transform unsuitable habitat into suitable habitat using the basic tools outlined below. Dr. Dale Rollins has said it clearly: "habitat management consists of two things - know your plants; and know how to manipulate them". Become a student of plants and how they respond to various management and you can become a great quail manager.

In 1932, the father of modern wildlife management, Aldo Leopold stated the central thesis of game management. It applies equally well to bobwhite quail as it does to elk, elephants or songbirds. This time-honored, simple thesis goes like this: "game can be restored by the creative use of the same tools which have heretofore destroyed it - axe, plow, cow, fire and gun". Leopold acknowledged that sometimes, these forces were unintentionally applied in such as way that the land produced large crops of game from time to time. He went on to say that wildlife management is the ***intentional*** and ***purposeful*** alignment of these forces so that land produces an abundance of wildlife on a regular basis.

A. S. Jackson, famed quail biologist with Texas Parks and Wildlife Department noted that bobwhites and their habitat are often "the result of indifference rather than purpose on the part of the land manager". Jackson agreed with Leopold that "We will have no conservation worthy of the name until food and cover for wildlife is deliberately instead of accidentally provided for". Let us look at each of these tools and how they can be deliberately applied for the benefit of quail habitat.

Axe

The axe represents our methods of controlling woody vegetation, especially what we often call "brush". The actual implements may be the rootplow, the bulldozer, the hydraulic shear, the roller chopper, the hydro-axe, the chain saw, or the spray plane, or backpack sprayer used to apply herbicides. Any of these tools can be used either to favor or to harm quail habitat. The way in which they are used determines their impact on quail habitat. The four primary principles to remember when "swinging the axe" are: extent, pattern, selectivity and method.

The extent of brush control done in a pasture can have a dramatic effect on bobwhite habitat. Quail certainly don't need as much cover as deer, but they definitely need the right amount of woody cover. Most experts would say that about 10% brush (give or take) is plenty for quail if it is the right kind of brush. This 10% could be met by being scattered randomly across a pasture in a savanna appearance or it could be that 90% of the land would be an open "grassland" and the other 10% in dense brush. For a pasture that is choked in dense mesquite or mixed brush, the control of 90% of the acreage done in the right way could favor quail habitat as well as improve grazing production.

Quail can easily tolerate much more than 10% woody cover. If the landowner wishes to have deer habitat as well as quail habitat, then he may wish to leave 35 to 50% of the land in woody cover as a compromise.

The pattern of brush control relates to the placement of openings relative to where the brush is left. A pattern which leaves the brush intermixed within areas of control is best for quail. Theoretically if 10% of the land were evenly retained in woody cover, then there would be four clumps of brush each about 35 feet across on each acre. This might be difficult to achieve when doing brush control, although it would create an ideal arrangement of woody cover. It would be much easier to leave a 50 foot strip of dense brush every 500 feet. If brush density were only moderate, then the leaving of a 100 foot strip every 500 feet may still give the net effect of 10% woody cover. On the opposite extreme, leaving a 100 acre block of dense brush while doing 900 acres of brush control would achieve a 10% brush cover, but would provide poor quail habitat since 90% of the habitat would have no woody cover at all.

Selectivity of brush control refers to the recognition of desirable kinds of woody cover and leaving them, while removing the less desirable kinds of brush. Leaving lotebush, sumac, plum, bumelia, hackberry or other desirable shrubs, while removing mesquite has become the norm for progressive quail managers.

The method of brush control used can affect quail habitat. Mechanical methods which usually disturb the soil have the added bonus of stimulating quail food plants. Chemical methods usually reduce the production of quail food plants.

Plow

The plow represents the tilling of soil and planting of seed. Conversion of native rangeland to cropland has destroyed millions of acres of quail habitat. However, the plow can also be used to greatly increase the production of quail food if it is properly done. In quail habitat management, the plow has two primary applications - disking and food plots.

Disking within native pastures is intended to kill grass and replace it with weeds or forbs. Quail food is grown at the expense of grazing. This practice is one of the best, yet least utilized practices to improve quail habitat. Using a disk or other type of plow, strips are tilled, to stimulate the germination and growth of native weed seed. Quail food plants that will often be stimulated by disking include: croton, snow-on-the-mountain, spurges, buffalobur, pricklypoppy, sunflower, ragweed, broomweed, pigweed, lambsquarter, annual panicums and Hall's panicum. Disked strips should be close to woody cover to maximize their usefulness. Strip width is usually one to four passes of the plow and should be done on 5% or more of the pasture. This would mean, for example, a 20 foot wide strip every 400 feet.

Strips should be re-plowed when the production of weeds declines and they start to revert back to grass. Disking a portion of the strips each year will keep the rotation going. Disking some strips in September or October and others in February or March will maximize the diversity of different kinds of weeds, both cool season and warm season. In addition to the production of good quail seed, these areas will often produce large numbers of insects. Disking may not be a good idea if ground disturbance tends to stimulate such undesirable plants as bitterweed or grass bur.

Food plots can also increase the production of quail food. Food plots should not be considered a reliable tool in areas that receive less than 25 inches of average rainfall. Food plots require considerably more time, effort and money than disking and are generally more prone to failure. Nevertheless, food plots continue to be a popular practice in quail management and make the landowner and the hunter feel like they are doing something positive for quail. Commonly used species for quail food plots are sorghums (grain, WGF, redtop, hegari, Egyptian wheat, African millet) millets (browntop, proso, German, pearl, Texas panicum) wheat, sunflower and cowpea. Less common species would include sesame, guar and plants which attract insects such as kochia or alfalfa. Food plots should be fenced from livestock and "farmed". Throwing out seed on a poorly prepared seedbed will usually result in failure. At worst, a failed food plot still provides some benefit and will stimulate some native weeds just like disking.

Although the plow is most commonly used as a tool to provide additional food for quail, it can also be used to add cover. The late Val Lehman found that planting rows of pricklypear by transplanting the pads in plowed land greatly benefited quail and other wildlife on the King Ranch. Charles Coffman, Biologist with the Natural Resources Conservation Service in Lubbock has developed and refined a procedure for establishing bare root shrubs without irrigation using commercial weed barriers.

Cow

According to Dr. Fred Guthery, "no habitat management tool is more powerful than the cow. ..she manages millions of acres of bobwhite cover. She can be harmful or helpful depending on how she's applied". The bobwhite must have the right amount of lightly grazed bunchgrass clumps *left over from the previous year* for nest concealment if good reproduction is to occur. Good reproduction is the key to good quail populations. Without good nesting cover, good reproduction is not likely to occur. A good clump of grass in the eyes of a nesting bobwhite is about the size of a basketball. Guthry recommends that a minimum of 250 such nest clumps per acre are needed for good nesting cover. This would be about one such clump every 13 feet across the entire pasture. With this abundance of good clumps, nest predators are much less likely to be able to find and destroy nests. Across much of the rangeland of Texas, there are few such clumps remaining at the beginning of the nesting season. Obviously the cow plays a major role in the abundance of nesting cover.

There can also be too much grass for quail. Too much thick grass impedes movement of quail and reduces the food supply by choking out good quail food plants. Bobwhites need to have a liberal amount of bare ground scattered throughout their habitat. The cow also can be used to keep ground cover open enough for quail movement and to allow growth of weeds.

The right amount of grazing to favor quail habitat is site specific, but a few general principles are helpful. In areas that receive more than 30 inches of rain, the accumulation of too much grass is more likely to hurt quail habitat. Therefore, grazing must be heavier. In semi-arid portions of bobwhite range where grasses do not tend to grow tall and thick, grazing must be lighter to insure adequate nest cover. Even moderate grazing in these areas can limit nest cover (and increase the likelihood of nest predation). There are many situations where pastures need to be completely rested from grazing for one or two years to develop an improved grass cover. Renowned quail authority, Herbert Stoddard who investigated quail and quail habitat in the southeast, said "In general ... the smaller number of domestic animals at large over the quail ranges, the better for the quail ...".

Another important aspect of grazing management is the kind of grazing animal (cattle, sheep, goat). The grazing of sheep and/or goats can have a dramatic effect on the quail food supply. Sheep and goats are more selective grazers than cattle and can pick those plants with higher nutrition. Many of the plants selected by sheep and goats are also good quail food plants. In areas where sheep and goats have historically been grazed there is often a notable lack of good quail food plants. Stoddard, who often stated his beliefs rather bluntly, said "Neither sheep nor goats should be tolerated on lands held primarily for quail shooting, for sheep pasture, next to cotton land, is about the worst quail habitat known". What he undoubtedly meant was when sheep or goats are overstocked, they can destroy quail habitat. Sheep and goats can be grazed in a manner to retain quail habitat, but the trade-offs need to be understood.

The kind of grazing system can also be an important factor in using livestock to manage quail habitat. Many ranchers practice what is called continuous grazing where there are livestock in all pastures all of the time. This practice usually leads to a gradual deterioration of pasture conditions and can hurt quail habitat. Cattle are selective grazers and will often choose to graze and re-graze the taller grasses in preference to the shorter grasses. When this happens over a long period, the better nesting clumps such as little bluestem, silver bluestem, sideoats grama will often be grazed too short for use as a quail nest. These and other taller grasses are often completely removed from a pasture subjected to continuous grazing.

The alternative to continuous grazing is often called a grazing rotation or a grazing system. It involves the periodic and regular removal of livestock from a pasture for a period of time, usually three to six months. Lehman said "Little if any southwestern rangeland will support a desirable canopy of tallgrass with satisfying regularity unless it is periodically rested from grazing". This is often achieved by grouping livestock into a single herd and rotating them among three or more pastures. For example, a 4 pasture - 1 herd grazing system would always have three pastures resting while one was being grazed. During these rest periods, taller grasses and desirable forbs get a chance to grow to their full size and make a seed crop. When a pasture is grazed by the herd, the manager determines when they have grazed enough, and they are moved to the next pasture. If improved nest cover is needed, the manager would move the herd when many of the taller bunch grasses still had 10 inches of height. If grass were too thick for weed growth and quail movement, the manager would graze for a longer period.

Fire

The fourth tool mentioned by Leopold for the management of habitat is fire. The intentional, planned use of fire is called prescribed burning, where the variables of humidity, temperature, wind and fuel are all carefully considered prior to starting the fire. It is becoming a more common practice in quail habitat although it is only rarely recommended as a benefit for quail. Normally, fire is used primarily to kill or injure certain woody plants such as pricklypear or cedar, not specifically to improve quail habitat. Even so, fire can be applied in such a way that it carries out its primary objective while at the same time does not do serious harm to quail habitat.

It is easy to visualize a fire removing nest cover and burning down prime woody cover for quail. Although these will grow back with time, the serious quail manager will not want to loose quail production in the meantime. It is more common within quail habitat for a prescribed fire to burn in a patchy manner, that is, leaving many odd areas unburned within a pasture. This is what the quail manager

desires. He often will intentionally choose to burn on a day with higher humidity, lower temperature or less wind in order to get a "cooler" fire. Or he may employ a different burning technique such a backfire to keep the fire less intense. He sacrifices the full impact of the fire in order to maintain adequate woody cover and some nest cover.

In situations where the grass cover is so thick that a patchy burn is not possible, the manager will need to create fireguards around certain key areas that need to be protected from the fire.

Fire has some direct benefits for quail if there is some woody cover and grasses left interspersed within the burned area. Burned areas provide good feeding areas since quail can more easily search for seed. These areas are often rich in insects the first year after a burn. Fire also tends to stimulate the germination of some desirable forbs, especially legumes and the seed production of plants is often greater after a burn in response to the increased availability of plant nutrients.

The improper use of fire can have devastating effects on quail habitat for several years, so caution must be used. Experienced burners should be used to help plan and carry out any burning.

Gun

The gun as a tool in habitat management is rarely mentioned when discussing quail. The gun is a necessary tool in the management of such animals as deer and elk which tend to overpopulate and harm their habitat. Quail do not overpopulate nor cause harm to their habitat, therefore control of excess quail by hunting is not required. However, in parts of Texas, excessive deer numbers may have a detrimental effect on quail habitat. Deer eat many of the same forbs that quail use. Habitat that has too many deer often has a lack of good quail plants and usually has few quail. An increased harvest of deer on these areas will not only improve deer habitat and deer quality, but may also allow a better food supply for quail. By contrast, areas with light to moderate deer populations often have the best quail production.

Innovative Habitat Techniques

Once the basic use of these tools is learned, there is the opportunity for more innovative use which is only learned by experience. Several examples will be described.

- Disking can be done both to stimulate quail food and to provide needed fireguards. The planting of disked fireguards to wheat and sunflower will create a green firebreak and a food plot at the same time.

- Where the structure of woody cover is not right for quail, small trees can be half cut and bent over to provide excellent low cover. The same effect could be crudely obtained with the proper use of heavy equipment.

- In lieu of food plots or supplemental feeding, whole milo can be fed to livestock. Much of this seed will pass through unharmed and be deposited across the pasture. Some seed will sprout, while others will be available for quail to scratch out.

- Fire and grazing can be used in combination to create weed plots. Small areas (one to five acres) can be burned within larger pastures. Cattle are drawn to the burned areas where they will concentrate and graze heavily. The net result is often a temporary weed patch.

- The feeding and supplementing of livestock with hay, protein, minerals and salt can be done in select locations to promote trampling, heavy grazing and manure buildup which will often stimulate weeds. The locations can be moved as needed to create desired results.

- In larger pastures with multiple water locations, one or more locations can be fenced to force cattle to graze less in some areas and more in other areas. This could be used to favor nest cover or to open up dense grass habitat as needed.

Conclusion

It is not enough to recognize that these are good tools which can be used to improve quail habitat. Quail habitat must be evaluated, not just in a general way, but on each and every acre of a farm or ranch. The weak link or links in habitat must be identified, and a plan developed to overcome that weak link. Those tools that can be best used to overcome habitat weakness are chosen. Some habitats can be brought to their full potential by the correct application of grazing alone. The axe, plow, fire and gun may not be needed. Other habitats may need the proper

application of several tools simultaneously.

Quail habitat management involves setting priorities and making decisions regarding land use. A land manager must decide what's more important to him - quail, deer, livestock, hay, crops, etc. If quail are most important, he may have to sacrifice both cattle and deer production. If deer are most important, he will sacrifice both quail and cattle production in order to provide adequate cover and browse for deer. If cattle are most important, both quail and deer habitat will suffer. In order to favor one kind of animal over another, we will have to favor one kind of plant over another. The tools of brush control, tillage, grazing, fire and in some cases hunting, can be used to favor the kinds of plants and therefore the kinds of animals that the manager desires.

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