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# WORKSHOP SUMMARY: DEVELOPING NORTHERN BOBWHITE MANAGEMENT PLANS—A HABITAT-BASED FRAMEWORK

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## ABSTRACT

Successful northern bobwhite (*Colinus virginianus*) management is a complex and often expensive process that requires careful planning and a well-designed habitat management program. Written management plans are often used by landowners who wish to maximize quail populations on their property. Although management plans are as varied as the individuals who write them, a successful plan should: (1) be chronologically based, (2) contain an associated budget, and; (3) combine the objectives of the landowner with the limitations and potential of the individual property. The goal of a management plan is to insure that habitat modifications proceed in a well-designed, cost-effective, and orderly fashion. Although this paper focuses on developing management plans for northern bobwhite, the concepts presented here can be used to develop management plans for other species of quails in the United States.

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## INTRODUCTION

The majority of land that is managed intensively for northern bobwhites is owned by private individuals. While the scientific literature is filled with an amazing array of detailed information about northern bobwhite life history and ecology, there is virtually no published information available on the process of quail management plan development. This is because publication of research findings often require that information about habitats and populations be processed as fragments suitable for statistical analysis. Furthermore, the majority of individuals involved with the day-to-day management of quail habitat are not inclined to submit their knowledge for publication in any scientific, or other format.

There is no standardized format for development of a quail management plan. Since the majority of management plans are developed by individuals, the formats used are as varied as the individuals who write them. Regardless of the format used, the goal of a plan is to insure that the complex, and often expensive, process of quail management, takes place according to a well-designed and orderly fashion. There are several key components that should be included in a management plan to provide usable information to a landowner. A properly-designed plan should be site-specific, chronologically based, and have an associated budget. Site specificity is one of the key ingredients in a well-designed plan and one which is often overlooked in broad-based management information. When a private landowner requests assistance with the development of a plan, they are not interested in obtaining general information on the life history and biology of the northern bobwhite. Instead, they are looking for site-specific information that will allow them to

achieve specific objectives, given economic limitations, and the potential of the land. For a management plan to be applied, it must discuss habitat modifications in a logical, chronologically based sequence that a landowner can understand. Approximate costs for various management items must be addressed in the plan. While costs vary from site-to-site, to suggest management strategies without discussing the approximate costs for these management items does not provide a landowner with sufficient information to make educated decisions. While a properly-designed plan should provide the basic framework for the successful development of a piece of property, it should also be flexible enough to take into consideration the vagaries of working with systems that are subject to fluctuations in precipitation, and numerous other abiotic and biotic factors that influence quail populations.

## MANAGEMENT PLAN COMPONENTS

As mentioned previously, no standard format exists for management plan development. The following sections describe the general format that I have used to develop management plans for private landowners. This format introduces a property, discusses the current limitations to quail production, develops strategies to offset these limitations, analyzes the costs of the proposed management strategies and develops a chronologically based work plan.

### The Introductory Section

In the introductory section of the plan, the size and location, along with the past uses of the property should be discussed briefly. The first step in the management plan process is to separate the property into its various habitat components, with the aid of an ae-

rial photograph, and create a map. The information on habitat and forest stand composition (such as number of acres in various habitat patches) should also be presented in tabular format. The current condition of the habitat, in combination with field surveys is then used to: (1) determine factors that could be limiting quail production and; (2) develop general strategies for removing these limitations.

If at all possible, the person developing a management plan should attempt to determine the status of the quail population prior to initiating any proposed habitat modifications. The initial status of the quail population can be used as a baseline to determine the long-term success of a management plan. Hunting records (e.g., covey finds per hour) are often maintained by landowners and can be used in lieu of an absolute population density estimate. If no hunting records are available, a simple covey map combined with a series of stimulated call counts (i.e., number of quail that call in response to a taped bobwhite call) can provide useful information to index current population abundance as a basis for judging future trends.

The objectives of the landowners should also be stated in the introduction. Often, the landowner does not have a precise objective. Typically, a landowner will only have general ideas concerning the future development of this property. It is the responsibility of the consultant to combine the general objectives of the landowner with the limitations and potential of the property and develop a precise, performance-based set of goals and objectives.

#### Soil and Site Limitations

It is essential to discuss current factors that are limiting quail production in a management plan, because these are the factors that must be overcome using various management strategies. Limitations can be broken into three major categories: soil, site, and financial.

#### Soil Limitations

The general soil type is one of most fundamental factors that must be considered in the development of a quail management plan. For the most part, soils cannot be changed through the management process. While we can alter soil fertility and acidity on a small scale, we cannot change the hydrological condition of a piece of property. Properties that are excessively wet, or extremely dry, have inherent, non-manageable factors that limit quail production. A realistic appraisal of these problems needs to be addressed in the plan. This is not to say that excessively wet or droughty properties cannot produce huntable populations of quail; however, the cost-to-benefit ratio of quail management is often lower on these areas than it is on sites where soil fertility and drainage is good to excellent.

#### Habitat-based Limitations

Habitat-based limitations are the inherent habitat factors that suppress populations of native wild quail.

These are the principal limitations that we hope to overcome through development of various management strategies. The current condition and distribution of the forest and open-land portions of a property play a critical role in determining the potential of the site to increase numbers of quail and the management costs required to accomplish this objective. A general rule of quail management states that if the property is largely forested, you need to incorporate openings (i.e., fields) and if the property is primarily composed of open ground, you need to incorporate forests. But how the open-land will be broken up and the forested land will be opened up are based in large part on the objectives of the owner, the potential of the property, and the limitations of the land as they relate to factors such as topography and soil fertility.

The current density of quail is one of the most critical habitat-based limitations that must be addressed in the development of a management plan. One of the fundamental questions that should be asked is: Are there a sufficient number of quail on the property that can potentially respond to management within a reasonable (2–4 years) amount of time? If there are not, is there the opportunity to legally relocate quail from other properties owned by the landowner? The capital and lost opportunity costs can be quite high in the initial phases of implementing a quail management plan; therefore, the cost-to-benefit ratio of proposed management practices must be taken into consideration with respect to the current density of quail. On properties that have low initial quail numbers and high hunting desires, pre-season releases of pen-raised quail may be required. The use or non-use of pen-raised birds should be discussed at this phase of plan development. The decision to use or not use releases of pen-raised quail should be left up to the landowner.

#### Financial Limitations

Financial limitations related to developing habitat that will increase wild quail production must be addressed in any management plan. A general rule of bobwhite management is that everything you do for quail is an economic tradeoff from other land use options. Knowing the comfort level of economic tradeoffs that an individual landowner is willing to accept is an essential part of developing a successful management plan. The level of economic tradeoffs the landowner is willing to accept will dictate the intensity of bobwhite management that can be undertaken.

#### Habitat Components and Management Practices

The section on Habitat Components and Management Practices is the portion of the plan where management strategies are developed to offset factors that limit wild quail. It is in this section of the management plan that we develop techniques to modify woodland and field conditions. Management strategies for the forested portions of the property should be developed on a stand-by-stand basis. The financial needs of the landowner should be taken into consideration when developing woodland modification techniques. Addi-

tionally, future stand regeneration and how it relates to quail management, should be discussed in this section of the plan. Whenever possible, you should stress integration of quail management with economic production from forestry and agricultural operations. Woodland modification techniques such as thinning, clear-cutting, burning, and creation of agricultural openings such as fields should be discussed. Adequate justification should be provided for any proposed timber reduction, or for long term regeneration plans.

The current condition of the open-land portion of the property should be discussed in this section and management strategies should be developed to increase the quail carrying capacity of these areas within the constraints set forth by the landowner. Sod-forming grasses (primarily Bermuda, fescue and bahia grasses) are a serious detriment to quail production throughout the Southeast. When modifying agricultural and fallow-field areas for quail it is absolutely imperative to eradicate these species before initiating any habitat modifications. Large amounts of money can be potentially wasted by not controlling these invasive species prior to incorporating habitat modifications. Open-land modification techniques, such as development of simple and/or complex hedgerows, breaking up large fields into smaller units, planting of pines in fallow-field areas, and incorporation of alternative food sources, should be addressed in this section. The past agricultural history of a property plays an important role in determining the future potential of the area and what management techniques will be used. Properties with a history of intensive farming are often devoid of native, weedy plants that are beneficial to quail. Conversely, non-intensively farmed agricultural fields often have a rich array of native seeds contained within the soil seed bank.

The use of food plots should be discussed in the management plan. Whether food plots are used on a property should be determined by the site-specific limitations of the property. The diversity and structure of a food plot is far more important to the life history of a quail than the actual agricultural plant grown. A diverse food plot should provide a year-round supply of both planted and native foods, areas for quail to forage on insects, summer fruit supplies, and mid-winter escape cover. A well-managed food plot should combine seasonal disking within the planted areas to encourage the production of native plants. Broad statements concerning the use of food plots cannot be made without determining the specific limitations of an individual property, and analyzing the type of food plots that will be utilized.

### Cover Management

The key to quail management is "structural diversity," not what you plant or how you plant it, but how the individual components of the habitat are arranged. Therefore, the proper distributions and types of cover are critically important to the development of a management plan. Since most woodland properties are maintained with periodic controlled burning, it is es-

sential to have an adequate distribution of firelines to maintain maximum diversity on the smallest scale that is economically and logistically feasible. If at all possible, a map of current and future firelines should be included in this section of the plan. The season that fire is applied, and how it relates to quail management, should be discussed with the landowner. On the majority of southeastern properties, a combination of cool and warm season fires should be used to maintain the proper landscape for maximum quail production. Alternative methods of maintaining vegetation, such as mowing, chopping and harrowing should also be discussed. The benefits and drawbacks of each of these cover management techniques should be addressed in relationship to the site-specific cover conditions of the property. If chemical (herbicide) control of hardwoods or other brush is required, the justification for this management and a description of the techniques to be used should be included in the plan.

### Miscellaneous Practices

In this section of the management plan I cover issues that do not warrant an entire section but are important to include in the plan. Among these are predator control, census techniques, planting techniques (such as what species require inoculations, what type of fertilizer to use, etc.), harvest management and record keeping. Record keeping is essential in the development of a management plan because it allows the consultant and the client to keep track of past success and failures. It also provides, over time, a management history for the property.

### Budgetary Considerations

As mentioned earlier, a plan without a budget does not provide the landowner with the information they need to make informed decisions. This is usually the part of a management plan that is most important to a landowner. Therefore cost estimates must be realistic and be as specific as possible. In determining a budget, there is another general rule of quail management that states, "everything takes longer and costs more." Costs should be broken into capital (one time costs) and annual operating expenses. Capital costs include items such as stumping, fireline construction, establishment of pines, herbicides, contract labor, liming and planting of perennials and reseeding annuals. Annual costs include feed, seed, fertilizer, annual herbicide applications and pen-raised quail if they are used. Costs should be presented in a professional and easily understood format.

### Chronological Work Plan

The work plan lists specific management activities that need to be completed for landowners to reach their desired objectives. Management activities should be stated in a logical, chronologically based sequence. Work items should be tied to the budget and if at all possible be listed on a monthly basis. If there are non-flexible management practices (such as pines being re-

leased via an herbicide application by a certain time or partridge pea being disked in a certain month) then these items should be stressed. All principal, year-round management activities should be listed within the work plan.

#### Appendices

In this portion of the plan you can include any supplemental information that may be needed by the landowner. The supplemental information may include published articles on census techniques, information on planting techniques, sources for various seeds and seedlings and if possible, local contract labor sources for stumping, pine planting, etc.

#### Management Map

No management plan is complete until there is a well-developed map or series of maps that show all existing and proposed habitat modifications. The map

is important to landowners so that they can visualize the proposed habitat changes discussed in the plan. All maps should include a definitive scale, a north orientation arrow, new and existing food plots, proposed habitat modifications (such as food plots, etc.) and proposed timber harvesting and regeneration areas.

#### Conclusion

A well-designed quail management plan can be a tremendous aid in the development of a property where the objective is to produce a huntable population of wild bobwhite quail. A properly-designed management plan insures that the complex process of quail management takes place in a logical and orderly fashion. Management plans should be site-specific, chronologically based, have an associated budget, and be flexible enough to deal with the changing objectives of landowners and the vagaries of working with mother nature.