Strategic plan for northern bobwhite restoration in Florida

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Strategic plan for northern bobwhite restoration in Florida

The Conceptual Plan for Northern Bobwhite Restoration in Florida (Appendix 1) provides a description of the problem of northern bobwhite (*Colinus virginianus*) declines in Florida, as well as a roadmap for further planning. In the "Strategic Plan for Bobwhite Restoration in Florida," overall goals and strategies to achieve those goals are outlined. However, instead of statewide quantitative goals, as first envisioned, a focal area approach is described. The basis of such an approach is that those areas throughout the state, that appear to have an adequate landscape of public and/or private lands suitable for restoration and management will be selected as focal areas. Then, as the process of selecting and developing these sites progresses, realistic goals can be established within the focal areas. Additionally, it is clear that because of dramatic changes taking place on the Florida landscape, long-term restoration goals are virtually impossible to project. Therefore, the plan recommends establishing goals in five-year segments with the latitude to make adjustments.

The overall goal is to identify areas in the state where large, landscape-scale habitat restoration is feasible and implement strategies to achieve sustainable and huntable bobwhite populations on those landscapes.

Due to the urgency of addressing the decline in bobwhites, there are several projects already under way to address problems associated with recovery. These projects are described, and in some cases, are already addressing objectives identified in the plan. The major emphasis throughout is on habitat restoration and management. The upland habitats favorable to bobwhites are the most biologically diverse upland habitats in the state. Therefore, it is clear that the outcome of restoring these habitats will have positive effects on many upland species, some of which are declining at a rate similar to bobwhites.

There are overall strategies described in the plan that are designed to achieve the necessary support from stakeholder groups and the general public. To achieve restoration it will be necessary to alter significant acreage within focal areas. Such an undertaking will require support from a broad spectrum of conservation and land management interests. Also, a state committee (State Bobwhite Committee) is recommended to achieve the oversight necessary to ensure all of the strategies outlined are pursued.

The section "Focusing on the Problem" has three goals. They are to 1) identify focal areas; 2) establish habitat restoration and bobwhite population objectives within focal areas; and 3) implement strategies to achieve restoration goals.

This plan is designed to be dynamic, and periodic updates are recommended. Furthermore, there should be no hesitation to alter or update the plan when it is apparent that such alteration would help achieve bobwhite restoration.

Strategic plan for bobwhite restoration in Florida

The 2003 Conceptual Plan for Northern Bobwhite Restoration in Florida (Appendix 1) provided the history, background and justification for this strategic plan. The major warning included in the earlier plan, as well as the National Bobwhite Conservation Initiative (NBCI), is that northern bobwhite (*Colinus virginianus*) populations have declined approximately 70% since 1980. In addition, an entire suite of species that occupy bobwhite habitat also have declined. In addressing this issue, the NBCI outlined some broad habitat restoration goals. Individual states were then encouraged to implement the NBCI at the state level. The Florida conceptual plan embraced the goal of the NBCI of restoring bobwhite populations to 1980 levels on improvable habitat (Appendix 1). The conceptual plan also recommended appointing two committees of key individuals to assist with the formulation of the final plan to establish more precise habitat restoration goals and strategies to achieve those goals.

The director of the Florida Fish and Wildlife Conservation Commission (FWC) appointed a Forestry Committee and an Agriculture and Range Committee to assist with the formulation of a comprehensive strategic plan. One meeting of the two committees occurred in 2005, as well as periodic consultations with various members of those committees.

Using input and insights gained since completion of the conceptual plan, the following strategic plan lays out more realistic goals and objectives than those outlined in the NBCI for bobwhite restoration in Florida. There have been numerous attempts to establish statewide restoration goals similar to those in the NBCI. However, each attempt has led to the same conclusion, there is much uncertainty about the number of acres of improvable habitat. This in turn has led to difficulty in establishing achievable population restoration goals. Most bobwhite biologists agree that to restore bobwhite populations, broad landscape scale changes are necessary. The following plan addresses that necessity by focusing on achievable habitat restoration goals on significant acreage within specific focal areas.

Current projects

Because of the urgency created by a continually declining bobwhite population, we have implemented important projects even as the comprehensive plan was being developed. The following is a synopsis of current active bobwhite projects:

Ranchland project: A key strategy in the effort to restore bobwhites will be the partnering of FWC with other public and private agencies that have a common interest in restoring early successional habitat necessary for bobwhites and

associated species. Already, partnerships have been established that take advantage of resources and expertise. A cooperative project between FWC and Tall Timbers Research Station (TTRS) was undertaken in 2003 with monies from the State Wildlife Grants Program to investigate the economics of bobwhite management on a working ranch. This work was expanded later, when TTRS and FWC prepared a proposal to determine the effectiveness of the federal Environmental Quality Incentive Program (EQIP) in restoring bobwhite habitat in the ranchland area of South Florida.

Approximately 3 million acres of native range remain in the peninsula of Florida (Appendix 1). Despite the presence of potential habitat within this region, bobwhites have declined at an annual rate of 4.3% since 1980. A large quantity of native range has disappeared through conversion to exotic grasses. However, on the remaining native range, the exclusive use of winter prescribed fire and improper grazing have allowed saw palmetto (*Serenoa repens*) to dominate. One assumption of the NBCI is that 73% of the bobwhite population recovery goal for this region (BCR 31) could be achieved by improving management on 7% of native rangelands. Therefore, EQIP funds were allocated through U.S. Department of Agriculture–Natural Resources Conservation Service (USDA-NRCS) to manipulate approximately 7% of rangeland acres within a five-county focal area. Cost-share funding provides financial assistance to landowners for prescribed burning, roller chopping, herbicide application and prescribed grazing. Implementation of habitat alterations began in the fall of 2005 and will continue for 10 years. Interest has been high, and approximately 17,000 acres were enrolled the first year. Researchers are also monitoring bobwhite and songbird population responses to habitat changes and landscape metrics. These include saw palmetto coverage, roller chopping strategies, treatment size, landscape context and prescribed fire regimes. In addition to landscape-scale studies, radio telemetry studies are providing valuable information on bobwhite population ecology on native range. The outcomes of these research projects will equip ranchers, biologists and conservation planners with scientific-based information that will improve the effectiveness of Farm Bill programs and conservation technical assistance for bobwhites and other wildlife species.

Public lands program: Approximately 5.6 million acres of public land in Florida are open to hunting. It is obvious that in order to achieve major bobwhite restoration goals, a significant number of acres of public lands must be restored. Florida's public lands are managed by numerous agencies with different land management goals. Therefore, in order to have any possibility of positively affecting upland habitat on public lands, it will be necessary to partner with these agencies and establish a common goal of upland habitat restoration on suitable lands.

There are a number of ongoing efforts on public lands that, if coordinated properly, have potential to improve a significant amount of bobwhite quail habitat. An example is restoration and maintenance of early successional habitat for the red-cockaded woodpecker and other associated species through aggressive use of prescribed fire and timber thinning to stimulate ground cover. In addition to ongoing efforts, there are new initiatives being explored to harvest and use woody biomass on public and private lands to generate electricity, produce bio-fuels and extract chemical compounds. Biomass harvest would open dense stands and facilitate reintroduction of prescribed fire into previously fire-suppressed areas.

Participants at the 2005 Leadership Summit on Bobwhite Management (Bobwhite Summit) agreed that restoring upland habitat on both public and private lands is the key to recovering bobwhite populations. Participants also felt that strong public/private partnerships would be critical to success. What's more, it was recognized that efforts to restore these important upland habitats would benefit a broad diversity of wildlife species, many of which have been declining along with bobwhites (Dimmick et al. 2001).

A direct outcome of the Bobwhite Summit was consensus among agencies that increased frequency of prescribed fire and changes in timber management are needed on public lands to restore habitats and wildlife populations dependent on them. Moreover, a novel management concept prevailed that saw value in approaching these problems from a statewide perspective. From these concepts emerged the need to develop a cooperative Upland Ecosystem Restoration Project (UERP). The purpose of UERP is to prioritize public lands for restoration and to initiate large-scale habitat restoration projects on selected areas to improve populations of northern bobwhites and other imperiled species.

TTRS is coordinating this effort in partnership with the University of Florida - Institute of Food and Agricultural Sciences (IFAS), the Department of Environmental Protection (DEP), the Florida Division of Forestry (DOF) and FWC. Several other potential partners have expressed a strong interest in supporting this project including Quail Unlimited (QU), Quail Forever (QF), the National Wild Turkey Federation (NWTF) and the US Forest Service (USFS). Several water management districts also have expressed strong support. The UERP is co-funded by DOF, DEP, FWC and the Florida Wildlife Legacy Initiative. A Florida Wildlife Legacy Initiative grant has been awarded and dedicates over $360,000 to coordination and implementation of UERP.

The UERP Public Lands Coordinator reports directly to Dr. Bill Palmer at the TTRS. The coordinator will be a catalyst for restoration activities, assist agencies with evaluation of potential restoration sites, plan restoration actions and help to create private-nongovernmental organization (NGO)-public partnerships

that will help fund management and design of restoration targets and monitoring strategies.

Specific overall objectives of UERP are to: 1) fully coordinate upland ecosystem restoration programs within the state; 2) develop official projects that operate under the oversight of a steering committee of agency leaders with assistance from a technical committee; 3) develop and plan long-term landscape level projects with measurable conservation targets; 4) develop grass roots and national support for local projects and acquire both local and national funding; and as much as feasible, 5) integrate planning of private land conservation programs within public land restoration projects. A private lands coordinator under the direction of Dr. Bill Giuliano at the University of Florida (UF) will assist with the UERP by emphasizing habitat development or restoration on private lands.

Upland habitat restoration is expensive, and without a coordinated approach such as UERP, it is likely that restoration efforts will fail because of logistical and funding constraints. Over the course of the next 10 years, UERP plans to establish projects that could restore as much as 200,000 acres. This restoration will lead to an unprecedented coordinated effort to rejuvenate upland ecosystems for multiple conservation objectives. This effort will fulfill numerous goals outlined in Florida's Wildlife Legacy Initiative and also will contribute to national restoration goals within the NBCI and this plan. We are uncertain what bobwhite population levels can be achieved practically on public lands. However, on very intensively managed properties in Florida, populations exceeding one bird per acre are common (Palmer, Tall Timbers Research Station pers. com.). It seems reasonable to assume that on public lands one bird per three acres can be achieved with appropriate use of fire and timber management.

Webb research project: In 2002, a project was initiated on the Fred C. Babcock/ Cecil M. Webb Wildlife Management Area (Webb WMA). One of the major objectives of the study was to initiate an experimental evaluation of the effect of harvest and hunting effort on the Webb WMA bobwhite population. The research has thus far demonstrated that the additive effects of the bobwhite harvest have been greater than expected. Preliminary results suggest that additional adjustments in the harvest strategy are needed to reduce overall mortality. Although restricting access reduced hunting mortality, overall it was still high; restricted areas still saw an overall mortality rate of 35.2% in 2005 and 43.2% in 2004. Furthermore, annual survival appeared to be very low during the period (7-12%) (Dimmick et al 2006). This study is providing information which will help define the relationship between harvest rate, mortality rate and annual survival rates. Ultimately, these results will lay the foundation for a data-driven approach to establishing bobwhite hunting regulations and enhance the ability of FWC to develop an adaptive management approach to bobwhite management on public lands.

Based on preliminary data, it appears that on the Webb WMA, hunting restrictions alone may not produce population gains and an increased harvest that is sustainable. An examination of the history of hunting and habitat management on the Webb WMA suggests that modifications designed to increase the food supply may be an additional key to increasing population density and subsequent harvest of bobwhites.

Major land use types

Following is a description of the major land use categories in the state. Each one of these may contain several ecological types, but management obstacles are similar within the category. For example, industrial and non-industrial timberlands may include flatwoods or high pine. Even though they can be separated ecologically, both habitat types typically need increased fire frequency and additional thinning to meet habitat objectives for bobwhites.

Row crop agriculture & private non-industrial timberlands: Row crop agriculture has traditionally offered habitat suitable for bobwhites. However, modern farming methods have removed fence rows and edges and have completely controlled weeds. These changes have made most farm fields unsuitable for bobwhites. A federal Farm Bill program, Habitat Buffers for Upland Birds (CP33), is designed to provide incentives to farmers to leave field borders next to farmed fields to provide escape cover and nesting and brood-rearing habitat. While CP33 has application throughout the bobwhite's range, Florida's cropland is decidedly different from much of the Southeast. Although approximately 3,639,850 acres of cropland exist in Florida (Table 3, Appendix 1), less than 10% is thought to provide some opportunity for bobwhite management. With addition of field borders, traditional crops such as corn, peanuts, soybeans, peas, sorghum and some small grains could offer habitat totaling approximately 232,739 acres. Given the wide spread nature of much of this habitat type, restoration efforts on agriculture land should be focused on areas where they fit into a landscape restoration effort.

In many cases, private non-industrial timberlands occur on landholdings of 1,000 acres or less and also may be part of a farming operation that generates revenue from cash crops or cattle. Frequently, pine timber is in young stands that are only coming into a stage where bobwhite management may be possible. However, in view of declining pulpwood prices and changing timber markets, longer rotations may be more attractive to landowners. Longer rotations should make some of these sites much more attractive for managing for grassland understories by encouraging multiple thinnings and generating revenue more frequently for landowners.

Approximately 266,589 acres of the non-industrial category are in longleaf pine, 2,035,636 acres in slash pine, 454,873 in loblolly and 832,474 acres classified as pine hardwoods (Appendix 1, Table 3,). All of the pine lands have some potential as bobwhite habitat. For example, there are as many as 100,000 acres of loblolly pine on plantations in north Florida that already are quality bobwhite habitat (Palmer, Tall Timbers Research Station pers. comm.). The site-specific characteristics of the remaining loblolly, slash and pine hardwood areas are unclear at present. Although potential for bobwhites may exist, landowner objectives and long-term management will dictate the true potential of these acres.
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Native range: Millions of acres of native range have been converted to domesticated grass pasture throughout south and south-central Florida. Under current economic conditions, it is likely that few private lands will ever be converted back to native range. However, even though estimates are uncertain, as many as 3,228,500 acres of native range may still remain (Appendix 1, Table 3). In order to validate this and other land-type estimates, considerable GIS work and ground truthing will need to be accomplished. Existing native range is largely dry-prairie and palmetto flatwoods. As a result of persistent winter burning and subsequent overgrazing, a significant percentage of these lands appear to have excessive palmetto coverage. Also, as noted previously, an ongoing project is investigating this issue, and it appears that roller chopping and prescribed fire can reduce palmetto and restore a herbaceous plant community more favorable to bobwhites and other wildlife.

Public timberlands: Approximately 2 million acres of potential bobwhite habitat occur on public timberlands in Florida. Unfortunately, less frequent fire and changes in land use have greatly altered plant communities on public lands. This change has resulted in habitat deterioration and steady declines in bobwhite populations, as well as numerous other fire-dependent wildlife species. On these lands, land managers rarely meet prescribed burning targets due to one or more of the following reasons: budget constraints, manpower shortages, limited number of permitted burn days due to unsuitable burning weather or conflicting agency priorities. In spite of the challenges public land mangers face, the creation of UERP should facilitate establishment of a significant acreage of bobwhite habitat on public lands.

Industrial timberland: Approximately 2,661,389 acres of forestlands is owned by the forest industry in Florida (Appendix 1, Table 3). Most of this land could have some potential for early successional understory habitat management. However, in most cases, managing for maximum timber or fiber production is not compatible with creating an understory of early successional grass–forbs. Furthermore, the timber industry in Florida is changing dramatically because of soaring land prices. Many of the timber companies are divesting their Florida holdings. The changing

objectives of many timber companies make it even more difficult to foresee how we might influence changes in management that benefit bobwhites. There are 72,716 acres of longleaf and nearly 2 million acres of slash pine on industrial timberlands. While there may be some possibilities for bobwhite management on some of the longleaf acres, the slash acreage is more problematic.

Goals and Strategies

The following goal is unlike the strictly quantitative goal presented in the NBCI. In Florida, when realistic possibilities of habitat restoration are scrutinized, the number of improvable acres is probably much smaller than the estimates presented in the NBCI. As indicated earlier, the uncertainty regarding the number of improvable acres makes establishing statewide restoration goals difficult.

The factors that influence the potential of particular sites for improvement include the nature of the site, the current plant community and the land management objectives of current managers. In many cases, fluctuating commodity prices and government programs can alter or modify land management objectives on private land. On public land, user group pressures can have a dramatic influence on the potential to alter management on an area. Currently, an overriding influence on private land is the tremendous development pressure that has driven land prices to record heights negating any other economic incentive that may be applied to the land. These and other factors must be considered when establishing restoration goals. In order to achieve meaningful goals in spite of these many obstacles, it is apparent that a focal area approach, targeting the areas with the most possibility for habitat restoration, has the greatest potential for success. Once areas are selected and targeted for restoration, achievable habitat and bobwhite population goals can be established.

Goal: Identify areas in the state where large landscape scale habitat restoration is feasible, and implement strategies to achieve sustainable and huntable bobwhite populations on those landscapes.

Early success in efforts to restore bobwhites is absolutely necessary. Land use systems that create habitats unfavorable to bobwhites increasingly dominate the landscape. If we cannot modify that trend within the near future, it is doubtful that we can ever have sustainable populations of bobwhites anywhere except on private plantations and some very select FWC lead managed areas. Long-term goals are desirable, but given the rate of change occurring in Florida, it is difficult to predict long-term outcomes. Goals and objectives are outlined in this document for five years; these short-term goals should have a significant possibility of being achieved. At the end of the five-year period, the feasibility of achieving additional goals will be more predictable. It also is important that restoration be directed

toward entire landscapes. In order to achieve meaningful habitat restoration, this plan tightens the focus by emphasizing a focal area approach.

Furthermore, we must not lose sight of the fact that this plan is about habitat. While the plan's focus is on bobwhite habitat restoration, benefits resulting from this restoration extend well beyond bobwhites. An example of compatible objectives involves the management of red-cockaded woodpecker habitat on state and federal lands. These activities provide suitable habitat for bobwhites. However, modifications could be made to fire management programs in focal areas that would provide even greater benefits to bobwhites while still maintaining quality red-cockaded woodpecker habitat.

Overall strategies: This plan emphasizes the task of altering significant acreages within focal areas. To achieve the major land management goals within these areas, there must be widespread support. This includes the support of the general public as well as stakeholder groups that have interest in the habitats proposed for management.

The following strategies are designed to achieve the necessary support. Because of the overall importance of fire-dependant habitats to bobwhite restoration in Florida, strategies to facilitate use of prescribed fire and to stimulate treatment of timber stands must be included. Research also is an important component of the restoration plan, but it must be coordinated and directed toward restoration and management in the 21st century setting. Finally, this plan will achieve its objectives only if it is implemented. Consequently, strategies are outlined to achieve the oversight necessary to ensure objectives are pursued.

Objective 1: Increase support for restoring the early successional habitat necessary to maintain sustainable populations of bobwhites as outlined in this plan.

***Strategy 1*:** Create an informational and educational plan directed at the general public that emphasizes the importance of restoring early successional habitat to bobwhites and those species associated with them.

Task 1: Develop partnerships with IFAS, FWC, TTRS, QU, QF and the Southeast Quail Study Group to distribute popular literature emphasizing the importance of early successional habitat to bobwhites and other associated species.

Rationale: In meetings and presentations the message of the plight of this particular habitat type has been presented. In some cases, such as the Bobwhite Summit, it has been presented very effectively to an influential audience. However, there needs to be an organized effort to develop a campaign to inform the general public.

***Strategy 2*:** Make factual information regarding bobwhite management available to landowners.

Task 1: Provide publications with easy-to-follow recommendations for managing bobwhites on private lands.

Rationale: An important task is to publish a bobwhite management booklet for Florida. This will probably be a cooperative project between IFAS, TTRS and FWC. This booklet should be a priority and should be disseminated to landowners as quickly as possible. Myths and misconceptions regarding the causes of bobwhite population declines need to be dispelled.

Strategy 3: Emphasize the importance of restoring early successional upland habitat for species other than bobwhites.

Task 1: FWC, IFAS and NGO's are tasked with delivering a message to special interest conservation groups concerning the positive impacts of bobwhite restoration on biological diversity and rare species conservation.

Rationale: The fact that restoration of bobwhite habitat will benefit a wide range of species has been continually emphasized. However, some groups with a vested interest in the upland habitats have not been fully engaged with bobwhite management efforts. QU and QF, in cooperation with IFAS, TTRS and FWC, should be encouraged to reach out to all conservation groups and exploit their common interest of restoring habitat.

Objective 2: Increase use of prescribed fire for land management in Florida.

Strategy 1: Establish a program that educates and informs land managers concerning the relationship between frequent fire in upland habitats and biological diversity.

Task 1: Hold workshops and field days and provide printed literature educating land managers on the value of frequent fire in upland habitats.

Rationale: Prescribed fire is widely accepted by resource professionals as an effective land management tool. However, it is apparent that many managers don't burn frequently enough to create grassland-forb communities necessary to encourage bobwhite populations and associated biological diversity.

Task 2: Develop interagency burn teams to assist public land managers in accomplishing prescribed fire goals.

Rationale: Specialized burn teams made up of interagency personnel could assist land managers in reaching prescribed fire goals and provide additional expertise in regard to site-specific application of fire. In addition to the agency goals (certain number of acres burned each year) the burn teams could help conduct more "bobwhite friendly" burns of smaller size and more appropriate temporal and spatial arrangement within focal areas.

Task 3: Encourage legislation to facilitate responsible and legitimate use of and public support for prescribed fire.

Rationale: Private groups and other NGO's that promote prescribed fire also should actively educate legislators and others on the value of fire. Specific actions should address improving current laws regarding application of fire to achieve more flexibility for the use of prescribed fire.

Objective 3: Provide a biological basis for bobwhite restoration efforts.

Strategy 1: Establish a consortium of researchers and managers to identify and coordinate research activities that may inform and assist bobwhite restoration.

Task1: FWC should establish an upland habitat research team.

Rationale: Currently, there are numerous ongoing research projects in Florida that are addressing questions directly or indirectly related to bobwhite restoration efforts. There also are ongoing research projects under the joint direction of TTRS and FWC, TTRS and UGA, TTRS alone, and the University of Florida. Good communication exists among these groups, however, as these projects grow, it will be important to establish priorities and coordination. Team members will include the FWC Small-game Program (SGMP) coordinator (Chuck McKelvy), TTRS scientist (Dr. Bill Palmer), UF faculty and research person (Dr. Bill Giuliano), U.S. Geological Survey Florida Cooperative Fish and Wildlife Research Unit (Dr. Franklin Percival), the UERP public lands coordinator (Greg Hagan), the UERP private lands coordinator (Kristin Candelora) and one public lands manager, one private lands manager and one other person selected by the above group.

Objective 4: Ensure the Strategic Plan for Northern Bobwhite Restoration in Florida is implemented.

Strategy 1: Establish a mechanism to monitor progress of plan implementation.

Task 1: FWC, in consultation with stakeholders, should develop a statewide Bobwhite Steering Committee.

Rationale: A committee (of up to 7 persons) should be developed by FWC to ensure the goals and objectives contained in the plan are met. The committee's charge will be to review progress and report back to various stakeholders including FWC. In addition, it should provide guidance in regard to adjusting strategies and goals, and assist in preparation of updated goals at the end of the first five-year period. The restoration project will be a cooperative effort involving stakeholders, public and private land managers and scientists.

Focusing on the problem

Goal 1: Identify focal areas.

> **Task 1: Develop focal areas made up of private and public land that will enable habitat restoration on a landscape scale.**

Rationale: To ensure restoration goals are realistic and achievable, it is necessary that UERP first identify the most desirable restoration sites. Factors that influence desirability are; (1) present plant community and its stage of succession; (2) prospects for landscape-scale restoration in conjunction with the site; (3) the willingness of the landowner to support the necessary management. This process also will use GIS and on-site evaluations, with a goal of providing a quantifiable basis for establishing focal areas made up of large blocks of suitable public land or combinations of public and private land. In situations where the focal area is made up of both public and private land, the public and private lands UERP coordinators will work cooperatively to identify the focal area and design a restoration and management strategy.

Goal 2: Establish habitat restoration and bobwhite population objectives within focal areas.

> **Task 1:** Establish habitat restoration and bobwhite population density objectives in five-year intervals within each focal area.

Rationale: Review of sites in the focal area via GIS, on-site visits, and collaboration with local land managers will provide a basis to establish realistic habitat restoration objectives. In addition, based on current knowledge of carrying capacity of specific habitats, mean population objectives should be established early in the process. For example, over the next five years, on public lands a reasonable objective might be 10 new areas averaging a minimum of 10,000 acres with a population goal of one bird per three acres. Specific habitat objectives within each focal area should have a five-year target date with additional objectives established as the initial targets are achieved. Baseline populations of bobwhites, and some associated species, should be documented in a representative sample of targeted landscapes. These objectives will be developed early in the process and will be

accomplished through a collaborative effort between the UERP coordinators and public and private land managers.

> **Task 2**: Establish definable and measurable criteria to document bobwhite habitat and population objectives.

Rationale: To measure progress toward restoration goals, a science-based method of monitoring the quality and quantity of restored habitat, and numbers and/or density of bobwhites and associated species must be implemented. This will be accomplished through a collaborative effort among FWC, TTRS and UF.

Goal 3: Implement strategies to achieve restoration goals.

> **Task 1:** Through demonstration areas, distribution of pertinent data and personal contact, the FWC's SGMP will provide guidance to FWC personnel regarding bobwhite restoration and management.

Rationale: To assist in establishing viable bobwhite management programs, SGMP personnel will provide assistance and data to other FWC personnel who are responsible for managing lands that have potential to sustain bobwhite populations.

> **Task 2:** On FWC lead managed areas, develop a model for bobwhite management on public lands.

Rationale: Research and management efforts on FWC lead managed areas, plus data generated by other cooperative bobwhite projects, will provide a science-based foundation for public lands bobwhite management. One of the objectives of upland ecosystem/bobwhite management on FWC lead managed areas should be to provide an example of effective and successful management.

> **Task 3:** Coordinate implementation of a bobwhite management program on selected public lands sites.

Rationale: The UERP public lands coordinator, in cooperation with FWC, other public land management agencies and NGOs, will initiate a restoration program on selected public lands sites. This will involve guidance and education, bringing together NGO and management agencies where cooperation is necessary, and helping secure funds for management activities. The program will be guided by goals that have been established and agreed to by all cooperating parties. In the final analysis, it is incumbent upon the UERP, FWC, NGO groups, IFAS and other public land managing agencies to bring to bear public and private support for the problem of restoring upland habitat resources in Florida. In many cases, the key to this being successful will be to get ahead of agency operational planning.

Task 4: Coordinate a bobwhite restoration and management program on selected private lands.

Rationale: With emphasis on those private lands identified within a focal area, the Private Lands UERP coordinator will collaborate with land managers to implement bobwhite restoration programs. This should be a cooperative effort among the Public Lands UERP coordinator, FWC, NGO's, IFAS and NRCS. Whenever possible, federal Farm Bill monies should be directed toward managing private land within the focal area. Several cost share programs funded by the U.S. Department of Agriculture (USDA) were designed to encourage wildlife habitat development. These programs, and others in the future, can provide significant incentives for upland habitat development if properly implemented. Other states have found that in order to get the most from USDA wildlife programs, the state wildlife agency, or some cooperating entity, needs to have a significant role in their delivery.

Task 5: Encourage private land investment for bobwhite management on land surrounding public land focal areas.

Rationale: A demand exists for private recreational land in Florida. However, bobwhite management on smaller tracts of land (less than 1,000 acres) is problematic because of generally low bobwhite populations across the landscape. Abundant populations on public lands can enhance management opportunities on adjacent lands and should make those properties more desirable as recreational lands.

Task 6: Establish an FWC strategy team to develop and deliver private land incentives that encourage bobwhite restoration on lands within the focal areas.

Rationale: One of the underlying themes of the bobwhite restoration effort is that to be successful, we must approach management on a landscape scale. Because of the importance of that strategy, efforts to impact private land should be directed toward the focal areas. A team made up of FWC personnel, plus the UERP coordinators, should develop a program of private land incentives to encourage bobwhite restoration within the focal areas. This could include directing Farm Bill programs to those areas, attempting to secure other government funding for incentive programs and developing promotional material to encourage restoration and management efforts.

Planning in the future

As indicated earlier, this plan should be updated in five years. However, with concurrence of the Bobwhite Steering Committee, there should be no hesitation to alter or update this plan when it is apparent such an alteration would

help achieve bobwhite restoration. The rapidly changing Florida landscape mandates that plans should be adaptable and dynamic.

With public support, restoration of bobwhites on public lands appears to be possible. On private lands, surging land prices promise to make bobwhite restoration difficult, and also there is a strong dependence on USDA Farm Bill programs to provide incentives to landowners to alter their landscape. We must now come to grips with the reality that Farm Bill monies may not always be available at the current levels. Therefore, it is incumbent upon those groups responsible for managing resources to explore every opportunity to provide incentives to private landowners to manipulate land to favor bobwhites and associated species.

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Appendix 1

Conceptual plan for northern bobwhite restoration in Florida

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Introduction

The northern bobwhite (*Colinus virginianus*) has suffered serious declines throughout much of its range for at least three decades. It is estimated that the bobwhite population declined 65.8% between 1980 and 1999 (Dimmick et al. 2002). The North American Breeding Bird Survey conducted annually by the US Fish and Wildlife Service showed a decline of 3.8% per year from 1982 until 1999. In response to this serious decline, the directors of the member states of the Southeastern Association of Fish and Wildlife Agencies requested the Southeast Quail Study Group Technical Committee (SEQSG) to prepare a plan for the recovery of the northern bobwhite. As a result of this request, the SEQSG prepared the Northern Bobwhite Conservation Initiative (NBCI) (Dimmick et al. 2002).

The goal of the NBCI is to "restore bobwhite populations range-wide to an average density equivalent to that which existed on improvable acres in the baseline year of 1980." The NBCI outlined three reasons for selecting 1980 as the baseline year: 1) population densities and hunting opportunities were significantly greater in 1980 than today, 2) portions of the current landscape, if properly managed, would support densities equivalent to those existing in 1980, and 3) important databases used in the NBCI have comparable beginning points on or near 1980. The NBCI goal was expressed as range-wide population densities rather than stating a goal to achieve numerical parity with 1980. The rapidly shrinking land base available for management would make the latter goal unachievable.

The NBCI used two data sets to establish past and present population densities and trends by state and Bird Conservation Region (BCR). Harvest records maintained by state conservation agencies were used to assess changes in bobwhite harvest since 1980 and to estimate the autumn population prior to the hunting season, and breeding densities at the initiation of the breeding season. The Northern American Breeding Bird Survey sponsored annually by the U. S. Fish and wildlife Service was used to identify and forecast trends in the status of bobwhites by state and BCR. Data from the 1982 and 1997 National Resources Inventory (NRI), generated by the Natural Resources Conservation Service (NRCS), were used to evaluate the current and past status of bobwhite habitat and to serve as a basis for developing habitat objectives. The NBCI established bobwhite population goals for each BCR and state, based on the estimated bobwhite densities in 1980 and in 1999 plus the amount of improvable habitat available, where improvable habitat was defined as current and potential habitat. The density estimated in the NBCI

for the Panhandle of Florida (part of BCR27) in 1980 was 0.460 birds/improvable acre in the fall population. By 1999 the density had declined to 0.145 birds/improvable acre. The estimated density for Peninsular Florida was 0.106 birds/improvable acre in the 1980 fall population, declining to 0.024/acre in 1999. The NBCI established a goal of restoring bobwhite densities to the 1980 level on 7,943,524 acres in Florida; this would result in 111,541 coveys being added to the population (Table 1).

Table 1. NBCI habitat restoration goals for Florida, including expected covey response because of restoration.

Land use Categories	Total acres in Florida	NBCI Goal for Florida (acres)	Expected Covey Response
Convert to native warm season grasses			
CRP[1] grass	5,100	5,100	1,275
Improved agricultural acres	8,884,400	337,324	84,331
Site prep, burn and thin			
Pines	7,486,300	7,486,300	25,590
CRP pines	114,800	114,800	345
Total		7,943,524 acres	111,541 coveys

[1]Conservation Reserve Program

The northern bobwhite in Florida

Bobwhite populations in Florida probably were at their highest densities during the early part of the 20th century. From this high point after early settlement, populations declined but still remained abundant until the 1950s and 60s. By the late 1970s, however, populations had begun to exhibit an even more pronounced downturn. Based on the North American Breeding Bird Survey, quail populations in Florida declined over 70% from 1980 until 2000. Harvest also declined over 75% during the same period (Table 2). This dramatic change in population status appears to be the result of land use changes that began after World War II and accelerated in the 1970s and 80s.

A lack of nesting and brood rearing habitat is a major limiting factor over much of the range of the bobwhite. This is a result of replacing native grasses with exotic grasses and by nesting having been eliminated in intensively managed cropland and dense pine forests (Dimmick et al. 2002). These changes characterize much of the timber and agriculture lands in North Florida. However, in some of the rangelands of Peninsular Florida, nesting habitat may be adequate while food

resources are lacking. In either case, the habitat degradation is likely the result of, or lack of, land-management activities.

Land-use systems that have created habitats unfavorable to bobwhite increasingly dominate the landscape. Additionally, recovery of bobwhite numbers in Florida will be made more difficult by the continued loss of the land base to urban development and human population growth. Furthermore, it is clear that landscape-scale habitat changes are necessary to stem population declines and return bobwhites to some reasonable population level.

Table 2. Statewide hunter survey results: harvest, hunter days, and harvest per day for bobwhite from 1950-2002

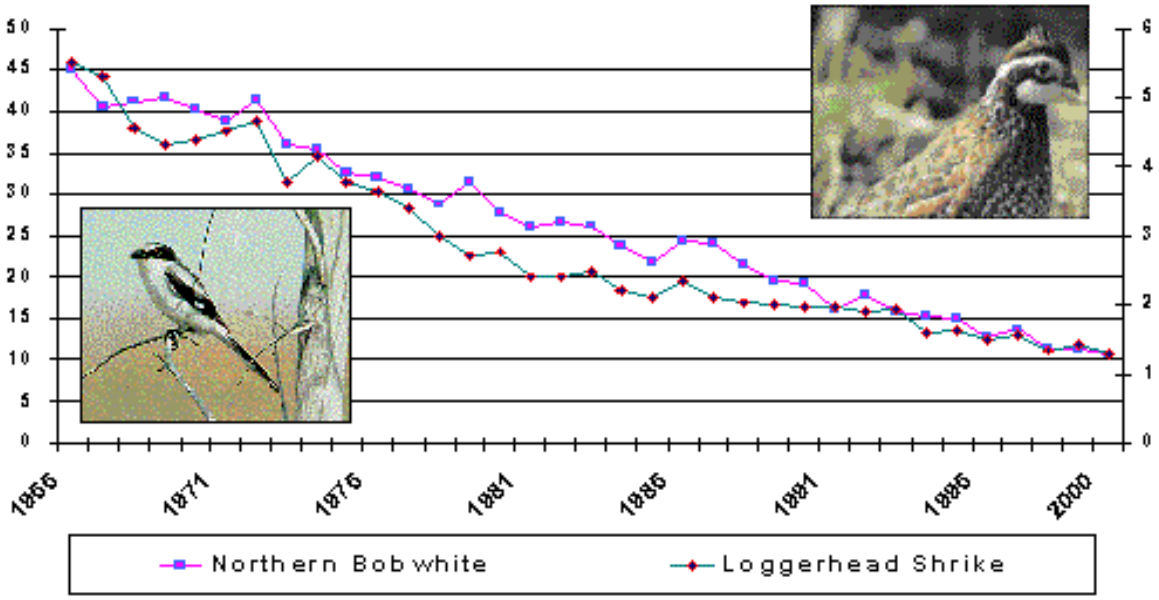
Year	Harvest	Hunter Days	Harvest Per Day	Year	Harvest	Hunter Days	Harvest Per Day
1950-51	980,000	310,000	3.2	1981-82	633,380	333,046	1.9
1951-52	1,300,000	330,000	3.9	1982-83	619,327	288,193	2.1
1952-53	1,200,000			1983-84	542,897	233,214	2.3
1953-54	1,640,000	444,000	3.7	1984-85	457,802	210,335	2.2
1954-55	1,340,000	470,000	2.9	1985-86	588,398	228,392	2.6
1955-56	1,220,000	360,000	3.4	1986-87	519,666	221,121	2.4
1956-57	1,410,000	390,000	3.6	1987-88	534,185	217,137	2.5
1957-58	2,026,000	517,300	3.9	1988-89	378,539	180,349	2.1
1958-59	1,851,700	514,600	3.6	1989-90	230,837	114,096	2.0
1959-60	1,818,300	551,800	3.3	1990-91	149,598	102,669	1.5
1960-61	1,977,600	541,000	3.7	1991-92	177,856	100,727	1.8
1963-64	2,047,196	724,093	2.8	1992-93	186,446	87,916	2.1
1966-67	2,238,700	656,000	3.4	1993-94	173,057	119,676	1.4
1967-68	2,388,300	705,600	3.4	1994-95	161,305	113,886	1.4
1969-70	2,847,500	773,900	3.7	1995-96	161,048	109,792	1.5
1970-71	2,423,520	778,878	3.1	1996-97	138,779	78,139	1.8
1971-72	1,712,700	642,500	2.7	1997-98	163,352	86,175	1.9
1972-73	3,154,800	866,000	3.6	1998-99	159,520	100,800	1.6
1973-74	1,969,950	822,932	2.4	*1999-00	269,997	92,644	2.9
1974-75	1,433,739	587,429	2.4	*2000-01	268,152	105,821	2.5
1975-76	1,783,570	513,960	3.5	*2001-02	199,888	88,356	2.3
1976-77	1,135,690	432,822	2.6				
1977-78	1,934,634	775,263	2.5				
1979-80	1,045,145	421,425	2.5				
1980-81	824,238	360,160	2.3				

* Survey unit was changed, and figures may not be comparable to data collected prior to 1999-2000

The potential benefits of restoring bobwhites in Florida are far-reaching. The establishment of bobwhite populations on the landscape in huntable numbers will result in the sport of quail hunting being available to a larger segment of society.

Furthermore, expansion of grassland/forb communities for bobwhites would provide habitat to many declining species. Brant et al. (2003) listed 94 rare and endangered plant species in Florida, of which 24 required frequent fire to maintain them. An additional 35 species require prescribed fire on a two- three-year rotation. Most of these plants occur in fire-maintained grasslands, which is good bobwhite habitat. Two important vertebrates included on Florida's rare, threatened or endangered list that are commonly found in the same plant communities as bobwhites are the red-cockaded woodpecker (*Picoides borealis*) and the gopher tortoise (*Gopherus polyphemus*). The North American Breeding Bird Survey counts for the loggerhead shrike (*Lanius ludovicianus*) provide an example of the fate of many species occupying early successional grassland forb plant communities. The loggerhead shrike declined > 70%, a rate similar to that of bobwhites, during the period from 1955 to 2001 (Fig. 1). The significance of this statistic is that while the two species have significantly different lifestyles, native grasslands are an important component of required habitat.

Figure 1. USFWS Region 4 BBS Indices for Northern Bobwhite and Loggerhead Shrike, 1966-2000.



Achieving the NBCI goal for Florida of increasing the number of bobwhite coveys by 111,541 will depend on our ability to improve existing habitat. Table 3 identifies the acreage of potential habitat by land use type that is available for improvement. Achieving the goal will depend on the expected response of bobwhite populations to improvement of each of these types and the acreage of each type improved. We are assuming that, for every acre of longleaf pine (*Pinus palustris*) that is heavily thinned and burned on an average of a two-year cycle, one additional covey would be produced per 91 acres. On pine (*Pinus* sp.) sites less suitable to bobwhite management, such as many slash pine (*Pinus elliottii*) sites, we assume that with moderate thinning and less frequent burning we can add a covey to the

population for every 333 acres managed. When high-quality grassland can be restored, we are assuming that there will be a covey produced for every 25 acres. Field border and set-aside areas which are established in conjunction with row crop land will, in most cases, be high-quality grassland. These are assumptions that, in general, were established in the NBCI. However, as the knowledge base increases, they may be subject to significant modification.

Table 3. Habitat restoration goals, by percentage of total habitat type within Florida, expressed in acres and the total number of bobwhite coveys expected to be produced from restoration.

Land-use type	Total Acres	Restoration Goals in Acres (Expected Coveys[A])					
		5%	10%	15%	20%	30%	50%
Industrial timberlands							
Longleaf pine	72,716	3,635 (40)	7,272 (80)	10,907 (120)	14,543 (160)	21,815 (240)	36,358 (400)
Slash pine	1,994,134	99,707 (299)	199,413 (599)	299,120 (898)	398,827 (1,198)	598,240 (1,797)	997,067 (2,994)
Loblolly pine	298,972	14,949 (164)	29,897 (329)	44,846 (493)	59,794 (657)	89,692 (986)	149,486 (1,643)
Pine hardwoods	295,567	14,778 (44)	29,557 (89)	44,335 (133)	59,113 (178)	88,670 (266)	147,784 (444)
Public timberlands							
Longleaf pine (Nat. Forest)	175,807	8,790 (97)	17,581 (193)	26,371 (290)	35,161 (386)	52,74) (580)	87,904 (966)
Longleaf pine (State lands)	225,376	11,269 (124)	22,538 (248)	33,806 (371)	45,075 (495)	67,613 (743)	112,688 (1,238)
Slash pine (Nat. Forest)	328,591	16,430 (49)	32,859 (99)	49,289 (148)	65,718 (197)	98,577 (296)	164,296 (493)
Slash pine (State lands)	425,342	21,267 (64)	42,534 (128)	63,801 (192)	85,068 (255)	127,603 (383)	212,671 (639)
Pine hardwoods (Nat. Forest)	82,906	4,145 (12)	8,291 (25)	12,436 (37)	16,581 (50)	24,872 (75)	41,453 (124)
Pine hardwoods (State lands)	222,650	11,133 (33)	22,265 (67)	33,398 (100)	44,530 (134)	66,795 (201)	111,325 (334)
Non-industrial timberlands							
Longleaf pine	266,589	13,329 (146)	26,659 (293)	39,988 (439)	53,318 (586)	79,977 (879)	133,295 (1,465)
Slash pine	2,035,636	101,782 (306)	203,564 (611)	305,345 (917)	407,127 (1,223)	610,691 (1,834)	1,017,818 (3,057)
Loblolly pine	454,873	22,743 (250)	45,487 (500)	68,231 (750)	90,975 (1,000)	136,462 (1,500)	227,437 (2,500)
Pine hardwoods	832,474	41,624 (125)	83,247 (250)	124,871 (375)	166,495 (500)	249,742 (750)	416,237 (1,250)
Exotic pasture	4,965,611	248,281 (9,931)	496,561 (19,862)	744,842 (29,794)	993,122 (39,725)	1,489,683 (59,587)	2,482,806 (99,312)
Native rangeland	3,228,500	161,425 (6,457)	322,850 (12,914)	484,275 (19,371)	645,700 (25,828)	968,550 (38,742)	1,614,250 (64,570)

Table 3. Continued.

Land-use type	Total Acres	Restoration Goals in Acres (Expected Coveys[A])					
		5%	10%	15%	20%	30%	50%
Cropland (Total)	3,639,850						
Orchards	981,910	49,096 (1,964)	98,191 (3,928)	147,287 (5,891)	196,382 (7,855)	294,573 (11,783)	490,955 (19,638)
Pasture/Grazing (cropland)	895,684	44,784 (1,791)	89,568 (3,583)	134,353 (5,374)	179,137 (7,165)	268,705 (10,748)	447,842 (17,914)
Sugar Cane	436,597	21,830 (873)	43,660 (1,746)	65,490 (2,620)	87,319 (3,493)	130,979 (5,239)	218,299 (8,732)
Other	397,167	19,858 (794)	39,717 (1,589)	59,575 (2,383)	79,433 (3,177)	119,150 (4,766)	198,584 (7,943)
Hay	265,985	13,299 (532)	26,599 (1,064)	39,898 (1,596)	53,197 (2,128)	79,796 (3,192)	132,993 (5,320)
Vegetables	250,562	12,528 (501)	25,056 (1,002)	37,584 (1,503)	50,112 (2,004)	75,169 (3,007)	125,281 (5,011)
Corn	97,939	4,897 (196)	9,794 (392)	14,691 (588)	19,588 (784)	29,382 (1,175)	48,970 (1,959)
Cotton	93,504	4,675 (187)	9,350 (374)	14,026 (561)	18,701 (748)	28,051 (1,122)	46,752 (1,870)
Peanuts	76,682	3,834 (153)	7,668 (307)	11,502 (460)	15,336 (613)	23,005 (920)	38,341 (1,534)
Potatoes	41,255	2,063 (83)	4,126 (165)	6,188 (248)	8,251 (330)	12,377 (495)	20,628 (825)
Soybeans (for beans)	41,021	2,051 (82)	4,102 (164)	6,153 (246)	8,204 (328)	12,306 (492)	20,511 (820)
Wheat (for grain)	16,231	812 (32)	1,623 (65)	2,435 (97)	3,246 (130)	4,869 (195)	8,116 (325)
Rice	10,691	535 (21)	1,069 (43)	1,604 (64)	2,138 (86)	3,207 (128)	5,346 (214)
Berries	7,282	364 (15)	728 (29)	1,092 (44)	1,456 (58)	2,185 (85)	3,641 (146)
Tobacco	6,881	344 (14)	688 (28)	1,032 (41)	1,376 (55)	2,064 (83)	3,441 (138)
Cowpeas & Southern Peas	6,119	306 (12)	612 (24)	918 (37)	1,223 (49)	1,836 (73)	3,060 (122)
Oats (for grain)	5,836	292 (12)	584 (23)	875 (35)	1,167 (47)	1,751 (70)	2,918 (117)
Rye	5,463	273 (11)	546 (22)	819 (33)	1,093 (44)	1,639 (66)	2,732 (109)
Sweet Potatoes	1,575	79 (3)	158 (6)	236 (9)	315 (13)	473 (19)	788 (32)
Sorghum (for grain)	945	47 (2)	95 (4)	142 (6)	189 (8)	284 (11)	473 (19)
Proso Millet (for grain)	521	26 (1)	52 (2)	78 (3)	104 (4)	156 (6)	260 (10)

[A]Expected coveys produced assumes one covey/91 acres of managed longleaf or loblolly pine; one covey/333 acres of managed slash pine or pine hardwoods; one covey/25 acres of managed pasture or rangeland; and one covey/25 acres of managed cropland, because in most cases, only edges will be affected.

Improvable habitats

Following is an initial breakdown of the improvable habitats in Florida. In Table 3, there is a matrix of this information provided which will afford a starting point for establishing habitat and population goals. Using the assumptions outlined earlier, there are estimated bobwhite population responses if various percentages of the land use categories are improved. One of the challenges of developing a final plan is establishing habitat alteration goals that have a reasonable probability of being achieved. The sources used to identify the quantity of each of the land use categories included: Forest Statistics for Florida, 1995 (Brown 1996), and the 1997 NRI generated by the NRCS.

Timberland

Pine timberland represents a large acreage, which has the potential of being managed more effectively for bobwhites. However, in their present condition, the majority of these lands do not provide high quality bobwhite habitat. The most effective management tool for bobwhites in pine timberland is prescribed fire (Stoddard 1931). It is systematic use of prescribed fire that will create the grass/ forb plant community necessary for bobwhites to thrive. Today in Florida, timberland management is characterized by the declining use of fire, dense stocking rates in timber stands, and short timber rotations. All of these trends discourage the development of good bobwhite habitat.

Industrial timberlands: There are 2.7 million acres of corporate timberland in Florida. Slash pine makes up the largest component of the total acreage. In most cases, timber companies manage their slash pine on a short rotation (20 years). It is then harvested for pulp and replanted. Tracts under this type management scheme offer little bobwhite habitat, except during the two-three years after planting. However, pulp prices are depressed, and some stands are managed on a chip–and-saw rotation. This involves thinning at 18 to 20 years and letting the stand grow for another seven-eight years. If fire is used properly in these stands, they may provide improved bobwhite habitat from approximately 20 years of age until harvest.

Longleaf pine occupies 72,716 acres of corporate timberland. When longleaf is managed for saw log and pole timber, the stand may be maintained for 50 years plus. Longleaf can be burned while in the grass stage (Landers and Mueller 1986) and will typically be burned more frequently throughout the life of the stand than other pine species. In addition, older stands are generally more open, allowing sunlight to develop favorable grass/forb plant communities in the understory. These factors make longleaf stands more desirable for bobwhite management than other pine types.

Public timberlands: Longleaf pine occupies 401,183 acres of state and federal lands in Florida. These stands are of differing ages, but in most cases, they will be managed on a longer rotation than commercial timberlands. Many of these lands may provide areas that have potential for improving early successional understory habitat. Presently, the frequency of prescribed fire in most of these stands is less than what is required to maintain ideal conditions for bobwhites. However, it is probable that there is potential on many sites to create good habitat for bobwhites and other early successional species without significantly compromising other natural resource management objectives.

Slash pine occupies 753,933 acres of public timberland. A significant portion of these lands are flatwoods, and because of their hydrological characteristics and the structure of the plant community, they do not have as much potential for bobwhite management as more-upland longleaf areas. However, some better-drained sites are characterized by a wiregrass/ runner oak understory (Abrahamrun and Hartnett 1990). These sites have considerable potential for bobwhite if the timber is thinned and prescribed fire is applied frequently.

There are 305,556 acres of state and federal lands that are classified as pine hardwoods. These sites generally have sparser ground cover than the pure pine stands, and succession favors hardwoods. Frequent use of fire and removal of hardwoods will be necessary to successfully manage pine hardwoods for bobwhite. On public lands, there may be some areas of pine hardwood where fire can be applied on a minimum of a two- year rotation and hardwood removal can be justified, resulting in increased bobwhite populations.

Non-industrial timberland: There are 266,589 acres of longleaf pine on properties owned by private non-industrial landowners. Many of these stands occur on farms or landholdings of 1,000 acres or less. In most cases, these are young stands, but they will be managed on a saw timber rotation and should provide increasing opportunities for improving bobwhite management.

There are 2,035,636 acres of slash pine on private non-industrial lands. A large percentage of the slash pine on private lands is planted with the objective of harvesting the trees in 20 years for pulp. Much of this acreage has been planted at 700 stems per acre, which ensures rapid canopy closure and limited understory development. In view of declining pulp wood prices, many landowners may opt to manage for chip-and-saw timber. These stands can support bobwhite if at 18 to 20 years they are thinned to achieve 40-60% sunlight on the ground and if frequent fire is used in the understory. A significant percentage of the slash pine acreage in non-industrial ownerships may have potential for this type of management.

Loblolly pine (*Pinus taeda*) occupies 454,873 acres of private non-industrial timberland. Approximately 70,000 acres of the total is located on plantations in

North Florida (Palmer personal communication) and is managed to provide good bobwhite habitat. The remaining 384,000 acres are, in most cases, providing poor-quality bobwhite habitat. However, since most of the loblolly is on well-drained sites, these stands have long term potential to provide improved bobwhite habitat if the timber is thinned, managed on a saw timber rotation, and frequently burned.

There are 832,474 aces of pine-hardwoods on non-industrial ownerships. Many of these sites do not offer the best prospects for bobwhite habitat improvement. However, depending upon site characteristics, some may be suitable.

Agricultural land

In the past, small weedy crop fields, hedgerows and fallow fields characterized row crop agriculture. In contrast to the complex early successional plant community produced by this land management system, today's agriculture provides a weed-free monoculture that is of little value to bobwhites.

Much of the native range that still occurs is probably overgrazed, is dominated by palmetto and appears to provide a minimum amount of food and brood-rearing habitat for bobwhites. The vast acreage of tame grass pastureland will remain mostly unusable as bobwhite habitat unless it is converted to native grass.

Crop land: There are 3,639,850 acres of cropland in Florida. This classification includes row crops, hay and pasture, orchards, and vegetable crops. There are 23 categories listed in Table 3. A significant task will be to evaluate bobwhite restoration possibilities and identify potential bobwhite population goals among these various classifications. Economic ramifications of altering land management on these lands are, in most cases, the most important considerations. Federal Farm Bill conservation programs offer several mechanisms for altering cropland management and may be the most important tool available.

Native rangeland: In Florida, there are 3,228,500 acres that are classified as native rangeland. Some of this may overlap with the flatwoods category. However, much of what is identified as native range occurs in Central and South Florida and is used for cattle grazing with timber production being of secondary value. In many cases, if grazing patterns can be altered and fire and chopping regimes favorable to grassland communities are implemented, this habitat type can contribute to bobwhite restoration. With economic incentives provided by hunting opportunities and the application of Farm Bill conservation program funds, it may be possible to alter a significant amount of these lands.

Exotic pasture: Large blocks of native rangeland have been converted to tame grass pasture over the past 30 years. It will be difficult to affect a significant

percentage of these lands. Methods for converting bahia grass (*Paspalum notatum*) and other introduced grasses back to native grasslands have not been fully developed. Furthermore, there will have to be a considerable economic incentive to encourage the conversion of tame grass pasture to native range. However, if governmental and other economic incentives can be applied, it may be possible to convert some of these lands into suitable bobwhite habitat.

Final plan development

The information provided in this conceptual plan provides the history, background, and justification for a final plan, but does not include an implementation component or "road map" for restoring bobwhite habitat in Florida. The final plan must include this implementation component, with clear restoration objectives and strategies to address the challenges of restoring bobwhite habitat across Florida. Developing these objectives and strategies will require involvement of bobwhite management experts, land management experts, and public and private conservation partners. The proposed mechanism for bringing these experts and partners together to develop the "road map" for restoring bobwhites in Florida is the establishment of three committees by the executive director of the Florida Fish and Wildlife Commission (FWC). Under this proposal, there would be a planning committee established for each major land-use category identified in Table 3 (timberlands, range and pasture lands and crop lands). The overall goal for these committees will be to develop a comprehensive bobwhite restoration plan for Florida. The specific objectives for each committee will be as follows:

A. Compile information necessary to specify objectives for restoration to bobwhite habitat of land-use categories under their purview.

B. Develop potentially achievable objectives for restoration of land-use categories under their purview that will contribute to the overall goal of bobwhite restoration.

C. Develop strategies through which the objectives can be achieved.

The FWC Small-game Management Program will compile the resulting objectives, strategies, and implementation plans into a Bobwhite Restoration Plan for Florida. The plan will serve as a template for the FWC, other land management agencies, landowners and conservationists to follow to achieve restoration of the bobwhite in Florida.

Committee selection: Following is a proposed structure and composition for each committee. Names of potential members are listed where those persons have expressed an interest in serving. In other cases, the agency or category that should be represented is listed. The Small-game Management Program coordinator, one quail authority outside the Commission, a representative from Florida Audubon and a Quail Unlimited representative will be included on every committee.

Timberlands committee:

Tommy Hines, FWC
Dr. Bill Palmer, outside quail authority
Audubon representative
Florida Department of Forestry representative
Florida Park Service representative
Industrial timberlands representative
Private forestry consultant
Quail Unlimited representative
U.S. Forest Service representative

Range and pasture committee:

Tommy Hines, FWC
Dr. Bill Palmer, outside quail authority
Pat Pfiles, ranch manager
Dr. Jim Self, beef cattle specialist-IFAS
Dr. George Tanner, range specialist, University of Florida
Audubon representative
NRCS representative
Quail Unlimited representative

Cropland committee:

Tommy Hines, FWC
Dr. Bill Palmer, outside quail authority
Audubon representative
Extension/IFAS representative
NRCS representative
Private landowner
Quail Unlimited representative

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