United States Department of Agriculture

Natural Resources Conservation Service

December 2003

Creating Early Successional Wildlife Habitat Through Federal Farm Programs: An Objective-driven Approach with Case Studies

NRCS Wildlife Habitat Management Institute – Watershed Science Institute

Creating Wildlife Habitat Through Federal Farm Programs: An Objective-Driven Approach with Case Studies

Principal Investigator
Wes Burger
Department of Wildlife & Fisheries
Mississippi State University

Funded and Coordinated with
USDA[1] Natural Resources Conservation Service
Watershed Science Institute
Wildlife Habitat Management Institute
Ed Hackett and Hank Henry - Coordinators

December 2003

Photo cover credit: Wes Burger

Acknowledgements

Natural Resources Conservation Service (NRCS)

This case study was produced through the cooperation and collaboration of numerous individuals. Ed Hackett with the NRCS Wildlife Habitat Management Institute and Hank Henry with the NRCS Watershed Science Institute provided direction, oversight, constructive criticism and technical review.

NRCS and external reviewers provided constructive criticism and enhanced the utility of this product. Specifically, helpful comments by Ed Hackett, Hank Henry, Ben West, Dave Godwin, Mark Smith, and Philip Barbour substantially improved the quality of the final product.

The case studies represent conservation success stories because of the cooperation, insight, and effort of dedicated and progressive District Conservationists in Panola County, MS (Jimmy Cook); Clay County, MS (Van Williams); and Hardeman County, TN (Charles Frost). Area biologists John DeFazio (MS) and Mike Hansbrough (TN) provided guidance and assistance in conservation plan development and in ensuring wildlife management practices were in compliance with USDA standards and contract obligations.

We express our appreciation to landowners in Panola, Clay, and Hardeman Counties for permission to use their properties in case studies.

Table of Contents

Introduction

Natural Resources Conservation Service (NRCS)

Approximately 74% of the contiguous lower 48 states is in non-federal, rural land use. This nearly 1.4 billion acre land mass is composed primarily of rangeland, forestland, cropland, and pasture/hayland (USDA 2003). Between 1982 and 2001 nearly 34 million acres were converted from forest land, rowcrop, pasture/hayland, and rangeland to urban and developed land uses (USDA 2003). As rural lands are converted to developed uses, commodity production on remaining lands must increase through greater efficiency.

Those individuals who own and manage these lands most often have priorities that revolve around producing food and fiber to meet domestic and global demands and financial returns to fuel corporate, local, and family economies. But the condition of these working rural lands directly influences national environmental quality. The manner in which these lands are used and conserved will determine if we, as a nation, meet societal objectives for natural resources conservation and environmental quality (USDA 2003). Healthy and sustainable wildlife populations are an essential component of environmental quality that we, as individuals and as a society, value. The future viability of wildlife populations in the U.S. is inextricably linked to the land use decisions of these private landowners.

Natural resources conservation planning is becoming increasingly complex as producers, governmental agencies, industry, and conservationists strive to develop and implement cost effective production systems that meet world demands for food and fiber, compete in global markets, and maintain the function and integrity of natural ecosystems. These changes are necessitated by increasing knowledge of ecological processes, expanding populations, increasing demands on natural resources, technological advances, and changing public expectations.

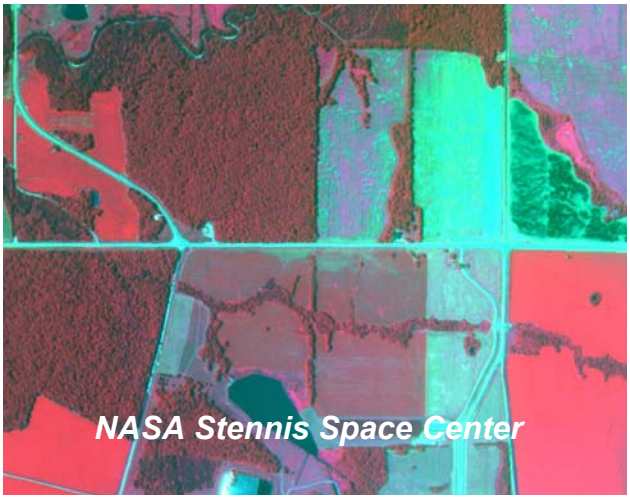
Increasingly, ecologists, wildlife biologists, and natural resource planners understand that the health of local wildlife populations, communities, and ecosystems is influenced not only by local environmental conditions and land use, but also by the structure and composition of the landscape at larger spatial scales. As such, maintenance of viable populations of many species requires conservation planning at the watershed, region, or continental scale. In recognition of the scale-dependent nature of conservation planning, the Natural Resources Conservation Services (NRCS) Watershed Science and Wildlife Habitat Management Institutes recently published and distributed *Conservation Corridor Planning at the Landscape Level: Managing for Wildlife Habitat, Part 190 National Biological Handbook*.

The Corridor Manual provides an overview of principles of landscape ecology and illustrates how these principles can be applied to conservation planning at watershed and larger spatial scales. However, the success of any area-wide conservation planning process is ultimately a function of the success of planning and implementation of conservation practices at the farm scale.

The NRCS is the agency, within the United States Department of Agriculture (USDA), that is tasked with providing assistance to private landowners who voluntarily participate in conservation programs. This assistance is very influential in determining the practices ultimately implemented. In a survey of Missouri CRP participants, NRCS recommendations were the most important factor influencing selection of established Conservation Practices (Kurzejeski et al. 1992). Similarly, Esseks and Kraft (1989) reported that the number of visits to the county Agricultural Stabilization and Conservation Service (ASCS, now FSA) office was the most important factor affecting the landowner's level of knowledge of CRP. The quality and kind of conservation technical assistance provided in county USDA Services Centers will have strong bearing on the future viability of wildlife populations in agricultural landscapes.

The objective of this publication is to suggest a philosophical framework in which wildlife conservation technical assistance is provided and to illustrate this approach with 3 case studies. These case studies have been prepared for NRCS field office personnel and directed at assisting those involved in farm-level conservation planning in agricultural landscapes.


Wes Burger

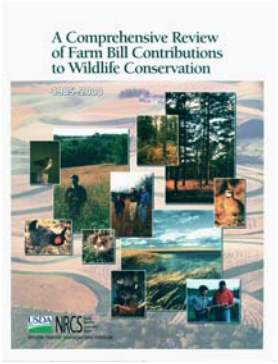

NASA Stennis Space Center


Wes Burger

Conservation Programs and Wildlife Habitat

Natural Resources Conservation Service (NRCS)

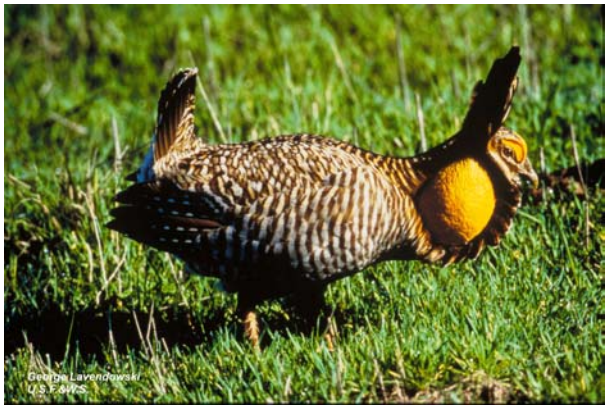
USDA conservation programs have tremendous potential to create and maintain wildlife habitat and populations. In 2002, the NRCS Wildlife Habitat Management Institute issued a report entitled "*A Comprehensive Review of Farm Bill Contributions to Wildlife Conservation.*" This report summarized virtually all of the published scientific reports of conservation benefits of USDA conservation programs such as CRP, WRP, EQIP, and WHIP. These studies provide overwhelming evidence that lands enrolled in federal conservation programs have provided wildlife habitat and have contributed to the maintenance or increase of some wildlife populations in some regions. The greatest benefits occurred on CRP lands in the Midwest. Waterfowl, game birds, and grassland songbirds are among the groups of species that have most benefited from previous conservation programs.



However, simply enrolling land in a conservation program and establishing a prescribed cover does not equate to wildlife habitat. The value of conservation program lands as wildlife habitat will vary among species and is a function of the size and shape of enrolled parcels, cover crop selected, the management regime imposed, and the landscape context in which the tract occurs. Despite the overall conservation benefits of programs such as the CRP, millions of acres of CRP provided little or no wildlife habitat value because of poor cover crop selection or management regimes. Ensuring that conservation program lands provide wildlife habitat and support viable populations requires an understanding of the habitat requirements of the focal species. This understanding is then translated to changes on the landscape through comprehensive planning and implementation at the farm scale.

…, simply enrolling land in a conservation program and establishing a prescribed cover does not equate to wildlife habitat.

The value of conservation program lands as wildlife habitat will vary among species and is a function of the size and shape of enrolled parcels, cover crop selected, the management regime imposed, and the landscape context in which the tract occurs.



Wildlife habitat is the physical, environmental factors, including but not limited to vegetation, that a species requires for survival and reproduction. The geographic distribution and abundance of a species is bounded by physical limitations (e.g. temperature, moisture, salinity, etc). Within these limitations, habitat use is further influenced by the abundance, distribution, and variability of resources (food, cover, breeding sites, etc). The environment is, and has been, essentially a

Wildlife habitat is the physical, environmental factors… that a species requires for survival and reproduction.

template that has molded animal morphology, physiology, and behavior. These "design features" or adaptations, equip a species to optimally exploit unique parts of a given environment. That is, each species acquires the energetic and nutritional resources required for survival and reproduction by foraging on specific foods, in a given manner, in a particular successional stage of one or more plant communities.

Because the biological processes (mate selection, nesting, brood rearing, thermoregulation, migration, etc.) in which individuals are involved vary throughout the annual cycle, energetic and nutritional needs vary seasonally. The availability and abundance of resources also vary seasonally. Consequently, the specific resources and habitats used vary throughout the annual cycle. The food and cover types used during the breeding season often are quite different from those used during winter. Brood habitat may be quite different than nesting habitat because chicks have different nutritional needs than adults (Figure 1).

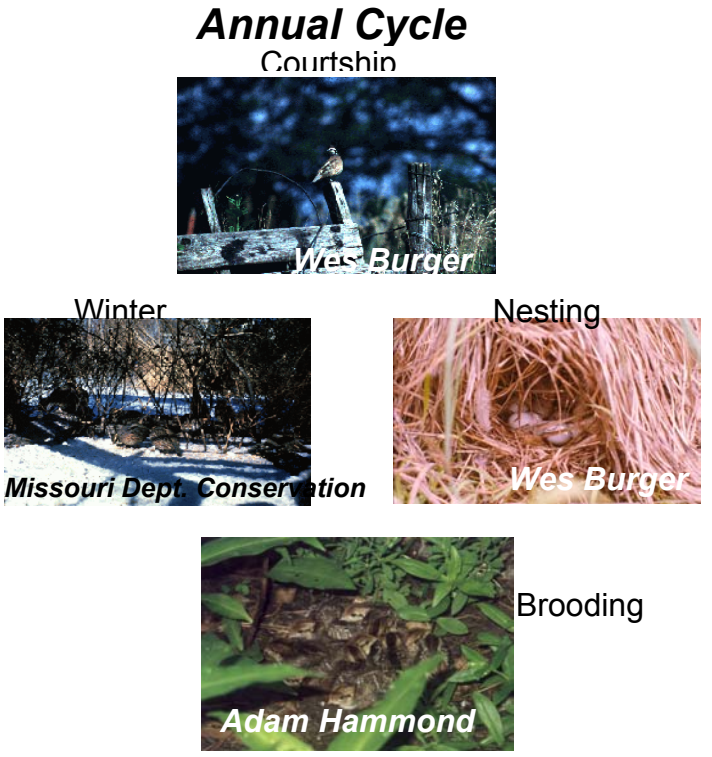


Figure 1. Habitat requirements vary seasonally throughout the annual cycle.

The objective of wildlife habitat management is to create the specific plant communities that provide the resources to meet the energetic and nutritional requirements associated with these seasonal biological processes on a year-round basis. To effectively provide wildlife habitat, conservation planners must have an understanding of seasonal habitat requirements for the species of interest.

Ecological Succession

Natural Resources Conservation Service (NRCS)

Much of wildlife management is accomplished by manipulating natural processes. Plant communities do not remain static over time, rather things change (Figure 2). We call this succession. Ecological succession is the orderly process of plant community development involving changes in plant species composition and structure over time. As plant communities change, the resources they provide for wildlife change, and subsequently their habitat value changes. The suite of wildlife species that a given tract of land supports will change over time as succession proceeds (Figure 3).

Figure 2. Plant communities change over time as illustrated by these successional changes in a bottomland hardwood system.

It is easy to visualize the kinds of changes that occur in forest succession. However, grasslands and wetlands also go through successional stages characterized by changing species composition and structure. Over time annual plants are replaced by perennials, litter accumulates, and bare ground declines. Vegetation density increases and seed and invertebrate production declines. As these changes occur, the ability of the plant community to meet specific habitat requirements of any given wildlife species changes.

We can alter (accelerate or set back) the plant community, and subsequently the resources provided and associated wildlife species, by managing the frequency, timing, and intensity of disturbance and hence the successional stage. Practices such as planting, fertilizing, irrigating will increase the rate of succession. Disturbances such as prescribed fire, disking, mowing, or herbicide may set back succession. Effective wildlife management entails recognizing the successional stages to which a species is adapted and using planned disturbance regimes to create and maintain those communities.

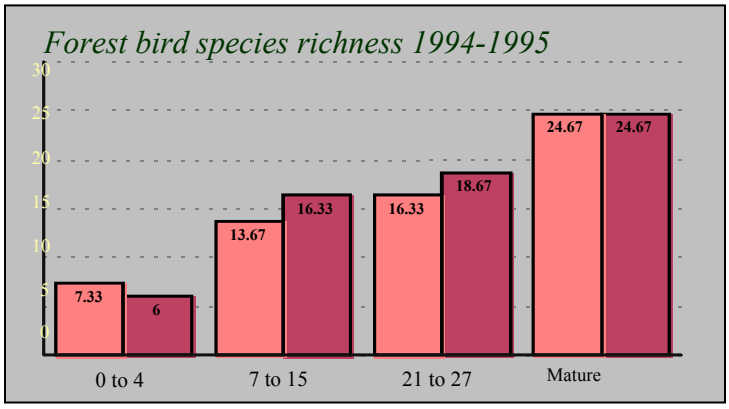


Figure 3. The number of forest bird species observed in bottomland hardwood plantings in the Mississippi Alluvial Valley increases with age of stand (1994 – 1995) (Nuttle 1997).

Natural Resources Conservation Service (NRCS)

The National Planning Procedures Handbook characterizes conservation planning as a 9-step process, preceded by preplanning activities and followed by post-implementation evaluation. The Conservation Corridor Handbook illustrates this process for area-wide planning.

Because these topics are thoroughly developed in both the NPPH and the corridor handbook, they will be addressed only briefly here. The preplanning process involves gaining an understanding of the preconditions that brought the producer to the planning process and collection of materials and resources that will be needed for planning.

Phase 1

The planning process begins with Step 1, which entails clearly identifying and concisely documenting the client's resource problems, opportunities, and concerns. In Step 2, the client's objectives are clearly stated and documented. Step 3 involves gathering sufficient data and information to analyze and understand the natural resource conditions in the planning area. This step documents baseline conditions on the client's property. This step should include identifying presence or distribution of wildlife species of interest, mapping plant communities and land use/landcover types, informing landowner of life history and habitat requirements of species of special interest, and inventorying those wildlife resources specifically related to the landowner's objectives. This step requires that the resource professional understand fundamental habitat requirements and relationships for the species of special concern. In Step 4, the baseline conditions identified in Step 3 are documented and displayed in easily understood formats. Comparisons between baseline natural resource conditions and potential future conditions allow the causes of the resource problem to be easily understood. Geographic Information System-based maps provide a powerful tool for accomplishing this analysis.

Planning Process

Preplanning
- Identify preconditions that triggered planning process
- Accumulate materials and resources needed for planning process

Phase 1. Collection and analysis at the conservation plan scale.
- Step 1 – Identify problems and opportunities
- Step 2 – Determine objectives
- Step 3 – Inventory resources
- Step 4 – Analyze resources

Phase 2. Decision support at the conservation plan scale
- Step 5 - Formulate alternatives
- Step 6 - Evaluate alternatives
- Step 7 – Make decisions

Phase 3. Application at the conservation plan scale
- Step 8 – Implement plan
- Step 9 – Evaluate plan

Phase 2

Step 5 entails formulating and articulating alternative management regimes that address resource problems and meet landowner objectives. This step requires both technical expertise and creative capability on the part of the resource professional. These alternatives can best be illustrated as a series of GIS map layers that depict baseline conditions, existing habitat resources, habitat resource management regimes, potential habitat and new plantings, and the synthesis, or hypothetical future conditions. Landowners can make more informed decisions if they are able to consider alternative plans for their property and resource needs. The Corridor Manual provides the following examples of alternative plans.

- Alternative plans using different practices to address a particular soil or water conservation problem.
- A plan to optimize wildlife species diversity.
- A plan to increase populations of a particular species, guild, or suite of species.
- A plan to optimize recreation, economic, or other corridor benefits
- A plan of conservation practices without enhancement for wildlife
- A no-action alternative

Step 6 involves evaluating the effects of each alternative and subsequent impacts. Alternatives are compared to baseline conditions to evaluate their ability to solve problems, meet quality criteria, and achieve the client's objectives. In Step 7, a conservation management system is selected based on the client's clear understanding of the impacts of each alternative.

Phase 3

In Step 8 the client has adequate information and understanding to implement, operate and maintain the planned conservation systems. The client and conservationist cooperate in implementing the plan. Step 9 involves evaluating the response to plan implementation to determine whether results are meeting ecological, economic, and social objectives and solving the conservation problems in a satisfactory manner. Results are fed back into the planning process and adaptive management strategies are employed.

Summary

This formal planning process has been developed to help the conservationist accomplish essential specific tasks in a systematic manner. When wildlife conservation is a central focus of the planning process these tasks might be summarized in the following bullets.

- Identify and understand resource problem
- Determine client's objectives
- Consider seasonal habitat requirements of focal species
- Evaluate landscape at appropriate spatial scales to identify existing habitat and deficiencies
- Determine plant communities that will provide essential life requisites
- Develop a plan that depicts landscape in a future potential state that will meet habitat requirements and accomplish client objectives
- Identify management practices that will create and maintain these communities
- Identify farm programs and practice standards under which these practices can be implemented
- Implement, evaluate, and modify

Objective-driven vs. Program-driven

Often, producer selection of conservation practices is program driven. That is, the landowner decides to enroll in a specific program, then management practices are driven by the requirements of that program. These management practices may or may not meet his stated or unstated objectives, they are simply required by the program in which he has elected to enroll. The NPPH and the Corridor Manual provide a clear alternative to this approach. The client objectives are clearly defined, an alternative landscape that meets the objectives is visualized, the management practices required to produce this landscape are identified, and programs under which these practices can be implemented are selected. Very often a given management practice or cover planting can be established under more than one program. However, the various programs may differ in their eligibility requirements, cost share, incentive payments, or duration. In many cases, conservation practices from multiple programs are required to meet objectives. Alternative plans under which the same practices are implemented using different programs allow the producer to optimize his or her economic as well as conservation objectives. Under this approach, objectives drive management practices and management practices lead to program selection, instead of program requirements driving management practices.

Case Studies

The following 3 case studies illustrate this objective-driven planning process and the resultant creation of high quality early successional wildlife habitat through farm program participation.

References

Esseks, J. D., and S. F. Kraft. 1989. Marketing the Conservation Reserve Program. J. Soil and Water Conserv. 44:425-430.

Kurzejeski, E. W., L. W. Burger, Jr., M. J. Monson, and R. L. Lenkner. 1992. Wildlife conservation attitudes and future land-use intentions of Conservation Reserve Program participants in Missouri. The Wildl. Soc. Bull. 20:253-259.

Nuttle, T. 1997. Response of breeding bird communities to afforestation of hardwood bottomland sites in Mississippi. MS. Thesis Mississippi State University. 68pp.

USDA 1999. Conservation Corridor Planning at the Landscape Level: Managing for Wildlife Habitat. National Biological Handbook, Part 614.4.

USDA 2003. Natural Resources Inventory, 2001 Annual NRI. www.nrcs.usda.gov/technical/land/nri.