United States Department of Agriculture

NRCS Natural Resources Conservation Service

March 2006

Technical Note

Creating Early Successional Wildlife Habitat through Federal Farm Programs:

An Objective-Driven Approach with Case Studies

Issued March 2006

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Acknowledgements

This publication was produced through the cooperation and collaboration of numerous individuals. **Ed Hackett** and **Hank Henry**, Natural Resources Conservation Service (NRCS), 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, Mississippi (**Jimmy Cook**); Clay County, Mississippi (**Van Williams**); and Hardeman County, Tennessee (**Charles Frost**). Area biologists **John DeFazio** (Mississippi) and **Mike Hansbrough** (Tennessee) provided guidance and assistance in conservation plan development and ensuring wildlife management practices were in compliance with U.S. Department of Agriculture (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.

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Purpose

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 three case studies:

- Birdlands Plantation in Panola County, Mississippi
- B. Bryan Farms in West Point (Clay County), Mississippi
- 1,471-acre tract in Hardeman County, Tennessee

The case studies were prepared for Natural Resources Conservation Service (NRCS) field office personnel and directed at assisting those involved in farm-level conservation planning in agricultural landscapes.

Figure 1 Location of Panola and Clay counties, MS

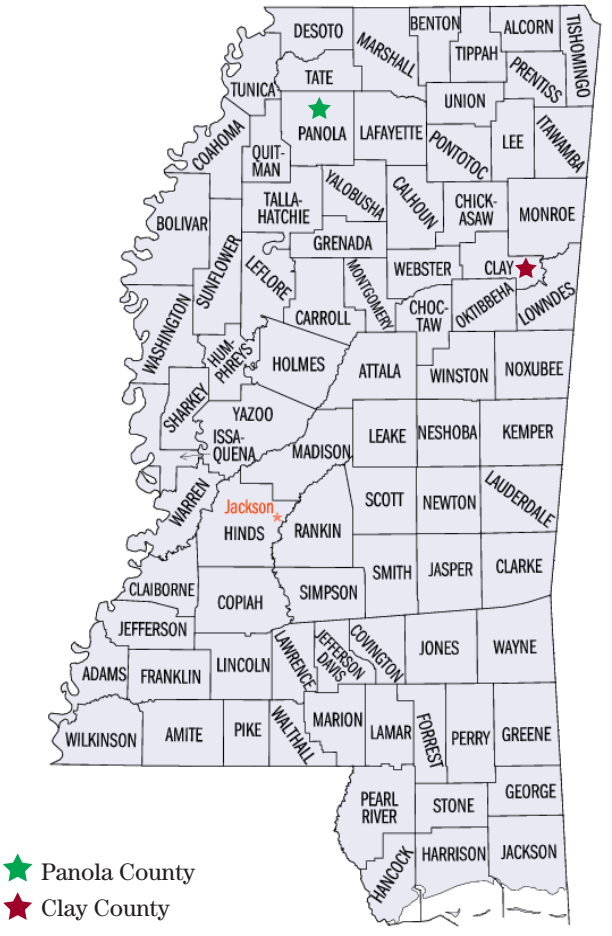
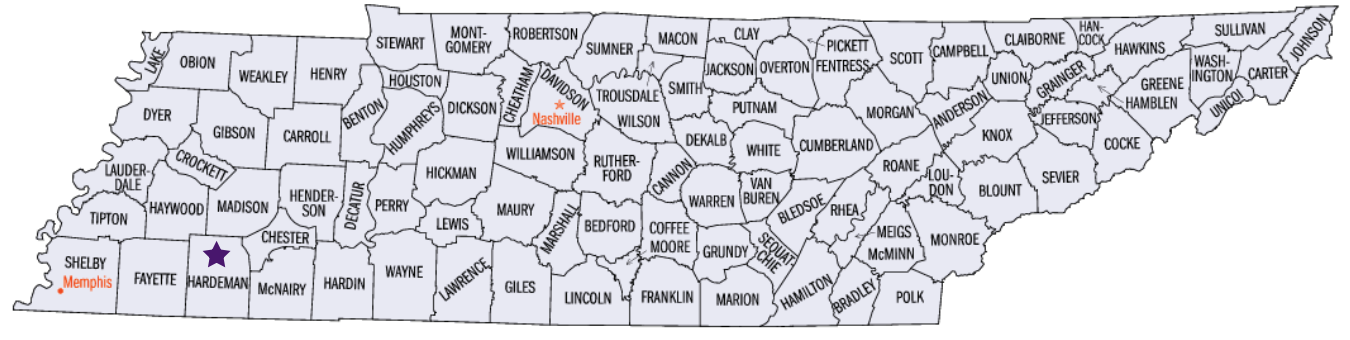


Figure 2 Location of Hardeman County, TN



(Technical Note, March 2006)

Introduction

Approximately 74 percent 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 forestland, row crop, 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 United States 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 Service (NRCS) published and distributed Conservation Corridor Planning at the Landscape Level: Managing for Wildlife Habitat, Part 190 National Biological Handbook.

The Corridor Handbook 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 quality and kind of conservation technical assistance provided in county USDA Service Centers will have strong bearing on the future viability of wildlife populations in agricultural landscapes.

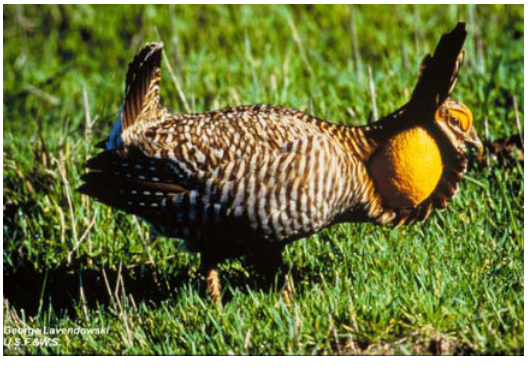
The NRCS is the agency within the U.S. Department of Agriculture (USDA) tasked with providing assistance to private landowners who voluntarily participate in conservation programs. This assistance is very influential in determining the practices ultimately implemented. In a survey of Missouri CRP participants, 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 Service Centers will have strong bearing on the future viability of wildlife populations in agricultural landscapes.

Conservation programs and wildlife habitat

USDA conservation programs have tremendous potential to create and maintain wildlife habitat and populations. In 2002, the NRCS issued a report entitled A Comprehensive Review of Farm Bill Contributions to Wildlife Conservation. This report summarizes virtually all of the published scientific reports on the 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 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 (fig. 3) and is a function of the size and shape of enrolled parcels, cover crop selected, management regime imposed, and landscape context in which the tract occurs. Despite the overall conservation benefits of programs such as the CRP, millions of acres of CRP provide 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.

Figure 3 Greater prairie-chickens require large expanses of open grassland that often cannot be provided by a single farm or ranch.



Wildlife habitat requirements

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 (temperature, moisture, salinity). Within these limitations, habitat use is further influenced by the composition and structure of vegetation that provides food, cover, breeding sites, and other needs.

The environment is essentially a 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 (fig. 4) (mate selection, nesting, brood rearing, thermoregulation, migration) 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.

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.

Figure 4 Annual cycle of biological processes. *Photo credits: Courtship, Wes Burger; Winter, Missouri Conservation; Nesting, Wes Burger; Brooding, Adam Hammond*

Courtship

Nesting

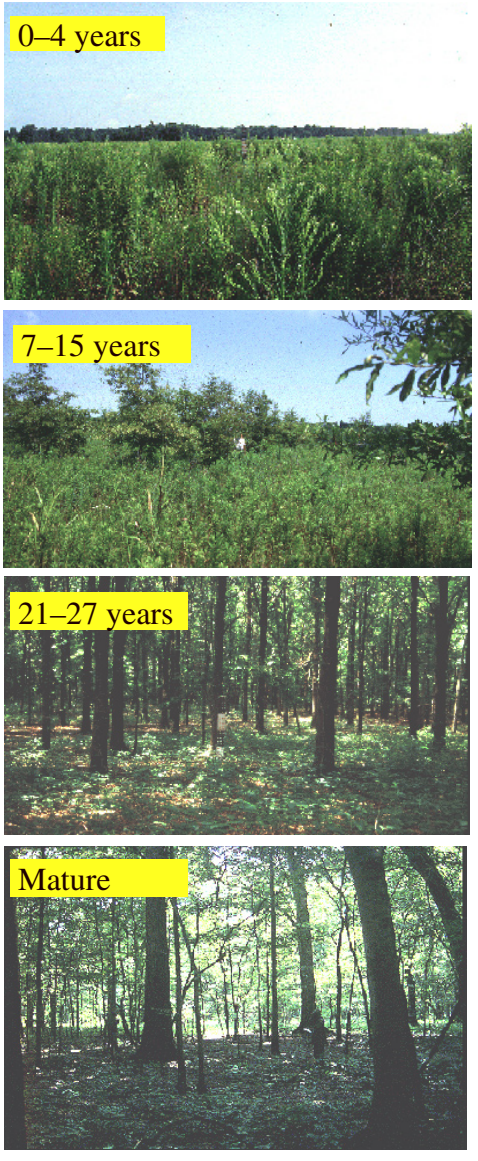
Winter

Brooding

Ecological succession

Much of wildlife management is accomplished by manipulating natural processes. Plant communities do not remain static over time, rather things change (fig. 5). 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 (fig. 6). 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 decreases. Vegetation density increases and seed and invertebrate availability decline. As these changes occur, the ability of the plant community to meet specific habitat requirements of any given wildlife species changes.

Figure 5 Successional changes in a bottomland hardwood system

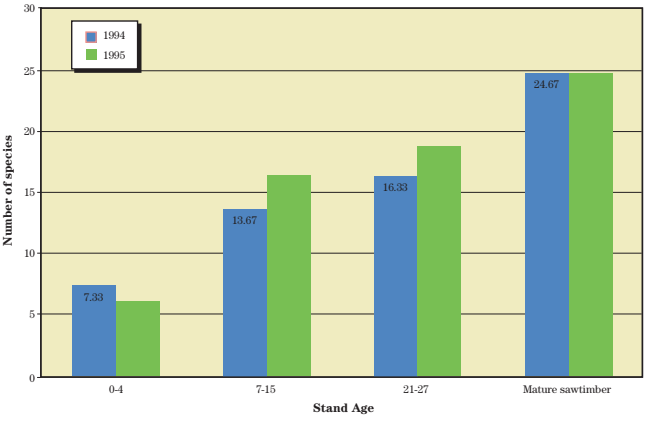


We can alter (accelerate or set back) the plant community and, subsequently, the resources provided and associated wildlife species, by managing the frequency, timing, and intensity of disturbance, and hence the successional stage. Practices such as planting, fertilizing, and irrigating increase the rate of succession. Disturbances such as prescribed fire, disking, mowing, or herbicide applications 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.

The National Planning Procedures Handbook (NPPH) characterizes conservation planning as a nine-step process, preceded by preplanning activities and followed by post-implementation evaluation. The 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 landowner/producer to the planning process and collection of materials and resources needed for planning.

Figure 6 Forest bird species observed in bottomland hardwood plantings and mature forest in the Mississippi Alluvial Valley (1994–1995) (Nuttle 1997)



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 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 the presence or distribution of wildlife species of interest, mapping plant communities and land use/landcover types, informing the 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 (GIS)-based maps provide a powerful tool for accomplishing this analysis.

Phase 2

Landowners can make more informed decisions if they are able to consider alternative plans for their property and resource needs. **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 are best 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. The Corridor Handbook provides the following examples of alternative plans:

- Alternative plans using different practices to address a particular soil or water conservation problem
- Plan to optimize wildlife species diversity
- Plan to increase populations of a particular species, guild, or suite of species
- Plan to optimize recreation, economic, or other corridor benefits
- Plan of conservation practices without enhancement for wildlife
- 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 man-

ner. Results are fed back into the planning process and adaptive management strategies are employed.

Summary

This formal planning process was 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 as follows:

- Identify and understand the 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 the plan.

Objective-driven versus Program-driven

Often, selection of conservation practices is program driven. That is, the landowner decides to enroll in a specific program, and then management practices are driven by the requirements of that program. These management practices may or may not meet the landowner's stated or unstated objectives; they are simply required by the program in which the landowner has elected to enroll. The NPPH and Corridor Handbook provide a clear alternative to this approach:

- The client's objectives are clearly defined.
- An alternative landscape that meets the objectives is visualized.
- Management practices required to produce this landscape are identified.
- Programs under which these practices can be implemented are selected.

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.

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

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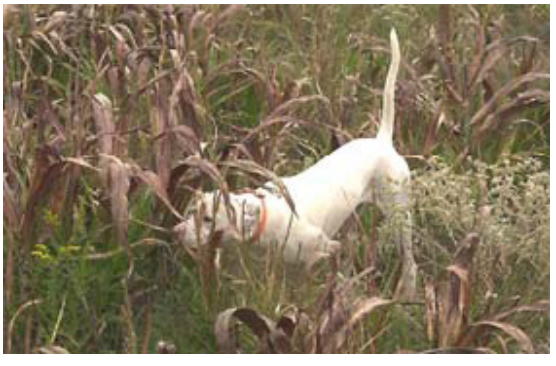
Case Study: Birdlands Plantation, Panola County, Mississippi

This case study illustrates how a private landowner with a clear vision of objectives and an understanding of wildlife habitat requirements can develop and implement an effective conservation plan. On this property, Federal farm programs (CRP and WHIP) provide the vehicle for wildlife habitat development. This case study illustrates the objective-driven approach to conservation planning and implementation.

Birdlands Plantation in Panola County, Mississippi, has a rich history of agriculture, bobwhite hunting, and bird dog field trialing. The core property has been the site of regional and national field trials for more than 50 years (fig. CS1–1). However, by the mid-1990s, wild bird populations on the 5,111-acre property had reached an all-time low. Like many other properties throughout the Southeast, high populations of wild bobwhite were seemingly a thing of the past. Some of those involved in the field trials on Birdlands suggested that to keep the trial viable, they might have to resort to the release of pen-reared birds. However, this solution, although commonly adopted on other grounds, is not an ecologically sound approach and was not an option for the owners. Instead, in 1997, they engaged a wildlife consultant to evaluate habitat conditions, identify causes of the population decline, and suggest management practices that would restore populations to former levels.

The owners had a clear vision of their goal and objectives. They simply wanted to create the finest all-age, bird dog field trial site run on wild birds in the Midsouth. They intended to accomplish this through intensive habitat management that would produce and sustain a high density of wild bobwhites.

Figure CS1–1 Bird dog field trials



Birdlands Plantation is held in three ownerships by two families (map CS1–1). The northern one-third of the property is held by one family, the southern one-third by a second family, and the central portion is held in a limited liability corporation, under joint ownership. However, because the families have common objectives and a shared vision, the property is effectively managed as a whole.

Site description

Birdlands is located in the Loess hills of Northwest Mississippi, not far from where the hills drop off into the Mississippi Delta. The topography is flat in the flood plains to rolling or steeply sloped in the uplands. Upland soils are highly erodible and deeply gullied in places. Upland soils on Birdlands are generally of the Loring (LoB2, LoB3, LoC3) and Grenada (GrB2, GrC3) series. Flood plains are comprised of predominantly Collins Soil series (Cm, Co).

In recent years, the property had been primarily dedicated to production of row crops, forage crops, and forest products (map 2). In 1997, land cover/land use on the property included mixed pine/hardwood (17%), row crop (14%), 11-year-old pine plantation enrolled in the CRP (21%), pasture hay (11%), grass CRP (14%), and pecan groves (8%). Pastures were dominated by bermudagrass and heavily grazed. Crop fields (beans, wheat, and corn) were typically large and clean farmed, although grass filter strips had been established on sloping fields. The 11-year-old pine plantations were dense, closed canopy, with a deep duff layer of needles and little understory, except where individual tree mortality had created light gaps. Grass CRP fields were either dense stands of broomsedge with a deep duff layer or solid stands of tall fescue.

Analysis

In developing a comprehensive management program, the wildlife consultant examined each portion of the property and tried to identify locally limiting resources (map CS1–3). The objective was to make 100 percent of the property usable to birds and increase the habitat quality in areas already supporting birds. The property had a number of assets including historically high bobwhite populations, good bobwhite seed population,

favorable landscape context, rich soils, good natural seed bank, farm program eligibility, and a progressive District Conservationist and County Executive Director in the county Farm Services Center.

However, it also had liabilities. The availability of essential habitat components for bobwhite varied considerably across the property. In more intensively cropped portions of the property, waste crops such as beans provide an abundant food source that can be made available to birds if sufficient cover is available in close proximity. In these areas, food was not limiting. However, nesting cover, brood-rearing cover, and woody escape cover were scarce. Consequently, in row crop areas, management should emphasize creation of wooded draws, pine corridors, plum thickets, and grass/fallow field borders. Conversely, in CRP fields, grass cover was widely available, but unsuitable because of the dense growth and deep litter accumulation. In grass-dominated fields, food was less available and brood-rearing cover scarce. Management activities emphasized renovation of grass stands using prescribed fire. Rotational cropping of food plots and strip disking could be used to create early successional plant communities that would provide foraging and brood rearing habitat. The dense exotic grasses in tall fescue CRP fields and bermudagrass pastures had stymied the development of a diverse native plant community and inhibited movement of chicks and foraging adults. Herbicidal eradication of the exotics and re-establishment of a native plant community was needed in these areas.

The 11-year-old pine plantations with closed canopies and little ground cover would provide no habitat until thinned and burned.

Habitat resource management

Although the overall composition of Birdlands was quite diverse, given land-use practices tended to be clustered creating three separate types of landscape (pine plantations, row crop, grasslands). Each of these landscapes had its own unique challenges and solutions. Bobwhite require interspersion of different successional stages (grasslands, shrubby woody cover, annual plant communities). Therefore, the management objective was to document the missing components in each of these landscapes and identify specific practices that would create and maintain these essential communities (fig. CS1–2 through 4). The following presents an analysis of each landscape and proposed solutions.

Row crop fields

Limitations

- No perennial grass for nesting
- No annual plant communities for brooding
- No woody escape cover
- No transition zones between crop and adjacent forest (field border, filter strip)

Management action (fig. CS1–2 and maps CS1–4 and 5)

- Create grass/legume field borders
  - o WHIP – native grass-legume transition zones
  - o CRP – CP22 with tree, shrub, and herbaceous zones
- Create wooded corridors and plum thickets
  - o WHIP – hedgerow establishment (pine trees and shrubs)
  - o CRP – CP22 with tree, shrub, and herbaceous zones

Figure CS1–2 Bicolor lespedeza and pine corridors established under WHIP to divide large fields into smaller units and increase usable space for bobwhite

Grasslands

Limitations

- Extensive plantings of exotic grasses (tall fescue and bermudagrass)
- Bobwhite not adapted to foraging in thick sod
- Broomsedge fields dense with deep litter layer from years of annual bushhogging
- Large grass fields provide little winter food

Management action (maps CS1–4, 6, 7, 9, and 10)

- Herbicidal eradication of forage grasses (Roundup® + Plateau® (now marketed as Journey®) for fescue, Arsenal® for bermuda)
  - o Cost-shared under WHIP for non-CRP
  - o Cost-shared as cover crop enhancement on CRP re-enrollment
- Rotational strip-disking and prescribed burning creates annual plant/legume communities and bare ground and reduces litter accumulation
  - o WHIP prescribed fire and strip disking practices on non-CRP
  - o Written into CRP management plan as recurring management practices
- Establish rotational food plantings

Figure CS1–3 (Top) Diverse plant community following herbicidal renovation of fescue; (bottom) Partridge pea response to disking and burning

CRP pine plantations

Limitations

- Densely stocked stands
- Closed canopy
- No sunlight to forest floor
- Little or no herbaceous ground cover
- Essentially unusable to birds

Management action (maps CS1–4 and 8)

- At contract expiration re-enroll as CP11 with 50 point wildlife option
- Prescribe burn
- Thin to < 300 trees/acre
- Convert 15 percent to openings with herbaceous cover
- Establish 3-year prescribed burn rotation
- Use selective herbicide to control hardwood understory encroachment

Figure CS1–4 CRP pine stands 2 years after burning

Today, wildlife populations flourish on Birdlands. Bobwhite are at higher population levels than anytime in recent history, and it seems to just keep getting better. The owners and their guests averaged more than three covey finds per hour and experienced many 12 to 20 covey days throughout the season. The property hosts two to four field trials per year and under favorable weather conditions, trialers can expect to see 15 to 17 coveys pointed in a day.

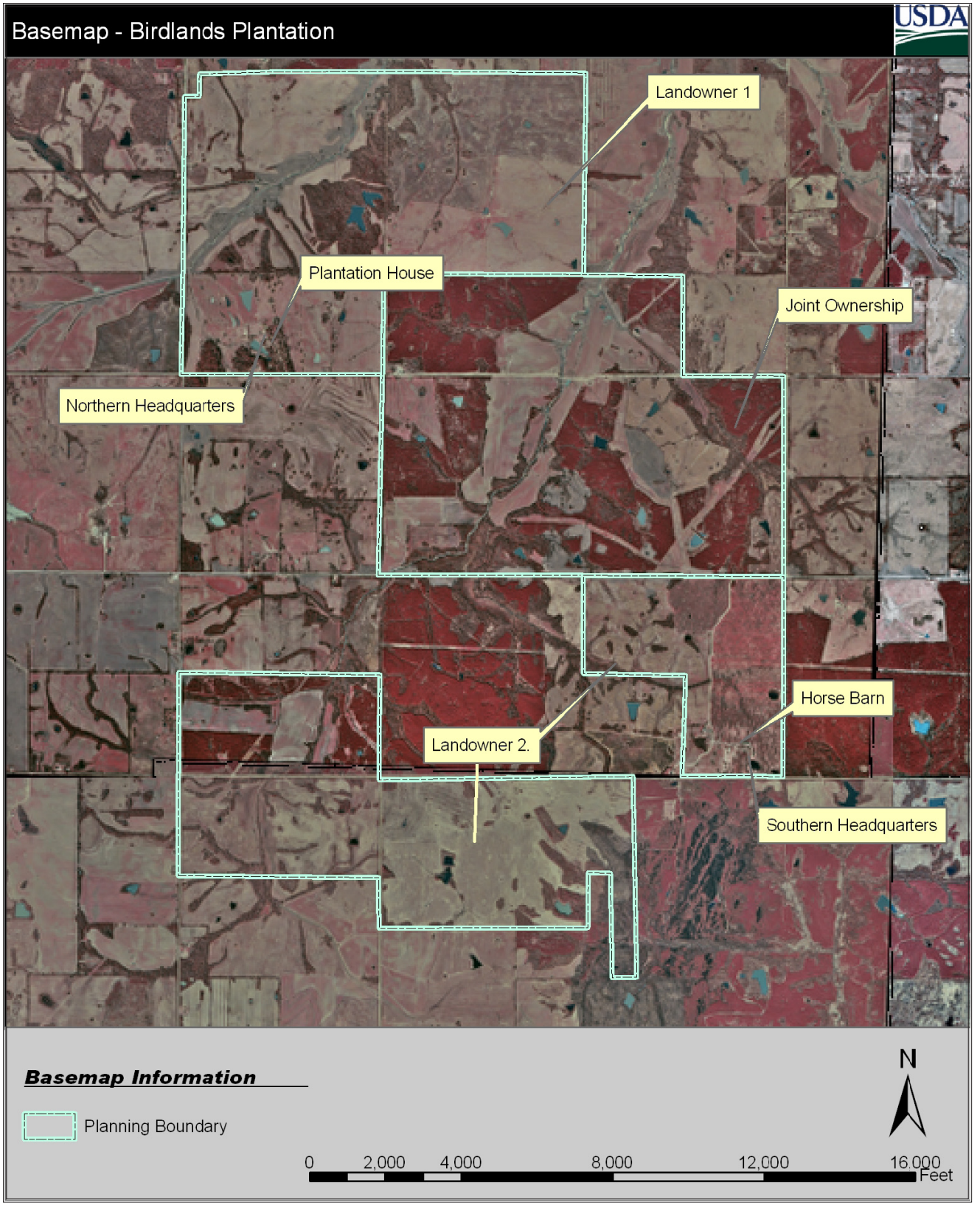
Bobwhite have not been the only beneficiaries. Grassland songbirds, such as meadowlark, dickcissel, red-winged black birds, and common yellow throat abound in the diverse grasslands. Grassland raptors, such as northern harriers, find abundant prey during winter and barn owls breed on the property. The property supports a large, well-balanced deer herd and a quality deer management program produces premium lease rates. Even eastern wild turkey, absent from this portion of the State for decades, are making a comeback.

Wildlife populations are often an accidental by-product of agricultural practices, but in the case of Birdlands, it is no accident. Wildlife conservation is fully integrated into the row crop and timber production system. Now the owners are reaping benefits with abundant wildlife populations, reduced erosion, better water quality, and a sustainable revenue stream. Participation in a suite of Federal farm programs has been integral to the success of Birdlands' wildlife conservation program. The success of this operation has provided a model for other landowners in the local community, state, and field trial communities. This site demonstrates that, even in today's landscape, comprehensive planning, objective-driven program selection, and integrated wildlife habitat management can produce great returns (fig. CS1–5).

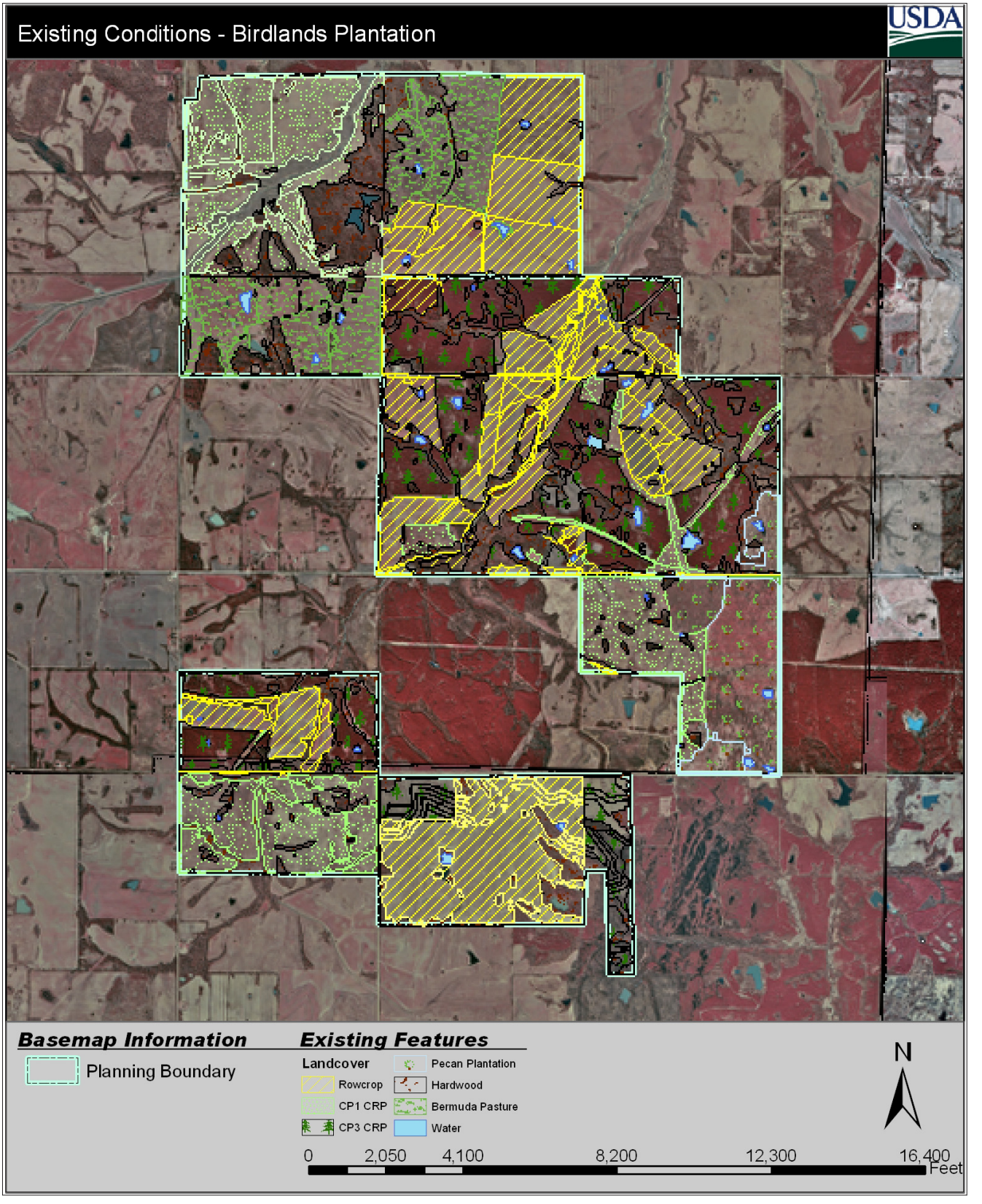
The maps on the following pages illustrate the planning process.

Figure CS1–5 Rip, the objective-driven dog and the objective

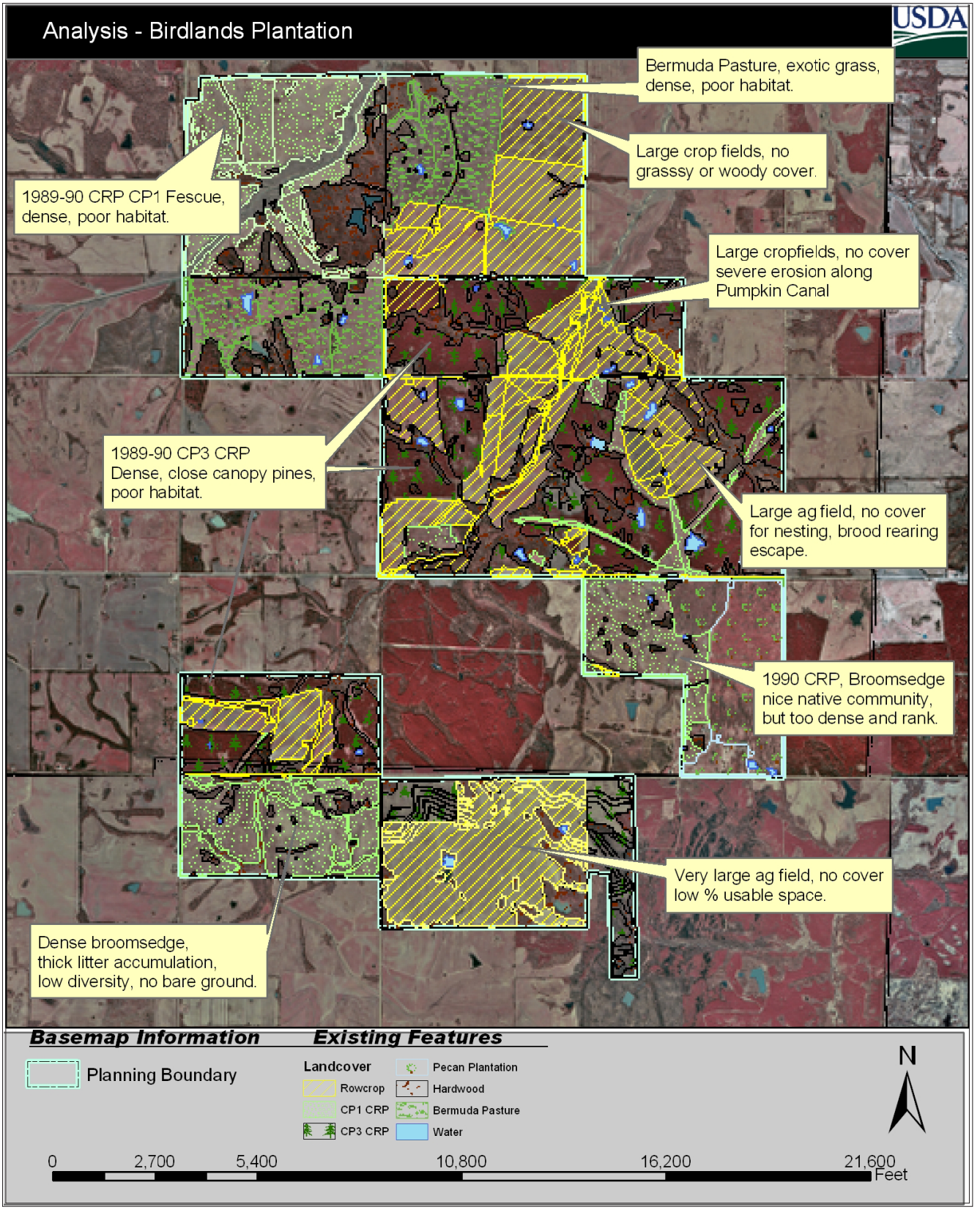
Map CS1–1 Basemap illustrating planning boundary and ownership for Birdlands Plantation, Panola County, MS



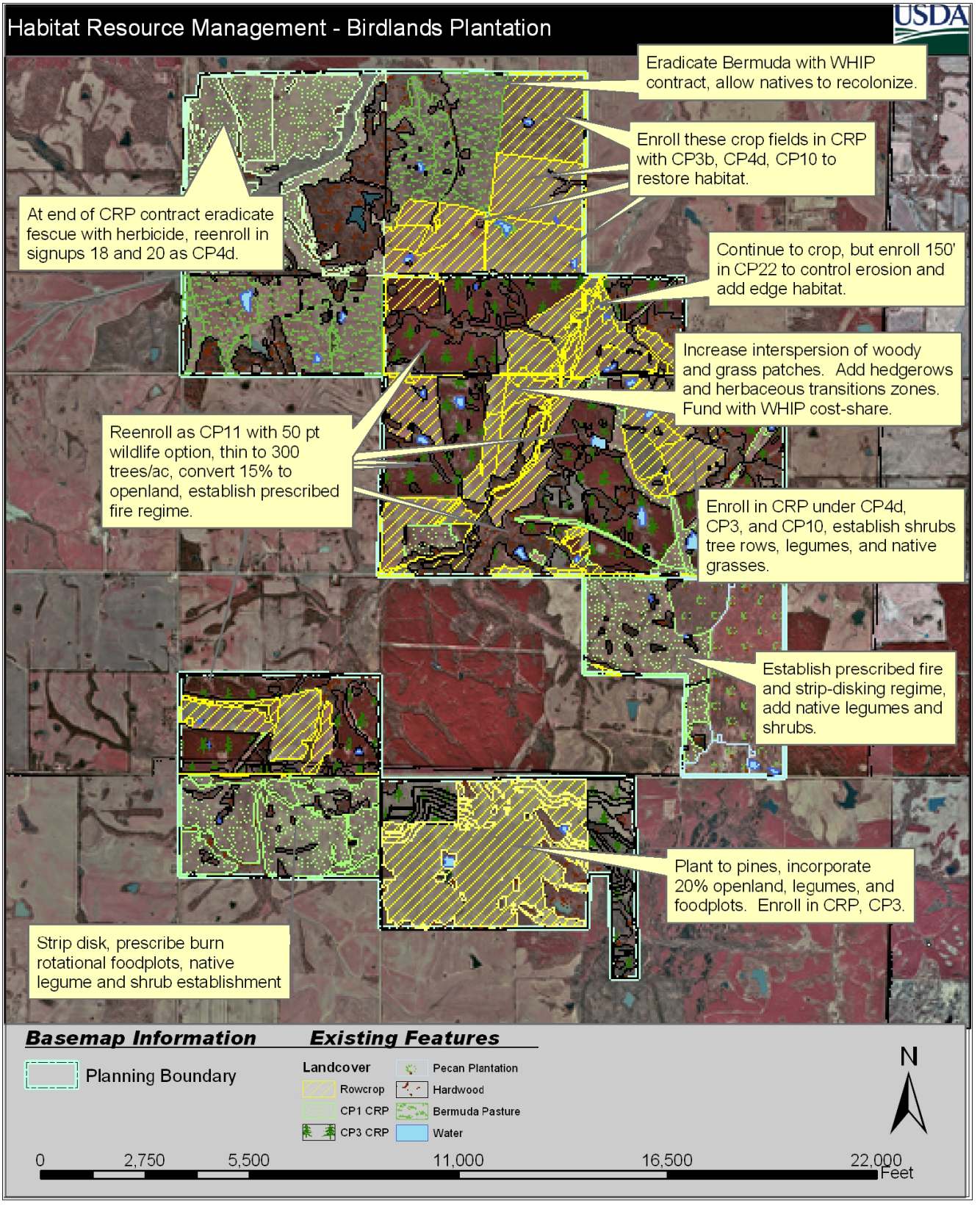
Map CS1–2 Existing conditions on Birdlands Plantation at initiation of planning process



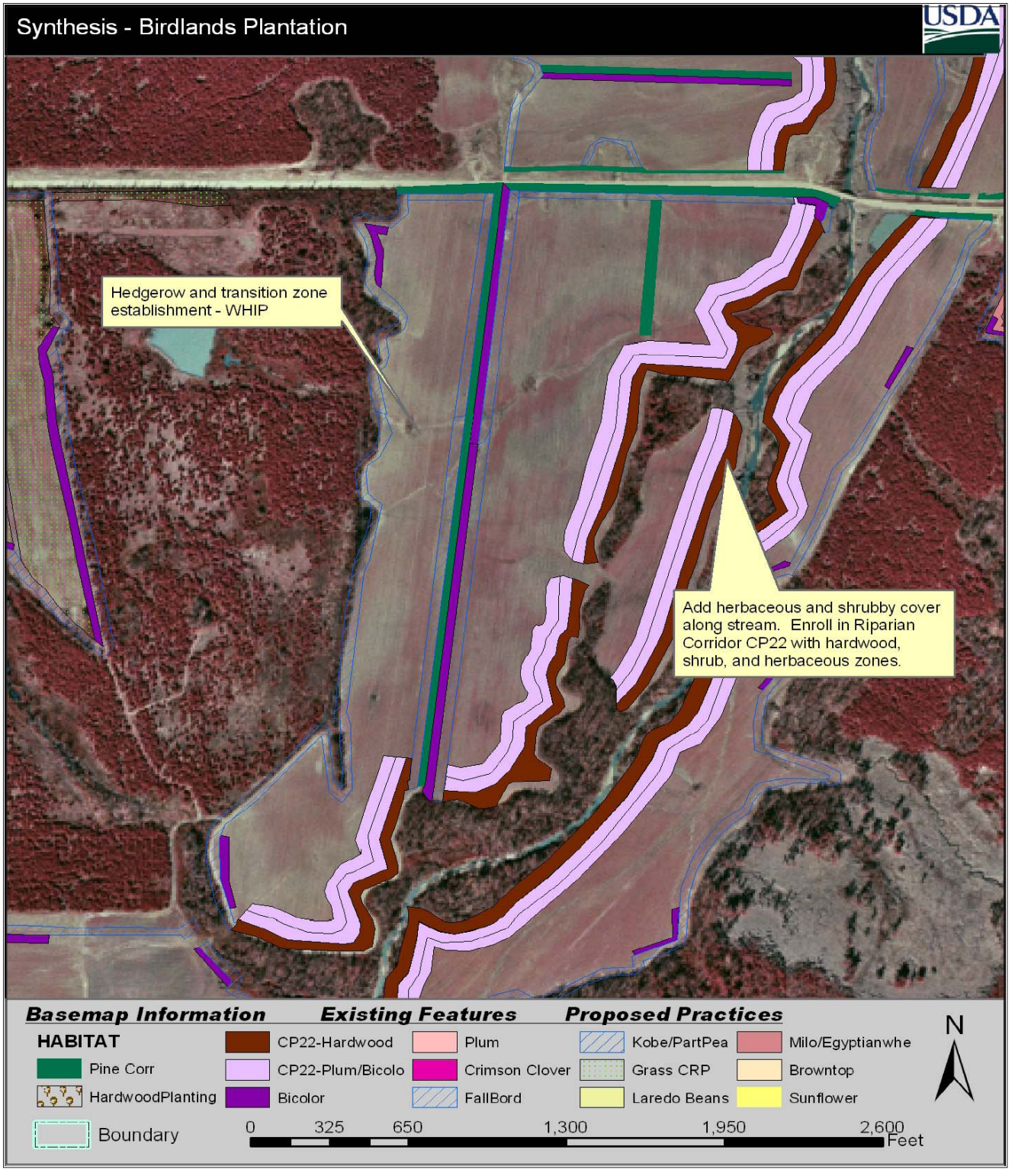
Map CS1–3 Analysis of existing conditions on Birdlands Plantation at initiation of planning process



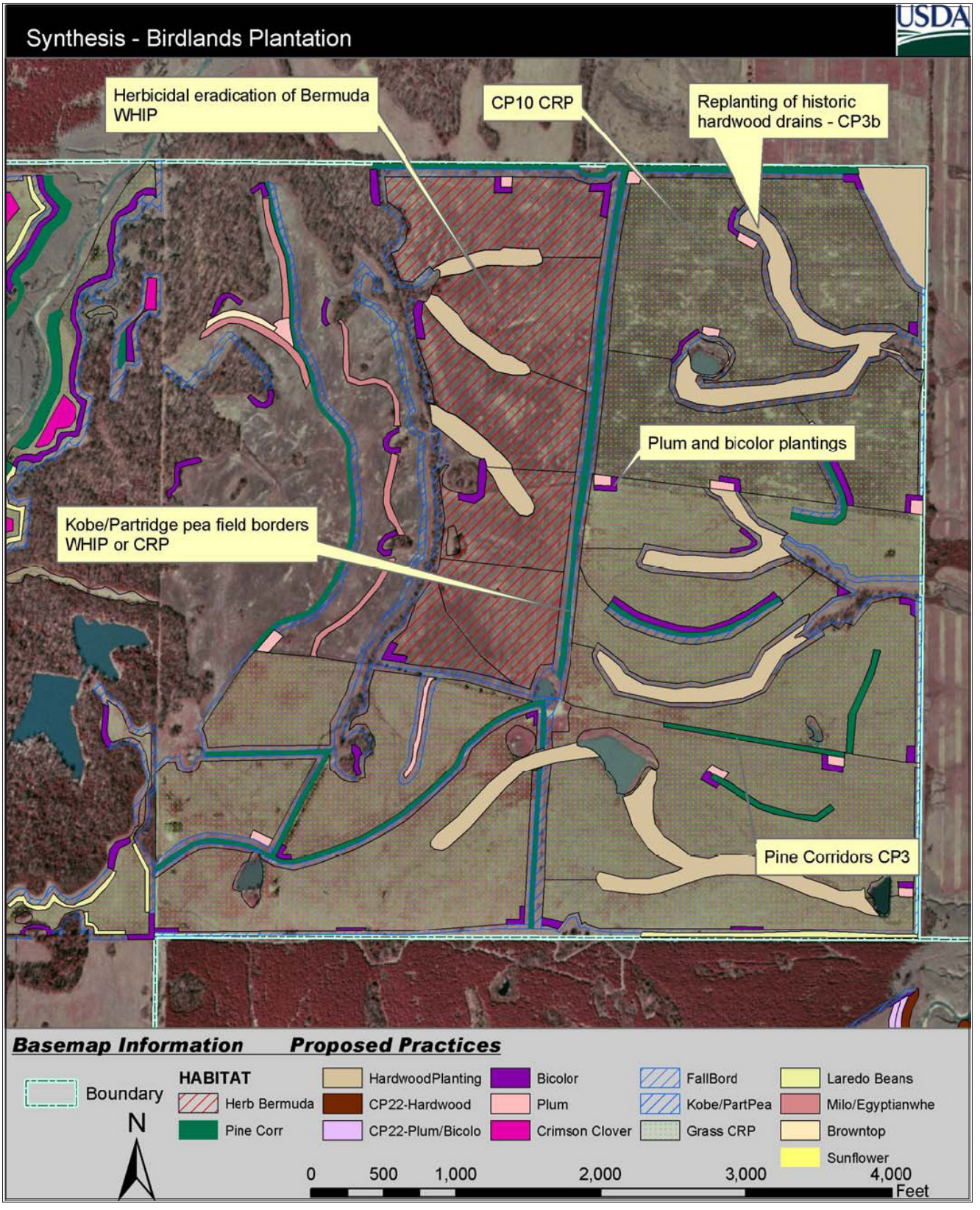
Map CS1–4 Habitat resource management required to achieve desired objectives on Birdlands Plantation



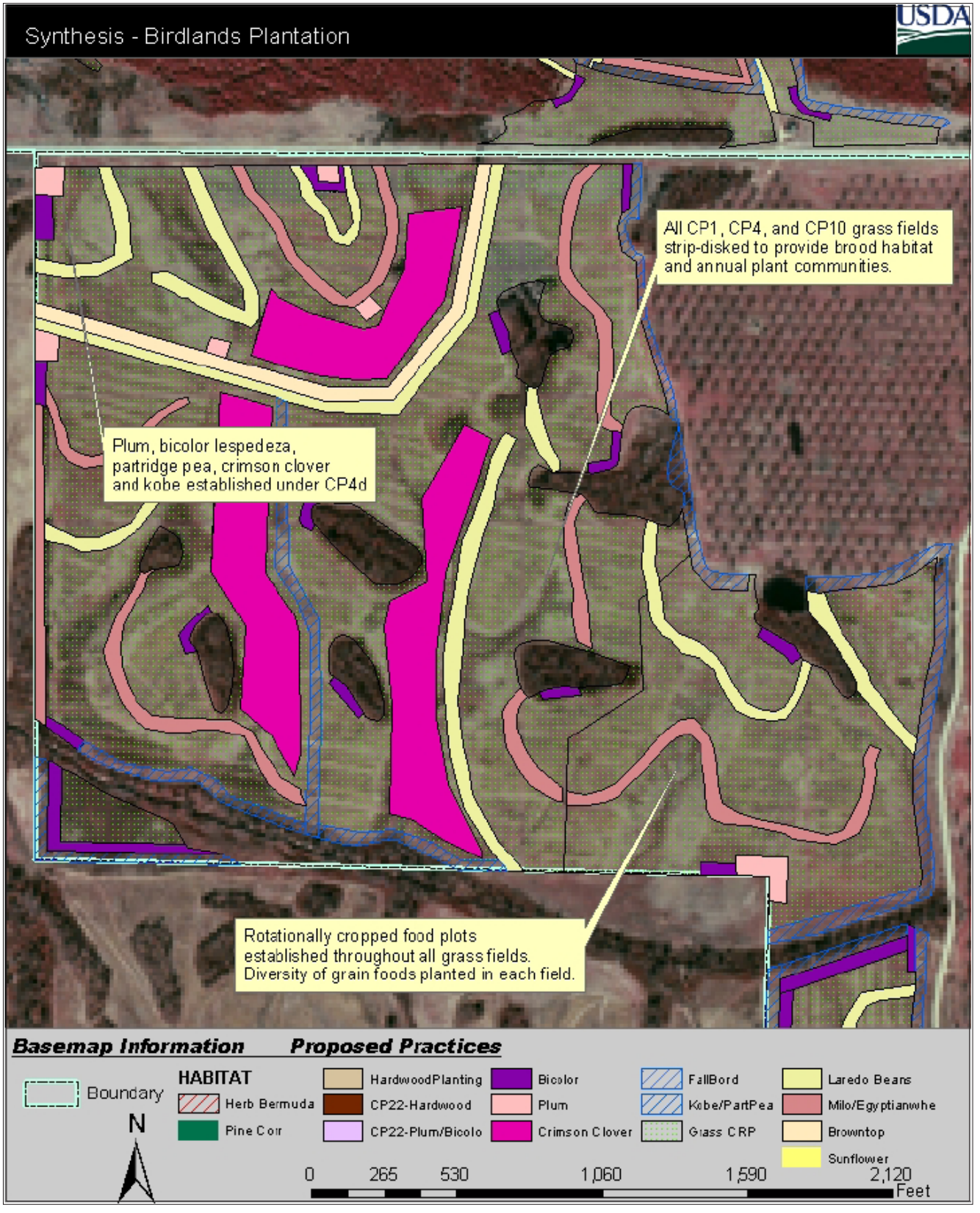
Map CS1–5 Example of specific practices and programs used to create nesting, brood rearing, and escape habitat on agricultural fields on Birdlands Plantation



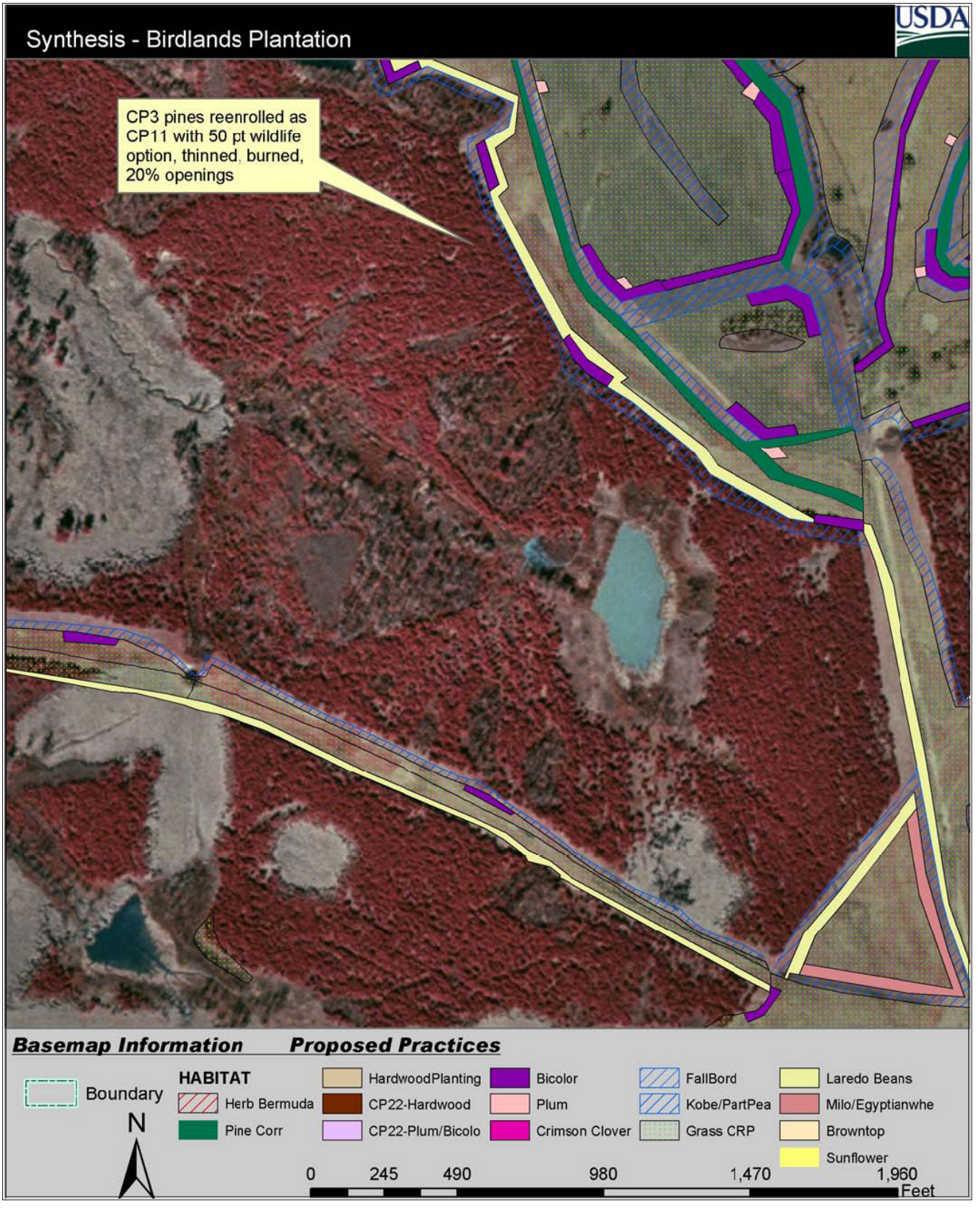
Map CS1–6 Examples of specific practices and programs used to enhance bobwhite habitat quality on bermuda-dominated idle grassland (west field) and cropland enrolled in CRP (east field)



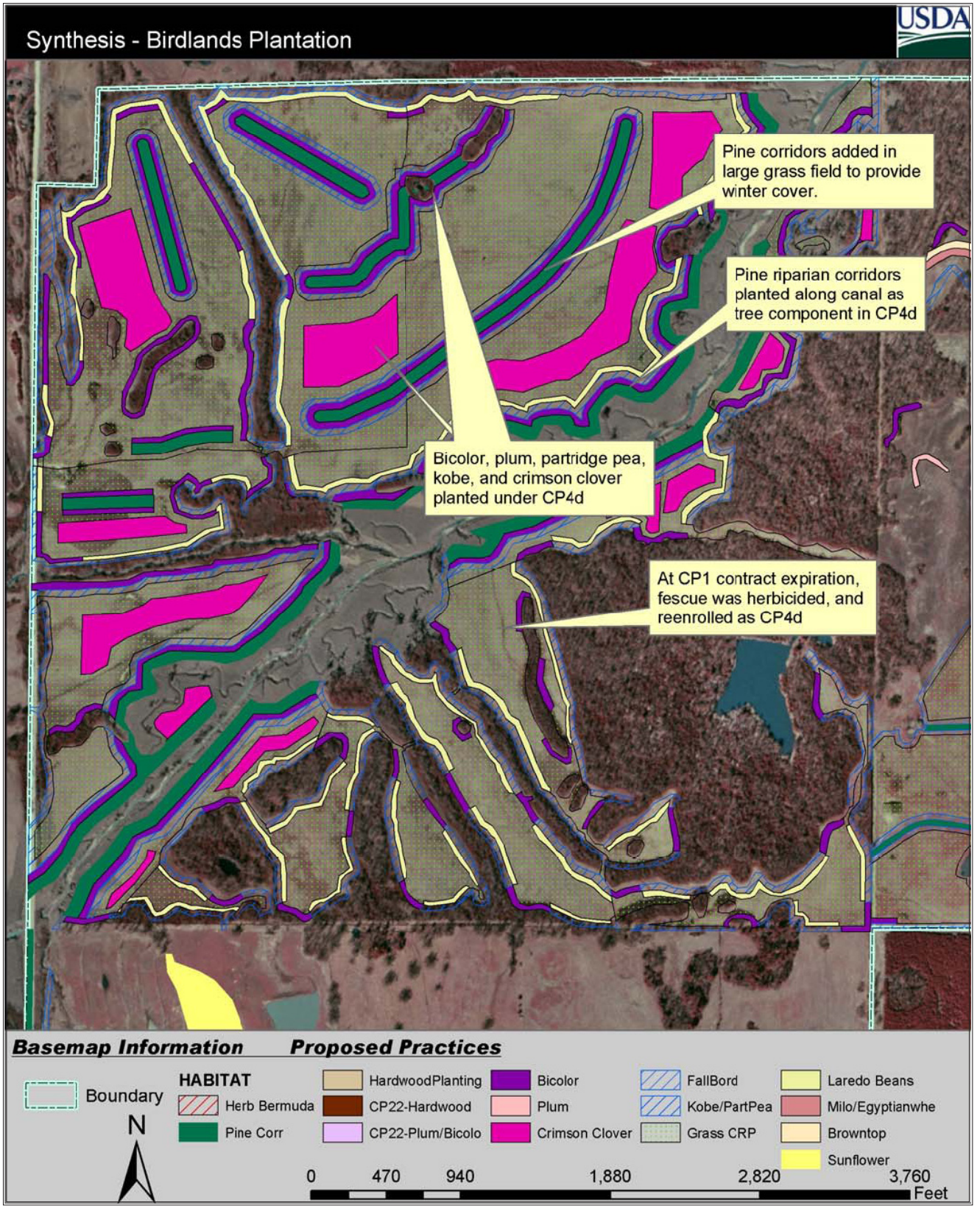
Map CS1–7 Example of management practices used on CRP grassland to enhance bobwhite habitat on Birdlands Plantation



Map CS1–8 Example of practices applied to CRP CP3 pine stands as part of reenrollment as CP11 on Birdlands Plantation



Map CS1–9 Example of practices established on CRP CP1 field at time of reenrollment as CP4d on Birdlands Plantation



Map CS1–10 Example of prescribed fire rotation established on all CRP grasslands on Birdlands Plantation

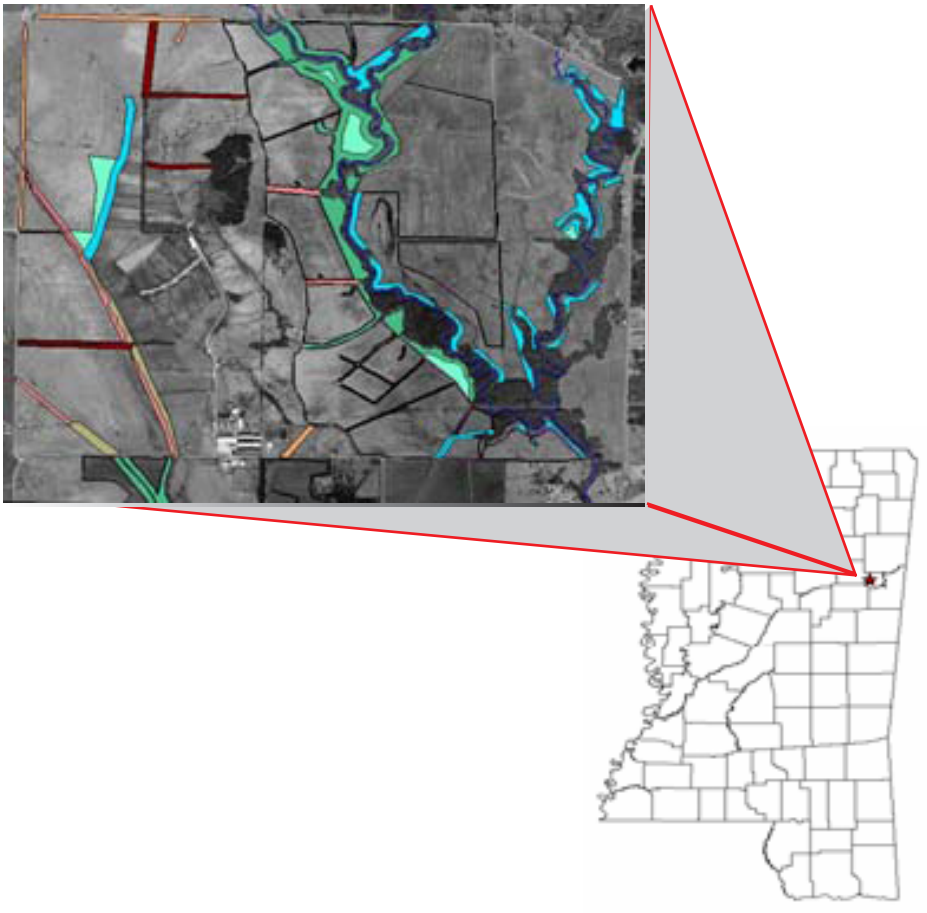
Case Study: B. Bryan Farms, West Point, Mississippi

This case study illustrates the conservation planning process for a large-scale commercial cattle and row crop operation where production, erosion prevention, water quality, and wildlife habitat management are coequal objectives. A suite of Federal farm programs provided the vehicle for implementation of these practices.

Jimmy Bryan fondly recalls bird hunting as a boy along the many miles of osage orange hedgerow that criss-crossed his family's large cattle operation near West Point, Mississippi (fig. CS2–1). Until last year, it had been several decades since he had last watched a covey rise over bird dogs on the property that he now owns and manages. As the cattle operation grew in size and efficiency, the cattle business boomed, but bobwhite populations plummeted.

Having succeeded in the cattle business, 4 years ago Jimmy decided it was time to do something to restore the quail hunting that he enjoyed as a young man. Additionally, he developed a new appreciation for the magnitude of soil erosion on his cattle and row crop operation and its effects on water quality in Town Creek, which bisects the property. After researching the subject and soliciting guidance from his NRCS office and Mississippi State University, he realized that he could implement management practices that would simultaneously address all three concerns. Working with resource conservationists, Jimmy identified a suite of buffer practices that would minimally impact his production system, but produce substantial returns on soil, water, and wildlife conservation.

Figure CS2–1 Location of B. Bryan Farms



Site description

Today, B. Bryan Farms, Inc., (BBF) is a very successful cattle and row crop operation located in the Black Prairie Physiographic region of Clay County, Mississippi. The 1,450-acre cattle operation is diversified with cow/calves, stockers, and a conditioning facility. The 3,705-acre core property also has about 910 acres in corn and soybean production. The western portion of the core property is rolling to steeply rolling and is primarily dedicated to forage production. The row crop operation, in the eastern portion of the property, lies in the floodplain of the east and west forks of Town Creek, which converge near the southern boundary of BBF (fig. CS2–2).

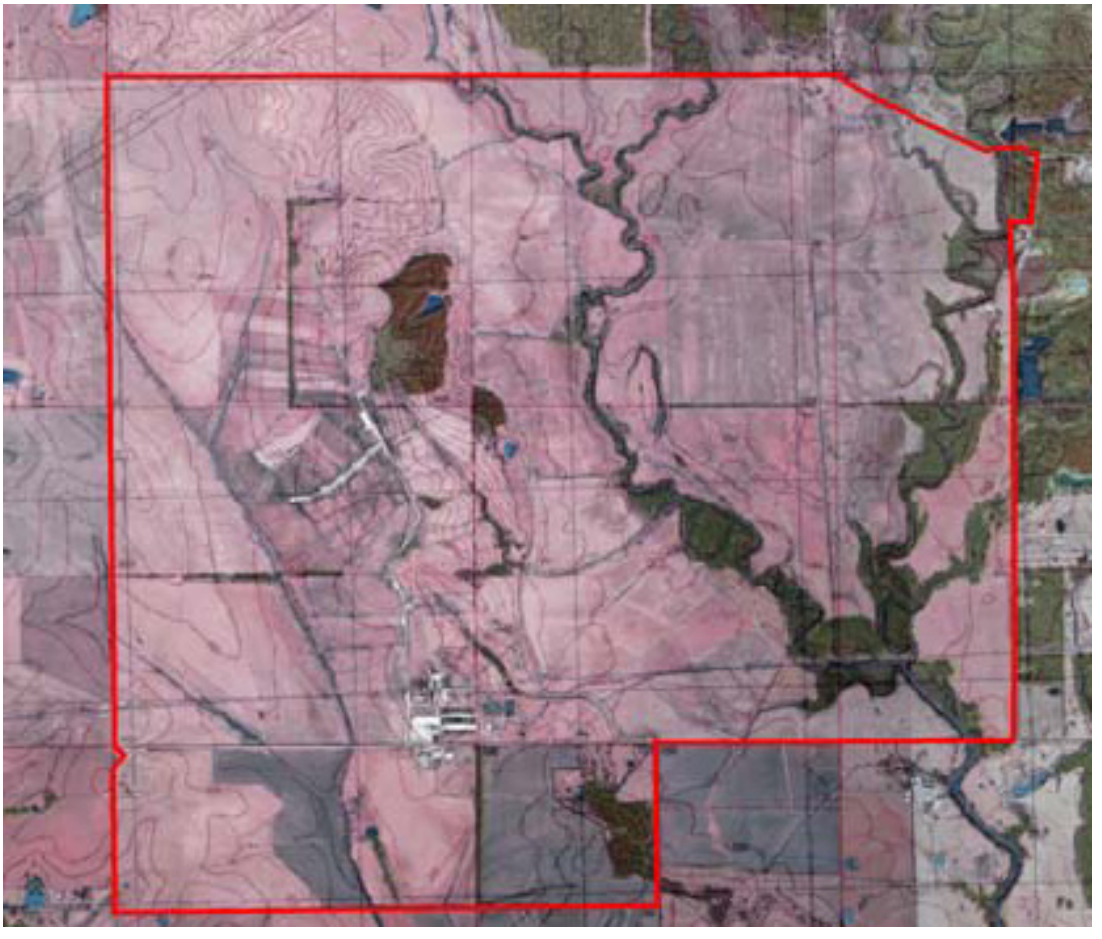
Jimmy Bryan's goal is to run a profitable, diversified, cattle/row crop operation in the context of a land stewardship ethic. His specific management objectives were to control erosion in pastures and croplands, improve bank stability and water quality in Town Creek, and restore bobwhite populations to huntable levels.

Analysis

The core property of BBF is composed of approximately 28 percent row crop, 45 percent pasture, 14 percent woods, and 12 percent conservation practices. These conservation practices were installed to deal with a number of specific problems. The steep topography on the hillside pastures resulted in heavy runoff during rain events. This runoff created concentrated flow erosion and streamside bank degradation and erosion. There was experiencing substantial headcutting in draws draining pastures and row crops. Cattle trampling accelerated headcutting and erosion.

Bobwhite populations had declined over time because of systematic loss of habitat associated with the re-

Figure CS2–2 Topography and land use on B. Bryan Farms



moval of hedgerows to increase the efficiency of the cattle operation. Native grasses, to which bobwhite are adapted, had been replaced with sod-forming exotic forage grasses (fescue and bermuda). Intensive grazing of pastures left little residual cover, and cattle grazing and loafing in remnant hedgerows had destroyed brushy escape cover. Brood-rearing cover in the form of annual plant communities had been eliminated from row crops and pastures. Grazing and cropping practices had left hard edges between row crops or pastures and remnant woods. There were no transition zones. The net effect was a simplification of the landscape and a dramatic reduction in usable space for bobwhite.

Conservation problems

Erosion

- Heavy runoff from pastures
- Concentrated flow erosion
- Streambank degradation/erosion
- Headcutting in draws
- Cattle trampling

Bobwhite

- Hedgerow removal
- Cattle trampling of shrubby cover
- Native grasses replaced with exotic forage grasses (fescue and bermuda)
- Intensive grazing left little cover
- Annual plant communities eliminated from cropland and pastures
- Lack of transition zones

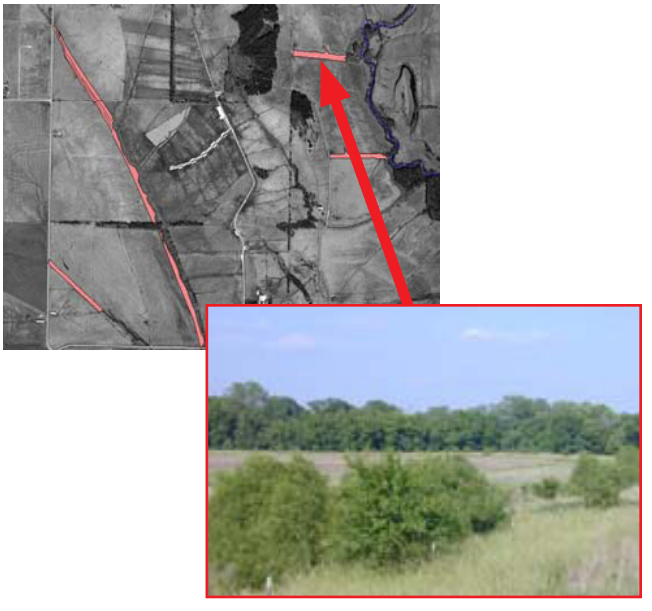
Habitat resource management

Working with resource professionals, Mr. Bryan developed a comprehensive soil and wildlife conservation plan that uses a combination of Federal conservation programs and voluntary practices to accomplish conservation objectives. To minimally impact the production system, practice selection focused on buffer practices.

ACP

Initial erosion control practices were initiated in the mid 1970s with installation of primary surface control structures (w-ditches, v-ditches, diversions). Under the ACP program, Mr. Bryan worked to stabilize stream banks by fencing cattle out of riparian areas and planting woody vegetation (oak mixture) along 30 acres of riparian zone (fig. CS2–3). Critical areas were stabilized with gully smoothing and establishment of fescue in draws and concentrated flow areas.

Figure CS2–3 ACP riparian buffer along cropland ditch



CRP CP22 – Forest riparian buffer

With the availability of Continuous CRP, the implementation of buffer practices began in earnest in 1998. In 1998, Mr. Bryan established 20 acres of CP22 forest riparian buffers along key drainages in his pastures. Cattle were fenced out of 100-foot-wide buffers and a mixture of oak species was planted. However, fescue competition was not controlled at tree planting, thus seedling survival and bobwhite habitat was poor (fig. CS2–4).

In 1999, an additional 135 acres were enrolled in CP22 – forest riparian buffer. Cattle were fenced out of these 150-foot-wide riparian areas, and a five-species oak mixture was planted. Prior to planting, fescue was eradicated on about one half of this area using 1.5 qt Roundup®/ac (fig. CS2–5).

In 2000, BBF enrolled 35 acres in 180-foot-wide riparian buffers under CP22. The riparian zone and an additional 20-foot buffer were fenced to exclude cattle. The extra 20 feet would allow maintenance of an annual herbaceous community or food planting adjacent to the riparian buffer. Although no incentive payment or cost-share was associated with this 20 feet, Mr. Bryan voluntarily added it to the conservation practice to provide flexibility in bobwhite management. Fescue was controlled on all acreage using 1.5 qt Roundup®/ac. A five-species oak mixture was planted (fig. CS2–6).

WHIP 2001

Mr. Bryan had a clear recollection of the historic locations of hedgerows in the upland pastures. Over time, most had been eliminated to enhance grazing efficiency. To improve bobwhite habitat quality and restore connectivity across the landscape, he planned to recreate these corridors. These new corridors would tie together existing and newly created habitat patches. Since these historic corridors were in the upland pasture, CP22 was not an option. However, the Mississippi WHIP program had a transition zone/corridor practice that was applicable. In 2001, he submitted a WHIP proposal to create 17.5 acres of 100-foot-wide corridors. The corridors consist of a 60-foot-wide planting of mixed upland oaks with a 20-foot legume mixture (partridge pea and kobe lespedeza) planted on each side of the corridor. Cattle were fenced out of the entire 100 feet prior to planting, fescue was eradicated with 1.5 qt Roundup®/ac (fig. CS2–7).

Figure CS2–4 CP22 along pasture drains, enrolled 1998

Figure CS2–5 CP22 along Town Creek riparian zone, enrolled 1999

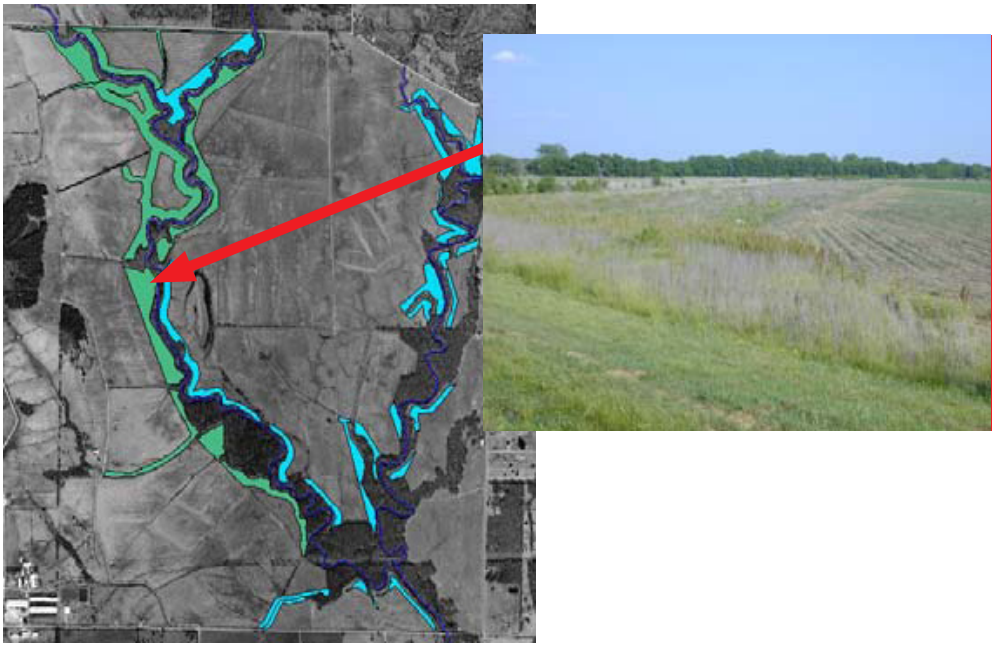
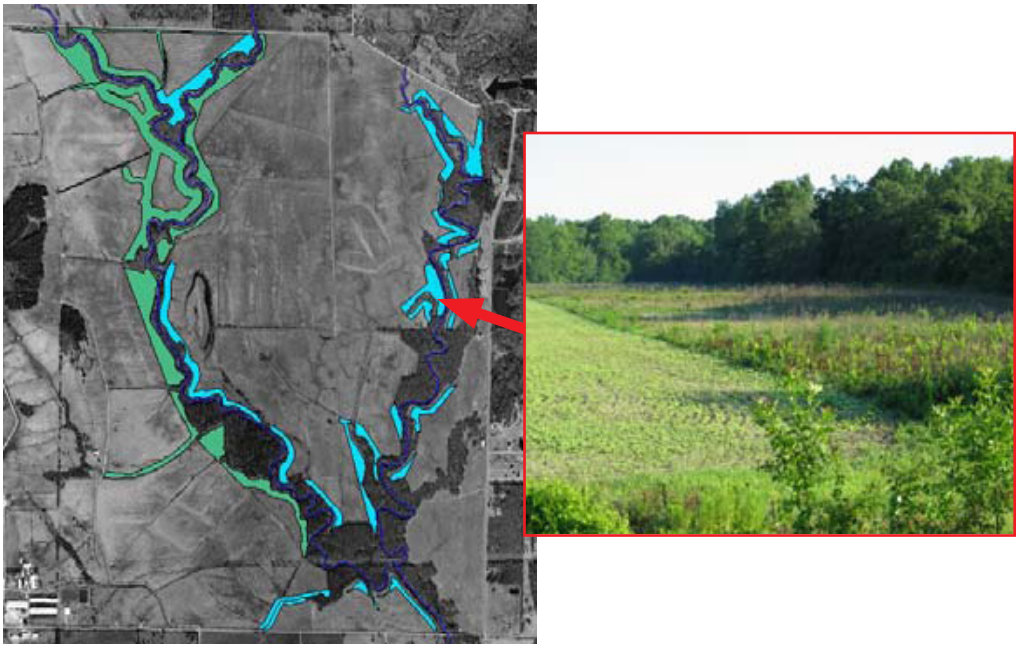


Figure CS2–6 CP22 along Town Creek riparian zone, enrolled 2000



Voluntary corridors

In addition to riparian buffers and WHIP corridors, Mr. Bryan also installed 31.5 acres of voluntary buffers with no incentive or cost-share payments. He saw an opportunity to create additional habitat and connecting corridors while in the process of replacing several miles of fence around the perimeter of the core property. Instead of removing and replacing the old fence, BBF moved the location of the new fence 50 feet into the pasture to create a boundary corridor. Within this fenced region, 3 rows of mixed upland oaks and 20 feet of kobe lespedeza were planted (fig. CS2–8).

Field borders

Around all agricultural fields 20-foot-wide field borders (fig. CS2–9) were planted to kobe lespedeza and partridge pea. These borders were allowed to succeed naturally, but will be maintained in a herbaceous plant community with periodic disking on a 3-year rotation. The specific objective of the field border practice was to add brood-rearing and nesting habitat to the row crop landscape and to further enhance connectivity.

Synthesis

B. Bryan Farms, Inc., has made a substantial investment in conservation. This has occurred over time as management priorities have evolved from maximizing profits to development of a sustainable, diversified operation emphasizing stewardship of various natural resources. In implementing the conservation plan, BBF has employed a combination of Federal farm programs and voluntary practices to simultaneously control erosion, improve water quality, and enhance wildlife habitat. With the implementation of each successive management practice, wildlife benefits grew as habitat increased in quantity, quality, and became more interconnected.

Today, BBF has substantially reduced erosion and headcutting. As a result, water quality in Town Creek and downstream water bodies has improved. Although it is still early in the management program, bobwhite populations seem to be responding. Mr. Bryan is optimistic. Last year he bought two new bird dogs.

Figure CS2–7 WHIP transition zone/corridor in upland pasture

Figure CS2–8 Voluntary pasture corridors

Figure CS2–9 Voluntary field borders

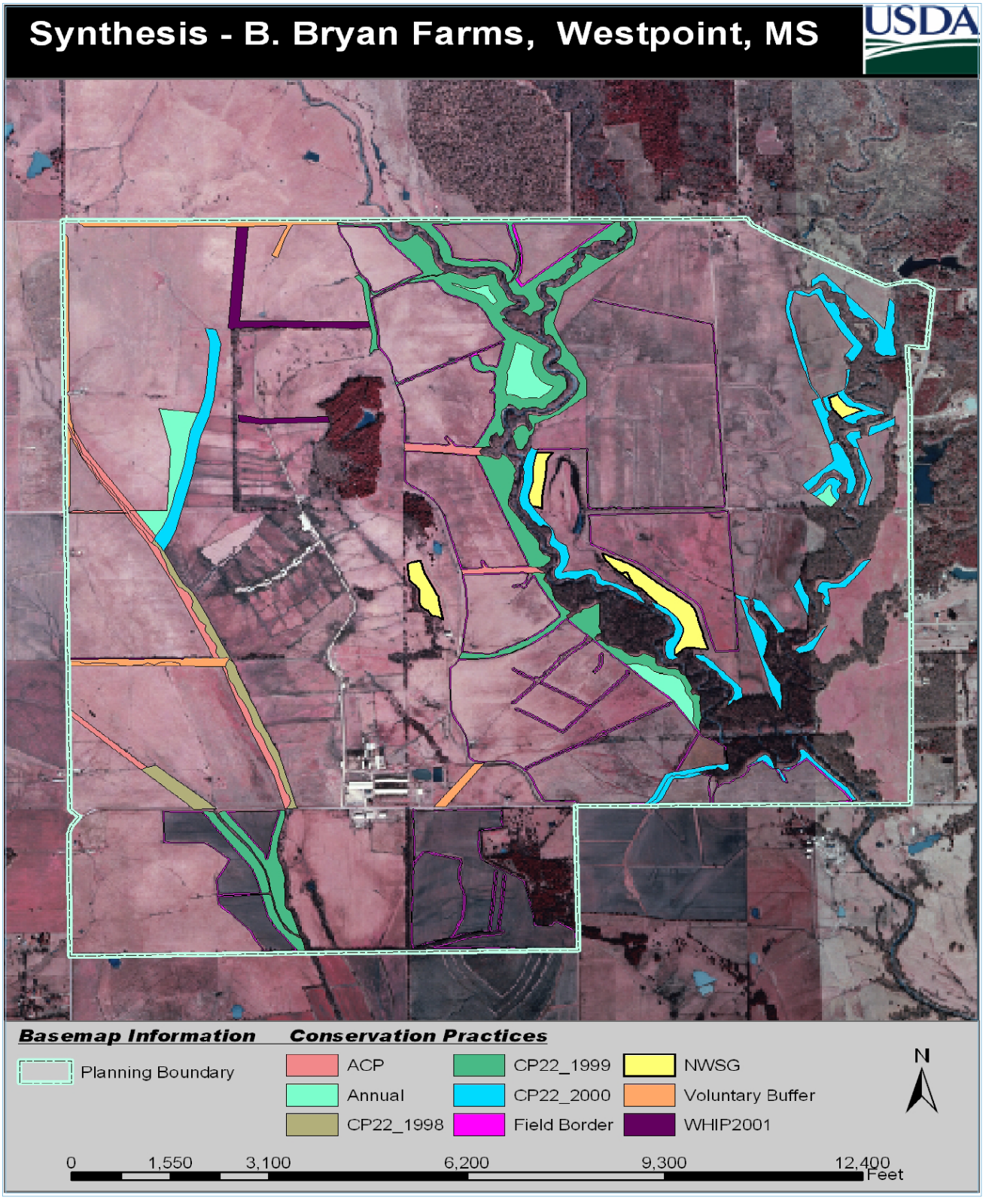
This past season, his dogs consistently found birds, as many as sever coveys in a morning, while hunting this working farm.

Bobwhite is not the only species that has benefited. Avian surveys along field margins demonstrate six to nine times greater abundance of wintering sparrows on fields with conservation borders. During the breeding season, grassland/shrub bird species, including common yellow-throat, indigo bunting, and dickcissel were more abundant on bordered edges than conventional crop-field margins.

Federal conservation programs play an integral role in resource planning on BBF. But the key to success has not been a single management practice, nor a program. Rather the key has been a comprehensive, objective-driven approach to conservation planning, grounded in a land stewardship ethic and guided by a clear vision of the stated objectives (fig. CS2–10).

Figure CS2–10 The objective: a result of farm planning with landowners

Map CS2–1 Synthesis – B. Bryan Farms, Westpoint, Mississippi



Case Study: Hardeman County, Tennessee

This case study illustrates the conservation planning process for a moderate-sized property with wildlife conservation priorities. Illustrations focus on practice selection in the context of bobwhite habitat requirements and conservation plan development for a competitive CRP bid submission. Unlike the other properties featured in this series, management activities on this property are still in the planning phase and have not yet been implemented.

The property featured in this case study is a 1,471-acre tract located in Hardeman and Fayette counties in Tennessee. Hardeman and Fayette counties are in the southwestern part of Tennessee in the Coastal Plain Physiographic Province. Forestry and farming are the primary land uses in these counties. However, the proximity to Memphis and Jackson, Tennessee, has produced high human population growth, averaging 2 to 3 percent per year over the last 5 years.

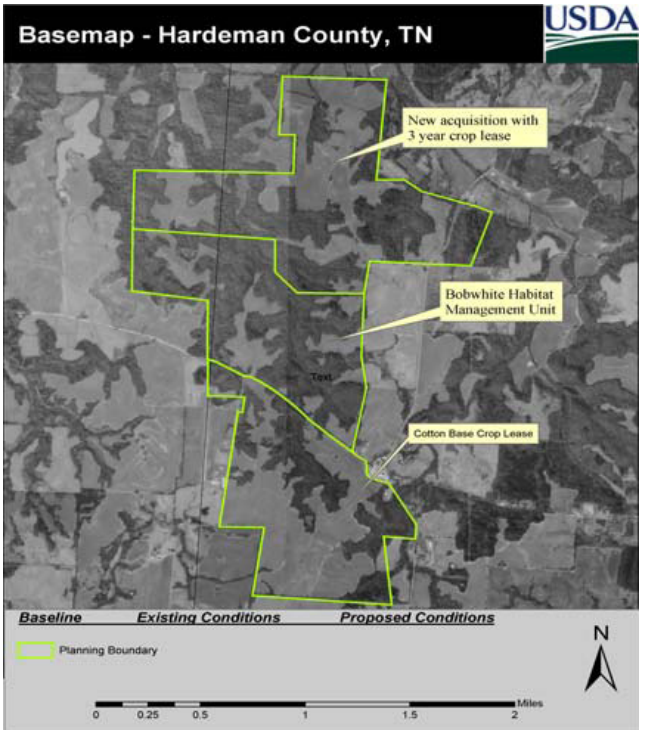
Two individuals who desire to remain anonymous hold this property in a partnership. The current owners whose primary objective is to protect the natural landscape and enhance the wildlife value recently acquired the property. Their primary use of the property will be recreational hunting. Northern bobwhite is the focal species of management concern and eastern wild turkey and whitetail deer are of secondary interest. After implementing wildlife habitat enhancements, the owners intend to protect these resources with a conservation easement that will allow continued farming, forestry, and wildlife management uses, but restrict development.

Site description

The topography is rolling to moderately rolling with about 85 feet maximum relief. Upland soils are generally of Loring Silt Loam (LoB2 and LoB3) and Lexington Silt Loam (LeB2 and LeB3) associations. These soils are moderately deep, occurring on undulating upland ridgetops and stream terraces with 2 to 5 percent slopes. These soils are highly erodible. The majority of the property (830 acres, or 51%) consists of oak-hickory hardwood forest lands. Currently, about 693 acres (47%) is in agricultural production (soybean, corn, cotton).

For management purposes, the property is divided into three units that differ in current land use and management priorities (fig. CS3–1 and map CS3–1). The southern unit has an associated cotton base and will be retained in cotton production for the foreseeable future. The northern unit has a 3-year farm lease on 244 acres and will be retained in soybean production through the 2005 growing season. Pending a new CRP enrollment, this acreage will be offered for CRP in 2006. In the meantime, 30-foot field borders planted to a legume mixture will be established to control erosion and enhance bobwhite habitat quality. The central unit (430 acres) consists of 104 acres of row crop, in 9 small fields, with the remainder in mixed second growth hardwood forest. The central unit has a farm lease through the 2003 growing season. The 104-acre row crop was accepted for CRP enrollment in 2004. The primary management objective on the central unit is wildlife habitat enhancement with an emphasis on northern bobwhite. This case study will focus on the planning process for this central unit (map CS3–2).

Figure CS3–1 Management units on Hardeman County, Tennessee property



Analysis

In evaluating current bobwhite habitat conditions on this central unit, it is evident that the essential resources are most limiting in their availability and/or distribution (map CS3–3). The landscape is predominantly characterized by mature, closed-canopy forest or row crop. Consequently, very little nesting cover (idle native grassland), brood-rearing cover (annual weed communities), or escape/winter roosting cover (shrubby woody communities) is currently available. Additionally, although the row crop agriculture provides an abundance of food for a short period, food resources are not uniformly and abundantly distributed through time and space. Therefore, winter food is probably a limiting factor.

Nesting cover is characterized by 2- to 3-year idle native grasslands with moderate litter accumulation. Perennial grasslands, dominated by native bunch grasses such as broomsedge, little bluestem, or Indian grass, provide excellent nesting cover (fig. CS3–2). Periodic disturbance is required to maintain grasslands at an appropriate density. Nesting habitat is scarce on this property, and most of the extant limited production is probably coming from marginal nesting habitat in road banks, woods edges, and field margins.

Brood habitat is characterized by 25 to 50 percent bare ground, nearly 100 percent forb canopy cover, and abundant insects. Annual plant communities and native grasslands with abundant forbs provide quality brood-rearing habitat. Brood habitat is optimal the first growing season following fire or the first and second growing season following disking. On this property, brood cover is essentially limited to scattered annual weed communities associated with crop field margins.

Figure CS3–2 Broomsedge, little bluestem, or Indian grass provide excellent nesting cover

Winter roosting cover and escape cover is characterized by scattered shrubs and low (3 to 10 feet tall) woody cover, distributed among annual and perennial grasses and forbs. The closed canopy nature of the forest limits development of a shrub understory, contributing to relatively little shrubby cover across the property.

In light of these deficiencies, management activities should create native grasslands, annual weed communities, and shrub components and enhance abundance and distribution of food resources. These components will initially be created with a suite of plantings as part of a CRP contract (map CS3–4) and will be maintained using planned periodic disturbance, including prescribed fire, strip-disking, and rotational food plots. These practices will create a mosaic of grass/legume communities interspersed with annual weed communities, shrubs, and food plantings.

Forest management

The owners desire to conduct timber management on the property in a manner that will enhance wildlife habitat, especially for wild turkey. Emphasis will be placed on increasing mast production and providing roosting sites, openings, and nesting habitat. As such, they hired a consultant forester to inventory and mark timber to remove approximately 20 percent of the oak volume and most of the non-mast producing trees in a single-tree and group-selection harvest. The property contains a small amount of pine timber in several small tracts. These will be clear-cut and maintained in open land managed for bobwhite (map CS3–6).

CRP enrollment

The landowners prepared a plan and submitted a CRP offering that specified a CP4d (wildlife habitat) cover practice for 103 acres in the Bobwhite Emphasis Unit. They selected a native warm-season grass (NWSG) mixture (3 PLS/ac little bluestem, 1.0 PLS/ac side oats gramma, 0.5 PLS/ac Indian grass, 1 lb/ac partridge pea, and 5 lb/ac kobe/Korean lespedeza) that would accrue 50 points on the wildlife component (N1a) of the EBI. They offered to put 10 percent of the CRP acreage in CP12 wildlife food plantings for an additional 5 points on the N1b component of the EBI. Food plots will be rotationally cropped in a mixture of milo, browntop millet, and soybeans. In addition to native warm-season grasses and forbs, approximately 10 acres of shrub plantings will be established in small patches distrib-

uted throughout the CRP fields. These shrub plantings will be planted in bicolor lespedeza and Chickasaw plum to provide winter food and cover (map CS3–7).

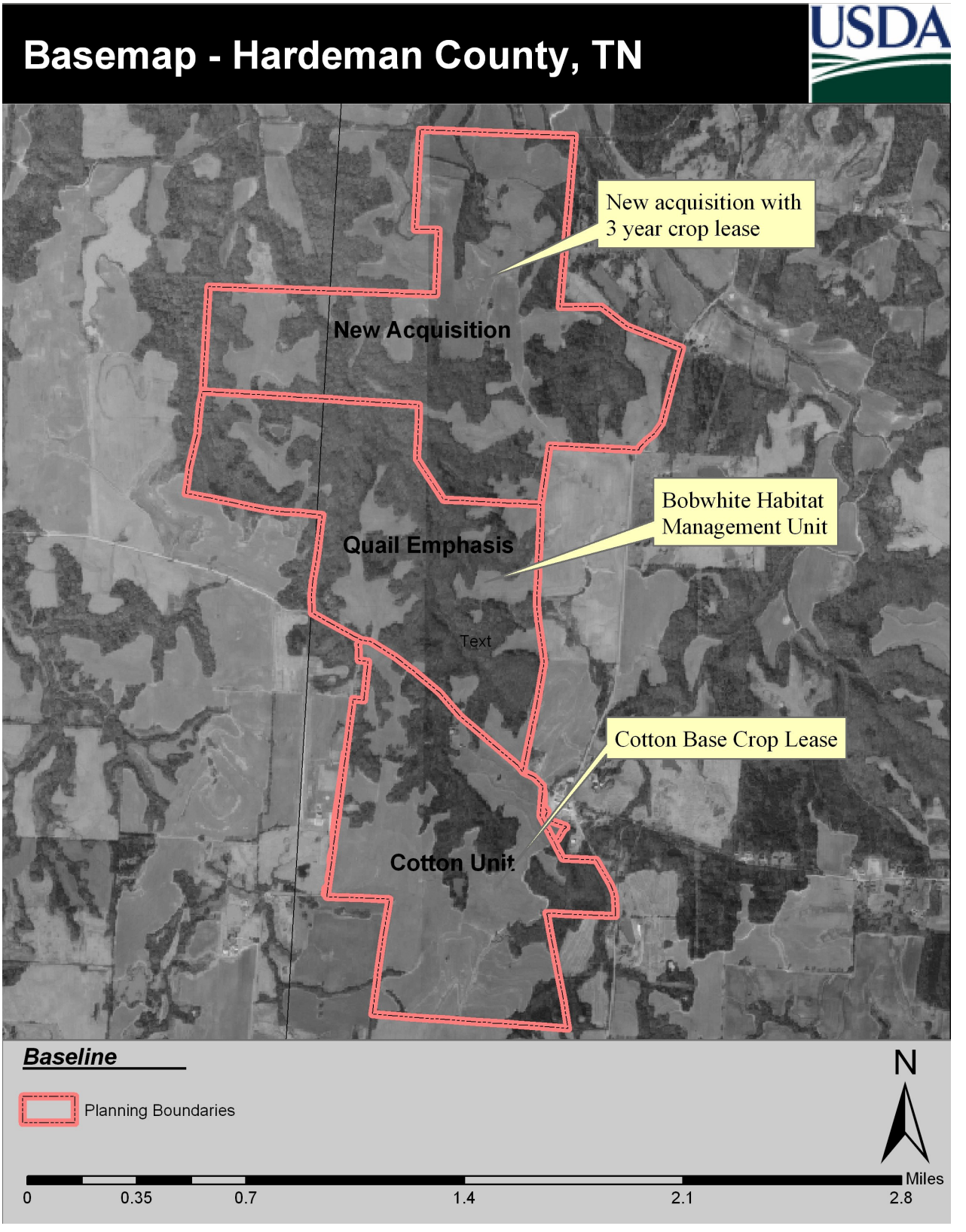
CRP maintenance

Desired communities will be established and maintained using a number of specific management practices. During the establishment period (1 to 2 years), selective herbicide (4 to 6 oz/ac Plateau) will be used to reduce weed competition and accelerate NWSG stand establishment. During contract years 2 through 10, prescribed fire will be used to encourage NWSG and legumes and manage litter accumulation (map CS3–8). Creation and maintenance of firebreaks will be required for prescribed fire implementation. Firebreaks will be disked in fall and planted to a mixture of wheat and kobe/Korean lespedeza. This practice will create a green firebreak during the winter and brood-rearing habitat during the following growing season. During contract years 4 through 10, light rotational (3-year rotation) strip-disking will be used to maintain a legume/forb component in the stand and manage grass density. Light disking will be accomplished in accordance with NRCS Early Successional Habitat Development Standard 647.

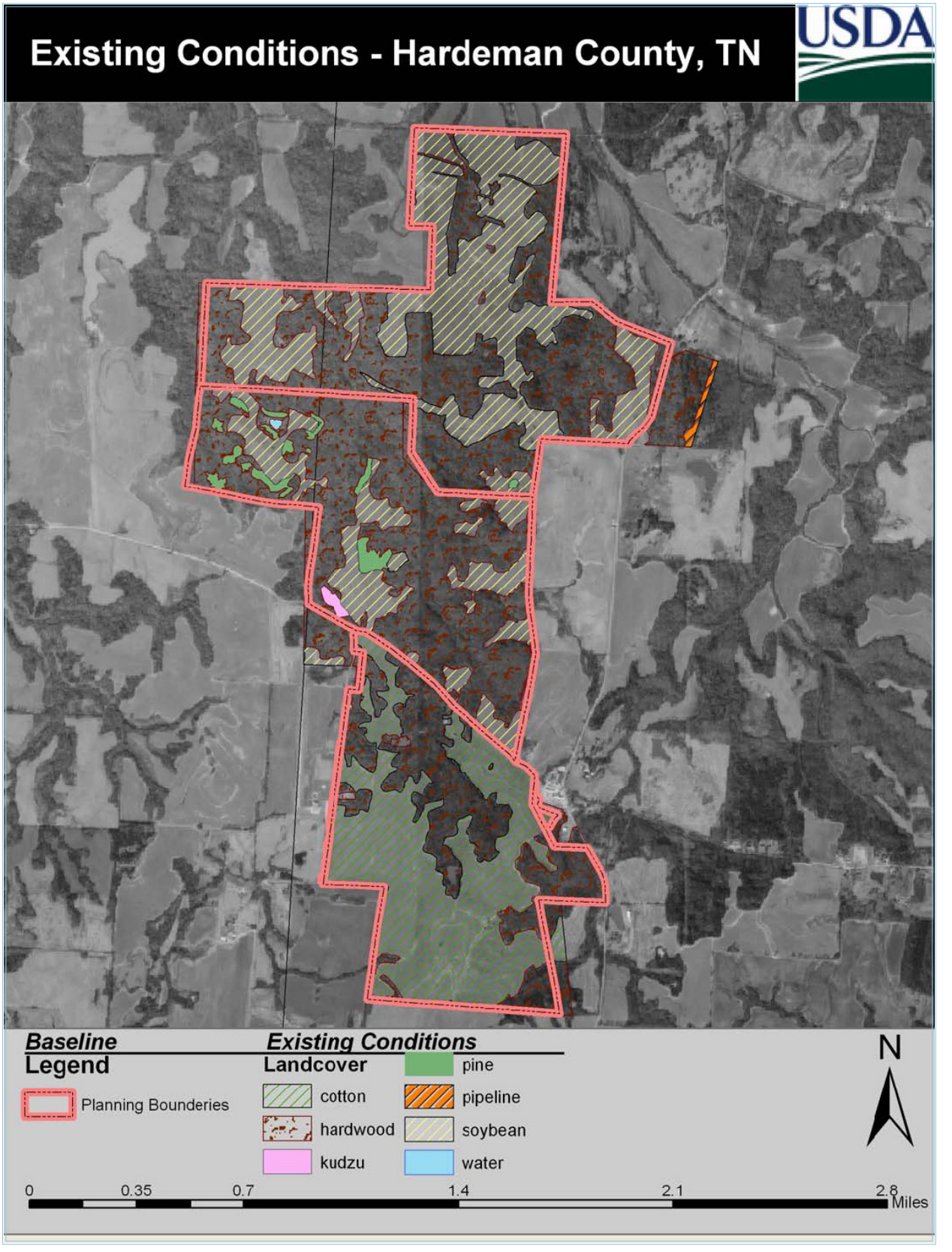
Summary

This case study illustrates comprehensive planning that integrates forestry, agriculture, and wildlife habitat management to achieve the landowner's overall goals. The timber and agricultural practices simultaneously produce revenue and enhance wildlife habitat value. The CRP program provides a vehicle to accomplish soil erosion and wildlife habitat enhancement objectives. Cooperation between a consultant wildlife biologist, the NRCS Area Biologist, and the local District Conservationist produced a CRP offering with a high EBI. The landowner's willingness to reduce his offered rental rate below the weighted average rental rate for the county and the occurrence of this tract in a Bobwhite Conservation Priority Area helped to ensure a competitive CRP offering.

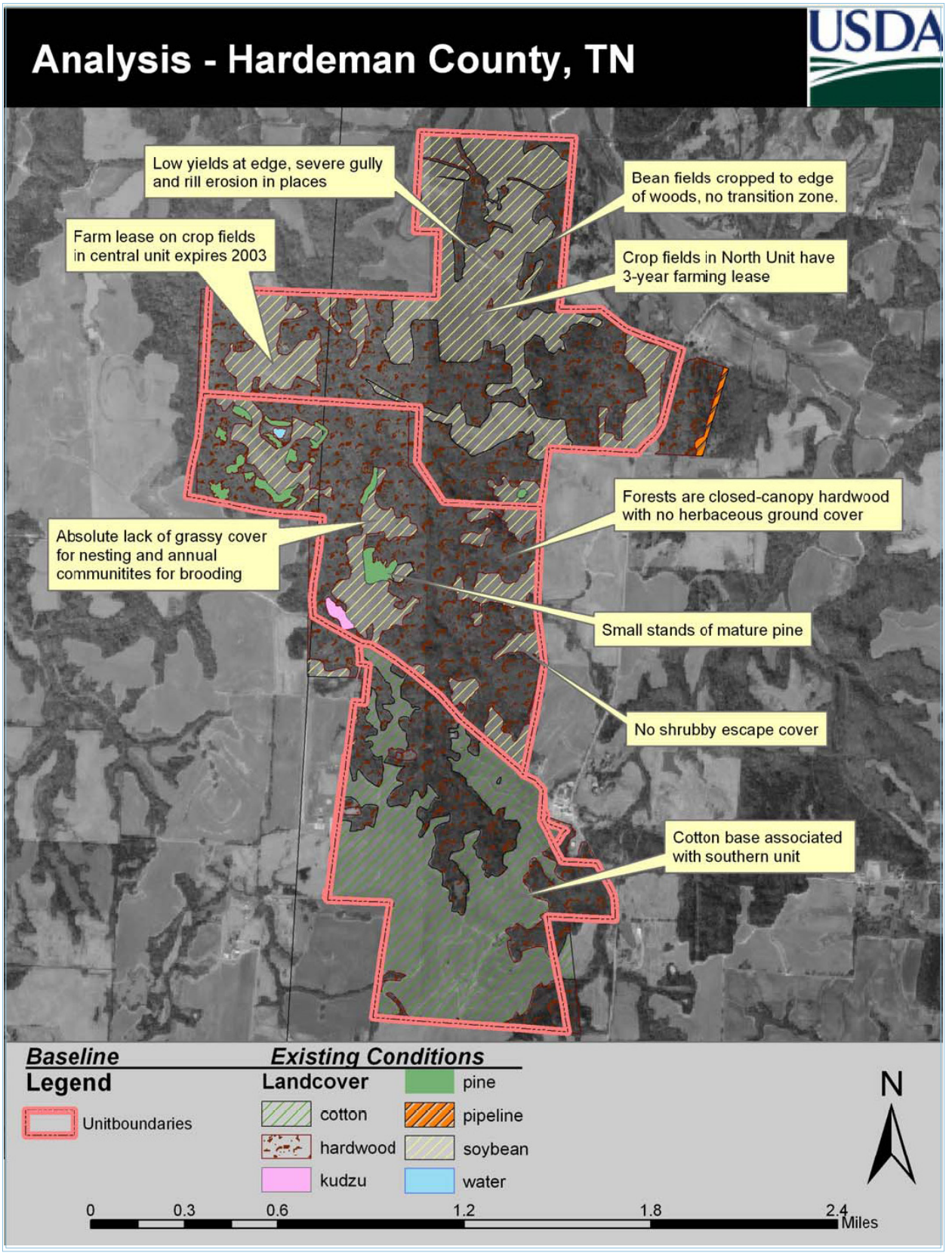
Map CS3–1 Basemap of Hardeman County property illustrating planning boundary and management units



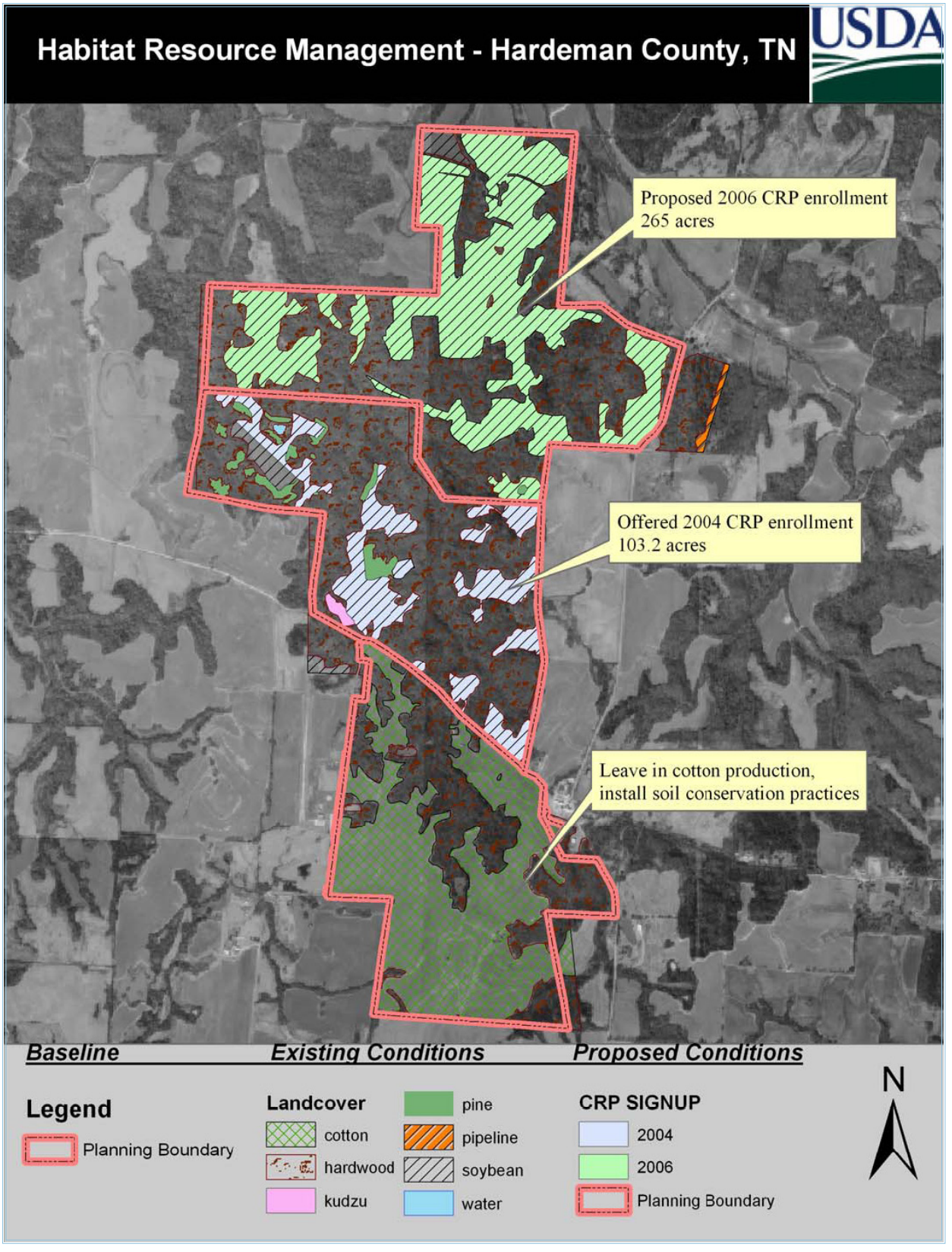
Map CS3–2 Existing conditions of Hardeman County property at initiation of planning



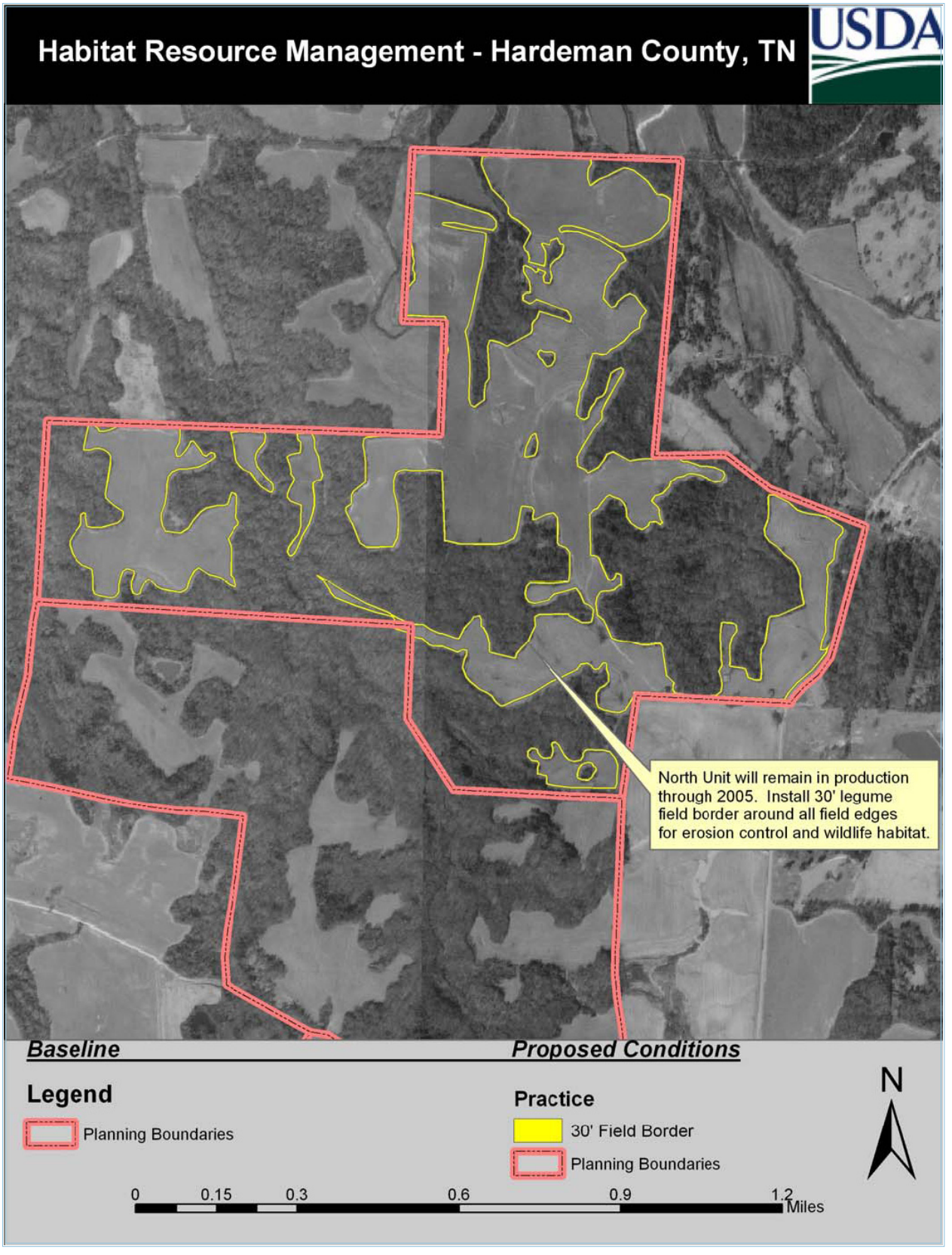
Map CS3–3 Analysis of resource conservation problems



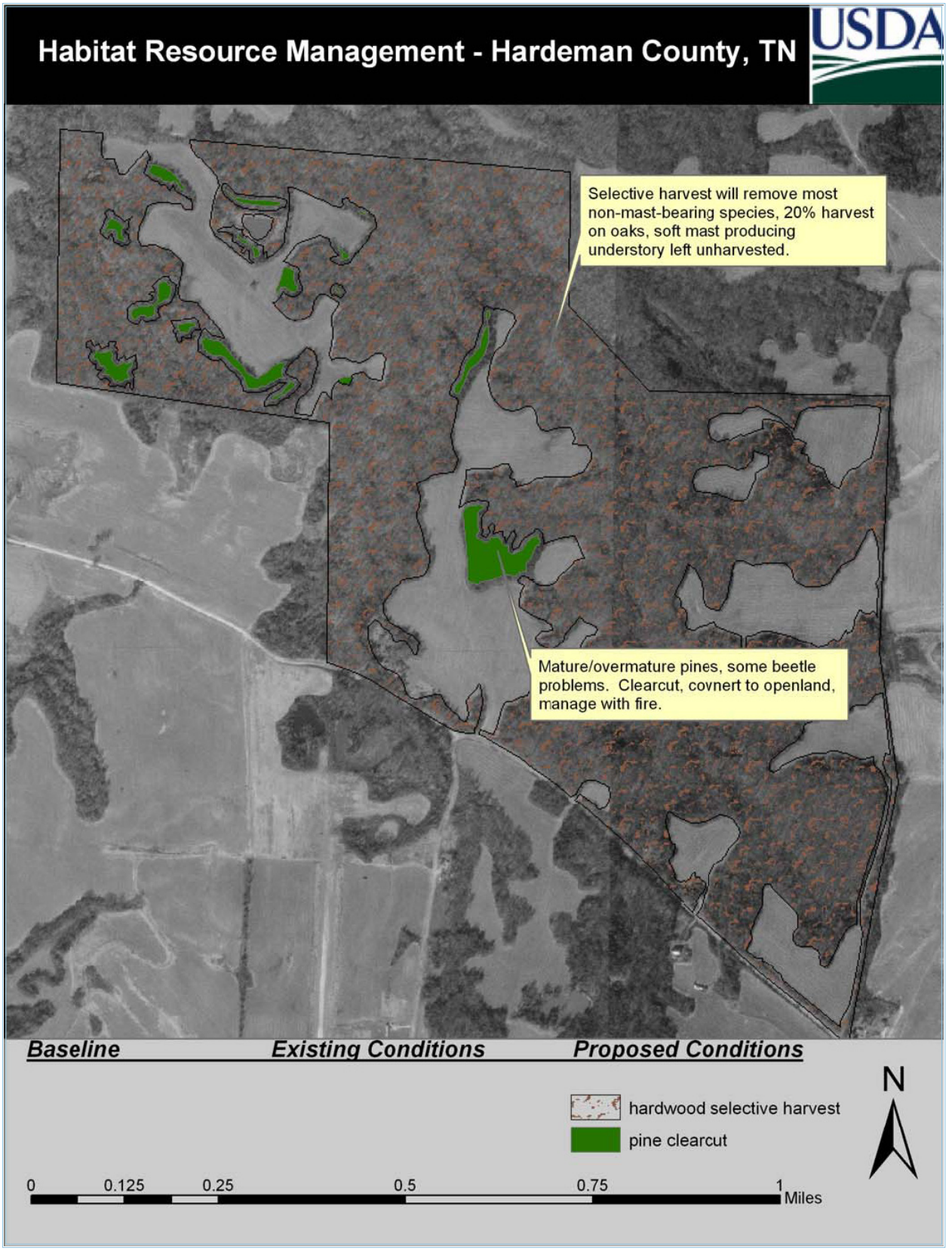
Map CS3–4 Suggested CRP enrollment



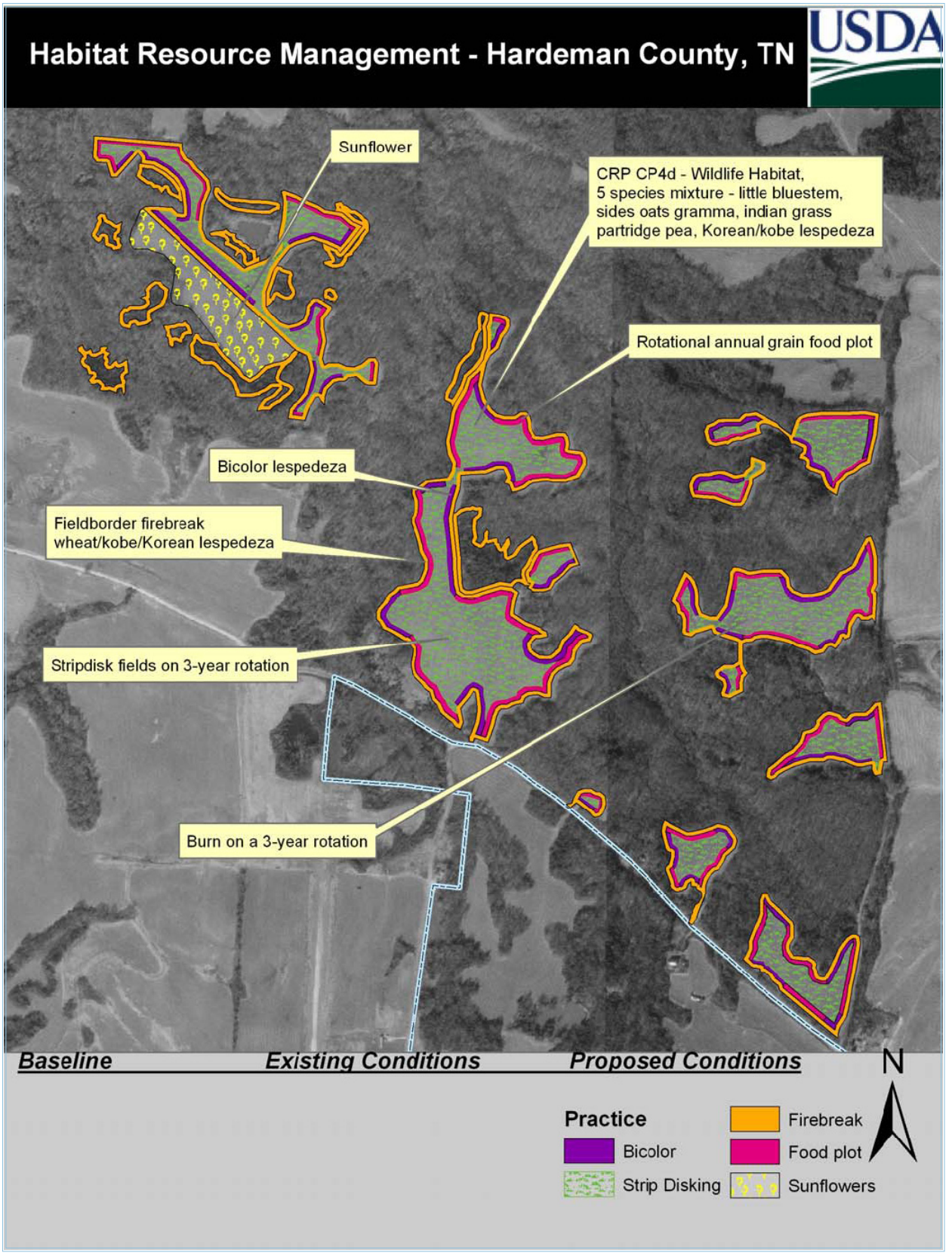
Map CS3–5 Field border practice for fields under row crop production until 2005



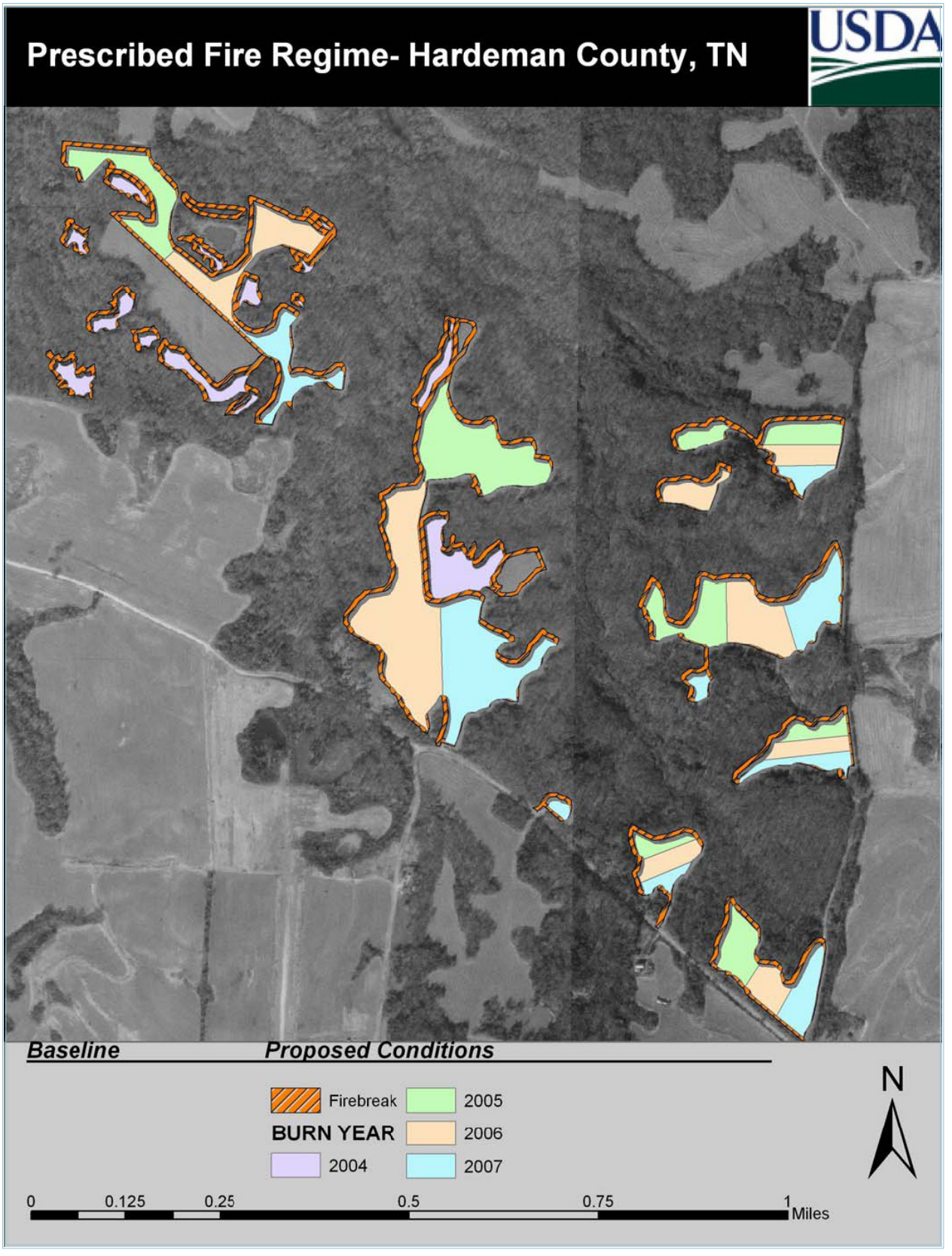
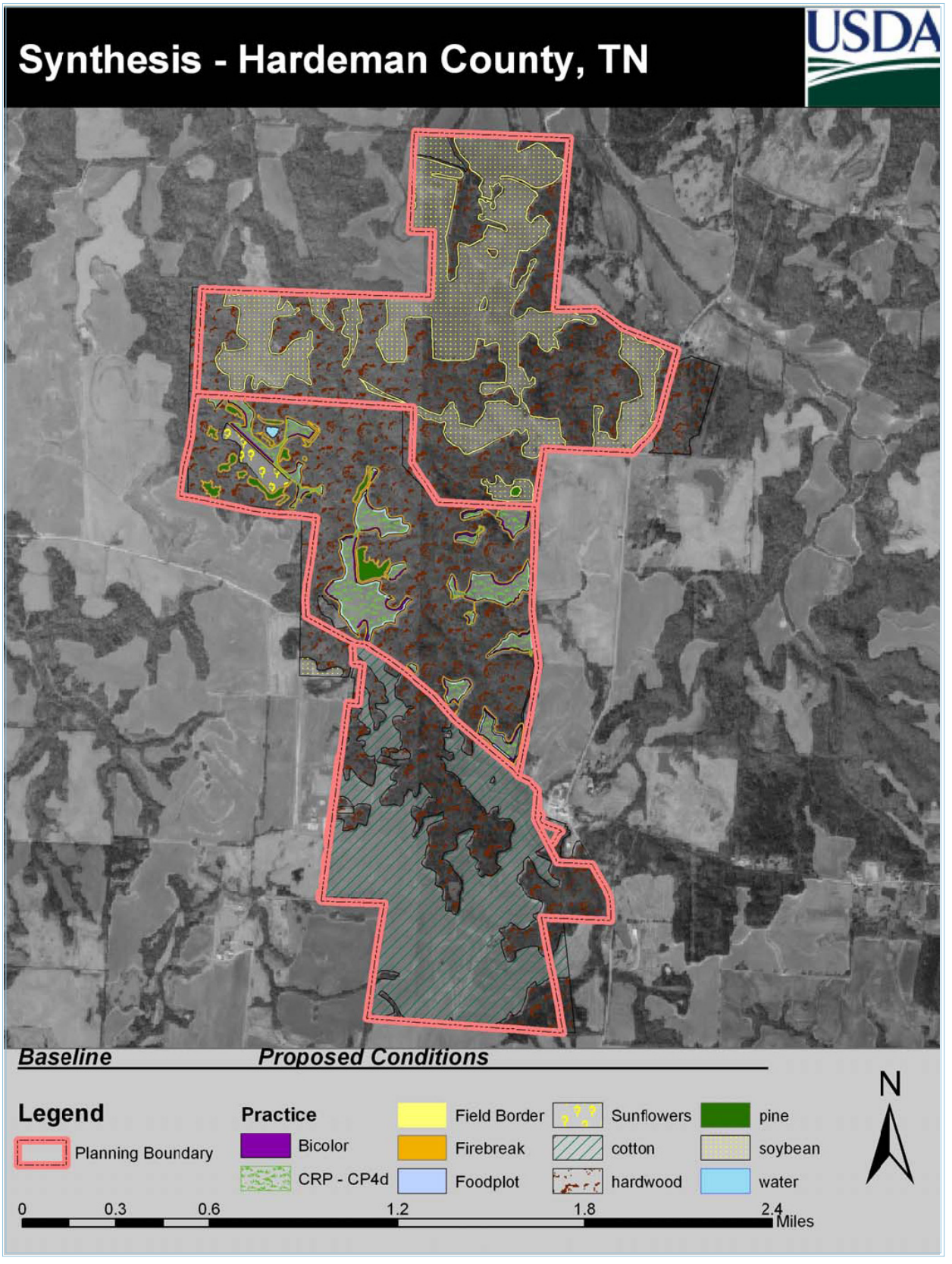
Map CS3–6 Prescribed forest management practices



Map CS3–7 Prescribed plantings and management practices for fields enrolled in CRP



Map CS3–8 Prescribed fire regime for fields enrolled in CRP



Map CS3–9 Synthesis of prescribed management regime for Hardeman County, TN, property