



Chapter 7: Conservation Planning Process

Natural Resources Conservation Service (NRCS)

INTRODUCTION

The NRCS has provided conservation planning, design, and implementation assistance to farmers, ranchers, and communities for decades. Thousands of conservation management practices have been installed across the country. The habitat created by these practices has been a significant factor in maintaining wildlife populations and species diversity in agriculturally dominated landscapes. However, more can be done to benefit wildlife. This chapter illustrates ways to integrate the concepts and principles discussed in Chapter 5 into the conservation planning process to provide more, higher quality connected habitat for wildlife.

PLANNING PROCESS

The phases and steps outlined in the NPPH for preparing conservation plans are identical to those used in preparing a watershed plan (Figure 6-1). The principal difference is more detailed site-specific information must be collected, analyzed, and synthesized for a conservation plan.

GETTING STARTED

PREPLANNING: CONSERVATION PLAN SCALE

The preconditions that initiate conservation planning on an individual farm, ranch or community open space are often the same as those that trigger area-wide planning efforts: crisis, mandate, incentives, or leadership. Planning may be recommended by the conservationist or NRCS assistance sought by a landowner or community. Regardless of who initiates the project, it is important to obtain basic information and assemble the necessary tools to start the planning process. The National Planning Procedures Handbook (NPPH) provides a detailed outline of how to proceed with preplanning activities. In addition to the preplanning procedures, tools, and materials discussed in the NPPH, the conservationist should also have available:



Ron Nichols - NRCS

- The area-wide plan - if available
- The "Corridors In Our Landscape" brochure
- This handbook - *Conservation Corridor Planning at the Landscape Level: Managing for Wildlife Habitat*
- USGS 7.5 minute quadrangle maps that include the client's property
- Copies of the NRCS 1:660 soil survey maps that include the client's property and immediately adjacent properties
- Any existing wildlife reports, research studies, EA or EIS reports or similar wildlife information specific to the watershed within which the client's property resides
- Photo prints, plans, or reports of completed projects within the District that have preserved, created, enhanced, or restored wildlife habitat; Consider putting together a "scrapbook" of these materials to take into the field

Having these materials available for the first formal client meeting will help the conservationist promote wildlife conservation as an integral part of the conservation plan. In addition, these materials will comprise a reference resource available when needed to answer client's questions.



USU Photo Services

PHASE 1 COLLECTION AND ANALYSIS AT THE CONSERVATION PLAN SCALE

Phase 1 involves:

- Identification of problems and opportunities
- Determine objectives
- Inventory resources
- Analyze resources

In Phase 1, the client and conservationist work to reach agreement on the problems, opportunities, and objectives for the conservation plan.

STEP 1 IDENTIFY PROBLEMS AND OPPORTUNITIES

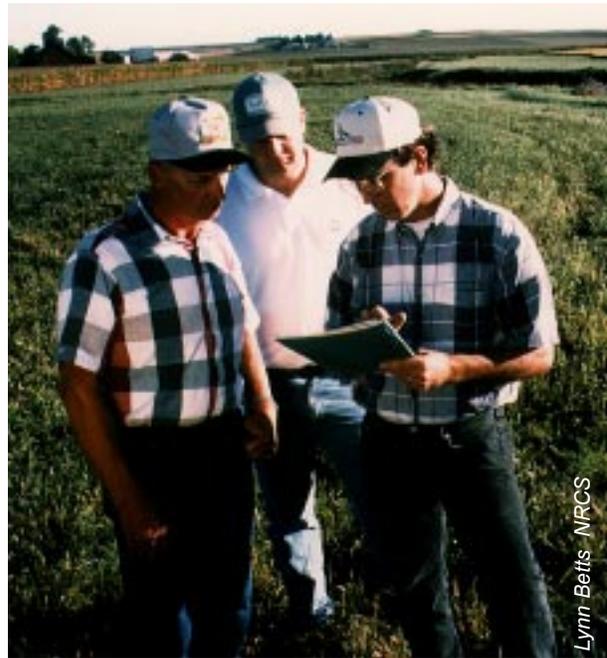
Planning Standard

The client's resource problems, opportunities and concerns are identified and documented.

Discussion

The first on-site visit with the client may be the most important step in the planning process at the farm, ranch, or community scale. Building trust begins with the first meeting. The client trusts the conservationist to provide the best advice and technical assistance possible in addressing his or her concerns. The conservationist trusts the client to properly implement recommended conservation practices and maintain them into the future. Both parties are committing time, money, and other resources necessary to successfully complete a conservation plan. Both parties understand that the conservation dividends resulting from their investment will accrue some time in the future.

The first on-site meeting affords the conservationist an opportunity to listen to the client's concerns and see the problems and possibilities in the field. It also provides an opportunity to involve the client in the planning process; asking them questions about wildlife and wildlife habitat on his/her property can produce important insights. Equally important, is the conservationist has the chance to discuss wildlife habitat opportunities from an experienced perspective gained working throughout the surrounding landscape.



The NPPH provides a detailed outline on how to proceed with Step 1 activities. In addition to these procedures, the conservationist should:

- Use the wildlife informational materials listed in the Preplanning section as aids when discussing wildlife concerns, problems, and opportunities with the client.
- Document wildlife and habitat related problems and opportunities on the client's property or on the soil survey aerial photo maps.
- Record these problems and opportunities with photographs.
- Emphasize opportunities to link habitats on the client's property with habitats on adjacent property. Document these opportunities on maps and with photographs.
- Record on maps and with photographs large areas (>80 acres) devoid of habitat and discuss with the client new possibilities to provide wildlife habitat or enhance the habitat value of some other existing conservation management practices.

If the client's property is within the boundaries of an existing area-wide plan, additional procedures include:

- Locate the client's property within the area-wide plan and review the plan with the client. Emphasize wildlife habitat related elements of the plan that could affect the client's property and the immediate environs.
- Visit any locations on the client's property where habitat recommendations or other features have been delineated on the area-wide plan.
- Discuss with the client the value-added benefits of incorporating these area-wide wildlife habitat plan recommendations on their property. This manual provides some excellent examples to share with the client.

Additional problems and possibilities invariably emerge later in the planning process. The planning process's inherent flexibility makes it possible to accommodate new information, when it emerges. Once the client and conservationist have completed the identification of problems and opportunities, they will have produced the products specified in the NPPH.

Documentation

Problems and opportunities are typically documented in a short report. This information can be recorded in Notes and Resource Inventory, a GIS data base, or other agency tracking systems. The report should include field notes, photographs, and any sketch maps that were prepared.

Products

- Identification and documentation of wildlife and wildlife habitat problems, opportunities, and concerns in the case file
- Communication with the client

STEP 2 DETERMINE OBJECTIVES

Planning Standard

The client's objectives are clearly stated and documented.

Discussion

Clients initiate conservation projects because they wish to change existing conditions to some desired future condition. Often the project is intended to eliminate a particular problem, stabilize an eroding swale in a field for example or explore some alternative resource use. It is important that the conservationist fully understand the client's objectives and values related to resource management. The conservationist can also assist the process of determining objectives by offering advice and suggestions. It is often helpful in clarifying objectives to go over field notes from the first on-site meeting with the client. By working together, the client and conservationist can formalize meaningful and realistic objectives for the wildlife resource as well as other resources.

Objectives should be stated so they describe what is desired without prescribing a specific solution. This allows client and conservationist opportunities to explore alternative plans in Step 4 of the process.

The NPPH includes an extensive list of items the client and conservationist should discuss and agree upon as part of the objective setting process. To ensure wildlife are fully considered in this important step, the conservationist should:

- Explain to the client how their objectives may affect the site's resources and ecology, and alert them to any specific impacts, positive or negative that may affect wildlife.
- Notify the client of any federal, state, or local laws related to wildlife or other resources that could affect the client's objectives so planning proceeds in a proactive way.
- Encourage the client to consider an overall objective of preserving, enhancing and restoring existing and potential (historical) habitats for diverse populations of desirable species.
- Encourage the client to establish, as an objective, linking habitats on his/her property with those on adjacent properties where applicable.

- Encourage the client to consider as an objective new conservation practices for wildlife in large areas (>80 acres) devoid of habitat.
- Use the checklist in this manual (Appendix B) as a tool for getting landowner input on specific wildlife species important to them; providing habitat for the client's preferred species can become an objective.
- If the client's property is within an existing area-wide plan, review the plan with the client.
- Encourage the client to incorporate into his/her conservation plan objective statement those recommendations in the area-wide plan, which apply to the property.

When the client and the conservationist come to an agreement on conservation plan objectives, they will have produced the products described in the NPPH.

Documentation

Objectives are typically documented in a short report.

Products

- A list of the client's objectives including specific wildlife and wildlife habitat objectives - as an objective note in the case file.

STEP 3 INVENTORY

Planning Standard

Sufficient data and information are gathered to analyze and understand the natural resource conditions in the planning area.



Discussion

The basic intent of the conservation plan inventory is to describe existing (benchmark) condition on the client's property. The wildlife resource section of the inventory has both a wildlife species component and a habitat component. The specific intent of the wildlife resource inventory at the conservation plan scale is to:

- Identify wildlife species that do or could inhabit the client's property
- Map plant community types
- Map wildlife species occurrence as associated with plant community types
- Map important corridors, habitat patches, and site features
- Map potential habitats
- Map general land cover types
- Provide life history information for those species of special interest to the client, threatened or endangered species or species of vulnerable populations
- Emphasize inventory of wildlife resources related specifically to objectives of the individual landowner

The client's involvement in the inventory process is essential; they are generally knowledgeable about the property's history and its resources. However, the conservationist should also take advantage of every opportunity to educate the client about wildlife and habitat while they work together in the field. An informed landowner is more likely to make decisions benefiting the wildlife resource. Information generated in the inventory is useful for further defining problems and opportunities identified in Step 1; it may also suggest that some of the client's original objectives be altered or eliminated or new objectives added.

The NPPH provides a general outline of basic inventory inputs. Inventory tools and procedures are also detailed. Discipline handbooks are useful references, providing additional inventory procedures. The *Habitat Evaluation Procedure* (HEP) manual is the recommended reference for evaluating the food, cover, and shelter components of wildlife habitat. In addition, a set of corridor inventory forms is included in Appendix A.

Documentation

All inventory data should be mapped at a common scale. This may require enlarging or reducing mapped information from different sources. For conservation plan scale projects, a scale of 1:660' or the scale of NRCS aerial photo soil maps, is the most convenient for planning purposes. The following maps, lists, and short reports should be prepared. Use aerial photos as a base for mapping (Figures 7-1 and 7-2).

Wildlife Species Data Needs

- List of species observed or whose presence is inferred from indirect evidence on the site
- List of federal or state listed threatened or endangered species (if any)
- List of species breeding on the site
- List of potential species (species typically associated with plant community types on the site) but not observed or inferred
- List of nuisance species (if any)
- Estimate of species abundance

Wildlife Habitat Data Needs

Existing Vegetation Map

- Grass plant community type
- Grass shrub plant community type
- Riparian wooded plant community type
- Riparian shrub plant community type
- Riparian grass plant community type
- Upland wooded plant community type (natural)
- Upland wooded plant community type (introduced)
- Wetland type

Land Use or Cover Type

- Cropland
- Pastureland
- Rangeland
- Conservation Reserve (indicate type)
- Parks/Open Space
- Urban
- Wetland Reserve Program (WRP)
- Wildlife Habitat Incentive Program (WHIP)

Habitat Features Map

Special patches

- Large remnant upland patches
- Large introduced patches

Special corridors

- Riparian corridors
- Migration corridors
- Dispersal corridors

Special areas

- Patches or corridors inhabited by threatened or endangered species or vulnerable populations
- Leks or other breeding sites
- Calving/birthing sites
- Winter range
- Winter cover
- Summer range
- Thermal cover
- Irreplaceable sources of food or water
- Other - (specify)

Special features

- Snags
- Dens
- Burrows
- Talus or rock piles
- Cliffs
- Caves and abandoned mines
- Other - (specify)

Potential Habitat Maps

- Steep slopes
- Poorly drained soils
- Damaged soils
- Disturbed sites (borrow pits, etc.)
- Easement corridors
- "Waste" areas
- Other - (specify)

Basemap

Hank Henry Farm
Natural Resources Conservation Service



Basemap Information

- Planning Boundary
- 100 Year Floodplain

Existing Features

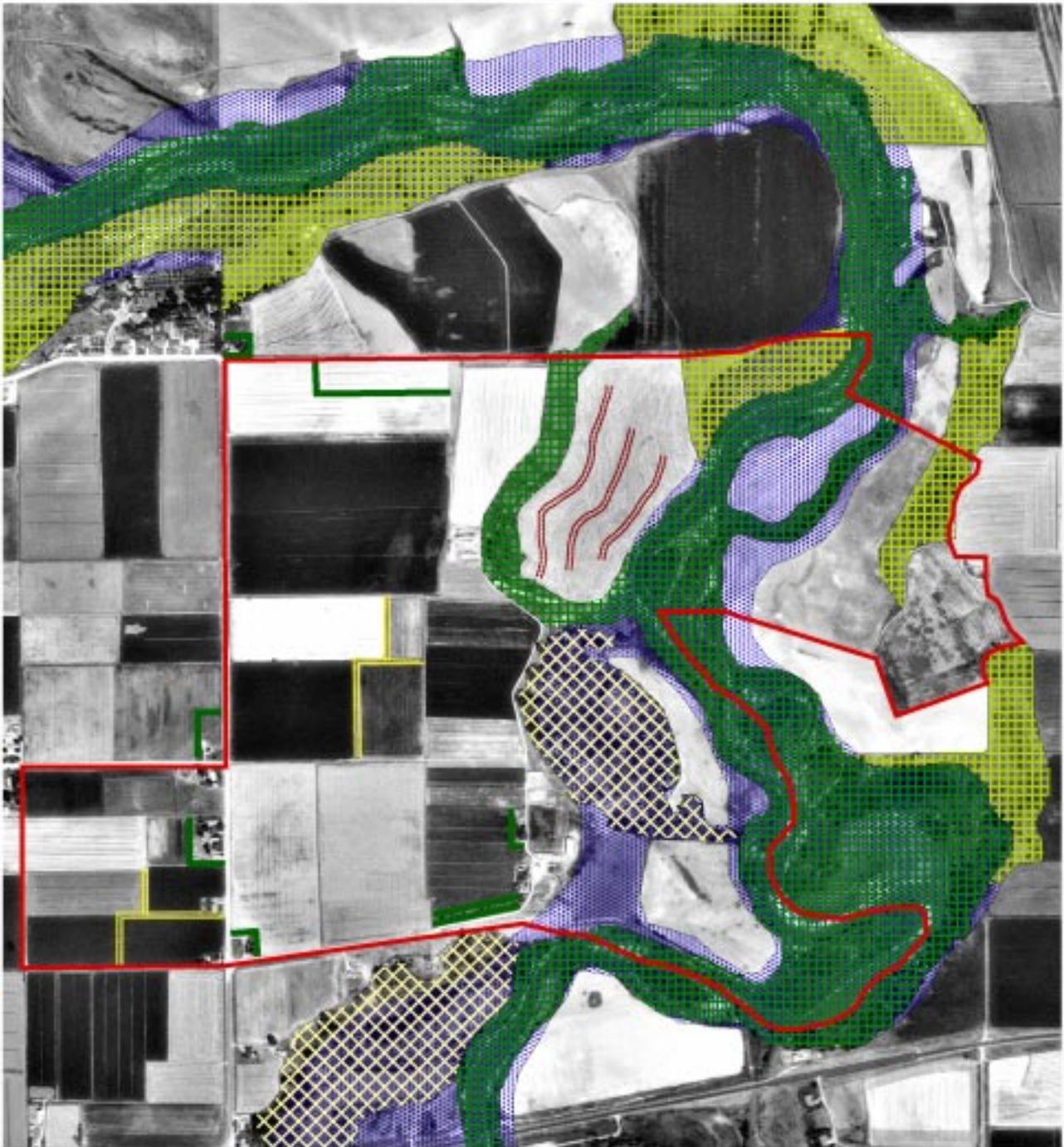
Proposed Practices



Figure 7-1

Existing Conditions

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Basemap Information

- Planning Boundary
- 100 Year Floodplain

Existing Features

- Windbreak
- Field Border
- Terraces
- Wetland Complex
- Riparian
- Upland Remnant

Proposed Practices

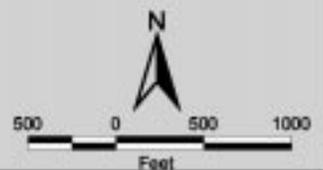


Figure 7-2

If the client's property is within an existing area-wide plan boundary, many of these maps will have been completed but at the scale of a USGS quad sheet 1:24000. The information relevant to the client's property can be taken off the area-wide plan, rescaled to 1:660 and drawn on the appropriate inventory sheet. Ground-truthing will be required to verify the accuracy of conversion from one map scale to another; additional detail may be required.

Other wildlife related data needs will vary depending on the client's objectives and the project site characteristics. Generally this information does not need to be mapped; for example, life history information for threatened or endangered species, vulnerable species, or species of special interest to the client. When the inventory is completed, the client and the conservationist will have produced the products described in the NPPH.

Products

- List of wildlife species on the client's property with estimates of abundance and diversity
- A set of maps depicting the components of wildlife habitat on the client's property
- Short wildlife related reports where necessary to elaborate on the mapped information

STEP 4 ANALYZE RESOURCES

Planning Standard

The benchmark condition for the planning area is documented. Results are displayed in easily understood formats depicting current natural resource conditions, physical characteristics of the planning unit, and comparisons between existing and potential conditions. The causes of the resource problems are identified.

Discussion

The conservationist must now interpret the inventory data. Discipline handbooks, manuals, and inventory worksheets are critical references in the analysis process. In some cases, consulting with experts may be required, for example when threatened or endangered species or locally vulnerable wildlife populations are issues.

The reports and maps prepared in the analysis phase should:

- Depict current wildlife and wildlife habitat conditions
- Compare current conditions with potential conditions
- Identify causes of wildlife and wildlife habitat problems

The NPPH outlines the basic procedures for the analysis. Results of the analysis may suggest that some previously defined objectives be eliminated or modified, some new objectives may be added. At the completion of Step 4 and Phase 1, the conservationist and client should be in agreement on problems, opportunities, and objectives for the conservation plan.

The wildlife component of the analysis should focus on wildlife and wildlife habitat; specifically species diversity, population dynamics, and habitat conditions, causes of conditions, and potential conditions in the patches, corridors, and matrix on the client's property. The analysis must draw cause and effect relationship between what occurs in the matrix and the condition of habitat in patches and corridors. It should also describe what if any effects patches and corridors exert on the matrix.

Analysis Questions

It is important to synthesize wildlife and wildlife habitat inventory information acquired in Step 3 into concise, accurate and easy to understand tables, graphs, and maps. Maps, either hand drawn or computer generated, are important in helping the client fully appreciate the wildlife-related problems and opportunities inherent on his/her property (Figure 7-3). The analysis of wildlife and wildlife habitat should answer the following questions:

Wildlife

- What wildlife populations are vulnerable to local extinction? (threatened and endangered species are a special case)
- What are the principal causes of the populations' or species' vulnerable status?
- What is the potential condition of these vulnerable populations?
- What factors are limiting non-game species diversity or game species abundance?
- What factors enhance populations of nuisance or pest species?

Threatened and endangered (T&E) species listed under the Endangered Species Act are the responsibility of the USFWS. States may also have T&E species or species of concern lists. Any T&E species habitat on the client's property must be managed to comply with USFWS standards or state standards. Vulnerable populations, although not technically threatened or endangered, could experience local extinction. These populations are typically listed with the State Natural Heritage Program which can specify a general area where a vulnerable species may be present. If the client's property falls within the general area, a survey should be conducted to determine the presence or absence of the species. If present, a biologist specializing in the species and a conservation biologist should be consulted to determine the causes of vulnerability and the potential of the population to persist.

Wildlife diversity is strongly influenced by plant community diversity, patch size, amount of edge, connectivity and presence or absence of water. The conservationist can compare the property's habitat characteristics and wildlife species to similar site locations in the watershed. The comparison may suggest general habitat characteristics limiting wildlife diversity on the client's property. The conservationist may request assistance and additional information from field biologists.

Most states have detailed models of the habitat requirements of game species. The USFWS also has Habitat Suitability Models for many game and non-game species. The conservationist can compare the habitat conditions described in the models with those identified in the inventory for a general idea of what factors may be limiting abundance or diversity. Unfortunately, information for many non-game species is limited. State or field biologists can provide more detailed information concerning limiting factors.



Gary Bentrup

Habitat

- Patches
- Corridors
- Potential Patches
- Special Areas
- Special Features
 - What is the current condition of habitat in existing patches, corridors, potential patches, special areas, and special features?
 - What causes these conditions?
 - What is the habitat potential of existing patches, corridors, potential patches, special areas, and special features?
 - What patches, corridors, potential patches, special areas, and special features are of greatest value or potential value to wildlife?

Patch habitat condition evaluations should be conducted using procedures outlined in discipline handbooks. Corridor condition evaluations should be completed using the corridor inventory forms in Appendix A. The inventory phase will have determined species present on the client's property. There are several ways to determine what species were or could be present. Many states have species distribution maps showing what species would be expected on the client's site. The list of expected species can be compared with the inventory list prepared. Conservationists may also know about what species could exist on the property based on his/her experiences elsewhere in the watershed. Any Environmental Assessment or Environmental Impact Statement done in the watershed will have a species list that can be used for comparative references.

Determination of the habitat value of patches, corridors, and special areas should be based on existing wildlife species and habitat. Consideration should be given to existing resources that have habitat potential but are not presently being used by wildlife. The most valuable patches, corridors, special areas and features will vary with each property, watershed, and region. However, there are some general habitat types and resources of high value in all watersheds and regions.

General high value habitat resources include:

- Relatively undisturbed patches of remnant vegetation (large patches are particularly valuable)
- Stream/riparian corridors
- Migration and dispersal corridors
- Wetlands
- Lakes, ponds, springs, seeps, and other water features
- Irreplaceable sources of food, water, cover, or sites for reproduction

The conservationist can expand on this list to include habitats or resources considered most important in his or her region. Documentation of these important resources on the composite analysis map is critical to the next step in the planning process.

At Risk Habitats

- What patches, corridors, special areas or special features are at risk?
- What are the causes of risk to these habitat resources?
- What is the potential for mitigating or eliminating threats to wildlife or wildlife habitat?

A habitat component at risk is defined as a patch, corridor, special area or feature, or other wildlife resource whose continued ecological function is threatened by some internal or external factor. For example, an unbuffered wetland receiving excessive amounts of silt and agricultural chemicals would be classified at risk. At some point the level of pollutants will cause eutrophication and significantly degrade the wetlands functional capabilities including habitat for wildlife. NRCS biologists reported matrix management practices, increasing field size, water development projects, and urbanization as primary factors in creating at risk conditions in wildlife habitat. At risk habitats should be delineated on the base map.

Matrix

- What current field management practices or other land use activities adversely impact wildlife or wildlife habitat?
- What specific attributes of management practices or land uses cause the adverse impacts?
- What potential wildlife or wildlife habitat benefits could be realized if field management practices or land uses were altered?

The condition and management of the matrix has a significant impact on wildlife. The client and conservationist should evaluate both elements in the field. NRCS biologists reported in a recent survey that the timing of haying and mowing, fall plowing, spring ditch burning, spraying, and unmanaged grazing were among the more common management practices that adversely impact wildlife. Indirect adverse impacts on wildlife include soil erosion, sedimentation, and chemical laden runoff. Matrix management practices adversely impacting wildlife should be delineated on the base map.

Documentation

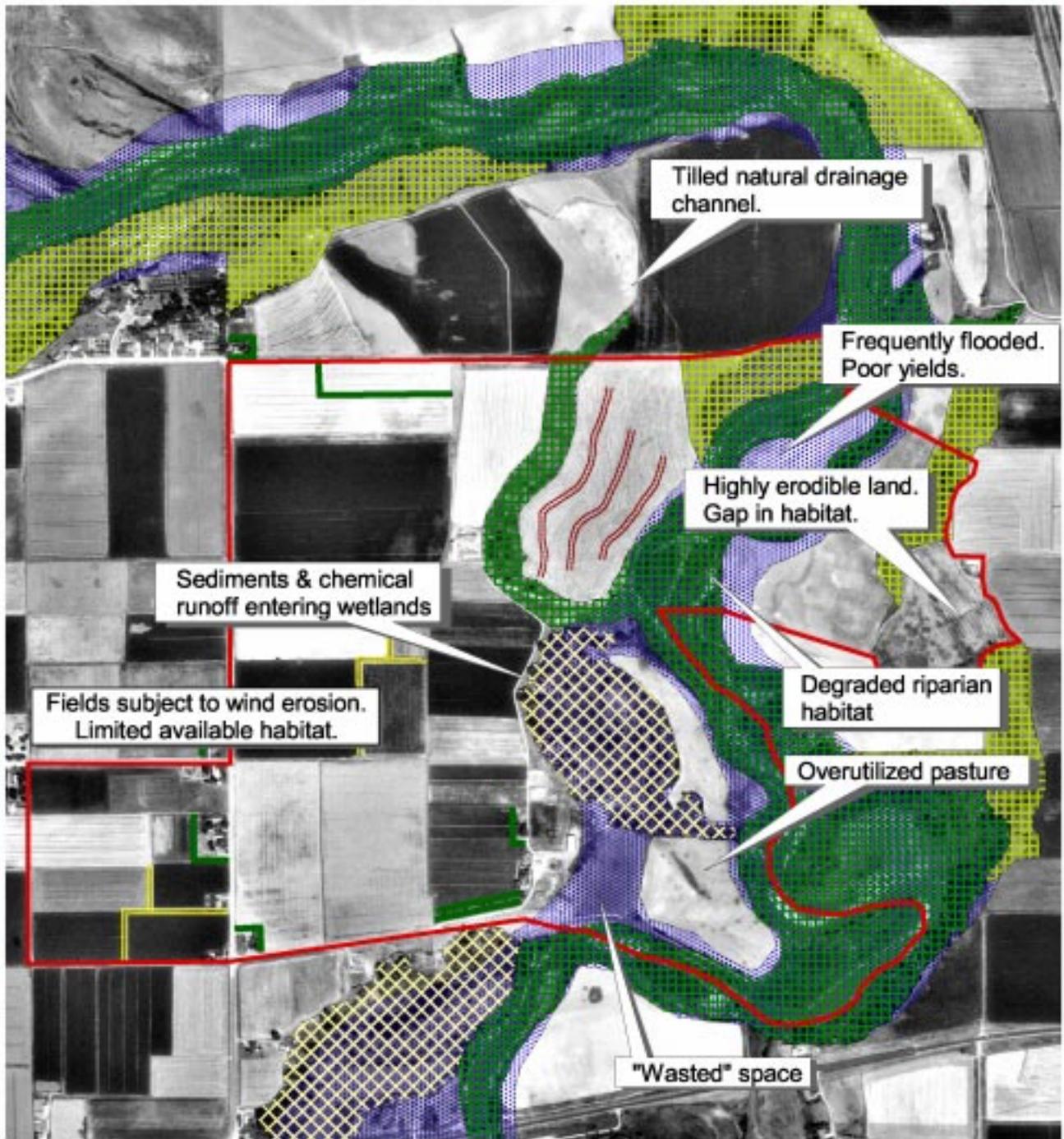
All patches, corridors, and the matrix will have been mapped in Step 3 inventory. Duplicate these maps and note the existing condition, causes of the condition, and potential condition. Relating this information to real locations on the property is useful for preparing alternatives. It is also important to note problems on the client's property, the causes of which originate off-site. These off-site problems are frequent in riparian corridors due to downstream flow.

Most of the analysis information will be recorded in short reports. However, it is also useful to develop a composite resource analysis map at the same scale as the inventory maps (1"=660') (Figure 7-3). This map documents the general habitat condition on the client's property. The map would locate:

- Threatened or endangered species habitat
- Patches with vulnerable populations
- The condition of all patches, corridors, potential patches, special areas, and special features

Analysis

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Natural Resources Conservation Service



Basemap Information

- Planning Boundary
- 100 Year Floodplain

Existing Features

- Windbreak
- Field Border
- Terraces
- Wetland Complex
- Riparian
- Upland Remnant

Proposed Practices



Figure 7-3

- High value patches and corridors, special areas and features
- Gaps in corridor connectivity
- Potential corridor connections, both on-site and off-site
- Patches, corridors, special areas and special features at risk
- Field management practices, both on-site and off-site, detrimental to wildlife
- Potential habitats

The value of mapping the analysis results is it ties the conclusions to specific locations on the client's property. The client can see direct links between the inventory, analysis, and resources. If other information is needed, the conservationist and client can refer to written reports documenting the analysis.

Products

- A clear statement of the benchmark condition in the planning unit and related areas.

PHASE 2 DECISION SUPPORT AT THE CONSERVATION PLAN SCALE

Phase 2 involves:

- Formulate alternatives
- Evaluate alternatives
- Make decisions

In Phase 2, the client and conservationist will develop a range of plan alternatives that address the problems, opportunities, and objectives identified in Phase 1. At the completion of Phase 2, they will select a conservation plan that best meets the objectives of both the client and the natural resources.

STEP 5 FORMULATE ALTERNATIVES

Planning Standard

Alternative treatments are developed to meet quality criteria and the objectives of the client.

Discussion

Two general conservation plan scales involve participation of the conservationist:

- Small scale conservation plans that address one to several localized problems or opportunities; installing a grassed waterway for example
- Large scale comprehensive farm/ranch or community conservation plans that could involve the installation of numerous conservation practices or combinations of practices across the entire property

Small Scale Projects

Small-scale projects, one to several conservation practices on a farm or ranch, have historically comprised the majority of requests for assistance. Fortunately, each conservation practice has inherent potential to benefit wildlife in some way. The challenge for the conservationist is to enhance the habitat potential of each conservation practice (regardless of location), to design practices that produce habitat functional values greater than the practice itself, and to educate the client about increased benefits from planning on a broader scale. Reference Chapter 5 - Conservation Plan/Practice section for ways to enhance habitat value for each conservation practice. Before the project can proceed, all options to enhance habitat value must also meet the client's objectives for initiating the project.

Large Scale Projects

A large-scale, comprehensive, conservation plan for an entire farm, ranch, or community open space presents a more difficult challenge, but the benefits for wildlife can be significant if the challenge is met. The planning task is more challenging because it must address problems and opportunities on the entire property, not just a few specific locations. The opportunities to benefit wildlife are greater because the planning area is large; it may include a diversity of plant community types and ecosystems, and the number of opportunities to link patches and corridors with adjacent properties generally increases. There may also be greater flexibility in the location of conservation corridors and more opportunities to develop integrated systems of conservation practices both on and off-site.

Process

The wildlife component of the conservation plan is prepared in direct consultation with the client. The basic wildlife plan from which all alternatives are derived is assembled as a series of map overlays or layers (Figure 7-4). The base layer is the composite analysis map, prepared in Step 4, which depicts existing habitat resources on the client's property. Subsequent layers illustrating proposed solutions to specific problems or opportunities are overlaid on the analysis composite base maps.

Layers typically included are:

Existing Habitat Resources – This base is a copy of the composite analysis map prepared in Step 4 (Figure 7-3).

Function – This layer delineates the location of conservation practices or systems of practices required to meet the client's objectives and comply with NRCS standards. Note: Wildlife functions are considered specifically in the Potential Habitat and New Plantings layer and the Synthesis layer.

Existing Habitat Resource Management – This layer delineates recommendations for preservation, enhancement, or restoration of all existing habitat resources on the client's property.

Potential Habitat and New Plantings – This layer delineates sites on the client's property that could be developed into wildlife habitat.

Synthesis – This layer uses the concepts and principles discussed in Chapter 5 to integrate the three previous layers into an ecologically sound wildlife plan that responds to the unique resources of the client's property and his or her program objectives.

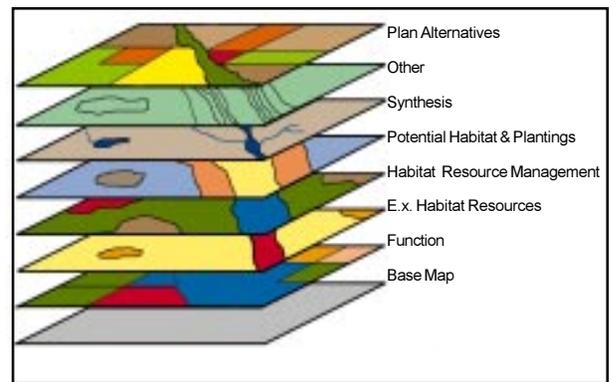


Figure 7-4: An example of map overlays or layers.

First Layer – Existing Habitat Resources

The conservationist should make a copy of the composite analysis map that delineates the pattern of existing habitat components including:

- Threatened or endangered species habitat
- Patches with vulnerable populations
- The condition of all patches, corridors, potential patches, special areas, and special features
- High value patches and corridors, special areas and features
- Gaps in corridor connectivity
- Potential corridor connections, both on-site and off-site
- Patches, corridors, special areas and special features at risk
- Field management practices, both on-site and off-site, detrimental to wildlife
- Potential habitats



Gary Bentrup



Craig Johnson

Second Layer – Function

Many conservation plan projects will involve the location and design of new conservation corridors to solve functional problems. Clients have specific objectives in mind, often addressing a specific soil or water conservation problem. The location of the problem in the field dictates the location of the conservation practices or systems of practice. The recommended process for locating and designing new corridor plantings to achieve functional objectives should proceed as follows:

- Review the client's objectives related to field management practices, wildlife habitat, erosion control, and air/water quality protection.
- Identify which ecological functions of corridors or other conservation practices or combinations of practices could be used to solve the problem or capitalize on the opportunity.
- Consider possible solutions such as fencing, grading, bioengineering, modified management systems, etc.
- Select corridor types or management practices or combination of practices that provide functions necessary to solve the problem or realize the opportunity, and are most beneficial to wildlife.
- Specify plant community structure and native plant species for the management practice, appropriate for wildlife species in the region (reference Chapter 5).
- Locate the corridor type, practice or combinations of practices where they would be installed in the field on the 1"=660' base map.
- Repeat this procedure for each problem or opportunity.

When all conservation practices and systems of practices necessary to meet the client's objectives have been located on the base map, a preliminary functional plan will have been completed. Starting plan development by addressing functional issues first does not mean wildlife issues are any less important, they are simply addressed later in the process. The final plan must integrate all objectives including wildlife objectives into an operational and ecologically unified whole (Figure 7-5).

Third Layer – Existing Habitat Resource Management

The condition of patches, corridors, potential patches, and special areas/features was documented in the analysis Step 4. Causes of the conditions were also identified. Both conditions and causes should be addressed in the plan. The following procedure for addressing existing habitat resource issues is suggested:

- Review the current condition of each patch, corridor, special area, or special feature as described in the analysis
- Review the wildlife analysis report to identify factors degrading these habitats or limiting species diversity or abundance
- Recommend ways to alleviate the cause or causes of habitat degradation or other factors limiting species diversity or abundance
- Include recommendations for problems or opportunities unique to the client's property

General recommendations to preserve, enhance, or restore patches, corridors, or other habitat resources should be noted on the base map and linked directly to that resource (Figure 7-6). Specific management techniques for meeting these objectives should be keyed to habitat resources on the map and discussed in detail in the implementation report (Step 8).

Fourth Layer – Potential Habitats and New Wildlife Plantings

The conservationist should review the areas of potential habitat delineated on the analysis map and assess possibilities of enhancing or restoring these areas. Consider the function these areas could perform in addition to habitat. For example, tiled wetlands are common in many regions of the country. During wet years, crop production on these areas is marginal. Many farmers are voluntarily crushing drain tiles, restoring these wetlands. Not only have these practices restored habitat for wildlife, they have also restored other wetland functions helping mitigate downstream flooding and reduce water pollution.

Function

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Natural Resources Conservation Service



Basemap Information	Existing Features	Proposed Practices
Planning Boundary	Windbreak	Conservation Tillage
	Field Border	CRP
	Terraces	Agroforestry
	Field Buffer	Filter Strip

N

500 0 500 1000
Feet

Figure 7-5

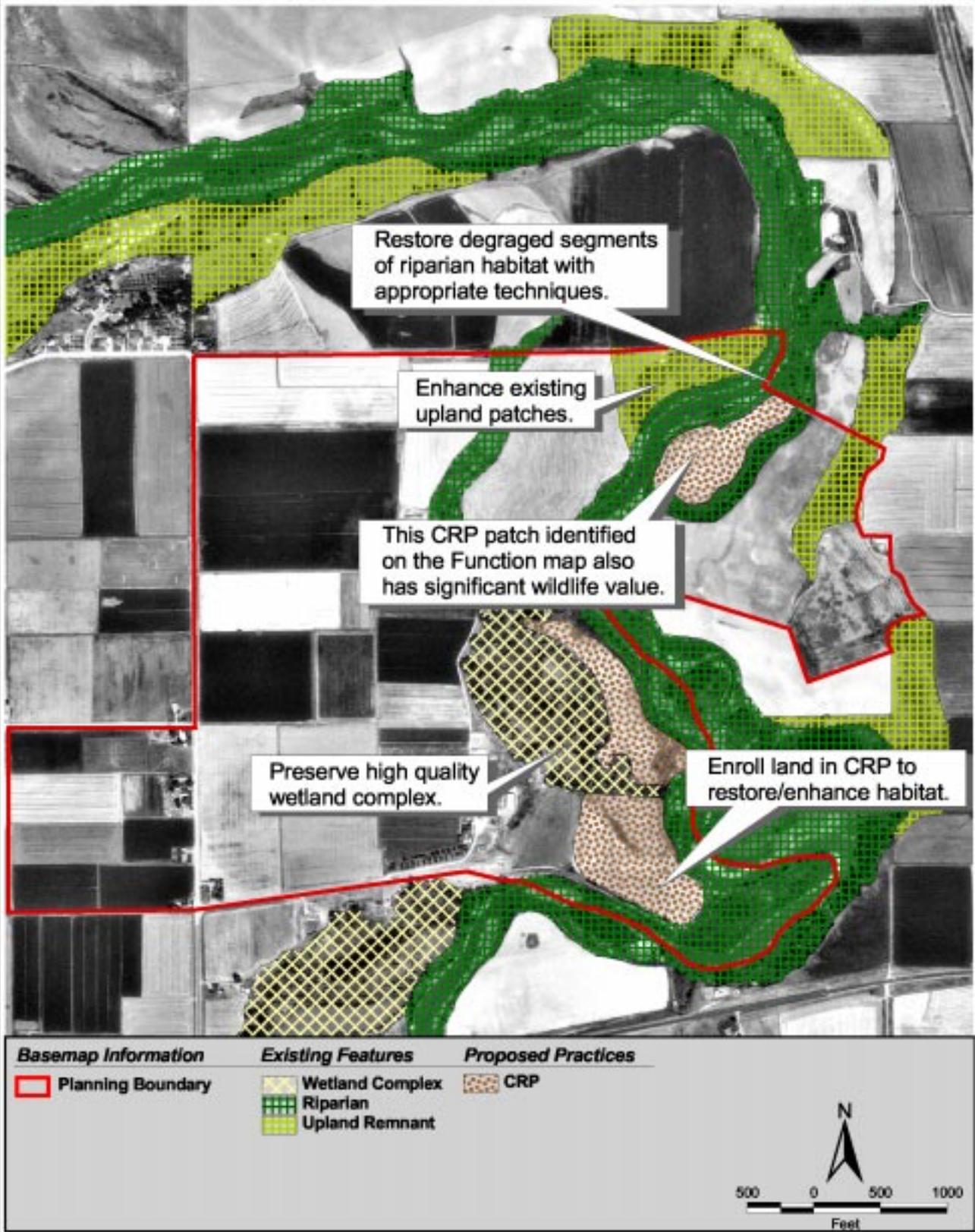


Figure 7-6

Easement corridors for powerlines, pipelines, and other utilities provide real possibilities to link patches and other corridors across a site. If properly planted and managed, easements can provide excellent habitat for many species. Similar habitat and linkage potentially exist in steep slopes, damaged soils, “waste” areas, and disturbed sites. Locate potential habitats worthy of development on the base map.

New wildlife corridor plantings offer exciting opportunities (see the Hedgerow Farms case study for example - pp. 7-27). New wildlife corridor plantings should be located to provide other ecological functions in addition to habitat thus maximizing their utility. When appropriate, the conservationist should propose corridor locations that serve as major connecting structures for wildlife on the farm, ranch, or community. In many respects, new plantings offer more design flexibility than any other plan activity. New plantings may include habitat patches as well as corridors. Look for opportunities to plant even small areas of new habitat within those large areas (>80 acres) outlined on the inventory map as being devoid of habitat.

It is important to make sure all proposed new plantings do not interfere with the client’s normal farming or ranching operations. For example, an Iowa State University extension publication *Stewards of Our Streams - Buffer Strip Design, Establishment and Maintenance* recommends streamside/riparian plantings to “square up” fields converting the area adjacent to stream meanders into habitat. If these recommendations were implemented, they would provide important riparian habitat and increase farm equipment operating efficiency (Figure 7-7). Locate all potential habitats proposed for enhancement or restoration and all new proposed plantings on this layer (Figure 7-8).

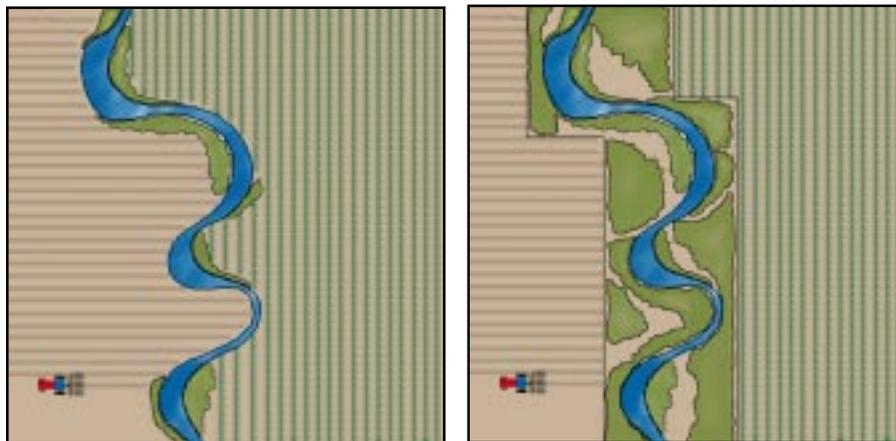


Figure 7-7: Before “squaring up” fields, habitat is limited to small isolated patches. After “squaring up” fields, habitat is increased 5-fold and farming efficiency is enhanced.

Fifth Layer - Synthesis

Synthesis involves combining the mapped information from all three previously developed layers. The pattern that emerges from overlaying all layers is often disconnected. It is a collection of conservation practices and management recommendations, not yet a plan. The challenge for the conservationist and the client is to convert this collection of practices and recommendations into a plan. They need to identify practical opportunities to connect patches, corridors, potential habitat patches, special areas, and special features into an integrated pattern. The intent is to optimize the value-added benefits of connectivity. Reference the concepts and principles on page 7-19 to help guide the plan development process.

Optimizing connectivity and modifying the other plan elements in response to planning principles may involve:

- Extending a corridor
- Changing corridor location, width, or configuration, where practical
- Adding corridors or patches
- Proposing additional structural, mechanical, or management practices
- Reintroducing natural mechanisms to manage vegetation

In some instances, there will not be a practical way to link patches or corridors; they will remain disconnected from the overall structure of the conservation plan but are still valuable as habitat.

The wildlife component of the conservation plan that emerges from the synthesis process should optimize habitat resources on the client’s property. The conservationist and client should take the preliminary synthesis plan into the field and evaluate each recommendation on location. Adjustments to the plan should be made as necessary in response to on-site conditions. The conservationist will prepare a final plan once all adjustments have been made (Figure 7-9).

Potential Habitats

Hank Henry Farm
Natural Resources Conservation Service



Basemap Information

 Planning Boundary

Existing Features

Proposed Practices

-  Windbreak
-  Field Border
-  Grassed Waterway

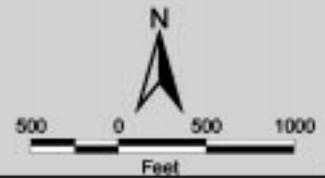


Figure 7-8



Lynn Betts NRCS



Lynn Betts NRCS

Planning Habitat Concepts and Principles

The concepts and principles discussed in Chapter 5 are guidelines the planning team can use to synthesize the four previous layers into an integrated wildlife habitat plan. They suggest locations, configurations, and linkages for corridors and patches providing the greatest benefit for wildlife. These concepts and principles are applicable regardless of project scale and have been rephrased as planning directives to use in this phase of the planning process.

Patches

- Preserve all large patches or introduce new ones where practical
- Connect all patches, large or small, that were historically connected
- Do not subdivide existing patches
- Preserve clusters of small patches
- Preserve patches that are near each other
- Introduce new patches in areas devoid of habitat

Corridors

- Preserve continuous corridors; plant gaps in discontinuous corridors
- Preserve existing corridors connecting existing patches; pay particular attention to migration and dispersal corridors
- Introduce, where practical, corridor plantings to connect patches that were historically connected

- Preserve or introduce multiple corridor or “stepping stone” connections between patches that were historically connected
- Design new corridors to be as wide as practical; widen existing corridors where practical

Special Areas and Features

- Preserve all patches, corridors, special areas or special features inhabited by threatened or endangered species or vulnerable populations
- Preserve other special areas and features

Potential Habitats

- Develop potential habitats where practical
- Consider artificial structures to provide habitat when natural habitat has been degraded or destroyed

Other Principles

- Address key impacts that create at-risk conditions for habitat
- Recommend matrix management principles that benefit wildlife
- Recommend structural diversity in patch and corridor plant communities
- Recommend native plant communities

The conservationist should adapt concepts and principles as necessary to meet project resource conditions and the needs of specific wildlife species.

Synthesis

Hank Henry Farm
Natural Resources Conservation Service



Basemap Information
 Planning Boundary

Existing Features
 Windbreak
 Field Border
 Terraces
 Wetland Complex
 Riparian
 Upland Remnant

Proposed Practices
 Windbreak
 Field Border
 Terraces
 Field Buffer
 Grassed Waterway

Conservation Tillage
 CRP
 Agroforestry
 Filter Strip

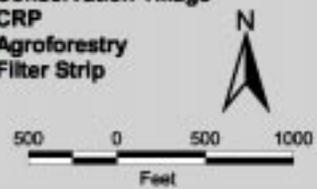


Figure 7-9

Develop Alternatives

The NPPH requires preparation of viable alternative conservation plans. There are a number of ways to develop alternatives to the base plan. Alternatives can focus on conservation function, wildlife (diversity or target species) or other corridor benefits. Some examples are:

- Alternative plans using different management 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 (required)

The conservationist and client must agree that each alternative meets the client's objectives and NRCS standards. In addition, each alternative must comply with all relevant Federal, state, and local regulations.

Product

A description of wildlife habitat alternatives available to the client

STEP 6 EVALUATE ALTERNATIVES

Planning Standard

The effects of each alternative are evaluated and impacts are described. Alternatives are compared to benchmark conditions to evaluate their ability to solve problems, meet quality criteria, and the client's objectives.



Discussion

The conservationist and client must evaluate the conservation plan alternatives developed in Step 5. The NPPH outlines the basic procedures for evaluating alternatives. The intent of evaluating the wildlife habitat component of the conservation plan is to:

- Compare the wildlife habitat component of conservation plan alternatives against habitat benchmark conditions as described in the analysis
- Compare the wildlife habitat benefits of each alternative
- Compare the effectiveness of each alternative in meeting the client's objectives
- Verify compliance with federal, state, and local statutes regulating wildlife or wildlife habitat

The Conservation Plan Alternative Evaluation Worksheet (pp. 7-22) provides a format for quantifiable comparisons between alternatives. Most of the data needed to fill out the form can be scaled from each plan alternative. However, estimated changes in species diversity will require input from a biologist. Because state wildlife agencies and the USFWS manage wildlife populations, they should be invited to review plan alternatives and make recommendations.

Computer simulations constructed on oblique aerial photographs are effective in depicting what different alternatives would look like if implemented on the client's property. This valuable tool can help the client and conservationist visualize each alternative (pp. 7-26).

Products

- A set of practical conservation management system (CMS) alternatives compatible with client and NRCS objectives.
- A conservation effects for decision-making (CED) worksheet, for each alternative, displaying effects and impacts for the client to consider and use as a basis for making conservation decisions.
- Technical assistance notes reflecting discussions between the planner and the client.



NRCS

Conservation Plan Alternative Evaluation Worksheet

Completing this form will provide a general evaluation of the impact of each alternative on wildlife habitat and wildlife populations.

INSTRUCTIONS: Enter the alternative name or number in the space provided. Using a scale, measure the length or calculate the area for each criterion and record them in the matrix. Where requested, check whether these figures have increased, remained the same, or decreased relative to the existing condition (benchmark). The last 2 criteria require the planning team to estimate the alternative's impact on wildlife. Each state is encouraged to develop criteria for making these estimates.

LOCATION	ADDRESS
County: _____	Landowner: _____ <i>mailing</i>
Township: _____	_____
Range: _____	_____ <i>rural post</i>
Section: _____	_____ <i>or fire code number</i>
Subsection: _____	Phone # _____ Day: _____ Evening: _____

ALTERNATIVE NAME: _____

EVALUATION

Criteria	Increase	No Change	Decrease	Acres	Length	Number	Not Applicable
Total area of corridor							
Linkage to adjacent patches or corridors							
Total length of corridor							
Length of existing corridor							
	Preserved						
	Enhanced						
	Restored						
Total area of patches by plant community							
	Grass						
	Grass shrub						
	Riparian wooded						
	Riparian shrub						
	Riparian grass						
	Upland wooded (natural)						
	Upland wooded (introduced)						
	Wetland						
Acres of farm or ranch land managed in ways that benefit wildlife							
Acres of farm or ranch land taken out of production							
Special areas preserved							
Special features preserved							
Other conservation measures (Specify)							
Estimated effects on species diversity							
Estimated effects on species abundance (Specify species)							



STEP 7 MAKE DECISIONS

Planning Standard

A conservation management system is selected based on the client's clear understanding of the impacts of each alternative. The selected alternative is recorded in the client's plan.

Discussion

The conservationist assists the client to understand his or her options in selecting an alternative. The NPPH provides general guidelines for helping the client consider plan alternatives. It is important to review objectives established in Step 2 at this point in the decision making process. They should be basic criteria upon which the final decision is made. Also review the 1" =660' drawings of each alternative using the Plan Alternative Evaluation Worksheets to compare habitat advantages and disadvantages of each alternative. A rigorous evaluation of each plan alternative will help the client understand the advantages and disadvantages for the wildlife resource and make an informed decision.

The conservationist prepares the final plan document once the client has selected an alternative. General guidance for preparing plan documents is provided in the NPPH.

Once the conservation plan is completed it is delivered to the client and a date is set for follow up or application assistance to coordinate funding and activities with state agencies, conservation groups, or others involved in plan implementation.

Products

- The plan document with the selected alternative, including potential program or implementation opportunities, and operation and maintenance
- Schedule of conservation system and practice implementation
- NEPA documentation (if required)
- Revised CED worksheet for a conservation plan

PHASE 3 APPLICATION AT THE CONSERVATION PLAN SCALE

Phase 3 involves:

- Implement plan
- Evaluate plan

In Phase 3, the client and the conservationist cooperate in implementing the conservation plan. Installed management practices are evaluated and adaptive management is applied where necessary.

STEP 8 IMPLEMENT PLAN

Planning Standard

The client has adequate information and understanding to implement, operate and maintain the planned conservation systems. Practices implemented with NRCS technical assistance will be installed according to agency standards and specifications.

Discussion

Implementing a conservation plan is the process of installing practices that make up the planned conservation management system. The plan may be implemented by the client with or without NRCS technical assistance. Implementation also includes operation and maintenance after installation to insure proper future functioning. It is only after habitat enhancing conservation corridors and practices are installed that wildlife benefit. Wildlife will continue to benefit as long as the corridors are maintained with their needs in mind.

The NPPH provides detailed instructions on how to proceed with the implementation process. One area that requires additional discussion for wildlife focused plans is permitting. A number of wildlife, wildlife habitat, and water quality related resources are regulated by federal, state, or local law. Conservationists should be familiar with the types of required permits and permitting agencies. All necessary permits must be acquired before the plan can be implemented.

One of the most critical aspects of implementation is funding, particularly where wildlife habitat is concerned. Clients, for good reason, pursue the most cost-effective solution to a particular soil or water conservation problem. For example, in the upper Midwest, smooth brome (*Bromus inermis*) is the most common species planted in grass waterways. Farmers and ranchers prefer smooth brome because it is easy to establish and provides good inexpensive erosion control. However, pure stands of smooth brome have limited value as habitat for wildlife. Alternative grass/forb seed mixes that produce high quality habitat are more expensive and difficult to establish. Fortunately, numerous private conservation organizations in the upper Midwest and other regions are seeking partnership opportunities with landowners to enhance the habitat value of grassed waterways and other conservation practices. They have programs that contribute funds, native seed mixes, trees, shrubs, seeding and planting equipment, and labor. Support of this kind makes it possible for landowners to install appropriate conservation practices beneficial to wildlife at no additional cost. The reduced long-term costs of managing native plant communities are an additional benefit for the landowner.

Partnerships of this type result in enhanced wildlife habitat and a strengthened social structure in rural communities. Partnering with federal and state agencies and county and local governmental departments can produce similar results. Chapter 8 is devoted to the topic of implementation.

Products

- Conservation practices applied
- Conservation management systems applied
- Communication with the clients
- Updated plan document
- Conservation plan revision notes
- Technical assistance notes
- Conservation contract where applicable



STEP 9 EVALUATE PLAN

Planning Standard

The planner maintains contact with the client to determine whether the implementation results are meeting ecological, economic, and social objectives and solving conservation problems in a manner satisfactory to the client and beneficial to the resources. Resource impacts different from those predicted are fed back into the planning process and adaptive management strategies employed.

Discussion

The purposes for evaluating wildlife and wildlife habitat components of the conservation plan as implemented include:

- To ensure wildlife habitat is functioning as intended
- To estimate wildlife response to conservation practices
- To initiate adaptive management where wildlife responses are different than those predicted

Evaluation of the implemented plan effects on wildlife is an on-site activity. The client, conservationist, and NRCS biologist should work together to observe, measure, discuss, and record the wildlife and wildlife habitat data. The conservationist should use the plan evaluation step as an opportunity to discuss the results with the client. Habitat benefits of the conservation practices implemented and the importance of vegetation management in the perpetuation of those benefits should be emphasized. The NPPH outlines the general procedures necessary to complete a plan evaluation.

Evaluating (estimating) the effects of the conservation plan on wildlife can be a difficult task. The very nature and behavior of some species afford little opportunity for assessment. In addition, the effects of conservation practices will not be immediate. Plants take time to grow; the results of fencing may require several years to be reflected in rejuvenated plant communities. The wildlife that inhabits these changing plant communities will also change over time in response to changing plant structure. Further, local and regional populations of wildlife are affected annually by weather and other natural factors. Consequently, changes in species

abundance from year to year may not be responses to implemented management practices but rather responses to other external factors.

Nevertheless, conducting a wildlife inventory over a period of years is worthwhile because it does illustrate trends. Inventories should be coordinated with state wildlife agencies and the USFWS. The types of information generated from a wildlife inventory that reflect the effects of the implemented conservation practice include:

- A list of species observed on the site
- A list of species that breed on the site
- Species abundance - estimated number of individuals present on the site
- Diversity - estimated number of species present on the site

Annual wildlife inventory information collected after implementation can be compared with data collected in the inventory Step 3. The data can be recorded on a simple bar graph to illustrate trends.

There are a number of well-established inventory and monitoring techniques in the wildlife biology literature. NRCS biologists and state wildlife agencies are well versed in these techniques, which include:

- Trapping
- Fecal pellet counts
- Call counts
- Harvest data (game species)
- Flush counts
- Roadside counts
- Number of artifacts (nests, burrows, tracks, etc.)
- Aerial counts

In addition, numerous species specific inventory and monitoring techniques can be used as needed. It is beyond the scope of this manual to detail each technique. The *Research and Management Techniques for Wildlife and Habitat* (The Wildlife Society 1994) is a useful reference. If threatened or endangered species or a vulnerable population is an issue, it may be necessary to enlist the help of other wildlife and conservation biologists in conducting an evaluation.

Adaptive Management

The accumulation of several years of evaluation data may suggest that a particular wildlife species or population may be responding in ways different than predicted to the implemented conservation practices. The plan should be reviewed by the conservationist and a biologist to determine the nature of the problem. Conservation practices should be modified as necessary to rectify the problem. In some cases, additional practices may need to be installed or species populations management employed.

Products

- O & M reports
- Outline of maintenance needs or other changes
- A decision to update or revise the plan, if needed
- Technical assistance notes indicating the effectiveness of the plan
- Case studies, if appropriate, following the guidance provided in the FOTG, Sec. V.
- Recommendations for changes in practice designs or specifications
- Recommendations for changes in FOTG materials
- A decision to revise or expand implementation strategies
- Updated conservation plan effects



Visual Simulations

A. This photograph depicts existing conditions on the farm. Note the engineered stream channel and dark gray wet soils adjacent to the stream.



B. This simulation shows the installation of a shelterbelt around the farm buildings, a grassed waterway, riparian buffer along the stream and a wooded patch on the wet soils.



C. In this simulation, grassed terraces have been installed and the riparian buffer widened in several locations. Terraces are connected to riparian buffers and grassed waterways.



D. The stream has been allowed to meander naturally within the floodplain and many floodplain functions are restored in this simulation. This fully integrated set of conservation practices maximizes wildlife habitat benefits.



E. This photograph depicts existing conditions. Note the lack of connectivity between the wetland and wooded patch and the larger landscape.



F. Shelterbelts installed in this simulation link wetlands, riparian woodlands, and wooded patches, providing wildlife corridors and habitat across a large area.

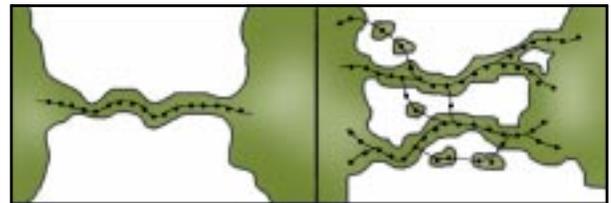
Computer simulations constructed on oblique aerial photographs are effective in depicting what different conservation alternatives would look like if implemented on the client's property. Simulations were prepared by Gary Wells, U.S. Forest Service, Agroforestry Center, Lincoln, NE. and were reproduced with permission.

Case Study:

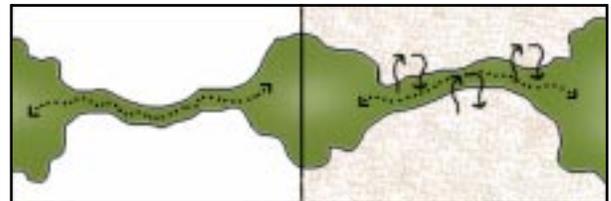
HEDGEROW FARMS

Corridor Planning Principles discussed in Chapter 5 that are exhibited by this case study include:

TWO OR MORE CORRIDOR CONNECTIONS BETWEEN PATCHES ARE BETTER THAN ONE.



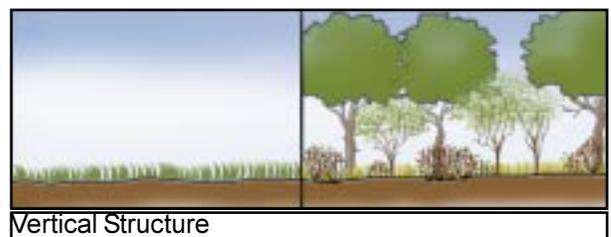
MANAGE THE MATRIX WITH WILDLIFE IN MIND.



NATIVE SPECIES ARE BETTER THAN INTRODUCED SPECIES.



STRUCTURALLY DIVERSE PATCHES AND CORRIDORS ARE BETTER THAN SIMPLE STRUCTURE.



Case Study: Hedgerow Farms

This case study illustrates how a private landowner partnering with federal, state and local agencies and groups can develop an effective conservation plan at the farm or ranch scale. Conservation corridors form the essence of the plan and function both as habitat and conduit for the 110 species that have been recorded on the property. Hedgerow Farms is also a teaching and research facility for farmers and ranchers in the region.

Hedgerow Farms, owned and operated by John Anderson and family, is a 600 acre row crop and grass seed production facility located 20 miles northwest of Davis, CA in the southern Sacramento Valley. Nestled in a 200,000-acre watershed at the base of the Vaca Hills, the farm is surrounded by other row crop farms and orchards. For the past 18 years, Hedgerow Farms has been pioneering methods for restoring and revegetating field borders, canal edges and berms, drainage ditches and riparian corridors with native California vegetation.

Intensive farming practices in the Sacramento Valley have essentially eliminated wildlife habitat and ecosystem functions on the majority of farmland. Most farmers routinely keep nonfarmed areas devoid of vegetation through a costly and labor-intensive combination of tillage and herbicides. Most of the major drainages that served historically as riparian corridors for wildlife have been channelized and stripped of vegetation.



Figure 2: A well designed windbreak with dense understory vegetation provides habitat for many species.



Figure 1: Aerial view of Hedgerow Farms.

In addition to eliminating wildlife habitat and biodiversity, this so-called “clean farming” has exacerbated soil erosion, sediment deposition, and flooding. It also locks farmers into a never-ending cycle of seasonal weed abatement. Left alone for even a short period, traditionally clean-farmed areas become a complex of non-native invasive weeds unacceptable to farmers that can choke water delivery systems.

The owners of Hedgerow Farms have developed and demonstrated the use of on-farm vegetation practices that completely reverse the concept of “clean farming.” Rather than eliminating vegetation, they have restored and cultivated native California vegetation on roadsides, irrigation canals, drainage ditches, field borders, and along a natural riparian corridor. Every non-farmed area is a complex of native plants (including perennial grasses, sedges, rushes, forbs, shrubs, vines and trees) competitively suppressing invasive weeds while providing a biologically diverse community of plants and animals.

Today, Hedgerow Farms supports multiple, interconnected corridors that have eliminated erosion, reduced the need for tillage and herbicides, and may even be assimilating agricultural nutrient run-off. The benefits to wildlife are tremendous. Over 110 species of birds have been recorded on the property. Game species are now regularly harvested and include dove, pheasant, quail, turkey, wood ducks, and mallards. Reptile and amphibian populations have made dramatic recoveries. A myriad beneficial insects and spiders inhabit the



Figure 3: The grassed banks of this irrigation canal reduces bank erosion and provides habitat.

diverse vegetation complexes. The federally listed endangered Valley elderberry longhorn beetle has recently taken up residence in elderberry shrubs planted in 1986. This boon to wildlife has not compromised farm productivity: adjacent fields of corn, wheat, sunflowers, safflower, alfalfa, and tomatoes have not been negatively impacted and may even benefit from the beneficial insects and abundant predators associated with the restored habitat.

The owners of Hedgerow Farms have found that cooperation and partnerships with local agencies have been both essential and rewarding. Installing roadside habitat required the support and participation of the Yolo County public works agency. Restoring riparian habitat and revegetating canal banks depended on a close working relationship with the Yolo County Flood Control and Water Conservation District. The owners also relied upon multiple cost share programs to fund the projects, including USDA ACP funds, the U.S. Fish and Wildlife Service's "Partners for Wildlife" program, and EPA 319 funds through the Yolo County Resource Conservation District. Finally, on-going monitoring and research involves the State Water Resources Control Board, the University of California at Davis, and the University of California Cooperative Extension.

The success and innovation of Hedgerow Farms has heightened local awareness and interest in conservation practices on farmland. The farm hosts an average of two tours each month attended by other farmers, agency representatives, and conservationists eager to learn more about farmland ecosystem management. The Yolo County Resource Conservation District together with NRCS works with Hedgerow Farms to provide education and outreach to expand these and similar programs throughout the watershed.

For additional information, contact:

*John H. Anderson
Hedgerow Farms
21740 Co. Rd. 88
Winters, CA 95616*

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