PURDUE UNIVERSITY

PURDUE EXTENSION
4-H-991-W

Developing a Wildlife Habitat Management Plan

Authors: Brian Miller, Extension Coordinator
Natalie Carroll, Youth Specialist

INTRODUCTION

The instructions in this publication will help teach students to develop a wildlife management plan. Before they can write a wildlife management plan, however, students need to know food and habitat needs of common wildlife species and understand basic habitat concepts. This information forms the basis of the wildlife management plan that defines the management of specific species on a specific property.

Management can involve increasing, decreasing, or maintaining current numbers of different species of wildlife. The skills that students learn in writing a management plan can be applied in any setting and throughout their lifetime. Students can evaluate these skills and compete against other students in the Indiana Wildlife Habitat Evaluation Career Development Event Program (WHEP CDE). Although this publication has been written as a resource for teachers and coaches preparing students for this contest, the information and concepts may be used by anyone interested in teaching students how to develop a wildlife management plan.

The WHEP CDE has three parts: 1) identifying wildlife foods, 2) evaluating wildlife habitat from aerial photos, and 3) developing a wildlife management plan. You will find information about the foods and photos activities in the *National Wildlife Habitat Evaluation Handbook* (order at www.whep.org). The Web site, www.four-h.purdue.edu/whep has information about the Indiana contest, scoring, and additional resources. The publication, *Wildlife Habitat Evaluation with Aerial Photographs* (4-H 910) is at www.ces.purdue.edu/new (choose Shop and enter wildlife habitat in the Search box).

This publication prepares students to develop a wildlife management plan for common wildlife species in Indiana using the format required in the Career Development Event. The wildlife management plan is a capstone test that requires students to apply all they have learned about Indiana wildlife species. Students must: understand wildlife food and habitat needs, movement patterns and restrictions; be able to assess the existing habitat components that are adequate and which need improvement; and be able to recommend habitat management measures that will make the required improvements to the existing habitat. By mastering the skills necessary to develop an effective wildlife management plan, students have acquired a skill they can apply immediately at their homes and in the future on properties they may rent or own.

The objective for this component of the WHEP CDE is to prepare youth to work as a team and write a wildlife management plan for specific species that may include urban, rural, wetlands, or a combination of these habitats.

When learning to prepare management plans:

1. Students study common wildlife management practices used to manage habitat for specific species (*National Wildlife Habitat Evaluation Handbook,* pages 93-111) and determine which practices are needed to improve the area to be managed by increasing the required habitat component in shortest supply.

The *National Wildlife Habitat Evaluation Handbook* lists common **wildlife species** eligible for judging in each of the three Indiana habitats:

Eastern deciduous forest (page 18)
Urban areas (page 46)
Wetlands (page 49)

It also lists **management practice**s that may be appropriate for each species in this habitat type:

Eastern deciduous forest (page 19)
Urban areas (page 47)
Wetlands (page 51)

Students should be familiar with all of the habitat management practices appropriate for species to be judged in the three habitats in Indiana and then be able to determine which practices (if any) are required to improve the habitat deficiencies in their management area for their selected species.

2. Youth will need to combine the knowledge that they gained in studying wildlife needs (pages 55-92) and in evaluating larger scale habitat configuration and abundance learned in the aerial photos exercise to write a management plan. (Resource: *National Wildlife Habitat Evaluation Handbook*)

3. The wildlife habitat management plan must be written by a team of three to four students. Teams are given a Field Condition Sheet that lists landowner objectives for a particular property (e.g., seeing bluebirds daily, reducing deer populations, etc.). The Field Condition Sheet may contain the following information: landowner's objectives; aerial photograph or sketch map of the property; definition of property boundaries, and the size of the tract; population conditions for some of the species; and special considerations, which may include costs. The team must make written recommendations based on landowner objectives. Each team will submit a written report, including:

- An interpretation of landowner's objectives.
- An evaluation of the current condition of the habitat to be managed.
- Identification of the habitat components that are adequate and those that are in short supply for each species to be managed.
- Identification of wildlife management practices that should be used to improve the required habitat components in poor condition or short supply. (Practices used in the Indiana WHEP CDE are found on pages 19, 47, and 51 of the *National Wildlife Habitat Evaluation Handbook* and explained on pages 93-111.)
- An explanation of how the practices will positively or negatively affect the designated species.
- Indication of where the management practices will be located within the given area.
- An explanation of how the team will evaluate the success of their plan.

SCORING

The wildlife management plan will be judged and scored by a team of wildlife biologists based on five criteria which are generally given equal value: background, plan development, implementation, evaluation, and neatness and overall quality. Figure 1 annotates these categories and refers you to the portions of the *National Wildlife Habitat Evaluation Handbook* that describe how to complete each section. The colored boxes in the right margin identify required management plan components that are scored by judges.

WILDLIFE HABITAT EVALUATION CAREER DEVELOPMENT EVENT JUDGING FORM

Rate according to the following (50 points possible):

1. Plan Background (10 pts)

   A. Species to be managed listed (points _____)

   B. Management objectives stated in quantifiable terms (points _____)

2. Plan Development (10 pts)

   A. Habitat assessment [e.g., What are the required habitat components (described on pages 55-91) for each species to be managed (eligible species on pages 18, 46, and 50) and which required habitat components are in poor condition, missing or in short supply?] (points _____)

   B. Wildlife management practices recommended [e.g., Which eligible wildlife management practices (listed in the *Wildlife Habitat Evaluation Program National Manual* pages 19,47, and 51 and explained on pages 93-111—see example in Table 1) are needed to improve the habitat components that are in poor condition, missing, or in short supply?] (points _____)

3. Plan Implementation (10 pts)

   A. Where, when, and how practices are applied: 1)Where will the practice be located? Either identify with words on the written portion of the plan or locate clearly on the map. 2) When will the practices be implemented (e.g., this spring, this fall, in year one, three years from now, etc.)? 3) Give specifics of how the management practice will be applied (e.g., by the landowner, with volunteer help, with certain pieces of equipment, etc.). (points _____)

   B. Affects on habitat (How do you anticipate that the practices you have recommended will improve the habitat and improve the habitat components that are in poor condition, missing, or in short supply?) (points _____)

4. Plan Evaluation (10 pts)

   A. Evaluation of management's affect on populations (What steps will you take to determine whether your recommended habitat improvements have achieved their desired objective, or whether more improvements or habitat adjustments are required at a later time?) (points _____)

5. Neatness and overall quality (10 pts) (points _____)
   Team number _____ and member names:

Species to be managed are listed

Management objectives are stated in quantifiable terms

Habitat assessment-habitat requirements of selected species

Habitat assessment-identification of components that are of poor quality, missing, or in short supply - if any

Wildlife management practices recommended

Plan Implementation-where, when, and how practices are applied

Plan Implementation-affects on habitat

Figure 1. Judging form used in the Indiana WHEP CDE

INSTRUCTIONS FOR DEVELOPING A WILDLIFE MANAGEMENT PLAN

Students are given a field condition sheet (Figure 2) which articulates the landowner's objectives, existing habitat conditions, and circumstances under which a wildlife management plan should be written. Students are then asked to develop a wildlife management plan for the property that meets the landowner's objectives and makes the appropriate suggestions for habitat improvements given the existing habitat conditions. Each plan is scored based on the criteria given in Figure 1.

Two example plans are given in the following pages: a rural management plan and an urban management plan. The second plan, the urban management plan, uses the color coding in the score sheet to help identify the required elements as they may appear in an actual plan (See Figure 6).

Example Field Condition Sheet
Rural Management Plan

Landowner Objectives

Landowner, Ima Wildlifer, wants to develop her 130 acre property for wildlife, particularly so she can see more wild turkeys and wood ducks throughout most of the year. She also has a nephew who enjoys turkey hunting, and wants to hunt here. A few wild turkeys are observed, mostly in the spring. Wood duck pairs are seen on the pond only early in the spring. Neither waterfowl nor turkey hunting is permitted at present.
Management practices can be carried out anywhere on the property. Ms. Wildlifer has $1,000 which she would be willing to spend this year on habitat improvement. Additional funds for habitat improvement must be generated from management of the property.

Figure 2. Sample field condition sheet used in Career Development Events

WRITING A MANAGEMENT PLAN

A Wildlife Management Plan is composed of two segments. One is a **written plan** (one side of one page) and the other is a **map** of the area with management practices drawn in the appropriate places. A basic map of the property (showing boundaries and major features) may be provided if the habitat configuration is complex (Figure 3). In some cases (e.g., where the area to be managed is a bare field), contestants will be asked to draw their own base map to start from. Rural and Urban Management Plans are scored similarly, but an extra emphasis is placed on the neatness and accuracy of the map for the Urban Plan. Contestants should consider the map a tool to help them show the judges the placement and arrangement of intended habitat improvements. The written plan should articulate the rationale and reasons for the improvements as well as details needed to implement, maintain, and evaluate the desired habitat improvements.

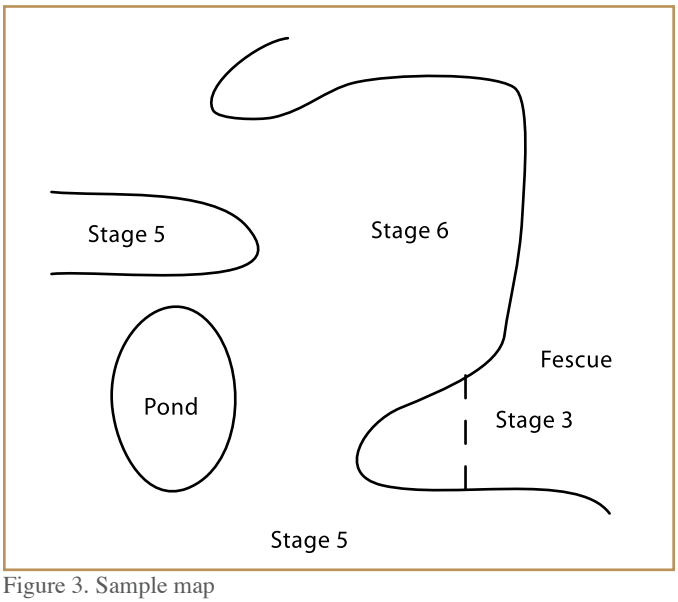

Figure 3. Sample map

The following section discusses the four main components of a wildlife management plan with examples of what this section should look like. Examples follow the field condition sheet outlined in Figures 2 and 3 (the map).

1. Background

This section should accomplish two things:

A) identify the species to be managed

B) clearly articulate the landowner's management objectives or expected outcomes in quantifiable or measurable form.

Example

Ms. Wildlifer wants to manage her property so she can see more wild turkeys and wood ducks and have them use her property in every season of the year. She also wants enough wild turkeys present in the spring to provide her nephew with a hunting opportunity.

2. Plan Development

(Current limiting factors determined from contestant's habitat assessment)

In this section students will:

A) Articulate the habitat components needed by the species to be managed and identify the required habitat components that are in poor condition, missing, or in limited supply, on a species by species basis (i.e., what habitat components are currently missing or holding the desired population below the intended management objective).

B) Identify the management practices that will be used to improve the habitat components that are in poor condition, missing, or in short supply. (See the *Wildlife Habitat Evaluation Program National Manual,* pages 19, 47, 51 and pages 93-111).

Example

Wood Ducks – Wood ducks require Stage 5 woodlands flooded with water and open water adjacent to Stage 5 and 6 woodlands. The existing pond is adjacent to Stage 6 woodlands, but contains no Stage 5 vegetation. Cavities required for wood duck nesting are also not present in trees adjacent to the pond. Therefore, nest box establishment and planting of trees and shrubs will be required.

Wild Turkey – Wild turkeys require 1/3 to 2/3 of their range in Stages 5 and 6 of plant succession interspersed with areas in Stages 3 and 4 of plant succession. There is adequate Stage 5 & 6 succession on the property needed to support turkeys. However, livestock grazing has reduced the native forbs needed to attract insects and the area in Stage 3 succession is now dominated primarily by fescue. There is no supplemental food (such as corn or waste grain) to support the birds during periods of heavy snow cover or mast failure, and there is a lack of soft mast to support the birds in early fall and in late winter. Therefore, livestock grazing management, planting food plots, planting shrubs, and planting grass and legumes will be required to provide the missing habitat components.

Table 1 lists the potential management practices to be considered for wild turkeys and wood ducks. (*Wildlife Habitat Evaluation Program National Handbook*, pages 19, 47, 51 and pages 93-111.) These are the potential practices one must choose from to apply on the given property. Students should apply only those practices that are appropriate given the landowner's management objectives and current habitat conditions.

Table 1 - Potential Management Practices

Turkey	Wood Duck
• Brush chopping (mowing)	• Decrease bag/creel/season limit
• Controlled (prescribed) burning	• Fish (pond) or wildlife survey
• Corridors	• Grain, leave unharvested
• Decrease bag/creel/season limit	• Increase bag/creel/season limit
• Disking	• Livestock grazing management
• Fish (pond) or wildlife survey	⊙ Nesting boxes/structures/platforms
• Grain, leave unharvested	• Plant mast trees
• Increase bag/creel/season limit	⊙ Plant trees and shrubs
⊙ Livestock grazing management	• Pond construction
⊙ Plant food plots	• Ponds, remove trees near dikes
⊙ Plant grass and forbs	• Ponds, repair spillways
• Plant mast trees	• Ponds, stop leaks
⊙ Plant trees and shrubs	• Snags, dead, down woody material
• Tillage, eliminate in fall	• Timber harvest, selective cut
• Timber harvest, clear-cut	• Water control structures
• Timber harvest, selective cut	
• Water developments for wildlife	◯ - Practices actually selected for example management plan.
• Wildlife damage management	

3. Plan Implementation

In this section students will:

A) Describe the management practices to be used to overcome the limiting factors identified above for each species.

B) Include where (located on the map), why, when, and how these practices will be applied and the effect each will have on the habitat (Figure 4).

Example

To increase the number of wood ducks, two nest boxes will be placed in the pond (in early March) prior to the nest season this spring. One nest box will be located in the shallow water on the north end of the pond and the other on the opposite end of the pond to provide ample space between nest boxes. Predator guards will be installed on the nest box poles to improve nest success. We will plant button bush shrubs in the shallow water on the north end of the pond. The shrubs will provide an adequate amount of Stage 5 vegetation needed for brood and escape cover and the nest boxes will provide the nesting habitat necessary to allow wood ducks to use this pond throughout the spring, summer, and early fall.

To increase the number of turkeys, we will plant a mixture of shrub species (including Washington hawthorn, flowering dogwood, flowering crabapple, Redbud, high bush cranberry, nine bark, and bayberry) along the east edge of the woods between the Stage 6 vegetation and the pasture. These shrubs will provide the soft mast required in the fall and late winter when hard mast and grain is not available. Food plots containing rows of corn, sorghum and soybeans will be planted

in patches at the north and south ends of the pasture. These food plots are extremely critical during winter months when snow cover makes hard mast unavailable. Planting food plots in patches (as opposed to narrow strips) and locating them adjacent to the Stage 5 and 6 vegetation makes the food plots more attractive to turkeys, because the cover is wider and provides greater protection from predators. We recommend that the pasture be renovated by killing the fescue with an herbicide and replanting the pasture with a grass-legume mixture this spring. Once established, grazing by livestock should be managed to retain a balance of grasses and legumes in the pasture and vegetation of ample height to provide adequate cover for turkey broods using the pasture to feed on insects throughout the summer and fall months. Our recommended practices should provide the fall and winter food resources needed to retain turkeys on the property throughout the fall, winter, and spring and will support wild turkey broods throughout the spring, summer and fall months.

4. Plan Evaluation

This section should summarize how the landowner (or future wildlife biologist) will know how well the management objectives have been achieved.

Example

The landowner will keep records of the number of wood ducks and wild turkeys seen on the property each month. The number of turkeys and wood ducks seen and the number of times they are seen each month will also be recorded and compared from year to year. In addition, the nephew will record the number of gobblers heard each spring and will record if a bird is harvested. Hunting success will be compared from year to year.

5 . Neatness and Overall Quality

Urban plan – the map is scored for neatness, quality, completeness, and accuracy.
Rural plan – the overall plan is scored for neatness, quality, completeness, and accuracy.
In Indiana we do one management plan each year; the national contest requires both plans to be written.

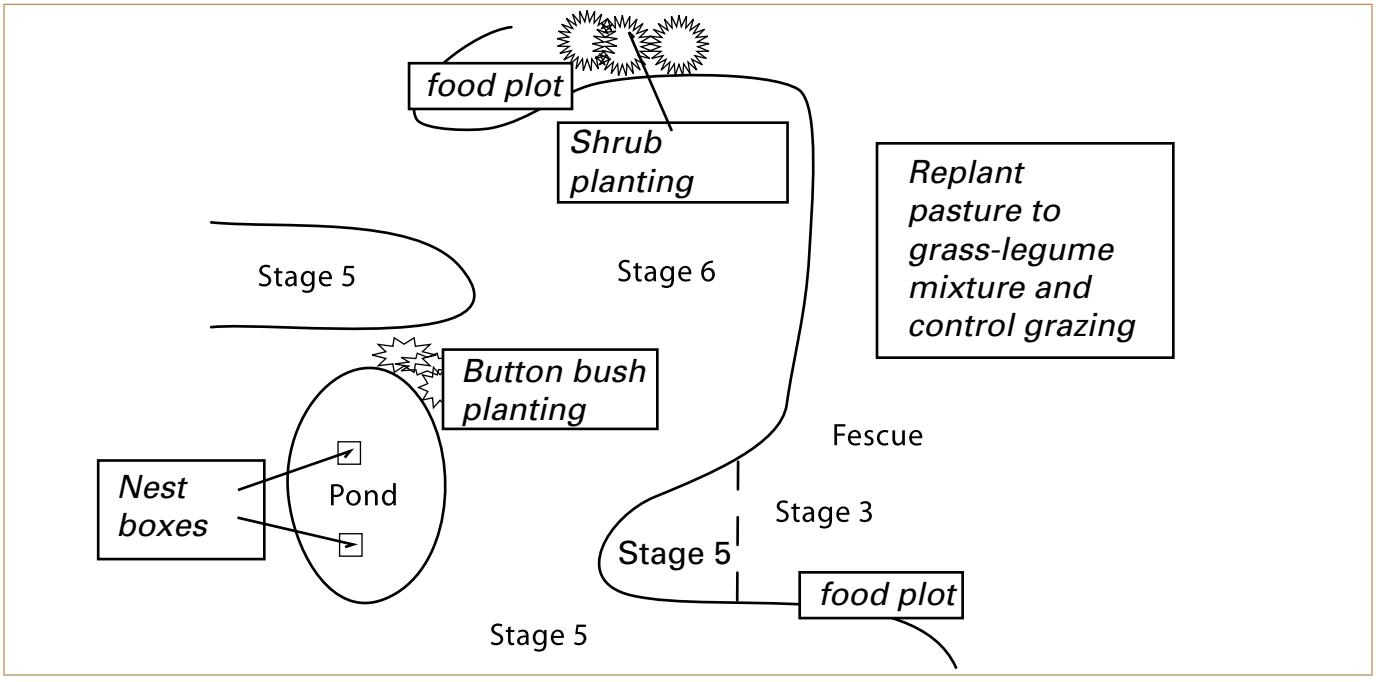

Figure 4. Sample map with plan implementation

Example - Urban Management Plan

The following field condition sheet (Figure 5) is an example from the urban management plan component of an actual national contest. A sample corresponding management plan (Figure 6) follows to illustrate how a well-written plan should look. All of the components required in the judging form (Figure 3) are identified (by corresponding colored boxes) for each species throughout the plan.

While this plan is considerably longer than students are allowed to provide in a contest, (one-page limit), the repetition of multiple species and thoroughness of each section provides multiple examples of how required components can be incorporated into a plan.

A full description of how to develop an urban wildlife management plan can be found in the *Wildlife Habitat Evaluation Program National Manual* on pages 132-139 and an example map can be found on pages 138-139.

Urban Landscape and Backyard Habitat Plan: Field Condition Sheet

Objectives:

The faculty and students at the Wooster campus have decided that they would like to have this area enhanced for wildlife. This area is close to the dining hall and recreational fields, making it a popular place to hang out between classes or to have lunch. In the late afternoons it is a popular spot to study and to relax before and after ballgames. While the area is currently very attractive, the faculty and students using this site have expressed an interest in observing more wildlife around them while they use it.

A horticulture class performed a campus-wide survey to determine what enhancements were desired by the campus community. Survey results determined that students and faculty used this area year-round. The average time spent visiting this garden area was 1 hour per visit. Garden visits could occur throughout the day with the heaviest use around noon and in the late afternoon between 4:30 and 7:00 p.m. Heaviest visitation occurred during the spring and fall with moderate daily use during the summer and winter months. The most popular wildlife species respondents wanted to see were: butterflies, hummingbirds, eastern cottontail rabbits, and eastern fox squirrels. Respondents indicated that they wanted wildlife to be abundant enough that at least one of these species should be visible at all times while visiting the garden.

Campus caretakers were also interviewed in the survey. The caretakers responsible for this garden area complained about significant damage from raccoons. Portions of plants and flower beds are dug up almost daily. Raccoons eat any fruits or vegetables grown in this site before they are ripe. Trash receptacles around the picnic area were disturbed so much by raccoons that they are removed each night. The gardeners stressed the need to minimize damage by raccoons. They made it very clear that raccoons have become pests in this garden area, and that the success of future plantings would be jeopardized if steps were not taken to minimize the population of raccoons attracted to this site and to minimize the potential damage they could cause.

Figure 5. A sample condition sheet for a backyard management plan

Urban Landscapes and Backyard Habitat
Sample Management Plan

Objectives: The objectives were to manage for more butterflies, hummingbirds, eastern cottontails, and eastern fox squirrels. The faculty and students want wildlife to be abundant enough that at least one species should be visible at all times while visiting this area. The potential wildlife damage problems caused by raccoons should be considered. Care should be taken to make sure that raccoon damage does not increase with habitat improvements and steps should be taken to reduce existing damage.

Species to be managed are listed

Management objectives are stated in quantifiable terms

Butterflies: Butterflies are found in gardens, yards, and parks planted with shrubs and flowers. Food usually consists of nectar from flowers, such as aster, verbena, zinnia, marigold, lilac, bush cinquefolia, and butterfly plant. Butterflies also require specific types of plants to lay their eggs on and to feed their larvae (i.e., dogbanes, milkweeds, asters, goldenrods, blackberries, wintercress, vetches, sunflowers, ironweed, and verbenas). Groups of butterflies are also attracted to moist sand or mud around water puddles and require shelter from wind. In addition, butterflies are sensitive to pesticides used for other insects.

Habitat assessment-habitat requirements of selected species

Most of the required habitat components for butterflies currently exist on the site and adequate wind protection is present. Therefore, we recommend keeping as many plantings of shrubs and flowers required by butterflies as possible. Existing plantings could be further enhanced by adding additional species required for larval stages of butterflies (such as milkweed) throughout the plantings. A few additional plantings of flowers could be added along the east border and in a few of the open grassy areas with adequate sunlight. In these plantings, flower species such as beebalm and other nectar species attractive to butterflies, that are not already present in the garden, could be added. Cardinal flower (a shade tolerant species) could also be interspersed in the flower beds in the shaded areas. Most of these species of plants required by butterflies are attractive and will meet the university's desire to have attractive plantings around the grounds. The primary habitat component that is missing from this area is a source of water. Butterflies are not only attracted to the water, but to the moist sand and mud surrounding the water. Therefore, building several small water gardens interspersed throughout this area that have sand or mud around the edges should provide water. Pesticides on the grounds should be used with caution.

Habitat assessment-identification of components that are of poor quality, missing, or in short supply - if any

Wildlife management practices recommended

Plan Implementation-where, when, and how practices are applied

Plan Implementation-affects on habitat

Hummingbirds: Hummingbirds prefer areas with large trees (Stages 5 and 6) with rough bark for nesting mixed with areas in Stages 2, 3, and 4 with nearby flowering plants for a food source. Hummingbirds construct small nests on tree branches 5-20 feet above the ground. Hummingbirds feed on the nectar from flowers and on the insects associated with the flowers. The insects provide an important source of protein to hummingbirds and the nectar is high in sugars that supply needed energy. Hummingbirds also seem to be attracted to the color red. They prefer flowers such as petunias, gladiolas, nasturtiums, begonias, morning glories, evening primrose, cardinal flower and columbine. They also prefer flowering shrubs and trees such as honeysuckle, lilac, flowering dogwood, and various fruit trees. They can be sensitive to insecticides, which decrease their food base. Hummingbirds obtain necessary water from their diet and therefore do not require free-standing water.

Habitat assessment-habitat requirements of selected species

Large trees with rough bark are present around the perimeter of this area and are therefore not a limiting nesting habitat component. A wide variety of flowers and flowering shrubs currently exist adjacent to the forested area. Therefore, we recommend maintaining the variety and quantity of flowering shrubs and plantings of flowers interspersed throughout the area. The existing plantings, in addition to the additional plantings recommended above for the butterflies, provide an abundant food source on the site, making artificial feeders unnecessary. Pesticides on the grounds should be used with caution.

Habitat assessment-identification of components that are of poor quality, missing, or in short supply - if any

Wildlife management practices recommended

Plan Implementation-affects on habitat

Plan Implementation-where, when, and how practices are applied

Eastern Cottontail: Eastern cottontails require Stages 3 and 4 of plant succession. Ideally, their habitat consists of an interspersed mixture of equal portions of grassland, cropland, and shrub cover. Cottontails will use green-space areas such as parks and golf courses in urban areas. Their food consists of a variety of forbs (including clover) and grasses from spring to fall. In winter, bark of shrubs and trees is often eaten as well as waste grains. They also require thick shrubs or herbaceous vegetation for hiding and resting cover. Brush piles provide refuge where additional cover is needed. Necessary water is obtained from their diet.

The site contains ample portions of grass and shrub cover. However, a crop component is not present and the existing grass component is managed as short grass and contains no forb component. Therefore, we recommend seeding ladino clover into the lawn area. This provides additional food for rabbits while the white flowers provide additional beauty to the garden area. Mowing should be reduced (perhaps once every 2 weeks) as the clover needs to grow to flowering stages. This has the additional advantage of reducing herbicide applications needed to maintain a manicured lawn environment. Border

areas on the north, adjacent to the wooded area, and on the east edge can be left in taller stages (perhaps mowed once monthly). This provides additional cover for rabbits and makes a natural border around the area. Escape and winter cover may be limiting. Therefore, we are recommending a few brush piles be constructed in the existing unmanaged woodland area on the north portion of this area. Winter food sources appear to be the greatest limiting factor. Therefore, we are recommending small plantings of grain sorghum and perhaps corn be interspersed in the existing and new planting beds. Grain plantings should be concentrated near existing cover, especially on the north end, when possible. Additional waste grains could also be provided as they fall from feeders (see recommendation for squirrels below).

Plan Implementation-where, when, and how practices are applied

Plan Implementation-affects on habitat

Habitat assessment-identification of components that are of poor quality, missing, or in short supply - if any

Wildlife management practices recommended

Eastern Fox Squirrel: Eastern fox squirrels require Stages 5 and 6 of plant succession with interspersed small openings in Stages 2 and 3 of plant succession. They feed on a variety of nuts, acorns, seeds, mushrooms, bird eggs, and corn. These squirrels also use urban areas with lots of trees. They nest in cavities in trees or build a nest out of twigs and leaves. It is generally recommended to provide 3-4 den trees or suitable nest boxes per acre. Nest boxes are most beneficial in stage 5 woodlands and urban areas lacking den sites. Water requirements are generally met by the food consumed. However, in late summer this may not be adequate. In urban areas, a pool or pan of water should be provided if other sources are not available and winter food can be provided by offering corn or sunflower seeds on the ground or in artificial feeders.

Habitat assessment-habitat requirements of selected species

The trees interspersed throughout the site provide an adequate component of Stages 5 and 6. However, supplies of den sites are limiting. Therefore, we recommend adding 3-4 nest boxes in large trees throughout the site. Water may also be limiting in the summer months. The water gardens we recommended for butterflies above will satisfy this requirement. The remaining limiting habitat component is the availability of a reliable winter food source. The existing trees are mostly mast producing trees (hickories and oaks). However, they may not produce enough mast to supply food in late winter months or during periods of deep snow cover or in years of mast failure. Therefore, we recommend using artificial feeders with corn and sunflower seeds to supplement this limiting component. The grain we recommended for rabbits above will also help meet this need.

Raccoon: Raccoons prefer areas interspersed with different successional stages and often occur in Stages 5 and 6 of plant succession. Raccoons nest and rest during the day in natural cavities, dens in the ground, under brush, and junk

piles, in old abandoned buildings, and on rocky cliffs and ledges. They eat a wide variety of foods consisting of garbage, birds, eggs, fish, small mammals, insects, crayfish, grains, seeds, fruits, and foods prepared for pet and human consumption. Raccoons are attracted by shallow water areas that provide emergent aquatic vegetation. They require water frequently during warm seasons.

Habitat assessment- habitat requirements of selected species

Raccoons are a pest on this site. Therefore we need to ensure that the practices we have recommended above will not enhance this habitat for raccoons or become an attractant for them. The nest boxes we recommended for squirrels will be fitted with a metal plate around the hole so that raccoons cannot enlarge the hole and use the boxes. The water gardens we recommended for butterflies will not have emergent aquatic vegetation in them and will not be stocked with fish or crawfish. The feeders we place for squirrels in winter will be suspended from structures that cannot support the weight of a raccoon to access them but will still allow squirrels the ability to reach the feeders. Trash cans are removed each night to avoid the damage, but still serve as an attractant to raccoons when present. We recommend installing metal trash containers with lids and latches. In addition, we recommend reducing the population of raccoons by harvesting more. This can be accomplished in this urban setting by using cage traps and relocating the raccoons to a suitable rural site at least 10 miles from this location or euthanizing them.

Habitat assessment- identification of components that are of poor quality, missing, or in short supply - if any

Plan Implementation- affects on habitat

Plan Implementation- where, when, and how practices are applied

Wildlife management practices recommended

Evaluation of Success: The overall objective is to provide adequate habitat for butterflies, hummingbirds, eastern cottontails, and Eastern fox squirrels to a quantity that at least one of these species is visible at all times while a person is visiting the garden. The caretaker of this site will conduct a census twice a month for a 1-hour period each time (the average visitor time). The time when at least one desired species is not visible will be recorded and totaled for the sampling period. In addition, the number of species and number of individuals will be recorded. Over the course of the year, this type of evaluation will allow us to determine during what months our objective is not being met. The data on the number of species and number of individuals also will tell us the abundance of wildlife using the site and how their use changes seasonally. We will be able to make changes based on the data we collect to make this site more desirable to species that are not frequently being observed during census periods. Comparisons can also be made from year to year to determine if the site is improving or becoming less desirable for our target species. The objective of managing the raccoon pest can best be evaluated by interviewing the caretaker to determine if damage to plantings has been reduced and if use of trash containers has been eliminated.

Figure 6. A sample well written management plan that corresponds to the field condition sheet in Figure 5

CONCLUSION

Learning how to evaluate wildlife habitat provides an excellent way to increase youth understanding of wildlife ecology and management practices. This document will help you prepare a team for the Wildlife Habitat Evaluation Program (WHEP) Career Development Event (CDE). Using the WHEP CDE as a goal helps students learn fundamental wildlife management concepts, concepts that they can use all their lives. Contest evaluations have shown that many participants in the WHEP CDE have already applied wildlife management concepts they have learned. Others expect to use what they have learned in the future. Furthermore, 19% of these participants felt that the knowledge they gained in studying for this contest influenced their college and career plans.

The suggestions in this document will help you prepare students to compete in the WHEP CDE. This event is sponsored by Purdue and the Indiana Department of Natural Resources and is held in the spring each year.

The Indiana Wildlife Habitat Evaluation contest is an invitational so no elimination events are required. The top 4-H and FFA teams are eligible to compete at their respective national competitions. Funds are available from the Indiana Chapter of the Wildlife Society to help defray travel costs for the winning 4-H team to go to the national 4-H event. Although any team may participate locally, teams not composed entirely of 4-H or FFA members are not eligible for the national 4-H and FFA events.

Pre-registration for state or national competition, with payment, is required. Ask your county Extension educator for registration deadlines, contest dates, and registration forms. Additional WHEP CDE information is available in *Teaching Wildlife Habitat Evaluation* (4-H 992-W).

New 9/06