

# PENNSYLVANIA GAME COMMISSION



## Wildlife Habitat Management Recommendations

*Prepared by:*

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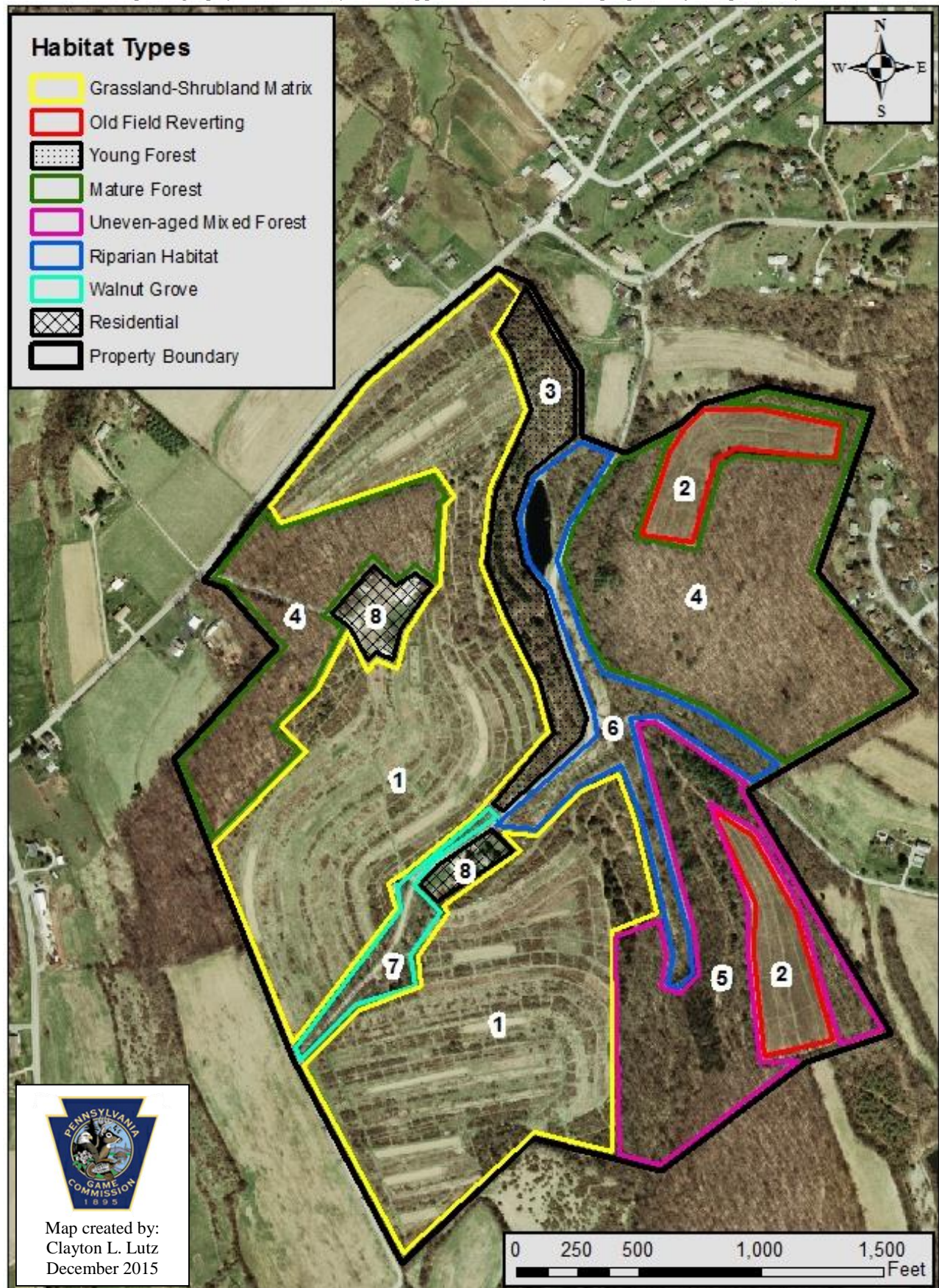
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Property:  
4178 Walters Hatchery Road  
York, PA 17408

175 acres  
York County  
Springfield Township

## Wildlife Habitat Management Plan Map – Springfield Twp F & S Association

Figure 1. Recommended management areas and existing features of the property. Background image is circa 2006 leaf-off aerial photography. All boundaries are approximate and for the purposes of this plan only.



Unit	Cover Type Description	Acres
1	<b>Grassland-Shrubland Matrix</b> (Patchwork of upland shrubs, forbs, and pioneering trees - rubus, locust, cherry, invasive shrubs)	79
2	<b>Old Field Reverting</b> (Upland shrubs, forbs, and pioneering trees - rubus, locust, cherry, invasive shrubs)	10
3	<b>Young Forest</b> (Mix of forbs, shrubs (sumac, flowering dogwood), and young trees)	9
4	<b>Mature Forest</b> (Oak, hickory, maple, cherry)	42
5	<b>Uneven-aged Mixed Forest</b> (Cherry, maple, oak, sycamore; understock due to recent logging; poor regen, invasive understory)	19
6	<b>Riparian</b> (Palustrian Shrubs - willow, dogwood spp, invasive shrubs; sycamore; Deep, moist soils)	10
7	<b>Walnut Grove</b> (Mature walnut trees with cool season grasses and invasive shrubs/grasses/vines in understory)	3
8	<b>Residential</b> (Clubhouse, lawn, parking areas, rental unit)	3
	TOTAL	175

# *Summary*

## ***Recommendation Focus***

The enclosed wildlife habitat management recommendations have been developed considering your goals, management constraints, surrounding landscape, current habitat conditions, as well as species distribution and habitat requirements. Given all of these factors, the greatest opportunity for active management on this property is to manage for healthy meadow (reverting field), shrubland, and young forest habitat. The reverting field and shrubland habitats on the property present excellent opportunities for quality wildlife habitat, but also present some challenges. The forested stands have a number of desirable features for wildlife, but mitigating some of the impacts of invasive plant species and poor timber harvest practices can enhance the forest's wildlife value. This plan specifically provides guidance for controlling invasive species, planting recommendations, young forest habitat creation and management techniques, silvicultural techniques to promote quality forest habitats, and stand specific recommendations to protect important features (vernal pools, streams, etc). Additionally, the plan contains management advice to enhance the wildlife value of other features of the property (streams, pond, forest openings, etc).

## ***Species to benefit***

### **1. Bird and Mammal Species of Greatest Conservation Need (SGCN)**

Grassland-Shrubland Matrix (Unit 1): American kestrel, dickcissel, prairie warbler, whip-poor-will, blue-winged warbler, eastern meadowlark, loggerhead shrike

Reverting Field Habitat (Unit 2): brown thrasher, prairie warbler, whip-poor-will

Young Forest Habitat (Unit 3): brown thrasher, prairie warbler, whip-poor-will, blue-winged warbler

Mature Forest Habitat (Unit 4): Summer tanager, scarlet tanager, northern long-eared bat

Uneven-aged Mixed Forest (Unit 5): Eastern red bat, northern long-eared bat

Riparian Habitat (Unit 6): American woodcock, blue-winged warbler, brown thrasher, great blue heron, purple martin, whip-poor-will, willow flycatcher

Walnut Grove (Unit 7): No known associates

Residential (Unit 8): Little brown bat, big brown bat

### **2. Associated Wildlife**

Grassland-Shrubland Matrix (Unit 1): eastern cottontail rabbit, white-tailed deer, northern cardinal, box turtle, wild turkey, eastern blue bird



Reverting Field Habitat (Unit 2): eastern cottontail rabbit, white-tailed deer, wild turkey, wood turtle, eastern box turtle, fox squirrels

Young Forest Habitat (Unit 3): wild turkey, white-tailed deer, eastern cottontail rabbit, eastern towhee, northern cardinal

Mature Forest Habitat (Unit 4): wild turkey, white-tailed deer, pileated woodpecker, grey and flying squirrels, red spotted newts

Uneven-aged Mixed Forest (Unit 5): Grey and flying squirrels, white-tailed deer

Riparian Habitat (Unit 6): eastern cottontail rabbit, wild turkey, white-tailed deer, grey and flying squirrels, woodland salamanders and frogs, wood and box turtles

Walnut Grove (Unit 7): Fox and flying squirrels

### 3. Endangered and Threatened

In preparation of this plan a Pennsylvania Natural Diversity Index (PNDI) database search was conducted for all known occurrences of species of concern in Pennsylvania. The intent of this database search is to ensure that the provided recommendations do not result in any negative ecological impacts. This search indicates one potential occurrence within or adjacent to the property (see attached receipt). Prior to implementing major habitat altering management practices, a subsequent PNDI search should be conducted to pinpoint specific project locations and types. If the response again indicates potential negative consequences to wildlife from habitat management actions, contact the appropriate agency so they can advise you on best management practices to achieve your goals and minimize negative impacts to the sensitive species.

#### ***Treatment Acreage (in priority order)***

Treatment Type	Management Unit	Acreage	<i>*Note that actual implementation acreages indicated may be less if the entire Stand does not receive treatment (i.e., shrub planting or invasive species control in only select areas of a delineated Stand).</i>
Invasive Species Control (non-native shrubs)	All Units	175*	
Invasive Species Monitoring	All Units	175	
Rotational mowing	1, 2	89	
Tree and Shrub Planting	1, 2, 6	99	
Soil preparation and herbaceous planting	1, 2	89	
Sustainable Timber Harvests	4, 5, 7	71	

#### ***Funding and Assistance Opportunities (see Contacts section)***

- Wildlife Habitat Incentive Program (WHIP) – administered by NRCS
- Environmental Quality Incentives Program (EQIP) – administered by NRCS
- Conservation Reserve Enhancement Program (CREP) – Administered by NRCS
- Hunter Access Program – administered by PA Game Commission

***Note:*** Please keep me informed should you decide to seek funding opportunities from NRCS. We work closely with the administering agencies and I may be of additional help during the application and project development process.

## ***Landowner Goal***

The landowner's overall goals, in order of importance, are to enhance recreational opportunities (hunting, wildlife observation, dog training), enhance wildlife habitat, sustain timber production for firewood utilization and timber harvests, and to protect water quality. The wildlife habitat objectives for this property are to balance the heretofore mentioned land uses while providing quality habitat for game and non-game species, including Species of Greatest Conservation Need. Hunting is an important and favored past time, along with general wildlife observation.

## ***Past Habitat Projects***

The property has a long and active history of improving habitats for wildlife. In particular, the 79-acre patchwork of grasslands and shrublands has been created and managed for small game habitat. Additionally, stream and riparian restoration activities have occurred within unit 6.

## ***Landscape Context***

The property is situated within the Upper Piedmont physiographic region of southcentral Pennsylvania. The property is contained within the PA Game Commission's Wildlife Management Unit 5B. The property is a mixture of forests, reverting fields, and a grassland/shrubland matrix. The surrounding landscape is comprised of farm land, woodlots, and residential housing developments. A medium sized complex of reservoirs (York Reservoir and Lake Redman contained in Nixon and Kain county parks) and Interstate 81 lie to the north and east, respectively, of the property. The closest residential areas are suburban developments surrounding the town of Jacobus adjacent to the property to the northeast. The town of Dallastown is located 5 miles to the east and the city of York is located 5 miles to the north. The wildlife water resources on the property include approximately of 3,000 feet of permanently flowing Hollow Tributary, 740 feet of an perennial unnamed tributary to Hollow Tributary, and 1,500 feet of an unnamed seasonally flowing tributary of Hollow Tributary. Additionally, there are several seasonally wet low lying areas, spring seeps, and ephemeral drainages. Hollow Tributary is a tributary to Codorus Creek, which flows in to the Susquehanna River. The property is contained within the Chesapeake Bay watershed. Topography is predominantly gently sloped hills and shallow valleys. Elevations range from 500 feet along the stream at the northern end of the property to 690 feet at the southern corner of the property.

## ***Management Strategies***

The strategies and subsequent implementation steps below provide specific guidance to manage habitat for wildlife species of particular interest, as well as additional species that will benefit from refined stewardship.

### **Strategy 1 – Maintain and enhance grassland-shrubland, reverting field, and young forest habitats**

This strategy is appropriate for stands 1 and 2. Grassland habitat is the habitat type that is being lost at the greatest rate in Pennsylvania, with young forest and shrubland habitat being the habitat we are losing at the second highest rate. Residential, industrial, and infrastructure

(particularly highway) development along with the intensification of agricultural practices have converted and fragmented grassland habitats. The term “reverting field habitats” refers areas that were once used as tilled fields or pastures. After agricultural activity has stopped, these areas are colonized by pioneering forb, shrub, and tree species and represent an early stage of forest succession. Often past agricultural practices have degraded soils through erosion and compaction, which can suspend these habitats in the early successional state. Beneficial and indicative species of this habitat type include golden rod, hawthorne, red bud, and flowering dogwood. “Riparian shrubland” or “palustrine shrubland” habitats are areas that contain deep, moist to saturated soils that support plant species that thrive in these soil conditions, such as alder, redosier dogwood, arrowwood, button bush, and hawthorne. These habitat types are extremely valuable to many species of wildlife because they offer abundant and diverse food resources and provide dense hiding and nesting cover. Additionally, these habitat types are being lost throughout the Commonwealth to development, agricultural intensification, and as forests mature. Consequently, the species that rely on these habitat types have suffered population declines for several decades. These species include familiar game species such as American woodcock and ruffed grouse as well as non-game species such as the golden-winged warbler. Fortunately, this property has a significant amount of quality shrubland habitats, and proper stewardship of the property will greatly benefit all wildlife and, most importantly, many that have been in decline.

The two major “threats” to these habitat types are non-native invasive species (NNIS) and the natural maturation of the habitat type into a forest. Below are recommended practices that should be implemented to promote these habitat types on the property. The strategy in Units 1 and 2 should be to remove the NNIS, protect and promote the establishment of natives, and to supplementally plant as opportunities arise to expand the footprint of the shrubland habitats. Controlling invasives and allowing natives to self-establish is likely to be the most effective and easiest stewardship of these sites. Planting can speed up the process, however, planting is labor intensive and survival of planting ranges widely. Additionally, reducing the number of mowed trails will increase the value of the wildlife habitat in these areas by increasing the patch size of the habitat and also reduce the number of travel corridors used by predators.

As we had discussed during the property visit, it is easier to maintain a habitat patch in its current state (as a shrubland, for example) than it is to create it from a bare patch of ground. However, the abundance of invasive species may require that the area be treated and planted from scratch, or the maturation of the vegetation may dictate that the patch be allowed to progress to another habitat type (a grassland converting to a shrubland, for example). Careful monitoring of the habitat and establishing a rotational plan will greatly help with this effort. The maximum benefit to wildlife would be to maintain about a third of the area of Stands 1 and 2 in each of the habitat types: grassland, shrubland, and young forest. Also, increasing the size of these habitat patches will increase their value to the wildlife that utilize them. Reducing the number of mowed trails would be a strategy to increase patch size and reduce predator corridors. However, this strategy will need to be balanced with other property objectives such as dog training and wildlife observation. Below are technical implementation strategies to assist with this goal.

### **Implementation 1 – Control invasive species**

Throughout these units, there are multiple invasive plant species present. In some patches, these species are present in relatively low abundance, however there are some well-

established thickets of invasives. In areas of low abundance, there is the opportunity to control these species while they are manageable and before they significantly inhibit native species. In other areas where invasives are dominating the structure and species composition of a patch, a better strategy would be to remove all vegetation and “start over” by planting native forb and grass species, or native shrub species. Research has shown that invasive plant species provide less nutritional food resources for wildlife and often do not provide the structural habitat features that native wildlife require. Additionally, many invasive species aggressively out-compete native species and can disrupt natural succession.

Invasive species should be identified and controlled. This can be a time consuming and costly activity, so priorities should be set. Stands that have particularly sensitive or valuable habitats should have a high priority.

Listed below are control strategies for the most common and problematic non-native plant species.

- 1.) **Shrub species: Japanese barberry, privet, bush honeysuckle, autumn olive, multi-flora rose.** Several of these species were noted on the property. It is recommended that these species be with a foliar application of herbicide. Cutting is not recommended because these species are aggressive stump sprouters. The most effective treatment is to use a 2:1 mixture of glyphosate and triclopyr, plus an aquatic-approved surfactant. To achieve this mixture, use an *equivalent* to 3 quarts of Rodeo®<sup>1</sup> plus 2 quarts of Garlon®3A<sup>1</sup>, plus aquatic-approved surfactant. Spot-spray herbicide via backpack sprayer so that foliage of target species is completely wet. Care must be taken to treat only targeted species. If triclopyr is not available, an application of a glyphosate-based herbicide can also be effective, but may require an additional treatment the following year. **For maximum effectiveness, invasive shrubs should be treated in late summer (August 1 through September 15).**
- 2.) **Ailanthus** (a.k.a., tree-of-heaven) was not noted on the property. However, this is a common and aggressive non-native invasive tree. It is highly recommended that the property be monitored for the presence of Ailanthus and that it be treated with herbicide. **Do not fell Ailanthus as it is an aggressive stump and root sprouter.** The most effective method for controlling Ailanthus available to the private landowner is the “hack-and-squirt” (a.k.a., stem injection) method. This method involves hacking an incision into the bark of the tree with a hatchet and squirting a %50 concentration of glyphosate into the wound. The wound should penetrate the cambium layer of the bark and there should be one incision for every inch of the tree’s diameter, spaced evenly around the stem. **For maximum effectiveness, invasive trees should be treated in late summer or fall (July 1 through October 15).**
- 3.) Non-native **vine honeysuckle and oriental bittersweet** are aggressive vines that have the ability to climb woody vegetation. If the entire plant is still close to the ground and accessible, use the same foliar treatment recommended in strategy #1 listed above. If the vines are too tall for foliar treatment or if the vine is intertwined with desirable species, the stems should be severed close to the ground and the wound should be saturated with a %50 concentration of glyphosate. **For maximum effectiveness, invasive vines should**

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<sup>1</sup> The use of trade names, brands, or registered products was used for clarity and does not imply or constitute endorsement by the PGC.



**be treated in late summer or fall (July 1 through October 1). Additionally, vine honeysuckle remains green and active late into the fall and begins in early spring. Therefore, this species can be foliar treated during this time when non-target species will not be effected by glyphosate.**

- 4.) The non-native annual **Japanese stiltgrass** is present on the property. This species can often be difficult to control due to its aggressive nature following a disturbance (providing sunlight) and their prolific seed production. Control methods should be used to remove or kill this species prior to seed production. Japanese stilt grass can be controlled by pulling, mowing, or foliar herbicide treatment prior to seed development in mid-July. Additionally, a grass-selective herbicide (such as Poast®<sup>2</sup>) can be used in mid-May. This allows for desirable forb and woody species (golden rod, asters, clovers, shrubs, etc) to persist and get well-established.
- 5.) The non-native annual **mile-a-minute vine** is present on the property. This species can be very difficult to control due to its rapid growth rate, ability to climb aggressively, and prolific seed production. Control methods should be used to remove or kill this species prior to seed production. Japanese stilt grass can be controlled by pulling, mowing, or foliar herbicide treatment prior to seed development in early April (prior to green-up). This herbicide will prohibit the emergence of annual plants (such as mile-a-minute and Japanese stiltgrass) but allow for perennial vegetation (golden rod, asters, clovers, shrubs, etc) to persist and get well-established.

## **Implementation 1 – Maintaining and enhancing grassland areas**

Quality grassland habitats provide a diverse mixture of grasses, legumes, and wildflowers (forbs). This in turn supports an abundant insect community. Grassland insects, as well as seeds, provide food resources for many nesting song birds (as well as wild turkeys) and small mammals. Diverse grasslands provide structural complexity and food resources throughout the year that are utilized by species such as cottontail rabbits. Although agricultural row crops and “food plots” produce abundant food, they lack structural diversity, do not support diverse insect communities, and lack multiple food resources required by many wildlife species. This is particularly true of agricultural areas that are intensively managed with herbicides and where hedgerows and fallow fields are lacking.

- 1.) Delayed and rotational mowing should be used to maintain grasslands in a state of early succession so that woody species do not become established and overly abundant. A field should be mowed every 2 to 3 years in late summer, anytime after **August 1**. The mowing schedule should be rotated so that roughly a third of the habitat is mowed each year. This will reduce and evenly distribute the effort of mowing, and provide diversity of habitat structure available to the wildlife.
- 2.) Wildlife grass stands should contain clumpy patches of grasses separated by beneficial wildflowers (i.e. golden rod, bee balm, black-eyed Susan, cone flower), legumes (i.e. clover), and some bare soil. As grass fields age, the grass cover will eventually form a thick sod and thatch layer, and dominate the stand over time. As this occurs, both the

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valuable forb and legume components for wildlife will decline. When the grass component exceeds 75% of the total cover and forbs are sparse (typically within 5-6 years) management should occur. Prescribed fire to manage native grass fields is the most effective form of management, but requires a burn plan and qualified individuals to safely conduct the burn. Of secondary (and logistically easier) preference would be a mow and light disk treatment to break-up the sod layer to promote forb diversity.

When forbs become sparse, mow the field in the fall (after August to avoid disturbing nesting wildlife) and disc between September and the end of February. Optimal forb production occurs when disking is conducted between October and late December. Disc at a depth of 3 inches until approximately 30-50% of the soil is exposed. This may require a few passes, depending on the density of the cover. The intention is to break up the sod and release forbs in the seedbank – **not** create a seedbed for planting. Consider interseeding with legumes at this time or frost seeding in late winter. A legume mix of various clovers may perform better in these sites (alsike, ladino), but consider some *native* legumes, such as partridge pea, Illinois bundleflower, and wild blue lupine as well.

## **Implementation 2 – Supplemental planting of native trees/shrubs**

Planting should be considered in areas where patches of invasives have been removed. The idea is to replace the invasives that have just been treated with a native planting to take advantage of the recently created growing space. Additionally, plantings could be used to extend the shrubland habitats into trail areas to expand habitat patch size and reduce the number or predator travel corridors. I highly recommend only planting native species. Below are recommendations to increase planting success and to maximize benefits for wildlife.

- 1.) Maintain a mix of herbaceous openings and dense shrub cover. An ideal target would be to retain approximately 30% of the area in herbaceous openings ranging from 0.5 to 2 acres. These openings provide an herbaceous component of the habitat that is valuable for rabbits, while also providing excellent forage areas for insectivorous birds and mammals. Additionally, maintaining a high percentage of herbaceous cover in Stand 1 may allow provide breeding habitat for grassland obligate species such as meadow lark and dickcissel.
- 2.) Select “upland shrubs” to plant in drier soils and “wetland shrubs” to plant in moist to saturated soils from the enclosed handout titled “Trees and shrubs beneficial to Pennsylvania wildlife”. These species are often available from local nurseries as older stock, or from PGC’s Howard Nursery. Also, consider hawthorne, crabapple, and alder in wet areas, and aspen, hawthorne, flowering dogwood, and red bud in drier soils.
- 3.) Plant the shrubs/conifers in April-May by following the specific instructions provided by the nursery. Shrubs and small deciduous trees should be planted at about 4-5 foot spacing as this will create a thicker habitat and account for some mortality of planted stems. Generally, shrubs should be planted in clusters of the same species rather than mixed.
- 4.) Plantings may need to be protected. Fencing or tubing can be used to protect against deer browsing. However, fencing and tubing are expensive and labor intensive. In lieu of fencing or tubes, you may consider “over planting” to account for additional mortality. However, if deer browsing is intense, fencing or tubes may be required. Additionally, girdling by rodents may be a problem where stems are planted in grass or other herbaceous areas. Mowing and/or herbiciding a 3 foot diameter around the seedlings

should be conducted for the first few years to reduce competition and reduce cover used by meadow voles.

### **Implementation 3 – Reduce the influence of overstory trees**

As shrublands age, the encroachment of overstory trees can begin to outcompete smaller shrubs and trees. As larger trees become established they can be felled to provide more sunlight to shrubland species. Felled trees can be left in place as the downed material will provide additional cover for wildlife. Young forest stands are most beneficial to wildlife 2 to 15 years after a disturbance, timber harvest, or felling event. Patches that contain trees species that can grow to large heights such as cherry, oak, and maple can be felled every 15 to 20 years. The felling will allow these species to stump sprout and quickly re-establish the dense cover of young forest habitat.

### **Implementation 4 – Mowing/mulching to maintain shrubland and young forest habitat**

Another strategy to maintain shrubland and young forest habitats is to mow or much small diameter woody stems. This strategy can be used to promote a younger stand of wood stems that will sprout after mowing, similar to Implementation 3. Also, mowing/mulching can be a valuable strategy for reducing invasive species. After a patch has been mowed/mulched, the site can be allowed to grow for one growing season. At the end of that first growing season, invasive species can be spot-sprayed with a broad spectrum herbicide while adjacent desirable species can be left to grow.

### **Strategy 2 – Maintaining forest habitat**

The forested habitats on the property are diverse and valuable for wildlife, but have been degraded by invasive species and timber harvests. During the site tour, we did not have the opportunity to fully evaluate the forested stands and did not enter Unit 4 and only briefly visited Stand 5. This plan will provide some general information about forest stewardship and a few specific suggestions for areas that we did tour. As discussed during our site tour, timber harvests can be an excellent tool for creating habitat, maintaining sustainable forests, and achieving other property goals. However, any plans to harvest timber should be reviewed by an independent professional to insure your objectives will be met. Research conducted by Penn State University has shown that less than half of timber harvests on private property are sustainable. Reference material is attached to this plan regarding how to evaluate a forested stand to determine if a timber harvest is appropriate.

### **Implementation 1 – Control Invasive Species**

As stated throughout this plan, non-native invasive species are detrimental to wildlife habitats. Continually monitoring and treating NNIS will prevent them from becoming overwhelming, for you and the forest. Their presence can also prevent successful timber harvests and the cost associated with controlling them can negate the economic benefit of a timber harvest. Control methods for the most common NNIS are listed above and included in attachments to this plan.

### **Implementation 2 - Protecting bat roost trees and snag habitat**

- 1.) Many bat species have experienced dramatic population declines due to the emergence of disease known as white-nose syndrome. Although this disease affects the bats primarily

during hibernation, providing quality habitat for foraging, roosting, and rearing young is highly recommended. The measures provided below are basic guidelines to protect bat roost habitat. In the event that significant timber harvests are planned, another PNDI analysis should be run and specific best management practices (BMPs) from PGC and USFWS should be followed if sensitive species are found to be present or potentially negatively affected by forest treatments.

- 2.) Retain all snags, except where they pose a serious human safety hazard due to their location near a building, yard, road, or power line. A tree with less than 10% live canopy could be considered a snag. When possible, delay removal of “hazard trees” until bats are hibernating (between November 15 and March 31).
- 3.) Do not harvest or manipulate shagbark hickory trees unless the density of shagbark hickory exceeds 16 trees per acre. If present, maintain at least 16 live shagbark hickory greater than 11 inches dbh (diameter at breast height) per acre. If no shagbark hickory trees greater than 11 inches dbh are present, leave 16 live shagbark hickory trees per acre of the largest specimens in the stand.
- 4.) The following tree species have high value as bat roost trees. Other tree species with exfoliating bark, crevices, or cavities also can serve as roost trees.

Hickories – shagbark, bitternut, mockernut, pignut

Maple - sugar maple, silver

Ash – green, white

Oak - northern red, scarlet, black, white, chestnut, pin

Elm – slippery

Black locust

Sassafras

Black Gum

- 5.) Additionally, artificial bat boxes can be constructed and installed to further provide roosting habitat for bats. Adding bat boxes near the residential areas of stand 8 would enhance these areas otherwise low wildlife value and provide additional wildlife observation opportunities.

### **Implementation 3 – Retain downed woody debris**

- 1.) Leaving downed logs or “downed woody debris” on the ground is important for a number of wildlife species. At least 19 species of salamander and 26 species of reptiles use stumps, logs, and woody debris piles. These logs, when in contact with the ground, provide nesting habitat and security cover for ground nesting birds (i.e., turkey, grouse, ovenbirds) and are important refugia for terrestrial salamanders, snakes, and small mammals, all of which can be important prey items for hawks, owls, and other predators. As downed woody debris decomposes, nutrients important for seedling regeneration are recycled into the soil.
- 2.) Brush and felled trees resulting from road maintenance or habit improvement projects can be constructed into brushpiles as cover habitat for small animals. This debris should not be gathered from already dead and downed woody debris (the benefits of already downed woody debris are described in the previous paragraph). Highest use of brushpiles occurs during the winter months when it provides refugia from cold and windy weather. This reduces the amount of energy expended by animals to maintain body temperatures. These

piles will best serve their purpose in locations without an extensive understory. They should be created by placing large limbs and tree trunks for the base (~10 ft wide) with a continual criss-cross pattern of medium-sized logs. There should be holes and openings created of varying sizes for varying sizes of animals utilizing the brushpile. The top portion should consist of small branches and tops of trees that are the size you can break with your hands. The height of the brushpile should be approximately 5 feet tall. This will help seal out the weather and provide additional perches and cover habitat for songbirds. To further increase wildlife use of the brushpile you can plant or promote (e.g., by seeding, or scarifying the soil) wild grape or blackberry at the edge of the pile, increasing the food and cover values for wildlife. To maintain your brushpile as a food and cover source for wildlife, you may need to add small diameter freshly cut branches to the top of the pile in late summer or early fall.

#### **Implementation 4 – Managing walnut stands**

Stand 7 is predominantly comprised of large black walnut trees with a relatively open understory of invasive shrubs, vines, and grasses. Other than providing a reliable food source for squirrels and other small mammals, this stand has fairly low wildlife value. However, it does add to the property's habitat value and black walnut can be a commercially valuable timber species. I would recommend against proactive management in this stand at this time because there are greater priorities/opportunities on the property and the chemical properties of walnut makes establishing other native plants difficult (as we discussed during the property tour).

#### **Strategy 3 – Maintaining riparian habitat**

Stand 6 is particularly valuable for wildlife because of its water resources. Much of the stand has been improved already through stream enhancement efforts and the planting of riparian tree and shrub species. These efforts can be further enhanced by maintaining this stand as a stream buffer by avoiding soil disturbance, controlling invasive species, and maintaining and/or planting riparian trees and shrubs. Additionally, the wildlife habitat value of the pond contained in Stand 6 can be enhanced.

#### **Implementation 1 – Adding habitat structure to pond/wetlands**

- 1.) A few logs can be individually placed along the periphery and extended into the pond for use as basking sites for turtles and snakes.
- 2.) A few small tree tops or branches can be placed at the edge of the pond in shallow areas where this cover is absent. Small branches provide female amphibians with structure to attach their eggs.
- 3.) Reduce mowed area around pond by allowing grass and forbs to grow. Avoid mowing these areas until late summer. This meadow habitat provides cover for amphibians against predators and desiccation, and also provides them with foraging areas to hunt for insects. This strategy will need to be balanced with other recreational uses of the pond but maintaining at least 50% of the ponds perimeter in an un-mowed state would be greatly beneficial to wildlife using this wetland.

**Also see enclosed information:**

- Supplement for the control of invasive species
- Early successional field planting
- Rotational mowing schedule
- Trees and shrubs beneficial to PA wildlife
- Sustainable forestry document
- Timber harvest decision tool
- Howard Nursery order form
- Contact information sheet
- PNDI receipt



# **Species of Greatest Conservation Need**

## **Biology and Habitat Management**

### **Grassland-Shrubland Matrix Habitat**

#### **Blue-winged Warbler**

*Habitat.* The blue-winged warbler is highly specialized to early successional habitats. It breeds in abandon fields, overgrown pastures, rights-of-ways, brushy hillsides, forest edge and clearings, stream edges, and wet swampy habitats containing patches of shrubs and herbaceous vegetation. It needs dense vegetation in the herbaceous and shrub layers up to 1.5 m (5 ft) in height, and little vegetation above 3 m (10 ft). It will only use abandoned fields in which the canopy height does not exceed 7 m (23 ft). Thicker areas of grasses and herbs and fewer shrubs are important components of the habitat. The blue-winged warbler places its well-concealed nest on the ground in a clump of tall grass or herbs or between exposed roots of stump. In general, this species is more commonly found in elevation below 2,000 ft, especially in lowland areas below 1,000 ft.

*Management.* Habitat management should include a combination of three features including 1) open patches of herbaceous vegetation, 2) dense thickets of shrubs, and 3) a forest edge. Habitat can be created through succession following farming or fire. Rotational farming or fire where about 25% of the area is disturbed or burned every 10 years may produce ideal conditions. This species will nest in relatively small (< 5 ha (12 acres)) young clearcuts with low canopy heights, preferably close to powerlines, roads, or other openings.

#### **Eastern Meadowlark (*Sturnella magna*)**

*Habitat.* The eastern meadowlark is found in grasslands, haylands, croplands, orchards, grassed islands among plowed fields, and pastures. It prefers moderately tall grasslands (12-35 cm) with abundant litter cover, high proportion of grass, moderate to high forb density, and low shrub cover (<5%). It nests on the ground in litter or under dense, overhanging grasses.

*Management.* To manage for meadowlarks, 1) protect large tracts of grassland (10 acres minimum, but prefers larger grasslands over small areas), 2) promote greater forb density and diversity in managed grasslands to improve overall habitat quality and provide food sources such as insects (this may be accomplished by allowing natural succession to proceed or by interseeding forb species in grassland plantings), 3) limit the encroachment of woody vegetation to discourage predators that may use woody vegetation as travel corridors and to enlarge the amount of interior grassland, 4) use rotational mowing/burning to maintain a complex of mowed/burned and unmowed/unburned habitats to provide a variety of grassland habitat types, 5) mow between August 1 and August 31<sup>st</sup>, which is after the nesting and brood-rearing seasons of most grassland bird species.

#### **Dickcissel (*Spiza americana*)**

*Habitat.* The dickcissel may be found in grasslands, meadows, and brushy fields. It prefers habitat with dense, moderately tall vegetation (particularly containing forbs). High abundance of

forbs provides perches, nesting cover, and increased invertebrate abundance. Fence posts and small trees are often used as song perches. Its nests are elevated in grasses, forbs, shrubs, or trees, and less commonly on the ground in thick vegetation. Examples of vegetations used to support the nest include dogwood, greenbriar, wild rose, wild aster, smooth brome grass, and thistle.

*Management.* Management recommendations may include 1) preventing fragmentation of large grassland habitat (minimum area required = 25 acres), 2) conducting treatments prior to mid April or following mid August, 3) using rotational mowing and burning regimes to keep succession in check, 4) disking areas to maintain annual seed producing plants (disking can also help to increase invertebrate population).

### **Loggerhead Shrike (see Dickcissel habitat and management)**

#### **Prairie Warbler (*Dendroica discolor*)**

*Habitat.* The prairie warbler is a pine-oak barren/young forest associate. It is found in thickets, young conifers, dry scrub, pine barrens, and Christmas tree farms or plantings. Many of these habitats are early successional and are suitable beginning about 5 years after burning or clearing and continuing for about 10-20 years. It is associated with pines, cedar, crabapple, and hawthorne. Small patches of habitat may be suitable for breeding. Nests are usually placed in a shrub, sapling, thicket, or fern clump, usually 0.3-3 m (1-10 ft) above ground, but occasionally higher. This species is often found in some of the same habitat as the eastern cottontail.

*Management.* Where pine or deciduous forests are the climax vegetation, and fire is not naturally occurring, active management (prescribed burning, clearcutting) is necessary to create the early successional, shrubby vegetation required by most prairie warbler populations. Because suitable habitat requires periodic disturbance, a single area cannot provide continually favorable habitat. Therefore, a mosaic of sites should be managed in different successional stages. Alternatively, an area cleared by burning or logging, or open corridors (e.g., along powerlines) in wooded areas, can be maintained in suitable condition for much longer periods by selective basal spraying of herbicides to remove trees.

#### **Whip-poor-will (*Caprimulgus vociferous*)**

*Habitat.* The whip-poor-will is found in forests, barrens, and open grassy pine plantations with well-spaced trees and a low canopy. It prefers even-aged successional habitats from regeneration to pole-stage stands and is uncommon in mature forest. It rests on the ground or on a branch, in thickets at the forest edge or in a hedgerow. This species lays its eggs on the ground in an open site under trees or shrubs, usually on a bed of dead leaves at the edge of the woods edge or in open woodland.

*Management.* Suggestions for management include 1) preserving breeding habitat which should include medium growth woodlands of many types, usually in uplands and not far from open country, primarily deciduous and mixed forest and 2) maintaining a relatively dense oak understory for nesting intermixed with more open habitat for foraging. Maintaining a balanced deer herd to limit browsing impact on regeneration and forest understory should be beneficial.

## **Reverting Field Habitat**

### **Brown Thrasher** (*Toxostoma rufum*)

*Habitat.* The brown thrasher uses a wide variety of brush habitats, including thickets and bushy areas in deciduous forest clearings, forest edge, shrubby areas, hedgerows, roadside thickets, and overgrown fields and pastures. It often occupies abandon fields that are overgrown with crab apple and hawthorn. Thrashers generally nest in shrubs and low trees, but ground nests have been observed.

*Management.* Management should provide or maintain areas (> 1 ha (2.5 acres)) of young dense brushy habitat with open areas for walking and foraging, thick brushy areas for nesting, and an abundance of song perches. Where present release hawthorn and crab apple of overtopping trees. Field edges can be border cut to provide dense young woody vegetation.

**Prairie warbler, whip-poor-will – see above**

## **Young Forest Habitat**

**Blue-winged warbler, brown thrasher, prairie warbler, whip-poor-will – see above**

### **Willow Flycatcher** (*Empidonax traillii*)

*Habitat.* The willow flycatcher is found in thickets, swamps, wetlands, streamsides, and dense shrubby deciduous habitats, especially riparian areas and meadows with shrubby patches. The presence of water (in the form of running water, pools, or saturated soils) and willow (*Salix* spp.), alder (*Alnus* spp.), or other deciduous riparian shrubs are essential habitat components. It prefers dense riparian deciduous shrub cover separated by open areas rather than large contiguous willow thickets without openings. It does not occur in dense tree cover, but occasionally uses scattered trees for singing and foraging perches. It nests in shrubs 3-10 feet above the ground (willow, buttonbush, dogwood, elderberry, hawthorn, rose) near slow streams, standing water or seeps, and swampy thickets.

*Management.* Management should 1) maintain riparian deciduous shrubs at least 3-6 feet high in patches greater than ¼ acres, 2) maintain more than 40% foliage cover density in the lower 6 feet of the deciduous shrub layer, 3) maintain shrub patches interspersed with openings (opening should be at least 2 meters wide to allow aerial foraging), and 4) promote native riparian vegetation communities and maintain wetlands and wet meadows to help sustain willow communities.

## **Mature Forest Habitat**

### **Northern Long-eared Bat** (*Myotis septentrionalis*)

*Habitat.* The northern long-eared bat is found in dense forest stands and chooses maternity roosts beneath exfoliating bark and tree cavities. This species is relatively solitary and is most often

found singly or in very small groups. In the summer this bat appears to be reliant upon forested habitats, foraging along forested edges, clearings, and over small ponds. Hunting occurs at heights of 3-10 feet and is coupled with periodic rest followed by a 2<sup>nd</sup> peak of feeding just prior to dawn. The northern long eared bat relies on caves and underground mines for hibernation sites where it typically chooses cooler sites than other bats.

*Management.* Retain potential natural (e.g., snags, shagbark and shellbark hickories) and manmade roosting sites (especially those with more sun exposure) and old buildings. If present, maintain at least 16 live shagbark hickory trees greater than 11 in. dbh per acre; if there are no shagbark hickory trees greater than 11 in. dbh, then leave the 16 largest shagbark hickories. Retain other species of trees that have been identified as having relatively high value as potential roost trees. Forest management should include managing a component of the forest to develop old growth characteristics. Maintain mature trees, including at least three live trees per acre greater than 20 in. dbh (of the species listed above) and at least six live trees per acre greater than 11 in. dbh (of the species listed above). No harvest or timber stand improvement activities should occur within 100 ft on both sides of perennial streams and within 50 ft on both sides of intermittent or ephemeral streams. Tree harvesting and prescribed burns in forest habitat should not be conducted between April 1 and November 15. Many species of bats, including the Indiana bat, consistently follow tree-lined paths rather than travel across large open areas. Connectivity among forest patches, especially in highly fragmented landscapes, is very important (especially near maternity colonies) because these corridors aid orientation, attract insects, and provide protection from wind and predators. Maintain wooded corridors to connect suitable patches of forested habitat.

### **Scarlet Tanager (*Piranga olivacea*)**

*Habitat.* With 13-17% of its global nesting population occurring in our state, Pennsylvania plays a significant role in this species' long-term survival. The scarlet tanager favors upland deciduous forests, and is particularly associated with oak trees. In Pennsylvania, this tanager is common in oak or hickory woodlands, beech forests, mixed pine stands, and pure, extensive stands of eastern hemlock. It is most commonly found in forests with relatively closed canopies, dense understory with a high diversity of shrubs, and sparse ground cover. It breeds in most forest stages, but is most abundant in mature forests. Nests are built in a leaf cluster well out on horizontal tree branch, commonly in oak, 2-23 m (7-75 ft) above ground with a clear unobstructed view of the ground from the nest and with flyways from adjacent trees to the nest. The scarlet tanager is less area-sensitive than many forest birds, and can be found in woodlots as small as 10-15 ha (25-37 acres) in some landscapes.

*Management.* Regionally, scarlet tanagers are negatively impacted by fragmentation and large amounts of edge habitat within a landscape. Forest > 100 ha (250 acres) are probably necessary to support maximum densities and/or population sizes. Because they often forage in the mid-canopy of a forest, management practices that promote regeneration, especially in areas with limited vertical structure, are recommended. Timber harvesting through group selection that creates even-aged patches may create acceptable conditions. They may also tolerate small or narrow clearcuts and timber stand improvements/thinning. Scarlet tanagers may occupy clearcut areas as early as 12 years after cutting if some trees are left uncut.

### **Summer Tanager (*Piranga rubra*)**

*Habitat.* The summer tanager is associated with open deciduous forests, especially dry upland woodlands; prefers oaks. Because PA is at the northern edge of its range, it has extremely limited distribution in the state (potential primary habitat is concentrated in the southwestern portion of the state, with a few sites in the southcentral and southeastern regions). It tends to be found in habitats with lower and less dense canopy cover, a lower diversity of tree species, and a lower density of large trees (>22 cm DBH) than scarlet tanagers. It is often described as a bee and wasp specialist but also consumes a wide variety of other insects.

*Management.* Management may include maintaining coverage of dry oak forest habitat type (especially in southwest and southeast PA), minimizing fragmentation of remaining large contiguous forest tracts within the species potential range in PA, and maintaining or increasing the proportion of core forest to promote the increase of this species.

## **Uneven-aged Mixed Forest Habitat**

### **Eastern Red Bat (*Lasiurus borealis*)**

*Habitat.* Optimal habitat for the red bat includes forest areas, forest edge communities, wooded hedgerows, orchards, overgrown fields, and areas with large shaded trees (e.g., city parks). It is seldom found in caves, but may inhabit buildings. The red bat is a solitary rooster that spends the daytime hours roosting in the foliage of deciduous trees, 1.5-6 m (5-20 ft) above the ground. American elms are favored in some areas, though Norway spruce, Scotch pines, and red pines are all known to be possible roost trees. In Pennsylvania they have been seen roosting on flowering dogwood leaves in migration. Bats appear to choose roosts that are concealed on all sides except from the bottom so that the bat can quickly drop out of the roost to avoid predators. This bat is also known to roost in tree hollows, on trunks of trees, in leaf litter, on Spanish moss, and even under sunflower leaves. It often returns to the exact same twig for several days at a time. The red bat forages high early on, but forages closer to the ground in straight flight or wide circle patterns as the evening gets later. Females roost singly instead of forming maternal roosting colonies.

*Management.* Retain potential natural (e.g., snags, shagbark and shellbark hickories)roosting sites (especially those with more sun exposure). Forest management should include managing a component of the forest to develop old growth characteristics. Maintain mature trees, including at least three live trees per acre greater than 20 in. dbh (of the species listed above) and at least six live trees per acre greater than 11 in. dbh (of the species listed above). No harvest or timber stand improvement activities should occur within 100 ft on both sides of perennial streams and within 50 ft on both sides of intermittent or ephemeral streams. Tree harvesting and prescribed burns in forest habitat should not be conducted between April 1 and November 15.

## **Riparian Habitat**

### **American Woodcock** (*Scolopax minor*)

*Habitat.* The American woodcock is generally considered an edge species. It requires a mix of habitats including forest openings or fields where males can sing and put on their aerial display, shrubs or young trees on moist soils where there is an abundance of earthworms (which comprise 80% of its diet), and young second-growth forest for nesting and brooding habitat. Day cover is generally not far from the display grounds, usually within 100-180 m (330-590 ft). Nests often are within 90 m (295 ft) of an occupied display ground. The display grounds are generally over 1.2 ha (3 acres), but can be as small as 0.05 ha (0.12 acres). Adults travel an average distance of 170 m (560 ft) between day and night habitats, as compared with 330 m (1,080 ft) for young birds. Shrub cover is typically high (75-87%). Important tree and shrub species include aspen, alder, birch, hawthorn, black haw viburnum, and dogwood. Nests are located in a shallow depression in existing leaf litter, usually 1 m (3 ft) from the base of a tree or shrub.

*Management.* Key factors to manage for are: 1) habitat structure, 2) soil texture, 3) soil moisture, and 4) vegetation. Habitat structure appropriate for feeding cover, display/ roosting grounds, and nesting all must be provided in appropriate areas and configuration. Maintain one or two ¼-acre openings in short vegetation as permanent courtship display areas. This can be accomplished by mowing the openings (low) with a brush hog late in the fall. Maintaining habitat for roosting and displays can be accomplished through disking, mowing, use of herbicides, prescribed burns, and encouraging native trees and shrubs. Ideally the goal is to have the area appear patchy, not uniform in structure. Planting shrubs in open fields and around the perimeter of cultivated fields will provide roosting and escape cover. Stands of mature aspen and alder should be clear-cut and allowed to regenerate. Other appropriate shrubs for wet sites are hawthorns, gray dogwood, spicebush, silky dogwood, black haw, and viburnum. Small amounts of croplands are useful, especially as roost sites. Blueberry fields make excellent roosting and courting areas. Silvicultural practices can also enhance habitat. Clearcuts can provide good nocturnal roosting cover (clearcutting small strips and blocks every 8-10 years on a 40-50-year rotation can provide a continuous supply of young growth). Shelterwood and seed trees that are left can help to retain a patchy structure that woodcock prefer.

### **Great Blue Heron** (*Ardea herodias*)

*Habitat.* This species utilizes a variety of quality wetlands for foraging, including marshes, ponds, lakes, streams, and rivers. It forages singly or in flocks and feed on fish, reptiles, amphibians, crayfish, and small birds and small mammals. The great blue heron nest in tall trees or snags in forested riparian areas or islands and forested hillsides, sometimes far from water. Numerous pairs establish their nests in the same area forming nesting colonies (rookeries), but they can sometimes nest singly.

*Management.* Maintaining good water quality is important for maintaining a healthy prey base for this species. Great blue herons nest in tall trees or snags in forested riparian areas or islands and forested hillsides, sometimes far from water. Numerous pairs establish their nests in the same area forming nesting colonies (rookeries), but they can sometimes nest singly. Minimize disturbance to nesting birds (individuals or colonies) during nesting season (February 15-August 31). Management of great blue heron rookeries involves three buffer or protection zones,



designed to ensure the necessary nesting habitat of the herons is not physically disturbed and that construction activities, or new structures, do not result in abandonment.

### **Purple Martin (*Progne subis*)**

*Habitat.* East of the Rockies, martins nest almost exclusively in human-supplied housing. They like a clear, open area fairly close to a water source. Martins are aerial insectivores, consuming insects during flight. Dragonflies are a favorite as well as moths, butterflies, flies, beetles, wasps and other flying insects. This species utilizes a variety of quality wetlands for foraging, including marshes, ponds, lakes, streams, and rivers along with adjacent uplands such as lawns and grasslands.

*Management.* Maintaining good water quality is important for maintaining a healthy prey base for this species. Providing and maintaining artificial nest structures is crucial for maintaining a breeding population of purple martins on a property. One of the most important steps in attracting Purple Martins is choosing the right location for a martin house. Martins prefer housing that is placed in open areas with clear flyways. Choose the center of the largest open spot available, about 30-120 feet from human housing and at least 40-60 feet from trees. Entrance orientation—north, east, south, or west—doesn't matter.

### **Willow Flycatcher (*Empidonax traillii*)**

*Habitat.* The willow flycatcher is found in thickets, swamps, wetlands, streamsides, and dense shrubby deciduous habitats, especially riparian areas and meadows with shrubby patches. The presence of water (in the form of running water, pools, or saturated soils) and willow (*Salix* spp.), alder (*Alnus* spp.), or other deciduous riparian shrubs are essential habitat components. It prefers dense riparian deciduous shrub cover separated by open areas rather than large contiguous willow thickets without openings. It does not occur in dense tree cover, but occasionally uses scattered trees for singing and foraging perches. It nests in shrubs 3-10 feet above the ground (willow, buttonbush, dogwood, elderberry, hawthorn, rose) near slow streams, standing water or seeps, and swampy thickets.

*Management.* Management should 1) maintain riparian deciduous shrubs at least 3-6 feet high in patches greater than ¼ acres, 2) maintain more than 40% foliage cover density in the lower 6 feet of the deciduous shrub layer, 3) maintain shrub patches interspersed with openings (opening should be at least 2 meters wide to allow aerial foraging), and 4) promote native riparian vegetation communities and maintain wetlands and wet meadows to help sustain willow communities.

### **Blue-winged Warbler, brown thrasher, whip-poor-will (see above)**