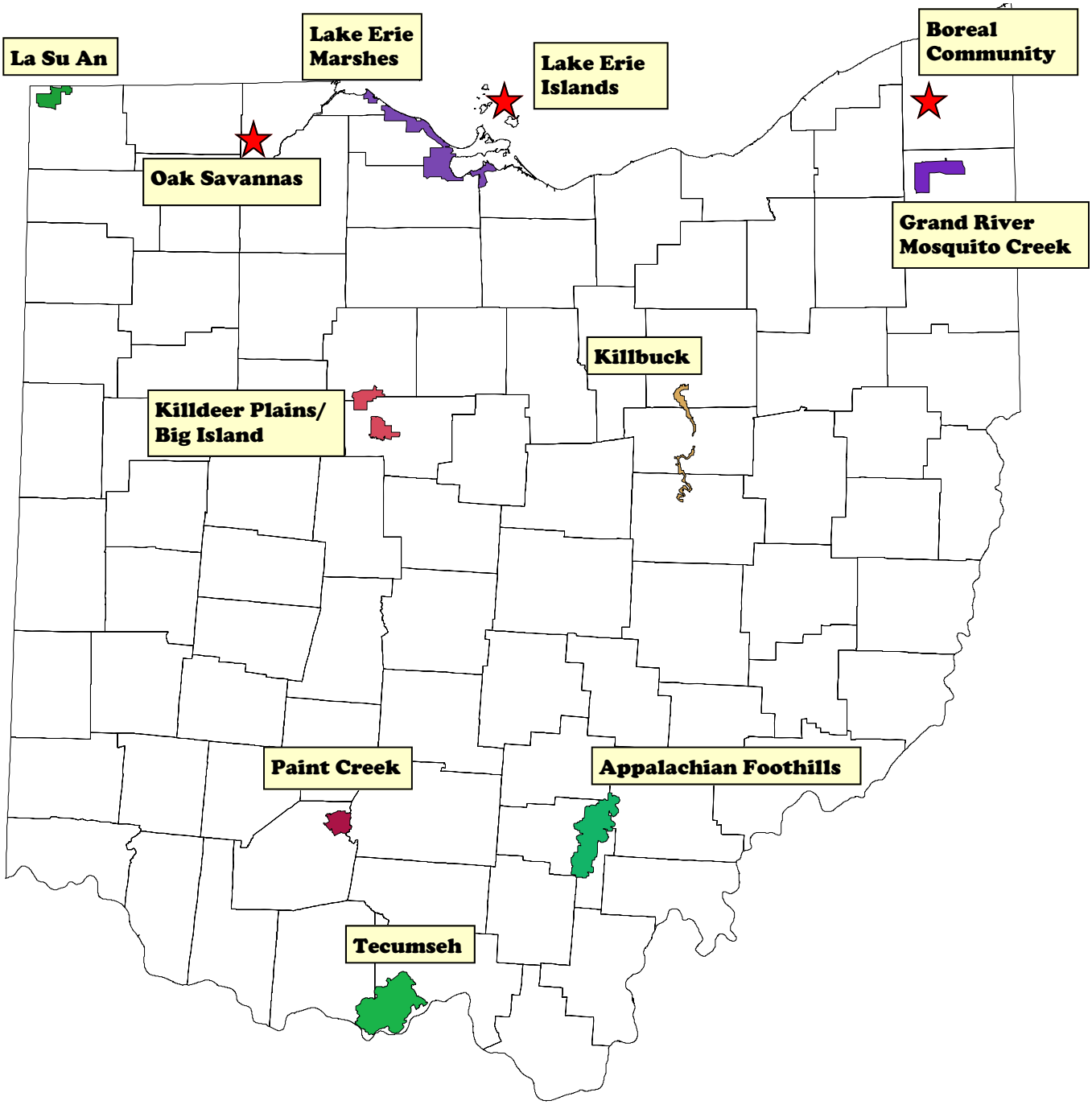
Section 1.3

Terrestrial Focus Area Overview Map

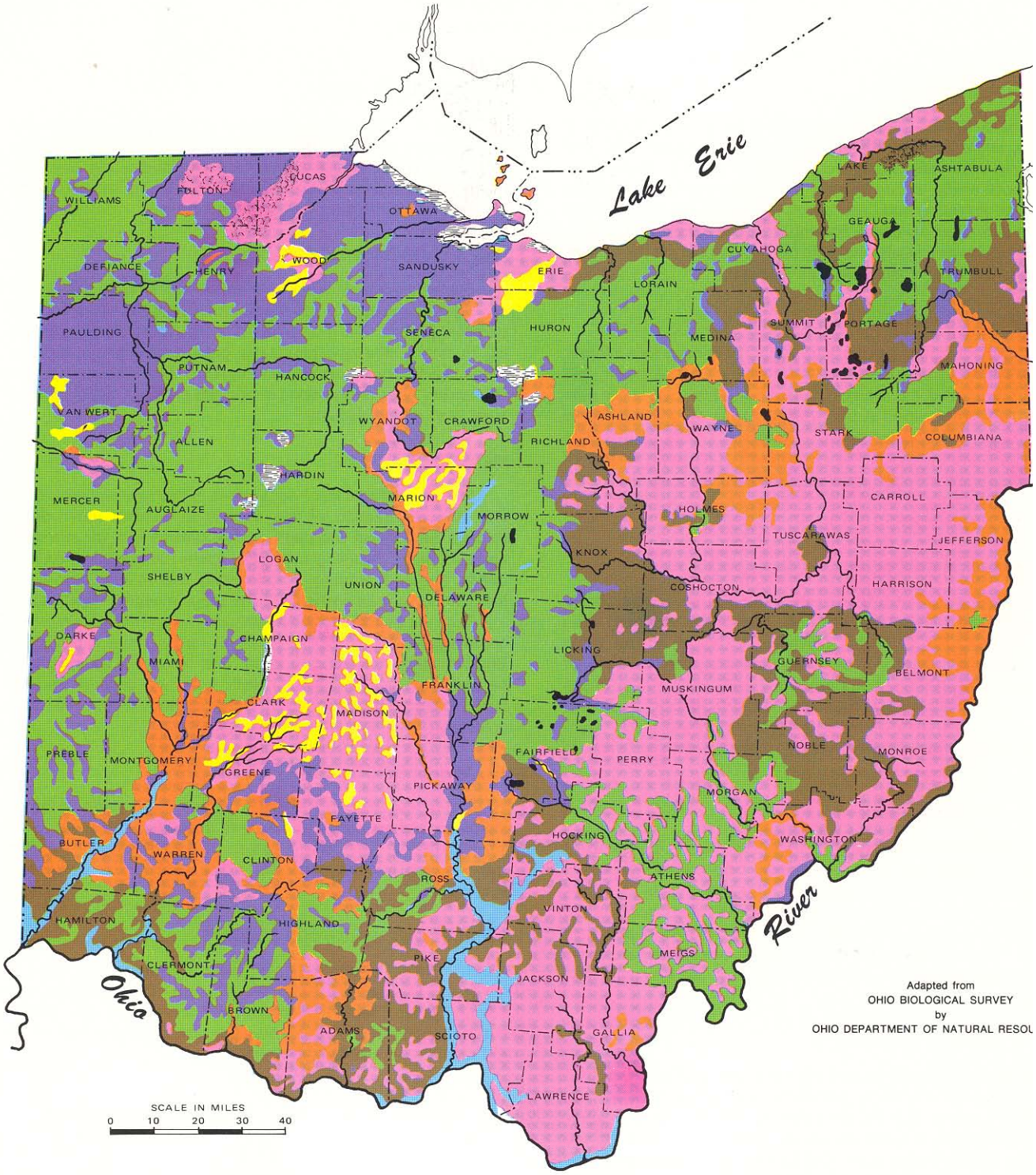
Focus Areas


La Su An
Lake Erie Marshes
Lake Erie Islands
Boreal Community
Oak Savannas
Grand River Mosquito Creek
Killbuck
Killdeer Plains/ Big Island
Paint Creek
Appalachian Foothills
Tecumseh

Section 1.4

Native Vegetation of Ohio

NATURAL VEGETATION OF OHIO
AT THE TIME OF THE EARLIEST LAND SURVEYS



Adapted from
OHIO BIOLOGICAL SURVEY
by
OHIO DEPARTMENT OF NATURAL RESOU

LEGEND

- BEECH FORESTS
- MIXED OAK FORESTS
- OAK - SUGAR MAPLE FORESTS
- ELM - ASH SWAMP FORESTS
- MIXED MESOPHYTIC FORESTS
- PRAIRIE GRASSLANDS
- OAK SAVANNAS
- MARSHES and FENS
- SPHAGNUM PEAT BOGS
- BOTTOMLAND HARDWOOD FORESTS

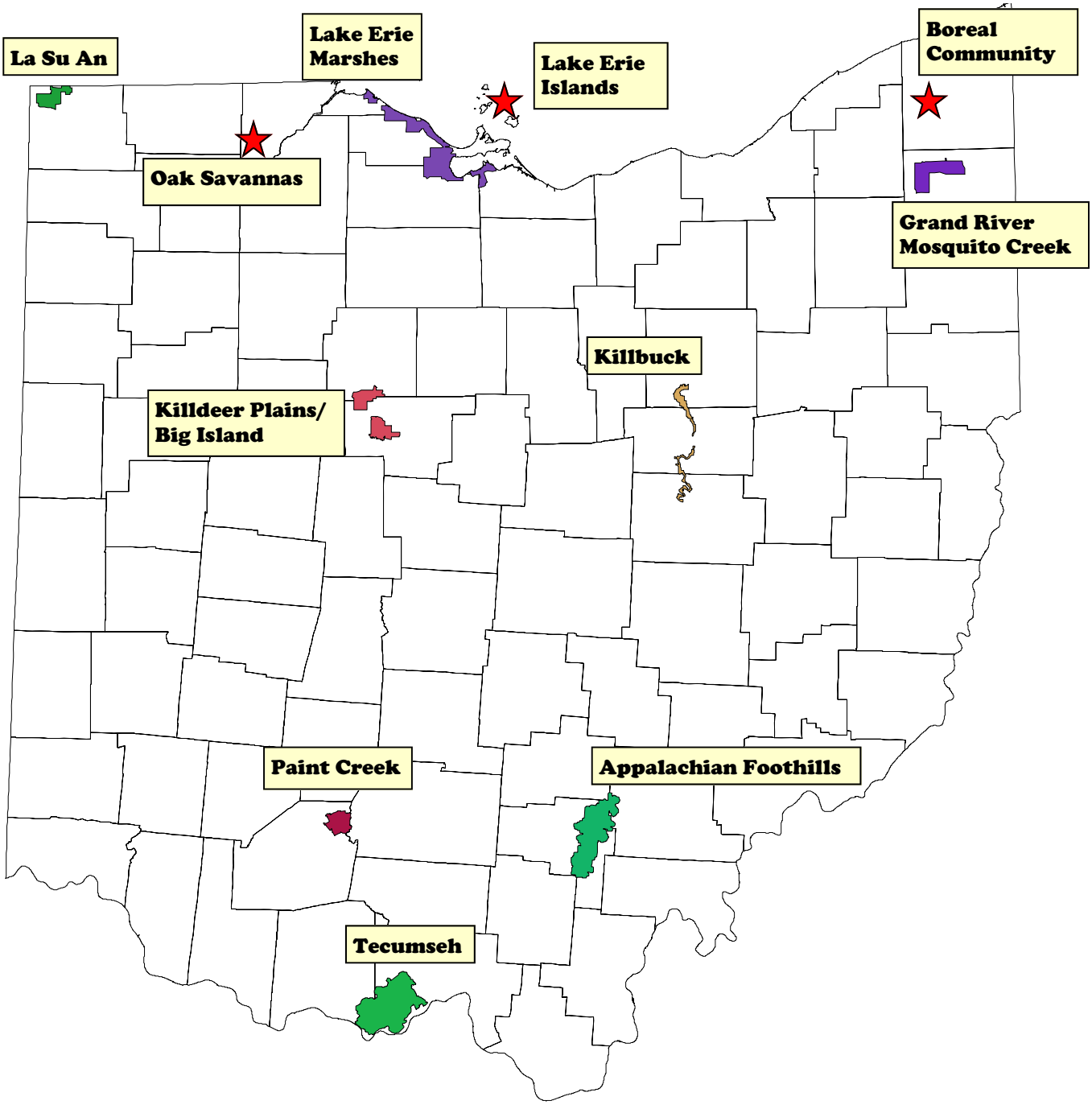
Section 2.0

Terrestrial Focus Area Tactical Plans

Section 2.1

Terrestrial Focus Area Overview Map

Focus Areas


La Su An
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Killdeer Plains/ Big Island
Paint Creek
Appalachian Foothills
Tecumseh

Section 2.2

Forestland Focus Area Plans

Section 2.2.1

Appalachian Foothills Forestland Focus Area Tactical Plan

Section 2.2.1.1

Appalachian Foothills Forestland Focus Area Tactical Plan

Appalachian Foothills Forestland Focus Area Tactical Plan

Goal: To provide the habitat requirements necessary to maintain and enhance the existing forest wildlife community within the Appalachian Foothills Focus Area.

Introduction/Background: The hill counties of southeast and southern Ohio currently exhibit the best examples of the forest wildlife habitat that existed in Ohio prior to European settlement. The Appalachian Foothills Focus Area, located in Vinton and Athens counties, includes the Zaleski State Forest, Waterloo Wildlife Area, Lake Hope State Park and portions of the Mead Corporation's Public Hunting Lands. In addition, some private lands are included in the Focus Area. While no specific activities are planned for immediately adjacent lands and inholdings that are privately owned, current habitat conditions on these areas will be considered as forest management plans are developed for public lands. Private lands comprise nearly 19,000 acres or about 28% of the 66,000+ acre tract (See Figure 1).

During the early 1800s, a vibrant iron ore industry developed in this area which used huge amounts of timber to operate the furnaces. Between 1818 and 1873, 69 pig iron furnaces flourished throughout the hanging rock area with two furnaces within the boundaries of the Zaleski State Forest. In the late 1800s, better iron ore reserves were discovered in Michigan and Missouri, causing the iron industry to quickly fade within the Appalachian Foothills area. By the turn of the 20th century, the iron ore industry was completely gone from Appalachian Foothills along with much of the timber. Subsistence farming was attempted in the area, but the steep slopes and thin soils proved too unproductive. It was during this time period that deep mining for coal became an important industry.

In 1935, under the direction of the U. S. Department of Agriculture and the Ohio Division of Forestry, the Zaleski Land Utilization Project was established. The objective of the Zaleski project was to return the land to its most productive capacity by establishing a forest community, providing flood control and preventing soil erosion. In the 1930s, the State of Ohio acquired 3,400 acres of the Strong Estate and Lake Hope was constructed along with 14 vacation cabins, 35 miles of roads, 21 miles of firebreaks and several fire towers.

In 1930, the distribution of natural cover in the Appalachian Foothills area was 29% openland, 35% brushland and 36% woodland. Today over 85% of the area is in some stage of forest cover. Current size class on Zaleski State Forest for all stands is 71% sawtimber, 22% poles and 7% seedling/sapling.

Currently, tree age classes in the Focus Area are shifting from less shrub/brush to more pole/mature with a slow but steady shift in tree species composition from oak and hickory dominated stands to maple and tulip poplar stands.

One-hundred-twenty-five species have been identified on Ohio's Native and Naturalized Terrestrial Wildlife Species List as having viable, broadly distributed populations around the state (e.g., robins, chipmunks, etc.). They occur as viable populations in most, if not all, of the focus areas. While these species are obviously part of the wildlife communities in the focus

areas, it is not critical to meet the habitat objectives in each focus area to ensure these species continued viability. Therefore, habitat guidelines were developed to address the needs of the species in the Appalachian Foothills Focus Area with more limited distribution and/or lower population levels. There are 57 species (12 mammals, 31 birds, 8 reptiles, 5 amphibians and 1 invertebrate) in this category found within the Focus Area (See Appendix 1).

Need/Justification: The Division of Wildlife's approach to enhancing and maintaining the highest level of terrestrial wildlife diversity in the state is to use a "focus area" concept to sustain viable populations of as many native species of wildlife as possible. The idea is to concentrate efforts and resources to provide all the necessary habitat requirements in a few large units of the major habitat types, along with the remnants of several unique habitats, for species that are of limited distribution or have low populations. Several widely separated focus areas for each of the major habitat types (forest, grassland and wetland) have been selected to reduce the risk of extirpation of species from natural disaster, disease outbreak, etc. Typically focus areas are associated with relatively large holdings of public land where future land use practices can be managed.

When considering the needs of several species of forest birds (pileated woodpecker, broad-winged hawk, yellow-throated vireo, worm-eating warbler, cerulean warbler, ovenbird and the American redstart), the literature suggests that the minimum forestland acreage needed before these species would likely be present is 300 acres. A viable population would require at least 200 breeding pairs. In a large forestland area or complex, the most area-sensitive of these avian species, the pileated woodpecker and broad-winged hawk, could be expected to nest at a density of 1 nest per 300 acres. Therefore, conservation areas designed to maintain viable populations of these species would need to have approximately 60,000 acres of suitable forest habitat (200 pairs x 300 acres/pair). The higher the proportion of forest habitat (as opposed to other cover types such as agriculture or post-stripmine grasslands) within the focus area the better with 80% or more being the most desirable. This approach assumes that the needs of less area-sensitive species along with the common, broadly distributed species will be met if the habitat requirements of the most area-sensitive species are provided.

To meet the habitat requirements of all of the forest-wildlife species found at the Appalachian Foothills, a variety of age and size classes of timber must be distributed throughout the Focus Area. An age/size class distribution of 30% seedling/sapling, 25% pole timber, 25% saw timber and 20% mature forest (i.e., no harvest activity) would meet the habitat needs required to sustain a healthy forest wildlife community (See Forest Habitat Tactical Plan). Based on the best currently available information, this approach (approximately 60,000 acres of forest habitat that comprises at least 80% of a focus area with a mixture of 30%, 25%, 25% and 20% seedlings, poles, saw timber and mature forest respectively) would sustain viable populations of all of Ohio's forest wildlife species with one exception – black bears. The literature suggests that the minimum acreage needed to sustain a viable population of black bears is 224,000 acres. Since this essentially quadruples the size of forest focus areas and since Ohio's bear population is clearly on the rise with substantial suitable, unoccupied habitat throughout the eastern and southern portions of the state, it has been determined not to base forestland focus area size on the needs of black bears. It should also be noted that while there is a reasonable likelihood that populations of species listed in Appendix 1 for this Focus Area will be viable if planned habitat management and restoration efforts are completed in a timely manner, not all species have the same probability of reaching viable levels because their populations may be impacted by factors other than habitat conditions on the Focus Area (e.g., location of Focus Area to species'

geographic range or habitat quality and availability on migratory routes and wintering areas).

The Appalachian Foothills Focus Area was chosen because Zaleski State Forest, Waterloo Wildlife Area, Lake Hope State Park and Mead Public Hunting Area comprise nearly 72% of the tract (Figure 1) and nearly 60,000 acres of the 66,000+ acre Focus Area are currently forested (Figure 2). It represents one of the best and largest examples of forest wildlife habitat currently found in the state.

Objective: To establish and maintain quality forest habitat that will support viable populations of the 57 species listed in Appendix 1 of this Plan in addition to the numerous species with viable, broadly distributed populations also found within the Focus Area.

Approach: Achieving this Plan's Goal and Objective will require a three-phased approach. The Information Phase will involve presentation of the Plan to the Division of Forestry, Division of Parks and Recreation and the Mead Paper Company to determine their willingness to cooperate with implementation. Assuming all are in agreement, the Plan would then need approval by the Director of the Department of Natural Resources. Assuming the Director approves the Plan, we would contact county commissioners, township trustees, private landowners and other individuals in the vicinity of the Focus Area to inform them of the Plan.

Inventory Phase – After the Plan is approved, an inventory of the structure and composition of the wildlife habitat within the Appalachian Foothills Focus Area will be conducted. Inventory information will come from existing forest stand inventories of the Division of Forestry, Mead Paper Company records, GIS inventories and other available sources. An aerial inspection will be conducted of Division of Parks and Recreation land, Mead Paper Company land, privately owned inholdings and a 1/4-mile buffer of privately owned land around the outer boundary of the Focus Area to inventory the wildlife habitat on those properties. Some limited inventories may be collected from the ground during this phase of the Plan. Additional habitat evaluation will be conducted at sites scheduled for vegetative treatment during the Implementation Phase of this Plan.

Planning and Implementation Phase – This phase of the Appalachian Foothills Plan will begin after the Inventory Phase is completed. Planning will involve comparing existing habitat inventories to planned habitat objectives as described in the **Needs/Justification** and determining what adjustments need to be made in the proportions of the various habitat types. The mature forest portion of the desired habitat will be partially represented by the habitat on Lake Hope State Park (3,103 acres). Based on the planned habitat objectives, the mature forest component of the Focus Area will need to encompass approximately 13,000 acres. Therefore, around 10,000 acres, in addition to the habitat on Lake Hope State Park, will be selected to comprise the mature forest component of the Focus Area. The habitat objectives will be achieved by: limiting management activities and allowing natural succession to continue in the designated mature forest tracts (e.g., riparian corridors, threatened and endangered plant communities that are found in maturing forest habitat, etc.), and on other selected portions of the Focus Area by slowing natural succession in stands of hawthorn/crabapple, old orchards and other old field conditions, returning mature and pole habitats to seedling/sapling stands, and performing activities that will change the structure and/or composition of different forest stands. Some of the management options for achieving the desired habitat will include timber and firewood sales, controlled

burning, herbicide application, release cutting and mowing.

Habitat management decisions will relate to the current habitat inventory and the planned habitat objectives. Critical components of habitat planning and establishment must include: when to apply activities, where to apply activities and the rate to apply activities. Ultimately, a diverse array of habitat types should be interspersed throughout the Focus Area versus locating all of the similar age/size/composition characteristics lumped together in a few large and widely spaced locations (the exception may be the mature forest component). The rate of applying management activities will vary with the degree of difference between the existing and desired amounts of the various habitat types. For instance, if the habitat inventory shows significantly higher percentages of mature forests than desired, the rate at which management occurs and the number of active sites will both be initially high. Once the desired structure and composition is reached, the rate of application and the number of sites will be reduced to maintaining the desired structure and composition. On the other hand, if the existing habitat is similar in structure and composition to the desired habitat, the rate of management activity and the number of sites will initially be lower. Regardless of the current habitat, the long-range amount of annual activity should eventually level off to a maintenance mode. A specific management plan that identifies what activities will be applied when and where will be developed and used to guide the “on the ground” progress toward meeting the planned habitat objectives.

Habitat objectives for all the focus areas were developed based on the best information currently available in terms of species-habitat relationships and the population ecology of associated wildlife species. Assumptions were made so that habitat work could proceed toward meeting plan goals and objectives. Clearly, evaluation and monitoring will be required periodically in each focus area for select species of interest to assess the validity of assumptions made during this planning process and to guide future revisions of these conservation activities. Thus, along with projects designed to attain focus area habitat goals, appropriate surveys and research evaluations need to be developed and implemented to ensure that habitat projects are producing measurable and desirable results for the intended wildlife community.

Section 2.2.1.2

Appalachian Foothills Focus Area Maps

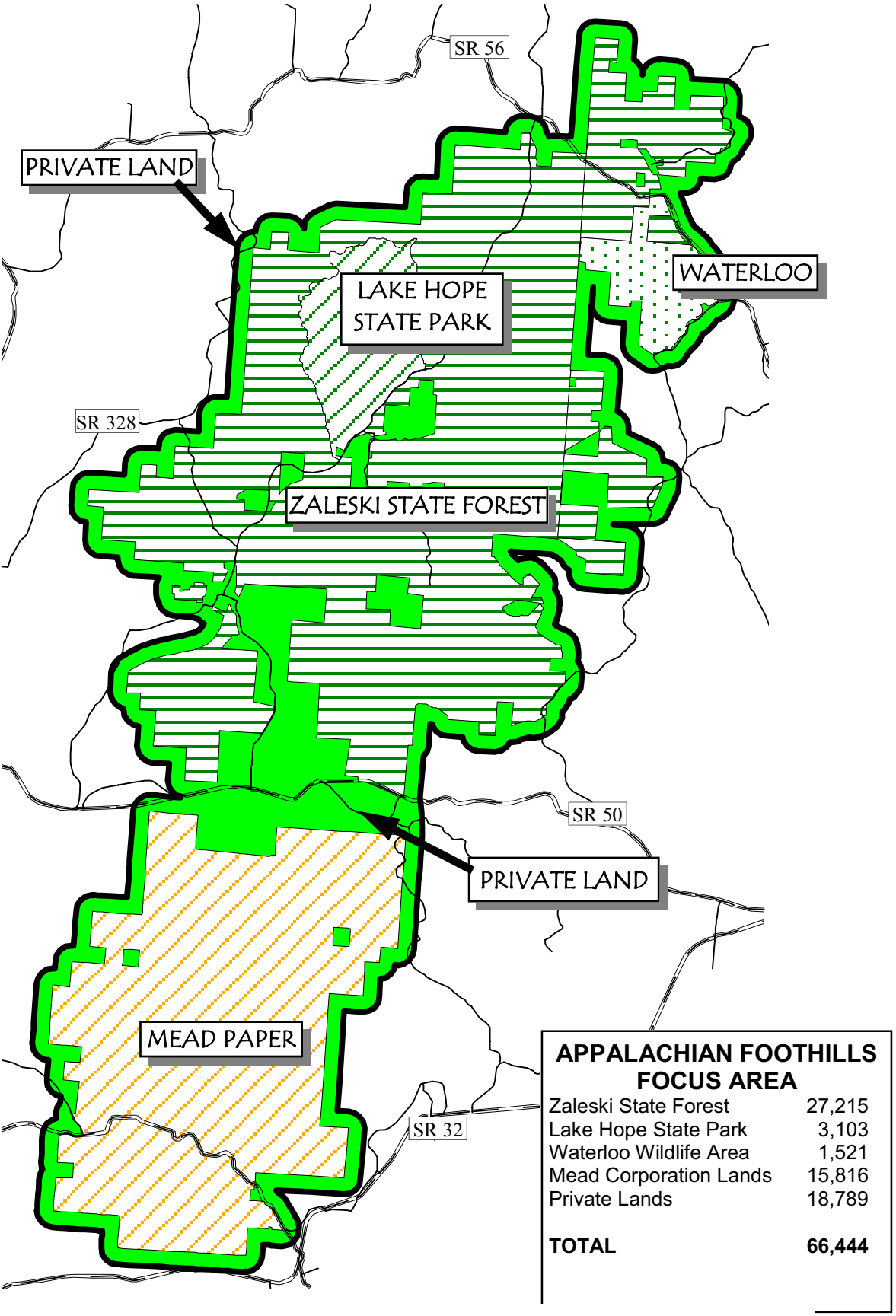


Figure 1. Appalachian Foothills Focus Area Ownership

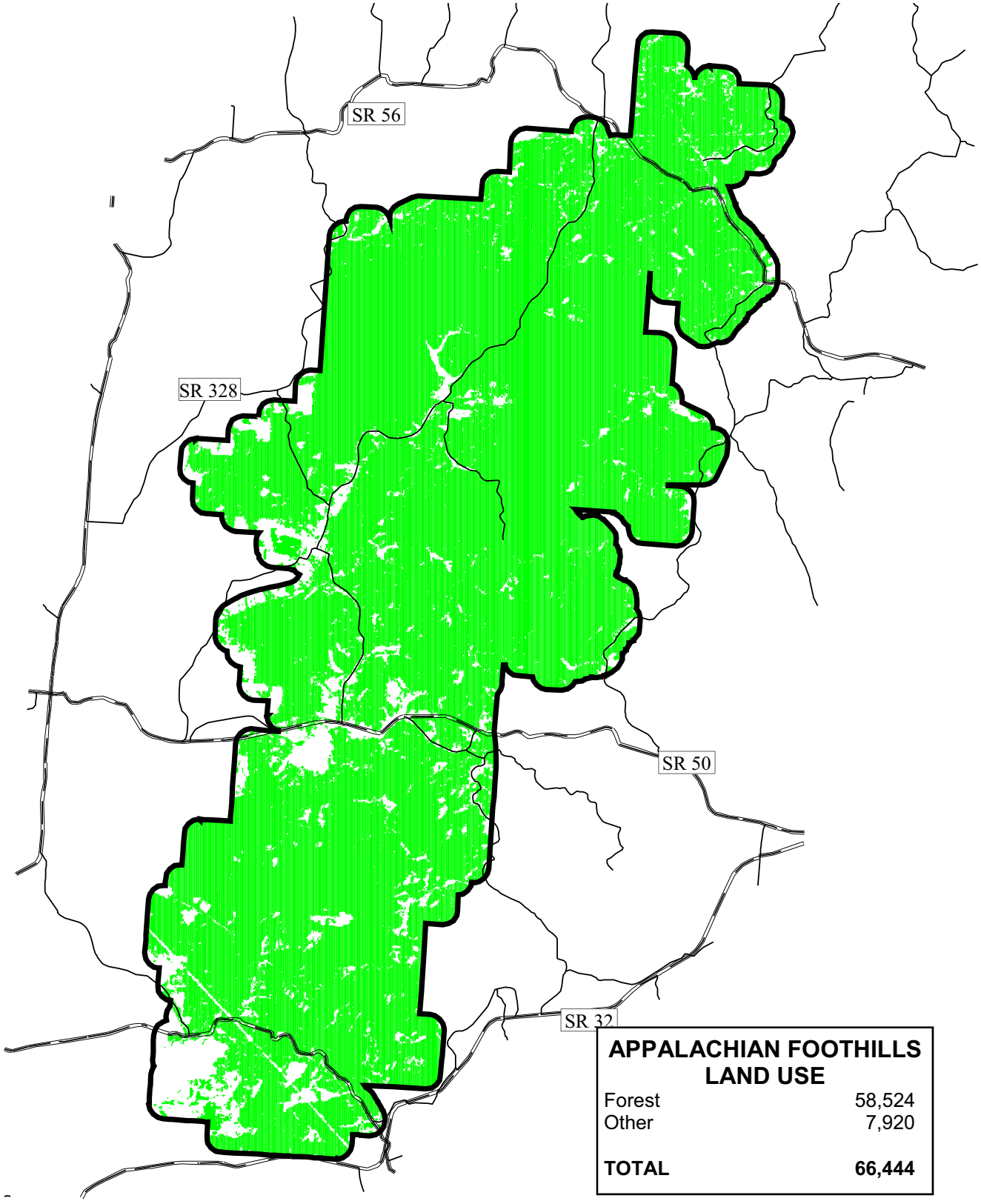


Figure 2. Appalachian Foothills Focus Area Land Use

Section 2.2.1.3

Appalachian Foothills Forestland Focus Area Species Expected to Benefit

Appendix 1 - Species expected to benefit within the Appalachian Foothills Focus Area*	
Common Name	**Scientific Name**
Mammals	
Bobcat	*Felis rufus*
Evening Bat	*Nycticeius humeralis*
Hairy-tailed Mole	*Parascalops breweri*
Hoary Bat	*Lasiurus cinereus*
Indiana Bat	*Myotis sodalis*
Meadow Jumping Mouse	*Zapus hudsonius*
Northern Long-eared Bat	*Myotis septentrionalis*
Pine Vole	*Microtus pinetorum*
Pygmy Shrew	*Microsorex hoyi*
Red Bat	*Lasiurus borealis*
Silver-haired bat	*Lasionycteris noctivagans*
Smoky Shrew	*Sorex fumeus*
Birds	
American Redstart	*Setophaga ruticilla*
Bewick's Wren	*Thryothorus bewickii*
Black and White Warbler	*Mniotilta varia*
Black-billed Cuckoo	*Coccyzus erythropthalmus*
Blue-headed Vireo	*Vireo solitarius*
Black-throated Green Warbler	*Dendroica virens*
Blackburnian Warbler	*Dendroica fusca*
Blue-gray Gnatcatcher	*Polioptila caerulea*
Blue-winged Warbler	*Vermivora pinus*
Broad-winged Hawk	*Buteo platypterus*
Cerulean Warbler	*Dendroica cerulea*
Chestnut-sided Warbler	*Dendroica pensylvanica*
Golden-winged Warbler	*Vermivora chrysoptera*
Great-crested Flycatcher	*Myiarchus crinitus*
Hermit Thrush	*Catharus guttatus*
Hooded Warbler	*Wilsonia citrina*
Louisiana Waterthrush	*Seiurus motacilla*
Northern Parula	*Parula americana*
Pileated Woodpecker	*Dryocopus pileatus*
Pine Warbler	*Dendroica pinus*
Red-headed Woodpecker	*Melanerpes erythrocephalus*
Red-shouldered Hawk	*Buteo lineatus*
Rose-breasted Grosbeak	*Pheucticus ludovicianus*
Sharp-shinned Hawk	*Accipiter striatus*
Summer Tanager	*Piranga rubra*
Veery	*Catharus fuscescens*
Whip-poor-will	*Caprimulgus vociferus*
Worm-eating Warbler	*Helmitheros vermivorus*
Yellow-billed Cuckoo	*Coccyzus americanus*
Yellow-throated Vireo	*Vireo flavifrons*
Yellow-throated Warbler	*Dendroica dominica*
Reptiles & Amphibians	
Black Kingsnake	*Lampropeltis getula nigra*
Broadhead Skink	*Eumeces laticeps*
Eastern Box Turtle	*Terrapene carolina carolina*
Eastern Smooth Earth Snake	*Virginia valeriae valeriae*
Ground Skink	*Scincella lateralis*
Kentucky Spring Salamander	*Gyrinophilus porphyriticus duryi*
Mountain Dusky Salamander	*Desmognathus ochrophaeus*
Mud Salamander	*Pseudotriton montanus*
Northern Coal Skink	*Eumeces anthracinus anthracinus*
Northern Spring Salamander	*Gyrinophilus porphyriticus porphyriticus*
Rough Green Snake	*Opheodrys aestivus*
Smallmouth Salamander	*Ambystoma texanum*
Timber Rattlesnake	*Crotalus horridus horridus*
Invertebrates	
American burying beetle	*Nicrophorus americanus*
*Does not include species with viable populations broadly distributed throughout Ohio as identified on the Native & Naturalized Terrestrial Wildlife Species List.	

Section 2.2.2

Tecumseh Forestland Focus Area Tactical Plan

Section 2.2.2.1

Tecumseh Forestland Focus Area Tactical Plan

Tecumseh Forestland Focus Area Tactical Plan

Goal: To provide the habitat requirements necessary to maintain and enhance the existing forest wildlife community within the Tecumseh Focus Area.

Introduction/Background: The hill counties of southeast and southern Ohio currently exhibit the best examples of the forest wildlife habitat that existed in Ohio prior to European settlement. The Tecumseh Focus Area (Figure 1), located in Scioto and Adams counties, includes Shawnee State Forest (60,179 acres, 75% of the total area), Shawnee State Park (587 acres, less than 1% of the total area), Raven Rock State Nature Preserve (93 acres, less than 1% of the total area), and scattered parcels of private land (19,414 acres, 24% of the total area). While no specific activities are planned for immediately adjacent lands and inholdings that are privately owned, current habitat conditions on these areas will be considered as forest management plans are developed for public lands.

Once inhabited by Shawnee Indians, Shawnee State Forest came into existence in 1922 with the purchase of 5,000 acres of land that had been heavily timbered and ravaged by fire. In the 1930s, six Civilian Conservation Corps camps were located in the forest. During this period, many of the roads were constructed in the then nearly inaccessible area. In 1949, the recreation facilities at Roosevelt Lake were transferred to the Division of Parks. The Roosevelt Game Preserve became a part of the forest in 1951.

Shawnee State Forest is managed to improve the growth, yield and quality of the timber on the area. The habitat needs of the wildlife that inhabit the Forest are considered when timber harvest plans are developed. A wilderness area totaling approximately 8,000 acres has been designated within the Shawnee State Forest where all timber management, habitat manipulation and public motorized travel have been eliminated.

Currently tree age classes in the Tecumseh Focus Area are shifting from less shrub/brush to more pole/mature with a slow but steady shift in tree species composition from oak and hickory dominated stands to maple and tulip poplar stands.

One-hundred-twenty-five species have been identified on Ohio's Native and Naturalized Terrestrial Wildlife Species List as having viable, broadly distributed populations around the state (e.g., robins, chipmunks, etc.). They occur as viable populations in most, if not all, of the focus areas. While these species are obviously part of the wildlife communities in the focus areas, it is not critical to meet the habitat objectives in each focus area to ensure these species continued viability. Therefore, habitat guidelines were developed to address the needs of the species in the Tecumseh Focus Area with more limited distribution and/or lower population levels. There are 55 species (13 mammals, 30 birds, 7 reptiles and 5 amphibians) in this category found within the Focus Area (See Appendix 1).

Need/Justification: The Division of Wildlife's approach to enhancing and maintaining the highest level of terrestrial wildlife diversity in the state is to use a "focus area" concept to sustain viable populations of as many native species of wildlife as possible. The idea is to concentrate efforts and resources to provide all the necessary habitat requirements in a few, relatively large units of the major habitat types, along with the remnants of several unique habitats, for species that are of limited distribution or have low populations. Several widely separated focus areas for

each of the major habitat types (forest, grassland and wetland) have been selected to reduce the risk of extirpation of species from natural disaster, disease outbreak, etc. Typically focus areas are associated with relatively large holdings of public land where future land use practices can be managed.

When considering the needs of several species of forest birds (pileated woodpecker, broad-winged hawk, yellow-throated vireo, worm-eating warbler, cerulean warbler, ovenbird and the American redstart), the literature suggests that the minimum forestland acreage needed before these species would likely be present is 300 acres. A viable population would require at least 200 breeding pairs. In a large forestland area or complex, the most area-sensitive of these avian species, the pileated woodpecker and broad-winged hawk, could be expected to nest at a density of 1 nest per 300 acres. Therefore, conservation areas designed to maintain viable populations of these species would need to have approximately 60,000 acres of suitable forest habitat (200 pairs x 300 acres/pair). The higher the proportion of forest habitat (as opposed to other cover types such as agriculture or post-stripmine grasslands) within the focus area the better with 80% or more being the most desirable. This approach assumes that the needs of less area-sensitive species along with the common, broadly distributed species will be met if the habitat requirements of the most area-sensitive species are provided.

To meet the habitat requirements of all the forest-wildlife species found at Tecumseh, a variety of age and size classes of timber must be distributed throughout the Focus Area. An age/size class distribution of 30% seedling/sapling, 25% pole timber, 25% saw timber and 20% mature forest (i.e., no harvest activity) would meet the habitat needs required to sustain a healthy forest wildlife community (See Forest Habitat Tactical Plan). Based on the best currently available information, this approach (approximately 60,000 acres of forest habitat that comprises at least 80% of a focus area with a mixture of 30%, 25%, 25% and 20% seedlings, poles, saw timber and mature forest respectively) would sustain viable populations of all of Ohio's forest wildlife species with one exception – black bears. The literature suggests that the minimum acreage needed to sustain a viable population of black bears is 224,000 acres. Since this essentially quadruples the size of forest focus areas and since Ohio's bear population is clearly on the rise with substantial suitable, unoccupied habitat throughout the eastern and southern portions of the state, it has been determined not to base forestland focus area size on the needs of black bears. It should also be noted that while there is a reasonable likelihood that populations of species listed in Appendix 1 for this Focus Area will be viable if planned habitat management and restoration efforts are completed in a timely manner, not all species have the same probability of reaching viable levels because their populations may be impacted by factors other than habitat conditions on the Focus Area (e.g., location of Focus Area to species' geographic range or habitat quality and availability on migratory routes and wintering areas).

The Tecumseh Focus Area was chosen because Shawnee State Forest, Shawnee State Park and Raven Rock State Nature Preserve comprise nearly 76% of the tract (60,859 acres of 80,273) (Figure 1) and 77,457 acres (96%) of the 80,000+ acre Focus Area are currently forested (Figure 2). It represents one of the best and largest examples of forest wildlife habitat currently found in the state.

Objective: To establish and maintain quality forest habitat that will support viable populations of the 55 species listed in Appendix 1 of this Plan in addition to the numerous species with viable, broadly distributed populations also found within the Focus Area.

Approach: Achieving this Plan's Goal and Objective will require a three-phased approach. The

Information Phase will involve presentation of the Plan to the Division of Forestry, Division of Parks and Recreation and the Division of Natural Areas and Preserves to determine their willingness to cooperate with implementation. Assuming all are in agreement, the Plan would then need approval by the Director of the Department of Natural Resources. Assuming the Director approves the Plan, we would contact county commissioners, township trustees, private landowners and other individuals in the vicinity of the Focus Area to inform them of the Plan.

Inventory Phase – After the Plan is approved, an inventory of the structure and composition of the wildlife habitat within the Tecumseh Focus Area will be conducted. Inventory information will come from existing forest stand inventories of the Division of Forestry, GIS inventories and other available sources. An aerial inspection will be conducted of Division of Parks and Recreation land, Division of Natural Areas and Preserves land, privately owned inholdings and a 1/4-mile buffer of privately owned land around the outer boundary of the Focus Area to inventory the wildlife habitat on those properties. Some limited inventories may be collected from the ground during this phase of the Plan. Additional habitat evaluation will be conducted at sites scheduled for vegetative treatment during the Implementation Phase of this Plan.

Planning and Implementation Phase – This phase of the Tecumseh Plan will begin after the Inventory Phase is completed. Planning will involve comparing existing habitat inventories to planned habitat objectives as described in the **Needs/Justification** and determining what adjustments need to be made in the proportions of the various habitat types. The mature forest portion of the desired habitat will be partially represented by the Wilderness Area of the Shawnee State Forest (8,000 acres). Based on the planned habitat objectives, the mature forest component of the Focus Area will need to encompass approximately 16,000 acres. Therefore, approximately 8,000 acres, in addition to the habitat in the Wilderness Area, will be selected to comprise the mature forest component of the Focus Area. The habitat objectives will be achieved by: limiting management activities and allowing natural succession to continue in the designated mature forest tracts (e.g., riparian corridors, threatened and endangered plant communities that are found in maturing forest habitat, etc.), and on other selected portions of the Focus Area by slowing natural succession in stands of hawthorn/crabapple, old orchards and other old field conditions, returning mature and pole habitats to seedling/sapling stands, and performing activities that will change the structure and/or composition of different forest stands. Some of the management options for achieving the desired habitat will include timber and firewood sales, controlled burning, herbicide application, release cutting and mowing.

Habitat management decisions will relate to the current habitat inventory and the planned habitat objectives. Critical components of habitat planning and establishment must include: when to apply activities, where to apply activities and the rate to apply activities. Ultimately, a diverse array of habitat types should be interspersed throughout the Focus Area versus locating all of the similar age/size/composition characteristics lumped together in a few large and widely spaced locations (the exception may be the mature forest component). The rate of applying management activities will vary with the degree of difference between the existing and desired amounts of the various habitat types. For instance, if the habitat inventory shows significantly higher percentages of mature forests than desired, the rate at which management occurs and the number of active sites will both be initially high. Once the desired structure and composition is reached, the rate of application and the number of sites will be reduced to maintaining the desired structure and composition. On the other hand, if the existing habitat is similar in structure and composition to the desired habitat, the rate of management activity and the number of sites will initially be lower. Regardless of the current habitat, the long-range amount of annual activity should eventually level off to a maintenance mode. A specific management plan

that identifies what activities will be applied when and where will be developed and used to guide the “on the ground” progress toward meeting the planned habitat objectives.

Habitat objectives for all the focus areas were developed based on the best information currently available in terms of species-habitat relationships and the population ecology of associated wildlife species. Assumptions were made so that habitat work could proceed toward meeting plan goals and objectives. Clearly, evaluation and monitoring will be required periodically in each focus area for select species of interest to assess the validity of assumptions made during this planning process and to guide future revisions of these conservation activities. Thus, along with projects designed to attain focus area habitat goals, appropriate surveys and research evaluations need to be developed and implemented to ensure that habitat projects are producing measurable and desirable results for the intended wildlife community.

Section 2.2.2.2

Tecumseh Forestland Focus Area Maps

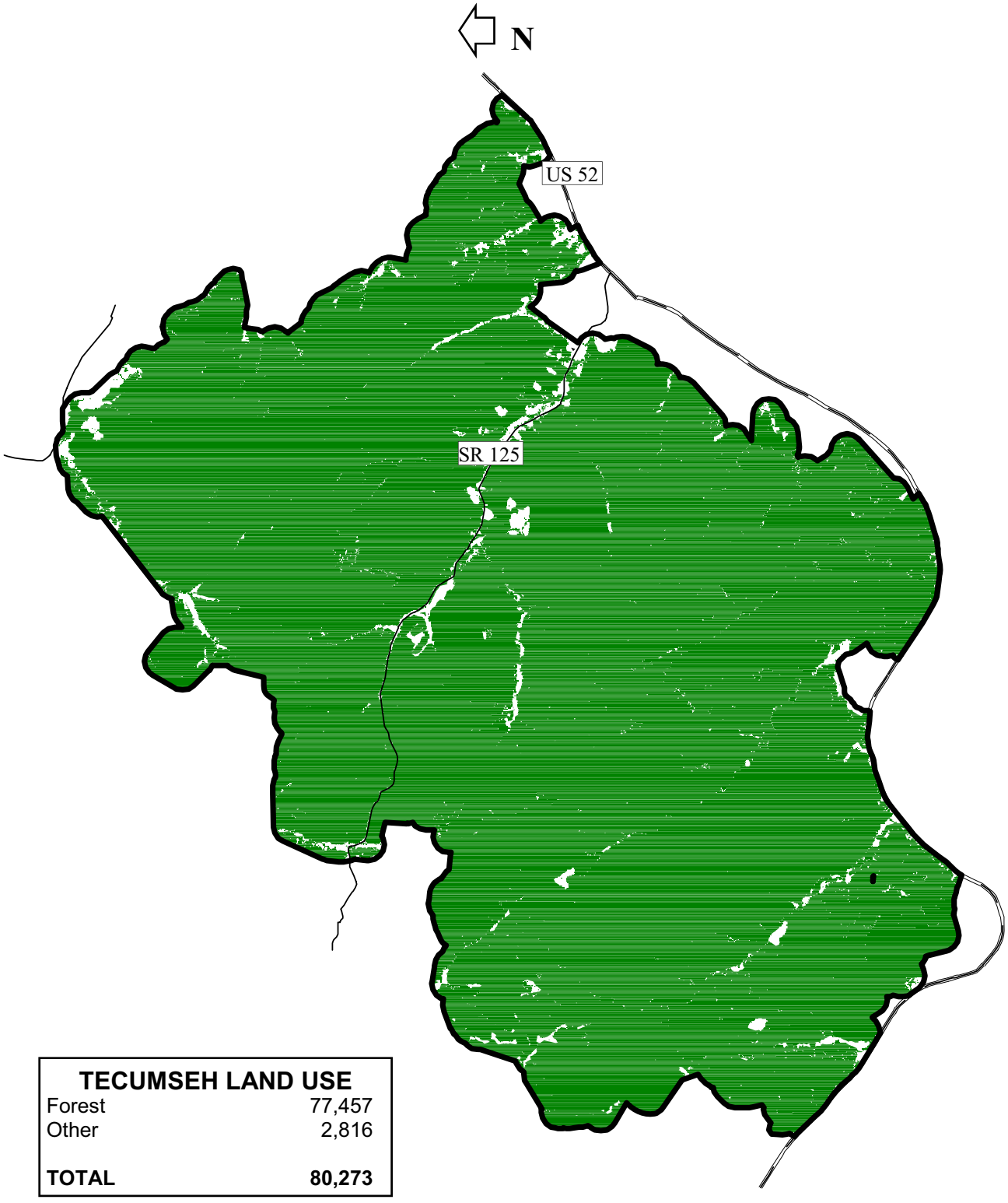
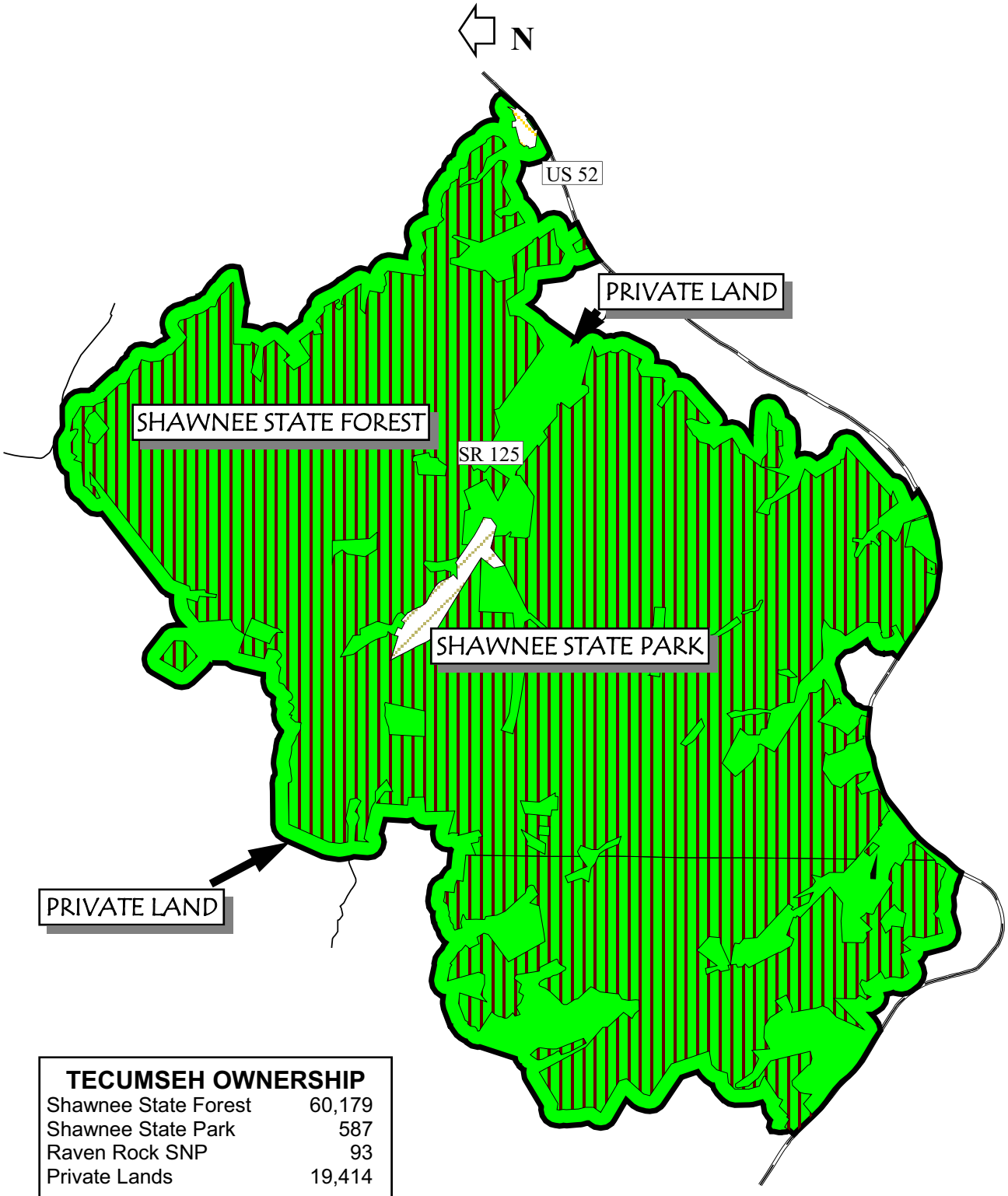


Figure 2. Tecumseh Focus Area Land Use



TECUMSEH OWNERSHIP	
Shawnee State Forest	60,179
Shawnee State Park	587
Raven Rock SNP	93
Private Lands	19,414
TOTAL	**80,273**

Figure 1. Tecumseh Focus Area Ownership

Section 2.2.2.3

Tecumseh Forestland Focus Area Species Expected to Benefit

Appendix 1 - Species expected to benefit within the Tecumseh Focus Area*	
Common Name	**Scientific Name**
Mammals	
Bobcat	*Felis rufus*
Evening Bat	*Nycticeius humeralis*
Hairy-tailed Mole	*Parascalops breweri*
Hoary Bat	*Lasiurus cinereus*
Indiana Bat	*Myotis sodalis*
Meadow Jumping Mouse	*Zapus hudsonius*
Northern Long-eared Bat	*Myotis septentrionalis*
Pine Vole	*Microtus pinetorum*
Pygmy Shrew	*Microsorex hoyi*
Rafinesque's Big-eared Bat	*Corynorhinus rafinesquii*
Red Bat	*Lasiurus borealis*
Silver-haired bat	*Lasionycteris noctivagans*
Smoky Shrew	*Sorex fumeus*
Birds	
American Redstart	*Setophaga ruticilla*
Bewick's Wren	*Thryothorus bewickii*
Black and White Warbler	*Mniotilta varia*
Black-billed Cuckoo	*Coccyzus erythropthalmus*
Blue-headed Vireo	*Vireo solitarius*
Black-throated Green Warbler	*Dendroica virens*
Blackburnian Warbler	*Dendroica fusca*
Blue Grosbeak	*Guiraca caerulea*
Blue-gray Gnatcatcher	*Polioptila caerulea*
Blue-winged Warbler	*Vermivora pinus*
Broad-winged Hawk	*Buteo platypterus*
Cerulean Warbler	*Dendroica cerulea*
Chestnut-sided Warbler	*Dendroica pensylvanica*
Golden-winged Warbler	*Vermivora chrysoptera*
Great-crested Flycatcher	*Myiarchus crinitus*
Hooded Warbler	*Wilsonia citrina*
Louisiana Waterthrush	*Seiurus motacilla*
Northern Parula	*Parula americana*
Pileated Woodpecker	*Dryocopus pileatus*
Pine Warbler	*Dendroica pinus*
Red-headed Woodpecker	*Melanerpes erythrocephalus*
Red-shouldered Hawk	*Buteo lineatus*
Rose-breasted Grosbeak	*Pheucticus ludovicianus*
Sharp-shinned Hawk	*Accipiter striatus*
Summer Tanager	*Piranga rubra*
Whip-poor-will	*Caprimulgus vociferus*
Worm-eating Warbler	*Helmitheros vermivorus*
Yellow-billed Cuckoo	*Coccyzus americanus*
Yellow-throated Vireo	*Vireo flavifrons*
Yellow-throated Warbler	*Dendroica dominica*
Reptiles and Amphibians	
Black Kingsnake	*Lampropeltis getula nigra*
Broadhead Skink	*Eumeces laticeps*
Eastern Box Turtle	*Terrapene carolina carolina*
Eastern Smooth Earth Snake	*Virginia valeriae valeriae*
Green Salamander	*Aneides aeneus*
Ground Skink	*Scincella lateralis*
Kentucky Spring Salamander	*Gyrinophilus porphyriticus duryi*
Mountain Dusky Salamander	*Desmognathus ochrophaeus*
Mud Salamander	*Pseudotriton montanus*
Rough Green Snake	*Opheodrys aestivus*
Smallmouth Salamander	*Ambystoma texanum*
Timber Rattlesnake	*Crotalus horridus horridus*
*Does not include species with viable populations broadly distributed throughout Ohio	
as identified on the Native & Naturalized Terrestrial Wildlife Species List.	

Section 2.3

Grassland Focus Area Plans

Section 2.3.1

Killdeer Plains - Big Island Grassland Focus Area Tactical Plan

Section 2.3.1.1

Killdeer Plains – Big Island Grassland Focus Area Tactical Plan

Killdeer Plains/Big Island Grassland Focus Areas Tactical Plan

Goal: To provide the habitat requirements necessary to maintain and enhance the existing grassland wildlife communities within the Killdeer Plains and Big Island Focus Areas.

Introduction/Background: The Killdeer Plains and Big Island Wildlife Areas currently exhibit some of the best examples of the grassland wildlife habitat that existed in western Ohio prior to European settlement. The Killdeer Plains Wildlife Area is located primarily in Wyandot County, and the Big Island Wildlife Area is located in Marion County, approximately 12 miles to the south of Killdeer (Fig. 1). The majority of land adjacent to and between these 2 Wildlife Areas is in private ownership, characterized by large farms in continuous rowcrop production.

These 2 Wildlife Areas are part of the Sandusky Plains, historically known as one of the largest prairies that existed in Ohio. Prior to European settlement of this area, the Sandusky Plains was comprised of islands of open grassland prairie that covered over 80,000 acres in portions of Crawford, Marion and Wyandot Counties. Intensive agricultural development of the area did not begin until the late 1800s because of poor drainage of the land. With the advent of modern drainage equipment in the early 1900s, most of these prairies were converted to small grains, pasture and small fields of rowcrops. Further changes in agricultural technologies in the 1950s resulted in a shift from small grains, pasture and hayfields to predominantly rowcrops, larger farm and field sizes, and increased fall plowing. This extensive loss of native prairie, pasture and small grains has led to a significant decline in grassland-dependent wildlife species throughout both Focus Areas, with grassland-nesting birds showing the greatest declines.

The Killdeer Plains and Big Island Wildlife Areas are both owned and managed by the Division of Wildlife, and comprise nearly 13,000 acres of public land, with grassland acreage totaling 4,300 acres. Because of the 12 mile distance between these 2 wildlife areas, a separate Grassland Focus Area will be centered around each. Upon completion of the grassland restoration around each of the core areas, efforts will be made to link the Killdeer Plains and Big Island Focus Areas with smaller grassland patches and corridors resulting in a large grassland complex with 2 core areas.

Killdeer Plains and Big Island Wildlife Areas currently provide a significant amount of wildlife-related public recreation. Hunting for upland game, including ring-necked pheasants and rabbits, and waterfowl is extremely popular on both areas. Birding and other forms of wildlife observation are also very popular because of the attraction of numerous birds of prey including short-eared, long-eared, and saw-whet owls, northern harriers, and bald eagles. Waterfowl, shorebirds, and numerous neotropical migrants are also a strong draw, attracting bird-watchers from across the state to view birds in numbers seldom seen in other regions of the state.

The Killdeer Plains and Big Island Focus Areas are situated in one of the few remaining largely undeveloped blocks of land in north-central Ohio. The area is characterized by wet soils, numerous drainage ditches, and intensive agriculture. The proximity of 2 major public land areas at the headwaters of both the Ohio River and Lake Erie provides a unique opportunity for the Division of Wildlife to emphasize private lands habitat in conjunction with public land management in an effort to affect wildlife habitat for grassland species in Ohio on a landscape level.

One-hundred-twenty-five species have been identified on Ohio's Native and Naturalized Terrestrial Wildlife Species List as having viable, broadly distributed populations around the state (e.g., robins, chipmunks, etc.). They occur as viable populations in most, if not all, of the focus areas. While these species are obviously part of the wildlife communities in the Killdeer Plains and Big Island Focus Areas, it is not critical to meet the habitat objectives in the Focus Areas to ensure these species continued viability. Therefore, habitat guidelines were developed to address the needs of the species in the Focus Areas with more limited distribution and/or lower population levels. There are 21 species (1 mammal, 14 birds and 6 reptiles) in this category found within the 2 Focus Areas (See Appendix 1).

KILLDEER PLAINS FOCUS AREA- This Focus Area consists of 13,404 acres, with private land accounting for 5,395 acres, or 40%. Approximately 61% of the Focus Area consists of agricultural land, 21% wetland, and 18% woodland. Currently, 2,493 acres of the agricultural land in the Focus Area is established in grassland habitat, with the vast majority of this grassland located on the wildlife area. Approximately 371 acres of grassland currently occur on private lands within the Focus Area (Fig. 2).

BIG ISLAND FOCUS AREA- This Focus Area consists of 13,541 acres, with private land accounting for 8,532 acres, or 63%. Approximately 80% of the Focus Area consists of agricultural land, 7% wetland, and 13% woodland. Currently, 2,445 acres of the agricultural land in the Focus Area is established in grassland habitat, with the vast majority of this grassland located on the wildlife area. Approximately 253 acres of grassland currently occur on private lands within the Focus Area (Fig. 2).

Need/Justification: The Division of Wildlife's approach to enhancing and maintaining the highest level of terrestrial wildlife diversity in the state is to use a "focus area" concept to sustain viable populations of as many native species of wildlife as possible. The idea is to concentrate efforts and resources to provide all the necessary habitat requirements in a few, relatively large units of the major habitat types, along with the remnants of several unique habitats, for species that are of limited distribution or have low populations. Several widely separated focus areas for each of the major habitat types (grassland, forestland and wetland) have been selected to reduce the risk of extirpation of species because of a natural disaster, disease outbreak, etc. Typically focus areas are associated with relatively large holdings of public land where future land use practices can be managed. In addition, they were selected because they contain the largest amount of the best remaining habitat of that type currently available. The Killdeer Plains and Big Island Wildlife Area sites were selected as grassland focus areas because of their close proximity to each other, their geographic location within the former Sandusky Plains prairie region, and the current and past management efforts on each of these two areas directed at establishment and maintenance of large fields dominated by prairie and cool-season grassland habitat. In addition, these 2 Wildlife Areas are significant in terms of providing habitat for migratory birds, including many threatened

and endangered species, because of their close proximity to the Scioto River migration corridor.

Grassland focus areas were designed to consider the needs of Ohio's grassland-dependent birds. Several of these birds (e.g., upland sandpiper, Henslow's sparrow, bobolink, and savannah sparrow) are highly sensitive to habitat fragmentation and the size of the grassland tract. It is unlikely that many of these species would consistently nest in an area of <250 acres of contiguous grassland habitat. Further, although the exact number of pairs needed for a minimum viable population for each of these species is unknown, this number can be reasonably estimated at 200 breeding pairs. The most sensitive of these species is unlikely to nest at a density higher than 1 pair per 25 acres of suitable habitat in a large grassland complex. Thus, a focus area should contain at least 5,000 acres of suitable, undisturbed grassland habitat to have a reasonable likelihood of supporting viable populations of Ohio's grassland-dependent birds (i.e., 200 pairs x 25 acres per pair = 5,000 acres of grass).

The Ohio landscape is unlikely to support such a vast sea of grassland habitat given current land ownership patterns and land-use practices. However, the Bird Conservation Area approach suggested by Partners in Flight and others may have merit. This approach would allow the 5,000 acres of grass to occur within a 12,500-acres focus area centered on a 2,500-acre block of grassland habitat (core area). The 10,000 acres surrounding the core would need to be at least 25% grassland habitat with 50% or more of the grassland tracts at least 250 acres in size. Based on the above, we believe a 12,500-acre grassland focus area is likely to provide all the habitat requirements necessary to support viable populations of Ohio's highly area-sensitive birds and other grassland-dependent species native to the region. Species excluded from this include the northern harrier, short-eared owl, and extirpated greater prairie-chicken due to their extreme area requirements, estimated to equal or exceed 30,000 acres of grassland habitat. This concept also precludes any reintroduction attempt for greater prairie-chickens in the foreseeable future since sufficient habitat is unlikely to be created to support such an effort. We believe it is simply impractical and unrealistic to attempt to provide such a vast grassland complex in Ohio.

Grasslands provided in this focus area approach must be in a landscape that is predominately open in nature with relatively little forest to overcome the negative impacts of habitat fragmentation. These grasslands must be undisturbed during the nesting season (May-July) and diverse in structure (i.e., height, density, and vegetative composition [forbs, warm- and cool-season grasses, and legumes]) with some early successional woody habitat intermixed where practical.

While there is a reasonable likelihood that populations listed in Appendix 1 will be viable if planned habitat management and restoration efforts are completed in a timely manner, several other factors may impact the success of our efforts. Specifically, not all these species have the same probability of reaching viable levels because they may be impacted by the location of the focus area with respect to a species' geographic range or habitat quality and availability on migratory routes and wintering areas.

The Killdeer Plains and Big Island Focus Areas contain 2 of the largest public land areas in western Ohio that already have significant acreage of grassland habitat (Fig. 2). This region of the state was once part of an extensive natural prairie community, with limited forestland, and therefore has excellent potential for grassland habitat restoration on a large scale. In addition, both wildlife areas are located within the Killdeer Plains Focus Area of the Upper Mississippi

River/Great Lakes Region Joint Venture of the North American Waterfowl Management Plan, the U.S. Fish & Wildlife Service's Regional Wetland Concept Plan, and are on Audubon's List of Important Bird Areas.

Objective: To establish and maintain quality grassland habitat that will support viable populations of the 21 wildlife species listed in Appendix 1 of this Plan in addition to the numerous species with viable, broadly distributed populations also found within the 2 Focus Areas.

Approach: The Killdeer Plains/Big Island Focus Area is really composed of 2 separate core areas of grassland habitat in public ownership separated by private lands within an agricultural landscape. As described below, this plan will strive to complete grassland restoration around each of the core areas first. Future efforts will be made to link the Killdeer Plains and Big Island Focus Areas with smaller grassland patches and corridors resulting in a large grassland complex with 2 core areas.

KILLDEER PLAINS FOCUS AREA–To address the *Goal and Objective* established for this plan, a Focus Area of 13,400 acres was selected. Once habitat work is accomplished, the focus area is expected to provide all habitat requirements necessary to support a viable population of Ohio's area-sensitive bird species, and is thus likely to support viable populations of all other native grassland species, with the exception of northern harriers, short-eared owls, and prairie chickens (extirpated).

To meet the minimum habitat requirements, at least 5,400 acres of undisturbed grassland will need to be provided within the Focus Area. This habitat must be in a landscape that is predominately open in nature, with relatively little forest acreage to have the most benefit. Grasslands within the Focus Area must also be diverse in structure with some early successional woody habitat intermixed. The 5,400 acres of grassland should consist of at least one 2,500-acre block of grassland habitat with the remaining acreage in the Focus Area consisting of at least 25% grassland habitat, with 50% or more of the grassland tracts at least 250 acres in size.

Killdeer Plains Wildlife Area currently does not meet the core area requirement of 2,500 acres of grassland habitat. Killdeer Plains presently has about 2,100 acres of grassland. In addition, the grassland habitat within this core area is highly fragmented by small patches of woodland and tree-lined fencerows. Also, a substantial proportion of the core area is dominated by reed canarygrass and Kentucky 31 tall fescue, 2 grass species known to have limited wildlife value. Priority restoration efforts at Killdeer Plains will include: 1) increasing the grassland acreage to 3,000 acres; 2) converting fields established in fescue and reed canarygrass to mixed stands of native warm-season grasses, associated forbs, and higher quality cool-season grasses and legumes; 3) emphasizing shrubby species instead of trees and reducing total woodland acreage where feasible; 4) controlling succession by burning and mowing outside of the nesting season to maintain quality grassland habitat; and 5) reducing fragmentation of existing grasslands while increasing total grassland acreage within the core area.

Nearly 5,400 acres of private agricultural lands occur within the Killdeer Plains Focus Area. These lands are intensively farmed and currently provide less than 400 acres of grassland habitat. Most of this grassland is established on fields enrolled in federal cropland set-aside programs (e.g.,

CRP, CREP, and WRP). Currently, about 2,500 acres of grassland habitats occur on public and private lands within the Focus Area. To meet the grassland habitat goal for this Focus Area, at least 2,900 acres of additional grassland habitat will need to be established on public and private lands. At least 900 acres will be established on the Killdeer Plains Wildlife Area with the remainder to be established on private lands.

BIG ISLAND FOCUS AREA–To address the *Goal and Objective* established for this plan, a Focus Area of 13,500 acres was selected. As noted above for Killdeer Plains, once habitat work is accomplished, the focus area is expected to provide all habitat requirements necessary to support a viable population of Ohio's area-sensitive bird species, and is thus likely to support viable populations of all other native grassland species, with the exception of northern harriers, short-eared owls, and prairie chickens (extirpated).

To meet the minimum habitat requirements, at least 5,400 acres of undisturbed grassland will need to be provided within the Focus Area. This habitat must be in a landscape that is predominately open in nature, with relatively little forest acreage to have the most benefit. Grasslands within the Focus Area must also be diverse in structure with some early successional woody habitat intermixed. The 5,400 acres of grassland should consist of at least one 2,500-acre block of grassland habitat with the remaining acreage in the Focus Area consisting of at least 25% grassland habitat, with 50% or more of the grassland tracts at least 250 acres in size.

Big Island Wildlife Area currently does not meet the core area requirement of 2,500 acres of grassland habitat. Big Island presently has about 2,200 acres of grassland. This grassland core area consists predominantly of fields 250 acres or larger established in mixed prairie grasses. Priority restoration efforts at Big Island will include: 1) increasing the grassland acreage to 2,500 acres with an emphasis on planting additional cool-season grasses and legumes adjacent to existing grass fields; 2) inter-seeding prairie forbs into the existing warm-season grassland; and 3) controlling succession by burning and mowing outside of the nesting season to maintain quality grassland habitat.

About 8,500 acres of private agricultural lands occur within the Big Island Focus Area. These lands are intensively farmed and currently provide only about 250 acres of grassland habitat. Most of this grassland is established on fields enrolled in federal cropland set-aside programs (e.g., CRP, CREP, and WRP). Currently, about 2,450 acres of grassland habitats occur on public and private lands within the Focus Area. To meet the grassland habitat goal for this Focus Area, nearly 3,000 acres of additional grassland habitat will need be established on public and private lands. At least 300 acres will be established on the Big Island Wildlife Area with the remainder established on private lands.

Strategies to increase grassland habitat on private lands within each of the 2 Focus Areas may vary and include efforts to increase landowner participation in federal cropland set-aside programs, financial and technical assistance to private landowners, cooperation with other conservation groups (e.g., Pheasants Forever and Ducks Unlimited), and influence on federal agricultural programs. Finally, to meet grassland habitat needs outside of the core areas, the Division of Wildlife may need to purchase land from willing sellers as it becomes available.

The following activities or projects should continue within the Focus Areas: establish and maintain large fields (i.e., 250 acres) of quality grassland habitat on Big Island Wildlife Area (W1NM25) and Killdeer Plains Wildlife Area (W2PM01); maintain contact with and provide technical assistance to resource-related agencies to emphasize conservation provisions of federal farm programs (e.g., CRP, CCRP, CREP, WRP, WHIP, and EQUIP), encourage private landowner participation in these programs, and provide technical advice to private landowners to increase and maintain quality grassland habitat on private lands (W1PM05 and W2PM05); distribute free prairie grass seed to private landowners (W1PM06 and W2PM06); provide financial incentive programs for grassland establishment on private lands (WANM33); and, educate the public and work with other conservation groups to increase the number of large fields of quality grassland habitat on private lands (W1NM22 and W1NX05).

As noted above, more effort will be needed at Killdeer Plains Wildlife Area to reduce total woodland acreage and field dividers and to convert fields established in fescue and reed canarygrass to mixed stands of native warm-season grasses, associated forbs, and higher quality cool-season grasses and legumes. To increase the availability of long-term quality grassland habitat in large fields on private lands within the Focus Areas, more emphasis should be placed on encouraging landowner enrollment in the Wetland Reserve Program through increased landowner contact, news releases, media contact, field days, and financial incentives. Educational efforts and private landowner workshops that address mowing and burning as tools for maintaining quality grassland habitat will be a priority.

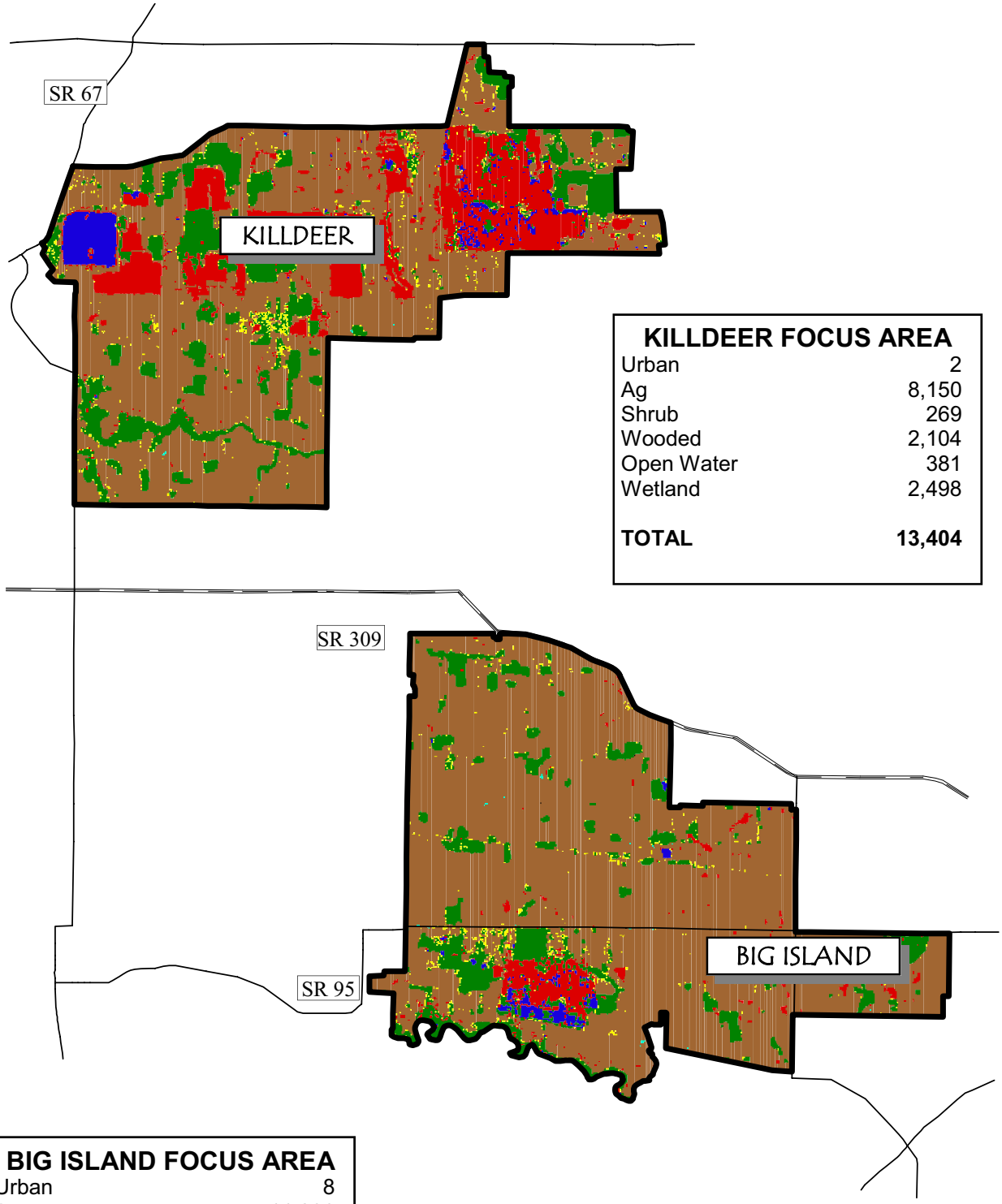
Habitat objectives for all the focus areas were developed based on the best information currently available in terms of species-habitat relationships and the population ecology of associated wildlife species. Assumptions were made so that habitat work could proceed toward meeting plan goals and objectives. Clearly, evaluation and monitoring will be required periodically in each focus area for select species of interest to assess the validity of assumptions made during this planning process and to guide future revisions of these conservation activities. Thus, along with projects designed to attain focus area habitat goals, appropriate surveys and research evaluations need to be developed and implemented to ensure that habitat projects are producing measurable and desirable results for the intended wildlife community.

Species that may require special attention or monitoring are listed in Appendix 1. For the Killdeer/Big Island Focus Area, the following species and comments need to be considered as habitat plans are made and reviewed. The least shrew is our only native shrew that requires open grassland habitat. Its presence in each portion of this Focus Area should be documented. Northern bobwhite, originating from Kansas, were released at Big Island Wildlife Area in 1999. The fate of these birds should be documented and, if necessary, additional wild birds should be released after habitat work is well underway to augment the local population. Prairie warblers will benefit from some of the habitat components that benefit northern bobwhite and Henslow's sparrows (e.g., relatively tall, dense grasslands with interspersed shrubs or nearby brushy vegetation) within this region of Ohio. Development or maintenance of dense, emergent wetland vegetation and tall, warm-season grasses will likely benefit the sedge wren. Other grassland birds listed will likely show population responses if a diverse grassland landscape is created within the Focus Area. The eastern massasauga is an Ohio endangered species and Federal candidate species that requires wetland and upland habitats. This snake is fairly common at Killdeer Plains Wildlife

Area and should remain so if wet meadows and forested wetlands are protected and enhanced while additional grassland habitat is created, especially in wet soil areas. An associated species, the eastern plains garter snake, will also benefit from restoration and enhancement of wet meadow and wet prairie grassland habitats. This Ohio endangered species is only known to occur near Killdeer Plains Wildlife Area. The eastern and northern ribbon snakes are semi-aquatic reptiles that use open water areas and moist woodland habitats. Populations of these snakes should not be negatively impacted by the grass restoration work proposed in this plan; however, little is known about these species in Ohio and their presence within the Focus Area should be documented. Kirtland's snake, an Ohio threatened species, uses wet meadow habitats and should benefit from efforts to maintain and enhance emergent wetlands and moist grassland habitats in the Focus Area. The presence of Kirtland's snake also should be documented within this Focus Area.

Section 2.3.1.2

Killdeer Plains – Big Island Grassland Focus Area Maps



KILLDEER FOCUS AREA	
Urban	2
Ag	8,150
Shrub	269
Wooded	2,104
Open Water	381
Wetland	2,498
TOTAL	**13,404**

BIG ISLAND FOCUS AREA	
Urban	8
Ag	11,206
Shrub	181
Wooded	1,549
Open Water	123
Wetland	474
TOTAL	**13,541**

Figure 2. Killdeer/Big Island Focus Area Land Use

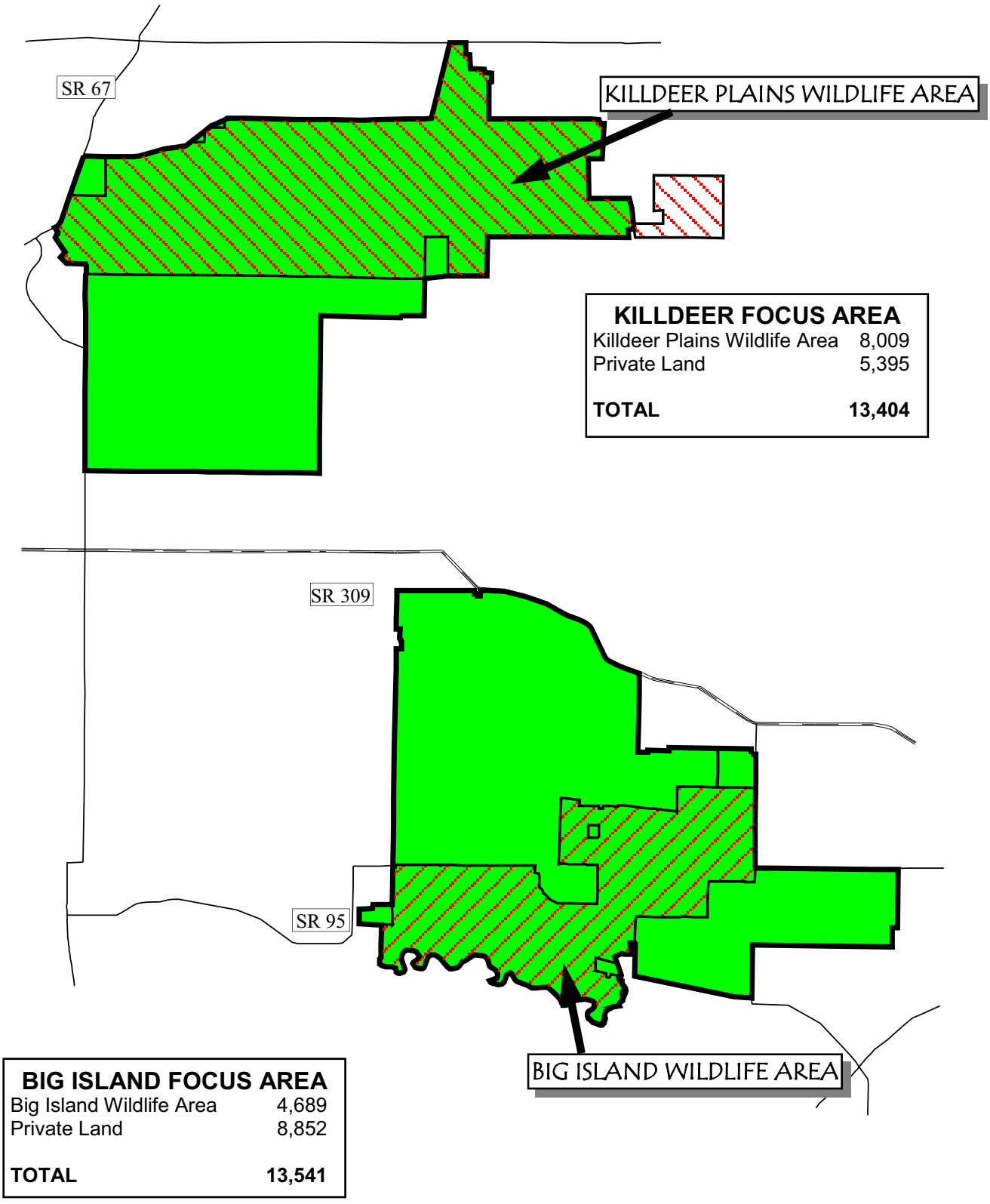


Figure 1. Killdeer/Big Island Focus Area Ownership

Section 2.3.1.3

Killdeer Plains – Big Island Grassland Focus Area Species Expected to Benefit

Appendix 1 - Species expected to benefit within the Killdeer/Big Island Focus Areas*	
Mammals	
Common Name	**Scientific Name**
Least Shrew	*Cryptotis parva*
Birds	
Common Name	**Scientific Name**
Blue-winged Teal	*Anas discors*
Bobolink	*Dolichonyx oryzivorus*
Dickcissel	*Spiza americana*
Eastern Meadowlark	*Sturnella magna*
Grasshopper Sparrow	*Ammodramus savannarum*
Henslow's Sparrow	*Ammodramus henslowii*
Northern Bobwhite	*Colinus virginianus*
Northern Shoveler	*Anas clypeata*
Prairie Warbler	*Dendroica discolor*
Ring-necked Pheasant	*Phasianus colchicus*
Savannah Sparrow	*Passerculus sandwichensis*
Sedge Wren	*Cistothorus platensis*
Upland Sandpiper	*Bartramia longicauda*
Vesper Sparrow	*Pooecetes gramineus*
Reptiles	
Common Name	**Scientific Name**
Eastern Massasauga	*Sistrurus catenatus catenatus*
Eastern Plains Garter Snake	*Thamnophis radix radix*
Eastern Ribbon Snake	*Thamnophis sauritus sauritus*
Kirtland's Snake	*Clonophis kirtlandii*
Northern Ribbon Snake	*Thamnophis sauritus septentrionalis*
Smooth Green Snake	*Liochlorophis vernalis*
*Does not include species with viable populations broadly distributed throughout Ohio	
as identified on the Native & Naturalized Terrestrial Wildlife Species List.	

Section 2.3.2

Lake La Su An Grassland Focus Area Tactical Plan

Section 2.3.2.1

Lake La Su An Grassland Focus Area Tactical Plan

Lake LaSuAn Grassland Focus Area Plan

Goal: To provide the habitat requirements necessary to maintain and enhance the existing grassland wildlife community within the Lake LaSuAn Focus Area.

Introduction/Background: The Lake LaSuAn Focus Area, located in Williams County, is an important breeding, foraging and/or migration area for numerous grassland-dependent wildlife species. Lake LaSuAn Wildlife Area is included in the Focus Area (Fig. 1). The Wildlife Area is 2,270 acres, of which approximately 930 acres are in cool and warm-season grasses (Fig. 2). The majority of land adjacent to the wildlife area is in private ownership, characterized by rowcrops, CRP fields and woodlots. Private land comprises about 85% of the Focus Area.

The Lake LaSuAn Focus Area is situated on the Wabash end moraine deposited during the Wisconsin glaciation. At the time of European settlement, the Lake LaSuAn Focus Area was a beech-maple hardwood forest with scattered poorly-drained wooded wetlands. Post-European settlement resulted in a dramatic decrease in forested acres as the land was cleared for agriculture. Further changes in agricultural technologies in the 1950s resulted in a shift from small fields supporting a variety of crops, hayfields, pastures and single family livestock operations to predominantly rowcrops, larger farm and field sizes, and increased fall plowing which greatly reduced grassland habitat in the region. Implementation of the 1985 USDA Farm Bill resulted in Williams County leading Ohio in Conservation Reserve Program set-aside acres.

The Lake LaSuAn Focus Area is in a very rural area of northwestern Ohio with little development. The area is characterized by gentle rolling hills carved out by many creeks and rivers. The soils in the Focus Area formed mainly in stratified, water-deposited material. Most of the soils within the Focus Area are classified as highly erodible and offer an opportunity to reduce the efforts of erosion within the St. Joseph River watershed through grassland management on both private and public lands.

Lake LaSuAn Wildlife Area currently provides a high level of wildlife-related public recreation. Hunting for upland game, including mourning doves, pheasants, and rabbits as well as forest game, in the riparian corridors, is very popular. Birding, though not popular at the present time, is expected to increase as the amount of grassland habitat increases.

One hundred, twenty-five species have been identified on Ohio's Native and Naturalized Terrestrial Wildlife Species List as having viable, broadly distributed populations around the state (e.g., robins, chipmunk, etc.). They occur as viable populations in most, if not all Focus Areas. While these species are obviously part of the wildlife community in the Lake LaSuAn focus area, it is not critical to meet the habitat objective in the Focus Area to ensure these species continued viability. Therefore, habitat guidelines were developed to address the needs of the species in the Lake LaSuAn Focus Area with more limited distribution and/or lower population levels. There are 14 species (1 mammals, 10 birds and 3 reptiles) in this category found within the Focus Area (See Appendix 1).

Need/Justification: The Division of Wildlife's approach to enhancing and maintaining the highest level of terrestrial wildlife diversity in the state is to use a "focus area" concept to sustain viable populations of as many native species of wildlife as possible. The idea is to concentrate efforts and resources to provide all the necessary habitat requirements in a few, relatively large

units of the major habitat types, along with the remnants of several unique habitats, for species that are of limited distribution or have low populations. Several widely separated focus areas for each of the major habitat types (grassland, forestland and wetland) have been selected to reduce the risk of extirpation of species because of a natural disaster, disease outbreak, etc. Typically, focus areas are associated with relatively large holdings of public land where future land practices can be managed. In addition, they were selected because they contain the largest amount of the best remaining habitat of that type currently available. The Lake LaSuAn site was selected as a grassland focus area because of the current and past management efforts to establish and maintain large fields dominated by warm-season and cool-season grassland habitat, the large amount of Conservation Reserve Program acreage in the area, and the presence of numerous grassland-dependent wildlife species, including several state threatened and endangered species.

Grassland focus areas were designed to consider the needs of Ohio's grassland-dependent birds. Several of these birds (e.g., upland sandpiper, Henslow's sparrow, bobolink, and savannah sparrow) are highly sensitive to habitat fragmentation and the size of the grassland tract. It is unlikely that many of these species would consistently nest in an area of <250 acres of contiguous grassland habitat. Further, although the exact number of pairs needed for a minimum viable population for each of these species is unknown, this number can be reasonably estimated at 200 breeding pairs. The most sensitive of these species is unlikely to nest at a density higher than 1 pair per 25 acres of suitable habitat in a large grassland complex. Thus, a focus area should contain at least 5,000 acres of suitable, undisturbed grassland habitat to have a reasonable likelihood of supporting viable populations of Ohio's grassland-dependent birds (i.e., 200 pairs x 25 acres per pair = 5,000 acres of grass).

The Ohio landscape is unlikely to support such a vast sea of grassland habitat given current land ownership patterns and land-use practices. However, the Bird Conservation Area approach suggested by Partners in Flight and others may have merit. This approach would allow the 5,000 acres of grass to occur within a 12,500-acres focus area centered on a 2,500-acre block of grassland habitat (core area). The 10,000 acres surrounding the core would need to be at least 25% grassland habitat with 50% or more of the grassland tracts at least 250 acres in size. Based on the above, we believe a 12,500-acre grassland focus area is likely to provide all the habitat requirements necessary to support viable populations of Ohio's highly area-sensitive birds and other grassland-dependent species native to the region. Species excluded from this include the northern harrier, short-eared owl, and extirpated greater prairie-chicken due to their extreme area requirements, estimated to equal or exceed 30,000 acres of grassland habitat. This concept also precludes any reintroduction attempt for greater prairie-chickens in the foreseeable future since sufficient habitat is unlikely to be created to support such an effort. We believe it is simply impractical and unrealistic to attempt to provide such a vast grassland complex in Ohio.

Grasslands provided in this focus area approach must be in a landscape that is predominately open in nature with relatively little forest to overcome the negative impacts of habitat fragmentation. These grasslands must be undisturbed during the nesting season (May-July) and diverse in structure (i.e., height, density, and vegetative composition [forbs, warm- and cool-season grasses, and legumes]) with some early successional woody habitat intermixed where practical.

While there is a reasonable likelihood that populations listed in Appendix 1 will be viable if

planned habitat management and restoration efforts are completed in a timely manner, several other factors may impact the success of our efforts. Specifically, not all these species have the same probability of reaching viable levels because they may be impacted by the location of the focus area with respect to a species' geographic range or habitat quality and availability on migratory routes and wintering areas.

Currently all of the highly-sensitive bird species, except the northern bobwhite quail, have been observed on the Lake LaSuAn Wildlife Area. Also, the copperbelly water snake, a federally threatened and state endangered species, is known to inhabit the wildlife area. Occurrences of the other Appendix 1 species need documentation. In addition, there are no known northern bobwhite quail populations in the Focus Area. Strategies need to be developed to establish bobwhite quail populations in the Focus Area. Given this relatively strong, existing grassland species base, it is felt that the LaSuAn area represents one of the best examples of a high quality grassland wildlife community remaining in the state.

Objective: To establish and maintain quality grassland habitat that will support viable populations of the 14 wildlife species listed in Appendix 1 of this Plan in addition to the numerous species with viable, broadly distributed populations also found within the Focus Area.

Approach: To address the *Goal and Objective* established for this plan, a Focus Area of 14,500 acres was selected. Once habitat work is accomplished, the Focus Area is expected to provide all habitat requirements necessary to support a viable population of Ohio's area-sensitive grassland bird species, and is thus likely to support viable populations of all other native grassland species, with the exception of northern harriers, short-eared owls, and prairie chickens (extirpated).

To meet the minimum habitat requirements, at least 5,800 acres of undisturbed grassland will need to be provided within the Focus Area. This habitat must be in a landscape that is predominately open in nature, with relatively little forest acreage to have the most benefit. Grasslands within the Focus Area must also be diverse in structure with some early successional woody habitat intermixed. The 5,800 acres of grassland should consist of at least one 2,500-acre block of grassland habitat with the remaining acreage in the Focus Area consisting of at least 25% grassland habitat, with 50% or more of the grassland tracts at least 250 acres in size.

Lake LaSuAn Wildlife Area currently does not meet the core area requirement of 2,500 acres of grassland habitat. LaSuAn currently has about 800 acres of warm-season and cool-season grasses planted; an additional 550 acres of grassland can be planted in the next 10 years. Private land within the Focus Area is comprised of row-crop agriculture and also a limited amount of pasture (250 acres) and hay crop (100 acres). There are also at least 3,400 acres enrolled in the Conservation Reserve Program on private lands in the Focus Area. These acreage figures suggest that the biggest challenge in the Focus Area may be creating a spatial arrangement of grassland habitats that produces a core area (see above). For private lands, strategies that will keep these fields enrolled in USDA conservation programs or that will result in the conversion of row-crop agriculture to grassland habitat will need to be identified. Strategies will vary and may include enrollment in federal cropland set-aside programs, financial and technical assistance to private landowners, cooperation with other conservation groups (e.g., Pheasants Forever and Ducks Unlimited), and influence on federal agricultural programs.

The following activities or projects should continue within the Focus Area: establishment and maintenance of quality grassland habitat at Lake LaSuAn Wildlife Area (W2PM01 and

W2CM01); and technical assistance to resource-related agencies to emphasize conservation provisions of federal farm programs (e.g., CRP, CCRP, CREP, WRP, and EQUIP) and technical advice to private landowners to increase and maintain quality grassland habitat on private land (W2PM05, W2PM06, and W2CM03).

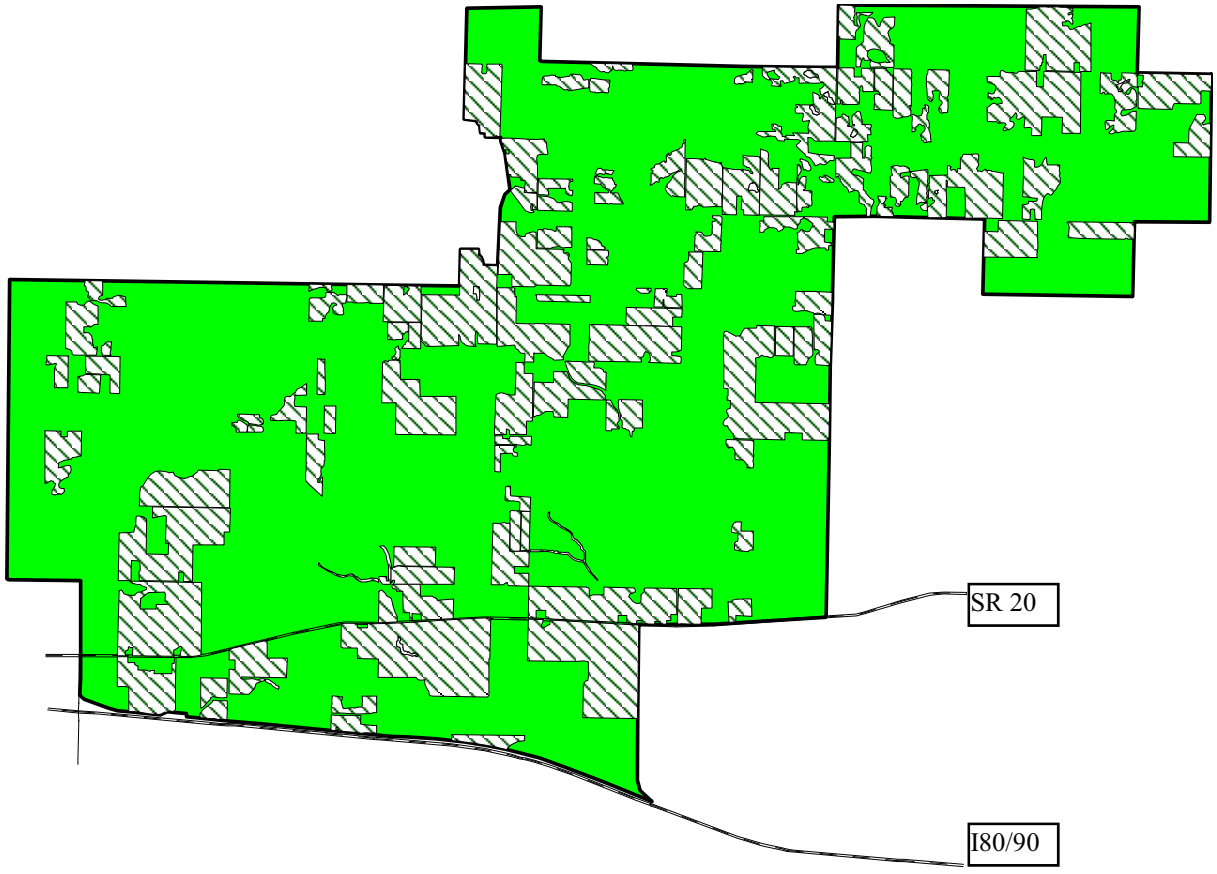
Every effort must be made to create as large a core area as possible to maximize benefits to area-sensitive grassland species. Priority must be given to increasing grassland acreage within the core area as well as to increasing the number of grassland fields on Lake LaSuAn Wildlife Area that are a minimum of 250 acres in size. Applicable techniques may include eliminating field dividers, emphasizing shrubby species instead of trees, and reducing total woody acreage. To increase the availability of long-term quality grassland habitat on private lands within the Focus Area, more emphasis should be placed on encouraging landowner enrollment in the Conservation Reserve Program through increased landowner contact, news releases, media contact, watershed meetings, field days, and financial incentives. Educational efforts and private landowner workshops that address mowing and burning as tools for maintaining quality grassland habitat will be a priority. Finally, to meet the Focus Area goal of 2,500 acres of grassland habitat within the core area, the Division of Wildlife may need to purchase land from willing sellers as it becomes available.

Habitat objectives for all the focus areas were developed based on the best information currently available in terms of species-habitat relationships and the population ecology of associated wildlife species. Assumptions were made so that habitat work could proceed toward meeting plan goals and objectives. Clearly, evaluation and monitoring will be required periodically in each focus area for select species of interest to assess the validity of assumptions made during this planning process and to guide future revisions of these conservation activities. Thus, along with projects designed to attain focus area habitat goals, appropriate surveys and research evaluations need to be developed and implemented to ensure that habitat projects are producing measurable and desirable results for the intended wildlife community.

Species that may require special attention or monitoring are listed in Appendix 1. For the LaSuAn Focus Area, the following species and comments need to be considered as habitat plans are made and reviewed. The least shrew is our only native shrew that requires open grassland habitat. Its presence in the Focus Area should be documented. Northern bobwhite are known to occur in Michigan just north of the Focus Area. After habitat work is well underway, wild birds may need to be released within the Focus Area if northern bobwhite are not present or only exist in low numbers. Development or maintenance of dense, emergent wetland vegetation and tall, warm-season grasses will likely benefit the sedge wren. Other grassland birds listed will likely show population responses if a diverse grassland landscape is created within the Focus Area. The blue racer is a snake restricted to northwestern Ohio that should occur in the Focus Area. This snake prefers early successional habitats and will likely benefit from grassland restoration work in the Focus Area, but its presence should be documented. The copperbelly water snake is a Federally threatened species and an Ohio endangered species that only occurs in Williams County. This reptile requires wet woodland and riparian bottomland habitats and associated waterways. While such areas are unlikely to be disturbed by efforts to create and enhance grassland habitats in the Focus Area, these habitats will need to be identified and protected. The northern ribbon snake is a semi-aquatic reptile that uses open water areas and moist woodland habitats. Populations of this snake should not be negatively impacted by grassland habitat work proposed in this plan; however, little is known about this species in Ohio and its presence within the Focus Area should be documented.

Section 2.3.2.2

Lake La Su An Grassland Focus Area Maps

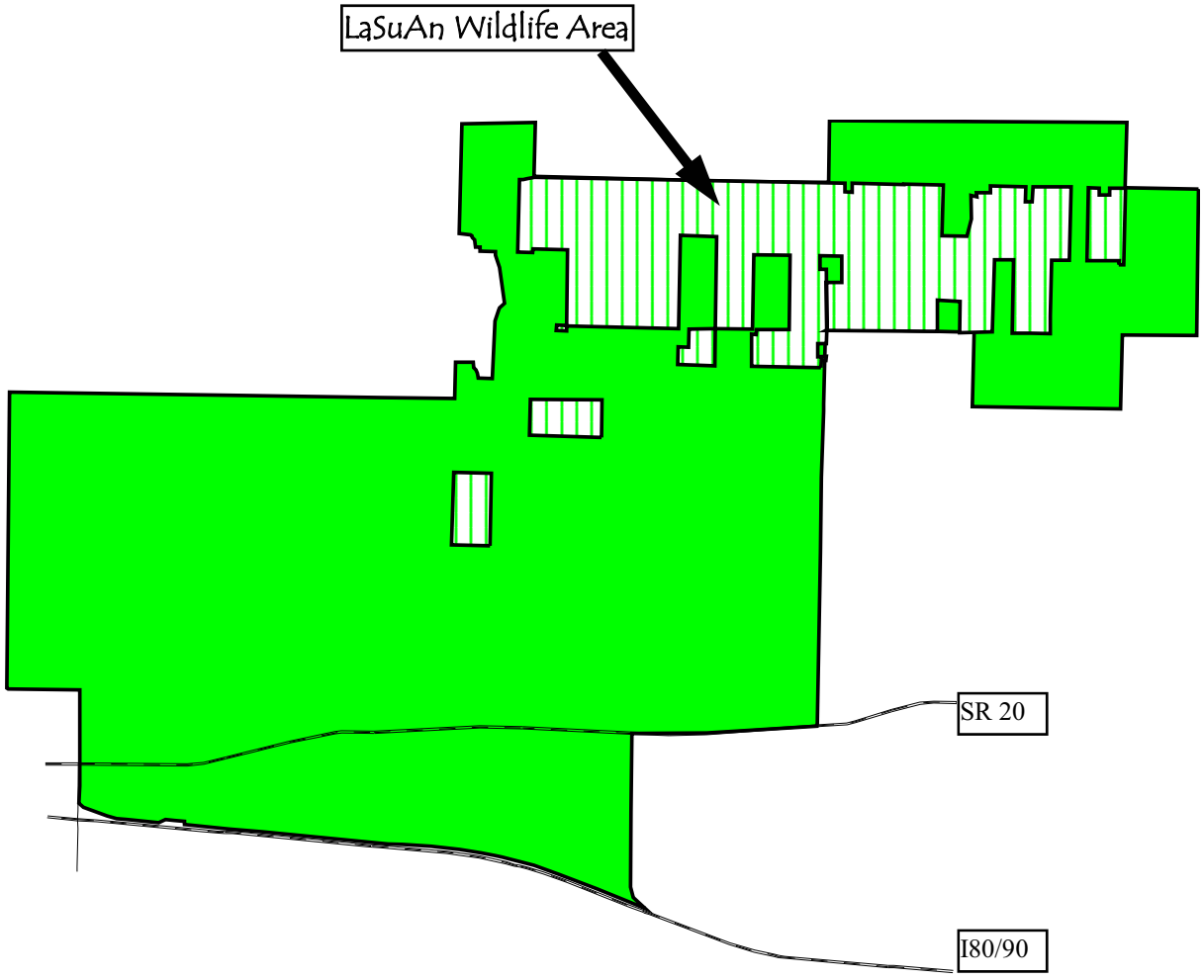


LaSuAn Focus Area Land Use

Grassland ..... 4,205 acres
Other ..... 10,346 acres

TOTAL ..... 14,551 acres

Figure 2. LaSuAn Focus Area Land Use



LaSuAn Focus Area Ownership

Private Land ..... 12,281 acres
LaSuAn Wildlife Area..... 2,270 acres

TOTAL ..... 14,551 acres

Figure 1. LaSuAn Focus Area Ownership

Section 2.3.2.3

Lake La Su An Grassland Focus Area Species Expected to Benefit

Appendix 1 - Species expected to benefit within the LaSuAn Focus Area*	
Common Name	**Scientific Name**
Mammals	
Least Shrew	*Cryptotis parva*
Birds	
Bobolink	*Dolichonyx oryzivorus*
Dickcissel	*Spiza americana*
Eastern Meadowlark	*Sturnella magna*
Grasshopper Sparrow	*Ammodramus savannarum*
Henslow's Sparrow	*Ammodramus henslowii*
Northern Bobwhite	*Colinus virginianus*
Ring-necked Pheasant	*Phasianus colchicus*
Savannah Sparrow	*Passerculus sandwichensis*
Sedge Wren	*Cistothorus platensis*
Vesper Sparrow	*Pooecetes gramineus*
Reptiles	
Black Racer	*Coluber constrictor constrictor*
Copperbelly Water Snake	*Nerodia erythrogaster neglecta*
Northern Ribbon Snake	*Thamnophis sauritus septentrionalis*
*Does not include species with viable populations broadly distributed throughout Ohio	
as identified on the Native & Naturalized Terrestrial Wildlife Species List.	

Section 2.3.3

Paint Creek Grassland Focus Area Tactical Plan

Section 2.3.3.1

Paint Creek Grassland Focus Area Tactical Plan

Paint Creek Grassland Focus Area Tactical Plan

Goal: To provide the habitat requirements necessary to maintain and enhance the existing grassland wildlife community within the Paint Creek Focus Area.

Introduction/Background: The Paint Creek Focus Area, located in Highland and Ross counties, has the potential to be an important breeding, foraging, and migration area for numerous grassland-dependant wildlife species in southwestern Ohio. Over 5,000 acres of Division of Wildlife-managed lands are located in the Focus Area with private property comprising a majority of the total acres (nearly 10,000) in the unit (Fig. 1). Current management practices on private property can be characterized by medium-sized farms in continuous rowcrop production with a few pastures and hayfields.

The Paint Creek Focus Area is part of the Darby Plains, historically known as one of the most extensive prairies that existed in Ohio. Prior to European settlement of this area, Darby Plains was centralized in Madison County but had island prairies in all adjacent counties and down the river corridors of the Darby, Paint Creek, and Miami watersheds. Northern Highland County in 1800 was comprised of wooded riparian corridors and island prairies on the dry tops of the rolling hills with scattered burr oak groves. Darby Plains was reported to have been the best hunting grounds for both the Wyandot and Shawnee Indians. Eventually, under pressure of more settlers, summer and fall hunting expeditions by native Americans ceased, and the Indians were forced from the area by 1820. Intensive agricultural development began in the mid-1800s. With the advent of modern drainage equipment in the early 1900s, most of the prairies were converted to small grains, pasture and small fields of rowcrops. Further changes in agricultural technologies in the 1950s resulted in a shift from small grains, pasture and hayfields to predominately rowcrops, larger farm and field sizes and increased fall plowing. This extensive loss of native prairie, pasture, and small grains has led to a significant decline in grassland- dependant wildlife species throughout the Focus Area, with grassland birds showing the greatest declines.

The Paint Creek Focus Area is in a very rural area of southwestern Ohio with little development. The area is characterized by gently rolling hills carved out by many creeks and rivers. The soils in the Focus Area formed mainly in stratified, water-deposited material. Most of the soils within the Focus Area are classified as highly erodible and offer an opportunity to reduce the effects of erosion on the Paint Creek watershed through grassland management on both private and public lands.

Paint Creek Wildlife Area currently provides a high level of wildlife-related public recreation. Hunting for upland game, including bobwhite quail, pheasants, and rabbits as well as forest game, in the riparian corridors, is very popular. Birding, though not popular at the present time, is expected to increase as the amount of grassland habitat increases.

One-hundred-twenty-five species have been identified on Ohio's Native and Naturalized Terrestrial Wildlife Species List as having viable, broadly distributed populations around the state (e.g., robins, chipmunks, etc.). They occur as viable populations in most, if not all, of the focus areas. While these species are obviously part of the wildlife community in the Paint Creek Focus Area, it is not critical to meet the habitat objectives in the Focus Area to ensure these species continued viability. Therefore, habitat guidelines were developed to address the needs of the species in the Paint Creek Focus Area with more limited distribution and/or lower population levels. There are 16 species (1 mammal, 15 birds) in this category found within the Focus Area (See Appendix 1).

Need/Justification: The Division of Wildlife's approach to enhancing and maintaining the highest level of terrestrial wildlife diversity in the state is to use a "focus area" concept to sustain viable populations of as many native species of wildlife as possible. The idea is to concentrate efforts and resources to provide all the necessary habitat requirements in a few, relatively large units of the major habitat types, along with the remnants of several unique habitats, for species that are of limited distribution or have low populations. Several widely separated focus areas for each of the major habitat types (grassland, forestland and wetland) have been selected to reduce the risk of extirpation of species because of a natural disaster, disease outbreak, etc. Typically focus areas are associated with relatively large holdings of public land where future land-use practices can be managed. In addition, they were selected because they contain the largest amount of the best remaining habitat of that type currently available. Current management effort on the Paint Creek Wildlife Area is directed towards converting rowcrop agriculture to grasslands and increasing the presence of grassland-dependant species, both on the Wildlife Area and on private property in the vicinity, through federal set-aside programs and the Division of Wildlife's Pastures To Prairies program.

Grassland focus areas were designed to consider the needs of Ohio's grassland-dependent birds. Several of these birds (e.g., upland sandpiper, Henslow's sparrow, bobolink, and savannah sparrow) are highly sensitive to habitat fragmentation and the size of the grassland tract. It is unlikely that many of these species would consistently nest in an area of <250 acres of contiguous grassland habitat. Further, although the exact number of pairs needed for a minimum viable population for each of these species is unknown, this number can be reasonably estimated at 200 breeding pairs. The most sensitive of these species is unlikely to nest at a density higher than 1 pair per 25 acres of suitable habitat in a large grassland complex. Thus, a focus area should contain at least 5,000 acres of suitable, undisturbed grassland habitat to have a reasonable likelihood of supporting viable populations of Ohio's grassland-dependent birds (i.e., 200 pairs x 25 acres per pair = 5,000 acres of grass).

The Ohio landscape is unlikely to support such a vast sea of grassland habitat given current land ownership patterns and land-use practices. However, the Bird Conservation Area approach suggested by Partners in Flight and others may have merit. This approach would allow the 5,000 acres of grass to occur within a 12,500-acres focus area centered on a 2,500-acre block of grassland habitat (core area). The 10,000 acres surrounding the core would need to be at least 25% grassland habitat with 50% or more of the grassland tracts at least 250 acres in size. Based on the above, we believe a 12,500-acre grassland focus area is likely to provide all the habitat requirements necessary to support viable populations of Ohio's highly area-sensitive birds and other grassland-dependent species native to the region. Species excluded from this include the northern harrier, short-eared owl, and extirpated greater prairie-chicken due to their extreme area requirements, estimated to equal or exceed 30,000 acres of grassland habitat. This concept also precludes any reintroduction attempt for greater prairie-chickens in the foreseeable future since sufficient habitat is unlikely to be created to support such an effort. We believe it is simply impractical and unrealistic to attempt to provide such a vast grassland complex in Ohio.
Grasslands provided in this focus area approach must be in a landscape that is predominately open in nature with relatively little forest to overcome the negative impacts of habitat fragmentation. These grasslands must be undisturbed during the nesting season (May-July) and diverse in structure (i.e., height, density, and vegetative composition [forbs, warm- and cool-season grasses, and legumes]) with some early successional woody habitat intermixed where practical.

While there is a reasonable likelihood that populations listed in Appendix 1 will be viable if planned

habitat management and restoration efforts are completed in a timely manner, several other factors may impact the success of our efforts. Specifically, not all these species have the same probability of reaching viable levels because they may be impacted by the location of the focus area with respect to a species' geographic range or habitat quality and availability on migratory routes and wintering areas.

The Paint Creek Focus Area was chosen because of the extensive grassland restoration effort already underway with the potential for substantially more on the Wildlife Area, over 2000 acres of CRP, hay and pasture land currently existing on private lands in the focus area (Fig. 2), the historical significance of this region in terms of high grassland wildlife populations and the presence of a sizable tract of publically-owned land.

Objective: To establish and maintain quality grassland habitat that will support viable populations of the 16 wildlife species listed in Appendix 1 of this Plan in addition to the numerous species with viable, broadly distributed populations also found within the Focus Area.

Approach: To address the *Goal and Objective* established for this plan, a Focus Area of 15,000 acres was selected. Once habitat work is accomplished, the Focus Area is expected to provide all habitat requirements necessary to support a viable population of Ohio's area-sensitive grassland bird species, and is thus likely to support viable populations of all other native grassland species, with the exception of northern harriers, short-eared owls, and prairie chickens (extirpated).

To meet the minimum habitat requirements, at least 6,000 acres of undisturbed grassland will need to be provided within the Focus Area. This habitat must be in a landscape that is predominately open in nature, with relatively little forest acreage to have the most benefit. Grasslands within the Focus Area must also be diverse in structure with some early successional woody habitat intermixed. The 6,000 acres of grassland should consist of at least one 2,500-acre block of grassland habitat with the remaining acreage in the Focus Area consisting of at least 25% grassland habitat, with 50% or more of the grassland tracts at least 250 acres in size.

Paint Creek Wildlife Area currently does not meet the core area requirement of 2,500 acres of grassland habitat. Paint Creek Wildlife Area currently has about 450 acres of warm-season grass planted with a potential total of 1,500 acres of grassland that can be planted in the next 10 years. Private land within the Focus Area is comprised of row-crop agriculture and also a significant amount of pasture (550 acres) and hay crop (500 acres). There are also nearly 1,000 acres enrolled in the Conservation Reserve Program on private lands in the Focus Area. For private lands, strategies leading to the conversion of row-crop agriculture to grassland habitat will need to be identified. Strategies will vary and may include enrollment in federal cropland set-aside programs, financial and technical assistance to private landowners, cooperation with other conservation groups (e.g., Pheasants Forever, Quail Unlimited, Ducks Unlimited), and influence on federal agricultural programs.

The following activities or projects should continue within the Focus Area: establishment and maintenance of quality grassland habitat at Paint Creek Wildlife Area (W5NM10); technical assistance to resource-related agencies to emphasize conservation provisions of federal farm programs (e.g., CRP, CCRP, CREP, WRP, and EQUIP) and technical advice to private landowners to increase and maintain quality grassland habitat on private land (W5PM05 and W5PM06); and financial incentive programs for grassland establishment on private land (WANM33).

The shape of the existing wildlife area and local topography make it difficult to create a large,

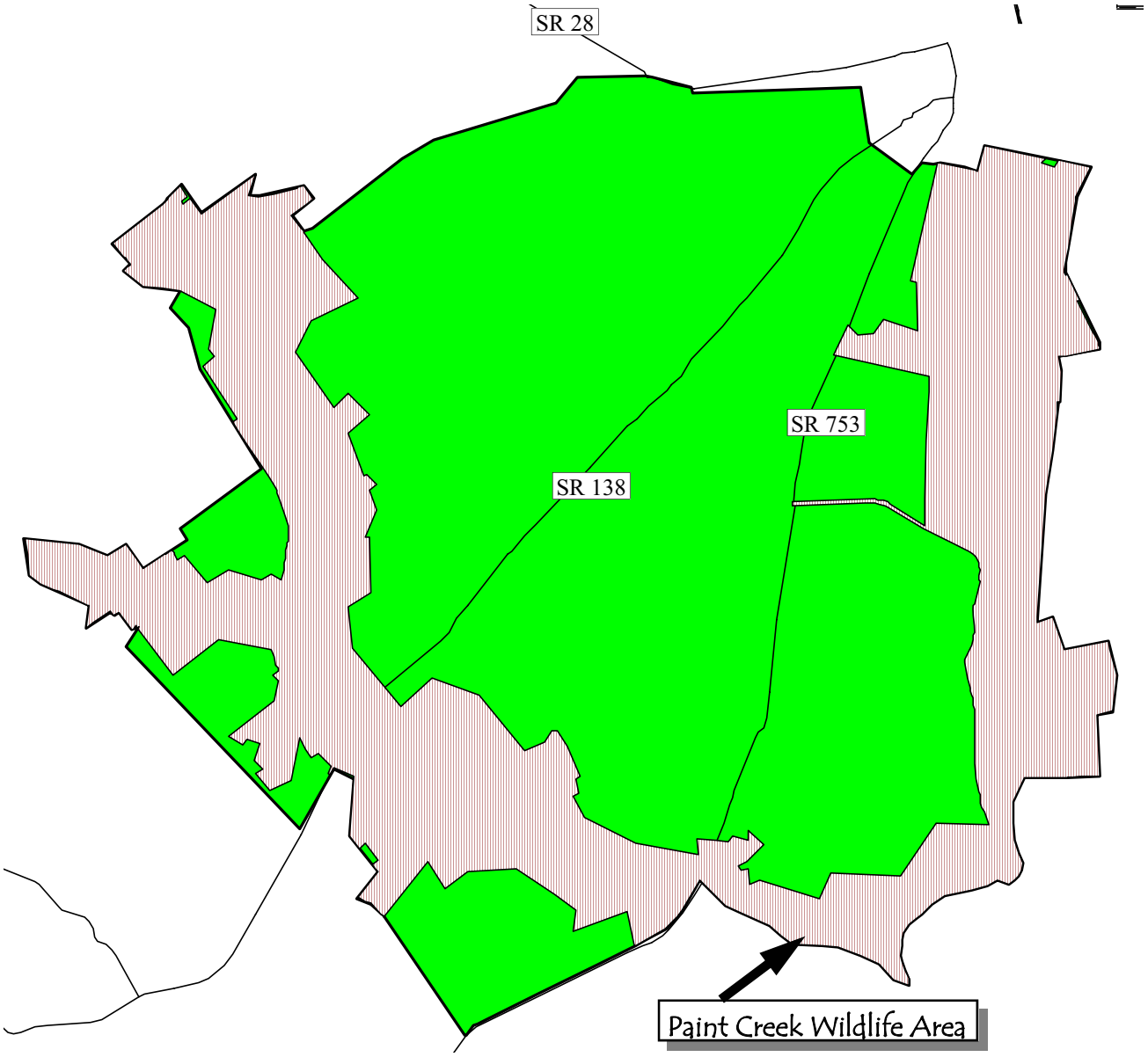
contiguous core area of grassland habitat; however, this is an essential element of this plan. Thus, every effort must be made to create as large a core area as possible to maximize benefits to area-sensitive grassland species. Priority must be given to increasing grassland acreage within the core area as well as to increase the number of grassland fields on Paint Creek Wildlife Area that are a minimum of 250 acres in size. Applicable techniques may include eliminating field dividers, emphasizing shrubby species instead of trees, and reducing total woody acreage. However, riparian corridors will be maintained for Paint Creek, Rattlesnake Creek, Hardin Creek, and other smaller streams. To increase the availability of long-term quality grassland habitat on private lands within the Focus Area, more emphasis should be placed on encouraging landowner enrollment in the Conservation Reserve Program or the Pastures To Prairies Program through increased landowner contact, news releases, media contact, watershed meetings, field days, and financial incentives. Educational efforts and private landowner workshops that address mowing and burning as tools for maintaining quality grassland habitat will be a priority. Finally, to meet the Focus Area goal of 2,500 acres of grassland habitat within the core area, the Division of Wildlife may need to purchase land from willing sellers as it becomes available.

Habitat objectives for all the focus areas were developed based on the best information currently available in terms of species-habitat relationships and the population ecology of associated wildlife species. Assumptions were made so that habitat work could proceed toward meeting plan goals and objectives. Clearly, evaluation and monitoring will be required periodically in each focus area for select species of interest to assess the validity of assumptions made during this planning process and to guide future revisions of these conservation activities. Thus, along with projects designed to attain focus area habitat goals, appropriate surveys and research evaluations need to be developed and implemented to ensure that habitat projects are producing measurable and desirable results for the intended wildlife community.

Species that may require special attention or monitoring are listed in Appendix 1. For the Paint Creek Focus Area, the following species and comments need to be considered as habitat plans are made and reviewed. The least shrew is our only native shrew that requires open grassland habitat. Its presence in the Focus Area should be documented. Barn owls require moist grasslands for foraging and cavities for nesting. An effort should be made to provide nesting structures within the core area and near other moist grasslands and pastures as well as to perform grassland restoration work in low-lying areas with higher soil moisture throughout the Focus Area. A monitoring program for this state endangered owl already exists. Prairie warblers will benefit from some of the habitat components that benefit northern bobwhite and Henslow's sparrows (e.g., relatively tall, dense grasslands with interspersed shrubs or nearby brushy vegetation) within this region of Ohio. Development or maintenance of dense, emergent wetland vegetation and tall, warm-season grasses will likely benefit the sedge wren. Other grassland birds listed will likely show population responses if a diverse grassland landscape is created within the Focus Area.

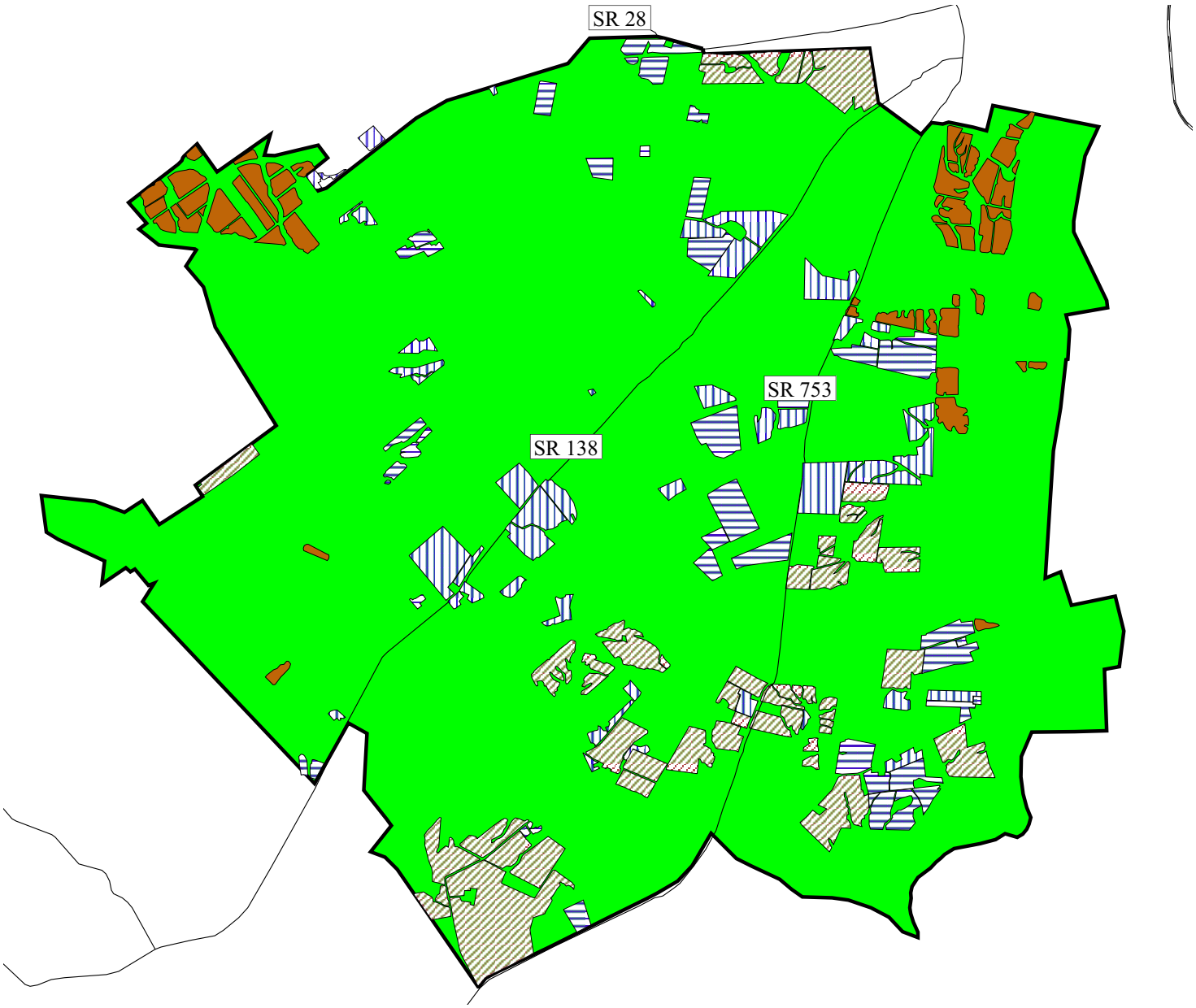
Section 2.3.3.2

Paint Creek Grassland Focus Area Maps



Paint Creek Focus Area	
Paint Creek Wildlife Area	5,187
Private Land	9,970
TOTAL LAND AREA	**15,157**

Figure 1. Paint Creek Focus Area Ownership



Paint Creek Focus Area Grassland Acres	
Paint Creek Wildlife Area	404
CRP	959
Hay	507
Pasture	541
TOTAL LAND AREA	**15,157**

Figure 2. Paint Creek Focus Area Grassland

Section 2.3.3.3

Paint Creek Grassland Focus Area Species Expected to Benefit

Appendix 1 - Species expected to benefit within the Paint Creek Focus Area*	
Common Name	**Scientific Name**
Mammals	
Least Shrew	*Cryptotis parva*
Birds	
Barn Owl	*Tyto alba*
Blue-winged Teal	*Anas discors*
Bobolink	*Dolichonyx oryzivorus*
Dickcissel	*Spiza americana*
Eastern Meadowlark	*Sturnella magna*
Grasshopper Sparrow	*Ammodramus savannarum*
Henslow's Sparrow	*Ammodramus henslowii*
Northern Bobwhite	*Colinus virginianus*
Northern Harrier	*Circus cyaneus*
Prairie Warbler	*Dendroica discolor*
Ring-necked Pheasant	*Phasianus colchicus*
Savannah Sparrow	*Passerculus sandwichensis*
Sedge Wren	*Cistothorus platensis*
Upland Sandpiper	*Bartramia longicauda*
Vesper Sparrow	*Pooecetes gramineus*
*Does not include species with viable populations broadly distributed throughout Ohio	
as identified on the Native & Naturalized Terrestrial Wildlife Species List.	

Section 2.4

Wetland Focus Area Plans

Section 2.4.1

Grand River/Mosquito Creek Wetland Focus Area Tactical Plan

Section 2.4.1.1

Grand River/Mosquito Creek Wetland Focus Area Tactical Plan

Grand River/Mosquito Creek Wetland Focus Area Tactical Plan

Goal: To provide the habitat requirements necessary to maintain and enhance the existing wetland wildlife community within the Grand River/Mosquito Creek Focus Area (GR/MCFA).

Introduction/Background: Located in Trumbull County, the GR/MCFA (Fig. 1) contains significant quantities of some of the highest quality wetland wildlife habitat remaining in the state. The western portion of the Focus Area, consisting primarily of the 6,936-acre Grand River Wildlife Area, is situated at the southern end of the Grand River Lowlands. The "Lowlands" are recognized as a distinct physiographic region that developed from the ancestral lakebed of a finger lake that once stretched from northern Trumbull County through the western half of Ashtabula County. The Grand River itself has been identified as having the highest diversity of fish and mussels of any river of its size in the Lake Erie drainage. Due to the quality and quantity of the wetland habitat in the vicinity, Grand River was selected as the best and first release site for river otters in the state when restoration efforts were initiated in 1986. Purchase of land for the wildlife area began in 1956.

The eastern portion of the Focus Area is comprised primarily of Mosquito Creek Wildlife Area (8,525 acres) which lies within the Ohio River drainage. The Mosquito Creek Reservoir Project was authorized in 1938 to provide flood control and a water supply for industry downstream. Full operation by the U.S. Army Corps of Engineers was initiated in 1944. The state of Ohio, Division of Wildlife, was granted a license by the Secretary of the Army in 1946 for fish and wildlife management on the 5,370 acres of land and water north of State Route 88. The federal land was used as a public hunting area from 1946 to 1962. The state of Ohio established a land acquisition unit adjacent to the federal land in 1956; to date, 6,011 acres have been purchased. A captive Canada goose flock was also initiated in 1956 which has grown to become well established throughout the region.

With establishment of the goose flock, a refuge was created at the north end of the reservoir in 1956. The refuge was expanded in 1962 to include all federal lands north of Township Road 240. As land was acquired by the state it was included in the refuge; some portions are open to limited public hunting and fishing access. Controlled waterfowl hunting was initiated in 1969 and today provides valuable hunting recreation both on the area and in the surrounding countryside.

The primary purposes of the Mosquito Creek Waterfowl Management Area are to maintain nesting habitat for waterfowl and other wetland-dependent wildlife, to provide a resting place for migratory waterfowl, to provide quality public hunting opportunity, and to create an opportunity for bird watchers and others to observe large numbers of waterfowl and numerous other wetland-associated birds.

Approximately 43% of Ohio's human population is located in northeast Ohio with over 3 million people living within 35 miles of the Focus Area. Due to the close proximity of large numbers of people, both wildlife areas sustain heavy public use for hunting, birding and other forms of wildlife-related recreation. Together, the Grand River and Mosquito Creek Wildlife Areas comprise 55% of the 28,229 acre Focus Area. Current habitat conditions within the Focus Area are characterized by numerous beaver swamps, riparian wetlands, bottomland forests and

adjacent agricultural lands. Topography in the area is extremely flat and the soils are poorly drained.

The GR/MCFA is included in two other plans involving the Division of Wildlife. The first is the Grand River Lowlands Tactical Plan. This Plan was prepared to provide direction to the Division to conserve the unique habitat throughout the entire Grand River Lowlands which is a much larger area. The second Plan, the Upper Mississippi River/Great Lakes Joint Venture Plan (UMR/GLJV) was developed to help implement the North American Waterfowl Management Plan. Grand River/Mosquito Creek is also a Focus Area in the UMR/GLJV. The habitat inventories and objectives in the GR/MCFA Plan will be incorporated in the UMR/GLJV Plan during it's next revision (2005). This Plan (GR/MCFA) has been prepared to guide the Wildlife Management and Research Section's efforts to develop and maintain wetland wildlife habitat within the Focus Area over the next 10 years.

One-hundred-twenty-five species have been identified on Ohio's Native and Naturalized Terrestrial Wildlife Species List as having viable, broadly distributed populations around the state (e.g., robins, chipmunks, etc.). They occur as viable populations in most, if not all, of the focus areas. While these species are obviously part of the wildlife communities in the focus areas, it is not critical to meet the habitat objectives in each focus area to ensure these species continued viability. Therefore, habitat guidelines were developed to address the needs of the species in the GR/MCFA with more limited distribution and/or lower population levels. There are 22 species (3 mammals, 16 birds and 2 reptiles and 1 amphibian) in this category found within the Focus Area (See Appendix 1).

Need/Justification: The Division of Wildlife's approach to enhancing and maintaining the highest level of terrestrial wildlife diversity in the state is to use a "focus area" concept to sustain viable populations of as many native species of wildlife as possible. The idea is to concentrate efforts and resources to provide all the necessary habitat requirements in a few, relatively large units of the major habitat types, along with the remnants of several unique habitats, for species that are of limited distribution or have low populations. Several widely separated focus areas for each of the major habitat types (forestland, grassland and wetland) have been selected to reduce the risk of extirpation of species from natural disaster, disease outbreak, etc. Typically focus areas are associated with relatively large holdings of public land where future land use practices can be managed. In addition, they were selected because they contain the largest amount of the best remaining habitat of that type currently available.

While methodology to calculate minimum size requirements for a wetland focus area is not available in the literature, it is felt that in Ohio 4,500 acres of non-forested, wetland habitat in association with 500 acres of forested wetland habitat would support a viable population (at least 200 breeding pairs) of all but the most area-sensitive wildlife species (bald eagles and trumpeter swans). The Bird Conservation Area approach put forth by Partners in Flight and others would require that 40% of a wetland focus area be comprised of wetland habitat. Therefore, a wetland focus area in Ohio needs to have at least 4,500 acres of non-forested wetlands and 500 acres of forested wetlands within a total area of 12,500 acres or less. To calculate minimum wetland habitat quantity needed in focus areas larger than 12,500 acres, one simply needs to multiply the

total size of the focus area by 0.4 (40%). Ninety percent of that product would be the amount of non-forested wetlands required and 10% would be the amount of forested wetlands needed. Thus, within the Grand River/Mosquito Creek Focus Area a minimum of 11,292 (28,229 X 0.4) total acres of wetland habitat is needed of which at least 10,163 (11,292 X 0.9) acres should be non-forested and at least 1,129 (11,292 X 0.1) acres should be forested. It is also important to note that a mix of hemi-marsh, moist soil units and deep water marsh should be maintained in the non-forested wetlands to insure the requirements for all species are met. Managers should strive to provide no less than 20% or no more than 40% of the non-forested wetlands in each of these three wetland types.

Based on the best, currently available information the above approach would sustain viable populations of all of Ohio's wetland wildlife species with two exceptions - bald eagles and trumpeter swans. It was calculated that trumpeter swans would need a minimum of 50,000 acres of wetland habitat (200 pairs X 250 acres/pair) to sustain a viable population and, based on recent nesting pair densities in the Lake Erie Marshes, bald eagles would require a focus area hundreds of thousands of acres in size to sustain 200 breeding pairs. Since this would increase the size of wetland focus areas far beyond the resources available to meet the minimum habitat requirements for these species and since Ohio's bald eagle and trumpeter swan populations are clearly on the rise with substantial, suitable unoccupied habitat still available within the state, it has been determined not to base wetland focus area size on the needs of these species. It should also be noted that while there is a reasonable likelihood that populations of species listed in Appendix 1 for this Focus Area will be viable if planned habitat management and restoration efforts are completed in a timely manner, not all species have the same probability of reaching viable levels because their populations may be impacted by factors other than habitat conditions on the Focus Area (e.g., location of Focus Area to species geographic range or habitat quality and availability on migratory routes and wintering areas).

The Grand River/Mosquito Creek Focus Area was chosen because the two wildlife areas comprise 55% of the tract. In addition, nearly 13,000 acres of wetland habitat (Fig. 2) and stable populations of many of Ohio's wetland-dependent wildlife species are already in place within the Focus Area. It's one of the highest quality and largest examples of a wetland wildlife community remaining within the state. It should also be noted that the Grand River/Mosquito Creek Focus Area is a significant staging site for migrating Southern James Bay Population Canada geese. In recent years this population has suffered substantial declines. Finally, as noted earlier, there is a large human population in close proximity to this Focus Area. Improvements to the habitat with resultant increases in wildlife populations will have the added benefit of helping to meet the growing demand for wildlife-related recreational opportunities in the area.

Objective: To establish and maintain quality wetland habitat that will support viable populations of the 22 species listed in Appendix 1 of this Plan in addition to the numerous species with viable, broadly distributed populations also found within the Focus Area.

Approach: More than the minimum necessary amount of forested wetlands already occurs in the Focus Area (1,129 acres needed; 8,426 acres existing). Preservation of these bottomland, forested wetlands will be encouraged where appropriate due to their historical significance to the

wildlife populations of this region. Conversely, a substantial amount (5,855) of non-forested wetlands are needed to meet the minimum desired habitat objective. Since loss of any existing wetlands will cause this figure to increase, initial efforts will be directed at protecting as much of the existing non-forested wetland habitat on private lands as possible. Emphasis will be placed within the Focus Area to provide educational and technical assistance to private landowners on the values of wetland stewardship and protection (W3PM05). Additional non-forested wetland development will also be emphasized to create, restore, or enhance private land within the Focus Area utilizing the Division's wetland cost share program (W3PM06) and various federal programs (CRP, WRP, etc.) where applicable.

Water level management capabilities do exist within several diked marshes on Grand River and Mosquito Creek Wildlife Areas. These areas are manipulated by seasonal drawdowns and reflooding to promote moist-soil and emergent plants for waterfowl food and brood cover, mudflats for shorebird migrations, and optimum hunting opportunities for the public.

Development, creation, or enhancement of additional, diked wetlands is also needed on public lands to meet the requirement for additional non-forested wetlands within the Focus Area. Suitable sites will be inventoried and developed where possible on both wildlife areas (W3PM01). Mitigation may serve to restore or create non-forested wetlands on public or private lands. Opportunities to utilize mitigants for this purpose will be welcomed and encouraged through contacts with the US Army Crops of Engineers, private environmental consultants, the mitigants themselves, or the public.

The Eastern massasauga rattlesnake was designated as state endangered in 1996 and as a federal candidate species in 1999. In the early 1800s, records indicate the snake's range included suitable wetland and grassland habitat in 31 counties. Today the snake's range has decreased substantially with the best-known populations occupying wildlife areas. It is believed that a significant population occurs within the GR/MCFA. Efforts to document the current distribution of the snake and integrate management measures consistent with the USFWS "The Eastern Massasauga Rattlesnake: A Handbook for Land Managers 2000" will ensure a viable population occurs within the Focus Area.

Habitat objectives for all the focus areas were developed based on the best information currently available in terms of species-habitat relationships and the population ecology of associated wildlife species. Assumptions were made so that habitat work could proceed toward meeting plan goals and objectives. Clearly, evaluation and monitoring will be required periodically in each focus area for select species of interest to assess the validity of assumptions made during this planning process and to guide future revisions of these conservation activities. Thus, along with projects designed to attain focus area habitat goals, appropriate surveys and research evaluations need to be developed and implemented to ensure that habitat projects are producing measurable and desirable results for the intended wildlife community.

Section 2.4.1.2

Grand River/Mosquito Creek Wetland Focus Area Maps

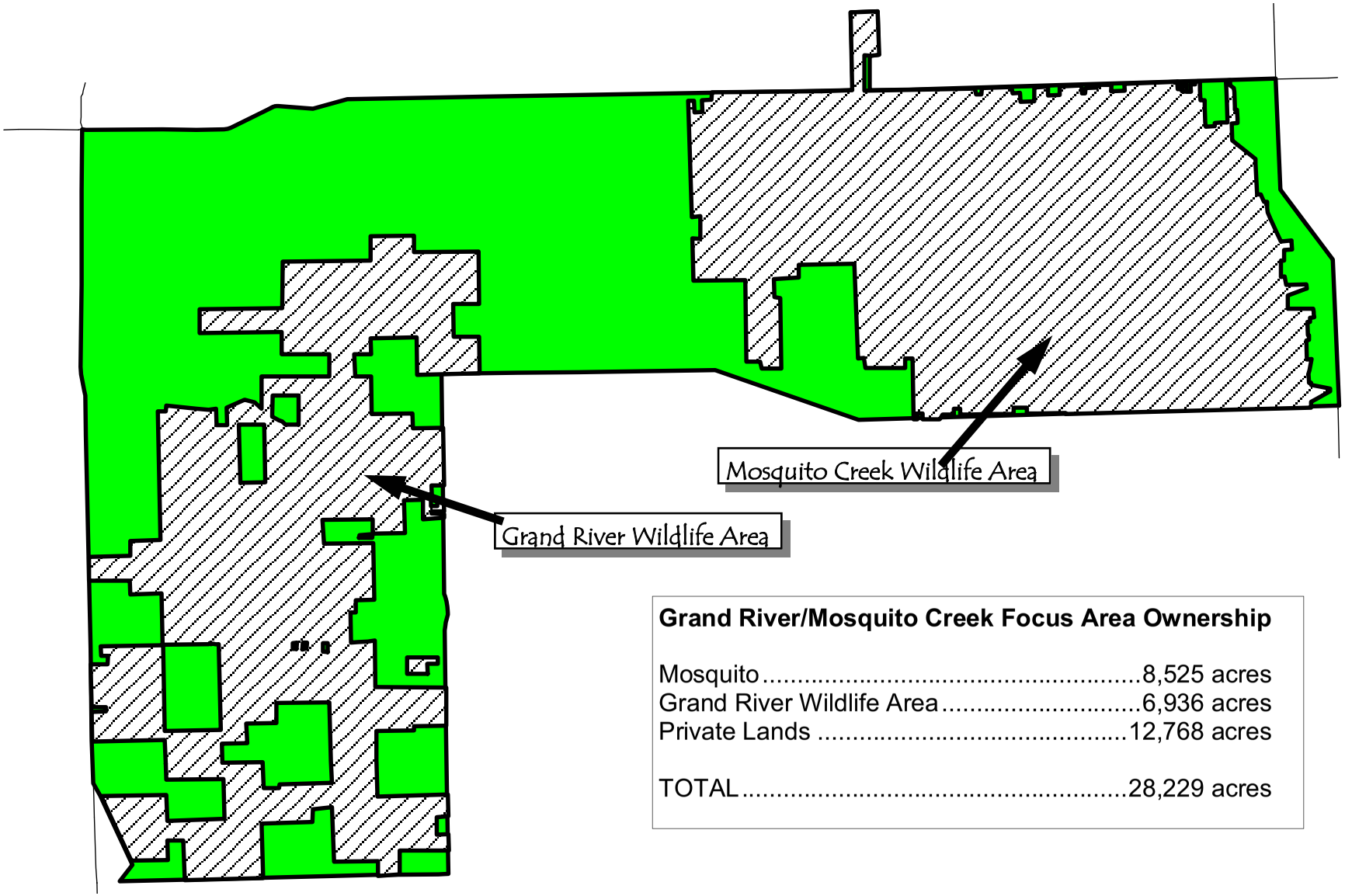
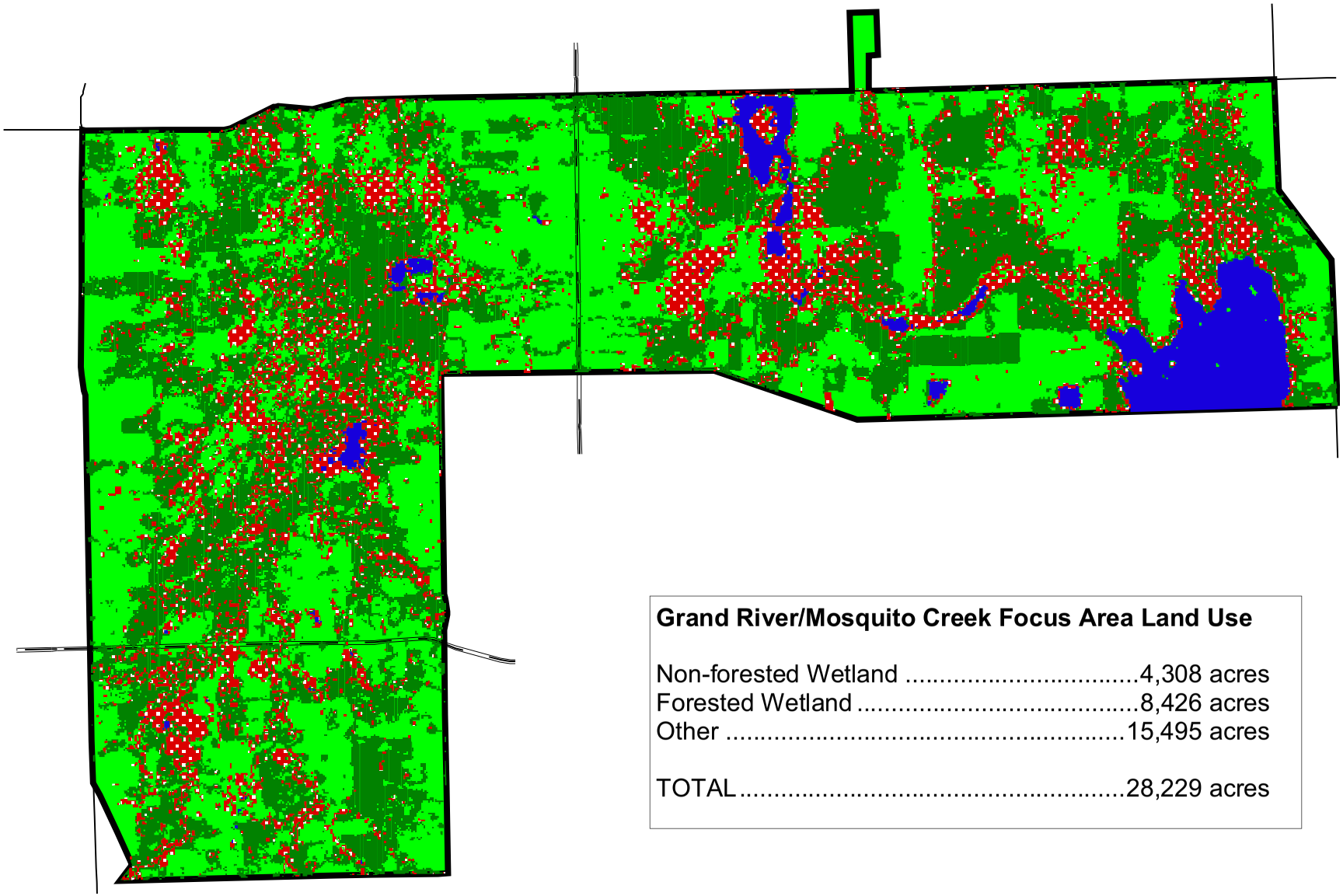


Figure 1. Grand River/Mosquito Creek Focus Area Ownership



Grand River/Mosquito Creek Focus Area Land Use

Non-forested Wetland	4,308 acres
Forested Wetland	8,426 acres
Other	15,495 acres
TOTAL	28,229 acres

Figure 2. Grand River/Mosquito Creek Focus Area Land Use

Section 2.4.1.3

Grand River/Mosquito Creek Wetland Focus Area Species Expected to Benefit

Appendix 1 - Species expected to benefit within the Grand River/Mosquito Creek Focus Area*	
Common Name	**Scientific Name**
Mammals	
Ermine	*Mustela erminea*
River Otter	*Lutra canadensis*
Star-nosed Mole	*Condylura cristata*
Birds	
American Bittern	*Botaurus lentiginosus*
Blue-winged Teal	*Anas discors*
Common Moorhen	*Gallinula chloropus*
Great Blue Heron	*Ardea herodias*
Green-backed Heron	*Butorides striatus*
Herring Gull	*Larus argentatus*
Hooded Merganser	*Lophodytes cucullatus*
Least Bittern	*Ixobrychus exilis*
Marsh Wren	*Cistothorus palustris*
Pied-billed Grebe	*Podilymbus podicees*
Prothonotary Warbler	*Protonotaria citrea*
Sora Rail	*Porzana carolina*
Spotted Sandpiper	*Actitis macularia*
Swamp Sparrow	*Melospiza georgiana*
Virginia Rail	*Rallus limicola*
Wood Duck	*Aix sponsa*
Reptiles & Amphibians	
Eastern Massasauga	*Sistrurus catenatus catenatus*
Four-toed Salamander	*Hemidactylium scutatum*
Northern Ribbon Snake	*Thamnophis sauritus septentrionalis*
*Does not include species with viable populations broadly distributed throughout Ohio	
as identified on the Native & Naturalized Terrestrial Wildlife Species List.	

Section 2.4.2

Killbuck Wetland Focus Area Tactical Plan

Section 2.4.2.1

Killbuck Wetland Focus Area Tactical Plan

Killbuck Wetland Focus Area Tactical Plan

Goal: To provide the habitat requirements necessary to maintain and enhance the existing wetland wildlife community within the Killbuck Focus Area.

Introduction/Background: The Killbuck Focus Area (Fig. 1) in east-central 0hio covers 14,700 acres of the Killbuck Creek valley through portions of Wayne, Holmes, and Coshocton counties. It contains diverse and significant riparian wetland wildlife communities. Killbuck Creek is the central natural feature influencing the Focus Area. In excess of 40 miles of Killbuck Creek are contained in the Focus Area. In the 12 miles between Wooster and Holmesville, there is only 10 feet of drop in elevation. This low stream gradient results in many acres of productive, emergent wetlands adjacent to the creek. Despite early attempts to channelize this stretch of Killbuck Creek (ending in 1921), large fluctuations in water depth occur during annual flood events. The town of Millersburg lies between the two halves of the Focus Area (2.4 stream miles) in a location where past channelization and a narrower valley floor result in little remaining wetland habitat. However, south of Millersburg to the confluence of the Killbuck with the Walhonding River in Coshocton County, the stream gradient and wetland habitat are similar in nature to the northern portion of the Focus Area and contain extensive wetlands.

The Killbuck Marsh Wildlife Area lies in Wooster, Clinton and Franklin Townships in south central Wayne County and Prairie Township in north central Holmes County. This 5,512 acre wetland complex is composed of a wide variety of habitats, including seasonally flooded bottomland hardwoods, shrub-scrub swamps, emergent marshes, shallow ponds with submergent vegetation, and wet meadows. It represents the largest remaining inland marsh in Ohio. Restoration of diked wetlands such as the Wright Marsh (350 acres in 1990) and the Moore Marsh (50 acres in 1991) have added to the diversity of habitats through increased management capability. Presently 5,641 acres of Division of Wildlife-owned lands (38%) are located in the Focus Area, 5,512 at Killbuck Marsh Wildlife Area and an additional 129 acres were recently purchased in Killbuck Township of Holmes County (Fig. 1).

Inland wetlands like those in the Killbuck Focus Area are important spring and fall staging areas for thousands of waterfowl during migration. As many as 23 species of ducks have been identified using the area. Shorebirds, a variety of other wildlife and endangered species also depend heavily on these inland wetlands.

The first recorded Ohio nesting attempt of the state endangered sandhill crane in more than 60 years was documented nearby at Funk Bottoms Wildlife Area in 1988. Sandhills now nest annually at both the Killbuck and Funk Bottoms Wildlife Areas. The first recorded nesting of bald eagles in the Killbuck Marsh Wildlife Area occurred in 2000. In 1991, Killbuck Marsh Wildlife Area was the site for a successful reintroduction of river otters which have since expanded into adjoining watersheds. Trumpeter swans were released in the Killbuck marshes in 1997 to re-establish this endangered species and two nesting attempts were documented in 2000. Additionally, the eastern massasauga rattlesnake, currently a candidate species for federal endangered status, is known to occur in the Killbuck Valley.
The Killbuck Focus Area is presently included in another plan involving the Division of Wildlife. The Upper Mississippi River/Great Lakes Joint Venture Plan (UMR/GLJV) was

developed to help implement the goals of the North American Waterfowl Management Plan. The "Killbuck Valley Focus Area" was identified within the UMR/GLJV Plan as an area of important wetland value and management priority. The next revision of the UMR/GLJV Plan (2005) will incorporate the habitat inventories and objectives of this Killbuck Focus Area Tactical Plan.

One-hundred-twenty-five species have been identified on Ohio's Native and Naturalized Terrestrial Wildlife Species List as having viable, broadly distributed populations around the state (e.g. robins, chipmunks, etc.). They occur as viable populations in most, if not all, of the focus areas. While these species are obviously part of the wildlife communities in the focus areas, it is not critical to meet the habitat objectives in each focus area to ensure these species continued viability. Therefore, habitat guidelines were developed to address the needs of the species in the Killbuck Focus Area with more limited distribution and/or lower population levels. There are 24 species (3 mammals, 17 birds, and 3 reptiles and 1 amphibian) in this category found in the Focus Area (See Appendix 1).

Need/Justification: The Division of Wildlife's approach to enhancing and maintaining the highest level of terrestrial wildlife diversity in the state is to use a "focus area" concept to sustain viable populations of as many native species of wildlife as possible. The idea is to concentrate efforts and resources to provide all the necessary habitat requirements in a few, relatively large units of the major habitat types, along with the remnants of several unique habitats, for species that are of limited distribution or have low populations. Several widely separated focus areas for each of the major habitat types (forestland, grassland and wetland) have been selected to reduce the risk of extirpation of species from natural disaster, disease outbreak, etc. Typically focus areas are associated with relatively large holdings of public land where future land use practices can be managed. In addition, they were selected because they contain they largest amount of the best remaining habitat of that type currently available.

While methodology to calculate minimum size requirements for a wetland focus area is not available in the literature, it is felt that in Ohio 4,500 acres of non-forested wetland habitat in association with 500 acres of forested wetland habitat would support a viable population (at least 200 breeding pairs) of all but the most area-sensitive wildlife species (bald eagles and trumpeter swans). The Bird Conservation Area approach put forth by Partners in Flight and others would require that 40% of a wetland focus area be comprised of wetland habitat. Therefore, a wetland focus area in Ohio needs to have at least 4,500 acres of non-forested wetlands and 500 acres of forested wetlands within a total area of 12,500 acres or less. To calculate minimum wetland habitat requirements in focus areas larger than 12,500 acres, one simply needs to multiply the total size of the focus area by 0.4 (40%). Ninety percent of that product would be the amount of non-forested wetlands required and 10% would be the amount of forested wetlands needed. Thus, within the Killbuck Focus Area, a minimum of 5,880 (14,700 X 0.4) total acres of wetland habitat is needed of which at least 5,292 (5,880 X 0.9) acres should be non-forested and at least 588 (5,880 X 0.1) acres should be forested. It is also important to note that a mix of hemi-marsh, moist soil units, and deep-water marsh should be maintained in the non-forested wetlands to insure the requirements for all species are met. Managers should strive to provide no less than 20% or no more than 40% of the non-forested wetlands in each of these three wetland types.

Based on the best, currently available information the above approach would sustain viable populations of all of Ohio's wetland wildlife species with two exceptions – bald eagles and

trumpeter swans. It was calculated that trumpeter swans would need a minimum of 50,000 acres of wetland habitat (200 pairs X 250 acres/pair) to sustain a viable population and, based on recent nesting pair densities in the Lake Erie Marshes, bald eagles would require a focus area hundreds of thousands of acres in size to sustain 200 breeding pairs. Since this would increase the size of wetland focus areas far beyond the resources available to meet the minimum habitat requirements for these species and since Ohio's bald eagle and trumpeter swan populations are clearly on the rise with substantial, suitable unoccupied habitat still available within the state, it has been determined not to base wetland focus area size on the needs of these species. It should also be noted that while there is a reasonable likelihood that populations of species listed in Appendix 1 for this focus area will be viable if planned habitat management and restoration efforts are completed in a timely manner, not all species have the same probability of reaching viable levels because their populations may be impacted by factors other than habitat conditions on the focus area (e.g. location of focus area to species geographic range or habitat quality and availability on migratory routes and wintering areas).

Active peat and sand/gravel mining operations in the vicinity along with residential encroachment and agricultural runoff threaten the quality of the wetlands within the Focus Area. Thus the current threat to both the remaining and restorable wetlands is high. Wetland habitat protection, restoration and enhancement efforts in the Focus Area will provide additional benefits to those already mentioned. Ground water recharge, water filtration, nutrient utilization and flood and erosion controls are but a few.

The Killbuck Focus Area was chosen due to the significant amount of protected, quality wetland habitat that already exists (Fig. 2) as well as many acres that can be restored to wetlands, and for the diversity of wetland-dependent wildlife currently occurring there including several state endangered species.

Objective: To establish and maintain quality wetland habitat that will support viable populations of the 24 species listed in Appendix 1 of this Plan in addition to the numerous species with viable, broadly distributed populations also found within the Focus Area.

Approach: Preliminary focus area figures indicate that we are very close to the required 5880 acres of wetland habitat with total non-forested at 3457 and forested at 2372 for a total of 5829 acres of wetland habitat currently available (Fig. 2). Unfortunately, there is much more variability in terms of the recommended combination of wetland types. Nearly 1840 acres of non-forested wetlands will need to be developed to approximate recommended quantities. Forested wetlands exceed recommendations by nearly 1800 acres. Preservation of the bottomland forested wetlands will be encouraged where appropriate due to their historical significance to wildlife in the region.

Riverine wetlands in association with Killbuck Creek, Shreve Creek, and other small tributaries in the wildlife area make up the bulk of the emergent and open-water wetland acreage there. These areas are normally controlled by seasonal inundations of these watercourses, beaver activity or logjam formation. Water level management options within these wetlands are limited. However, other forms of wetland management are possible such as monitoring and herbicide treatment of invasive plants like phragmites, spatterdock, or purple loosestrife.

Water level management capabilities do exist within several diked marshes on the Killbuck

Wildlife Area. These areas are manipulated by seasonal drawdowns and reflooding to promote moist-soil & emergent plants for waterfowl food and brood cover, mudflats for shorebird migrations, and optimum hunting opportunities for the public.

Development, creation, or enhancement of additional, diked wetlands is needed to meet the requirement for additional non-forested wetlands within the Focus Area. Suitable sites will be inventoried and developed where possible on the wildlife areas (W3PM01). Mitigation may serve to restore or create non-forested wetlands on public or private lands. Opportunities to utilize mitigants for this purpose will be welcomed and encouraged through contacts with the US Army Corps of Engineers, private environmental consultants, the mitigants themselves, or the public.

The majority of the Focus Area is privately owned (9,059 acres or 62%). Riverine wetlands similar to those on the wildlife area also dominate private property. Protection of these wetlands through acquisition may be an option but only where willing sellers of suitable parcels exist. Instead, emphasis will be placed within the Focus Area at providing educational and technical assistance to private landowners on the values of wetland stewardship and protection (W3PM05). Additional non-forested wetland development will also be emphasized to create, restore, or enhance private land acreage within the focus area utilizing the Division's wetland cost share program and various federal programs (CRP, WRP, etc.) where applicable (W3PM06).

The Eastern massasauga rattlesnake was designated as state endangered in 1996 and as a federal candidate species in 1999. In the early 1800s, records indicate the snake's range included suitable wetland and grassland habitat in 31 counties. Today the snake's range has decreased substantially with the best-known populations occupying several wildlife areas. Suitable habitat for the snake currently exists within the Killbuck Marsh Focus Area. However, their range within the Focus Area has not been adequately surveyed. Efforts to document the current distribution of the snake and integrate management measures consistent with the USFWS "The Eastern Massasauga Rattlesnake: A Handbook for Land Managers 2000" will ensure a viable population occurs within the Focus Area.

Habitat objectives for all the focus areas were developed based on the best information currently available in terms of species-habitat relationships and the population ecology of associated wildlife species. Assumptions were made so that habitat work could proceed toward meeting plan goals and objectives. Clearly, evaluation and monitoring will be required periodically in each focus area for select species of interest to assess the validity of assumptions made during this planning process and to guide future revisions of these conservation activities. Thus, along with projects designed to attain focus area habitat goals, appropriate surveys and research evaluations need to be developed and implemented to ensure that habitat projects are producing measurable and desirable results for the intended wildlife community.

Section 2.4.2.2

Killbuck Wetland Focus Area Maps

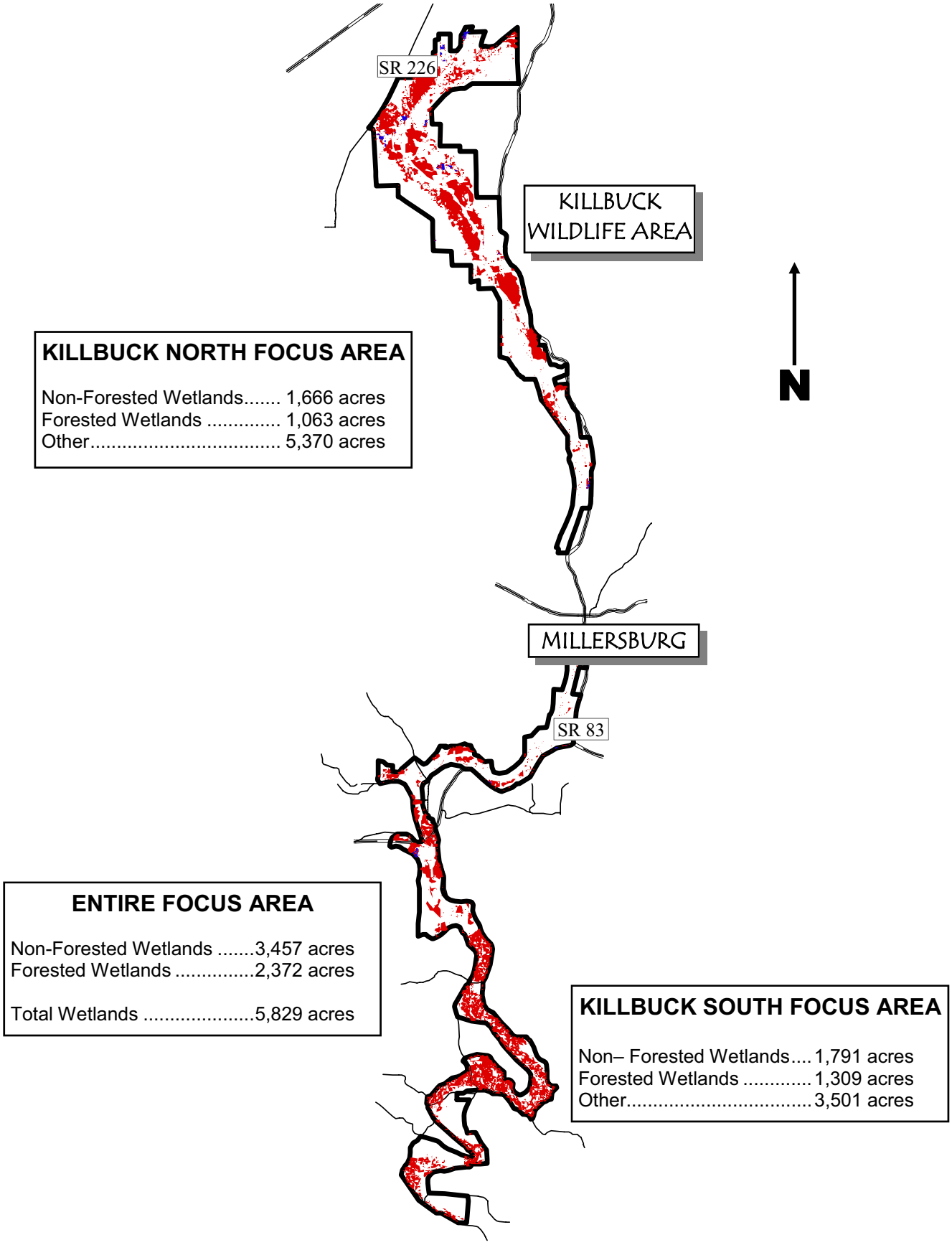


Figure 2. Killbuck Focus Area Wetland Habitats

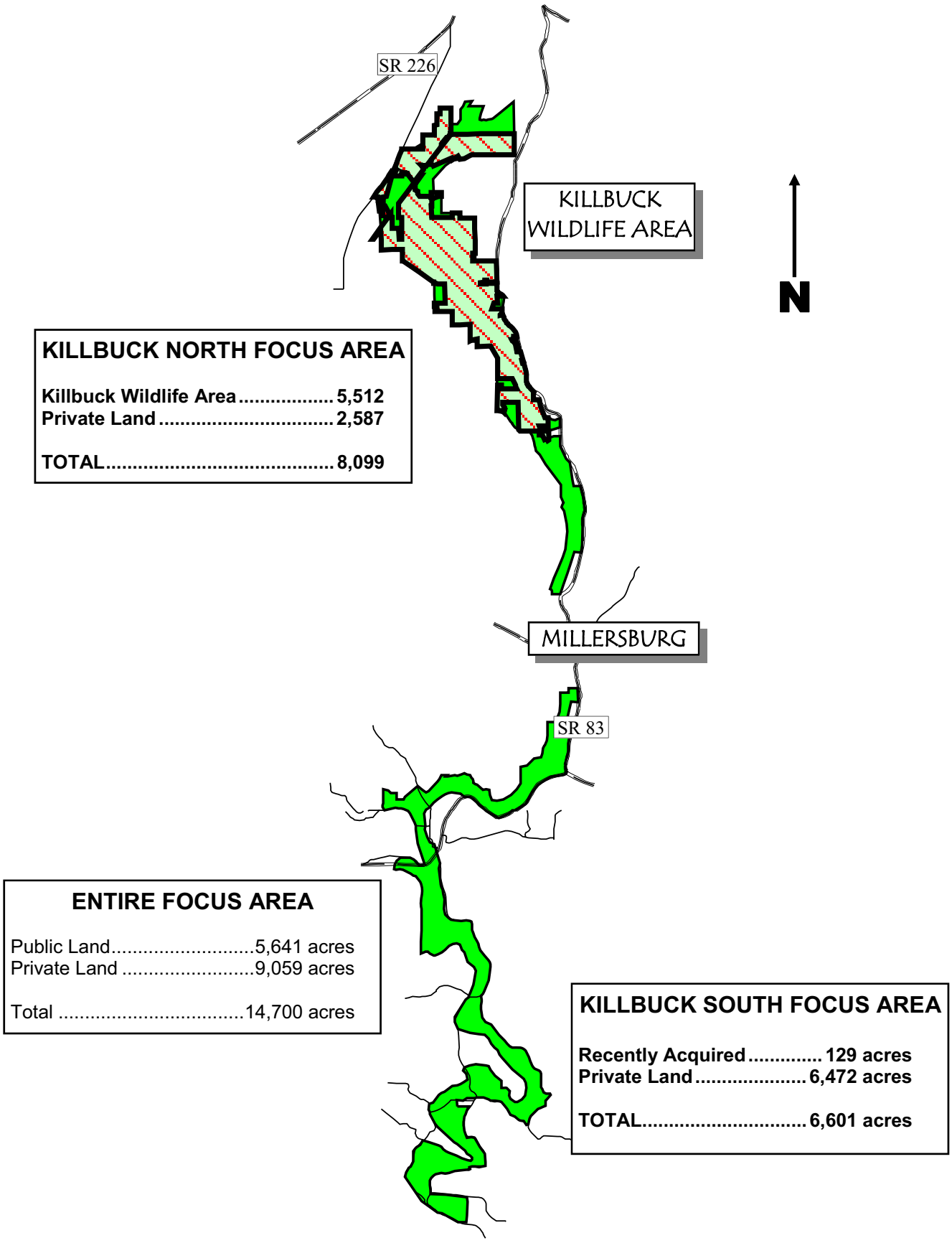


Figure 1. Killbuck Focus Area Ownership

Section 2.4.2.3

Killbuck Wetland Focus Area Species Expected to Benefit

Appendix 1 - Species expected to benefit within the Killbuck Focus Area*	
Common Name	**Scientific Name**
Mammals	
River Otter	*Lutra canadensis*
Southern Bog Lemming	*Synaptomys cooperi*
Star-nosed Mole	*Condylura cristata*
Birds	
American Black Duck	*Anas rubripes*
American Coot	*Fulica americana*
Bald Eagle	*Haliaeetus leucocephalus*
Blue-winged Teal	*Anas discors*
Common Moorhen	*Gallinula chloropus*
Great Blue Heron	*Ardea herodias*
Green-backed Heron	*Butorides striatus*
Hooded Merganser	*Lophodytes cucullatus*
Least Bittern	*Ixobrychus exilis*
Marsh Wren	*Cistothorus palustris*
Prothonotary Warbler	*Protonotaria citrea*
Sora Rail	*Porzana carolina*
Spotted Sandpiper	*Actitis macularia*
Swamp Sparrow	*Melospiza georgiana*
Trumpeter Swan	*Cygnus columbianus*
Virginia Rail	*Rallus limicola*
Wood Duck	*Aix sponsa*
Reptiles & Amphibians	
Blanding's Turtle	*Emydoidea blandingii*
Four-toed Salamander	*Hemidactylium scutatum*
Kirtland's Snake	*Clonophis kirtlandii*
Northern Ribbon Snake	*Thamnophis sauritus septentrionalis*
*Does not include species with viable populations broadly distributed throughout Ohio	
as identified on the Native & Naturalized Terrestrial Wildlife Species List.	

Section 2.4.3

Lake Erie Marshes Wetland Focus Area Tactical Plan

Section 2.4.3.1

Lake Erie Marshes Wetland Focus Area Tactical Plan

Lake Erie Marshes Wetland Focus Area Tactical Plan

Goal: To provide the habitat requirements necessary to maintain and enhance the existing wetland wildlife community within the Lake Erie Marshes Focus Area.

Introduction/Background: The Lake Erie Marshes Focus Area lies along the Western Basin of Lake Erie. It stretches from the eastern edge of Maumee Bay along the Lake Erie shoreline and ends just west of the City of Sandusky in Sandusky Bay (Fig. 1). Traditionally known as a portion of the Great Black Swamp, the Lake Erie Marsh Region once comprised 300,000 acres from Sandusky to Detroit. This vast system was composed of coastal wetlands, riverine marshes, wet prairies, hardwood swamps and oak savanna. In one generation, the Black Swamp was almost completely drained for agriculture and industry. Today only ten percent of the original wetlands remain, mostly in state and federal control or in private hunting clubs.

The Lake Erie Marshes are especially important to certain groups of birds including waterfowl, neotropical migrant songbirds (such as warblers and thrushes that nest in North America and winter in Mexico, the Caribbean and Central and South America), raptors, bald eagles, shorebirds and colonial-nesting wading birds such as herons.

The region is an important staging area for migrant songbirds as they rest up for the passage around or over Lake Erie in the spring. Lake Erie represents the largest barrier to many of these species after they cross the Gulf of Mexico. The abundance and variety of insect prey available in the marshes and adjacent habitats permit these birds to refuel for their continued migration. It is currently believed that the western Lake Erie shoreline has one of the most dramatic buildups of neotropical migrants in North America during spring migration.

The Lake Erie marshes are at the crossroads of the Mississippi and Atlantic flyways, and they annually attract hundreds of thousands of migrating waterfowl. The Lake Erie marshes are also the most important migration staging area for black ducks on the continent. Surveys indicate that approximately 70 percent of the black ducks on the Mississippi flyway are concentrated in these wetlands during fall migration. This high concentration represents nearly 17 percent of all black ducks tallied nationwide. Waterfowl species that nest in the area are mainly mallard, blue-winged teal, wood duck and Canada goose.

The Lake Erie Marshes are situated in a rapidly developing area of the Great Lakes. Explosive development in the form of marinas, condominiums, and support industry continues to occur. Many small wetlands have succumbed to this development, and larger marsh complexes have been encroached upon. The area is also heavily farmed, with many wetlands converted to agriculture prior to protection. The current threat to remaining and restorable wetlands is high.

Twelve tracts in federal or state ownership are located in the Focus Area. Four of these are part of the National Wildlife Refuge system, and total 8,239 acres. Eight Division of Wildlife-owned properties (9,442 acres) are scattered throughout the Focus Area. Combined, these public holdings represent 28 percent of the acreage in the designated Focus Area (Fig. 2). Wetlands of the Lower Great Lakes are one of six original continental areas designated as a "*priority habitat range*" in the North American Waterfowl Management Plan, NAWMP. The Lake Erie Marsh region was selected as a high priority Flagship Project site under the Lower Great Lakes/St. Lawrence Basin Joint Venture with a goal of providing at least 17,540 additional acres of high quality wetland

habitat in the region (1991). Wetland habitat protection and enhancement are the two *Objectives* identified in the Joint Venture Plan to attain the *Goal*. Acquisition, legislation, education, cooperative agreements, research, and habitat strategies on public and private lands are the key components necessary to accomplish the plan's *Objectives*.

One-hundred-twenty-five species have been identified on Ohio's Native and Naturalized Terrestrial Wildlife Species List as having viable, broadly distributed populations around the state (e.g., robins, chipmunks, etc.). They occur as viable populations in most, if not all, of the focus areas. While these species are obviously part of the wildlife communities in the focus areas, it is not critical to meet the habitat objectives in each focus area to ensure these species' continued viability. Therefore, habitat guidelines were developed to address the needs of the species in the Lake Erie Marshes Focus Area with more limited distribution and/or lower population levels. There are 30 species (2 mammals, 23 birds and 3 reptiles and 2 invertebrates) in this category found within the Focus Area (See Appendix 1).

Need/Justification: The Division of Wildlife's approach to enhancing and maintaining the highest level of terrestrial wildlife diversity in the state is to use a "focus area" concept to sustain viable populations of as many native species of wildlife as possible. The idea is to concentrate efforts and resources to provide all the necessary habitat requirements in a few, relatively large units of the major habitat types, along with the remnants of several unique habitats, for species that are of limited distribution or have low populations. Several widely separated focus areas for each of the major habitat types (forestland, grassland and wetland) have been selected to reduce the risk of extirpation of species from natural disaster, disease outbreak, etc. Typically, focus areas are associated with relatively large holdings of public land where future land use practices can be managed. In addition, they were selected because they contain the largest amount of the best remaining habitat of that type currently available.

While methodology to calculate minimum size requirements for a wetland focus area is not available in the literature, it is felt that in Ohio 4,500 acres of non-forested, wetland habitat in association with 500 acres of forested wetland habitat would support a viable population (at least 200 breeding pairs) of all but the most area-sensitive wildlife species (bald eagles and trumpeter swans). The Bird Conservation Area approach put forth by Partners in Flight and others would require that 40% of a wetland focus area be comprised of wetland habitat. Therefore, a wetland focus area in Ohio needs to have at least 4,500 acres of non-forested wetlands and 500 acres of forested wetlands within a total area of 12,500 acres or less. To calculate minimum wetland habitat quantity needed in focus areas larger than 12,500 acres, one simply needs to multiply the total size of the focus area by 0.4 (40%). Ninety percent of that product would be the amount of non-forested wetlands required and 10% would be the amount of forested wetlands needed. Thus, within the Lake Erie Marshes Focus Area a minimum of 24,110 (60,276 X 0.4) total acres of wetland habitat is needed of which at least 21,700 (24,840 X 0.9) acres should be non-forested and at least 2,411 (24,110 X 0.1) acres should be forested. It is also important to note that a mix of hemi-marsh, moist soil units and deep water marsh should be maintained in the non-forested wetlands to insure the requirements for all species are met. Managers should strive to provide no less than 20% or no more than 40% of the non-forested wetlands in each of these three wetland types.

Based on the best, currently available information the above approach would sustain viable

populations of all of Ohio's wetland wildlife species with two exceptions - bald eagles and trumpeter swans. Trumpeter swans would need a minimum of 50,000 acres of wetland habitat (200 pairs X 250 acres/pair) to sustain a viable population and, based on recent nesting pair densities in the Lake Erie Marshes, bald eagles would require a focus area hundreds of thousands of acres in size to sustain 200 breeding pairs. Since this would increase the size of wetland focus areas far beyond the resources available to meet the minimum habitat requirements for these species and since Ohio's bald eagle and trumpeter swan populations are clearly on the rise with substantial, suitable unoccupied habitat still available within the state, it has been determined not to base wetland focus area size on the needs of these species. It should also be noted that while there is a reasonable likelihood that populations of species listed in Appendix 1 for this Focus Area will be viable if planned habitat management and restoration efforts are completed in a timely manner, not all species have the same probability of reaching viable levels because their populations may be impacted by factors other than habitat conditions on the Focus Area (e.g., location of Focus Area to species geographic range or habitat quality and availability on migratory routes and wintering areas).

The Lake Erie Marshes Focus Area was chosen for many important reasons:

- GIS mapping indicates that over 15,000 acres of non-forested wetland and open water habitats (riverine – estuary, etc.) still exist (Fig. 1).

- Within the region, 17,600+ acres of publicly owned lands are under USFWS or DOW management control.

- Three additional large wetland complexes are owned by private duck hunting clubs (10,200 acres).

- Area wetlands provide important migration and staging areas for waterfowl, shorebirds, raptors and songbirds.

- Marshes bordering Lake Erie are important for nesting and wintering bald eagles and many other wetland-dependent species (Appendix 1).

- Wetlands in the Lake Erie marshes provide a large amount of public recreation including waterfowl hunting, furbearer harvest, wildlife observation, fishing, photography, etc.

- Lake Erie wetlands provide benefits to ground water recharge, water filtration, nutrient utilization, and flood and erosion control.

Objective: To establish and maintain quality wetland habitat that will support viable populations of the 30 species listed in Appendix 1 of this Plan in addition to the numerous species with viable,

broadly distributed populations also found within the Focus Area.

Approach: Nearly 7,000 acres of additional non-forested wetland habitat needs to be developed to meet the minimum habitat requirements for the unit. Two major wildlife areas(Magee Marsh, 2,000 acres; Pickerel Creek 1,300 acres) located in the Focus Area are managed specifically for wetland wildlife habitat. Metzger Marsh, state and federal lands combined, provides another 900 acres of wetland habitat. Smaller satellite areas in the region also contribute a significant amount of wetland habitat. Suitable sites for additional wetland habitat will be developed on existing wildlife area lands. Most of these public areas are divided into units, and managed on a rotational basis. Manipulation of wetland vegetation communities through water level control, discing, burning, planting and herbicides are used to attain complexes consisting of various wetland types, such as moist soil or hemi-marsh (W2PM01, W2PX01). Biological agents aimed at controlling purple loosestrife are released at selected state wildlife areas in the Focus Area (WWNR05). Suitable sites for additional wetland habitat will be developed on existing wildlife area lands.

Goals have been developed by the U.S. Fish and Wildlife Service for the Ottawa National Wildlife Refuge and the Cedar Point National Wildlife Refuge. In part, the Habitat Goal for these areas seeks to "restore functional components of the Lake Erie Marsh ecosystem." The Objective is to provide 300 to 500 acres of marsh on a five year average basis at Ottawa, and manage 2,500 acres of contiguous marsh at Cedar Point. Active management of wetland habitat occurs on other areas within the ONWR complex, using standard wetland management practices.

Private ownership of wetland habitats in the Focus Area is significant, and should be maintained. Winous Point Marsh Conservancy (4,500 acres), Ottawa Shooting Club (3,200 acres), and Toussaint Shooting Club (2,500 acres) are the three largest holdings containing significant wetland habitat. Federal Farm Bill programs are important to the contribution of wetland habitat in the Focus Area, and need to be continued. In Lucas, Ottawa, Sandusky and Erie Counties, over 1,050 acres of wetland habitat are enrolled and maintained under CRP wetland and WRP combined. Development of small wetlands in the Focus Area provides beneficial habitat, especially when adjacent or in close proximity to larger wetland complexes. Encouraging enrollment in Farm Bill programs and providing technical assistance (W2PM05) along with support funding (W2PM06) should continue. To date, over 800 acres of small wetland habitat sites have been developed through Division of Wildlife cost-sharing in these same Focus Area counties (W2PM06).

Mitigation for replacement of wetland habitat lost to development provides additional acreage. Mitigation projects at Pickerel Creek (50 acres) and Willow Point (95 acres planned) have restored and enhanced wetlands. Future mitigation projects in the Focus Area (similar to Three Eagles), although not predictable, are likely to occur and have the potential to provide additional wetland habitat. Limited acquisition from willing sellers of existing or prime wetland development sites is likely to occur.

Habitat objectives for all the focus areas were developed based on the best information currently available in terms of species-habitat relationships and the population ecology of associated wildlife species. Assumptions were made so that habitat work could proceed toward meeting plan goals and objectives. Clearly, evaluation and monitoring will be required periodically in each focus area for select species of interest to assess the validity of assumptions made during this planning process and to guide future revisions of these conservation activities. Thus, along with projects designed to attain focus area habitat goals, appropriate surveys and research evaluations need to be developed and implemented to ensure that habitat projects are producing measurable and desirable results for the intended wildlife community.

Section 2.4.3.2

Lake Erie Marshes Wetland Focus Area Maps

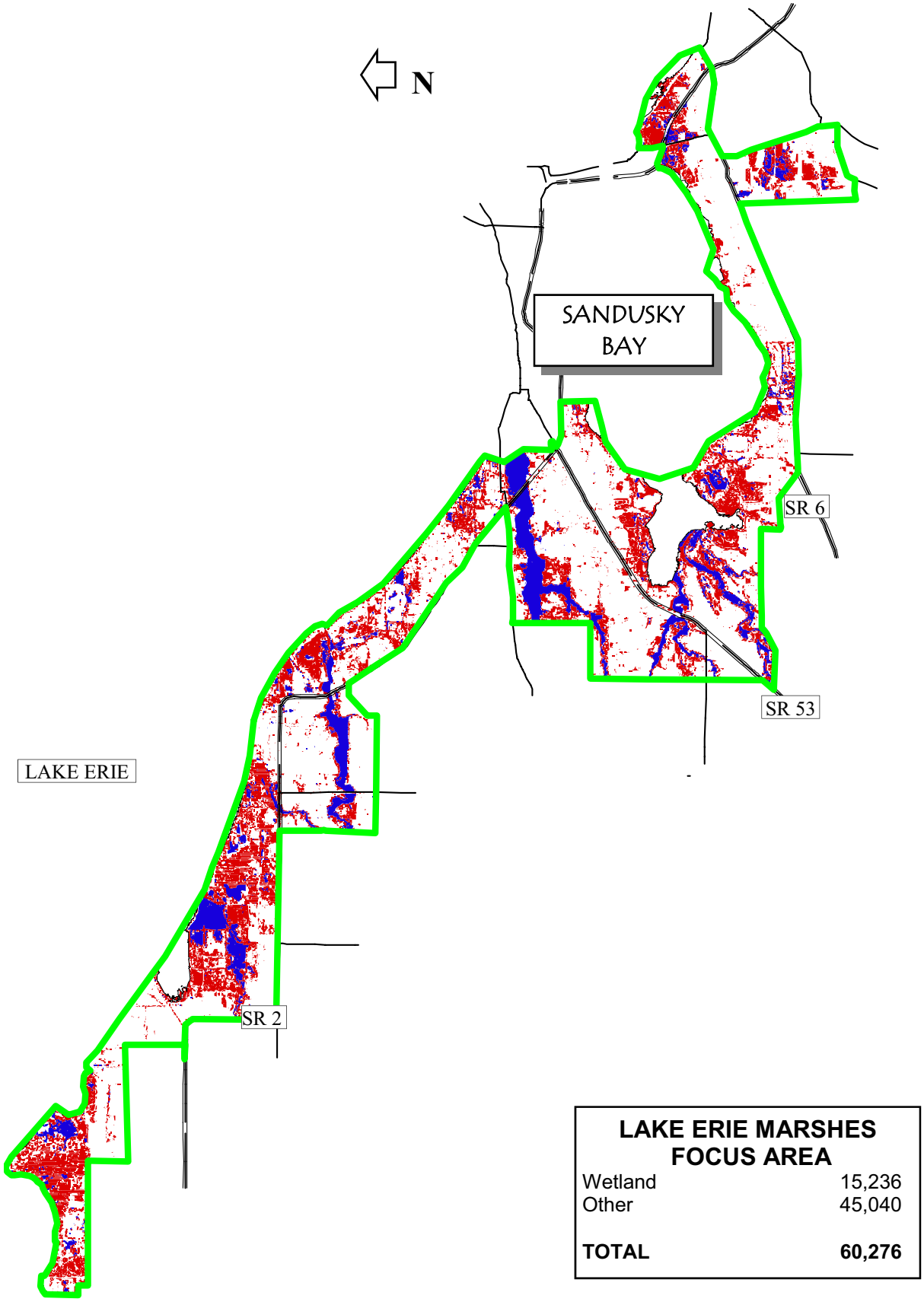


Figure 1. Lake Erie Marshes Focus Area

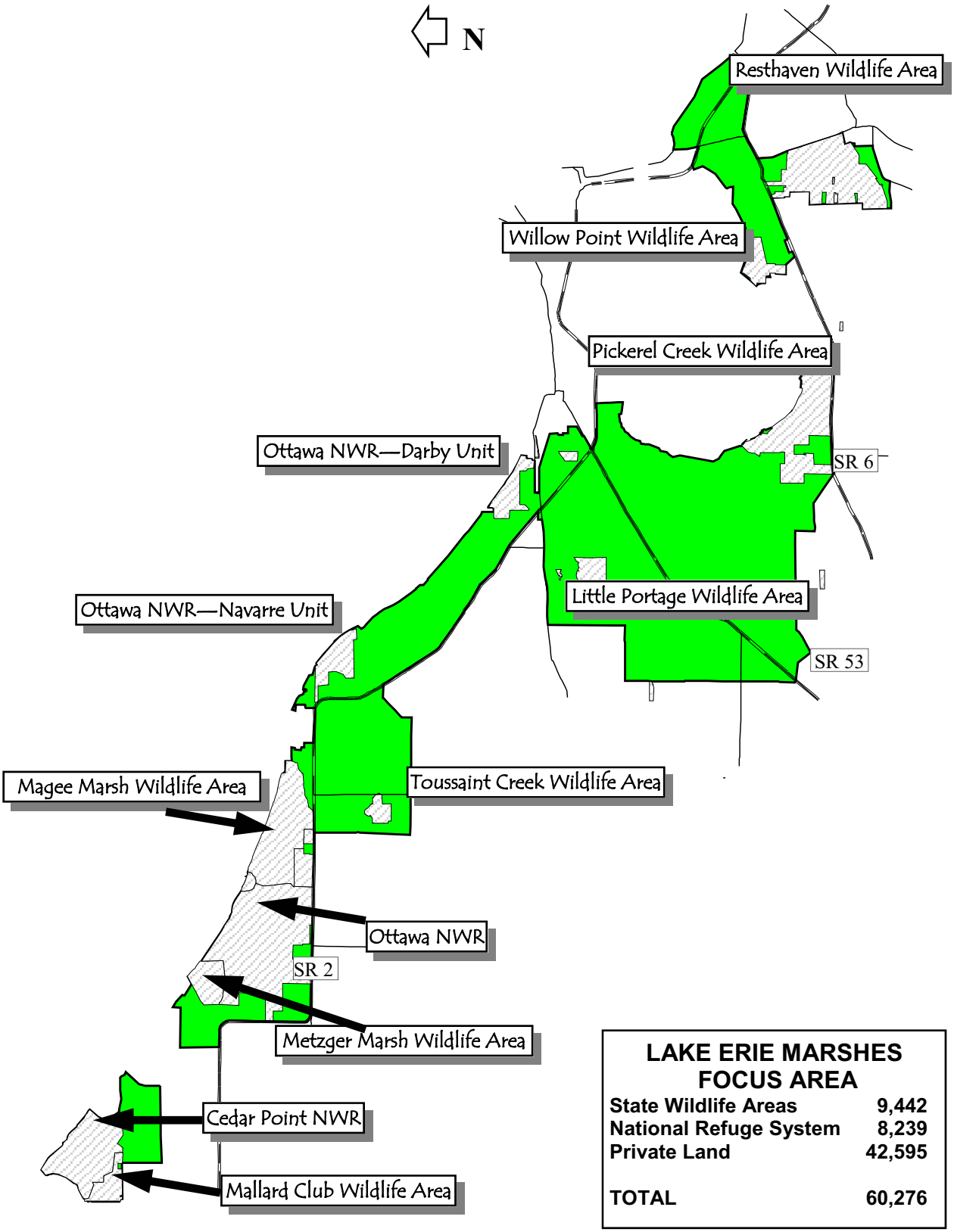


Figure 2. Lake Erie Marshes Focus Area Ownership

Section 2.4.3.3

Lake Erie Marshes Wetland Focus Area Species Expected to Benefit

Appendix 1 - Species expected to benefit within the Lake Erie Marshes Focus Area*	
Common Name	**Scientific Name**
Mammals	
River Otter	*Lutra canadensis*
Southern Bog Lemming	*Synaptomys cooperi*
Birds	
American Bittern	*Botaurus lentiginosus*
American Coot	*Fulica americana*
Black Tern	*Childonias niger*
Blue-winged Teal	*Anas discors*
Common Moorhen	*Gallinago chloropus*
Common Tern	*Sterna hirundo*
Great Blue Heron	*Ardea herodias*
Green-backed Heron	*Butorides striatus*
Herring Gull	*Larus argentatus*
Hooded Merganser	*Lophodytes cucullatus*
King Rail	*Rallus elegans*
Least Bittern	*Ixobrychus exilis*
Marsh Wren	*Cistothorus palustris*
Northern Harrier	*Circus cyaneus*
Pied-billed Grebe	*Podilymbus podicees*
Prothonotary Warbler	*Protonotaria citrea*
Sedge Wren	*Cistothorus platensis*
Snowy Egret	*Egretta thula*
Sora Rail	*Porzana carolina*
Spotted Sandpiper	*Actitis macularia*
Swamp Sparrow	*Melospiza georgiana*
Virginia Rail	*Rallus limicola*
Wood Duck	*Aix sponsa*
Reptiles	
Blanding's Turtle	*Emydoidea blandingii*
Eastern Fox Snake	*Elaphe vulpina gloydi*
Kirtland's Snake	*Clonophis kirtlandii*
Invertebrates	
	Hypocoena enervata
	Spartiniphaga inops
*Does not include species with viable populations broadly distributed throughout Ohio	
as identified on the Native & Naturalized Terrestrial Wildlife Species List.	

Section 3.0

Forest Habitat Tactical Plan

Section 3.1

Forest Habitat Tactical Plan

Forest Habitat Tactical Plan

Goal: Establish and maintain the age/size class distribution and species composition of Ohio's forests in a proportion capable of supporting viable populations of all extant native forest-dependent wildlife species.

Intro/Background: Prior to European settlement, Native Americans manipulated forests with fire, agriculture, and clearing. Most Native Americans were forced out of the Ohio country by white frontiersmen and soldiers during the 1700s. The first European settlers encountered vast stands of uninterrupted mature forest because Native Americans had been displaced and their efforts to manage the forest had stopped. Ohio's forests had many years to mature into the relatively undisturbed old growth forests encountered by the first permanent settlers.

Ohio's forests have undergone dramatic changes since the late 1700s, a time when nearly 95% of Ohio was forested. Rapid settlement of the Ohio country resulted in a steady decline in forest cover to a low of 12% in 1940. This massive loss of forest habitat was instrumental in the extirpation of many wildlife species from Ohio. Exotic diseases such as chestnut blight and Dutch elm disease were also introduced to North America. These diseases resulted in the demise of the American chestnut, which often made up 25% of forest stands, inflicted heavy mortality on the American elm, and altered the composition of Ohio's remnant forests.

Ohio's forestland has been increasing since 1940 and, as of 1991 when the last inventory was completed, comprised approximately 30% of the state's land area. This represents a 2.5-fold increase over 51 years and has been the major factor leading to the successful reintroduction, return, or resurgence of many forest-dependent wildlife species.

Although forest land has increased dramatically, there are still wide differences in the amount of forest cover among the geographic regions of the state. In the western glaciated farmland region, most counties are less than 15% forested, with much of the forest occurring in small isolated patches of 20 acres or less. The northeastern glaciated counties average 30% forest cover and most are heavily urbanized. The east-central, southeastern, and south-central unglaciated counties (hill country) are the most heavily forested and are our primary forestland habitat base. Forest cover in these counties ranges from 35% to 80%. This distribution of forest land is a key determinant of the distribution and abundance of Ohio's forest wildlife.

Ohio's forests are maturing. The increase in Ohio's forest land since 1940 was due primarily to the reversion of abandoned pasture to brush and ultimately mature forest in eastern Ohio. The brushy stage of forest succession is declining as Ohio's forests mature. Since 1968, acreage in the seedling/sapling size class (trees < 5 inches d.b.h.) decreased over 50% from 3.7 to 1.8 million acres, whereas acreage in the sawtimber size class (trees ≥ 11 inches d.b.h.) more than doubled from 1.9 to 4.0 million acres. As of 1991, the age/size class distribution of Ohio's forestland habitat base was 24% seedling/sapling, 23% pole timber, and 53% saw timber.

Forest composition also is changing. Forests once dominated by oak and hickory are becoming increasingly dominated by red maple and yellow poplar. Red maple has become the dominant tree species in growing stock volume in Ohio. Between 1979 and 1991, red maple saw timber volume (board feet per acre) increased from 127 to 325, sugar maple from 191 to 295, and yellow poplar from 268 to 400. During that same time period, oak saw timber volume increased from 334 to 347 and hickory from 245 to 328.

Ohio's forestland historically supported 100 avian species, 30 species of mammals, 48 species of reptiles and amphibians, 58 species of lepidopterans and numerous other invertebrates. This wide assemblage of native fauna are all dependent on forest habitat for survival and reproduction. Each species has unique habitat requirements. Some species can survive and reproduce only in the earliest stages of forest succession, whereas others need mature forest with large, tall trees. Some species require a broken forest with a good interspersion of age classes, whereas others need large expanses of unbroken mature forest with little or no edge. The varied needs of all forest-dependent wildlife in Ohio can be met by managing forests on the landscape level using the focus area approach. Two focus areas, each at least 60,000 acres in size, will be managed to provide viable populations of all native wildlife species indigenous to these areas. Maintaining the remaining forest landscape in roughly 30% seedling/sapling, 25% pole timber, 25% saw timber, and 20% mature forest (i.e., no harvest activity) should provide adequate amounts of vertical and horizontal structure across the landscape for all forest wildlife species.

Need/Justification: Managing forested landscapes for wildlife diversity involves managing patterns of succession. A forest landscape with stands of many age classes will have more kinds of wildlife than a single-aged forest landscape. For forest wildlife, age classes can be broken down into four stages: seedling-sapling, pole timber, saw timber and mature forest. Some wildlife species are restricted to the earliest stage, some are dependent upon the latter stages of succession, and some are generalists. To maximize forest wildlife diversity, all age classes must be present in suitable amounts across the forest landscape at any given time. If an age class is altered or missing, the wildlife species dependent upon that age class for survival and reproduction will be adversely affected.

Forests have characteristic patterns of natural disturbance. Uneven-aged forests with small-scale, frequent disturbance and even-aged forests with large-scale, infrequent disturbance correspond with two harvesting systems that imitate natural disturbance patterns - selection cutting and clearcutting. In selection cutting, trees, either singly or in small groups, are removed at frequent intervals. Single tree and group selection cutting that impact less than one acre do not open the canopy enough to allow shade intolerant trees (e.g., oaks and hickories) to become established and thus the continued presence of shade-tolerant trees (e.g., red maple, sugar maple, American beech) is favored. Clearcutting refers to harvesting all trees on a tract of land. Clearcuts initiate forest succession and produce an array of different-aged stands across the forest landscape. Clearcut stands in which many oak or other shade-intolerant seedlings were established

before the cut or in which regeneration comes from root sprouts may experience little change in species composition. However, in a clearcut without advance regeneration, seed availability and site quality will drive species composition of the new stand. Clearcuts are necessary to regenerate shade-intolerant tree species and thus are the preferred silvicultural system when oak and hickory regeneration is the management objective.

If the trend toward increasing forest maturity continues, populations of forest wildlife species dependent on young woodlands will likely decline in the future. Research is needed to evaluate the habitat requirements for survival and reproductive success of forest wildlife in Ohio in relation to forest patch size, isolation, and age class.

In the absence of fire, it is likely that the relative occurrence of oaks and hickories will decline as they are replaced by late-successional, shade-tolerant species. Acorns and hickory nuts are staple foods of many forest wildlife species. Consequently, as forest composition shifts from oak and hickory dominance to red maple and yellow poplar, declines in mast-dependent species are likely. In addition, a loss of oaks may result in a general deterioration of foraging conditions for migratory nongame forest birds. Loss of oaks killed by impending gypsy moth invasions may escalate problems faced by oak-dependent wildlife. More research is needed to learn how to manage areas to retain oak dominance.

Enlarging forest tract size and conserving existing large tracts is a prudent conservation strategy. Large habitat blocks ($\geq$60,000 acres) can meet the needs of all area-sensitive forest wildlife species and are large enough to incorporate natural disturbances. Based on the focus area approach, forested landscapes should be managed with an emphasis on maintaining a representative mix of forest types and age classes to meet the habitat requirements of all forest species native to the region.

Knowledge of the current proportion and distribution of forest types and age classes is necessary to determine what has to be done to provide adequate habitat capable of supporting viable populations of all native forest-dependent wildlife. Such information is available as forest inventory data and cover maps for some publicly-owned forestland in Ohio. Such data probably do not exist for most privately-owned forest tracts and must be collected.

The success of a young oak-hickory forest is largely dependent upon the ability of new seedlings or sprouts (advance reproduction) to maintain their competitive advantage after the overstory is removed by timber harvesting. In general, at least 400 well-distributed advance oak seedlings at least 3 feet tall/acre are needed to ensure perpetuation of an oak forest. Oak advance reproduction is most prolific on poor (dry, sandy) sites. On good sites, shade-tolerant species such as sugar maple and basswood may out-compete oaks in the forest understory. In some forest stands, oak advance reproduction may be inadequate and oak regeneration will be dependent upon stump sprouts.

Objectives:

Establish and maintain the age/size class distribution of Ohio's primary forestland habitat base as 30% seedling/sapling, 25% pole timber, 25% saw timber, and 20% mature forest.

Increase the oak-hickory component of Ohio's primary forestland habitat base by 10% on public lands.

Approach: Management opportunities for forest wildlife are influenced by the proportion and distribution of principal forest types and age classes, marketability of trees for commercial operations, and the composition and density of understory and ground layer food and cover plants. The unglaciated south-central, southeastern, and east-central regions of Ohio support >70% of the state's forestland. Forest habitat management should be emphasized in this part of the state. In glaciated Ohio, opportunities to manage large blocks of forestland are limited. However, many forest wildlife species can thrive where there is a mosaic of interconnected woodlots in that part of the state. With the exception of tracts being managed to meet the needs of grassland-dependent wildlife, all woodlots on public land in glaciated Ohio should be retained and, where appropriate, expanded. Efforts aimed at encouraging private landowners to retain woodlots should also continue.

The proportion and distribution of forest types and age classes needs to be determined immediately. After determining what forest types and age classes are available, management plans can be developed to bring large forested landscape areas into the preferred 30% seedling/sapling, 25% pole timber, 25% sawtimber, and 20% mature forest age/size class distribution.

Forest inventory data will also be used to direct where the oak-hickory component of Ohio's forested landscape can be increased. Clearcutting should be emphasized to increase the proportion of these species in future stands. Research results from the effects of burning and thinning on oak regeneration should be incorporated on public and private forestlands throughout Ohio if these management practices are shown to increase the vigor of advance oak reproduction. In addition, oaks and other high value wildlife trees will be planted on selected sites on wildlife areas which have been stripmined.

More emphasis needs to be placed on educating the public about forest management practices. The Information and Education Group should be asked to emphasize making the public aware that clearcutting is a form of forest regeneration, not destruction. Private landowners should be encouraged to implement even-aged and uneven-aged forest management practices wherever appropriate. An early successional forest wildlife habitat management unit should be established on the larger wildlife areas in unglaciated Ohio (Appendix 1). These management units should be >500 acres and placed on a long term (75-100 years depending on current age classes) timber harvest rotation that emphasizes small (<20 acres), well-distributed clearcuts. Controlled burns should be considered for these sites if research shows fire to be an effective management tool to increase the proportion of oaks and hickories.

The following projects and associated activities should continue: management of public lands for forestland wildlife (W3PM01, W4PM01, W4PM04, W5NM10, and W5PM01), forest habitat management on private lands (W4PM06, W5NM05, and W5PM05), technical assistance on forest management to private landowners (W3PM05 and W4PM05), and public education programs for woodlands on private lands (W3NM05, W4NM05 and WFNX01). Research projects to: 1) Evaluate the habitat requirements for survival and reproductive success of forest wildlife in Ohio in relation to forest patch size, isolation and age class (WFCR05) and 2) Determine management practices to retain oak dominance in forests needs to be undertaken.

Appendix 1

Wildlife Areas Where Early-Successional Forest Wildlife Units Should Be Established.*

64915. Brush Creek
64916. Cooper Hollow
64917. Crown City
64918. Egypt Valley
64919. Highlandtown/Yellow Creek
64920. Monroe Lake
64921. Pleasant Valley
64922. Powelson
64923. Salt Fork
64924. Tranquility
64925. Tri-Valley
64926. Trimble
64927. Tycoon
64928. Wellston
64929. Wolf Creek
64930. Woodbury

*Does Not Include Forestland Focus Areas.

Section 4.0

Grassland Habitat Tactical Plan

Section 4.1

Grassland Habitat Tactical Plan

Grassland Habitat Tactical Plan

Goal: Restore enough grassland habitat to return grassland-dependent wildlife species to levels seen in the 1960s.

Intro/Background: When Ohio was settled, our only grasslands consisted of native tallgrass prairie. These prairies comprised 2.5% or 1,000 mi^2 of Ohio's landscape, while most of the remaining landscape was forested. Yet, as forests and prairies were cleared for agriculture, Ohio's total grassland acreage increased and became even more valuable for Ohio's wildlife community. Grassland-dependent and grassland-associated wildlife populations increased and expanded their ranges to include much of the state. Ohio grasslands represented the easternmost extent of the geographic range of some grassland-dependent wildlife species. The Ohio landscape of the early 1900s was replete with many grassland-dependent songbirds, northern bobwhite, the introduced ring-necked pheasant and gray partridge, and the badger. After World War II, however, grasslands available to Ohio's wildlife declined sharply due to intensive agriculture and other development pressures associated with our state's growing human population. Unfortunately, grassland wildlife populations showed declines that closely paralleled the loss of Ohio's grasslands.

Need/Justification: Grasslands are considered by many wildlife experts to be the North American ecosystem in greatest danger of being lost. The Ohio Working Group of Partners in Flight also noted that grassland and wetland birds were in greatest need of conservation in the state due to habitat loss. These losses include direct conversion of native and introduced grasses to other uses as well as more intensive mowing of hayfields, overgrazing of pastures, and fragmentation and isolation of our remaining grasslands from similar habitats. Current land-use trends within glaciated Ohio suggest that intensive row-crop agriculture will continue, farms will increase in size and decrease in number, and suburban and rural housing development will continue. These pressures will continue to threaten Ohio's remaining grasslands. Grasslands of significance also occur in large tracts in Ohio's unglaciated hill country, predominantly on areas impacted by surface mining for coal. These large reclaimed areas are particularly valuable to several of Ohio's most area-sensitive grassland birds and, thus, merit inclusion in this plan. While these areas will revert to forest over time, steps can be taken to slow this process on some of the higher quality grasslands on wildlife areas in eastern and southern Ohio. On the positive side, conservation programs within the last several federal farm bills have added grassland habitats of moderate quality to our landscape but not in sufficient quantity to reverse declines of grassland wildlife.

Objective: Restore enough grassland habitat to reverse the population declines of all the following grassland-dependent species as measured by the North American Breeding Bird Survey: eastern meadowlark, grasshopper sparrow, bobolink, and ring-necked pheasant.

Approach: Although a significant effort is planned to restore grassland habitats within several focus areas in an attempt to ensure the maintenance of viable grassland wildlife populations, it is equally imperative that efforts be made to ensure the health of these grassland-dependent species on a statewide basis. The Henslow's sparrow, for example, is found in eastern and southern Ohio near reclaimed strip mines in relatively high numbers for this declining grassland bird. Ohio's population of this species is a significant portion of the total global population. Thus,

grassland conservation efforts cannot be limited to select focus areas or even glaciated Ohio if the objective of this plan is to be met.

Specifically, major wildlife areas in glaciated Ohio (See Appendix 1) should emphasize grassland restoration where practical. To benefit the greatest number of grassland species, especially those most sensitive to field size and fragmentation, restoration efforts should seek to create as large a grassland mosaic as possible. Priority should be given to making each individual mosaic at least 250 acres in size by maximizing individual field sizes, eliminating field dividers, emphasizing shrubby species instead of trees, and reducing total woody acreage. Long, linear habitats should be avoided within the mosaic, although they may be used to connect different mosaics. Also, a diversity of grasslands should be created and maintained. While establishment of mixed stands of native warm-season grasses and associated forbs should be emphasized (60%), cool-season grasses and legumes provide important nesting habitats and structural diversity on the landscape and should be included (30%). Other grassland types, like pure stands of switchgrass for winter and escape cover, should be minor components of the grassland landscape (10%). Two-hundred-fifty acres of new grassland habitat should be established on wildlife areas statewide (including focus areas) annually. Burning should be an integral part of grassland management with 20-35% of the area burned annually.

Strip-mine grasslands in eastern and southern Ohio tend to already exceed 250 acres in size; however, they too should be maintained in as large a mosaic as possible (see above). Mowing, burning and use of herbicides can be incorporated into management of these sites to maintain and increase grassland quality and slow succession. In addition, tree planting to accelerate the rate of succession back to forested habitat should be avoided on the higher quality grassland tracts.

Few opportunities may exist to create such large grassland mosaics on private lands; however, these same principles apply when providing technical assistance to private landowners. Private land efforts should continue to use conservation provisions within the federal farm program to create these smaller, quality grasslands within Ohio's agricultural region. Fostering partnerships between conservation organizations and private landowners as an incentive for enrollment in wildlife-friendly programs should be strongly promoted.

The following activities or projects should continue: restoration of quality grassland habitats on major wildlife areas within glaciated Ohio (W1PM02, W2CM01, W3NM26, W5NM10, WPPM01), management of public lands for grassland wildlife (W1PM01, W2PM01, W3PM01, W4PM01, W5PM01, WANX03), technical assistance on private lands (W1PM05, W2PM05, W3PM05, W4PM05, W5PM05, WANM10), habitat management on private lands (W1PM06, W2PM06, W3PM06, W4PM06, W5PM06, WANM30, W5CM01 W5PM08), incentive programs for grasslands on private lands (WANM31), federal farm bill coordination (WANM01, WANM34), and public education programs about grassland management (W1CM03, W2NM05).
More emphasis should be placed on the Pastures to Prairies project (WAPM01) and the financial

incentive concept for encouraging landowners to provide quality grasslands on their properties. Private lands activities should continue to emphasize conservation provisions of the federal farm program and seek creative ways to encourage enrollment. District operational plans for public land management on all major wildlife areas in glaciated Ohio, and select wildlife areas with significant grassland resources in the hill country (W4PM02), should focus the resources necessary to create and maintain quality grassland mosaics as described above.

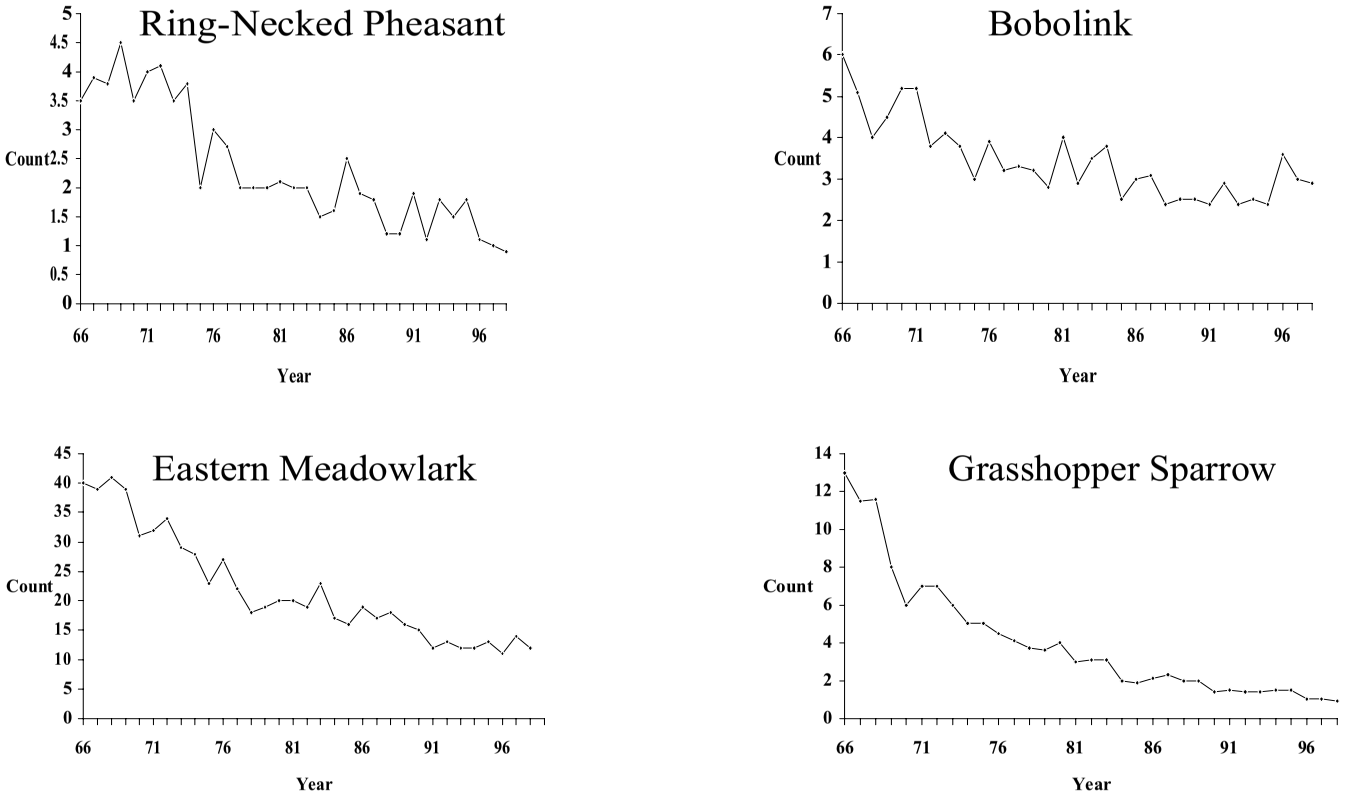


Figure 1. Ohio Breeding Bird Survey trends for select grassland birds, 1966-1998.

Appendix 1

Wildlife Areas Where Grassland Habitat Establishment Should Be Emphasized.*

1.Berlin
2.Deer Creek
3.Fallsville
4.Grand River
5.Indian Creek
6.Mosquito Creek
7.Rush Run
8.Woodland Trails
9.Highlandtown
10.Killbuck

*Does Not Include Grassland Focus Areas.

Section 5.0

State-Listed Terrestrial Wildlife Tactical Plan

Section 5.1

State-Listed Terrestrial Wildlife Tactical Plan

State-listed Terrestrial Wildlife Tactical Plan

Goal: Increase populations and distributions of endangered and threatened terrestrial wildlife species to occupy available habitats.

Intro/Background: Effective January 1, 1974, Ohio Revised Code 1531.25 granted the Chief of the Division of Wildlife authority to adopt rules restricting the taking or possession of native wildlife threatened with statewide extirpation and to develop and periodically update a list of endangered species. The first list of endangered species (Ohio Administrative Code 1501:31-23-01) contained 5 mammals, 7 birds, and 2 reptiles. Since then numerous terrestrial species have been added to the endangered list. In the 1980s, it became apparent that other species were in jeopardy of becoming endangered or needed additional monitoring. These species were designated as Athreatened@ or of Aspecial interest.@ In 2001, the Division initiated a reevaluation of the endangered species list. During this process, the need for an additional state-list category was recognized and has been designated as Aspecial interest.@ The name of the previous special interest category has been changed to Aspecies of concern@ but retains its original definition.

AEndangeredA is a native species or subspecies threatened with extirpation from the state. The danger may result from one or more causes, such as habitat loss, pollution, predation, interspecific competition, or disease. AThreatened@ is a species or subspecies whose survival in Ohio is not in immediate jeopardy, but to which a threat exists. Continued or increased stress will result in its becoming endangered. A Aspecies of concern@ is a species or subspecies which (1) might become threatened in Ohio under continued or increased stress or, (2) there is some concern but for which information is insufficient to permit an adequate status evaluation. This category may contain species designated as a furbearer or game species but whose statewide population is dependent on the quality and/or quantity of habitat and is not adversely impacted by regulated harvest. A Aspecial interest@ is a species that occurs periodically and is capable of breeding in Ohio. It is at the edge of a larger, contiguous range with viable population(s) within the core of its range. These species have no federal endangered or threatened status, are at low breeding densities in the state, and have not been recently released to enhance Ohio=s wildlife diversity. With the exception of efforts to conserve occupied areas, minimal management efforts will be directed for these species because it is unlikely to result in significant increases in their populations within the state.

Currently, 33 vertebrate (5 mammals, 19 birds, 5 reptiles, and 4 amphibians) and 24 invertebrate (7 butterflies, 14 moths, and 3 beetles) terrestrial species are designated as endangered, 11 vertebrate (8 birds, 2 reptile, and 1 amphibian) and 7 invertebrate (1 butterfly, 4 moths, and 2 beetle) species are designated as threatened, and 30 vertebrates (8 mammals, 13 birds, 8 reptiles, and 1 amphibians) and 32 invertebrate species (2 butterflies, 23 moths, 6 beetle, and 1 cricket) are designated as species of concern. There are 30 birds, 1 butterfly, and 10 moth species designated as special interest. In addition, 14 vertebrate (9 mammals and 5 birds) and 1 invertebrate species (butterfly) have been extirpated from Ohio and 2 species, the passenger pigeon and the Carolina parakeet, are extinct. These state-listed species are associated with grasslands, forests, wetlands, and unique habitats. Where feasible, attention will be focused on

the recovery of Ohio=s endangered and threatened species and the repatriation of extirpated wildlife.

Needs and Justification: Although significant efforts are planned to restore habitats within designated focus areas (see Focus Area Plans), it is not likely that endangered and threatened species can be restored to the point of meeting the criteria for delisting simply by focusing our attention in these areas. Many endangered species have limited statewide distributions, occur in small numbers, and/or are in isolated locations. Furthermore, Ohio represents the peripheral range of many endangered species= distributions.

Mammals

Nine mammals have been extirpated from Ohio. Seven of these were extirpated by the 1850s. Mountain lions and gray wolves were eliminated from Ohio shortly after settlement to protect people and livestock. Elk and bison were killed for their meat and hides. The marten, lynx, and fisher probably were never common in Ohio. The unique habitat and space required by these species for survival and reproduction are no longer present in Ohio; thus, reintroduction is not a feasible option. The rice rat, a southern marsh species, has not been reported in Ohio from historic times. Their Ohio occurrence is known only from bones found in Native American archaeological sites. Reintroduction of this wetland species is not being considered. The porcupine, which was extirpated by 1900, was once probably common in extreme northeastern and northwestern Ohio. While porcupines occasionally enter the state on their own, there are no plans to reintroduce this species because of possible conflicts.

The black bear, bobcat, Indiana bat, Allegheny woodrat, and snowshoe hare currently comprise the endangered mammals of Ohio. Black bears and bobcats were extirpated by 1850, but returned to Ohio from adjacent states as Ohio=s forest land increased. Both species are provided full protection under the law as their populations increase in abundance and distribution. With immigration from adjacent states and continued growth of resident black bear and bobcat populations, it is possible that these species can be removed from the endangered list by 2010. The Indiana bat was listed as endangered at the federal level in 1967 and at the state level in 1974 because of significant population declines throughout its range. The Allegheny woodrat has always had a limited distribution in Ohio and has been listed as endangered since 1974. A better understanding of the habitat requirements of the Indiana bat and Allegheny woodrat is needed to manage these species and improve their population status in Ohio. In 2002, the river otter, which had been designated as endangered since 1974, was delisted. Because of an aggressive repatriation project which began in 1986, river otters have increased in number and are expanding their range beyond the initial release watersheds. Efforts to secure more reliable estimates of survival, reproduction, and other population parameters will be examined in the coming years. Possible effects of contaminants and the carrying capacity of Ohio=s habitat should also be investigated. Repatriation of the snowshoe hare began in January 2000 with initial releases in eastern Geauga and western Ashtabula counties. Hares are being live trapped in Michigan=s Upper Peninsula, flown to Ohio, and released in the study area. A portion of the hares are being fitted with radio-collars to allow monitoring of movement, habitat use, and survival. This is a collaborative effort with the OSU School of Natural Resources.

While no mammals are designated as threatened, 8 species (pygmy shrew, star-nosed mole, Eastern small-footed bat, Rafinesque=s big-eared bat, Southern red-backed vole, woodland jumping mouse, badger, and ermine) are designated as species of concern. Little is known about the statewide distribution and population of these species of concern. While the public occasionally reports observations of badgers, generally the species of concern is not easily observed and seldom reported. Species-specific surveys are needed to develop a better understanding of their basic ecology and distributions.

Birds

The American swallow-tailed kite, greater prairie chicken, ivory-billed woodpecker, common raven, and Bachman=s sparrow are the 5 extirpated avian species. Most experts believe ivory-billed woodpeckers are extinct. Based on radiocarbon dating of materials from a Scioto County site, the ivory-billed woodpecker is believed to have disappeared from Ohio during the 15th or 16th century. American swallow-tailed kites nested in Ohio during the first half of the 19th century, but habitat destruction and human persecution eliminated this species. The American swallow-tailed kite (and ivory-billed woodpecker) requires very extensive, contiguous tracts of mature forest for survival. Because their required habitat no longer exists in Ohio, reintroduction of these species is not biologically feasible. Rapid conversion of forests and native prairies to farmland as Ohio=s human population increased extirpated the raven and the greater prairie chicken by 1880. Greater prairie chickens require very large tracts of grassland habitat. While suitable habitat exists in southeastern counties and there are no known competitors with the Bachman=s sparrow, the last documented sighting of it was from Scioto County in 1978. There is no clear reason for their disappearance from Ohio or other adjacent states. Raven populations in western Pennsylvania appear to be increasing and ravens may expand their range into Ohio over the next decade. It is felt that restoration of a viable population of these three species is also not biologically feasible in Ohio.

There are 19 endangered avian species in Ohio. Recovery efforts are already in place for the bald eagle, common tern, osprey, trumpeter swan, and peregrine falcon. The breeding range of the yellow-bellied sapsucker, a forest-dependent endangered bird, is at its southern edge in Ohio. Nesting pairs of this species are found only in cool, humid microclimates of hemlock forests at scattered locations throughout eastern Ohio. Lark sparrows are at the extreme eastern limit of their range in Ohio and are unlikely to ever occur in viable numbers ($\exists$200 breeding pairs). Because Ohio is on the extreme edge of these birds= ranges, it is unlikely that management efforts would result in significant increases in their populations within the state. Therefore, with the exception of efforts to protect occupied areas, minimal management efforts will be directed for these species. Five other endangered species (American bittern, king rail, black tern, sandhill crane, and northern harrier) breed in limited numbers in Ohio. West Sister Island in Lake Erie contains the largest colonies of snowy egrets (<10 pairs) and cattle egrets (<10 pairs) in the Great Lakes. Conservation of nesting sites will be the emphasis of management activities for these seven species. The loggerhead shrike is the rarest Ohio breeding passerine. Their numbers have declined because of the loss of grasslands and woody fencerows. The potential of surface-mined grasslands as breeding habitat for these and other grassland-dependent species needs to be

evaluated before management recommendations can be formulated. Bewick=s wrens are declining because of interspecific competition with house wrens. Throughout their range, Bewick=s wrens disappear wherever house wrens become established and may be extirpated from Ohio in the near future. The golden-winged warbler, once locally common in the Oak Openings region, has been replaced by the expansion of the blue-winged warbler. Since declines of these two species are the result of being displaced by other species, no management efforts are planned at this time. The Kirtland=s warbler and the piping plover (both federally endangered species) neither breed nor winter in Ohio, but most, if not all, of their population probably crosses over the state each spring and fall during migration. No management activities are planned for these two species.

There are 8 threatened avian species in Ohio; the upland sandpiper, barn owl, dark-eyed junco, hermit thrush, least flycatcher, least bittern, yellow-crowned night-heron, and black-crowned night-heron. The black-crowned night-heron has experienced a steady decline in nesting pairs on West Sister Island with possible elimination of the breeding colonies in the near future if the decline continues unabated. Research is needed to quantify impacts of vegetation changes from roosting/nesting cormorants, or competition for nest sites. Such information is needed to determine whether the potential exists to develop cormorant-specific management programs on the breeding sites without simultaneously impacting other avian communities. The upland sandpiper, a grassland-dependant species, has been declining since the mid-1960s. It is believed the population of this species will benefit as a result of activities undertaken in the Grassland Habitat and several of the Focus Area Tactical Plans. In 2002, the barn owl was downlisted from endangered as a direct result of efforts initiated in the late 1980s to monitor populations and productivity trends. While the barn owl is not in jeopardy of extirpation from the state, continued research and monitoring is warranted. Nesting pairs of dark-eyed juncos and hermit thrushes are found only in cool, humid microclimates of hemlock forests at scattered locations throughout eastern Ohio. Because Ohio is on the extreme edge of these birds= ranges, it is unlikely that management efforts would result in significant increases in their populations within the state. Therefore, management efforts will be directed at the protection of occupied areas. Nesting locations of the least bittern and yellow-crowned night-heron are difficult to find. Information gathered using the Ohio Wetland Breeding Bird Survey will be used to obtain population data and breeding locations for the conservation of these species. Little is known about the nesting biology of the least flycatcher. Based on Breeding Bird Atlas records, this species is found in various woodland habitats primarily in northern Ohio. While the species prefer second-growth forest they appear to utilize a broader range of wooded areas. Extirpation is not anticipated as long as this forest age class is available in Ohio.

Of the 13 avian species of concern, habitat destruction and degradation contributed to the decline of sharp-shinned hawk and cerulean warbler populations. The current status and habitat requirements of these two species should be assessed via a compilation of all available data and published literature. The Henslow=s sparrow, declining throughout its range, is found in eastern and southern Ohio near reclaimed surface mines in relatively high numbers. Ohio=s population of this species is a significant portion of the total global population. Specific management recommendations that will address the needs of the Henslow=s sparrow, Northern bobwhite

quail, and bobolink are covered in the Grassland Habitat Tactical Plan. Long-term declines have been noted for nearly all grassland wildlife populations; however, the causes of these declines are not fully understood. Prothonotary warblers prefer to nest in natural cavities over standing water but will readily occupy artificial nest structures. Where suitable habitat exists, this is a fairly common bird with the largest population residing in the Killbuck Creek Valley. Black vultures expanded their northern range into southern Ohio in the late 1800s and today are believed to have >100 nesting pairs. In recent years, black vultures have been reported in spring time livestock attacks near roosting sites. While the known number of sedge wren breeding pairs is small (<100 pairs), their population has been stable. Data gathered in the past several years indicates the sedge wren is more broadly distributed through its Ohio range then previously believed. Further data concerning the distribution and abundance of this species will be beneficial. Finally, additional research is needed using the Ohio Wetland Breeding Bird Survey to obtain population data for wetland birds not adequately handled by the North American Breeding Bird Survey (such as marsh wrens, great egrets, common moorhens, sora rails, and Virginia rails); however, sampling effort needs to be distributed statewide, and various technique refinements need to be tested before meaningful statewide trends in wetland breeding bird populations can be produced.

Thirty bird species have be designated as of special interest. They are the Canada warbler, magnolia warbler, black-throated blue warbler, mourning warbler, Blackburnian warbler, long-eared owl, short-eared owl, northern saw-whet owl, northern waterthrush, winter wren, Bell=s vireo, brown creeper, Chuck-will=s-widow, pine siskin, purple finch, red-breasted nuthatch, western meadowlark, golden-crowned kinglet, blue grosbeak, common snipe, little blue heron, gadwall, American wigeon, green-winged teal, northern pintail, northern shoveler, redhead duck, ruddy duck, Wilson=s phalarope, and the yellow-headed blackbird. All of these species are relatively infrequent Ohio breeding birds at the edge of a larger, contiguous range with viable population(s) within the core of their range. These species have no federal endangered or threatened status, are at low breeding densities in the state, and have not been recently released to enhance Ohio=s wildlife diversity. With the exception of efforts to conserve occupied areas, minimal management efforts will be directed for these species because it is unlikely to result in significant increases in their populations within the state.

Reptiles

There are 5 endangered reptiles (Eastern massasauga rattlesnake, timber rattlesnake, copperbelly water snake, Lake Erie water snake, and the Eastern plains garter snake) in Ohio. Habitat destruction, human persecution, and unregulated collection have contributed to the decline of these species. In addition, all 5 endangered reptiles have very limited statewide distributions. Recovery efforts are currently underway for the Eastern massasauga rattlesnake, timber rattlesnake, and the Eastern plains garter snake. Recovery plans for the copperbelly water snake and the Lake Erie water snake are in development. Research is needed concerning the hibernation, seasonal activity, movement patterns, and foraging behavior of the Lake Erie water snake and the copperbelly water snake. This information will aid in conservation and management decisions needed for the species recovery. The reason for the decline of the Eastern

plains garter snake is not fully understood and needs to be determined. The potential of captive breeding to augment their declining population also needs further investigation. The Kirtland=s snake is a threatened species found in association with wet prairies. Their occupied Ohio range appears to be declining but because of their secretive nature and habitat preference, confirmed sightings are infrequent. The spotted turtle, also a threatened species, is associated with fens. Their population decline is directly linked to the destruction and fragmentation of fen habitats. They have also been locally vulnerable to over collection for the pet trade. Surveys are necessary to determine both species present distribution and abundance. There are 9 reptiles designated as species of concern (Eastern box turtle, Blanding=s turtle, false map turtle, coal skink, black king snake, Eastern garter snake (melanistic), shorthead garter snake, rough green snake, and the Eastern fox snake). Population declines and shrinking occupied ranges of these species are directly attributed to habitat destruction coupled with unregulated collection. It is anticipated that actions taken under other tactical plans and recently implemented regulations to restrict collection from the wild will reverse these trends. Research is also needed to assess the effects of forest management practices on survival and reproduction of state-listed reptiles.

Amphibians

The blue-spotted salamander, green salamander, cave salamander and Eastern spadefoot toad are the state=s endangered terrestrial amphibians. All 4 amphibians are endangered because of habitat destruction and each species occurs in only a few, isolated locations in Ohio. Ohio represents the extreme southern edge of the blue-spotted salamander=s range, which is found in a few locations in the Oak Savanna Focus Area. Conservation of the remaining 3 endangered amphibians will need to be addressed on a site-by-site basis. Protection of the few remaining breeding locations of these species will be critical in maintaining viable populations in Ohio. The mud salamander is the only amphibian designated as a threatened species. Ohio represents the northern edge of the mud salamander=s range and only 20 voucher specimens exist for this species. Little is known about its life history or current statewide distribution. A survey of historical locations and other areas with suitable habitat should be initiated to better delineate the salamanders occupied range. The four-toed salamander is designated as a species of concern. The four-toed salamander requires mature forests with bogs to complete their life cycle. While the species is believed to be scattered throughout the glaciated plateau, its current range and population size needs to be assessed. Research is also needed to assess the effects of forest management practices on survival and reproduction of state-listed amphibians.

Invertebrates

The mustard white butterfly is the only known extirpated invertebrate in Ohio. This butterfly is known from literature records in the vicinity of Toledo and may have occurred throughout much of the original Black Swamp. Because Ohio represents the extreme southern limit of the mustard white=s range and extensive habitat destruction in the Black Swamp region has occurred, repatriation of this species may not be biologically feasible and needs to be evaluated.

The Division of Wildlife is responsible for the conservation of 24 invertebrate (7 butterflies, 14 moths, and 3 beetles) terrestrial species designated as endangered in Ohio. The Mitchell=s satyr butterfly is known to be associated with fens supporting lush stands of sedges. This species was

recorded from 1 northeastern Ohio location in the 1920s and may be extirpated. However, continued attempts to locate this species in Ohio and identify its host plant, if found, are needed. Both the swamp metalmark and the purplish copper butterflies are found in association with fens. The swamp metalmark is known from only 2 locations while the purplish copper has a wider western Ohio distribution. Continued surveys by members of the Ohio Lepidopterists Society may locate additional localities of these 2 butterflies. The regal fritillary butterfly is associated with wet prairies and has declined substantially. Efforts to restore prairies and wetlands in areas where the regal fritillary still occur may bolster its population. Recovery plans are already being implemented for the Karner blue butterfly and the American burying beetle. Conservation measures outlined for the Oak Savanna Focus Area Plan are believed to provide the necessary habitat needed to sustain viable populations of the Karner blue butterfly, the Eastern Persius dusky wing butterfly, frosted elfin butterfly, and the *Ufeus satyricus* moth. Research and surveys are only beginning to identify the principal habitat associations, biology, and life histories of the remaining 13 endangered moths and the two other endangered beetles. Continued efforts to survey and study these endangered species, as well as those designated as threatened (Silver-bordered fritillary, wayward nymph*, Spartiniphaga panatela*, *Fagitana littera*, The pink-streak, *Cicindela hirticollis*, and the Cobblestone tiger beetle) or as species of concern (two-spotted skipper, grizzled skipper, looper moth, buck moth, one-eyed sphinx, precious underwing, *Macrochilo bivittata*, *Phalaenostola hanhami*, *Paectes abrostolella*, *Capis curvata, Tarachidia binocula*, *Apamea mixta*, *Agroperina lutosa*, columbine borer, bracken borer moth, osmunda borer moth, *Chytonix sensilis*, *Amolita roseola*, goat sallow, *Brachylomia algens,* purple arches, scurfy quaker, *Trichosilia manifesta, Euchlaena milnei, Agonopterix pteleae,* six-banded longhorn beetle, Cicindela splendida*, Cicindela ancocisconensis, Cicindela cursitans*, *Cicindela cuprascens*, *Cicindela macra*, and the Laricis tree cricket), are essential to determining if viable populations can be sustained. The olympia marblewing butterfly, and ten moths; Slender clearwing*, Sphinx lucitiosa*, *Tathorhynchus exsiccatus, Catocala marmorata*, *Catocala maestosa*, Subflava sedge borer moth*, Caradrina meralis, Calophasia lunula, Leucania insueta, Protorthodes incinct* are designated as species of special interest. While these invertebrates are occasionally documented within the state, they are not believed to have viable sustaining populations. In the future, if increased numbers and locations of these species are found, their status will be further evaluated. In addition, research is needed to assess the effects of forest management practices on survival and reproduction of state-listed invertebrates.

Objectives:

1) Restore viable populations and/or critical habitats of the state endangered Allegheny woodrat, trumpeter swan, osprey, bald eagle, peregrine falcon, common tern, and snowshoe hare, to the point they meet the criteria for downlisting by 2010.
2) Maintain and enhance habitats that support black bear and bobcat populations in rural eastern and southern Ohio in a manner that allows these species to meet criteria for downlisting by 2010.
3) Evaluate and initiate, if feasible, restoration efforts for the mustard white butterfly, loggerhead shrike and sandhill crane to enhance or reestablish these species within their former Ohio range.
4) Enhance populations and/or manage critical habitats of the state threatened upland sandpiper to the point this species meets the criteria for downlisting by 2010.

5) Determine the status of all species of concern.
6) Observe changes in the breeding numbers, locations, and the frequency and duration of occurrence of special interest species and reevaluate their status as warranted.

Approach: Much of what needs to be done to address the goal and objectives listed above will center on the protection of state-listed species= populations, conservation and restoration of their habitat, and aggressive research and surveys to guide our efforts. Furthermore, because more than 95% of Ohio is in private ownership, the Division will work closely with private landowners to enhance and conserve lands which support state-listed wildlife. Finally, while the designation of other terrestrial species as endangered, threatened, or species of concern is not anticipated, if species are listed during this strategic planning cycle appropriate measures will be implemented to restore viable populations.

Current projects and associated activities which should continue or possibly be expanded include: (1) common tern nest monitoring, with an increase in nesting platforms and possible modifications to platforms (W2CMO4), (2) expanding the wetland breeding bird survey statewide (WWCR01), (3) bald eagle nest monitoring (WWCR02), (4) trumpeter swan nest and production surveys and swan releases designed to induce migratory behavior (WWCR03), (5) osprey hacking and nest monitoring (WWCR04), (6) river otter watershed surveys, with a new study involving mark and recapture (WWPR04), (7) the statewide monitoring of forest birds (WFCR04), bobcats (WFCR01), black bears (WFPR07), and timber rattlesnakes (WACR05), (8) locating and protecting with bat-friendly gates, mines and caves serving as hibernation roost sites for Indiana bats and other species (WFCR03 and WACR02), (9) surveying the population status of all bat species in the Preble Underground Mine, (10) efforts to monitor barn owls statewide (WUCR01, W1CM02, W2CM05, W3CM02, W4CM01, W5CM02), (11) efforts to monitor peregrine falcons statewide (W1CM01, W2CM07, W3CM01, WUCR06), (12) developing radio-tracking techniques to assess barn owl habitat use (WUCR07, WUCR05), (13) continuing and expanding surveys to assess the population status of cave-dwelling bat species, (14) continuing current research and surveys to determine hibernation, seasonal activity, movement patterns, and foraging behavior of the Lake Erie water snake (WACR09) and the copperbelly water snake, (15) continuing reintroduction and monitoring efforts for the Karner blue butterfly (W2CM06) and the American burying beetle (WACR12), (16) providing technical assistance to private landowners who wish to enhance and/or restore state-listed species habitat (W1PM06, W2PM06, W3PM06, W4PM06, W5PM06), (17) continuing and expanding efforts to survey and study state-listed invertebrate species (WACR03), (18) continuing long-term monitoring of butterflies and moths throughout Ohio (WACR10), (19) maintaining and expanding the Frog & Toad Calling Count Survey routes (WACR04) and other herpetofauna surveys, (20) continuing surveys of state-listed species on wildlife areas (WACR06, WWCR12), (21) continuing and expanding GIS applications for all wildlife areas and participation in Ohio=s GAP analysis (WANM02, WACM03), (22) continuing analysis of bird banding data (WWPR03), (23) continuing the reintroduction and evaluation of the snowshoe hare (WUCR03, WUCR04), and (24) continuing surveys and evaluating the potential of captive breeding to augment the declining population of the Eastern plains garter snake (WACR01), (25) continuing to trap and relocate wild Northern bobwhite quails (WUNR02), and (26) assessing habitat use by barn owls during the breeding season (WUCR07).

New initiatives which should be implemented include: (1) periodically update the wetland inventory and GIS database to guide habitat, research, and monitoring efforts (WACM03 and WANM02), (2) examine the sensitivity of wetland-dependent species to wetland size and habitat fragmentation, (3) determine the habitat needs of sandhill cranes (WWCR08), and (4) initiate a study involving mark-recapture of river otters to better estimate survival, reproduction, and other population parameters, (5) investigate the effects of forest management practices on survival and reproduction of state-listed reptiles, amphibians, and invertebrates (WFCR07), (6) compile all applicable data and scientific literature to assess the current status of Ohio=s species of concern, (7) design studies to better assess landscape and field characteristics that contribute to successful habitat management of a variety of species, as the GIS mapping is completed, (8) maternity roost tree and summer foraging habitat requirements of Indiana bats need to be quantified and related to forest management practices, (9) identify the factors responsible for the disappearance of the Allegheny woodrat from what appears to be suitable habitat should be investigated (WFCR02), (10) evaluate the feasibility of restoring Allegheny woodrats to historically occupied sites, (11) develop and strengthen partnerships with the Division of Parks & Recreation, the U.S. Fish & Wildlife Service, interested landowners, and non-governmental organizations interested in conserving island-dependant wildlife, (12) work with shoreline residents and businesses to ensure open rock cribs are used in the construction of new or refurbished docks on the Lake Erie islands, (13) establish statewide salamander (WACR07) and if feasible, small mammal surveys, (14) provide permanent conservation easements for private lands which currently support or may support state-listed wildlife or their habitat, (WACR08) and (15) initiate activities described in the Grassland Habitat and several of the Focus Area Tactical Plans to increase the population of the upland sandpiper, Henslow=s sparrow, bobolink, Northern bobwhite quail, and other grassland associated bird species (16) develop a nesting habitat model for barn owls (WUCR05), (17) evaluating habitats with potential value to sedge wrens (WUCR08) and grassland sparrows (WUCR09), (18) conserve nesting sites of the American bittern, least bittern, king rail, black tern, sandhill crane, sedge wren, northern harrier, snowy egret, and cattle egret, (19) evaluate the feasibility of repatriating viable populations of the mustard white butterfly, (20) implement a loggerhead shrike survey (WUCR10), (21) quantify impacts to colonial waterbirds by double-crested cormorants, (22) determine reason(s) for the decline of the Eastern plains garter snake, (23) initiate surveys for the Kirtland=s snake, (24) protect known breeding locations of endangered amphibians, (25) restore prairies and wetlands adjacent to habitats occupied by the regal fritillary butterfly, (26) assemble available habitat information relating to woodland hawks and warblers (WFCR06), (27) monitor and develop a demographic model of grassland birds on surface mines (WUCR09), (28) determine the status and management of forest breeding birds in Ohio (WFCR04), and (29) determine minimum area and habitat requirements of scrub-successional birds (WFCR05).

Section 6.0

Unique Habitats Tactical Plan

Section 6.1

Unique Habitats Tactical Plan

Unique Habitats Tactical Plan

Goal: To provide the habitat requirements necessary to maintain and enhance existing wildlife communities dependent upon unique habitats.

General Introduction/Background/Needs/Justification: At the time of European settlement, Ohio's landscape was primarily a vast expanse of forest, with a few large grassland and wetland areas. Also scattered throughout the state, in smaller amounts, were other significant habitats, referred to as unique habitats. Ohio's primary unique habitats include: Lake Erie islands, oak savannas, the boreal (snowbelt) community, and caves. There are 21 species (8 mammals, 3 birds, 2 reptiles, 3 amphibians, and 5 endangered invertebrates) dependant on Ohio's unique habitats. Rich and diverse assemblages of flora and fauna are associated with each unique habitat. While quality unique habitat still exists, the quickening pace of development and suburban sprawl threatens to further fragment these areas. In addition to conserving unique habitats, opportunities also exist to enhance man-made structures which simulate natural habitats for some wildlife, such as utilizing mines as hibernacula for the Indiana bat and skyscrapers as nesting sites for peregrine falcons.

Lake Erie Islands - Introduction/Background

The Lake Erie islands constitute an archipelago of 22 islands lying between the Canadian and American shores of the Western Basin of Lake Erie. Ohio has jurisdiction over 13 of the islands which range in size from the 1.2 acre Starve Island with 0.186 miles of shoreline to the 2,824 acre Kelleys Island which has 11.6 miles of shoreline. Although the Lake Erie islands are distinct from the neighboring mainland in climate, topography, surface geology and soils, they are considered vegetatively indistinguishable from the surrounding mainland. Shoreline characteristics vary from island to island but consist of beaches of sand, gravel or small stones; loose rocks; limestone shelves; and shear cliffs all with varying amounts of vegetative cover. The islands were first settled between 1810-1835, with quarrying of limestone (Kelleys Island) and vineyard culture (Middle Bass Island) becoming important by the end of the century. The quarry industry declined significantly in the 1940s while the vineyard industry, which peaked in the 1890s, today is minimal.

The Lake Erie Islands historically have been an important staging and stop over location for a variety of migratory avian species. In addition, West Sister Island currently supports approximately 40% of all herons and egrets nesting in the U.S. Great Lakes with the largest colony of snowy egrets (<10 pairs), the only little blue heron colony (<5 pairs), and the largest colony of great blue herons, great egrets, and black-crowned night-herons. The entire population of the Lake Erie water snake is restricted to eight Lake Erie islands. The snake's population has declined on 3 of the 4 Ohio islands most important to its long-term survival. This decline resulted in the species being listed as federally threatened in 1999 and state endangered in 2000.

Today, approximately 900 acres of island habitat including some shoreline is managed by the Ohio Department of Natural Resources and the US Fish and Wildlife Service.

Lake Erie Islands - Needs/Justification

The conversion of the Lake Erie islands' landscape has been dramatic. Island forests were cleared for agricultural endeavors and limestone quarrying was an important industry through the 1800s. Since the early 1900s, the islands have been developed at a quickening pace as summertime residences and to meet the needs of the growing tourism industry. Today nearly a

million tourists visit the islands each summer to camp, bike, boat, sail, fish, and sight see.

Human disturbance, habitat degradation and destruction, coupled with shoreline alteration and development are the most serious threats to island-dependant wildlife. The Lake Erie water snake's population has suffered additional declines from people killing them. Research is needed concerning the hibernation, seasonal activity, movement patterns, and foraging behavior of the Lake Erie water snake. This information will aid in conservation and management decisions needed for the species recovery. Research is also needed to quantify impacts to colonial waterbirds and other avian communities that are potentially affected by vegetation changes resulting from roosting/nesting cormorants. In addition, cormorants compete with these birds for nest sites. Information is needed to determine whether the potential exists to develop cormorant-specific management programs on the breeding grounds without simultaneously impacting other avian communities. On Lake Erie islands, cormorants nest primarily in trees in close proximity to other colonial-nesting species. The habitat alteration/competition problem is discouraging given the lack of alternative nesting sites for colonial waterbirds. The black-crowned night heron and the cattle egret have experienced a steady decline in nesting pairs on West Sister Island with possible elimination of the breeding colonies in the near future if the decline continues unabated. Conservation of nesting sites will be the emphasis of management activities for colonial waterbirds. Furthermore, the feasibility of habitat enhancement on Green Island for reestablishing the Lake Erie water snake and attracting nesting colonial waterbirds should be assessed. Finally, fluctuating water levels in the lake, shoreline erosion, pollution or chemical contaminants, and the impacts of aquatic nuisance species on the prey base are also unknown factors which may be detrimental to island-dependant wildlife and need to be assessed.

Because the actual amount of habitat required to sustain viable populations of the endangered Lake Erie water snake is unknown, the existing inland and shoreline habitat needs to be conserved and enhanced wherever feasible.

Oak Savannas - Introduction/Background

Oak savannas are limited to the northwestern portion of the state, along a sandy belt of soil known as the Oak Openings in parts of Henry, Fulton, and Lucas counties. This area is 22 miles long, six miles wide, and encompasses 130 to 140 square miles. Oak savannas are dry areas dominated by drought-resistant prairie plants such as little bluestem, lupine, and widely-spaced oak trees and are often surrounded by spots of poor drainage supporting wetlands.

In 1859, Lucas County Commissioners led the effort to develop an extensive network of drainage ditches throughout the county to drain the wet prairies and make the land available to agriculture. The water table was lowered and the oak savannas and wet prairies were converted to pastures and farms. Draining the wet areas of the Oak Openings enabled farms and homes to exist in areas that were formerly wetlands. Over the years, numerous farms in the area were abandoned for the more fertile soils found in the nearby black swamp region. During the 1930s, farmed-out areas were planted in pines to keep sand from blowing across roads and against houses.

There are 4 endangered species, the blue-spotted salamander, the frosted elfin butterfly, the Karner blue butterfly, and the Eastern pursius dusky wing butterfly, dependant upon oak savanna habitat.

Oak Savannas - Needs/Justification
Today, less than 2% of the complex of dunes and swales that supported the sedge meadows, tallgrass prairies, barrens, and oak savannas remain. Once undesirable farm land, the close proximity of the Oak Openings to Toledo has resulted in its commercial, industrial and residential development. People's ability to commute longer distances and their desire to live in more rural areas has quickened the pace of development in the region and fragmented the oak savanna habitat.

While remnant oak savanna plant communities still exist on many residential properties, large, intact oak savanna habitat is limited. Few areas are connected leaving isolated oak savanna habitat scattered throughout the region.

Periodic fires which once sustained the oak savanna plant community by retarding succession only occur in intensively managed areas. Non-native, invasive species such as purple loosestrife out compete native plant communities and make restoring oak savanna habitat more difficult. In addition, the use of chemical controls (i.e., demilin, and Bt) for the eradication of the gypsy moth is known to impact non-target lepidopteran species. This could be devastating to lepidopterans with distributions which are limited to the Oak Openings.

Today, approximately 1,000 acres of oak savanna habitat is actively maintained by the Division of Natural Areas & Preserves and The Nature Conservancy. Remnant oak savannas, wet prairies, and sand dunes are scattered throughout an additional 8,300 acres owned by the Division of Forestry and the Toledo Metroparks.

Little is known about the symbiotic relationship of some wildlife species associated with oak savannas. Research is needed to identify the elements of these complex relationships and determine limiting factors for maintaining viable populations of oak savanna-dependant species. In addition, the habitat specificity of the Karner blue butterfly, Eastern Persius dusky wing butterfly, and the frosted elfin butterfly needs to be determined. The current distribution and abundance of the blue-spotted salamander needs to be established so that sound management practices can be implemented to conserve a viable population within the Focus Area.

Until data exist which quantify the minimum habitat requirements necessary to sustain viable populations of the three endangered lepidopterans, efforts need to be made to enhance, restore, and connect fragmented oak savanna habitat. Habitat should be maintained in a mosaic of open prairie grass areas with native lupines and nectaring plants (95%) interspersed with widely scattered oaks (3%) and small wetlands (2%).

Boreal Community - Introduction/Background
Boreal communities are generally thought of as areas which occur in northern regions of the United States and Canada. However, both boreal flora and fauna occur in extreme Northeastern Ohio. Robert Gordon (1969) used the 40 inch snowfall line to define the boundary between the hemlock-white pine-northern hardwood forest region extending north through Canada and the deciduous forest region running through Ohio and south through the United States. Boggy forests which developed at the edge of kettle lakes or acidic bogs in wet depressions where soils have high organic content would also be included in the boreal community (Barbara Andreas, 1989). Michael Lafferty (1979) defined this area of Ohio as the "snowbelt" which includes

Lake, Geauga, and Ashtabula counties. Based on these definitions, the historical distribution of boreal flora and fauna, and considering areas of urban expansion, the Boreal Community today is limited to those portions of Ashtabula County, the eastern 1/3 of Geauga County, and the northern 1/3 of Trumbull County where the average annual snowfall exceeds 60 inches.

Similar to marshes and swamps, Ohio's bogs have been greatly impacted since the arrival of European settlers. Bogs occur in depressions, usually glacial kettle holes, and are restricted to the glaciated region of Ohio. Bogs are characterized by soils made up of partially decomposed plant remains. Bogs have internal drainage and are fed by rain or ground water. There is often a remnant of open water in the center surrounded by a floating mat of sphagnum. Wooded or hemlock bogs are very rare in Ohio. Those that do occur are extremely small and usually have been altered from their natural state. They often occur in a larger wet forest complex and the hemlock stand is usually quite small. Today, hemlock bogs occur only in Ashtabula County, have been greatly reduced in size and are increasingly isolated. Less than 1% of Ohio's original bogs still support peatland associated flora.

Historical records indicate twelve wildlife species were dependent on Ohio's boreal habitat. These included the spotted turtle, four-toed salamander, fisher, lynx, porcupine, snowshoe hare, ermine, southern red-backed vole, woodland jumping mouse, dark-eyed junco, winter wren, and northern waterthrush.

Boreal Community - Needs/Justification

Approximately 43% of the state's human population resides in Northeastern Ohio. Losses of boreal habitat can be attributed primarily to agriculture, but also to recreation, water level changes, mining, and development. Many boreal areas have been destroyed, fragmented, and isolated as a result of commercial, industrial, and residential development.

Four of the twelve boreal-dependant wildlife species have been extirpated (fisher, lynx, porcupine, and snowshoe hare). The fisher and lynx probably were never common in Ohio and it is not likely that restoration efforts for either of these species would be successful. The porcupine, which was extirpated by 1900, was once common in extreme northeastern and northwestern Ohio. While porcupines occasionally enter the state on their own, there are no plans to reintroduce this species. Snowshoe hares were extirpated from Ohio by 1940. There was an unsuccessful attempt to reestablish a population of snowshoe hares in the 1950s. A second repatriation project was initiated in January, 2000 with releases in eastern Geauga County. Designated as special interest, little is known about the current distribution and abundance of the ermine, southern red-backed vole, and woodland jumping mouse. Surveys need to be initiated to assess their status and distribution. Breeding ranges of the endangered dark-eyed junco, winter wren, and northern waterthrush are at their southern edge in Ohio. Only a few nesting pairs of these species are found in the cool, humid microclimates of hemlock forests at scattered locations. Because Ohio is on the extreme edge of these birds' ranges, it is unlikely that management efforts would result in a significant increase in their populations. Therefore, with the exception of efforts to protect occupied areas, minimal management efforts will be implemented for these species. Population declines and shrinking occupied range of the spotted turtle are directly attributed to habitat destruction coupled with unregulated collection. Conservation of the remaining bogs and occupied areas of the spotted turtle and recently implemented regulations to restrict collection from the wild is expected to reverse this trend. Four-toed salamanders require mature forests with bogs to complete their life cycle. While the

species is believed to be scattered throughout the glaciated plateau, its current range and population size needs to be assessed within the Boreal Community. Efforts to conserve the larger, remaining tracts of boreal habitat along with existing hemlock stands and bogs within the area will be a priority.

Caves - Introduction/Background

Most of Ohio's caves occur in a 40-mile-wide track of land aligned north-south through the middle of the state (Brucker 1979). There are approximately 300 known caves which span the state from Adams County to the Lake Erie Islands.

In addition to naturally formed caves, there are 4,000+ recorded inactive underground mines resulting from mineral extraction. Most of these mines were the product of coal extraction and lie in the unglaciated region of the state. A few mines, such as the Preble County mine, occur in the glaciated western portion of Ohio and resulted from industrial mineral mining. Of the 4,000+ recorded mines, less than 20% are believed to have external entrances which are still open.

Both natural caves and man-made mines provide critical habitat for wildlife. The features common to most caves include total darkness, relative permanence (in contrast to more ephemeral environments like a forest), and relatively constant environmental conditions (temperature, relative humidity, minimal air flow). Two equally important features are caves' long history of isolation and their uniqueness. No two caves are alike in their physical, environmental, or biological features (Belwood, 1998). While structurally less stable than caves, man-made mines can offer similar microclimates.

There are five mammals, one amphibian, and two endangered invertebrates known to be dependant on caves or mines for a significant portion of their lives. Of the eight, the Allegheny woodrat, Indiana bat, Eastern small-footed bat, Rafinesque's big-eared bat, cave salamander, Ohio cave beetle, and Kramer's cave beetle are state-listed species.

Caves - Needs/Justification

To secure populations of most of Ohio's cave-wildlife species, a minimum of 25% of all caves or quality mines must be protected. This can be accomplished by installing bat-friendly gates in all high quality mine entries and conserving natural buffer zones (a minimum of 200 acres) around the cave or mine entries known to support hibernating bats.

While difficult to enforce, Ohio's Cave Protection Act (Ohio Revised Code 1517.21 to 1517.26) makes it illegal to kill, harm, or disturb any cave life. Human disturbance (resulting from recreational caving, commercialization, and vandalism) is the most serious threat to cave-dependant wildlife. Sealing and improper gating also reduces or eliminates the availability of mines to wildlife. In addition, only 1/3 of the known caves and less than 10% of the mines, with open external entrances, have been surveyed. Properly designed and installed gating can provide secure environments for cave-dependant wildlife. Research is needed to determine the habitat specificity of all state-listed invertebrates which occupy caves. Many wildlife species are limited to very specific locations within the cave or mine complex. Research is also needed to better understand the biology and life history of these species and their relationship to the micro-habitats which they occupy. Furthermore, opportunities exist to provide quality hibernacula for Indiana bats by enhancing internal features of man-made mines, to simulate the humidity,

airflow, and micro-habitat required by these bats, but this has not been well studied or attempted. The feasibility of enhancing these mine features needs to be determined. Additional surveys and research are needed to adequately assess the population status of all cave dwelling bat species. All Ohio bats are insectivores and are known to feed over a variety of habitats including riparian corridors, forests, grasslands and agricultural fields. In addition to protecting caves and mines, lands near cave entrances must be conserved to ensure the bats have adequate areas to feed to increase their fat reserves prior to entering a hibernaculum as well as at spring emergence. While Hobbs (1981) has recorded approximately 88 species and subspecies of invertebrates and 49 species and subspecies of vertebrates in Ohio caves, few scientists study cave life and there may be numerous species yet to be identified or discovered. Efforts to survey and research cave-dependant invertebrates need to be expanded.

Objective: Restore, enhance, and maintain unique habitats that will support viable populations of the 21 wildlife species listed in Appendix 1 of this plan as well as the numerous species with viable, broadly distributed populations also found within these areas.

Approach: To offset habitat losses and sustain viable populations of unique habitat-dependant wildlife will require cooperation of existing landowners and other land managing organizations and agencies. The Division must 1) develop and strengthen partnerships with state and federal agencies and non-governmental organizations (such as The Nature Conservancy) who own or manage land to conserve and restore unique habitat; 2) provide technical assistance to private landowners who wish to enhance and/or restore unique habitat (W2PM06, W3PM06, W4PM06, and W5PM06); 3) connect fragmented parcels of unique habitat to allow for wildlife movement between areas; 4) partner with private landowners to conserve unique habitat-dependant wildlife species through conservation easements, land donation or acquisition (only from willing sellers); 5) continue reintroduction and monitoring efforts for the snowshoe hare (WUNR03) and the Karner blue butterfly (W2NM22); 6) ensure that long-term monitoring of butterflies and moths continues; 7) continue to work with Lake Erie Island shoreline residents and businesses to ensure open rock cribs are used in the construction of new or refurbished docks; 8) continue research and surveys to determine hibernation, seasonal activity, movement patterns, and foraging behavior of the Lake Erie water snake; 9) identify and implement measures to ensure secure nesting sites exist for colonial waterbirds on the Lake Erie islands; 10) identify the causes for the decline of the black-crowned night heron populations and reverse the trend, if feasible; 11) evaluate the feasibility of providing quality hibernacula for Indiana bats by enhancing internal features of man-made mines; 12) initiate surveys to determine the current distribution and abundance of the ermine, southern red-backed vole, woodland jumping mouse, blue-spotted salamander, cave-dwelling bat species and cave-dependant invertebrates; and finally 13) continue locating and protecting, with bat-friendly gates, mines and caves serving as hibernation roost sites for Indiana bats and other species (WFNR03 and WANR05) and surveying the population status of all bat species in the Preble County Underground Mine.

Habitat objectives for all the focus areas were developed based on the best information currently available in terms of species-habitat relationships and the population ecology of associated wildlife species. Assumptions were made so that habitat work could proceed toward meeting plan goals and objectives. Clearly, evaluation and monitoring will be required periodically in each focus area for select species of interest to assess the validity of assumptions made during this planning process and to guide future revisions of these conservation activities. Thus, along

with projects designed to attain focus area habitat goals, appropriate surveys and research evaluations need to be developed and implemented to ensure that habitat projects are producing measurable and desirable results for the intended wildlife community.

Section 6.1.1

Unique Habitats Map

Unique Habitats

Section 6.1.2

Unique Habitats Species Likely to Benefit

Appendix 1 - Species expected to benefit within the Unique Habitats*	
Boreal Community	
Mammals	
Ermine	*Mustela erminea*
Southern Red-backed vole	*Clethrionomys gapperi*
Woodland jumping mouse	*Napaeozapus insignis*
Reptiles & Amphibians	
Four-toed Salamander	*Hemidactylium scutatum*
Spotted Turtle	*Clemmys guttata*
Caves	
Mammals	
Allegheny woodrat	*Neotoma magister*
Eastern Small-footed Bat	*Myotis subulatus leibii*
Indiana Bat	*Myotis sodalis*
Northern Long-eared Bat	*Myotis septentrionalis*
Rafinesque's Big-eared Bat	*Corynorhinus rafinesquii*
Amphibians	
Cave Salamander	*Eurycea lucifuga*
Invertebrates	
Kramer's cave beetle	*Pseudanophthalmus krameri*
Ohio cave beetle	*Pseudanophthalmus ohioensis*
Lake Erie Islands	
Birds	
Black-crowned Night-Heron	*Nycticorax nycticorax*
Great Blue Heron	*Ardea herodias*
Great Egret	*Casmerodius albus*
Reptiles	
Lake Erie Water Snake	*Nerodia sipedon insularum*
Oak Savannas Focus Area	
Amphibians	
Blue-spotted Salamander	*Ambystoma laterale*
Invertebrates	
Frosted elfin	*Incisalia irus*
Karner blue	*Lycaeides melissa samuelis*
Persius dusky wing, Eastern	*Erynnis persius*
*Does not include species with viable populations broadly distributed throughout Ohio	
as identified on the Native & Naturalized Terrestrial Wildlife Species List.	

Section 7.0

Wetland Habitat Tactical Plan

Section 7.1

Wetland Habitat Tactical Plan

Wetland Habitat Tactical Plan

Goal: Increase the total wetland acreage (wet woods, shrub swamp, and marsh) within the state.

Intro/Background: Before European settlement, Ohio's wetlands covered 18.9% (5 million acres) of the state. The majority of these wetlands were swamp forest, 3 million acres of which composed the Great Black Swamp in northwest Ohio. This massive swamp was approximately 120 miles long and 40 miles wide. As settlers moved west, they drained the wetlands for timber and farming, thus eliminating 87% of the state's original wetlands. An estimated 661,000 wetland acres remained in the 1980s when the most recent inventory of Ohio wetlands was completed. At that time the remaining wetlands consisted primarily of wet-woods (68%), shrub swamps (16%), and marshes (16%). Wetland-dependent wildlife species have been severely impacted by this significant reduction in the amount and quality of wetland habitat.

Need/Justification: Wetlands are among the most biologically productive habitats in the world, yet, in Ohio, they are also one of the most frequently destroyed. Ohio ranks second only to California in wetland loss since 1780. The Ohio Working Group of Partners in Flight noted that grassland and wetland birds were in greatest need of conservation in the state due to habitat losses. Wetland habitats are also compromised by their size and location. Many wetlands are small, isolated habitats surrounded by suburbia or farm fields, thus their wildlife value is fairly low. Non-native, invasive plants (e.g., purple loosestrife, phragmites, Eurasian milfoil) are also a major threat to wetlands, and management of Ohio wetlands has largely become a nonstop battle to control these exotics.

Since the early 1980s, federal and state programs have slowed the loss of wetlands, and several agricultural/conservation programs now exist which provide incentives to restore wetlands. Wetland mitigation also serves to keep wetlands on the map; however, compared to the original wetland, the quality, function, and location of mitigated wetlands as wildlife habitat is unclear. Evaluation needs to be conducted of vegetative and wildlife response to newly constructed wetlands to ensure that mitigated wetlands are functionally equivalent to the original destroyed wetlands. The quantity and quality of Ohio's wetlands must be maintained, since a decline in either will decrease the value of this critical wildlife habitat.

Objective: Increase Ohio's wetland acreage by 500 acres/year for 10 years from 661,000 to 666,000 acres.

Approach: State wildlife areas are a critical component to Ohio's wetland habitat as they provide core wetland areas surrounded by smaller private wetlands. Management of high-quality public wetlands is vital to showcase proper wetland management to the public, and to provide a central wetland habitat area for wildlife to expand into surrounding private wetlands. To benefit the greatest number of resident and migratory wildlife species, wetland construction and restoration efforts should focus on creating wetland complexes. Communities of aquatic vegetation should be manipulated using water level control, discing, burning, planting, and herbicides to attain an interspersion of wetland types (e.g., moist soil, hemi-marsh, deep water, etc.) within the wildlife areas. Although a significant effort is planned to restore wetland habitats within several focus areas in an attempt to ensure the maintenance of viable wetland wildlife populations, it is equally imperative that efforts be made to ensure the health of these wetland-dependent species throughout the state. Wetland conservation efforts can not be limited to focus areas or even state wildlife areas if the objective of this plan is to be met.

The majority of wetland acreage lies within the private sector, so efforts need to be focused on educating private citizens on the value of wetland stewardship and on providing technical guidance on wetland restoration and management. The 3 wetland focus areas chosen by the Division of Wildlife (Lake Erie marshes, Killbuck, and Grand River/Mosquito Creek) have also been identified in the North American Waterfowl Management Plan (NAWMP) as regions targeted for private-land wildlife habitat efforts. Financial assistance through NAWMP grants or NRCS administered programs (e.g., WRP, CREP) should continue to be used as landowner incentives to preserve, create, restore, or manage wetlands for wildlife.

The following activities or projects should continue: restoration or creation of quality wetland habitats on wildlife areas, (W2PM03, W3NM26, W3NM27, W4NM01), management of public lands for wetland wildlife (W1PM01, W2PM01, W2PX01, W3PM01, W4PM01, W5PM01, W4NM08, W2CM02), technical assistance on private lands (W1NX05, W1PM05, W2PM05, W3PM05, W4PM05, W5PM05), wetland management on private lands (W1PM06, W2PM06, W3PM06, W4PM06, W5PM05, W5PM06, WANM03), biological control programs such as the purple loosestrife beetle (WWCR05), wetland habitat coordination and evaluation and coordination of Lake Erie habitat management with other agencies (WWCR09).

Construction and restoration of new wetlands on wildlife areas should remain a high priority since private wetlands are still being drained. We need to continue to be active in the area of wetland mitigation to ensure that wetlands which are destroyed are replaced by mitigated wetland habitat of equal or better value to wildlife. An evaluation of mitigated wetlands needs to be done to ensure they are functionally equivalent to the original, destroyed wetland habitat. Partnerships with conservation organizations such as Ducks Unlimited and Pheasants Forever will continue to help the Division increase wetland acreage through financial or in-kind contributions. District Operational Plans should focus necessary resources to create and maintain quality wetland complexes. Also, special efforts should be made to protect existing fens and bogs since some of Ohio's wildlife species (e.g., spotted turtle) are totally dependent on this rare habitat. Six-hundred-twenty-five acres of wetland habitat should be restored or enhanced statewide (including Focus Areas) annually.

New initiatives should be implemented to 1) periodically update the Ohio wetland inventory and GIS database to guide habitat, research, and monitoring efforts; 2) examine sensitivity of wetland-dependent species to wetland size and habitat fragmentation (similar to Partners in Flight Grassland Bird Conservation Area model); and 3) create financial incentives to construct or restore private land wetlands.

Section 8.0

Streams and Watersheds Tactical Plan

Section 8.1

Streams and Watersheds Tactical Plan

Ohio Department of Natural Resources
Division of Wildlife

Comprehensive Wildlife Conservation Strategy

STREAMS AND WATERSHEDS TACTICAL PLAN 2005-2010

GOAL
To use a watershed approach in protecting and managing riparian habitats to enhance aquatic wildlife abundance and diversity, and increase recreational opportunities in Ohio's Focus Watersheds.

Introduction
Streams and riparian habitats are the most biologically diverse aquatic systems in Ohio. The structural variability of streams creates highly diverse habitats that are inhabited by many aquatic species, including over 153 fishes, 63 mussels, 14 amphibians and thousands of crustaceans and insects. Almost all of Ohio's state-listed threatened and endangered aquatic species are primarily stream-dwelling. Unfortunately, the rich diversity of streams is imperiled by a multitude of stressors.

As Ohio's population continues to increase, development of rural land and resulting fragmentation of wildlife habitat threatens many streams, which are Ohio's most biologically diverse aquatic habitats. Habitat loss and degradation, changes to hydrology, excessive sedimentation, channelization, and loss of floodplain connectivity all impact aquatic communities. Additionally, aquatic invasive species threaten to further impact native species and degrade habitats. Resource agencies and conservation groups realize that habitat protection and restoration must be done at the watershed level to be most effective.

The DOW realizes that to effectively implement watershed approaches requires collaboration with other agencies and NGO's that share common goals regarding the status and function of watersheds. The DOW must form broad coalitions to ensure effective planning, maximize resources, and efficiently implement conservation and restoration programs. The recurrent theme of partnerships throughout this document is intentional and critically important for achieving our goals.

Focus Watersheds
Focus Watersheds were drawn from the ODNR Candidate Streams for Protection and Restoration (see Section 8.3.1). This rates Ohio watersheds by integrating measures of physical and biological integrity, biodiversity, and recreational opportunity. All watersheds received a prioritization score which ranks their relative importance for protection and restoration activities.

The DOW has identified eleven Focus Watersheds to concentrate efforts related to aquatic portion of its CWCS. These include the highest scoring watersheds in Ohio. Watersheds in both the Lake Erie and Ohio River drainages representing all of Ohio's major ecoregions have been included. All have diverse habitat types with high use designations and excellent biodiversity. Most are Ohio Scenic Rivers.

Focus Watersheds for Ohio's Aquatic CWCS

Watershed*	Prioritization Score	Ohio Drainage (mi^2)
Little Miami River	14	1755
Grand River	11	705
Scioto River	11	6510
Paint Creek	11	
Big Darby Creek	13	
Little Darby	10	
Muskingum River	11	8038
Kokosing River	9	
Walhonding River	9	
Great Miami River	10	3948
Stillwater River	6	
Cuyahoga River	8	425
Ohio Brush Creek	8	435
Little Beaver Creek	7	510
Maumee River	6	4862
Sandusky River	6	1420
Chagrin River	4	264
	Total:	28872
	Ohio (land area):	40953
Percentage of Ohio covered by Focus Watersheds:		71%

*Italicized are important sub-watersheds of the Focus Watershed

IMPLEMENTATION OF STREAMS AND WATERSHEDS STRATEGIC PLAN STRATEGIES

Dam Removal and Fish Passage

Strategy:

- Remove dams that are no longer needed or justified.

Conservation Issues & Threats	Conservation Actions
Thousands of dams on Ohio streams cause habitat loss/fragmentation, increased sedimentation, decreased water quality, reduced biodiversity, and reduced animal movement and abundance.	Participate in ODNR Dam Removal Workgroup
	Develop partnerships with other government agencies and private firms to provide technical support and guidance for dam removal and fish passage projects
	Provide training for DOW staff in dam assessment and removal issues
	Identify and archive information on dams in Focus Watersheds
	Develop criteria for prioritizing candidate dams for removal; prioritize dams in Focus Watersheds
	Develop standardized DOW procedures for dam removal projects (including monitoring biotic communities and channel morphology post-removal)
	Obtain and assess public input on proposed dam removals
	Pursue at least one dam removal per year in each DOW District
	Assess dams that cannot be removed for other fish-passage options; develop natural fishways for passage where possible

Habitat Protection and Restoration on Private Lands

Strategies:

- Protect and restore forested riparian corridors, floodplains, and wetlands through conservation easements, acquisition, and landowner programs and incentives.
- Develop and support programs and incentives that encourage and maintain good stewardship practices for riparian and in-stream habitat
- Through partnerships, collaboration, and coordination, participate in and support stream and watershed efforts by other agencies, non-governmental organizations (NGOs), and other groups
- Develop and implement a Private Lands Aquatic Program.

Conservation Issues & Threats	Conservation Actions
Most riparian habitat in Ohio is privately owned; status and management of these critical habitats varies greatly, impacting habitat quality and biodiversity. Riparian habitats are rapidly being lost or degraded because of rapid development in much of Ohio. Restoring and protecting privately-owned riparian habitats is the single most critical component of managing biotic communities in Ohio streams. Partnerships among government agencies, NGO's, and private landowners are critical to maximizing resources and meeting watershed-level goals.	Finalize DOW Conservation Easement Policy
	Work with other ODNR divisions to improve and formalize procedures for conservation easements and acquisitions
	Develop partnerships with land trusts, watershed and conservation groups, and other government agencies to guide acquisition and protection activities in each Focus Watershed.
	Enter into MOU's with other organizations to formalize partners for holding and monitoring conservation easements
	Develop "anchor point" strategy for each Focus Watershed; prioritize areas for acquisition and protection to create contiguous riparian corridors and habitat for ASGCN
	Work with Ohio's Natural Heritage Database staff to develop GIS tools to archive and monitor status of protected lands in Focus Watersheds
	Implement DOW/OEPA Vernal Pool Mitigation Program; seek other opportunities for formal inter-agency mitigation programs
	Work with OEPA, ODOT, USACE, and other government agencies to use mitigation needs to protect riparian habitats in Focus Watersheds
	Expand DOW Livestock Exclusion Fencing Program to SWCD's in all counties in Focus Watersheds
	Promote landowner participation in state and federal land conservation programs (CRP, WRP, CREP, Landowner Incentive Program, Clean Ohio, etc.)
	Develop riparian habitat programs based on successful terrestrial programs (e.g Pastures to Prairies)
	Develop an Aquatic Private Lands Program to work with landowners to develop and implement habitat improvement projects (streambank stabilization, etc.)

Habitat Protection and Restoration on Public Lands

Strategy:

- Develop and implement stream protection best management practices on Division of Wildlife and other state-owned land.

Conservation Issues & Threats	Conservation Actions
The Ohio Department of Natural Resources owns hundreds of thousands of acres of land for purposes of conservation and recreation. Much of this land occurs within Focus Watersheds. The DOW must ensure that riparian habitats on public lands are managed to best benefit wildlife.	Work with DOW and other ODNR personnel to identify streamways on ODNR lands
	Work with Ohio's Natural Heritage Database staff to develop GIS tools to archive and monitor status of streamways and riparian habitats on ODNR lands in Focus Watersheds
	Develop interagency partnerships for creating and implementing riparian management plans
	Develop procedures for assessing and monitoring riparian habitats on ODNR lands
	Identify and prioritize opportunities to enhance habitats of ASGCN on ODNR lands

Biological and Habitat Assessment and Monitoring

Strategies:

- Protect high quality stream habitats and restore others based on the presence of a high aquatic diversity, rare and endangered species, good sport fishing, biological integrity, and other related criteria.
- Collect baseline stream habitat data using quantitative and qualitative methods for the purpose of restoration and monitoring change over time.

Conservation Issues & Threats	Conservation Actions
Habitat loss and impairment is the greatest general threat to Ohio's ASGCN. Insufficient data currently exists to adequately assess status and trends of ASGCN and their habitats. Developing effective management and research programs is hampered by chronic lack of data. A primary goal of the CWCS is implementation of a monitoring program to adequately assess status and trends of ASGCN and their habitats. Partnerships are essential among government agencies and NGO's for monitoring ASGCN because the DOW lacks sufficient personnel to conduct all needed surveys and research.	Develop processes for coordinating disparate sources (other government agencies, Ohio Biological Survey, university studies, etc.) of distribution and abundance data for ASGCN in Focus Watersheds; develop stream assessment module for the Ohio Fisheries Information System database (Appendix 5).
	Review existing data to identify data gaps and needs for research and management actions
	Develop stream assessment and monitoring module for DOW Inland Management System (Appendix 4) and formalize DOW Watershed Management Team
	Identify reference reaches of streams and habitats in Focus Watersheds to monitor for quantifying spatial and temporal trends in populations of ASGCN (and aquatic communities as a whole) and their habitats
	DOW personnel conduct annual assessment of ASGCN fishes in Focus Watersheds
	Identify and contract local experts to conduct annual assessments of non-fish ASGCN
	Review annual assessment results and refine monitoring program as needed
	Prioritize ASGCN regarding need for species-specific research, assessment and management projects; implement such projects as resources allow
	Develop strategic plans for management of selected ASGCN (Appendix 2)
	Conduct comprehensive surveys of freshwater mussels in all Focus Watersheds (Appendix 3)
	Continue for DOW to be a primary partner of the Freshwater Mussel Research & Conservation Facility at the Columbus Zoo and Aquarium
	Monitor and assess spread of invasive species and their impacts on ASGCN and their habitats

Restoration and Maintenance of Hydrologic Functions

Strategies:

- Protect and restore natural flow regimes including important ground water recharge areas, floodplains, wetlands, and stormwater retention areas.
- Participate in and support (e.g., technical assistance and funding) regional land use planning efforts in Ohio.
- Help develop model stream protection guidelines (e.g., generic conservation easements, a riparian protection ordinance).
- Review existing Division, state, and federal laws and regulations on stream habitat and propose new polices, rules, and laws where needed to strengthen statewide stream habitat protection initiatives and/or regulations.

Conservation Issues & Threats	Conservation Actions
Ohio is a relatively small state with a large population. Rapid development, urban sprawl, and increasing impervious surfaces are disrupting natural hydrologic functions. Altered hydrology may degrade or destroy stream and riparian habitat and disrupt biological functions and reduce biodiversity. Slowing overland flow of water into streams is critical to restoring natural flow regimes and protecting essential wildlife habitat.	Provide training in geomorphological, fluvial, and in-stream flow processes for DOW personnel
	Work with other government agencies and NGO's to coordinate watershed planning and restoration efforts
	Work with USACE, Ohio Conservation Districts, municipalities, and other dam-owning entities emulate natural flood-pulse and flow regimes
	Identify areas of compromised hydrologic function in Focus Watersheds, especially regarding impacts to habitat for ASGCN
	Identify and prioritize potential restoration projects (channel re-meandering, floodplain and backwater reconnection, etc.) in Focus Watersheds
	Work with private landowners to install control structures on or deactivate unneeded drainage tiles and ditches
	Participate in local and regional planning to encourage practices minimizing impacts on streams
	Review Ohio's Scenic Rivers and related legislation to assess authorities regarding land-use planning and development
	Work with SWCD's and county drain commissions to ensure that activities under drainage and county ditch laws are minimized or are implemented following BMP's
	Advocate for laws and agency rules that create and strengthen stream and riparian habitat protections
	Complete one geomorphological restoration project in each Focus Watershed per biennium

Educating Ohio's Citizens Regarding the Value of Steams and Watersheds

Strategy:

- Develop and provide stream education to landowners, the general public, schools, and public officials.

Conservation Issues & Threats	Conservation Actions
Most Ohioans do not completely understand or appreciate the full value of healthy, functional streams and watersheds. An educated public would lobby for and support stronger laws and programs for protection and restoration of streams and watersheds.	Fully utilize the DOW's public communication (TV, print, internet, etc.) and educational outlets to promote streams and watersheds
	Partner with SWCD's, The Farm Bureau, and other agricultural groups to develop and distribute educational materials to agricultural producers
	Continue working with the Columbus Zoo and Aquarium and COSI to develop additional stream and watershed-related continuing education modules for primary and secondary teachers; find additional partners for similar initiatives throughout Ohio
	Provide support to local watershed councils and other conservation organizations to aid their educational outreach activities
	Provide copies of "A Guide to Ohio Streams" to all school and public libraries in Ohio
	Develop a standardized streams and watersheds presentation for use by DOW staff; ensure that Fish Management and Research staff of each DOW district make at least five such presentations to school, business, and civic groups annually

Funding for a Streams and Watersheds Program

Strategy:

- Seek additional funding for the Streams and Watersheds Habitat Program.

Conservation Issues & Threats	Conservation Actions
Insufficient funding often is the limiting factor in implementing habitat protection and restoration. The DOW must ensure that sufficient funding is available to effectively carry out all Streams and Watersheds strategic objectives.	Pursue partnerships with local, state, and federal agencies to fund joint projects
	Develop a database of government and private funding sources
	Work with USACE, ODOT, and OEPA to develop programs to steer mitigation needs toward projects benefiting streams and watersheds
	Seek additional funding for habitat improvements from funding sources targeting management of T&E species
	Seek additional appropriations for the Streams and Watersheds Program

Ohio Aquatic Species of Greatest Conservation Need

The primary focus of the DOW Streams & Watersheds Tactical Plan is protection and restoration of riparian and in-stream habitats. As such, all native or naturalized species dependent upon riparian or in-stream habitats for all or part of their life histories are the intended beneficiaries of programmatic activities. In satisfying the CWCS requirement for choosing Aquatic Species of Greatest Conservation Need (ASGCN), the DOW wanted to focus on species that would be the best indicators of healthy, functional habitats. Trends in abundance and distribution of these species will be quantified through development and implementation of the IMS stream assessment program.

Additionally, species listed as ASGCN include the most likely candidates for future individual research and management projects. Sufficient data is lacking to quantitatively assess trends of statewide abundance and distribution of most of these species. As additional data becomes available through the IMS stream assessment program, informed decisions regarding development of research projects can be made. Paddlefish, brook trout, lake sturgeon, Hind's emerald dragonfly, and freshwater mussels as a group are examples of ASGCN for which the DOW currently is funding research and assessment projects.

All species listed as ASGCN are native to Ohio. These species have been drawn from Ohio and federal lists of threatened and endangered species and from species having NatureServe rankings of Vulnerable, Imperiled, or Critically Imperiled for Ohio.

The ASGCN list was assembled with input of personnel from the following agencies and organizations:

- Midwest Biodiversity Institute
- The Nature Conservancy – Ohio Chapter
- ODNR – Division of Natural Areas and Preserves
- ODNR – Division of Wildlife
- Ohio Biological Survey, Inc.
- The Ohio State University – Department of Evolution, Ecology and Organismal Biology

Data regarding distribution of ASGCN in Focus Watersheds was provided by the ODNR – Division of Natural Areas and Preserves' Natural Heritage Database. This is the most authoritative and reliable source for data on occurrence and distribution of diversity species for Ohio, incorporating data from a myriad of sources and providing reliable QA/QC for those data. Watersheds lacking certain taxa primarily reflect the paucity of distribution data for these species in Ohio, and, secondarily, the potential incomplete entry of all viable data into the Natural Heritage Database. The DOW intends to address both issues under the Streams and Watersheds Tactical Plan.

Aquatic Species of Greatest Conservation Need

FISH

Paddlefish *Polyodon spathula*
Shovelnose sturgeon *Scaphirhynchus platorynchus*
Lake Sturgeon *Acipenser fulvescens*
Spotted Gar *Lepisosteus oculatus*
Shortnose Gar *Lepisosteus platostomus*
American eel *Anguilla rostrata*
Ohio Lamprey *Ichthyomyzon bdellium*
Northern Brook Lamprey *Ichthyomyzon fossor*
Mountain Brook Lamprey *Ichthyomyzon greeleyi*
Silver Lamprey *Ichthyomyzon unicuspis*
American Brook Lamprey *Lampetra appendix*
Cisco (or Lake herring) *Coregonus artedi*
Lake trout *Salvelinus namaycush*
Lake whitefish *Coregonus clupeaformis*
Brook Trout *Salvelinus fontinalis*
Burbot *Lota lota*
Longnose sucker *Catostomus catostomus*
Blue Sucker *Cycleptus elongatus*
River Redhorse *Moxostoma carinatum*
Greater Redhorse *Moxostoma valenciennesi*
Mountain Madtom *Noturus eleutherus*
Northern Madtom *Noturus stigmosus*
Blue catfish *Ictalurus furcatus*
Pirate perch *Aphredoderus sayanus*
Western banded killifish *Fundulus diaphanus menona*
Channel darter *Percina copelandi*
Eastern Sand darter *Ammocrypta pellucida*
River darter *Percina shumardi*
Least darter *Etheostoma microperca*
Iowa darter *Etheostoma exile*
Bluebreast Darter *Etheostoma camurum*
Spotted Darter *Etheostoma maculatum*
Tippecanoe Darter *Etheostoma tippecanoe*
Variegated Darter *Etheostoma variatum*
Speckled chub *Macrhybopsis aestivalis*
Spoonhead sculpin *Cottus ricei*
Mississippi Silvery Minnow *Hybognathus nuchalis*
Bigeye Chub *Hybopsis amblops*
Rosyside Dace *Clinostomus funduloides*
Streamline Chub *Erimystax dissimilis*
Creek Chubsucker *Erimyzon oblongus*
Lake Chubsucker *Erimyzon sucetta*
Tonguetied Minnow *Exoglossum laurae*
Silver Chub *Macrhybopsis storeriana*
Pugnose Shiner *Notropis anogenus*
Popeye Shiner *Notropis ariommus*
Bigeye Shiner *Notropis boops*
Ghost Shiner *Notropis buchanani*
Bigmouth Shiner *Notropis dorsalis*
Blackchin Shiner *Notropis heterodon*
Blacknose Shiner *Notropis heterolepis*

Pugnose Minnow *Opsopoeodus emiliae*
Longnose Dace *Rhinichthys cataractae*
Goldeye *Hiodon alosoides*
Mooneye *Hiodon tergisus*
Ohio Muskellunge *Esox masquinongy ohioensis*

MUSSELS

Elephant-ear *Elliptio crassidens crassidens*
Yellow sandshell *Lampsilis teres*
Black sandshell *Ligumia recta*
Flat floater *Anodonta suborbiculata*
Wavy-rayed lampmussel *Lampsilis fasciola*
Round pig-toe *Pleurobema sintoxia*
Elktoe *Alasmidonta marginata*
Kidneyshell *Ptychobranchus fasciolaris*
Creek heelsplitter *Lasmigona compressa*
Three-ridge *Amblema plicata*
Purple Wartyback *Cyclonaias tuberculata*
Fanshell *Cyprogenia stegaria*
Butterfly *Ellipsaria lineolata*
Purple Catspaw *Epioblasma obliquata obliquata*
White Catspaw *Epioblasma obliquata perobliqua*
Northern Riffleshell *Epioblasma torulosa rangiana*
Snuffbox *Epioblasma triquetra*
Ebonyshell *Fusconaia ebena*
Longsolid *Fusconaia subrotunda*
Pink Mucket *Lampsilis abrupta*
Sharp-ridged Pocketbook *Lampsilis ovata*
Eastern Pondmussel *Ligumia nasuta*
Washboard *Megalonaias nervosa*
Threehorn Wartyback *Obliquaria reflexa*
Sheepnose *Plethobasus cyphyus*
Clubshell *Pleurobema clava*
Ohio Pigtoe *Pleurobema cordatum*
Pyramid Pigtoe *Pleurobema rubrum*
Fat Pocketbook *Potamilus capax*
Rabbitsfoot *Quadrula cylindrica*
Monkeyface *Quadrula metanevra*
Wartyback *Quadrula nodulata*
Salamander Mussel *Simpsonaias ambigua*
Purple Lilliput *Toxolasma lividus*
Pistolgrip *Tritogonia verrucosa*
Fawnsfoot *Truncilla donaciformis*
Deertoe *Truncilla truncata*
Pondhorn *Uniomerus tetralasmus*
Rayed Bean *Villosa fabalis*
Little Spectaclecase *Villosa lienosa*

AMPHIBIANS

Hellbender *Cryptobranchus alleganiensis*

CRUSTACEANS

Sloan’s Crayfish Orconectes sloanii

Great Lakes crayfish *Orconectes propinquus*
Northern crayfish *Orconectes virilis*
Fern Cave Isopod *Caecidotea filicispeluncae*
Frost Cave Isopod *Caecidotea rotunda*
Buckskin cave pseudoscorpion *Apochthonius hobb*

INSECTS

Racket-tailed emerald *Dorocordulia libera*
Brush-tipped emerald Somatochlora walshii
Blue corporal *Ladona deplanata*
Chalk-fronted corpora *Ladona julia*
Yellow-sided skimmer *Libellula flavida*
Riffle snaketail *Ophiogomphus carolus*
Canada Darner *Aeshna canadensis*
Mottled Darner *Aeshna clepsydra*
American Emerald *Cordulia shurtleffii*
Elfin Skimmer *Nannothemis bella*
Hine's Emerald *Somatochlora hineana*
Uhler's Sundragon *Helocordulia uhleri*
Frosted Whiteface *Leucorrhinia frigida*
Tiger Spiketail *Cordulegaster erronea*
Spine-crowned Clubtail *Gomphus abbreviatus*
Handsome Clubtail *Gomphus crassus*
Plains Clubtail *Gomphus externus*
Rapids Clubtail *Gomphus quadricolor*
Skillet Clubtail *Gomphus ventricosus*
Green-faced Clubtail *Gomphus viridifrons*
Northern Pygmy Clubtail *Lanthus parvulus*
Wabash River Cruiser *Macromia wabashensis*
Incurvate Emerald *Somatochlora incurvata*
Kennedy's Emerald *Somatochlora kennedyi*
Lilypad forktail *Ischnura kellicott*
River jewelwing *Calopteryx aequabilis*
Seepage Dancer *Argia bipunctulata*
Unnamed Caddisfly *Chimarra socia*
Unnamed Caddisfly *Oecetis eddlestoni*
Unnamed Caddisfly *Brachycentrus numerosus*
Unnamed Caddisfly *Psilotreta indecisa*
Unnamed Caddisfly *Hydroptila albicornis*
Unnamed Caddisfly *Hydroptila artesa*
Unnamed Caddisfly *Hydroptila koryaki*
Unnamed Caddisfly *Hydroptila talledaga*
Unnamed Caddisfly *Hydroptila Valhalla*
Unnamed Caddisfly *Hydroptila chattanooga*
Unnamed Caddisfly *Asynarchus montanus*
Unnamed Caddisfly *Nemotaulius hostilis*
Unnamed Mayfly *Rhithrogena pellucida*
Unnamed Mayfly *Litobrancha recurvata*
Unnamed Mayfly *Stenonema ithica*
Unnamed Midge *Rheopelopia acra*
Unnamed Midge *Bethbilbeckia floridensis*
Unnamed Midge *Apsectrotanypus johnsoni*
Unnamed Midge *Radotanypus florens*
Unnamed Midge *Cantopelopia gesta*

ASGCN DISTRIBUTIONS IN FOCUS WATERSHEDS

Fishes

Mussels

Amphibians

Crustaceans

Insects

Figure 1: Chagrin River Watershed Fish Distribution