# Management Plan for the Wilder Wildlife Management Area, Lyme, New Hampshire

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# Section 1. Introduction to the Wilder Wildlife Management Area

## Location

The 60-acre Wilder Wildlife Management Area (WMA) is located on River Road 0.75 miles south of East Thetford Road and 2 miles southwest of the center of Lyme, New Hampshire (Figure 1). The WMA is bordered to the west by the Connecticut River, to the east by River Road, and to the north by Grant Brook.

## Background of Land Acquisition

Two parcels comprise the WMA. The southern 2/3 of the property (approximately 40 acres) was purchased in 1964 from Edmond and Dorothy Goodwin. The northern 1/3 of the property (approximately 20 acres) was purchased in 1974 from Rosa Lee Fisher. Both parcels were purchased with Sport Fish & Wildlife Restoration funds administered by the U.S. Fish & Wildlife Service to provide habitat for migrating waterfowl and public access to the Connecticut River.

## History of Landuse

Little is known about the history of landuse for this WMA. The agricultural fields were farmed for decades and were kept in agricultural production from the time the department acquired them until 2002 when the existing agricultural agreement expired. Additional information will be added to this section as it is obtained.

# Section 2. Description of Natural and Cultural Features

## Soils

The soils at Wilder WMA are dominated by Peacham and Ossipee soils (18.80 acres) and Winooski silt loam (17.72 acres) with lesser amounts of Rippowam fine sandy loam (6.26 acres) and Hitchcock silt loam (4.23 acres), and less than one acre of Agawam fine sandy loam (Figure 2; Table 1). Approximately 18 acres (most of the existing fields) is comprised of prime farmland soils. Although these areas are moderately well to well drained, much of it experiences frequent flooding. An additional 6 acres are farmland soils of local importance, but are poorly drained and also experience frequent flooding.

Table 1. Soils of Wilder Wildlife Management Area, Lyme, NH.

| SOIL NAME | ACRES | FARMCLASS | DRAINAGE CLASS | FLOODING |
|---|---|---|---|---|
| AGAWAM FINE SANDY LOAM | 0.44 | Prime farmland | Well drained | none |
| HITCHCOCK SILT LOAM | 4.23 | Not prime farmland | Well drained | none |
| PEACHAM AND OSSIPEE SOILS | 18.80 | Not prime farmland | Very poorly drained | none |
| RIPPOWAM FINE SANDY LOAM | 6.26 | Local importance | Poorly drained | frequent |
| WINOOSKI SILT LOAM | 17.72 | Prime farmland | Moderately well drained | frequent |

## Natural Communities

No exemplary natural communities have been identified on the WMA. However, potential silver maple floodplain forest exists on the peninsula of land extending from the outlet of Grant Brook southward. Scattered silver maples also occur along the western bank of the WMA.

## Aquatic Features

The Wilder WMA is bordered by the Connecticut River to the west. Additionally, the WMA contains 10.5 acres of emergent wetland: 5 acres in the middle of the WMA and an additional 5 acres in the southern part of the property (Figure 3). Emergent wetlands are typically dominated by herbaceous perennial wetland plants such as cattails (Cowardin et al. 1979). There is some open water associated with both wetlands.

## Wildlife Including Threatened and Endangered Species

The Wilder WMA was purchased primarily to provide habitat for waterfowl. During six one-hour surveys completed in April, 1999 observers recorded 15 species of waterfowl using the WMA (Table 2; Hunt et al. 1999). A total of 725 observations were recorded, with 64% being observed in the backwater area between the mainland and the peninsula of land that extends from the outlet of Grant Brook southward. The majority of waterfowl observed were mallards (*Anas platyrhynchos*) and wood ducks (*Aix sponsa*) followed by Canada geese (*Branta canadensis*) and American black ducks (*Anas rubribes*). Also observed was one pied-billed grebe (*Podilymbus podiceps)*, which is a state endangered species.

Landbird surveys were also conducted. Six points were established at least 100 m apart and surveyed twice during the month of June for ten minutes/point. Two hundred forty observations were made of 47 species (Table 3; Hunt et al. 1999). Sixteen percent of the observations were of red-winged blackbirds (*Agelaius phoeniceus*). Yellow warbler (*Dendroica petechia*), cedar waxwing (*Bombycilla cedrorum*), song sparrow

(*Melospiza melodia*), common yellowthroat (*Geothlypis trichas*), and American goldfinch (*Carduelis tristis*) each comprised 5-7% of the observations. No state or federally listed species were observed during the landbird survey.

No other wildlife surveys have taken place on the WMA, and other than the single pied-billed grebe recorded in 1999, no state or federally listed wildlife species have been documented on the Wilder WMA. However, the state and federally endangered dwarf wedge mussel (*Alasmidonta heterodon*) has been identified 0.75 miles upstream of the WMA in the Connecticut River. Wood turtles (*Clemmys insculpta*), a species of special concern in New Hampshire, have been found three miles southeast of the WMA in the town of Lyme. Although not documented on the Wilder WMA, the wetlands on the WMA provide potential wood turtle habitat. Golden-winged warblers (*Vermivora chrysoptera*), another species of special concern, have been found three miles south of the WMA in the town of Hanover. Suitable habitat for golden-winged warblers could be provided if some of the existing fields were allowed to revert to a shrubland condition.

Although not documented on or near the property, the Wilder WMA has the potential to provide habitat for a number of other species of conservation concern including northern leopard frogs (*Rana pipiens*) and smooth green snakes (*Opheodrys vernalis*), whose habitat consists of marshes, wet meadows, pastures, and old fields among others; Fowler's toad (*Bufo fowleri*) whose habitats include riverbanks, fields, and pastures; and American woodcock (*Scolopax minor*) (Babbit 2005, Babbit and Friedenfelds 2005, Robinson and Oehler 2005, Tuttle and Marchand 2005).

Table 2. Waterfowl observed at Wilder Wildlife Management Area, Lyme, NH during 1999 surveys (Hunt et al. 1999).

| Common Name | Scientific Name | #Observed | %Observed |
|---|---|---|---|
| Mallard | *Anas platyrhynchos* | 271 | 37.4 |
| Wood Duck | *Aix sponsa* | 162 | 22.3 |
| Canada Goose | *Branta canadensis* | 101 | 13.9 |
| American Black Duck | *Anas rubribes* | 77 | 10.6 |
| Green-winged Teal | *Anas crecca* | 40 | 5.5 |
| Ring-necked Duck | *Aythya collaris* | 37 | 5.1 |
| Hooded Merganser | *Lophodytes cucullatus* | 17 | 2.3 |
| Common Goldeneye | *Bucephala clangula* | 6 | 0.8 |
| Snow Goose | *Chen caerulescens* | 4 | 0.6 |
| Common Merganser | *Mergus merganser* | 3 | 0.4 |
| Northern Shoveler | *Anas clypeata* | 2 | 0.3 |
| Bufflehead | *Bucephala albeola* | 2 | 0.3 |
| Pied-billed Grebe | *Podilymbus podiceps* | 1 | 0.1 |
| American Wigeon | *Anas americana* | 1 | 0.1 |
| Barrow's Goldeneye | *Bucephala islandica* | 1 | 0.1 |
| **Totals** | | **725** | **100.0** |

Table 3. Other birds observed at Wilder Wildlife Management Area during point count surveys in 1999 (Hunt et al. 1999).

| Common Name | Scientific Name | #Observations | % |
|---|---|---|---|
| Red-winged Blackbird | *Agelaius phoeniceus* | 36 | 16.1 |
| Yellow Warbler | *Dendroica petechia* | 17 | 7.6 |
| Cedar Waxwing | *Bombycilla cedrorum* | 16 | 7.1 |
| Song Sparrow | *Melospiza melodia* | 16 | 7.1 |
| Common Yellowthroat | *Geothlypis trichas* | 14 | 6.3 |
| American Goldfinch | *Carduelis tristis* | 13 | 5.8 |
| American Crow | *Corvus brachyrhynchos* | 8 | 3.6 |
| Willow Flycatcher | *Empidonax traillii* | 8 | 3.6 |
| Bank Swallow | *Riparia riparia* | 7 | 3.1 |
| Tree Swallow | *Tachycineta bicolor* | 7 | 3.1 |
| Warbling Vireo | *Vireo gilvus* | 7 | 3.1 |
| Common Grackle | *Quiscalus quiscula* | 6 | 2.7 |
| Gray Catbird | *Dumetella carolinensis* | 6 | 2.7 |
| Barn Swallow | *Hirundo rustica* | 4 | 1.8 |
| Eastern Kingbird | *Tyrannus tyrannus* | 4 | 1.8 |
| N. Rough-winged Swallow | *Stelgidopteryx serripennis* | 4 | 1.8 |
| Northern Flicker | *Colaptes auratus* | 4 | 1.8 |
| Red-eyed Vireo | *Vireo olivaceus* | 4 | 1.8 |
| Veery | *Catharus fuscescens* | 4 | 1.8 |
| Baltimore Oriole | *Icterus galbula* | 3 | 1.3 |
| European Starling | *Sturnus vulgaris* | 3 | 1.3 |
| Alder Flycatcher | *Empidonax alnorum* | 2 | 0.9 |
| Black-and-White Warbler | *Mniotilta varia* | 2 | 0.9 |
| Black-capped Chickadee | *Poecile atricapillus* | 2 | 0.9 |
| Mourning Dove | *Zenaida macroura* | 2 | 0.9 |
| Ovenbird | *Seiurus aurocapillus* | 2 | 0.9 |
| Swamp Sparrow | *Melospiza georgiana* | 2 | 0.9 |
| Yellow-rumped Warbler | *Dendroica coronata* | 2 | 0.9 |
| American Black Duck | *Anas rubripes* | 1 | 0.4 |
| American Redstart | *Setophaga ruticilla* | 1 | 0.4 |
| American Robin | *Turdus migratorius* | 1 | 0.4 |
| Belted Kingfisher | *Ceryle alcyon* | 1 | 0.4 |
| Black-throated Green Warbler | *Dendroica virens* | 1 | 0.4 |
| Bluejay | *Cyanocitta cristata* | 1 | 0.4 |
| Bobolink | *Dolichonyx oryzivorus* | 1 | 0.4 |
| Brown-headed Cowbird | *Molothrus ater* | 1 | 0.4 |
| Chestnut-sided Warbler | Vermivora chrysoptera | 1 | 0.4 |
| Chipping Sparrow | *Spizella passerina* | 1 | 0.4 |
| Eastern Wood Peewee | *Contopus virens* | 1 | 0.4 |
| Hermit Thrush | *Catharus guttatus* | 1 | 0.4 |
| Northern Cardinal | *Cardinalis cardinalis* | 1 | 0.4 |
| Tufted Titmouse | *Baeolophus bicolor* | 1 | 0.4 |
| White-breasted Nuthatch | *Sitta carolinensis* | 1 | 0.4 |
| Wood Duck | *Aix sponsa* | 1 | 0.4 |
| Wood Thrush | *Hylocichla mustelina* | 1 | 0.4 |
| Yellow-billed Cuckoo | *Coccyzus americanus* | 1 | 0.4 |
| Yellow-throated Vireo | *Vireo flavifrons* | 1 | 0.4 |
| | | 224 | 100.0 |

## Plants Including Threatened and Endangered Species

Along with the waterfowl and landbird surveys, a plant survey was conducted in 1999 over the course of the entire growing season and into late fall. The focus was to look for state endangered or threatened species. One hundred ninety-four species were documented on the WMA including five state threatened species and one species considered state historic, which hadn't been reported in the state for over 100 years (Appendix A; Hunt et al. 1999). The later species, large toothwort (*Cardamine x maxima)* grows on a narrow shelf of floodplain forest between River Road and the river. The species status is somewhat questionable as they are thought to be a sterile hybrid of common toothwort (*Cardamine diphylla)* and cut-leaved toothwort (*Cardamine concatenata)*, a state endangered species.

The state threatened species include meadow horsetail (*Equisetum pratense*), clustered snakeroot (*Sanicula gregaria*), Virginia waterleaf (*Hydrophyllum virginianum*), American bladdernut (*Staphylea trifolia*), and hackberry (*Celtis occidentalis*). Additionally, four plants listed under state rule Agr3800 as being invasive exotic plants also occur on the WMA. These include Morrow's honeysuckle (*Lonicera morrowii*), purple loosestrife (*Lythrum salicaria*), common reed (*Phragmites australis*), and multiflora rose (*Rosa multiflora*).

## Archeological and Historic Features

No archeological or historic features are known to occur on the WMA. The presence of these features will need to be explored further.

# Section 3 Management of WMA

## Management Goals

The New Hampshire Fish & Game Department is the guardian of the state's fish, wildlife and marine resources. The mission of the department is to work in partnership with the public to conserve, manage and protect these resources and their habitats, inform and educate the public about these resources, and provide the public with opportunities to use and appreciate these resources (NHFG 1998). As such, the primary goal of management on department lands is to improve and/or restore habitats for wildlife to aid in maintaining the state's native biodiversity. A secondary goal is to provide appropriate public access to department lands for recreational use of the state's fish and wildlife resources.

## Management Objectives

When determining habitat management objectives for a WMA, a number of issues are considered including:

- Deed restrictions and legal mandates. Legal obligations take precedence when outlining habitat management objectives. For instance, if the WMA was purchased with federal funds, the property must continue to fulfill the purpose for which it was acquired as outlined in federal grant agreements.
- Potential to provide habitat for state and federally listed species or species of conservation and management concern and critical wildlife habitats as outlined in the New Hampshire Wildlife Action Plan and the New Hampshire Big Game Plan. Potential is evaluated based on known habitat requirements of wildlife species, current vegetation composition, potential future vegetation composition given existing soil, aspect, hydrologic, and other site conditions, and landscape context.

Given these considerations the management objectives for the Wilder WMA include:

1) Create and maintain a grain crop on a portion of the WMA to provide a food source for migrating waterfowl;
2) Restore riparian buffers along the Connecticut River and existing emergent wetlands to enhance the water quality and wildlife habitats associated with these aquatic systems;
3) Increase the amount of shrubland to provide habitat for a number of wildlife species of conservation concern.

## Current Condition of WMA (Figure 4)

The WMA is currently comprised of the following habitats:

- **Old agriculture field (22 acres).** The agriculture fields were last farmed in 2002, and now contain a mix of old field grasses and forbs (e.g., meadowsweet, goldenrod, timothy, and reed canary grass, among others). There is little to no buffer between the agriculture fields and the Connecticut River and the emergent marsh in the center of the WMA.

- **Shrubland (3.5 acres).** Shrublands are primarily located along the edges of the old agriculture field and in between the emergent wetlands.

- **Open water wetlands (14 acres)**. These are primarily associated with the outlet to Grant Brook.

- **Emergent wetlands (10.5 acres)** – see page 3 for description.

- **Floodplain forest (6 acres).** Floodplain forest comprised primarily of silver maple and willow is located on the peninsula of land extending from the outlet of Grant Brook southward. This area, along with the edges of the agriculture fields are where most of the invasive exotic plants are located.

- **Forest (4 acres).** A small patch of forest is located in the northeastern part of the property adjacent to River Road and is comprised mostly of black ash, white ash, black cherry, beech, and yellow birch.

## Desired Future Condition (Figure 5)

The desired future condition of habitats on the WMA reflect the need to provide appropriate habitat for migrating waterfowl as required in federal aid grant agreements. It also reflects the lands ability to provide critical wildlife habitat for other species as outlined in the New Hampshire Wildlife Action Plan and the Big Game Plan.

- **Grain (7 acres; *Objective 1*).** This would be planted in two portions of the existing old agriculture field. Grain (e.g., corn, millet, etc.) would provide a food source for waterfowl migrating along the Connecticut River. It will also help to enhance food resources for big game species. The New Hampshire Big Game Plan calls for increasing deer and bear population levels and maitaining current turkey population levels in the Management Unit where the Wilder WMA is located and suggests enhancing habitat on state lands as one method to reach these objectives (NHFG 2005).

  The area planted to grain would need to be at least 100 feet from both the Connecticut River and the emergent wetland in the middle of the WMA. Runoff from an unbuffered field can degrade aquatic habitats by allowing runoff of fertilizers and pesticides into adjacent wetlands, and accelerating erosion and sedimentation. One hundred feet is the minimum buffer width to maintain water quality of adjacent wetlands (Chase et al. 1997).

- **Grass (1.5 acres: *Objective 2*).** The area designated to be planted to grass (e.g., orchard grass, timothy, etc.) lies in between the two areas to be planted to a grain crop. No portion of this area is more than 100 feet from either the river or the emergent marsh. As such, this area will be maintained in permanent grass cover to help maintain water quality of adjacent wetlands and yet provide a landing area clear of shrubs and trees to facilitate the use of the grain crop areas by waterfowl. Once planted, this area will be maintained via annual or biennial mowing with a brush hog between August 1 and the end of the growing season. Mowing late in the growing season will deter negative

impacts to breeding wildlife attempting to use the area while allowing control of woody shrub and tree species that may attempt to colonize the area.

- **Shrubland (10.5 acres; *Objectives 2 & 3*).** Shrublands have been idenfied as a critical wildlife habitat in the New Hampshire Wildlife Action Plan. This habitat type is declining in New Hampshire and throughout the Northeast as are the wildlife species associated with shrublands (Oehler and Snyder 2005). For instance, nearly half of the 33 shrubland birds covered by Breeding Bird Survey routes in the Northeast have significantly declined in the last 35 years (Dettmers 2003). Additionally, 139 species of reptiles, amphibians, birds, and mammals either prefer (17 species) or utilize (122 species) shrub and old-field habitats (Scanlon 1992).

  To increase the amount of shrubland habitat on the WMA, an approximately 5.5-acre portion of the old agriculture field near River Road will be left unmaintained. The same will be allowed along a buffer strip between the grain crop area and the emergent wetland in the center of the WMA. Leaving these areas to grow will allow colonization by shrubs and trees. These areas will be monitored to determine the appropriate time to return for management to maintain them in a shrubland state. This determination will be based on vegetation size, wildlife utilization, and available equipment. However, based on previous experience and on-site soil conditions, it is assumed maintenance will be needed every 5-8 years.

  Providing and maintaining shrubland habitat on the WMA may help in providing habitat for golden-winged warblers and American woodcock, two species of conservation concern. It will also provide additional habitat for other shrubland species including yellow warbler, song sparrow, chestnut-sided warbler (*Vermivora chrysoptera*), and yellow-billed cuckoo (*Coccyzus americanus*), among others. All of these have been identified on the WMA (Table 3) and many have experienced region-wide population declines.

- **Open water and wetlands associated with the outlet to Grant Brook (15 acres).** No management is currently planned for this area.

- **Emergent wetlands (10.5 acres; *Objective 2*).** Emergent wetlands are a critical wildlife habitat identified in the New Hampshire Wildlife Action Plan. Statewide, they provide habitat for 18 species of conservation concern. Wetlands are rich habitats that provide a number of critical functions including shoreline stabilization, sediment retention and erosion control, food web productivity, and wildlife habitat (Marchand 2005).

  As mentioned previously, appropriate buffers will be maintained adjacent to all wetlands to maintain water quality. Shrubland habitat will provide a buffer between the grain crop areas and the emergent marsh in the center of the WMA. Floodplain forest will buffer the Connecticut River from grain crop areas. Maintaining wetland habitats in good condition may provide habitat for wood turtles, a species of conservation concern that have been identified in the town of Lyme. The proximity of the wetland to shrubland and field

habitats may also provide habitat for smooth green snakes and northern leopard frogs.

- **Floodplain forest (12.5 acres; *Objective 2*).** Floodplain forest is another critical wildlife habitat identified by the New Hampshire Wildlife Action Plan. Floodplain forests support diverse plant and animal communities, protect and enhance water quality, and control erosion and sediment. Some researchers estimate that in Europe and North America, up to 90% of flood plains in North America are under cultivation and are functionally extinct. Habitat restoration is the most critical need for this habitat type in New Hampshire (Bowman 2005).

  Floodplain forest will be restored along the western and northern edges of the property to act as a buffer between the grain crop areas and the Connecticut River. NHFG biologists will consult ecologists from the New Hampshire Natural Heritage Bureau and The Nature Conservancy to aid in identifying the best means of restoration. Some options to investigate include:
  - Using silver maple seed harvested on site to direct seed the buffer area after it has been slightly tilled to create a seedbed.
  - Collecting seed from silver maples on site to grow to seeding/sapling stage in the State Forest Nursery for direct planting in the buffer.

  NHFG biologists will also consult ecologists from these organizations to ensure the protection of the three rare plant species that occur at the north edge of the old agriculture field where some of the floodplain restoration is planned. These species include Virginia waterleaf, tall coneflower, and hackberry.

  Restoring a buffer along the river will aid in enhancing and maintaining the water quality of the Connecticut River. Maintaining water quality including reducing sedimentation and erosion of streambanks are key strategies to maintaining habitat for the state endangered dwarf wedge mussel which have been identified in the Connecticut River just north of the WMA (Wicklow 2005).

- **Forest (4.5 acres)**. No management is currently planned for this small patch of forest. The only management likely to occur would be control of invasive exotic plants that may be found there.

Table 4. Acreage of current and desired future condition of habitats on the Wilder Wildlife Management Area.

| Landcover | CC[A] | DFC[B] |
|---|---|---|
| Grain | 0.0 | 7.0 |
| Grass | 0.0 | 1.5 |
| Old Field | 22.0 | 0.0 |
| Shrubland | 3.5 | 10.5 |
| Open Water | 14.0 | 14.0 |
| Wetland | 10.5 | 10.5 |
| Floodplain Forest | 6.0 | 12.5 |
| Upland Forest | 4.0 | 4.0 |
| **Total** | **60.0** | **60.0** |

[A] Current condition
[B] Desired future condition

## Inventories & Monitoring

Inventories and monitoring are important aspects of land management. Inventories can provide additional information not previously known that can help guide land management. Monitoring can help assess success of management and determine impacts on nontarget organisms. Inventory and monitoring projects that will be considered for the Wilder WMA include:

- Inventory abundance and distribution of invasive exotic plants to assess potential negative impacts on critical habitats and rare species and determine feasibility of control.

- Monitor existing populations of rare plants periodically to ensure habitat management is not deterring their long-term viability. As mentioned previously, three species occur in an area planned for floodplain forest restoration. The other two rare plant species documented on the WMA do not occur in areas where management is planned.

- Monitor breeding birds to track changes in species composition as habitat changes over time and to evaluate success of habitat management and restoration.

- Inventory WMA for presence of wood turtles, northern leopard frogs, fowler's toads, and smooth green snakes, and if documented, assess impacts of management on each.

## Section 4 Public Use and Recreation on the WMA

As already mentioned, the primary goal of management on department lands is to improve and/or restore habitats for wildlife to aid in maintaining the state's native biodiversity. Providing recreational opportunities is a secondary goal. Recreational activities that are compatible with the conservation of wildlife and other natural resources are encouraged. Recreational activities that are commonly practiced on department lands include hunting, fishing, trapping, wildlife viewing, and hiking, among others. Hunting, fishing, and trapping are allowed on all department lands by individuals with appropriate licenses. In addition to a license, trappers also require written permission by the department's Executive Director to trap on department lands. Motorized recreational wheeled vehicles (e.g., ATVs) are prohibited on department lands. It is not known to what extant any of the above recreational pursuits are practiced on the WMA.

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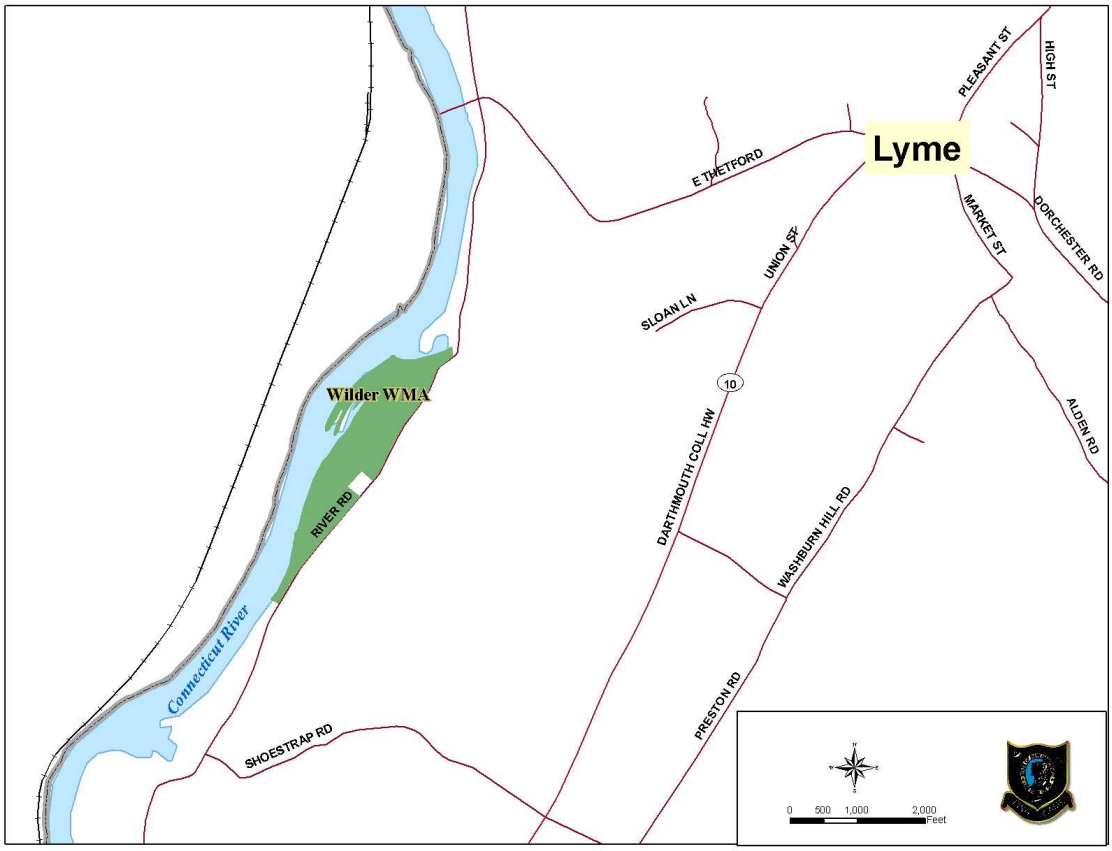


Figure 1. Location of Wilder Wildlife Management Area, Lyme, NH.

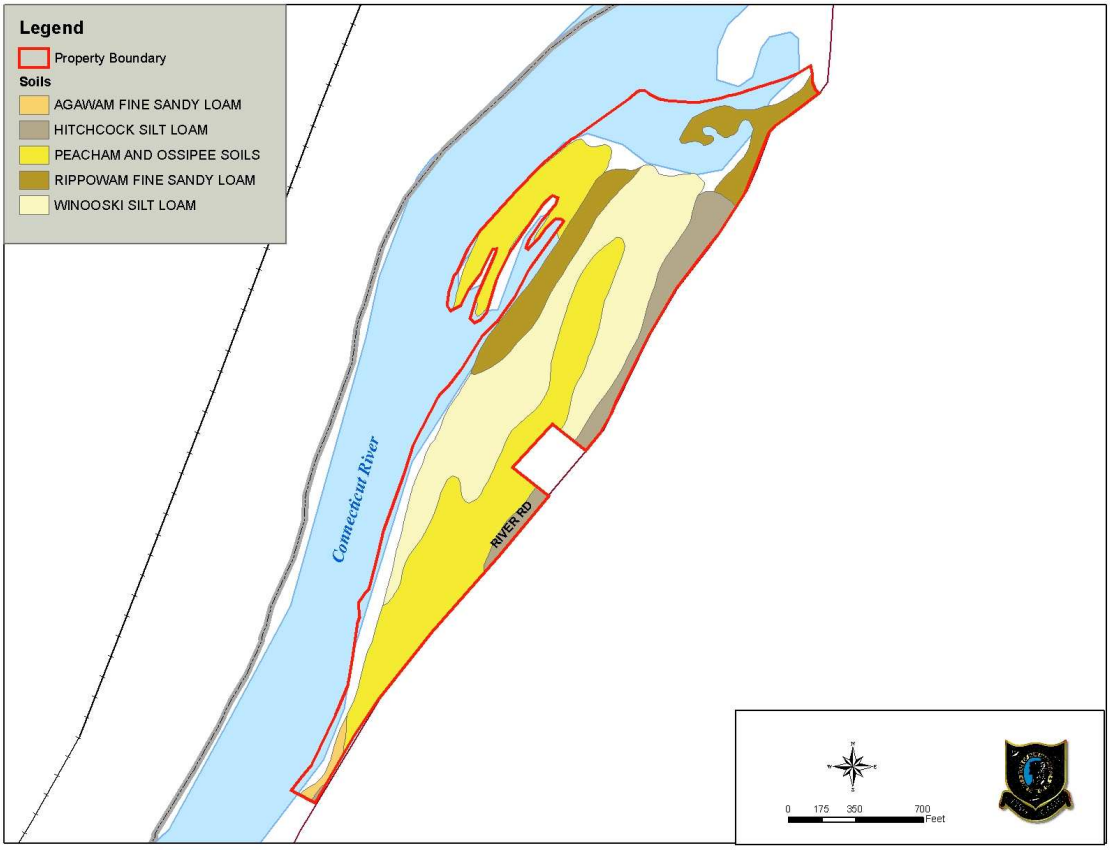


Figure 2. Soils of Wilder Wildlife Management Area.

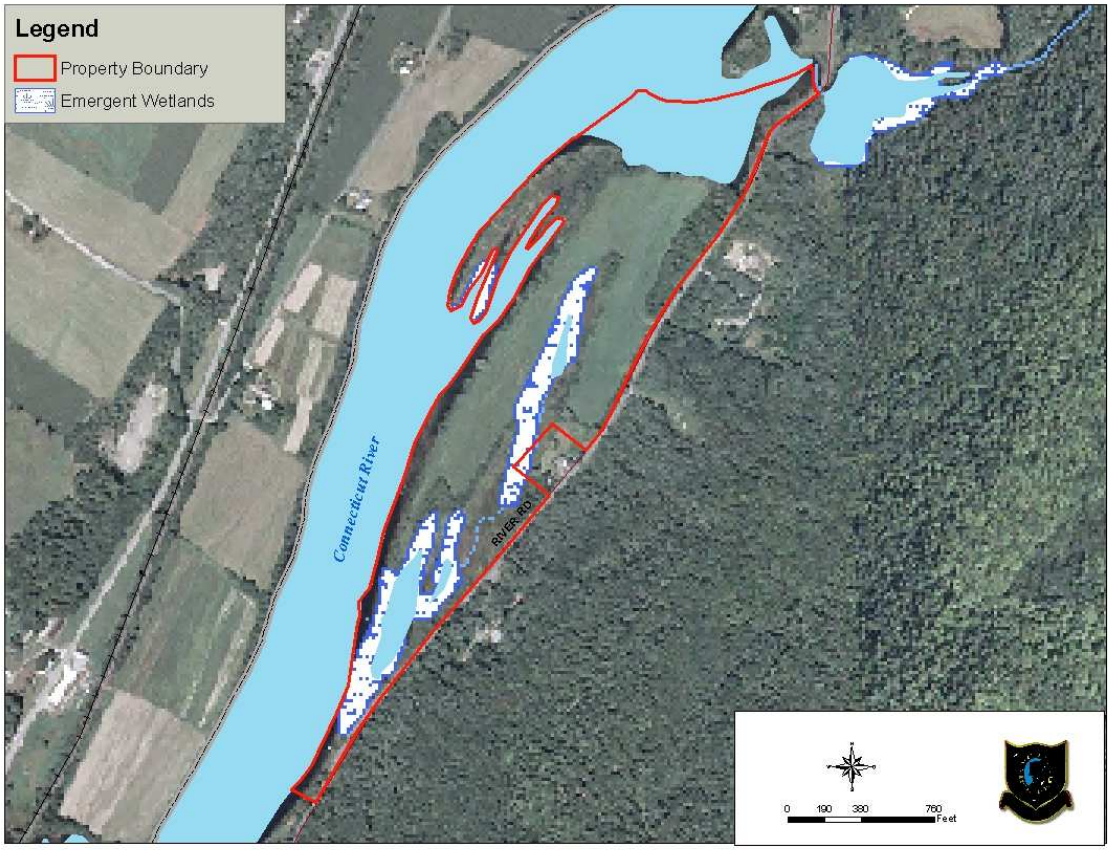


Figure 3. Wetlands on the Wilder WMA.

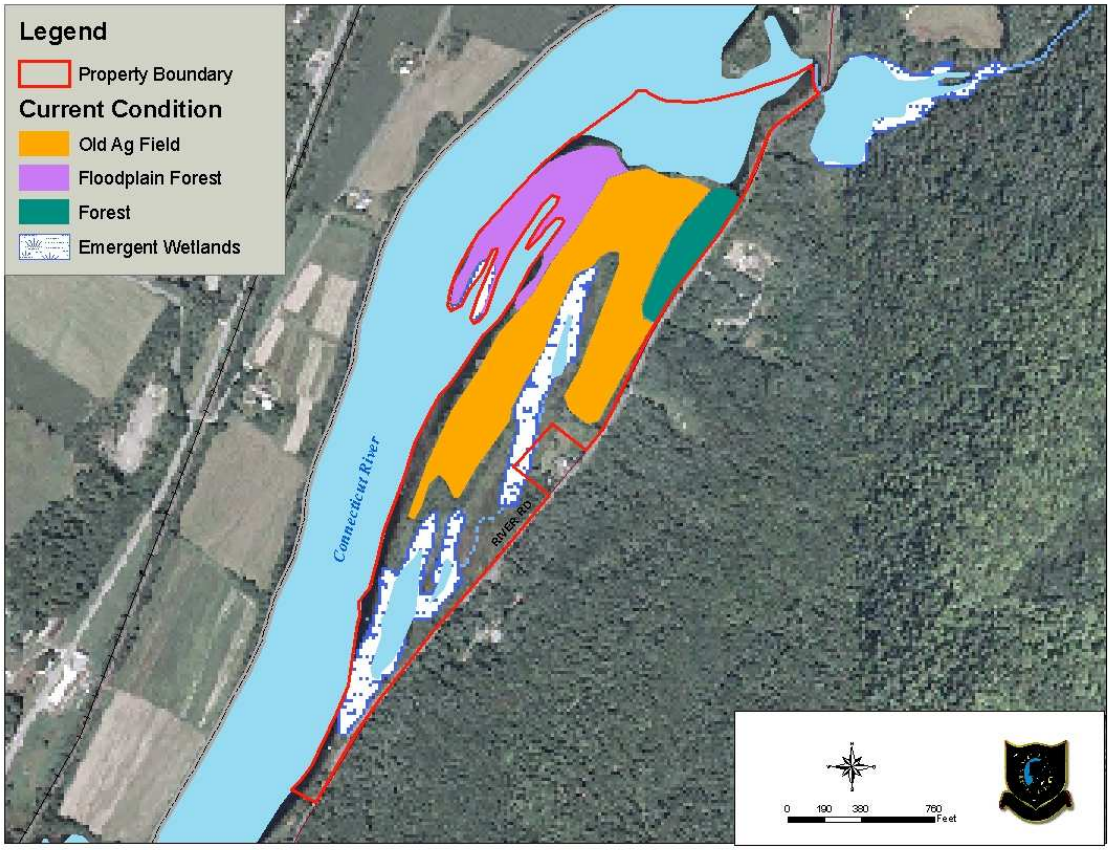


Figure 4. Current condition of wildlife habitats at Wilder WMA. Areas not delineated are a mix of shrubland and floodplain forest.

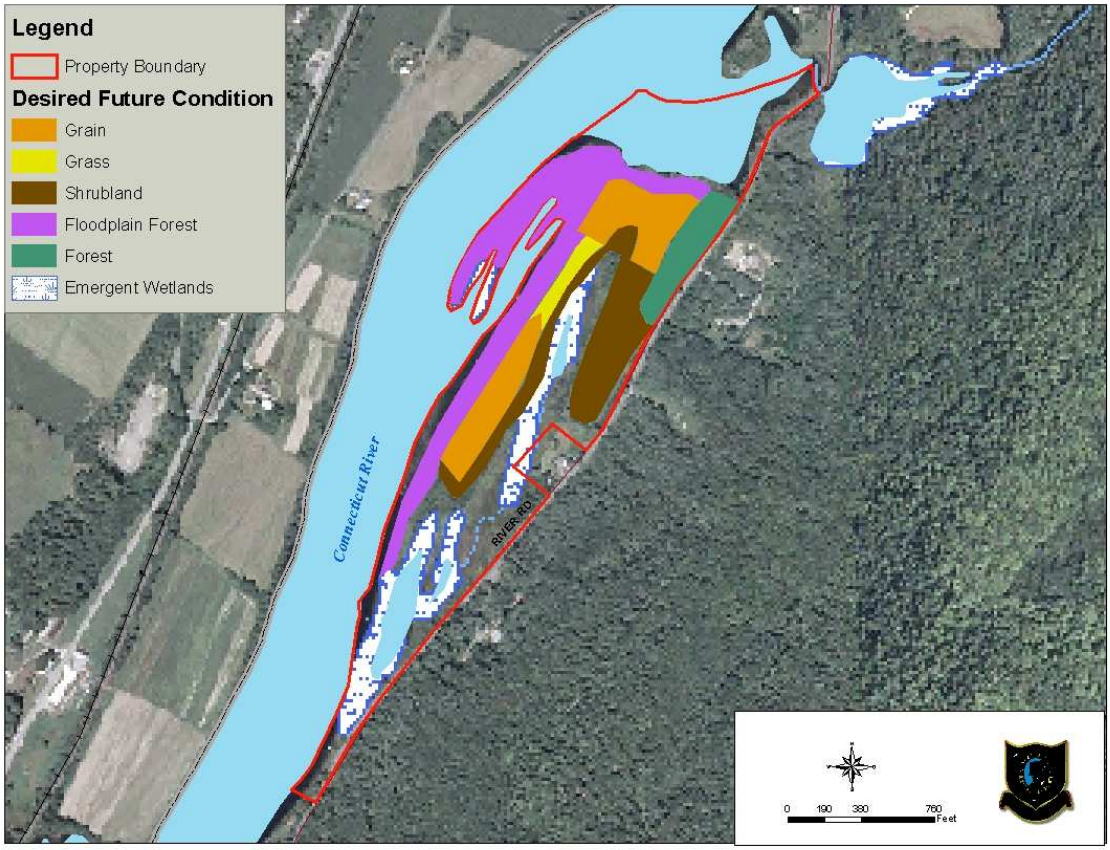


Figure 5. Desired future condition of wildlife habitats at Wilder WMA. Areas not delineated are a mix of shrubland and floodplain forest.