

U.S. Fish & Wildlife Service

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October 2007



# Great Meadows

*National Wildlife  
Refuge*

*Weir Hill Trail  
Red Maple Trail*



*printed on recycled paper with vegetable based inks*

## Welcome



*This goose, designed by J.N. Ding Darling, has become the symbol of the National Wildlife Refuge System.*

Welcome to the Great Meadows National Wildlife Refuge. The refuge spans 12 miles of the Sudbury and Concord Rivers, with a total of more than 3,800 acres within the Sudbury and Concord units. The trails at Weir Hill take visitors on a mile-long walk around marshes, upland trails, woodlands, fields, pond, and river.

Please visit us at the refuge headquarters with any questions you may have about the refuge.

## Weir Hill Trail

### Buttonbush and Purple Loosestrife - From the Deck

1

A good place to start your walk is from the observation deck at the main building. From here you have an excellent view of the Sudbury River and its floodplain ‘meadow’ covered in buttonbush, a native shrub which is a valuable part of the wetland / floodplain ecosystem. The submerged part of these plants provides habitat for many small invertebrates. These in turn are a food source for fish, frogs, and birds. The seeds of the buttonbush are also eaten by birds, and the bush itself is used for nesting by many bird species.

Wetlands make up 90 percent of Great Meadows. These wetlands serve many functions, from providing crucial nesting and feeding habitat to countless species, to playing a critical role as sponges which reduce erosion and flooding. These wetlands also recharge the groundwater supply – the water we drink – and filter out harmful substances.

The floodplain before you has been invaded by purple loosestrife (*Lythrum salicaria*). This invasive plant from Europe has tall spikes of purple flowers, and was introduced to North America in the early 1800’s as an



*Purple loosestrife*

ornamental flower, but has since become an aggressive invader of native wetlands.

Here at Great Meadows two methods of biological control, the release of the galerucella beetle (*Galerucella pusilla*) and of the hylobius weevil (*Hylobius transversovittatus*) have been used with good success. Both insects feed exclusively on purple loosestrife, and are thereby able to keep the purple loosestrife in control without having any adverse effects on the rest of environment.



## Weir Hill History

2

You are now walking along the edge of Weir Hill. Researchers who have studied the area have found evidence of human occupation going back 11,000 years. Remnants of the Wampanoag and Susquehanna tribes have been recovered in the region. They used the area for transportation, hunting, and fishing. Tools made from local quartzite, rhyolite, and wood have been found.

The name “Weir Hill” comes from the fishing weirs (which resemble underwater fences) used by the Native Americans who lived in the area. The Native Americans named the Concord River “Musketahquid”, meaning “grassy banks”. When the settlers arrived, they named it “Great River Meadows”.

## Kettle Hole

3

Notice the large deep depression on top of the hill. This is a kettle hole left by the last glacier to cover the region. 15,000 years ago, an ice sheet a mile high covered the spot on which you're now standing. When it retreated, it left behind huge amounts of rocky debris. With the debris, some massive ice blocks also remained. When one such block finally melted, the kettle hole was left in its place.

## Hemlock and the Woolly Adelgid

4

Here is a slope of evergreen hemlock trees. These trees recently suffered from an infestation of woolly adelgid, a sap-feeding insect introduced from Asia which now feeds on hemlock throughout North America. The insects' egg sacks look like the tips of cotton swabs on the underside of the hemlock's needles. In order to control the insects, many of the hemlocks were marked and stem-injected (spraying and soil injection posed a threat to the wetland down the hill) with chemicals to deter the pests and save our hemlock grove. While some hemlocks have died anyway, we are hopeful that many more will continue to live.

*Great horned owl*



## Nuts

5

Two kinds of oak dominate this wooded area: red and white oak. Red oaks have pointed leaves, while white oaks' leaves are rounded. Wildlife, as did the Native Americans, tends to prefer the white acorns to the red, as they are sweeter. Those from the red oak are bitter due to the tannins in the tree. If there appear to be more red than white oaks, it is probable



*Red oak*

*Woodcock in flight*



that the squirrels eat the white acorns first, leaving fewer to grow into trees.

## Meadow and Woodcock

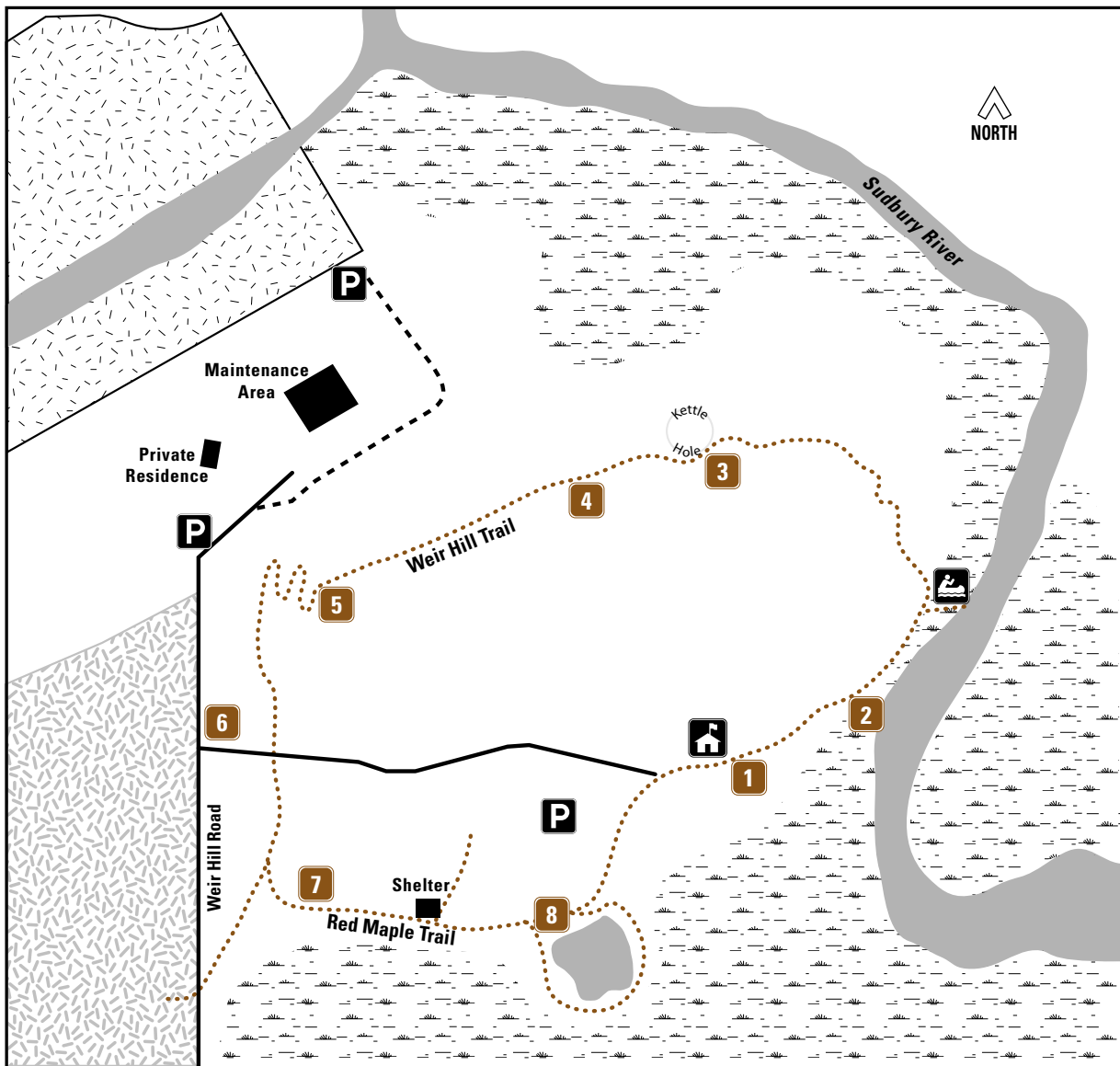
6

Every spring, American Woodcock can be seen and heard in this field at dusk engaging in their spectacular courtship display in which the male birds give a "peent" call and fly up from the ground in a spiral. These little birds are forest-dwelling shore birds with a long flexible bill used to probe soft ground for earthworms and insects.

Come and watch by the fence some spring evening at dusk, and you might very well see and hear the courtship display of this otherwise secretive little bird.

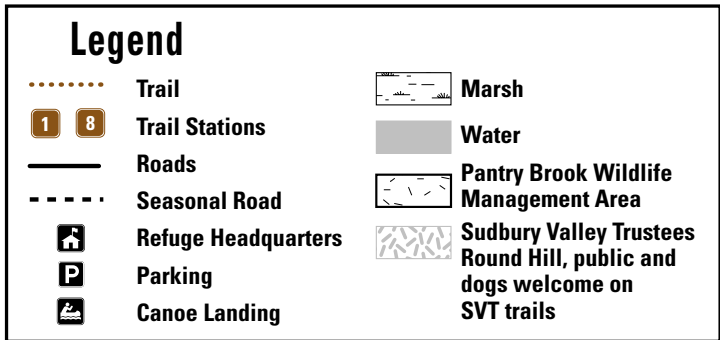


*Woodcock in nest*



# Great Meadows

*National Wildlife Refuge*



## Red Maple Trail

### Bugs and Birds

7



Walking through the Red Maple Swamp, you may find yourself trekking through mud and being harassed by more insects than at other parts of the trail. In springtime, the rivers overflow their banks and cover the floodplain. This floodplain is not only an ideal habitat for those species we enjoy, but also to those that “bug” us.

### Dragonfly



Although they may be pests to us, many insects play an integral role in a habitat's health. They serve as food for many species of birds; they break down dead leaves, branches, and other plant matter, speeding up the return of nutrients to the soil. While some insects, like grubs, damage plants, others like butterflies, ants, beetles, wasps, and bees are indispensable as pollinators.

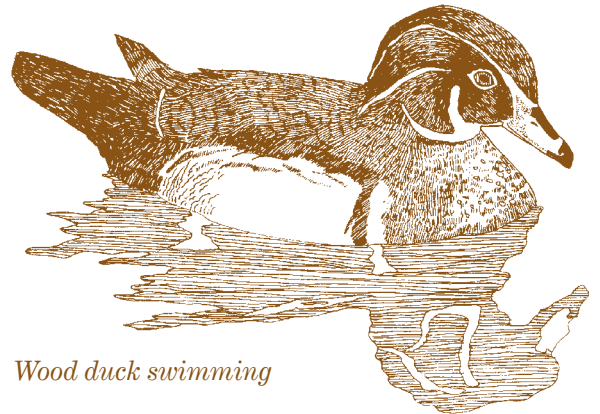


*Swallowtail*

### Red-winged blackbird



Red-winged blackbirds are some of the most often seen and heard residents of wetlands. They are also very easy to identify by their glossy black plumage and unmistakable scarlet and yellow shoulder patches. Red-winged blackbirds establish territories early in the year, and so are harbingers of spring.



*Wood duck swimming*

Wood ducks are shy, beautiful birds which nest in tree cavities near water. Look for trees with cavities in them. You may not see a duck itself, but this is their ideal habitat. When the ducklings are ready to come out into the open, they jump down from their nest hole – which can be quite high off the ground – to the water or soft ground below.

**Once a  
Swimming  
Hole**

8

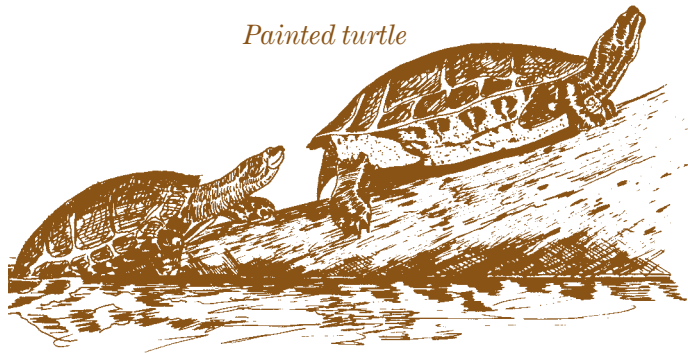
This pond, originally created as a swimming hole, is now only available to wildlife. Native plants are allowed to grow freely around the pond, while birds, frogs, fish, and turtles use it for food and cover.



*Green frog*

Take a careful look at the shrubs and trees surrounding this pond. Can you tell the difference between native black alder and invasive glossy buckthorn? The two are remarkably similar in appearance. While both have slender stems with smooth speckled bark and medium sized oval leaves, the two can be distinguished in part by the serrated edges of alder leaves (and the presence of catkins) in contrast with the smooth-edged leaves of the buckthorn.

*Painted turtle*



The battle against buckthorn is ongoing. In this area, refuge staff are pulling young buckthorn plants and killing others through targeted herbicidal application. Control of buckthorn is a long-term effort which will need constant vigilance to keep the buckthorn from becoming the dominant plant in this forest community.

We hope you have enjoyed the Weir Hill and Red Maple Trails. Please come again soon!

**For further information, contact:**  
Refuge Manager  
Great Meadows  
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*Alder*