

RESTORING HABITATS AND TIDAL WETLANDS AS WILDLIFE HABITAT

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PURPOSE

1. Learn procedures for restoring woodland borders by controlling invasive species and introducing native and other wildlife-valuable species.
2. Learn procedures for conversion of a lawn to an early successional old field habitat.
3. Learn procedures for banding birds that occupy these habitats.
4. Examine one of the Connecticut River's freshwater tidal marshes, consider how this habitat has changed over time and consider changes that have occurred in its wildlife community.

OVERVIEW

The Hadlyme section of Connecticut along the east bank of the lower Connecticut River is one of the first locations of European settlement in the state. It was colonized by 1665, shortly after the 1635 establishment of Fort Saybrook at the river mouth. It has a long agricultural history, and even into the 1930s much of its surrounding land was cultivated for crops and livestock. Today, however, it is situated in one of the most heavily forested parts of the state, with ca. 65% of the landscape vegetated by forest.

The property we will investigate was once part of a dairy farm, and as such native plant communities have been highly modified and invaded by numerous alien species. When management began this past spring, the property's woodland border contained a dense undergrowth of alien shrubs and vines. Much of the property also contained a park-like lawn with a canopy of invasive hybrid butternut (*Juglans cinerea x ailantifolia*) trees. About half of the lawn area is now being returned to an early successional old field, and most of the trees in it are being removed. Both of these areas are inhabited by wildlife species that are often associated particularly with the coastal Connecticut environment.

In addition to this property, the Whalebone Creek marsh is nearby. The Connecticut River, to which it is connected, experiences daily tidal fluctuation, although it is just far enough upriver to be beyond the reach of saline water from Long Island Sound. Hence, it is a freshwater tidal marsh with a community composition resembling that of an old growth community, in that the species present are similar to those present for ca. 6,000 years. Its appearance varies greatly from spring to fall as different emergent marsh plants assume dominance. It also experiences long-term variation in the coverage by particular plant species. As with the upland property, the wildlife community here is characteristic particularly of the Connecticut coastal region.

One thought to keep in mind as we examine these habitats is that in order to be an effective wildlife manager it is valuable to be something of a botanist. Understanding the habitats in which wildlife reside is central to developing effective management strategies.

WOODLAND BORDER

The environment. The alien thickets beneath this largely native canopy were before clearing largely composed of highly invasive Burningbush (*Euonymus alatus*), Multiflora Rose (*Rosa multiflora*), Norway Maple (*Acer platanoides*), Eurasian Privet (*Ligustrum vulgare*), Russian Olive (*Eleagnus angustifolia*), Oriental Bittersweet (*Celastrus orbiculata*), Asiatic Wineberry (*Rubus phoenicolasius*), Chinese Wisteria (*Wisteria sinensis*) and Japanese honeysuckle (*Lonicera japonica*). These species have since spring, 2024 been cut back and regrowth is discouraged through periodic string trimming. Beginning in spring, 2025, we will supplement this control technique by spot-treating with herbicide.

With the invasive component now controlled, the canopy is characterized by such native trees as Sugar Maple (*Acer saccharum*), Eastern White Pine (*Pinus strobus*), Eastern Redcedar (*Juniperus virginiana*) Eastern Hemlock (*Tsuga canadensis*), Black Cherry (*Prunus serotina*), Shagbark Hickory (*Carya ovata*), Pignut Hickory (*C. glabra*) and

Black Birch (*Betula lenta*). Freed from competition with aliens, the understory also contains such native sapling, seedling and vine species as Tulip Poplar (*Liriodendron tulipifera*), White Ash (*Fraxinus americana*), American Beech (*Fagus grandifolia*), Black Oak (*Quercus velutina*), Flowering Dogwood, (*Cornus florida*), Sassafras (*Sassafras albidum*), Virginia Creeper (*Parthenocissus quinquefolia*), Riverbank Grape (*Vitis riparia*), Fox Grape (*V. labrusca*) and Spicebush (*Lindera benzoin*). In addition to these natives, several individuals of naturalized but noninvasive species have been retained. These include Norway Spruce (*Picea abies*), Japanese Deutzia (*Deutzia crenata*) and European Mock Orange (*Philadelphus coronarius*). A native herbaceous component is also present and includes such species as White Wood Aster (*Eurybia divaricata*), Blue-stemmed Goldenrod (*Solidago caesia*), Elm-leaved Goldenrod (*S. ulmifolia*), Lady Fern (*Athyrium filix-femina*), Evergreen Wood Fern (*Dryopteris intermedia*), Christmas Fern (*Polystichum acrostichoides*), Interrupted Fern (*Osmunda claytoniana*) and White Baneberry (*Actaea pachypoda*).

Management. Management involves not only removing invasive alien plants and promoting the establishment of native species but also supplementing this community with some naturalized species that have multi-season wildlife value. Over the decades, the thinking about habitat management has evolved. As recently as the 1970s, wildlife managers were advocating the planting of some species now known to be highly invasive. Restoring communities back to native ones has more recently been advocated, although there is now realization that supplementing native communities with some non-natives can be a reasonable strategy. In some instances, species like the Northern Catalpa (*Catalpa speciosa*) have historically been absent from the Northeast, although prehistorically (before the last ice age) they were present here. In others, species like the Norway Spruce survive better in Connecticut than the native but highly geographically restricted Red Spruce (*P. rubens*).

We are actively supplementing the existing community with native species presently absent as well as introducing native species newly ranging into this part of the state. We are cultivating the common woodland shrubs Maple-leaved Viburnum (*Viburnum acerifolium*), Mountain Laurel (*Kalmia latifolia*) and Witch Hazel (*Hamamelis virginiana*) for introduction into the woodland border. These species will be planted this fall, as the soil remains warm enough to promote root growth and leaves provide less or no transpiration burden for the developing roots.

Notably, the character of Connecticut's forests is changing. Species like Tulip Poplar and Sassafras, more southerly-distributed species, are becoming more common in our forests. Moreover, a species like American Holly (*Ilex opaca*), historically rare on the Connecticut coast, has in recent years been expanding its range inland as seed and seedling viability has improved with the warming Connecticut climate. Similarly, Eastern Redbud (*Cercis canadensis*), known historically from a single Connecticut stand, is now expanding its range as, again, its local viability improves. Species like Post Oak (*Quercus stellata*) and Dwarf Chinkapin Oak (*Q. prinoides*), both characteristic understory oaks of the Southeast coastal plain, also have been historically rare, although these are now likely to expand their range. In anticipation of these community changes, we are cultivating American Holly and Post Oak seedlings from nearby populations for fall introduction into the border. We have already planted a redbud on the property.

Wildlife. At present, the wildlife community is particularly rich in bird species associated with edge and successional habitats. Characteristic breeders during summer included Eastern Towhee, Gray Catbird, Baltimore Oriole, Rose-breasted Grosbeak, Warbling Vireo, Yellow-throated Vireo, Blue-winged Warbler and, the coastal Connecticut specialty, the White-eyed Vireo. As this woodland border evolves toward one more typical of coastal plain woodlands to the south, we may begin to see additional southerly-distributed species like the Prothonotary Warbler and Yellow-throated Warbler colonize as well. Migratory overshoots of these two species are already occurring with increasing frequency during spring migration.

EARLY SUCCESSIONAL OLD FIELD

The environment. This ca. one acre area was formerly a lawn with scattered hybrid butternuts growing on it. By suspending mowing, it is already reverting to an early successional old field. To date, however, the only broadleaf herbaceous species to invade on its own is Daisy Fleabane (*Erigeron annuus*), which an annual pioneer species. A small stand of the native old field grass Little Bluestem (*Agropogon scoparius*) also has established itself.

Management. The sole management practice used to date has been cessation of mowing. Over the fall and winter, most of the canopy butternuts will be removed and then in spring the field will be mowed once to remove seedling butternuts. After mowing, seeds and seedlings of broad-leaved herbaceous species (often termed forbs by wildlife managers) will be introduced into the field. To date, we have collected seeds from nearby populations of New York Ironweed (*Vernonia noveboracensis*), Common Milkweed (*Asclepias syriaca*), Joe-pye-weed (*Eupatorium purpureum*) and Rough-stemmed Goldenrod (*S. rugosa*). In addition, we are presently cultivating Butterflyweed (*Asclepias tuberosa*), a native milkweed of drier soils, in our flower garden.

Wildlife. Common Yellowthroats, American Goldfinches and Yellow Warblers frequented this area in summer and a Field Sparrow made a brief appearance in spring. In late winter, Yellow-bellied Sapsuckers and a Red-headed Woodpecker, a species that wanders east from the Midwest, used trees associated with the field. More typical year-round inhabitants of the park-like canopy included Pileated Woodpecker, Red-bellied Woodpecker and Downy Woodpecker. Other species recorded in the field and nearby include American Toad, Pickerel Frog, Eastern Milk Snake, Meadow Vole, White-footed Mouse, Meadow Jumping Mouse, Eastern Chipmunk, Eastern Mole, Short-tailed Shrew, Striped Skunk, Raccoon, Red Fox, Bobcat, Fisher, Coyote and White-tailed Deer.

TIDAL WETLAND

The environment. During the bird-breeding season, much of the 30 ha Whalebone Creek marsh is submerged >1 m at high tide. Pickerelweed (*Pontederia cordata*), and Bullhead Lily (*Nuphar variegatum*) cover these deepwater portions, but shallower areas are primarily vegetated by River Bulrush (*Scirpus fluviatilis*), Tuckahoe (*Peltandra variegata*), Calamus (*Acorus calamus*) and small patches of Narrow-leaved Cattail (*Typha angustifolia*). Creeks divide the marsh and extensive mudflats are exposed at low tide. Unlike at brackish marshes further downriver, Common Reed (*Phragmites communis*) has not overwhelmed the plant communities of freshwater tidal marshes.

Temporal community change. Wild Rice (*Zizania aquatica*), an annual species that is particularly dominant in deeper water portions of the marsh, overwhelms the spring and early summer communities by August, when it can reach 12 feet in height. The community also changes over longer periods of time. In 1986, species like Pickerelweed and Bullhead Lily were particularly widespread, whereas by 2024 these species had greatly receded in occurrence.

July, 1986 showing *Nuphar* and *Pontederia*.



July, 2024 showing little *Nuphar* and *Pontederia*.



August, 2024 showing *Zizania* overtopping other vegetation.



Wildlife. Since studies on breeding bird species at this marsh began, the most abundant interior marsh inhabitants have consistently been Red-winged Blackbird, Marsh Wren and Swamp Sparrow. Marsh edge species have typically been Common Yellowthroat, Yellow Warbler and Song Sparrow. Mallard, Wood Duck, Canada Goose and Mute Swan also have been consistently present. Other species have occurred in some years but not others, however. Notably, during years when spring river flooding extended well into May, species like the Least Bittern and Virginia Rail have been absent. Still other species have colonized after previously being restricted to more saline portions of the river. Such species include the Great Egret, Osprey, Gadwall and Double-crested Cormorant.

BIRD-BANDING



Banding activities involve not only placing a numbered metal ring on a bird's leg, but can also involve the placement of colored plastic rings. By placing plastic rings on legs in a particular sequence, individuals can be identified in the field and tracked over time. An example of how to do this is in the *Additional Resources #1* below. Banding also allows for computation of population size through recording recaptures or re-observations (see *Additional Resources #2* below).

There are a number of ways to capture birds for banding. We use fine nylon nets called mist nets, but baited wire ground traps are often used for seed-eating birds. Mist nets come in different sizes and are useful for capturing birds as large as hawks. In addition, cannon nets, which use charges to propel nets over flocks of ground-inhabiting birds, may be used to capture birds such as waterfowl.

Once captured, making a series of measurements and other observations on an individual is a way for it to be sexed, aged and to have its physiological state assessed. Such additional information as the degree of skull ossification, evidence of molt, plumage characteristics, amount of fat deposits, presence of developing eggs,

presence of a brood patch or a cloacal protuberance, and presence of ectoparasites are all useful in these regards. An example of how measurements can be combined with multivariate statistics to learn about the age and sex of individuals may be found in *Additional Resources* #3 below.

ADDITIONAL RESOURCES

1. An example of how color-banded birds can be used to map home ranges and determine aspects of social behavior is at <https://www.birdconservationresearch.org/pdf/flock.PDF>.
2. An example of how banding data can be used to compute population size is at https://www.birdconservationresearch.org/pdf/labs/population_estimation.pdf.
3. Detailed directions for making morphological measurements on birds and how to employ multivariate statistics in analyzing the measurements are at <https://www.birdconservationresearch.org/pdf/eskimo%20curlew%20final.pdf>.