Habitats of Columbia County:
Their distribution and interesting features
The Living Land Project

A multi-year collaborative project of the Hawthorne Valley Farmscape Ecology Program, Hudsonia Ltd. and the Columbia Land Conservancy.
Ultimate Goals:

• To engage the general public in exploring the landscape and help them develop an informed compassion for its wild inhabitants.
• To broaden individual ways of seeing the landscape by sharing the land perspectives of a variety of people through interviews, stories, pictures and activities.
• To develop tools for land managers and help guide their actions when they want to take habitat and/or species conservation, as well as cultural perspectives, into consideration.
Immediate Goal:
To compile an “Ecological and Cultural Field Guide to the Habitats of Columbia County”, which describes
• the physical characteristics of a variety of habitats,
• their history and management,
• their value for plants and animals,
• and how people are perceiving and interacting with them.
We thank the NOVO Foundation, the Sandy River Charitable Trust, Kalliopeia, the Hudson River Estuary Program, several smaller foundations and many private donors for their support.

This project would not have been possible without the interest and collaboration of many landowners who invited us to include their habitats in this study.
Not only the field guide, but also a suite of events (incl. public presentations and workshops for planning boards and CACs), field activities and other outreach, and accompanying materials
Tentative ecological zones:

- **High Taconics**: >350m, schist etc.
- **Harlem Valley and Northeastern Valley**: <200m, limestone/dolostone/marble
- **Low Taconics, Southern and Northern Foothills**: rocky and hilly areas of mid elevation
- **Central Flatlands**: <100m, till & outwash, good farmland
- **Northern Sand**: sandy glacial and lacustrine deposits, outwash, kames; lots of good farmland
- **Hudson River Corridor**: <50m (except hills S of Hudson); clayey and sandy soils; lots of good farmland
- **SW Swales**: rocky and till-derived soils
For three years (2012-14), we conducted biological inventories in several examples of each habitat type within each ecological zone.

This resulted in a total of 499 inventories (their locations depicted by dots on the map) of 20 mostly terrestrial habitats, representing uplands and wetlands, and a range of management intensities.
In each sample location, we document
• Vascular Plants
• Ants
• Ground beetles

In relevant habitats, we also document
• Dragonflies
• Butterflies
• Amphibians

In addition, we keep notes of encounters with
• Reptiles
• Mammals
• Birds

We tried to look at the land “through the eyes of all these different groups of species”.
We also tried to look at the land “through the eyes of many people from different walks of life and age groups”.
Habitats Studied

ROCKY OUTCROPS
- Gravel Pit and Quarry
- Wooded Outcrops

WOODED UPLANDS
- Ancient Forests
  - Hemlock Forest
  - Northern Hardwood(Hemlock) Forest
  - Mature Sugar Maple Forest
  - Rich Oak Forest
  - Oak-Hickory Forest
  - Young Sugar Maple Forest
- Young Forests
  - White Pine Forest
  - Black Locust Forest
  - Red Cedar Forest
  - Conifer Plantation
  - Mixed Young Forest

OPEN UPLANDS
- Oak Heath Barrens
- Blueberry Heath
- Successional Shrubland
- Old Field
- Dry Meadow
- Upland Hayfield/Pasture
- Cemetery
- Utility Corridor
- Lawn

FRESHWATER TIDAL HABITATS
- Tidal Marsh
- Tidal Mudflat
- Tidal Shrub Swamp
- Tidal Swamp Forest

WOODED WETLAND (non-tidal)
- Floodplain Forest
- Swamp Forest
- Wooded Seep
- Intermittent Woodland Pool
- Headwater Stream

OPEN WETLANDS (non-tidal)
- Shrub Swamp
- Marsh
- Wet Meadow
- Bog
- Calcareous Fen
- Circumneutral Bog Lake
- Beaver Pond
- Constructed Pond
Habitats Studied

UPLANDS

ROCKY OUTCROPS
Gravel Pit and Quarry
Wooded Outcrops

WOODED UPLANDS

Ancient Forests
- Hemlock Forest
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Young Forests

OPEN UPLANDS

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WETLANDS

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WOODED WETLAND (non-tidal)

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**UPLANDS**

ROCKY OUTCROPS
Gravel Pit and Quarry
Wooded Outcrops

WOODED UPLANDS

Ancient Forests
Hemlock Forest
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Rich Oak Forest
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Young Sugar Maple Forest
White Pine Forest
Black Locust Forest
Red Cedar Forest
Conifer Plantation
Mixed Young Forest

Young Forests

OPEN UPLANDS

Oak Heath Barrens
Blueberry Heath
Successional Shrubland
Old Field
Dry Meadow
Upland Hayfield/Pasture
Cemetery
Utility Corridor
Lawn

**WETLANDS**

**FRESHWATER TIDAL HABITATS**

Tidal Marsh
Tidal Mudflat
Tidal Shrub Swamp
Tidal Swamp Forest

**WOODED WETLAND (non-tidal)**

Floodplain Forest
Swamp Forest
Wooded Seep
Intermittent Woodland Pool
Headwater Stream

**OPEN WETLANDS (non-tidal)**

Shrub Swamp
Marsh
Wet Meadow
Bog
Calcareous Fen
Circumneutral Bog Lake
Beaver Pond
Constructed Pond
Geographically limited, rare habitat: Oak Heath Barrens
Whorled Pogonia
(Isotria verticillata)

Indian Cucumber-root
(Medeola virginiana)
Management for Habitat Conservation in Oak Heath Barrens:

• Don’t develop!
• Minimize trampling
• Burning?
Habitats Studied

ROCKY OUTCROPS
Gravel Pit and Quarry
Wooded Outcrops

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FRESHWATER TIDAL HABITATS

Tidal Marsh
Tidal Mudflat
Tidal Shrub Swamp
Tidal Swamp Forest
Upland (and mature) Hayfield...
Upland (and mature) Hayfield...

... and permanent Pasture: common habitats distributed throughout the County and amazingly similar to each other
Pasture and Hayfield

Mustards

Lambs Quarters

Legumes

Alfalfa, etc.

Vetch
Pasture and Hayfield

- Cabbage White
- Common Sootywing
- Silver-spotted Skipper
- Wild-Indigo Duskywing
- Clouded Sulphur
- Orange Sulphur
Grassland birds who might be nesting in mature hayfields

- Grasshopper Sparrow
- Bobolink
- Meadowlark
- Vesper Sparrow
# Population Trends of Grassland-breeding Birds

## Population Trend in **New York State**
from 1980-85 to 2000-05

<table>
<thead>
<tr>
<th>Bird</th>
<th>Trend</th>
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<tbody>
<tr>
<td>Henslow’s Sparrow</td>
<td>- 80%</td>
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<td>Upland Sandpiper</td>
<td>- 65%</td>
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<td>Vesper Sparrow</td>
<td>- 50%</td>
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<tr>
<td>Grasshopper Sparrow</td>
<td>- 42%</td>
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<tr>
<td>Horned Lark</td>
<td>- 37%</td>
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<td>Eastern Meadowlark</td>
<td>- 25%</td>
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<td>Field Sparrow</td>
<td>- 16%</td>
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<td>Bobolink</td>
<td>- 8%</td>
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<td>Killdeer</td>
<td>- 4%</td>
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<td>Red-winged Blackbird</td>
<td>- 2%</td>
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<tr>
<td>Northern Harrier</td>
<td>- 1%</td>
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<tr>
<td>Song Sparrow</td>
<td>- 1%</td>
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<tr>
<td>Savannah Sparrow</td>
<td>+ 2%</td>
</tr>
</tbody>
</table>

*(The Second Atlas of Breeding Birds in New York State 2005)*
Not all hayfields are suitable for grassland birds: Timing of hay cut is crucial.

<table>
<thead>
<tr>
<th>Species</th>
<th>Start</th>
<th>Stop</th>
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<tr>
<td>Bobolink</td>
<td>18-Jun</td>
<td>18-Jul</td>
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<td>9-Jun</td>
<td>9-Jul</td>
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<tr>
<td>Field Sparrow</td>
<td>16-Jun</td>
<td>16-Jul</td>
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<tr>
<td>Grasshopper Sparrow</td>
<td>27-Jun</td>
<td>27-Jul</td>
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<tr>
<td>Henslow Sparrow</td>
<td>17-Jun</td>
<td>17-Jul</td>
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<tr>
<td>Horned Lark</td>
<td>28-Mar</td>
<td>28-Apr</td>
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<td>Killdeer</td>
<td>ca. 21 May</td>
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<td>Northern Harrier</td>
<td>ca. 4 July</td>
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<tr>
<td>Red-winged Blackbird</td>
<td>26-May</td>
<td>26-Jun</td>
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<tr>
<td>Savannah Sparrow</td>
<td>11-Jun</td>
<td>11-Jul</td>
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<tr>
<td>Song Sparrow</td>
<td>17-May</td>
<td>17-Jun</td>
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<tr>
<td>Upland Sandpiper</td>
<td>ca. 15 June</td>
<td>-</td>
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<tr>
<td>Vesper Sparrow</td>
<td>5-Jun</td>
<td>5-Jul</td>
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</tbody>
</table>

*derived from Bull's *Birds of New York*

**Date of first hay cut in Columbia County:**

- 1843: ~ 14th of July
- Late 1800s: **June**
- Today: **May**
Hay quality and grassland breeding birds

Bobolinks in Hawthorne Valley (2005 breeding season)
Habitats Studied

ROCKY OUTCROPS
Gravel Pit and Quarry
Wooded Outcrops

WOODED UPLANDS

Ancient Forests
- Hemlock Forest
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Young Forests
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- Mixed Young Forest

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FRESHWATER TIDAL HABITATS
- Tidal Marsh
- Tidal Mudflat
- Tidal Shrub Swamp
- Tidal Swamp Forest

WOODED WETLAND (non-tidal)
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- Headwater Stream

OPEN WETLANDS (non-tidal)
- Shrub Swamp
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- Bog
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- Beaver Pond
- Constructed Pond

WETLANDS
Geographically wide-spread, but uncommon and sometimes under-appreciated habitat: **Dry Meadow**
Comparative Plant Diversity and Composition in Upland Meadow Habitats

Average number of plant species per sample location

- Dredge spoil meadow (n=3): 23.0 species
- Gravel pit/quarry (n=6): 105.0 species
- Utility corridor (n=6): 101.3 species
- Cemetery (n=6): 78.8 species
- Hay/pasture (n=9): 39.9 species
- Old field (n=30): 62.5 species
- Dry meadow (n=18): 64.0 species
- Blueberry field (n=4): 68.3 species
Little Bluestem (*Schizachyrium scoparium*)
Little Bluestem (*Schizachyrium scoparium*)
Little Bluestem (*Schizachyrium scoparium*)
Little Bluestem (*Schizachyrium scoparium*)
Indian Skipper

Cobweb Skipper

Little Bluestem
(*Schizachyrium scoparium*)
Smooth Aster (*Symphyotricum laevis*)

Heath Aster (*Symphyotricum ericoides*)

Gray Goldenrod (*Solidago nemoralis*)

Silverrod (*Solidago bicolor*)

Sweet Fern (*Comptonia peregrina*)
DOCKS

UMBELS

MILKWEED

PUSSY TOES

DRY MEADOW
(and OLD FIELD)

MALLOWs

ASTERs

LITTLE BLUESTEM & OTHER GRASSES

VIOLETS
Management for Habitat Conservation:
• No fertilizer!
• Rotational mowing/grazing
• Mow after grassland birds have fledged
• Burning?
Geographically wide-spread and much debated habitat: Utility Corridors
## Habitats Studied

### Rocky Outcrops
- Gravel Pit and Quarry
- Wooded Outcrops

### Wooded Uplands
- Hemlock Forest
- Northern Hardwood(-Hemlock) Forest
- Mature Sugar Maple Forest
- Rich Oak Forest
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- Black Locust Forest
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- Mixed Young Forest

### Young Forests

### Ancient Forests

### Open Uplands
- Oak Heath Barrens
- Blueberry Heath
- Successional Shrubland
- Old Field
- Dry Meadow
- Upland Hayfield/Pasture
- Cemetery
- Utility Corridor
- Lawn

### Freshwater Tidal Habitats
- Tidal Marsh
- Tidal Mudflat
- Tidal Shrub Swamp
- Tidal Swamp Forest

### Wooded Wetland (non-tidal)
- Floodplain Forest
- Swamp Forest
- Wooded Seep
- Intermittent Woodland Pool
- Headwater Stream

### Open Wetlands (non-tidal)
- Shrub Swamp
- Marsh
- Wet Meadow
- Bog
- Calcareous Fen
- Circumneutral Bog Lake
- Beaver Pond
- Constructed Pond
Ancient Forests:
Hidden treasures in a 70% forested county
Ancient Forest = forest that has long been forest, although selective logging, grazing or other use may have occurred. All primary/Old Growth forest is ancient but not vice-versa.

(As far as we can tell, there is no Old Growth forest in Columbia County.)
Difference in Forest Soil between post-agricultural and ancient forest
Uncommon wildflowers associated with ancient forests

Including:

• American Ginseng (*Panax cinquefolius*)
• American Spikenard (*Aralia racemosa*)
• Beechdrops (*Epifagus virginiana*)
• Bush Honeysuckle (*Lonicera canadensis*)
• Canada Violet (*Viola canadensis*)
• Dutchman’s Breeches (*Dicentra cucullaria*)
• Gay-wing Milkwort (*Polygala paucifolia*)
• Hobblebush (*Viburnum lantanoides*)
• Lopseed (*Phryma leptostachya*)
• Pink Lady’s-Slipper (*Cypripedium acaule*)
• Rattlesnake Plantain Orchid (*Goodyera pubescens*)
• Trailing Arbutus (*Epigaea repens*)
• Upland Boneset (*Eupatorium sessilifolium*)
• Wild Ginger (*Asarum canadense*)
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<th>TREE SPECIES</th>
<th>N=17</th>
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## FOREST TYPES

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Hemlock Forest: low diversity, low rarity, low invasives
N. Hardwood-Hemlock Forest: high diversity, medium rarity, medium invasives
Oak-Hickory Forest: low diversity, high rarity, low invasives
Mature Sugar Maple Forest: medium diversity, medium rarity, medium invasives
### FOREST TYPES

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**Nordem Hardwood - Hemlock**

**Ancient**

**Young**

**SHRUBS and TREE SEEDLINGS**

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**INVASIVES!**
Ancient Forests: Management Considerations

• find out if you have any on the land you manage (early aerial photos, speak with old-timers)
• don’t clear them; steer development away from them
• treat them with particular care when harvesting timber (avoid disturbance to soil, avoid large openings/logging roads)
• remove invasives, if necessary, but avoid “parkification”
“Parkification”
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Russet-tipped Clubtail
Leave Space for the Habitat.

From Scenic Hudson’s Sea Level Rise Mapper
ROCKY OUTCROPS
Gravel Pit and Quarry
Wooded Outcrops

WOODED UPLANDS
Ancient Forests
Hemlock Forest
Northern Hardwood(-Hemlock) Forest
Mature Sugar Maple Forest
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Young Forests

OPEN UPLANDS
Oak Heath Barrens
Blueberry Heath
Successional Shrubland
Old Field
Dry Meadow
Upland Hayfield/Pasture
Cemetery
Utility Corridor
Lawn

UPLANDS
Young Forests

FRESHWATER TIDAL HABITATS
Tidal Marsh
Tidal Mudflat
Tidal Shrub Swamp
Tidal Swamp Forest

WOODED WETLAND (non-tidal)
Floodplain Forest
Swamp Forest
Wooded Seep
Intermittent Woodland Pool
Headwater Stream

WETLANDS

OPEN WETLANDS (non-tidal)
Shrub Swamp
Marsh
Wet Meadow
Bog
Calcareaous Fen
Circumneutral Bog Lake
Beaver Pond
Constructed Pond
Floodplains tended to form along larger streams moving through relatively flat terrain.

YELLOW indicates the location of floodplain soils.
approximate locations of native American fields at time of settlement.
The NYS census of 1825 lists a maximum of about 270 water-powered industries. These created dams and empoundments that re-shaped the floodplain.
Direct use and upland erosion occasioned by early farming may have profoundly altered the soils and hydrology of these areas.
“I have observed that ... rich low lands before they was cleared: produced abundance of hasels, weeds & vines, which entangled ye trash which ye floods brought there: & in time rotting kept it very rich. but when cleared & plowed they had A contrary effect upon it & instead of bringing a rich supply & leaving it they often bore away some of ye best of ye soil which was a fine black sandy Loam”

John Bartram, ca. 1755
Farming and soil erosion continues today, although some types of use are less damaging than others, at least to the soils and aquatic habitats....
1830 Land use in the Lee, MA area: Note floodplain meadows – perennial grass agriculture may have been more sustainable.

Data: Harvard Forest
A Spring-time Land of Ephemerals.
Green Dragon
(*Arisaema dracontium*)

False Mermaid Weed
(*Floerkea proserpinacoides*)
BUTTERFLIES
20 species of butterflies, including the rare Hackberry Emperor and American Snout and the uncommon Question Mark and Spicebush Swallowtail.
45 species, 10 of these were new county records, including:

- Brook Snaketail
- Spine-Crowned Clubtail
- Arrow Clubtail
- and Blue-tipped Dancer

(all species of greatest conservation need)
**BEES**

59 species of native bees (most of which were new county records)

**GROUND BEETLES**

85 species, 35 of which might be rare or uncommon in our region
Ancient Forest = Fewer Invasives.
Of an estimated 25,000 acres of historical floodplain forest, about 3,600 acres appear to be in ‘Ancient Forest’ today.
Preserve the Mess!
Value the Old!
At least, Go to Grass!
Habitats Studied

ROCKY OUTCROPS
- Gravel Pit and Quarry
- Wooded Outcrops

WOODED UPLANDS
- Ancient Forests
  - Hemlock Forest
  - Northern Hardwood (=Hemlock) Forest
  - Mature Sugar Maple Forest
  - Rich Oak Forest
  - Oak-Hickory Forest
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- Young Forests
  - White Pine Forest
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  - Mixed Young Forest

OPEN UPLANDS
- Oak Heath Barrens
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FRESHWATER TIDAL HABITATS
- Tidal Marsh
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Wet Meadows
We consider the question of what farms can provide to nature conservation from the perspective of Ecological Analogies.
Ecological analogies refer to human-shaped habitats which, while not the ones that the given organism co-evolved with, offer enough similarities or analogies to be ecologically functional for that species.
Where do native organisms which used to live in these landscapes now find a home in this landscape?
Where do native organisms which used to live in these landscapes now find a home in this landscape?

Where they find working ecological analogies!

Ca. 1400

Ca. 1870

Ca. Today
For example, some shrubland birds, who might have evolved to take advantage of post-fire shrubland... might find a suitable ecological analogy in a shrubby pasture.
Grassland birds, who had evolved to breed in Midwestern Tallgrass Prairie, sometimes find a suitable ecological analogy in a mature hayfield.
Wetland butterflies, who had evolved to live in and around beaver meadows,… might find a suitable ecological analogy in an occasionally-grazed wet pasture.
Beaver Pond  →  Beaver Meadow
Beaver ponds and their associated wet meadows did and do take up a large area in landscapes where beaver are allowed to thrive.

These ponds don’t usually lead to wet meadows (and can destroy them).
Meaning a greater potential conservation role for agriculturally-maintained wet meadows.
An un-grazed wet meadow.... back to swamp forest or floodplain forest.
**Wet Meadows** have a high number and high proportion of native plant species compared to other *on-farm* habitats.

Total Spp. (194) 95 194 158 109 159 31 68 97 45

64% of the plants in Wet Meadows/Marches are native.
Examples of uncommon native plants from **wet meadows**

- Nodding Lady's Tresses (*Spiranthes cernua*)
- Swamp Candle (*Lysimachia terrestris*)
- Cardinal Flower (*Lobelia cardinalis*)
- Yellow Stargrass (*Hypoxis hirsuta*)
- Ragged-Fringed Orchid (*Platanthera lacera*)
- Allegheny Monkeyflower (*Mimulus ringens*)
Examples of native late summer-flowering plants from **wet meadows**

- **Bur-marigold** (*Bidens cernua*)
- **New England Aster** (*Symphyotrichum [=Aster] novae-angliae*)
- **Spotted Joe-Pye-Weed** (*Eutrochium [=Eupatorium] maculatum*)
- **Common Boneset** (*Eupatorium perfoliatum*)
Butterfly host plants of **Wet Meadows:**
e.g. **Sedges** (*Carex* sp.)
Butterfly host plants of Wet Meadows:
e.g. Docks (*Rumex* sp.)

*Bronze Copper* caterpillars feed on docks.
Butterfly host plants of **Wet Meadows:**
e.g. **Turtlehead** (*Chelone glabra*)

**Turtlehead** (*Chelone glabra*)

**Baltimore Checkerspot**
caterpillars feed on Turtlehead
Monarch caterpillars feed on milkweeds (Asclepias sp.).

Butterfly host plants of Wet Meadows: e.g. Swamp Milkweed (Asclepias incana).

Swamp Milkweed (Asclepias incana)
A Rorschach Approximation of a Wet Meadow Butterfly Community

Brown, Appalachian
Brown, Eyed
Copper, Bronze
Mulberry Wing
Skipper, Dun
Checkerspot, Baltimore
Red Admiral
Northern Broken-dash
Little Wood Satyr
Skipper, Silver-spotted
Skipper, European
Fritillary, Meadow
Viceroy
Swallowtail, Black
Swallowtail, Eastern Tiger
Copper, American
Common Wood Nymph
Monarch
Common Ringlet
Eastern Tailed Blue
Sulphur, Orange
Sulphur, Clouded
Skipper, Least
Cabbage White
Pearl Crescent
Wet Meadow over Marsh

Brown, Appalachian
Brown, Eyed
Copper, Bronze
Mulberry Wing
Skipper, Dun
Checkerspot, Baltimore
Red Admiral
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Little Wood Satyr
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Sulphur, Orange
Pearl Crescent
Sulphur, Clouded
Skipper, Least
Eastern Tailed Blue
Common Ringlet
Monarch
Common Wood Nymph
Fritillary, Great Spangled
Skipper, Peck's
Sulphur, Clouded
Cabbage White
Wet Meadow over Old Field
Wet Meadows: Amphibians and reptiles of conservation interest
Wet Meadows as Landscaping
Large scale enrichment of a wet meadow with native wetland plants...
... smaller scale creation of a rain garden “from scratch”, assembling the native plant community of a wet meadow ...
Wet meadows, in order to stay as wet *meadows*, need to be kept open by occasional mowing or grazing.
They also need to avoid the POND BOOM.
Where are ponds being dug & which habitats are they replacing?

Construction Context | % of 84 ponds
--- | ---
Replaced Wetlands | 23
Empounded Streams | 20
Created in Upland | 36
Unknown | 21

Wet Meadow
Habitats Studied

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We hope this gives you a little feel for the ‘color’ behind this ‘dry’ table...
and for the plants and animals we came across while trying to describe this County.

How much of it seems familiar to you?