

Appendices to

“The Flora & Fauna of Some Columbia County Farms: Their Diversity, History, and Management”

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1. Photographic guide to common grasses and legumes of our pastures.
2. List of wild plants documented on Columbia County farms.
3. List of birds documented on Columbia County farms.
4. Photographic guide to Watchlist Butterflies.
5. Photographic guide to our frogs.
6. Photographic guide to our salamanders.
7. Photographic guide to regional stream fish.
8. Table of aquatic results from Hawthorne Valley stream studies.

Appendix1. Photographic guide to common grasses and legumes of our pastures.



HABIT:

- Medium size (to 100 cm)
- Perennial
- Bunchgrass
- Leaves ribbed and rough above, glossy below
- Leaf margins +/- smooth
- Inflorescence is a long spike with spikelets facing central axis with their narrow side (compare with quackgrass)
- Spikelets awned



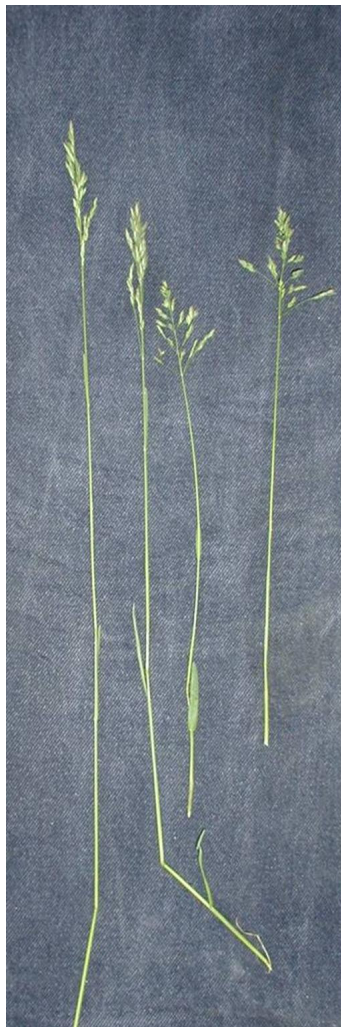
COLLAR REGION:

- Ligule very short (<1mm)
- Prominent claspings auricles (similar to quackgrass)
- Sheath open

GENERAL OBSERVATIONS:

- Seems to occur in most pastures
- Starts flowering in early June
- Without flowers, easily confused with tall fescue
- Supposedly produces excellent quality forage

Italian Ryegrass
(*Lolium perenne* var. *aristatum*)



HABIT:

- Small to medium size (30-100cm)
- Perennial
- Sod-former, spreads with rhizomes
- Leaves short and narrow
- Characteristic prow-shaped leaf tip
- No hairs

COLLAR REGION:

- Ligule +/- 2mm
- No auricles
- Open sheath, margins might touch up to collar



Kentucky Bluegrass

(Poa pratensis)

GENERAL OBSERVATIONS:

- The most common pasture grass, also the most common lawn grass; it survives repeated grazing or cutting because its growing point remains low to the ground
- One of the first to grow in spring, starts to flower in May



Orchard Grass

(*Dactylis glomerata*)

HABIT:

- Medium size (60-120 cm)
- Light green
- Perennial
- Bunchgrass
- Young shoots flattened
- No hairs
- Leaves +/- soft on both surfaces
- Margins not cutting

COLLAR REGION:

- Ligule 5-7 mm (similar to that of reed canary grass and timothy)
- No auricles
- Sheath open, but margins touching

GENERAL OBSERVATIONS:

- One of the most common pasture grasses; the moderately low growth habit allows it to withstand grazing
- One of the first to grow in spring, starts flowering in May
- The cows like to eat the young plants, but avoid the inflorescence



**HABIT:**

- Medium sized (50-100 cm)
- Perennial
- Creeping rhizomes
- Leaves sparsely hairy
- Inflorescence is a long spike with spikelets facing the central axis with their broad side (compare with ryegrass)

COLLAR REGION:

- Ligule very short [<1 mm]
- Prominent clasping auricles (similar to those of ryegrass)
- Sheaths open
- Lower sheaths may have short hairs



Quackgrass

(*Elytrigia repens*

syn. *Agropyron repens*)

GENERAL OBSERVATIONS:

- Occurs here and there in the pastures
- Starts to flower in early June

**HABIT:**

- Tall (60-150 cm)
- Bluish green
- Perennial
- Spreads slowly with short, thick rhizomes
- Leaves without hairs
- Leaf margins rough

**COLLAR REGION:**

- Ligule 3-6 mm (similar to those of orchard grass and timothy)
- Broad collar
- Sheath open, but margins tightly overlapping up to collar
- Ligule membrane continues down along margins of sheath

GENERAL OBSERVATIONS:

- Occurs in wet areas in the pastures and also grows in and along the creek
- Starts growing early in spring but 1st flowers seen only in early June
- Supposedly needs to be kept grazed down to less than 12", otherwise becomes unpalatable to cows

Reed Canary Grass

(*Phalaris arundinacea*)



HABIT:

- Medium size (50-100 cm)
- Perennial
- Sod-former spreading with short rhizomes
- No hairs
- Leaves +/- smooth on both surfaces

COLLAR REGION:

- Ligule 1.5-2 mm
- No auricles
- Collar wide and sometimes folded
- Characteristic closed sheath(!)



Smooth Brome Grass (*Bromus inermis*)

GENERAL OBSERVATIONS:

- Occurs here and there in most pastures
- Its leaves supposedly provide excellent early spring grazing
- Starts flowering in early June and can be seen mostly along the edges of pastures (and roads)

HABIT:

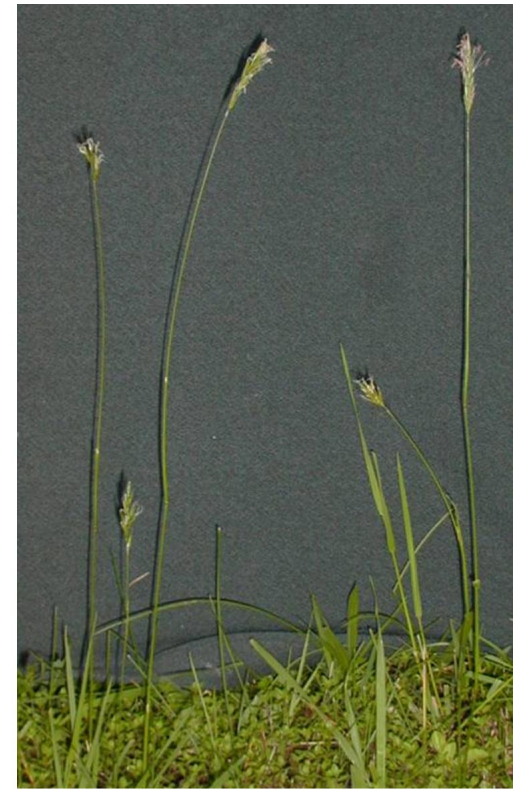
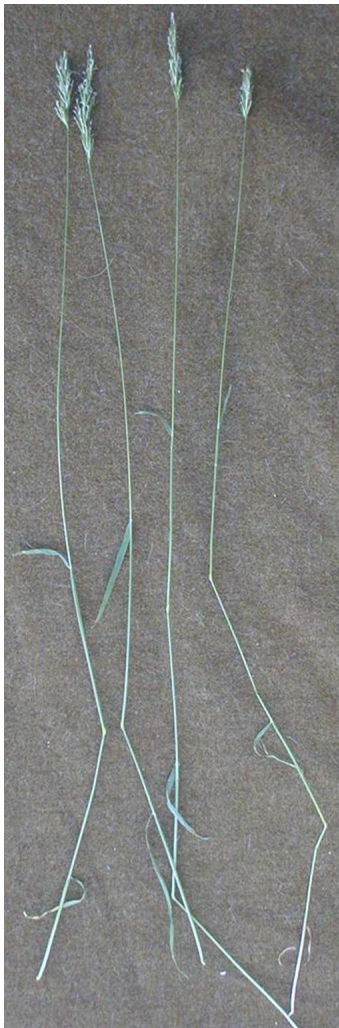
- Small to medium size (30-60 cm)
- Grows in small clumps
- Perennial
- Leaves very short (!)

COLLAR REGION:

- Ligule +/- 2mm
- No auricles, but characteristic fringe of hairs at the margins of the leaf base (!)
- Open sheath

GENERAL OBSERVATIONS:

- Spread throughout most of our pastures
- One of the first grasses to grow and flower in spring (first flowers seen in late April)
- Supposedly has little nutritional value for the cows



Sweet Vernal Grass

(*Anthoxanthum odoratum*)



Timothy
(*Phleum pratense*)

HABIT:

- Medium size (50-100 cm)
- Perennial
- Bunchgrass with short rhizomes and stolons
- Stems whitish and swollen (bulb-like) at the base

COLLAR REGION:

- Ligule 2-4 mm (resembles that of orchardgrass)
- No auricles
- Sheaths open

GENERAL OBSERVATIONS:

- Seems to be quite common in some pastures
- Starts flowering in early June
- Supposedly the best all-around pasture grass



HABIT:

- Medium size (50-120 cm)
- Perennial
- Bunchgrass with short rhizomes, can form dense sod
- Leaves ribbed and rough above, glossy below
- Leaf margins rough

COLLAR REGION:

- Ligule very short [<1 mm]
- Auricles blunt and lobe-like with or without hairs (sometimes similar to those of ryegrass and quackgrass)
- Sheaths open



Tall Fescue (*Festuca elatior*)

GENERAL OBSERVATIONS:

- Occurs here and there in the pastures
- Supposedly tolerates continued close grazing



- Erect and bushy (1-3 ft tall)
- Flowers purple, in short raceme
- Trifoliate (each leaf is composed of three leaflets) {1}
- Leaflets elliptical to obovate, margin toothed mostly in upper half {2}, small projecting tip {3}
- Terminal leaflet stalked, often turning upward {4}
- Stipules lance-shaped with a long, narrow tip {5}

! Without flowers, it is similar to other trifoliate legumes with stalked terminal leaflets. However, *black medick* does not grow as tall and tends to have more roundish leaflets; *sweet clovers* have entirely toothed margins.

*Alfalfa has been seeded into some of pastures and hayfields. Native of the Caspian area.



Alfalfa
(*Medicago sativa*)

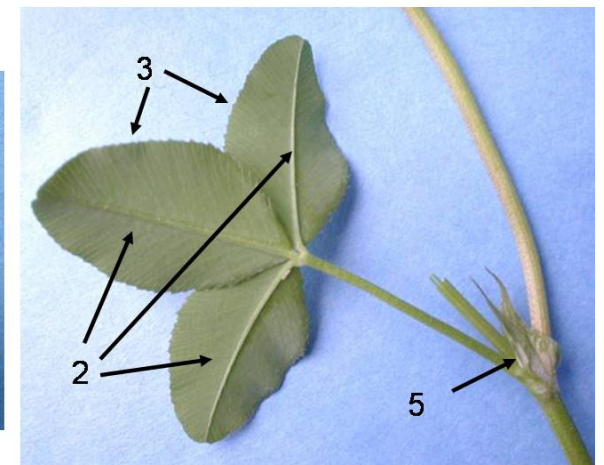


- Ascending, glabrous (not hairy)
- Pink to white flowers in stalked flower heads {1}
- Trifoliate (each leaf is composed of three leaflets) {2}
- Leaflets oval (tend to be broadest near the middle), with pronounced serration {3}, never with a light-colored V-shaped line or triangular patch {4}
- Stipules light colored with a broad base attached to the stem and a long narrow free tip {5}

! Without flowers, the leaves might be confused with those of *red clover*, which has a similar leaflet size and shape, but is pubescent and not as strongly serrate, or with those of *white clover*, which has smaller, more rounded leaflets that are not as strongly serrate.



*Found on almost all our pastures and hayfields.
Native of Eurasia.



Alsike Clover
(*Trifolium hybridum*)



- Prostrate to suberect
- Big (1.5 cm) yellow flowers in few-flowered umbells
- Trifoliate (each leaf is composed of three leaflets), but the stipules have the size and shape of leaflets {1}, so that the leaf appears to have five leaflets
- Leaflets elliptic to oblanceolate, margins entire (no serration)

! Not easily confused with any other clover, because none of our other clovers has stipules of the size and shape of its leaflets, and none has such large yellow flowers.

* It grows in almost every meadow and pasture. Native of Europe.



Birdsfoot Trefoil
(*Lotus corniculatus*)

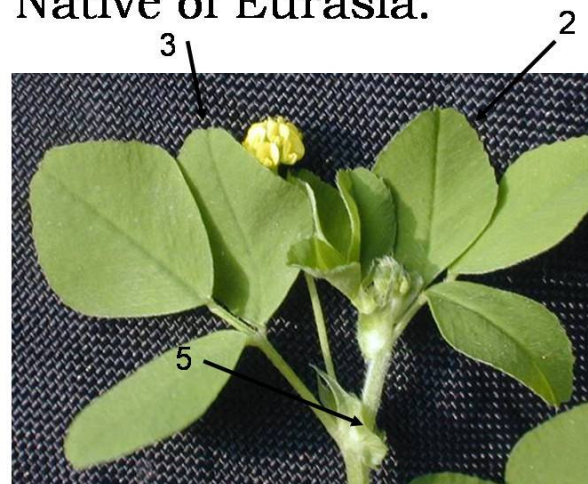


- Sprawling
- Flowers yellow, in tiny, round, long-stalked inflorescences
- Trifoliate (each leaf is composed of three leaflets) {1}
- Leaflets obovate, margin toothed at least in upper half {2}, small projecting tip {3}
- Terminal leaflet stalked, often turning upward {4}
- Stipules lance-shaped {5}

! Quite similar to hop clovers, the most common of which, *palmate hop clover*, does not have stalked terminal leaflets and grows taller. Also similar to *alfalfa* and the *sweet clovers*, which grow much taller and tend to have more elliptical leaflets.

*Occurs in small amounts in almost all pastures and hayfields. Native of Eurasia.

Black Medick
(*Medicago lupulina*)





- Trailing or climbing with tendrils {1}
- Flowers purple, in many-flowered, one-sided racemes
- Leaflets 5-11 pairs

! Without flowers, it is similar to *crown vetch*, but can be distinguished by its tendrils. The other common vetch, *four-seeded vetch*, has shorter leaves (2-5 pairs) and tiny flowers born singly or in pairs.

* Sometimes found along the edges of pastures and hayfields. It is a native of Eurasia and possibly of northeastern North America.

Bird- or Cow Vetch
(*Vicia cracca*)





- Loosely ascending
- Flowers pinkish, in stalked umbels
- Leaflets 11-25
- No tendrils

! Without flowers similar to Cow-Vetch, but lacking tendrils.

* Found along the margins of most pastures and hayfields, very common along roadsides. It is a native of the Mediterranean region.

Crown-Vetch
(*Coronilla varia*)





- Trailing or climbing with tendrils {1}
- Flowers light purple to white, born singly or in pairs
- Leaflets 2-5 pairs
- Seedpods with 4 seeds

! Much more delicate than the other vetches.

* Easily overlooked, but found in most pastures and hayfields. Native of Eurasia.



Four-Seeded Vetch
(*Vicia tetrasperma*)





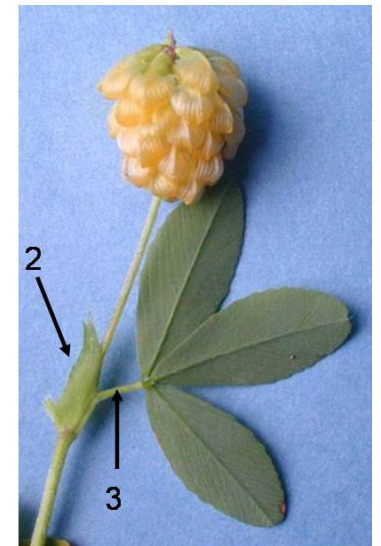
- Ascending, much branched, stems appressed-hairy
- Flowers yellow, in short-cylindrical, stalked inflorescences
- Trifoliate (each leaf is composed of three leaflets) {1}
- Leaflets oval and serrate
- Stipules {2} tend to be approx. as long as the leaf stalk {3}

! Might be confused with *black medick*, which has stalked terminal leaflets, a much smaller flower head and is generally a smaller plant. *Pinnate hop-clover* is smaller, has a stalked terminal leaflet, and leaf stalks that are longer than the stipules.

* Found interspersed in many meadows, mostly along the edges. Native of Eurasia.

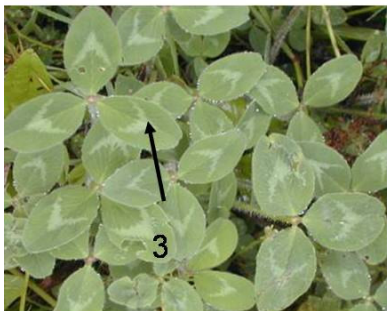
Palmate Hop-Clover

(*Trifolium aureum*)

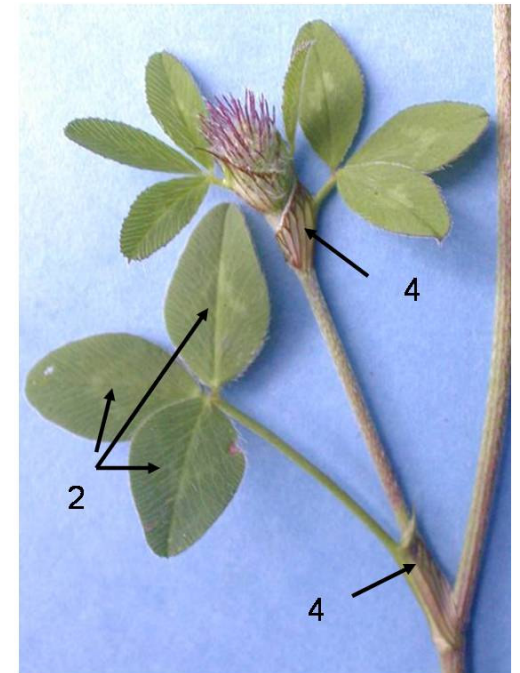




- Ascending, pubescent (hairy)
- Red to magenta or pinkish flowers in stalkless flower heads (sitting on top of a pair of leaves) {1}
- Trifoliate (each leaf is composed of three leaflets) {2}
- Leaflets oval (tend to be broadest near the middle), very shallowly serrate, sometimes marked with a light-colored triangular patch {3}
- Stipules “baggy”, light colored with dark veins, attached to stem for three-quarters of their length, with short, narrow free tip {4}



! Without flowers, the leaves might be confused with those of *alsike clover* or *white clover*, but the combination of pubescent leaves and “baggy” stipules allows for positive identification.



Red Clover (*Trifolium pratense*)

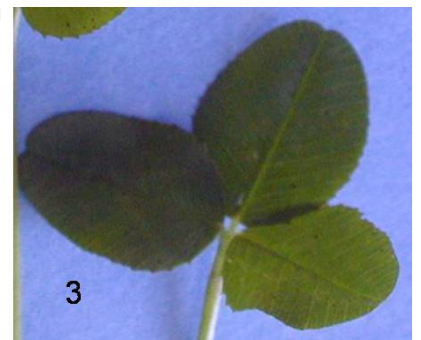
* Common in all pastures and hayfields.
Native of Europe.



- Creeping, entire plant glabrous (not a bit hairy)
- Flower heads and leaves emerging on individual stalks {1} which branch off the main stem {2} creeping along the ground
- Flowers white to pink, in round, long-stalked inflorescences
- Trifoliate (each leaf is composed of three leaflets) {3}
- Leaflets broad elliptic to obovate, somewhat serrate, sometimes marked with a light-colored V-shaped line {4}



! Without flowers, the leaves might be confused with those of *alsike clover*, which are also glabrous, but tend to be more oval with pronounced serration of the margins, or with those of *red clover*, which have a pubescent (hairy) underside. The light-colored leaf markings of red clover leaves tend to be more in the shape of a triangle



White Clover (*Trifolium repens*)

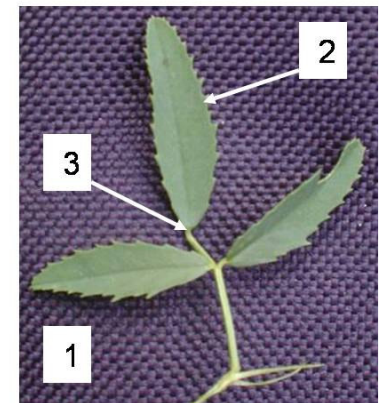
* One of the most common pasture plants. Native of Europe.



- Erect, much branched, 3-8 ft tall
- Flowers white, in many-flowered racemes
- Trifoliate (each leaf is composed of three leaflets) {1}
- Leaflets quite narrow and serrate {2}
- Terminal leaflet stalked {3}

! Without flower, this plant is hard to distinguish from *yellow sweet clover*. Might also be confused with *alfalfa*, which has a similar leaflet shape and a stalked terminal leaflet, but the serration on *alfalfa* leaflets is limited to the upper half.

* Typically a plant of road-sides, but sometimes found along the edges of pastures and hayfields. Native of Eurasia.



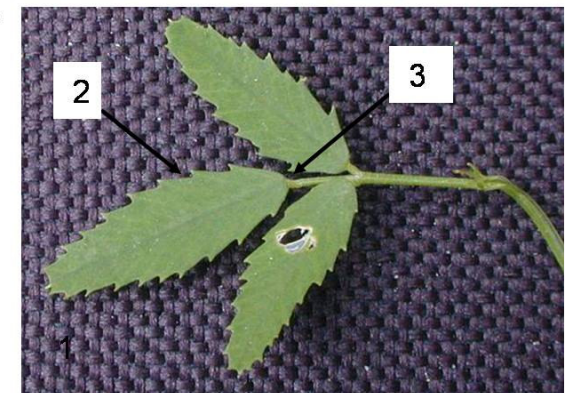
White Sweet Clover
(*Melilotus alba*)



- Erect, much branched, 3-8 ft tall
- Flowers yellow, in many-flowered racemes
- Trifoliate (each leaf is composed of three leaflets) {1}
- Leaflets quite narrow and serrate {2}
- Terminal leaflet stalked {3}

! Without flowers, this plant is hard to distinguish from *white sweet clover*. Might also be confused with *alfalfa*, which has a similar leaflet shape and a stalked terminal leaflet, but the serration on *alfalfa* leaflets is limited to the upper half.

* Typically a plant of road-sides, but sometimes found along the edges of pastures and hayfields. Native of Eurasia.



Yellow Sweet Clover
(*Melilotus officinalis*)

Appendix 2. List of wild plants documented on Columbia County farms.

Common Name ¹⁾	Species ¹⁾	growth form ²⁾	native ³⁾	conservation interest ⁴⁾	invasive ⁵⁾	Habitat						Farm ⁶⁾						
						Meadows/Fallow	Forest	Garden/Row crops	Hedgerows	Yard/Lanes	Wetlands/Beaches	Hawthorne Valley	Chaseholm	Gumaer	Harrier Field	Little Seed Garden	Miller's Crossing	Threshold
Allegheny monkey-flower	<i>Mimulus ringens</i>	h	n(p)	!		x					x	x	x					
Alsike clover	<i>Trifolium hybridum</i>	h				x		x			x	x	x	x	x	x	x	x
American beech	<i>Fagus grandifolia</i>	t	n				x				x		x					
American chestnut	<i>Castanea dentata</i>	t	n				x				x							
American elm	<i>Ulmus americanus</i>	t	n(p)			x	x		x		x	x	x	x				
American germander	<i>Teucrium canadense</i>	h	n(p)	o							x	x				x		
American mannagrass	<i>Glyceria grandis</i>	h	n	r		x					x	x						
Anise root	<i>Osmorhiza longistylis</i>	h	n				x										x	
Apple	<i>Pyrus malus</i>	t				x	x		x			x						
Arrow-ld tearthumb	<i>Polygonum sagittatum</i>	h	n			x	x		x	x	x	x	x			x	x	
Arrow-wood	<i>Viburnum dentatum</i> <i>var. lucidum</i>	s	n			x			x		x	x						
Asiatic dayflower	<i>Commelina communis</i>	h									x					x	x	
Autumn eleagnus	<i>Elaeagnus umbellata</i>	s			i	x			x		x	x						
Awls aster	<i>Aster pilosus</i>	h	n(p)			x				x	x	x	x					
Barnyard-grass	<i>Echinochloa crusgalli</i>	h				x		x	x		x	x	x		x		x	
Barren strawberry	<i>Waldsteinia fragarioides</i>	h	n				x					x		x				
Basswood	<i>Tilia americana</i>	t	n				x					x						
Beaked hazel	<i>Corylus cornuta</i>	s	n						x			x						
Bee balm	<i>Monarda fistulosa</i>	h	n(p)	!		x												x
Beech-drops	<i>Epifagus virginiana</i>	h	n				x					x		x				
Birdsfoot trefoil	<i>Lotus corniculatus</i>	h				x		x			x	x	x	x	x		x	x
Bitternut	<i>Carya cordiformis</i>	t	n				x					x						
Bittersweet	<i>Solanum dulcamara</i>	h			i	x			x		x	x	x		x	x	x	x
Black bindweed	<i>Polygonum convolvulus</i>	h				x		x	x	x		x			x		x	
Black birch	<i>Betula lenta</i>	t	n				x					x		x				
Black grass	<i>Juncus gerardii</i> ?	h	n								x	x						
Black locust	<i>Robinia pseudoacacia</i>	t			i	x			x			x		x			x	x
Black medick	<i>Medicago lupulina</i>	h				x		x				x		x				x
Black mustard	<i>Brassica nigra</i> cf.	h				x					x	x			x			
Black oak	<i>Quercus velutina</i>	t	n				x					x						
Black snakeroot	<i>Sanicula marilandica</i>	h	n				x					x						
Black willow	<i>Salix nigra</i>	t	n			x					x	x						
Blackberries	<i>Rubus</i> sp. (probably <i>R. allegheniensis</i>)	s	n			x			x			x		x				x
Blackcap raspberry	<i>Rubus occidentalis</i>	s	n			x			x			x						
Black-eyed Susan	<i>Rudbeckia hirta</i>	h	n(p)			x									x			x
Bladder campion	<i>Silene vulgaris</i>	h				x		x		x		x	x					x
Bladder-nut	<i>Staphylea trifolia</i>	t	n				x						x					
Bloodroot	<i>Sanguinaria canadensis</i>	h	n	v			x					x	x	x			x	
Blue alfalfa	<i>Medicago sativa</i> ssp. <i>sativa</i>	h				x						x	x	x	x	x	x	
Blue cohosh	<i>Caulophyllum thalictroides</i>	h	n	s			x					x	x					
Blue curls	<i>Trichostema dichotomum</i>	h	n	!		x						x						
Blue marsh violet	<i>Viola cucullata</i>	h	n			x					x	x						
Blue wax	<i>Cuphea viscosissima</i>	h	n(p)	r?		x						x						
Blue-stemmed goldenrod	<i>Solidago caesia</i>	h	n			x	x					x						
Blue-weed, Viper's bluegloss	<i>Echium vulgare</i>	h				x						x						
Blunt spike rush	<i>Elaeocharis ovata</i>	h	n			x					x	x						
Boneset	<i>Eupatorium perfoliatum</i>	h	n(p)			x			x	x	x	x	x				x	
Bottlebrush grass	<i>Elymus hystix</i>	h	n				x					x						
Boxelder	<i>Acer negundo</i>	t	n						x		x		x	x		x		
Bracken fern	<i>Pteridium aquilinum</i>	h	n				x					x						

		growth form ²⁾	native ³⁾	conservation interest ⁴⁾	invasive ⁵⁾	Habitat						Farm ⁶⁾						
						Meadows/Fallow	Forest	Garden/Row crops	Hedgerows	Yard/Lanes	Wetlands/Beaches	Hawthorne Valley	Chaseholm	Gumaer	Harrier Field	Little Seed Garden	Miller's Crossing	Threshold
Common Name ¹⁾	Species ¹⁾											(initial observations)						
Bristly aster	<i>Aster puniceus</i>	h	n(p)			x						x						
Bristly greenbriar	<i>Smilax cf. hispida</i>	l	n				x						x					
Broad beech fern	<i>Thelypteris hexagonoptera</i>	h	n	v, s			x					x						
Broad-leaved arrowhead	<i>Sagittaria latifolia</i>	h	n								x		x					
Broad-leaved dock	<i>Rumex obtusifolius</i>	h				x					x	x			x		x	
Broad-leaved sedge	<i>Carex platyphylla</i>	h	n				x					x	x					
Brome grass	<i>Bromus racemosus?</i>	h				x						x						
Brown knappweed	<i>Centaurea jacea</i>	h				x				x	x	x	x	x			x	
Buckwheat	<i>Fagopyrum esculentum</i>	h				x						x						
Bulbiliferous water-hemlock	<i>Cicuta cf. bulbifera</i>	h	n	!							x	x						
Bulbous buttercup	<i>Ranunculus bulbosus</i>	h				x						x						
Bull-thistle	<i>Cirsium vulgare</i>	h				x				x	x	x	x	x	x	x	x	x
Bur-cucumber	<i>Sicyos angulatus</i>	v	n			x				x			x					
Bur-marigold	<i>Bidens cernua</i>	h	n			x					x	x	x					?
Bur-reed	<i>Sparganium americanum</i>	h	n			x					x	x						
Butter-and-eggs	<i>Linaria vulgaris</i>	h				x					x	x	x	x		x	x	x
Butternut	<i>Juglans cinerea</i>	t	n				x					x						
Canada goldenrod	<i>Solidago canadensis</i>	h	n(p)			x					x	x	x				x	
Canada mayflower	<i>Maianthemum canadense</i>	h	n				x					x	x	x				
Canada thistle	<i>Cirsium arvense</i>	h			i	x		x	x		x	x	x		x	x	x	x
Canadian anemone	<i>Anemone canadensis</i>	h	n(p)							x						x		
Cardinal flower	<i>Lobelia cardinalis</i>	h	n(p)	v		x					x	x						
Carrion flower	<i>Smilax herbacea</i>	v	n	!						x			x					
Catalpa	<i>Catalpa sp.</i>	t	n			x				x			x					
Catnip	<i>Nepeta cataria</i>	h				x							x				x	
Celandine	<i>Chelidonium majus</i>	h			i	x	x					x	x	x			x	
Charlock	<i>Sinapis arvensis</i>	h				x						x	x		x		x	
Cheat	<i>Bromus secalinus</i>	h				x						x				x		
Chestnut oak	<i>Quercus prinus</i>	t	n				x						x					
Chicory	<i>Cichorium intybus</i>	h				x			x	x	x	x	x	x	x	x	x	x
Choke cherry	<i>Prunus virginiana</i>	s	n(p)			x	x		x			x						
Christmas-fern	<i>Polystichium acrostichoides</i>	h	n	v			x					x		x				
Cinnamon-fern	<i>Osmunda cinnamomea</i>	h	n	v			x				x	x						
Clammy ground-cherry	<i>Physalis heterophylla</i>	h	n(p)			x			x			x	x	x	x		x	x
Clearweed, Richweed	<i>Pilea pumila</i>	h	n			x	x				x	x	x		x		x	x
Cleavers	<i>Galium aparine</i>	h	n			x					x	x		x			x	
Columbine	<i>Aquilegia canadensis</i>	h	n				x					x	x	x				
Comfrey	<i>Symphytum officinale</i>	h				x						x						
Common agrimony	<i>Agrimonia gyrosepala</i>	h	n			x	x				x	x	x				x	
Common blue heart-ldd aster	<i>Aster cordifolius cf.</i>	h	n			x	x					x		x				
Common blue violet	<i>Viola sororia (incl. V. papilionaceae)</i>	h	n(p)			x	x					x	x	x				
Common Blue-eyed Grass	<i>Sisyrinchium montanum</i>	h	n(p)	o		x					x	x				x		
Common burdock	<i>Arctium minus</i>	h				x		x	x	x	x	x	x	x	x	x	x	x
Common buttercup	<i>Ranunculus acris</i>	h				x					x	x			x			x
Common cattail	<i>Typha latifolia</i>	h	n			x					x	x						
Common chickweed	<i>Stellaria media</i>	h				x		x				x					x	
Common cinquefoil (or. Running five-finger)	<i>Potentilla simplex (or. P. canadensis)</i>	h	n			x					x	x	x	x		x		x
Common cocklebur	<i>Xanthium strumarium</i>	h				x			x				x					
Common dodder	<i>Cuscuta gronovii</i>	v	n(p)								x	x						

		growth form ²⁾	native ³⁾	conservation interest ⁴⁾	invasive ⁵⁾	Habitat					Farm ⁶⁾							
						Meadows/ Forest	Garden/ Row crops	Hedgerows	Yard/ Lanes	Wetlands/ Beaches	Hawthorne Valley	Chaseholm	Gumaer	Harrier Field	Little Seed Garden	Miller's Crossing	Threshold	
Common Name ¹⁾	Species ¹⁾					(initial observations)												
Common elderberry	<i>Sambucus canadensis</i>	s	n						x		x	x		x				
Common enchanter's nightshade	<i>Circaea lutetiana</i>	h	n				x				x	x	x				x	
Common evening primrose	<i>Oenothera biennis</i>	h	n(p)			x		x			x	x	x	x			x	x
Common flat-topped goldenrod	<i>Euthamia graminifolia</i>	h	n(p)			x			x		x	x	x	x		x	x	
Common juniper	<i>Juniperus communis</i>	s	n	!		x			x			x						
Common lamb's quarters	<i>Chenopodium album</i>	h				x		x		x	x	x	x	x	x	x	x	x
Common lowbush blueberry	<i>Vaccinium angustifolium</i>	s	n				x		x			x						
Common mallow	<i>Malva neglecta</i>	h				x				x		x		x				
Common milkweed	<i>Asclepias syriaca</i>	h	n(p)			x		x			x	x	x	x	x	x	x	x
Common mullein	<i>Verbascum thapsus</i>	h				x					x	x	x	x			x	x
Common nightshade, Black nightshade	<i>Solanum nigrum</i>	h	n								x	x	x				x	
Common plantain	<i>Plantago major</i>	h				x		x			x	x	x	x	x	x	x	x
Common poison-ivy	<i>Toxicodendron radicans</i>	l	n(p)			x	x		x		x	x	x	x			x	x
Common polypody	<i>Polypodium virginianum</i>	h	n	v			x					x						
Common prickly ash	<i>Zanthoxylum americanum</i>	t	n(p)	o			x						x					
Common privet	<i>Ligustrum vulgare</i>	s			i				x			x		x			x	
Common purslane	<i>Portulaca oleracea</i>	h						x				x			x		x	
Common quickweed	<i>Galinsoga quadriradiata</i>	h				x		x			x	x	x				x	x
Common ragweed	<i>Ambrosia tremisiifolia</i>	h	n			x		x	x	x	x	x	x	x	x	x	x	x
Common reed	<i>Phragmites australis</i>	h	?		i	x					x	x					x	
Common sowthistle	<i>Sonchus oleraceus</i>	h				x						x						
Common speedwell	<i>Veronica officinalis</i>	h				x	x					x	x			x		
Common St. John's-wort	<i>Hypericum perforatum</i>	h				x						x	x	x			x	x
Common stitchwort	<i>Stellaria graminea</i>	h				x					x	x			x			x
Common tansy	<i>Tanacetum vulgare</i>	h				x						x						
Common vervain	<i>Verbena hastata</i>	h	n(p)			x	x				x	x	x					
Common water purslane	<i>Ludwigia palustris</i>	h	n(p)			x					x	x						
Common woodreed	<i>Cinna arundinacea</i>	h	n				x					x						
Common Wood-sorrel	<i>Oxalis stricta</i>	h	n			x	x	x			x	x	x	x	x	x	x	x
Common wormwood	<i>Artemisia absinthium</i>	h				x						x						
Common yarrow	<i>Achillea millefolium</i>	h	?			x		x			x	x	x				x	
Corn speedwell	<i>Veronica arvensis</i>	h				x						x					x	
Cottonwood	<i>Populus deltoides</i>	t	n			x	x		x		x	x						
Cow-vetch	<i>Vicia cracca</i>	h				x		x		x	x	x			x	x	x	
Cow-wheat	<i>Melampyrum lineare</i>	h	n				x					x						
Crab-apple	<i>Pyrus spp.</i>	t	?				x		x			x						
Crab-grass	<i>Digitaria sanguinalis</i>	h				x		x			x	x	x	x	x		x	x
Creeping buttercup	<i>Ranunculus repens</i>	h			i	x						x						x
Crown-vetch	<i>Coronilla varia</i>	h				x						x						
Curly Dock	<i>Rumex crispus</i>	h				x				x	x	x	x	x	x	x	x	x
Cut-leaved toothwort	<i>Dentaria laciniata</i>	h	n				x					x		x				
Cut-leaved water-horehound	<i>Lycopus americanus</i>	h	n(p)			x					x	x	x	x				x
Dame's rocket	<i>Hesperis matronalis</i>	h			i	x	x				x	x		x		x	x	x
Dandelion	<i>Taraxacum officinale</i>	h				x		x		x	x	x	x	x	x	x	x	x
Dark green bullrush	<i>Scirpus atrovirens</i>	h	n(p)			x					x	x	x					
Day lily	<i>Hemerocallis fulva</i>	h									x			x				
Debtford pink	<i>Dianthus armeria</i>	h				x					x	x	x				x	x
Deer tongue grass	<i>Panicum clandestinum</i>	h	n(p)						x		x			x			x	

						Habitat					Farm ⁶⁾								
						Meadows/Fallow	Forest	Garden/Row crops	Hedgerows	Yard/Lanes	Wetlands/Beaches	Hawthorne Valley	Chaseholm	Gumaer	Harrier Field	Little Seed Garden	Miller's Crossing	Threshold	
Common Name ¹⁾	Species ¹⁾	growth form ²⁾	native ³⁾	conservation interest ⁴⁾	invasive ⁵⁾	(initial observations)													
Devil's beggar-ticks	<i>Bidens frondosa</i>	h	n(p)			x			x		x	x			x		x	x	
Dewberry	<i>Rubus flagellaris</i>	s	n(p)			x					x	x					x	x	
Ditch stonecrop	<i>Penthorum sedoides</i>	h	n	!							x	x	x						
Dock-leaved smartweed	<i>Polygonum lapathifolium</i>	h	n	!							x		x				x		
Dog rose	<i>Rosa canina</i>	s				x			x			x							
Dog violet	<i>Viola conspersa</i>	h	n				x					x		x					
Dogfennel, Mayweed	<i>Anthemis cotula</i>	h				x		x			x	x			x	x	x	x	
Downy chess	<i>Bromus tectorum</i>	h			i	x		x				x			x				
Dutchman's breeches	<i>Dicentra cucullaria</i>	h	n	s?			x					x		x					
Dwarf ginseng	<i>Panax trifolius</i>	h	n				x					x		x					
Dwarf St. John's-wort	<i>Hypericum mutilum</i>	h	n(p)			x					x	x		x					
Early goldenrod	<i>Solidago juncea</i>	h	n(p)			x						x	x						
Early meadow rue	<i>Thalictrum dioicum</i>	h	n				x					x	x	x					
Early saxifrage	<i>Saxifraga virginiensis</i>	h	n			x	x					x							
Eastern lined aster	<i>Aster lanceolatus</i>	h	n(p)			x	x		x	x	x	x							
Eastern red cedar	<i>Juniperus virginiana</i>	t	n(p)			x	x		x			x	x				x	x	
Eastern willow-herb	<i>Epilobium coloratum</i>	h	n(p)			x			x		x	x	x				x		
Ebony spleenwort	<i>Asplenium platyneuron</i>	h	n	v			x					x							
English plantain, "Rib Grass"	<i>Plantago lanceolata</i>	h				x		x			x	x	x	x	x	x	x	x	
English ryegrass	<i>Lolium perenne</i> var. <i>perenne</i>	h				x					x	x							
European barberry	<i>Berberis vulgaris</i>	s			i	x			x			x							
European buckthorn	<i>Rhamnus cathartica</i>	s			i	x	x		x			x	x						
European field pansy	<i>Viola arvensis</i>	h				x						x							
Fall panicum	<i>Panicum dichotomiflorum</i>	h	n			x		x				x	x	x	x	x		x	
Fall-dandelion	<i>Leontodon autumnalis</i>	h				x					x	x							
False buckwheat	<i>Polygonum scandens</i>	v	n						x								x	x	
False hellebore	<i>Veratrum viride</i>	h	n				x				x	x		x			x		
False mermaid weed	<i>Floerkea proserpinacoides</i>	h	n	r		x	x					x		x		x	x		
False nutsedge	<i>Cyperus strigosus</i>	h	n(p)			x		x			x	x			x				
False pimpernel	<i>Lindernia dubia</i>	h	n						x			x							
False Salomon's seal	<i>Smilacina racemosa</i>	h	n				x					x	x				x		
False Waterpepper	<i>Polygonum hydropiperoides</i>	h	n(p)			x				x	x	x							
False-nettle	<i>Boehmeria cylindrica</i>	h	n				x					x	x						
Fancy wood-fern	<i>Dryopteris intermedia</i>	h	n	v			x					x		x					
Fanleaf hawthorn	<i>Crataegus flabellata</i>	s	n			x	x		x			x							
Field bindweed	<i>Convolvulus arvensis</i>	h				x						x		x	x			x	
Field garlic	<i>Allium vineale</i>	h			i	x	x					x	x	x			x	x	
Field milkwort	<i>Polygala sanguinea</i>	h	n(p)	s?		x						x					x		
Field mustard, Rape	<i>Brassica rapa</i>	h				x						x			x		x		
Field peppergrass	<i>Lepidium campestre</i>	h				x		x				x					x		
Field thistle	<i>Cirsium discolor</i>	h	n(p)	!		x							x						
Field-pussytoe	<i>Antennaria neglecta</i>	h	n(p)	!		x						x							
Figwort	<i>Scrophularia marilandica</i>	h	n	!							x						x		
Fleabane	<i>Erigeron</i> spp.	h	n(p)			x		x	x	x	x	x	x	x	x	x	x	x	
Flowering dogwood	<i>Cornus florida</i>	t	n	v			x		x			x		x					
Flowering maple	<i>Viburnum acerifolium</i>	s	n				x					x							
Fly-honeysuckle	<i>Lonicera canadensis</i>	s	n	r			x					x							
Foam flower	<i>Tiarella cordifolia</i>	h	n				x					x							
Four-o'clock	<i>Mirabilis nyctaginea</i>	h								x		x							
Fowl mannagrass	<i>Glyceria striata</i>	h	n(p)			x					x	x						x	
Fowl meadow-grass	<i>Poa palustris</i>	h	n(p)			x					x	x						x	
Fox grape	<i>Vitis labrusca</i>	l	n						x					x					
Fox sedge	<i>Carex vulpinoidea</i>	h	n(p)			x					x	x			x				
Fragile fern	<i>Cystopteris fragilis</i>	h	n	v			x					x							

		growth form ²⁾	native ³⁾	conservation interest ⁴⁾	invasive ⁵⁾	Habitat						Farm ⁶⁾						
						Meadows/Fallow Forest	Garden/Row crops	Hedgerows	Yard/Lanes	Wetlands/Beaches	Hawthorne Valley	Chaseholm	Gumaer	Harrier Field	Little Seed Garden	Miller's Crossing	Threshold	
Common Name ¹⁾	Species ¹⁾					(initial observations)												
Fragrant cudweed	<i>Gnaphalium obtusifolium</i>	h	n(p)	!		x												x
Fringed brome	<i>Bromus ciliatus</i>	h	n(p)			x					x							
Fringed loosestrife	<i>Lysimachia ciliata</i>	h	n(p)			x	x				x	x		x				x
Fringed polygala	<i>Polygala paucifolia</i>	h	n				x				x							
Fringed sedge	<i>Carex crinita</i>	h	n(p)			x	x				x	x						
Frost grape	<i>Vitis riparia</i>	l	n			x			x		x	x	x	x		x	x	
Garlic mustard	<i>Alliaria petiolata</i>	h			i	x	x				x	x	x	x	x	x	x	
Germander speedwell	<i>Veronica chamaedrys</i>	h				x					x							
Giant chickweed	<i>Stellaria aquatica</i>	h									x	x						
Giant foxtail	<i>Setaria faberi</i>	h				x		x	x		x	x	x	x	x		x	x
Giant ragweed	<i>Ambrosia trifida</i>	h	n	s					x		x	x					x	
Gill-over-the-ground, Ground ivy	<i>Glechoma hederacea</i>	h			i	x						x	x	x	x		x	x
Goblet aster	<i>Aster lateriflorus</i>	h	n(p)			x	x				x	x	x					
Golden Alexander, Meadow parsnip	<i>Zizia aurea</i>	h	n(p)			x						x						
Golden carpet, Mossy stonecrop	<i>Sedum acre</i>	h				x						x						
Golden ragwort	<i>Senecio aureus</i>	h	n(p)	!		x					x	x						
Gooseberry	<i>Ribes cynosbati</i>	s	n				x		x			x						
Gray goldenrod	<i>Solidago nemoralis</i>	h	n(p)	!		x						x	x					
Green foxtail	<i>Setaria viridis</i>	h	?			x		x				x			x			
Greenbriar	<i>Smilax cf. rotundifolia</i>	l	n	!					x			x						
Green-headed coneflower, Cut-leaf coneflower	<i>Rudbeckia laciniata</i>	h	n	s		x					x	x						
Grey birch	<i>Betula populifolia</i>	t	n			x	x		x			x						
Grey-twig dogwood	<i>Cornus racemosa</i>	s	n(p)			x			x			x		x			x	
Groundnut	<i>Apios americana</i>	h	n(p)								x					x		
Ground-pine	<i>Lycopodium obscurum</i>	h	n			x								x				
Halbert-ld tearthumb	<i>Polygonum arifolium</i>	h	n	s		x	x				x	x			x			
Hayscented fern	<i>Dennstaedtia punctilobula</i>	h	n				x					x						
Heal-all	<i>Prunella vulgaris</i>	h	?			x	x	x				x	x		x			x
Hedge bindweed	<i>Calystegia sepium</i>	v	?			x							x	x	x	x	x	
Hedge mustard	<i>Sisymbrium officinale</i>	h				x		x	x	x	x	x		x	x		x	
Helleborine	<i>Epipactis helleborine</i>	h				x	x					x						
Hemlock	<i>Tsuga canadensis</i>	t	n				x					x		x				
Hemp dogbane	<i>Apocynum cannabinum</i>	h	n(p)									x	x			x	x	x
Hempnettle	<i>Galeopsis tetrahit</i>	h									x	x						
Herb-robert	<i>Geranium robertianum</i>	h	n				x					x						
Highbush blueberry	<i>Vaccinium corymbosum</i>	s	n				x				x	x		x				
Hillside blueberry	<i>Vaccinium pallidum</i>	s	n				x					x						
Hispid buttercup	<i>Ranunculus hispidus</i>	h	n				x						x					
Hoary alysium	<i>Berteroa incana</i>	h				x											x	
Hog-peanut	<i>Amphicarpaea bracteata</i>	h	n(p)			x	x					x	x					
Honewort	<i>Cryptotaenia canadensis</i>	h	n				x				x	x					x	
Hooked crowsfoot	<i>Ranunculus recurvatus</i>	h	n				x										x	
Hop sedge	<i>Carex lupulina</i>	h	n(p)			x					x	x						
Horse nettle	<i>Solanum carolinense</i>	h				x						x	x	x			x	x
Horse-balm	<i>Collinsonia canadensis</i>	h	n				x					x						
Horsetail	<i>Equisetum spp.</i>	h	n(p)			x						x		x		x	x	
Horseweed	<i>Conyza canadensis</i>	h	n(p)							x	x	x	x		x		x	
Indian cucumber-root	<i>Medeola virginiana</i>	h	n				x					x		x				

		growth form ²⁾	native ³⁾	conservation interest ⁴⁾	invasive ⁵⁾	Habitat					Farm ⁶⁾								
						Meadows/Fallow	Forest	Garden/Row crops	Hedgerows	Yard/Lanes	Wetlands/Beaches	Hawthorne Valley	Chaseholm	Gumaer	Harrier Field	Little Seed Garden	Miller's Crossing	Threshold	
Common Name ¹⁾	Species ¹⁾					(initial observations)													
Indian pipe	<i>Monotropa uniflora</i>	h	n				x					x							
Indian tobacco	<i>Lobelia inflata</i>	h	n			x	x				x	x	x	x			x	x	
Interrupted fern	<i>Osmunda claytoniana</i>	h	n	v			x					x	x	x					
Ironwood	<i>Ostrya virginiana</i>	t	n			x	x		x			x							
Italian ryegrass	<i>Lolium perenne</i> var. <i>aristatum</i>	h				x						x						x	
Jack in the pulpit	<i>Arisaema triphyllum</i>	h	n				x					x	x	x		x	x	x	
Japanese barberry	<i>Berberis thunbergii</i>	s			i	x	x				x	x	x	x			x	x	
Japanese chess	<i>Bromus japonicus</i>	h				x						x		x		x	x		
Japanese hedge-parsley	<i>Torilis japonica</i>	h							x				x						
Japanese knotweed	<i>Polygonum cuspidatum</i>	h			i	x	x				x	x		x		x	x		
Jimson-weed	<i>Datura stramonium</i>	h	?		i	x				x		x							
Johnny-jump-up	<i>Viola tricolor</i>	h				x						x							
Jumpseed	<i>Polygonum virginianum</i>	h	n				x		x				x	x			x		
Kentucky bluegrass	<i>Poa pratensis</i>	h				x						x	x	x	x	x	x	x	
Knotweed	<i>Polygonum</i> sp.	h	?			x					x	x							
Knotweed	<i>Polygonum aviculare</i>	h				x				x	x		x		x		x	x	
Knotweed	<i>Polygonum erectum</i>	h	n			x							x		x				
Lady-fern	<i>Athyrium filix-femina</i>	h	n	v			x					x							
Lady's thumb	<i>Polygonum persicaria</i>	h				x		x			x	x	x	x	x			x	
Large-tooth aspen	<i>Populus grandidentata</i>	t	n				x					x							
Late goldenrod	<i>Solidago gigantea</i>	h	n(p)			x					x	x	x						
Leatherwood	<i>Dirca palustris</i>	s	n	r			x					x							
Lemon balm	<i>Melissa officinalis</i>	h								x								x	
Little bluestem	<i>Schizachyrium scoparium</i>	h	n(p)	!		x						x						x	
Little sundrops	<i>Oenothera perennis</i>	h	n(p)	o		x										x			
Live-forever	<i>Sedum purpureum</i>	h					x					x							
Long-bristled smartweed	<i>Polygonum cespitosum?</i>	h			i	x	x					x	x		x		x	x	
Longleaf ground-cherry	<i>Physalis longifolia</i>	h	n(p)			x		x					x						
Long-lyd stitchwort	<i>Stellaria longifolia</i>	h	n			x					x	x							
Long-spurred violet	<i>Viola rostrata</i>	h	n				x					x							
Loose-flowered sedge	<i>Carex laxiflora?</i>	h	n				x					x							
Love-in-a-mist	<i>Nigella damascena</i>	h				x				x		x							
Low bindweed	<i>Calystegia spithamea</i>	h	n(p)	o													x		
Low cudweed	<i>Gnaphalium uliginosum</i>	h				x						x							
Maidenhair fern	<i>Adiantum pedatum</i>	h	n	v			x					x							
Mannagrass	<i>Glyceria acutiflora</i>	h	n	!		x					x	x							
Marginal wood-fern	<i>Dryopteris marginalis</i>	h	n	v			x					x		x					
Marsh bedstraw	<i>Galium palustre</i>	h	n			x					x	x							
Marsh fern	<i>Thelypteris palustris</i>	h	n(p)	v		x					x	x							
Marsh marygold	<i>Caltha palustris</i>	h	n(p)			x						x							
Marsh pennywort	<i>Hydrocotyle americana</i>	h	n			x	x				x	x							
Marsh St.-John's-wort	<i>Triadenum virginicum</i>	h	n	!		x					x	x							
Meadow fescue	<i>Festuca pratensis</i>	h				x						x			x				
Meadowsweet	<i>Spiraea alba</i> var. <i>latifolia</i>	s	n(p)			x			x		x	x	x						
Milk purslane	<i>Euphorbia maculata</i>	h	n			x											x		
Miterwort	<i>Mitella diphylla</i>	h	n				x					x		x					
Moneywort	<i>Lysimachia nummularia</i>	h			i	x					x	x					x		
Moonseed	<i>Menispermum canadense</i>	v	n				x						x						
Moth mullein	<i>Verbascum blattaria</i>	h				x				x		x							
Motherwort	<i>Leonurus cardiaca</i>	h				x			x	x	x	x	x				x		
Mountain-mint	<i>Pycnanthemum</i> cf. <i>incanum</i>	h	n	!		x							x						

		growth form ²⁾	native ³⁾	conservation interest ⁴⁾	invasive ⁵⁾	Habitat						Farm ⁶⁾						
						Meadows/Fallow	Forest	Garden/Row crops	Hedgerows	Yard/Lanes	Wetlands/Beaches	Hawthorne Valley	Chaseholm	Gumaer	Harrier Field	Little Seed Garden	Miller's Crossing	Threshold
						(initial observations)												
Common Name ¹⁾	Species ¹⁾																	
Mountain-mint	<i>Pycnanthemum tenuifolium</i>	h	n(p)	!		x						x						
Mouse-ear chickweed	<i>Cerastium vulgatum</i>	h				x					x	x	x		x	x	x	x
Mouse-ear hawkweed	<i>Hieracium pilosella</i>	h				x					x	x						
Multiflora rose	<i>Rosa multiflora</i>	s			i	x	x		x	x	x	x	x	x		x	x	x
Musk mallow	<i>Malva moschata</i>	h				x						x						
Musklewood, Blue beech	<i>Carpinus caroliniana</i>	t	n				x		x			x						
Naked tick-trefoil	<i>Desmodium nudiflorum</i>	h	n				x					x						
Nannyberry	<i>Viburnum lentago</i>	s	n				x		x			x						
Narrow-leaved speedwell	<i>Veronica scutellata</i>	h	n	!		x					x	x						
New Jersey tea	<i>Ceanothus americanus</i> <i>var. americanus</i>	s	n(p)	r		x						x						
New York fern	<i>Thelypteris noveboracensis</i>	h	n	v			x					x						
New-England aster	<i>Aster novae-angliae</i>	h	n(p)			x					x	x	x					
Nimblewill	<i>Muhlenbergia schreberi?</i>	h	n			x								x				
Nodding lady's tresses	<i>Spiranthes cernua</i>	h	n(p)	v		x					x	x						
Northern blueflag, Iris	<i>Iris versicolor</i>	h	n			x	x				x	x	x	x				
Northern three-lobed bedstraw	<i>Galium trifidum</i>	h	n			x					x	x						
Northern water-horehound	<i>Lycopus uniflorus</i>	h	n(p)				x					x						
Norway maple	<i>Acer platanoides</i>	t			i		x					x	x					
Oats	<i>Avena sativa</i>	h				x						x			x			
Orange-red king-devil	<i>Hieracium aurantiacum</i>	h				x						x				x		
Orchard grass	<i>Dactylis glomerata</i>	h				x		x			x	x	x	x	x	x	x	x
Oriental bittersweet	<i>Celastrus orbiculatus</i>	l			i	x			x			x						
Ox-eye daisy	<i>Chrysanthemum leucanthemum</i>	h				x				x	x	x	x	x	x	x	x	x
Palmate hop-clover	<i>Trifolium aureum</i>	h				x						x	x					x
Panic grass	<i>Panicum languinosum</i>	h	n(p)			x	x					x		x				x
Partidgeberry	<i>Mitchella repens</i>	s	n				x					x	x	x				
Pasture rose	<i>Rosa carolina</i>	s	n(p)	!		x			x			x	x				x	x
Pasture thistle	<i>Cirsium pumilum</i>	h	n			x						x					x	
Path rush	<i>Juncus tenuis</i>	h	n(p)			x	x		x	x	x	x	x	x	x	x		x
Pear	<i>Pyrus communis</i>	t				x	x		x			x						
Pennsylvania bittercress	<i>Cardamine pennsylvanica ?</i>	h	n								x	x		x				
Pennsylvania sedge	<i>Carex pennsylvanica</i>	h	n(p)				x					x						
Pennsylvania smartweed	<i>Polygonum pennsylvanicum</i>	h	n			x		x	x	x	x	x	x		x		x	x
Penny fieldcress	<i>Thlaspi arvense</i>	h				x		x			x	x	x		x	x	x	
Perfoliate bellwort	<i>Uvularia perfoliata</i>	h	n				x					x						
Pignut	<i>Carya glabra</i>	t	n				x		x			x						
Pin-cherry	<i>Prunus pennsylvanica</i>	t	n				x		x			x						
Pineapple weed	<i>Matricaria matricarioides</i>	h				x		x			x	x				x		
Pink ladyslipper	<i>Cypripedium acaule</i>	h	n	v			x					x						
Pointed broom sedge	<i>Carex scoparia</i>	h	n(p)			x					x	x						x
Pokeweed	<i>Phytolacca americana</i>	h	n						x		x	x	x	x			x	x
Poorman's pepper	<i>Lepidium virginicum</i>	h	n(p)			x						x			x	x	x	
Poverty oatgrass	<i>Danthonia spicata</i>	h	n(p)			x	x					x						
Prickly lettuce	<i>Lactuca serriola</i>	h				x		x	x			x			x			
Prickly sow-thistle	<i>Sonchus asper</i>	h						x				x						
Purple loosestrife	<i>Lythrum salicaria</i>	h			i	x					x	x	x		x		x	
Purple-flowering raspberry	<i>Rubus odoratus</i>	s	n				x					x						
Purplestem Angelica	<i>Angelica atropurpurea</i>	h	n(p)	o		x						x	x					
Purplestem beggar-tick	<i>Bidens connata</i>	h	n			x					x	x						

		growth form ²⁾	native ³⁾	conservation interest ⁴⁾	invasive ⁵⁾	Habitat					Farm ⁶⁾							
						Meadows/Fallow	Forest	Garden/Row crops	Hedgerows	Yard/Lanes	Wetlands/Beaches	Hawthorne Valley	Chaseholm	Gumaer	Harrier Field	Little Seed Garden	Miller's Crossing	Threshold
Common Name ¹⁾	Species ¹⁾					(initial observations)												
Quack-grass	<i>Elytrigia repens</i>	h				x		x			x	x	x	x			x	x
Quaking aspen	<i>Populus tremuloides</i>	t	n(p)			x	x		x			x						
Rabbit-foot clover	<i>Trifolium arvense</i>	h				x						x						
Ragged-fringe orchis	<i>Habenaria lacera</i>	h	n(p)	v, r?		x						x						
Ragged-robin	<i>Lychnis flos-cuculi</i>	h			i	x						x						
Rattlesnake grass	<i>Glyceria canadensis</i>	h	n			x					x	x						
Red clover	<i>Trifolium pratense</i>	h				x		x			x	x	x	x	x	x	x	x
Red maple	<i>Acer rubrum</i>	t	n				x		x			x		x				
Red mint	<i>Mentha x gentilis</i>	h				x					x	x						
Red mulberry	<i>Morus rubra</i>	t	n				x					x						x
Red oak	<i>Quercus rubra</i>	t	n				x		x			x						
Red trillium	<i>Trillium erectum</i>	h	n	v			x					x	x	x			x	
Red-osier dogwood	<i>Cornus sericea</i>	s	n(p)			x			x			x						
Redtop	<i>Agrostis gigantea</i>	h				x					x	x			x			
Reed canary-grass	<i>Phalaris arundinacea</i>	h	?		i	x					x	x	x	x	x	x	x	
Retorse sedge	<i>Carex retrorsa?</i>	h	n	?		x					x	x						
Rhombic copperleaf	<i>Acalypha rhomboidea</i>	h	n(p)			x					x	x	x	x	x		x	x
Rice cutgrass	<i>Leersia oryzoides</i>	h	n(p)				x			x		x	x				x	
Rough cinquefoil	<i>Potentilla norvegica</i>	h	n(p)			x						x	x			x	x	
Rough pigweed	<i>Amaranthus retroflexus</i>	h						x				x	x	x	x		x	x
Rough-stemmed avens	<i>Geum laciniatum</i>	h	n				x										x	
Round-leaved tick-trefoil	<i>Desmodium rotundifolium</i>	h	n				x					x						
Round-lobed hepatica	<i>Hepatica americana</i>	h	n				x					x						
Royal fern	<i>Osmunda regalis</i>	h	n	v			x				x	x		x				
Rue anemone	<i>Anemonella thalictroides</i>	h	n				x					x	x	x				
Russian olive	<i>Elaeagnus angustifolia</i>	t			i				x			x						
Salad-burnet	<i>Sanguisorba minor</i>	h				x							x					
Sallow sedge	<i>Carex lurida</i>	h	n(p)			x					x	x				?		
Salomon's seal	<i>Polygonatum sp.</i>	h	n				x					x	x	x			x	
Sassafras	<i>Sassafras albidum</i>	t	n(p)	o			x					x						
Sawbeak sedge	<i>Carex stipata?</i>	h	n(p)			x					x	x						
Scarlet oak	<i>Quercus coccinea</i>	t	n				x					x						
Scarlet pimpernel	<i>Anagallis arvensis</i>	h					x					x						
Scrub oak, Bear oak	<i>Quercus ilicifolia</i>	s	n				x					x						
Sensitive fern	<i>Onoclea sensibilis</i>	h	n(p)	v		x	x				x	x	x	x	x	x		x
Serviceberry	<i>Amelanchier spp.</i>	t	n				x		x			x						
Sessile-leaved bellwort	<i>Uvularia sessilifolia</i>	h	n				x					x		x				
Shagbark hickory	<i>Carya ovata</i>	t	n				x		x			x						
Sheep fescue	<i>Festuca ovina</i>	h					x					x		x				
Sheep sorrel	<i>Rumex acetosella</i>	h			i	x						x	x			x	x	
Sheperd's purse	<i>Capsella bursa-pastoris</i>	h				x						x	x		x	x	x	
Shining clubmoss	<i>Lycopodium lucidulum</i>	h	n				x					x						
Showy goat's beard	<i>Tragopogon pratensis</i>	h					x					x	x		x	x	x	x
Silver maple	<i>Acer saccharinum</i>	t	n									x						
Silverrod	<i>Solidago bicolor</i>	h	n	!			x					x						
Silvery cinquefoil	<i>Potentilla argentea</i>	h					x					x					x	
Skullcap	<i>Scutellaria lateriflora</i>	h	n				x	x				x						
Skunk cabbage	<i>Symplocarpus foetidus</i>	h	n					x			x	x		x			x	
Slender vetch	<i>Vicia tetrasperma</i>	h					x				x	x				x		
Small-flowered crowfoot, Kidney-leaved buttercup	<i>Ranunculus abortivus</i>	h	n				x	x				x	x	x				
Smooth aster	<i>Aster laevis</i>	h	n(p)	!			x					x						
Smooth brome-grass	<i>Bromus inermis</i>	h					x			x		x	x	x	x		x	x
Smooth pigweed	<i>Amaranthus hybridus</i>	h							x			x	x	x				x
Smooth rock-cress	<i>Arabis laevigata</i>	h	n				x	x				x		x				
Smooth sumac	<i>Rhus glabra</i>	s	n(p)	!					x			x						

						Habitat						Farm ⁶⁾						
		growth form ²⁾	native ³⁾	conservation interest ⁴⁾	invasive ⁵⁾	Meadows/Fallow	Forest	Garden/Row crops	Hedgerows	Yard/Lanes	Wetlands/Beaches	Hawthorne Valley	Chaseholm	Gumaer	Harrier Field	Little Seed Garden	Miller's Crossing	Threshold
Common Name ¹⁾	Species ¹⁾												(initial observations)					
Soapwort	<i>Saponaria officinalis</i>	h				x					x	x						x
Soft chess	<i>Bromus hordeaceus</i>	h				x									x			
Soft rush	<i>Juncus effusus</i>	h	n(p)			x	x		x		x	x	x		x	x		
Sorghum, milo	<i>Sorghum bicolor</i>	h				x		x		x		x						
Speargrass	<i>Poa annua</i>	h				x					x	x				x		
Spearmint	<i>Mentha spicata</i>	h				x						x	x		x			
Speckled alder	<i>Alnus incana</i>	t	n			x	x		x			x						
Spicebush	<i>Lindera benzoin</i>	s	n				x				x	x		x				
Spike-rush	<i>Elaeocharis palustris</i>	h	n(p)			x					x	x						
Spotted Joe-pye-weed	<i>Eupatorium maculatum</i>	h	n(p)			x					x	x	x	x			x	
Spotted knappweed	<i>Centaurea maculosa</i>	h			i	x			x		x	x	x		x	x	x	x
Spotted St. John's-wort	<i>Hypericum punctatum</i>	h	n(p)			x						x	x	x				
Spotted yewelweed	<i>Impatiens capensis</i>	h	n			x	x				x	x	x		x		x	
Spring beauty	<i>Claytonia carolinensis</i>	h	n				x					x						
Squarrose sedge	<i>Carex squarrosa</i>	h	n(p)	s		x					x	x						
Squawberry	<i>Vaccinium stamineum</i>	s	n				x		x			x						
Staghorn sumac	<i>Rhus typhina</i>	s	n			x	x		x			x	x	x		x	x	
Starflower	<i>Trientalis borealis</i>	h	n				x					x		x			x	
Stargrass	<i>Hypoxis hirsuta</i>	h	n(p)	s			x					x						
Steeplebush, Hardhack	<i>Spiraea tomentosa</i>	s	n(p)			x	x		x		x	x						
Stinging nettle	<i>Urtica dioica</i>	h	?			x		x			x	x	x		x		x	
Stinkgrass	<i>Eragrostis cilianensis</i>	h						x				x						x
Strawstem beggar-tick	<i>Bidens comosa</i>	h	n			x					x	x						
Streambank wild rye	<i>Elymus riparius</i>	h	n			x						x						
Striped maple, Moosewood	<i>Acer pensylvanicum</i>	t	n				x					x						
Sugar maple	<i>Acer saccharum</i>	t	n				x		x			x						
Sulfur cinquefoil, Rough-fruited cinquefoil	<i>Potentilla recta</i>	h				x						x	x	x	x	x	x	x
Summer-grape	<i>Vitis cf. aestivalis</i>	l	n				x						x					
Sunflower	<i>Helianthus sp.</i>	h	n(p)	!		x						x						
Swamp candle	<i>Lysimachia terrestris</i>	h	n(p)	!		x					x	x						
Swamp rose	<i>Rosa palustris</i>	s	n			x	x		x		x	x	x					
Swamp white oak	<i>Quercus bicolor</i>	t	n				x					x						
Swamp-milkweed	<i>Asclepias incarnata</i>	h	n(p)			x					x	x	x					
Sweet clover	<i>Melilotus sp.</i>	h									x	x				x		
Sweet fern	<i>Comptonia peregrina</i>	s	n(p)	o		x			x			x		x				x
Sweet vernal grass	<i>Anthoxanthum odoratum</i>	h				x	x				x	x	x	x			x	x
Sweet white violet	<i>Viola blanda</i>	h	n				x					x		x				
Sweet-scented bedstraw	<i>Galium triflorum</i>	h	n			x	x				x	x						
Sycamore	<i>Platanus occidentalis</i>	t	n			x						x		x				
Tall beggar-tick	<i>Bidens vulgata</i>	h	n			x					x	x						
Tall fescue	<i>Festuca elatior</i>	h				x						x			x		x	
Tall goldenrod	<i>Solidago altissima</i>	h	n			x					x	x	x					
Tall meadow rue	<i>Thalictrum pubescens</i>	h	n					x			x	x	x					
Tall oatgrass	<i>Arrhenatherum elatius</i>	h				x						x						
Tall white beard-tongue	<i>Penstemon digitalis</i>	h	n(p)	!		x						x				x		
Tall white lettuce	<i>Prenanthes altissima</i>	h	n				x					x						
Tansy-mustard	<i>Descurainia sophia</i>	h				x				x		x						
Tartarian honeysuckle	<i>Lonicera tatarica</i>	s			i	x			x			x						
Teasel	<i>Dipsacus sp.</i>	h				x						x						
Thimbleweed	<i>Anemone virginiana</i>	h	n(p)			x						x						
Thin-leaved coneflower, three-lobed coneflower	<i>Rudbeckia triloba</i>	h	n(p)	?		x					x	x					x	
Thyme-leaved speedwell	<i>Veronica serpyllifolia</i> var. <i>serpyllifolia</i>	h				x						x	x			x		
Ticklegrass	<i>Agrostis hyemalis</i>	h	n(p)			x						x						
Timothy	<i>Phleum pratense</i>	h				x			x		x	x	x	x	x	x	x	x
Toad rush	<i>Juncus bufonius</i>	h	n	r?		x						x						

						Habitat						Farm ⁶⁾						
						Meadows/Fallow	Forest	Garden/Row crops	Hedgerows	Yard/Lanes	Wetlands/Beaches	Hawthorne Valley	Chaseholm	Gumaer	Harrier Field	Little Seed Garden	Miller's Crossing	Threshold
Common Name ¹⁾	Species ¹⁾	growth form ²⁾	native ³⁾	conservation interest ⁴⁾	invasive ⁵⁾	(initial observations)												
Toad rush	<i>Juncus bufonius</i>	h	n	r?		x						x						
Toothwort	<i>Dentaria diphylla</i>	h	n				x					x						
Trailing arbutus	<i>Epigaea repens</i>	h	n	v			x					x						
Tree of heaven	<i>Ailanthus altissima</i>	t			i		x		x				x	x			x	
Trout lilly	<i>Erythronium americanum</i>	h	n				x					x		x			x	
True forget-me-not	<i>Myosotis scorpioides</i>	h			i	x					x	x						
Tulip-tree	<i>Liriodendron tulipifera</i>	t	n				x						x					
Tumbling mustard	<i>Sisymbrium altissimum</i>	h													x		x	
Turtlehead	<i>Chelone glabra</i>	h	n(p)	v			x					x	x					
Tussock sedge	<i>Carex stricta</i>	h	n									x	x				x	
Velvet-grass	<i>Holcus lanatus</i>	h					x						x					
Velvetleaf	<i>Abutilon theophrasti</i>	h					x		x		x		x	x		x	x	
Virginia creeper	<i>Parthenocissus quinquefolia</i>	l	n				x	x		x			x	x	x		x	
Virginia waterleaf	<i>Hydrophyllum virginianum</i>	h	n					x					x					
Virgin's bower	<i>Clematis virginiana</i>	v	n				x						x					
Water hemlock	<i>Cicuta maculata</i>	h	n(p)				x					x	x		x		x	
Water parsnip	<i>Sium suave</i>	h	n(p)	!			x						x					
Water smartweed	<i>Polygonum amphibium</i> var. <i>emersum</i>	h	n	!									x				x	
Water speedwell	<i>Veronica anagallis-aquatica</i>	h										x				x	x	
Watercress	<i>Rorippa nasturtium-aquaticum</i>	h			i		x					x	x	x				
Waterpepper	<i>Polygonum hydropiper</i>	h					x					x	x	x			x	
Water-plantain	<i>Alisma plantago-aquatica</i>	h	n				x					x	x	x				
Wheat	<i>Triticum aestivum</i>	h					x						x					
White ash	<i>Fraxinus americana</i>	t	n				x	x		x			x					
White avens	<i>Geum canadense</i>	h	n				x						x	x			x	
White baneberry	<i>Acatea alba</i>	h	n					x					x		x			
White birch	<i>Betula papyrifera</i>	t	n					x		x			x					
White campion	<i>Silene latifolia</i>	h						x			x	x	x	x	x		x	
White clover	<i>Trifolium repens</i>	h						x		x		x	x	x	x	x	x	
White oak	<i>Quercus alba</i>	t	n					x		x			x					
White pine	<i>Pinus strobus</i>	t	n					x		x			x		x			
White snakeroot	<i>Eupatorium rugosum</i>	h	n					x				x	x					
White spruce	<i>Picea glauca</i>	t	n							x			x					
White sweet clover	<i>Melilotus alba</i>	h						x				x	x					
White vervain	<i>Verbena urticifolia</i> var. <i>urticifolia</i>	h	n					x	x				x	x	x	x	x	
White wood aster	<i>Aster divaricatus</i>	h	n						x				x	x				
Whorled loosestrife	<i>Lysimachia quadrifolia</i>	h	n(p)					x	x				x	x				
Whorled milkwort	<i>Polygala verticillata</i>	h	n(p)	s?				x					x					
Whorled wood aster	<i>Aster acuminatus</i>	h	n						x				x					
Wild basil	<i>Satureja vulgaris</i>	h	n	!				x					x	x				
Wild black cherry	<i>Prunus serotina</i>	t	n					x	x		x		x					
Wild carrot, Queen Ann's Lace	<i>Daucus carota</i>	h						x		x	x		x	x	x	x	x	
Wild geranium	<i>Geranium maculatum</i>	h	n					x	x				x					
Wild ginger	<i>Asarum canadense</i>	h	n						x				x		x		x	
Wild leek	<i>Allium tricoccum</i>	h	n						x				x	x	x			
Wild licorice	<i>Galium lanceolatum</i>	h	n						x				x					
Wild madder	<i>Galium mollugo</i>	h						x		x	x		x	x	x	x	x	
Wild marjoram	<i>Origanum vulgare</i>	h							x				x	x				
Wild mint	<i>Mentha arvensis</i>	h	?					x			x		x	x				
Wild onion	<i>Allium canadense</i>	h	n(p)										x				x	

		growth form ²⁾	native ³⁾	conservation interest ⁴⁾	invasive ⁵⁾	Habitat					Farm ⁶⁾							
						Meadows/Fallow Forest	Garden/Row crops	Hedgerows	Yard/Lanes	Wetlands/Beaches	Hawthorne Valley	Chaseholm	Gumaer	Harrier Field	Little Seed Garden	Miller's Crossing	Threshold	
Common Name ¹⁾	Species ¹⁾											(initial observations)						
Wild parsnip	<i>Pastinaca sativa</i>	h				x						x	x					
Wild radish, Jointed charlock	<i>Raphanus raphanistrum</i>	h				x		x				x				x	x	
Wild sarsaparilla	<i>Aralia nudicaulis</i>	h	n				x					x	x	x				
Wild stonecrop	<i>Sedum ternatum</i>	h					x					x						
Wild strawberry	<i>Fragaria virginiana</i>	h	n(p)			x						x	x		x	x		x
Wild thyme	<i>Thymus serpyllum</i>	h				x						x						
Winter cress	<i>Barbarea vulgaris</i>	h				x		x				x	x		x	x	x	x
Winterberry	<i>Ilex verticillata</i>	s	n	v			x		x		?	x						
Witch-grass	<i>Panicum capillare</i>	h	n			x						x			x			
Witch-hazel	<i>Hamamelis virginiana</i>	s	n			x	x		x			x						
Wood anemone	<i>Anemone quinquefolia</i>	h	n(p)				x					x	x	x				
Wood strawberry	<i>Fragaria vesca</i>	h	n				x					x						
Wood-nettle	<i>Laportea canadensis</i>	h	n								x		x					
Woodrush	<i>Luzula multiflora</i>	h	n(p)			x	x					x		x				
Wool grass	<i>Scirpus cyperinus</i>	h	n(p)			x					x	x	x					
Wormseed mustard	<i>Erysimum cheiranthoides</i>	h				x							x				x	
Wrinkle-leaved goldenrod	<i>Solidago rugosa</i>	h	n(p)			x					x	x	x					
Yard-grass	<i>Eleusine indica</i>	h				x				x			x					x
Yellow alfalfa	<i>Medicago sativa ssp. falcata</i>	h				x						x						
Yellow avens	<i>Geum aleppicum</i>	h	n			x					x	x	x					
Yellow birch	<i>Betula alleghaniensis</i>	t	n				x					x						
Yellow forest-violet	<i>Viola pubescens</i>	h	n				x					x		x				
Yellow foxtail	<i>Setaria glauca</i>	h				x		x			x	x		x	x		x	x
Yellow king-devil	<i>Hieracium caespitosum</i>	h				x						x				x		
Yellow nutsedge	<i>Cyperus esculentus</i>	h	n(p)			x						x			x			
Yellow sweet clover	<i>Melilotus officinalis</i>	h				x						x				x	x	
Yellow touch-me-not	<i>Impatiens pallida</i>	h	n			x	x					x					x	
Zig-zag goldenrod	<i>Solidago flexicaulis</i>	h	n				x					x						

¹⁾ Plant identifications and names are mostly based on Gleason & Cronquist (1991): "Manual of Vascular Plants of Northeastern United States and Adjacent Canada, 2nd. ed."; we also consulted McVaugh (1958): "Flora of the Columbia County Area, New York", and several illustrated field guides

²⁾ Growth forms: h=herbaceous, l=woody liana, s=shrub, t=tree, v=vine

³⁾ Native plants: n=considered native to our region; n(p)=native to our region but also native to the midwestern tallgrass prairies (according to "The Tallgrass Restoration Handbook for Prairies, Savannas and Woodlands" (1997) edited by Stephen Packard and Cornelia F. Mutel); ? native and introduced populations or subspecies of a species occur in our region

⁴⁾ Conservation interest: marked in this column are plants of conservation concern that are legally protected (as posted on <http://www.plants.usda.gov>) or considered rare or scarce or of uncertain status in the Hudson Valley by Hudsonia (Kiviat and Stevens 2001); e=endangered in NYS, v=exploitably vulnerable in NYS; o=legally protected in other states; r=rare in Hudson Valley, s=scarce in Hudson Valley, ?=uncertain status in Hudson Valley; in addition,

⁵⁾ Invasive plants: plants marked in this column are considered invasive according to the Invasive Plants Atlas of New England (<http://invasives.eeb.uconn.edu/ipane/>)

⁶⁾ As described in the methods section, inventory methods were not standardized accross the farms. Therefore, the information about plant occurrences on the farms presented in this table is not valid for between-farm comparisons.

Appendix 3. List of birds documented on Columbia County farms.

Birds Recorded from Columbia County Farms

Common Name	% farms	Common Name	% farms
Acadian Flycatcher	25	least flycatcher	37.5
American bittern	12.5	least sandpiper	25
american black duck	12.5	lesser yellowlegs	12.5
american crow	100	lincoln sparrow	12.5
american goldfinch	87.5	little egret	12.5
american kestrel	25	louisiana waterthrush	12.5
american redstart	25	mallard	62.5
American robin	87.5	merlin?	12.5
american tree sparrow	25	mourning dove	75
american woodcock	37.5	mute swan	12.5
bald eagle	12.5	nashville warbler	12.5
baltimore oriole	100	nighthawk	12.5
barn owl	12.5	northern bobwhite	12.5
barn swallow	75	northern cardinal	75
barred owl	12.5	northern flicker (yellow shafted?)	87.5
belted kingfisher	37.5	northern harrier	37.5
black & white warbler	25	northern mockingbird	37.5
black-billed cuckoo	12.5	northern rough-winged	25
black-capped chickadee	62.5	northern waterthrush	12.5
Black-throated Green Warbler	12.5	orchard oriole	25
blue jay	75	osprey	37.5
blue-grey gnatcatcher	12.5	ovenbird	25
blue-winged warbler	62.5	pigeon	62.5
bobolink	62.5	pileated woodpecker	37.5
broad-winged hawk	25	pine warbler	12.5
brown creeper	25	prairie warbler	12.5
brown thrasher	25	red-bellied woodpecker	37.5
brown-headed cowbird	100	red-eyed vireo	25
canada goose	62.5	red-headed woodpecker	12.5
canada warbler	12.5	red-shouldered hawk	25
carolina wren	12.5	red-tailed hawk	37.5
cedar waxwing	50	red-winged blackbird	87.5
chestnut-sided warbler	50	ring-billed gull	12.5
chimney swift	50	ring-necked duck	12.5
chipping sparrow	87.5	ring-necked pheasant	25
clay-colored sparrow	12.5	rose-breasted grosbeak	37.5
cliff swallow	12.5	rose-breasted nuthatch	12.5
common egret	12.5	rough-legged hawk	12.5
common grackle	62.5	ruby-crowned kinglet	12.5
common merganser	12.5	ruby-throated hummingbird	37.5
common raven	25	ruffed grouse	12.5
common snipe	25	rusty blackbird	12.5
common yellowthroat	62.5	savannah sparrow	87.5
cooper's hawk	37.5	scarlet tanager	50
dark-eyed junco (slate-colored)	50	screech owl	25
downy woodpecker	50	sharp-shinned hawk	37.5
eastern bluebird	50	short-eared owl	12.5
eastern kingbird	62.5	snow bunting	12.5
eastern meadowlark	25	snow goose	25
eastern phoebe	50	snowy owl	12.5
eastern towhee	50	solitary sandpiper	25
eastern wood-peewee	25	solitary vireo	12.5
european starling	62.5	song sparrow	100
evening grosbeak	12.5	spotted sandpiper	12.5
field sparrow	50	swamp sparrow	37.5
fish crow	12.5	tennessee warbler?	12.5
Golden-crowned kinglet	12.5	tree swallow	75
Great blue heron	37.5	tufted titmouse	50
great crested flycatcher	25	turkey vulture	37.5
great egret	37.5	upland sandpiper	12.5
great horned owl	25	veery	37.5
greater yellowlegs	12.5	warbling vireo	62.5
green heron	62.5	water pipet	25
green-winged teal	12.5	white-breasted nuthatch	37.5
grey catbird	75	white-crowned sparrow	25
hairy woodpecker	37.5	white-throated sparrow	50
henslow sparrow	12.5	wild turkey	50
hermit thrush	12.5	willow/alder flycatcher	25
herring gull	12.5	wood duck	37.5
homed lark	25	wood thrush	75
house finch	37.5	yellow throated vireo	12.5
house sparrow (released 1860)	62.5	yellow warbler	75
house wren	37.5	yellow-bellied sapsucker	37.5
indigo bunting	75	yellow-billed cuckoo	12.5
killdeer	87.5	yellow-rumped warbler (myrtle warbler)	37.5

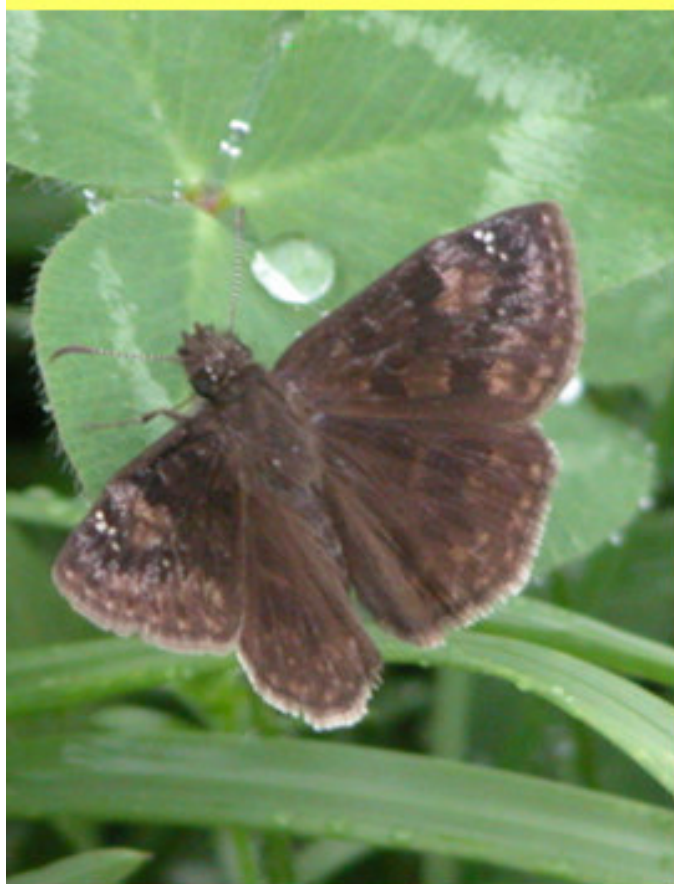
Appendix 4. Photographic guide to Watchlist Butterflies.



Baltimore Checkerspot



Banded Hairstreak



Wild Indigo Duskywing



American Copper



Aphrodite Fritillary



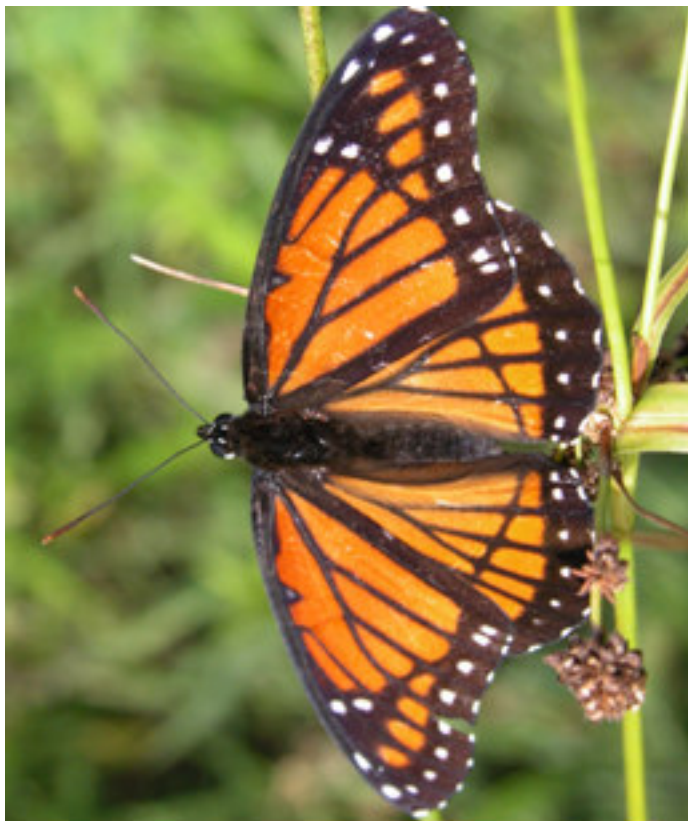
Hickory Hairstreak



Great Spangled
Fritillary



Meadow Fritillary



Viceroy



Red-spotted Purple



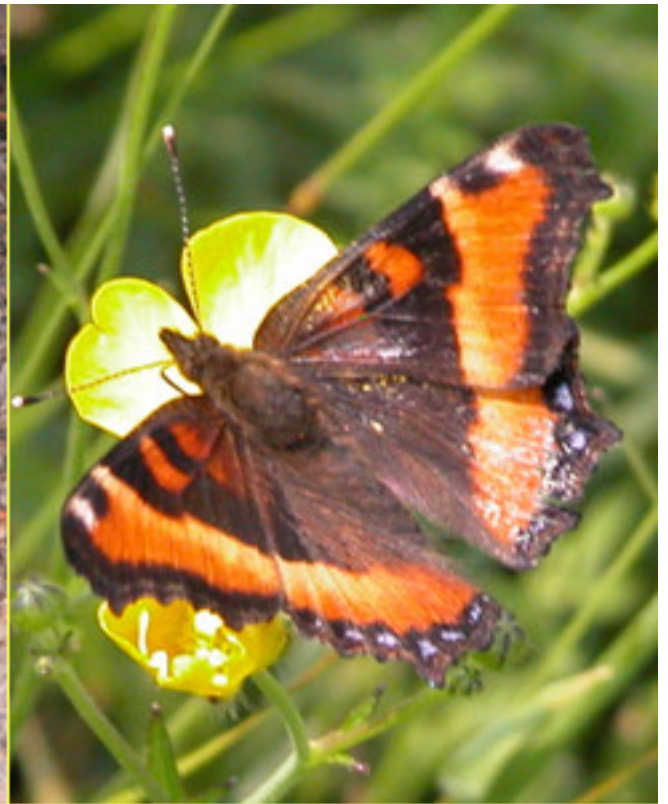
Northern Pearly Eye



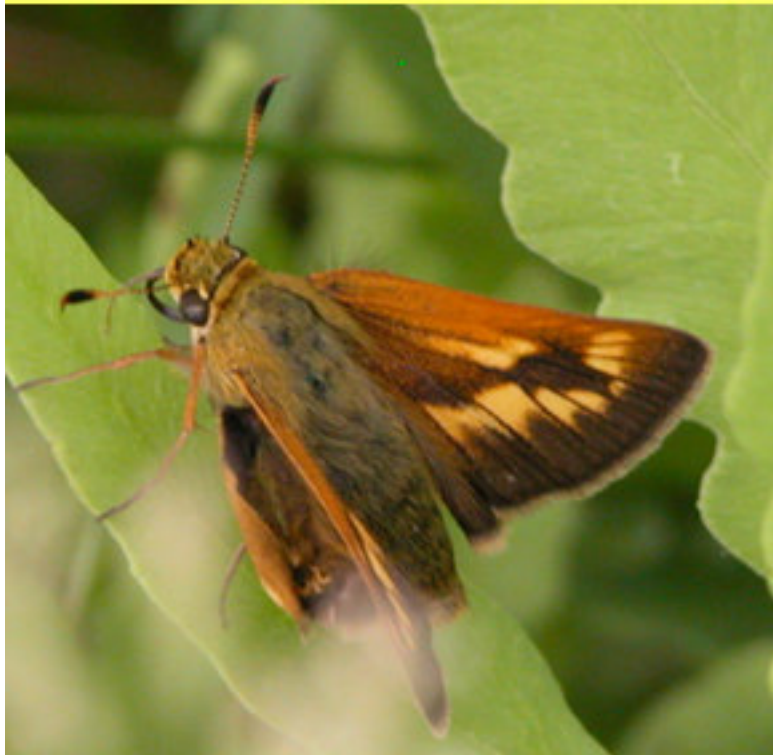
Black Swallowtail



Compton's Tortoiseshell



Milbert's Tortoiseshell



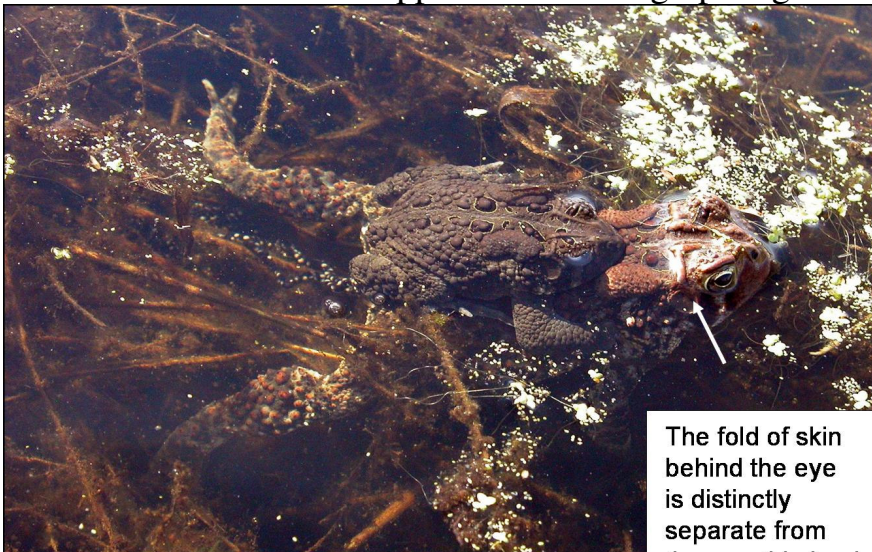
Northern Long Dash



Leonard's Skipper

American Toad

(*Bufo americanus*)



The fold of skin behind the eye is distinctly separate from the parotid gland



This lump is the parotid gland.



Only 1 or 2 'warts' in each black spot.

Toads in general can be told from the frogs of our area by their warts. They also tend to be browner (although the Wood Frog is brownish too) and drier-skinned. They are often found in drier areas than most frogs, although, as the pictures show, they do breed in ponds.

We have two other possible toad species in our area, the Spadefoot and Fowler's Toads. The rare Spadefoot (which we have not seen in the County), with its vertical pupil, distinct coloration and small parotid gland, should be fairly obvious. The Fowler's Toad is more similar and requires closer inspection (see Fowler Toad page in this Appendix).



Sometimes more than two warts in each dark patch.



Parotoid abuts skin folds behind the eyes.



Belly without black spots

Fowler's Toad

(*Bufo fowleri*)

We have found Fowler's Toad in dry woods and grasslands near wetlands (but not yet on any working farms). We include it here because of its presence in our area and its similarity to the American Toad.

This is a southern species which reaches its northern limits in our region, extending into New York mainly along the Hudson River Valley.

Belly coloration and the number of warts per dark patch are said to be distinguishing characteristics.

Green Frog

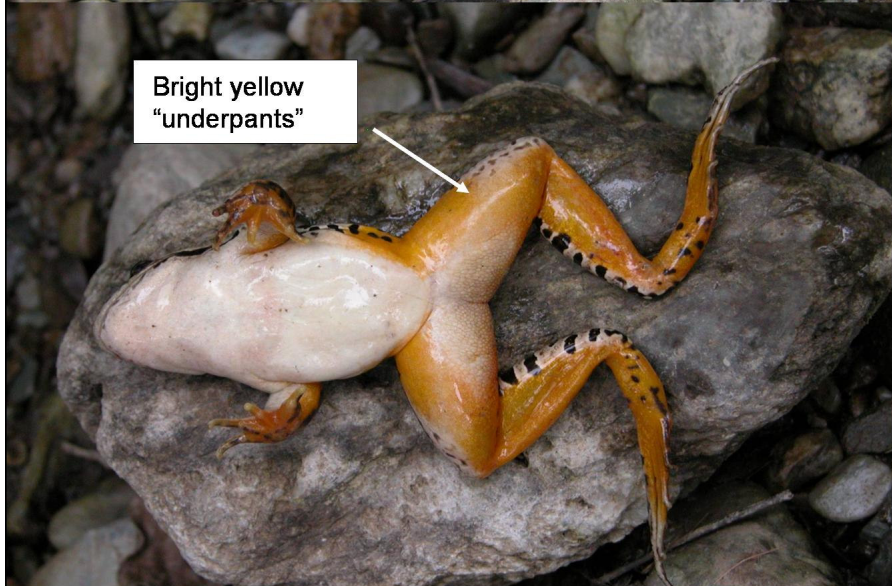
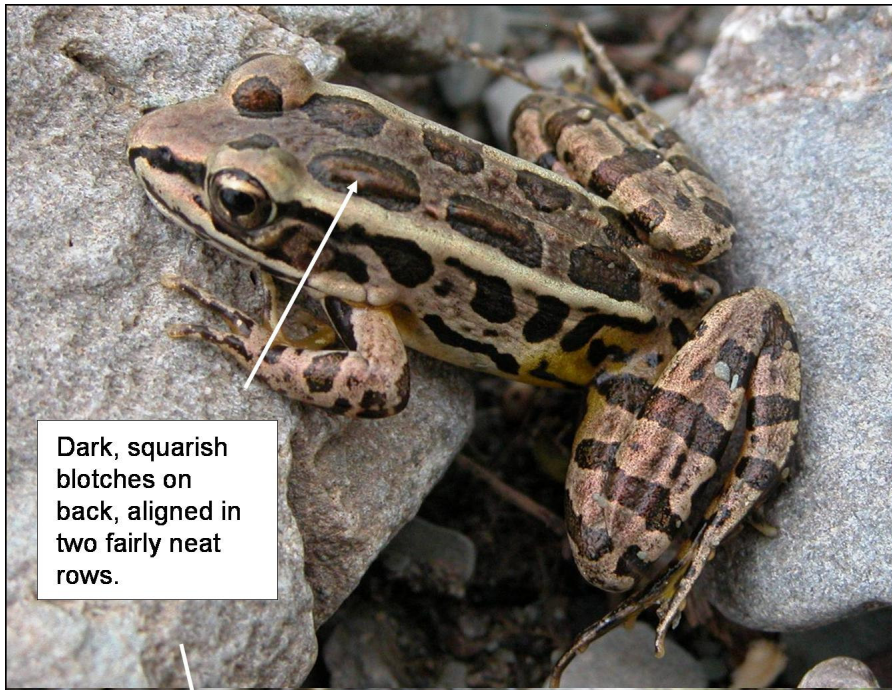
(*Rana clamitans*)

The Green Frog is our most common frog – learn to identify it and you will be able to name most frogs you see!

Green Frogs have variable coloration that is due in part to age, condition and gender.

The top photo is of a mating male – his throat is yellow, the rest of him green, and his ear drum is much larger than his eye. The female at left is younger, but the pair below provides a good comparison, male on right, female on left. The individual below shows the degree of splotching that some green frogs have. Importantly, their “splotches” are not surrounded by light margins as in Pickerel or Leopard Frogs.





Pickerel Frog

(*Rana palustris*)

Unlike any of the other frogs that we have commonly seen in our area, the Pickerel Frog has very distinct blotches surrounded by dark borders. The lateral folds of skin are lighter than the rest of the body, making for quite a trim-looking beast.

We have found this species mainly along creeks, although occasionally also around ponds. In other words, in many of the places we found the more common green frog.

The regionally rare Leopard Frog also has distinct blotches, but that species' blotches are not square nor so neatly aligned; it also doesn't have yellow underpants and its blotches have light margins.

Bullfrog

(*Rana catesbeiana*)

This is our largest frog; the one pictured on top was roughly 10 inches long. Of course, they need to grow to that size and, when young, can be confused with the smaller and often co-occurring Green Frog. The key characteristic is that the fold of skin that begins behind each eye wraps around the ear drum, rather than continuing down the back as in the Green Frog.

Bullfrogs were scattered in our survey area. We found them mainly by permanent ponds. They are said to be voracious predators, and their presence can exclude some other amphibian species.

Males have large eardrums which abut the eyes; the individuals pictured here all appear to be females.



Fold of skin beginning behind eye loops around eardrum rather than continuing down back.





Dark Maks



Egg clusters

Wood Frog

(*Rana sylvatica*)

This is our flagship vernal pool frog. They gather en masse in early spring for a brief mating period, leaving the distinctive clumps of eggs seen below.

Their dark mask is characteristic, although given variation in the brownish hue of the body, it is sometimes more or less conspicuous.

A horizontal dark line across iris



Spring Peeper

(*Pseudacris crucifer*)

This was the most common frog in our surveys. Its tiny size belies its powerful peep, which announces its presence. We found them almost anywhere there was a pool or pond.

The only other adult frog with which they might be mistaken is the small Northern Cricket Frog, an endangered species in New York and one that we never saw. The Peeper has a characteristic (although sometimes broken) "X" on its back and a dark horizontal line across the eye. The Cricket Frog tends to have a green or brown patch on its back, rougher skin, a dark triangle on the back of its head, and a vertical line through the iris.



"X" marks the species



A Peeper peeping





Grey Treefrog

(Hyla versicolor)

This frog was occasionally abundant in our surveys. Its color is quite variable, ranging from green when young through shades of grey and tan as adults. Bigger than a Peeper, smaller than our other frogs, their most distinctive characteristic may be the yellow on the undersides of the legs (partially visible below). Also, as with Peepers but none of our other frogs, the toes of this species end in sucker-like enlargements which presumably help it grip vegetation.





Redback Salamander

Plethodon cinereus

Redback salamanders are our most common woodland salamanders. Find a moist, healthy forest in our area, start turning over rocks and logs, and you are likely to find them. This species lays its eggs on land and, as the lower right photo shows, the young look like miniatures of the adults.

This is a slim salamander. It usually has a reddish back. There is, however, a 'leadback' coloration which is greyer. Four-toed Salamanders, a possible source of confusion, are rarer, browner, have a bright white belly with dark dots, and a squarer nose. We have not yet found Four-toed Salamanders on any farms.

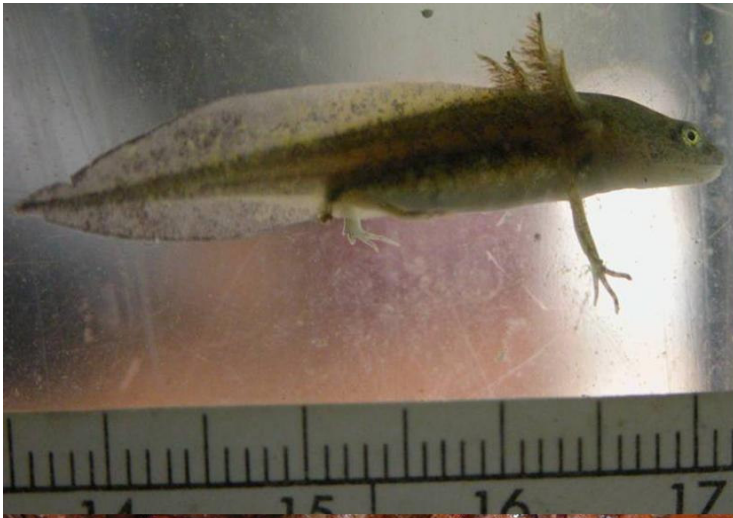


Northern Dusky Salamander

Desmognathus fuscus

These salamanders are not as aquatic as the Two-lined, nor as terrestrial as the Redback. They are commonly found along the banks of streams or in seeps.

As young (upper two pictures), they have vague reddish dots. As adults, they are dark bodied, not as stocky as mole salamanders, but have heavy hind legs. A light line extending from the back of the eye to the back of the jaw is distinctive of this genus. The Mountain Dusky is similar, but said to have a herringbone pattern on its back; we haven't found it (so far as we know!).



Spotted Salamander

*Ambystoma
maculatum*

This is our most common vernal pool salamander. Around the beginning of April, they are often found in relative abundance in vernal pools. They occurred on at least four of the Columbia County farms for which we have information.

As adults, this species seems unmistakable. It is a large (reportedly up to 10 inches long), black salamander with bright yellow polka dots. The gilled young develop for 2-3 months in the pools, finally metamorphosing into the dull semi-terrestrial version seen in the upper right hand corner.

Outside of their pond lives, they spend the year lurking in or near their burrows (hence the Ambystoma salamanders are called “mole salamanders”).

Often the most obvious evidence of this species are its gelatinous egg clusters or small “spermatophores”. Spermatophores are the tiny, sperm-topped structures males leave on pool bottoms in Spring; they look like single curds of cottage cheese.



**Jefferson
Salamander**

*Ambystoma
jeffersonianum*

This is a rarer vernal pool salamander. While it seems to frequent the same general haunts as Spotted Salamanders, it seems to be a more strictly woodland sort. This species apparently interbreeds with the Blue-spotted Salamander in some areas and forms an array of hybrids.

Jefferson Salamanders are greyish-black with a lighter, sometimes bluish speckling, especially along the sides. They tend to be slightly smaller than Spotted Salamanders but are similarly stocky. They are reported to spend their adult, non-breeding period in upland tunnels, and hence are also considered “mole” salamanders.



Northern Two-lined Salamander

*Eurycea
bislineata*

This was by far
our most
common stream
salamander.



These are slim salamanders with long tails. Their usual coloration is golden-tan with two black lines starting at the eye and running down each side. Occasionally, they apparently show up in red morphs. We were told by experts that the bright red salamander shown above right is also a Two-lined.

Larvae were often found under rocks (as the photo of larvae awaiting re-release, upper left, shows). The adults, while less abundant, were commonly found on or near shore. When released in shallow water, larvae head for the bottom, while adults head towards shore.



Red-Spotted Newt

*Notophthalmus
viridescens*

Red-spotted newts abound in our area. They are frequently found in permanent ponds, where their toxic skin appears to protect them from at least some predation. They have an interesting life-cycle: born in the pond, the young larvae develop until they are able to come ashore. Once ashore, they wander about for a year or two in the bright orange coloration shown at top. This is the Red Eft stage. They return to the ponds as adults, developing a darker coloration and a wide, propulsive tail.

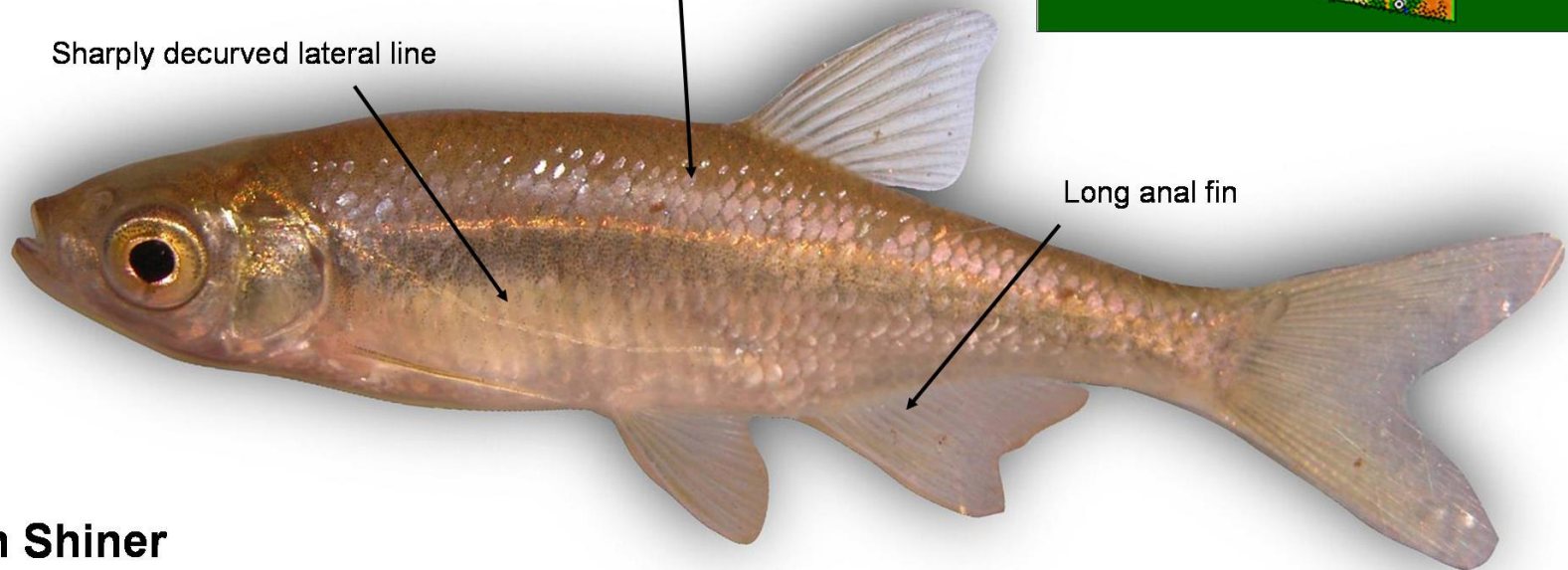
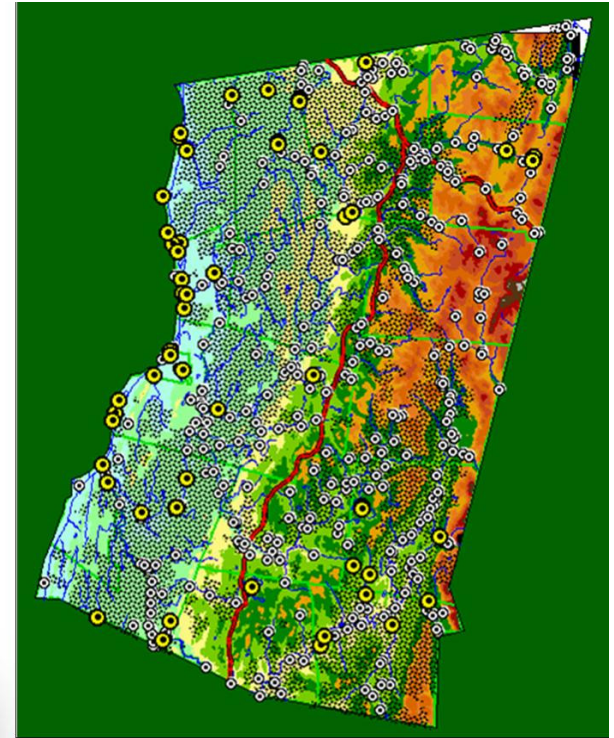
There is no mistaking the Red Eft stage – its colors shout out for attention (apparently not a bad idea if you are poisonous). The adult newt is less conspicuous, but its red dots are usually apparent, and its slim head and broad tail are distinctive.

This Shiner eats mostly zooplankton,
supplemented with algae and insects.

Tends to have a more
silvery or golden
coloration

Sharply decurved lateral line

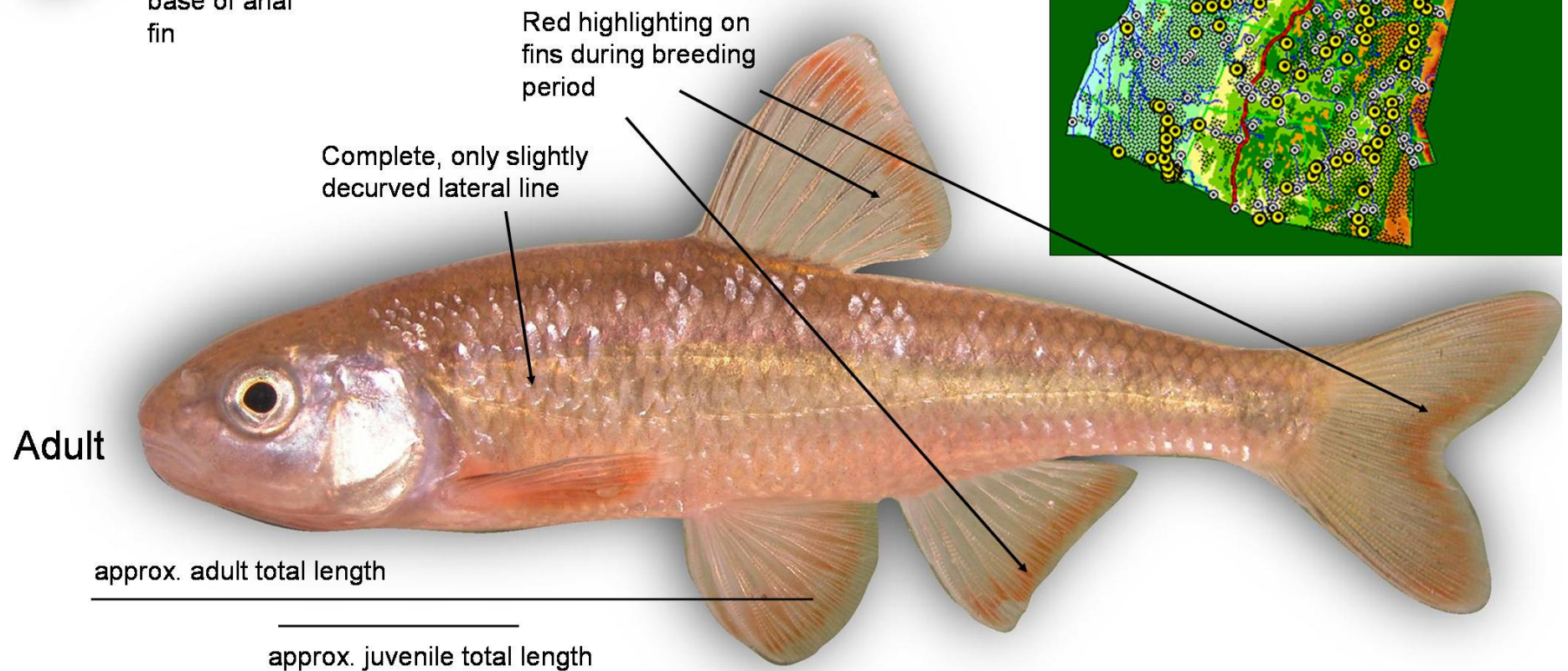
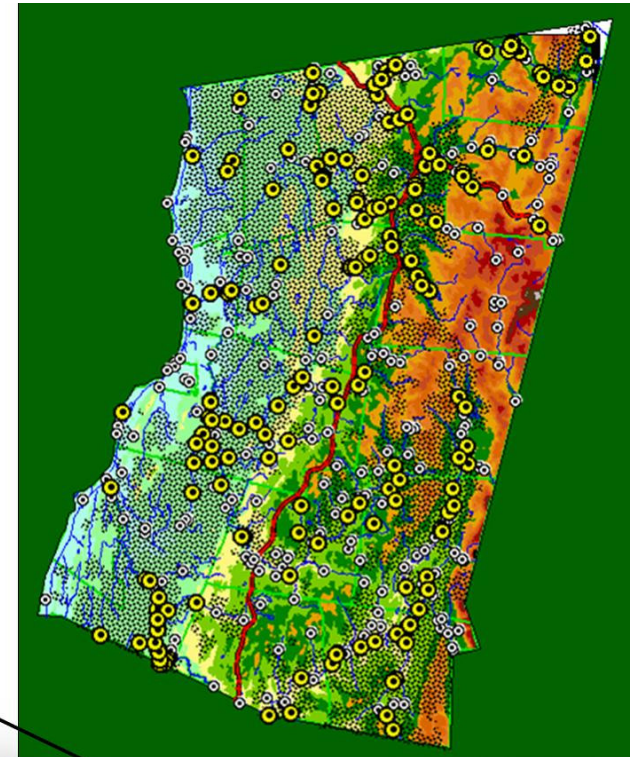
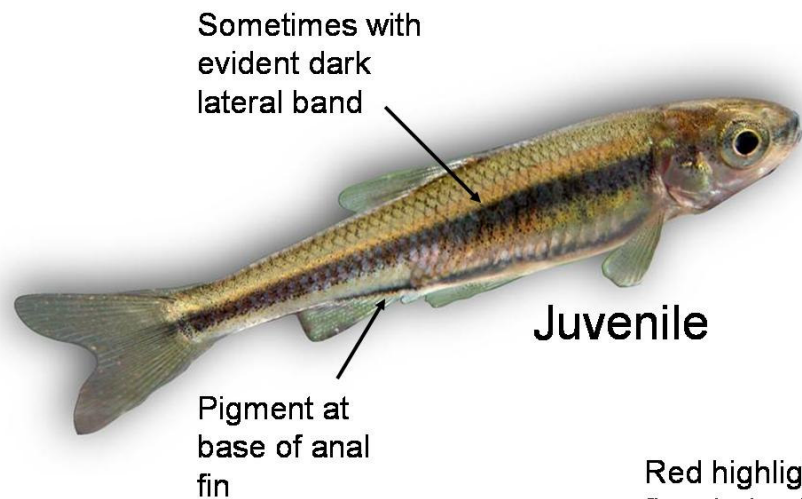
Long anal fin



Golden Shiner

Notemigonus crysoleucus

approx. total length



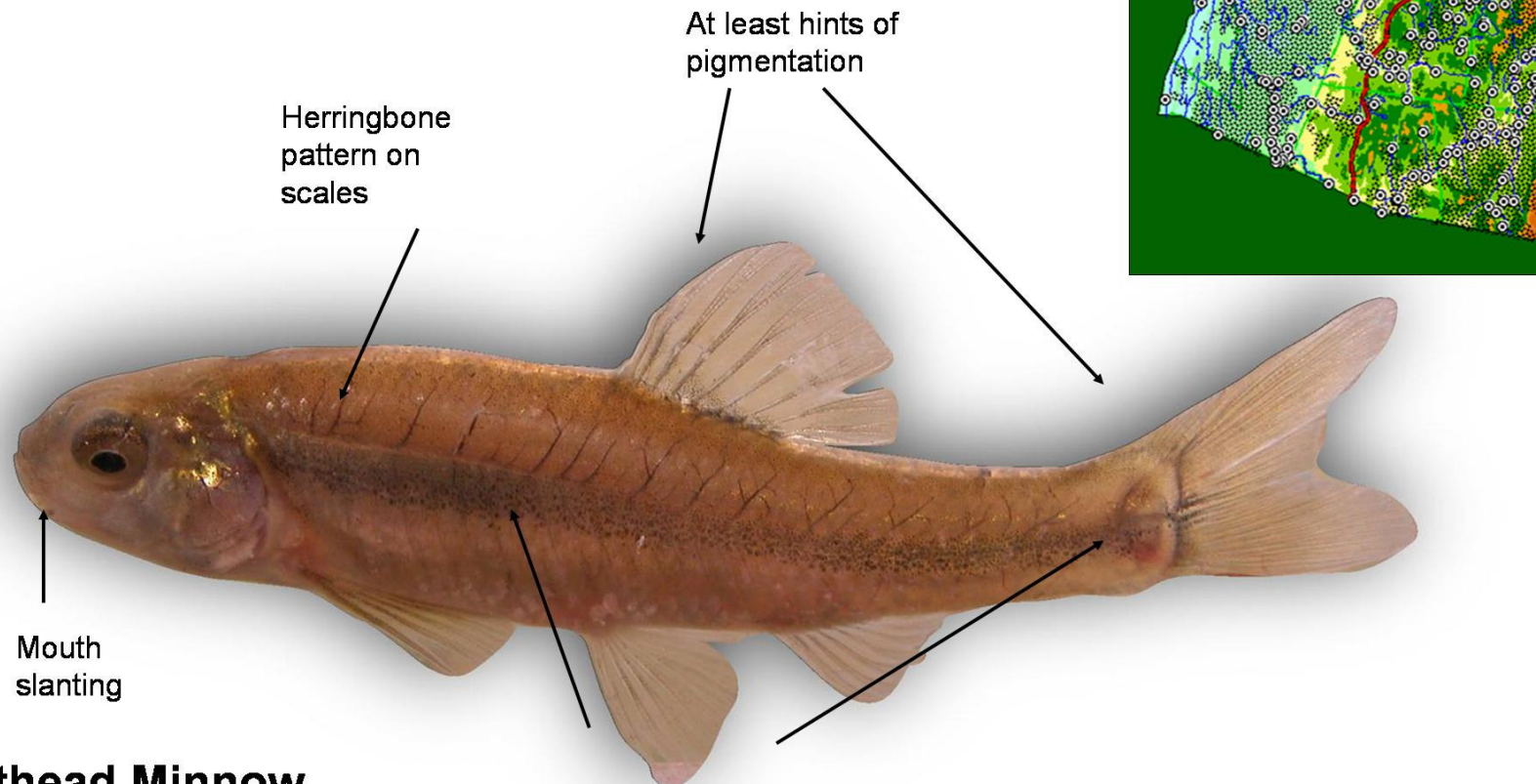
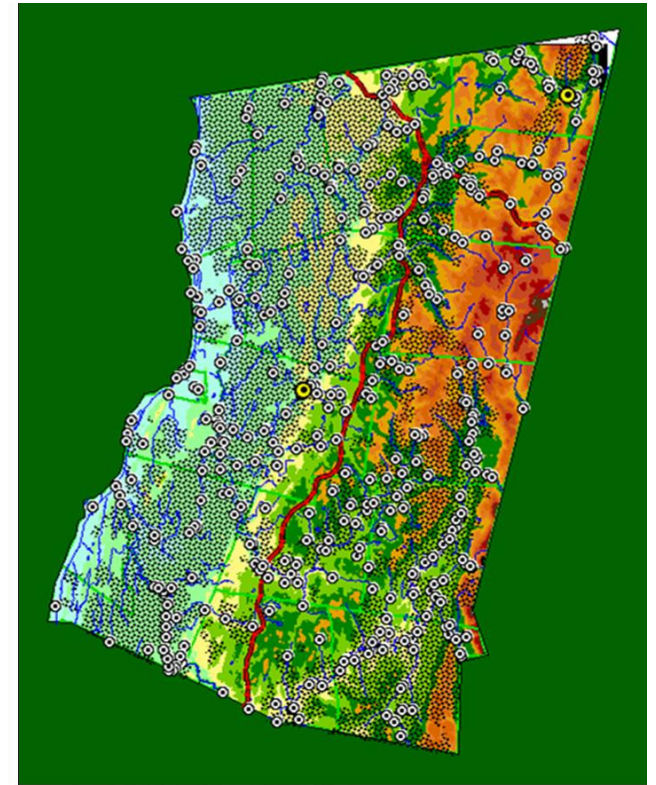
Common Shiner
Notropis cornutus

These fish eat both plant and animal (mainly insect) material, often scavenging near the surface.



Bumps on head of breeding fathead male

This species feeds mainly on algae, zooplankton, insects and plants found on the bottom.

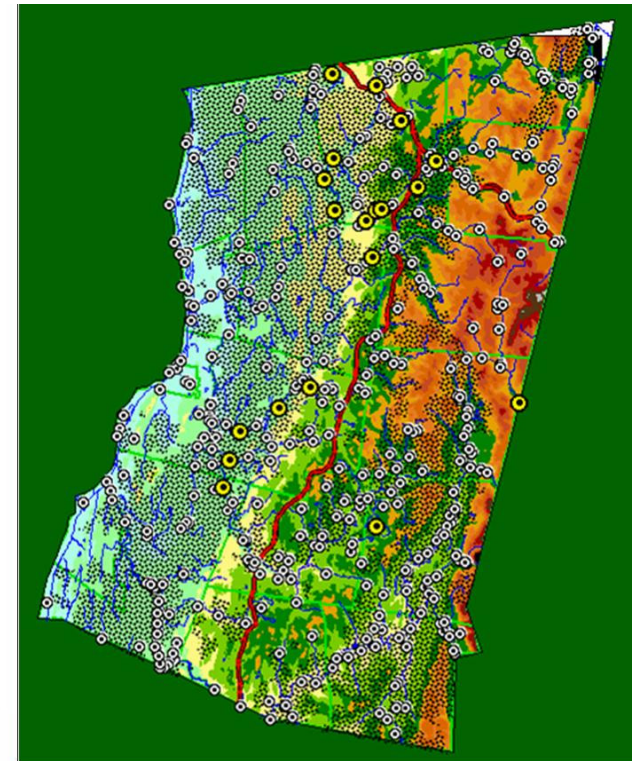


Fathead Minnow
Pimephales promelas

Body, especially base of tail, stout

approx. total length

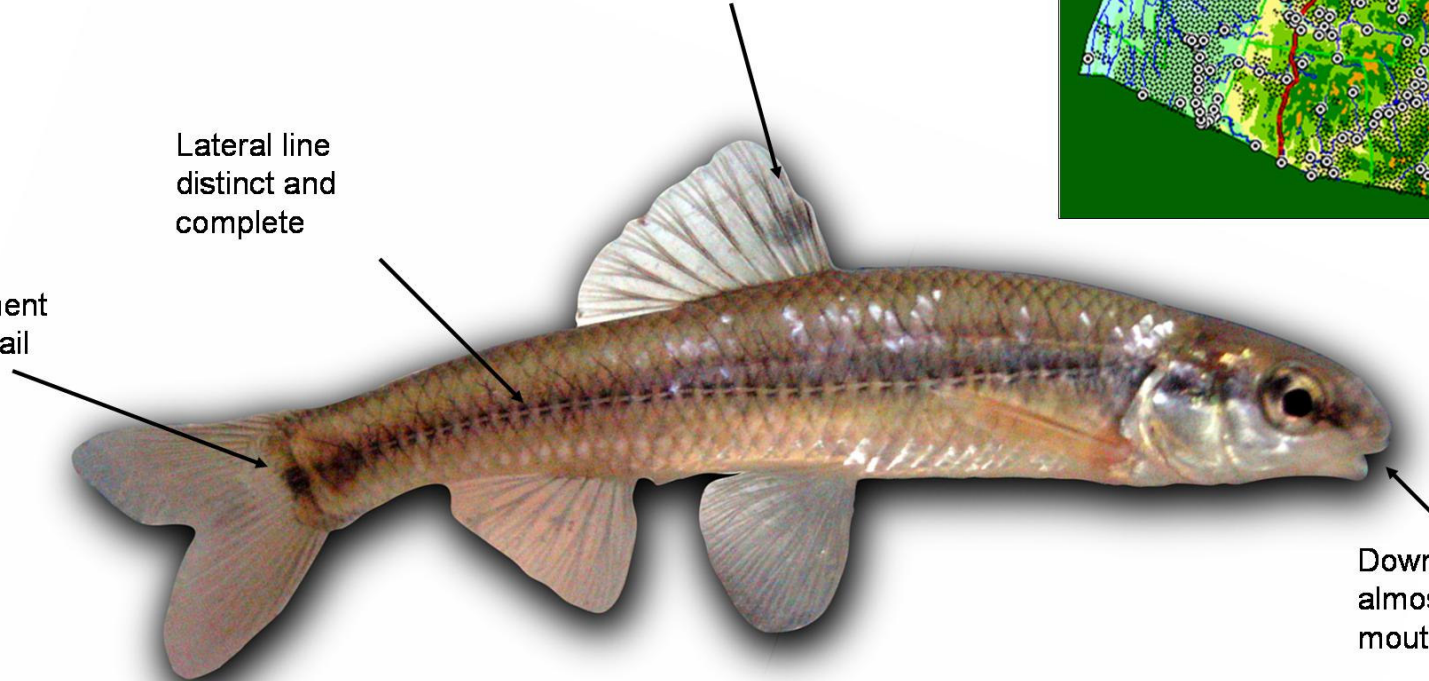
This Shiner eats mainly on the bottom, where it consumes zooplankton, algae and other small organisms.



Stout first fin ray; dark
pigmentation about half way up
leading edge of dorsal fin.

Lateral line
distinct and
complete

Dot of pigment
at base of tail

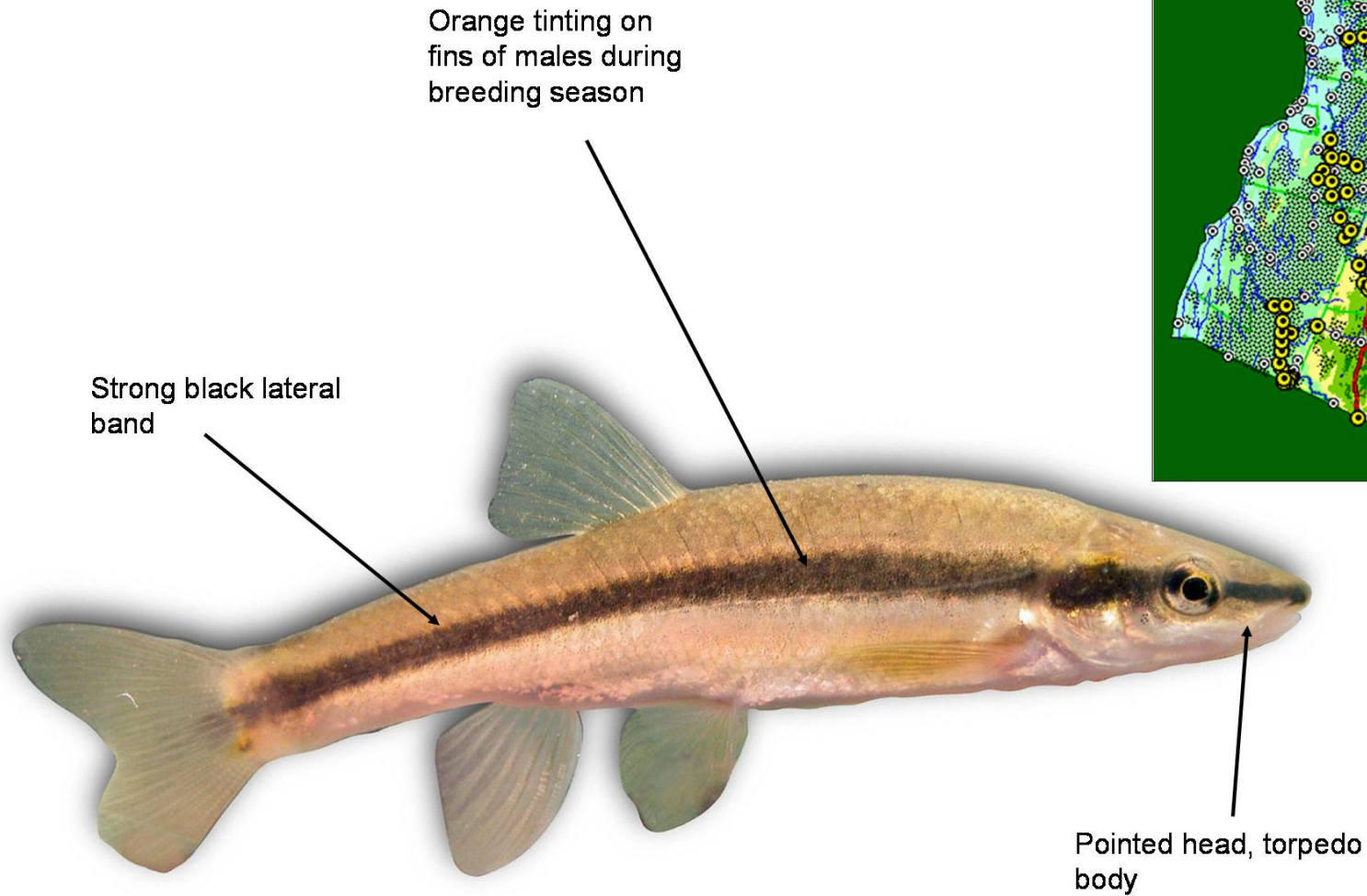
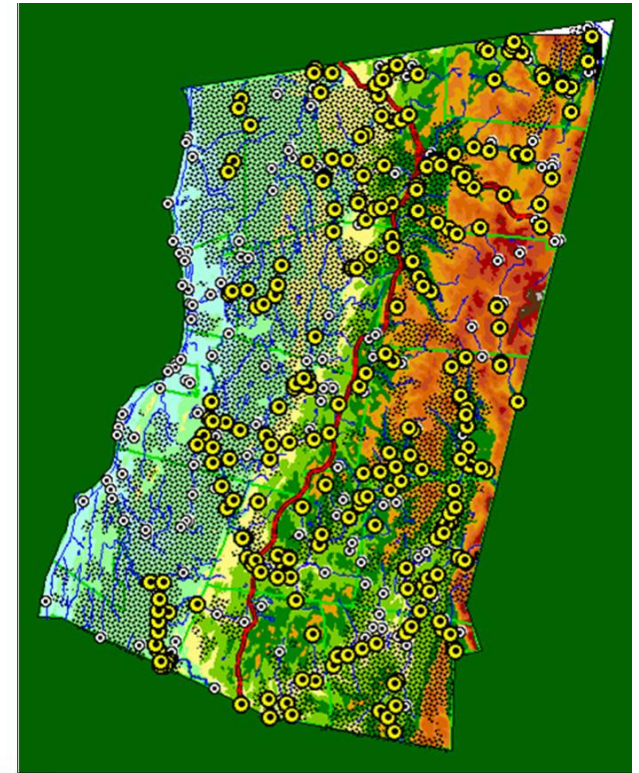


Downward facing,
almost sucker-like
mouth

Bluntnose Shiner
Pimephales notatus

approx. total length

Dace eat mainly aquatic insect larvae, especially midges; they also eat some algae.

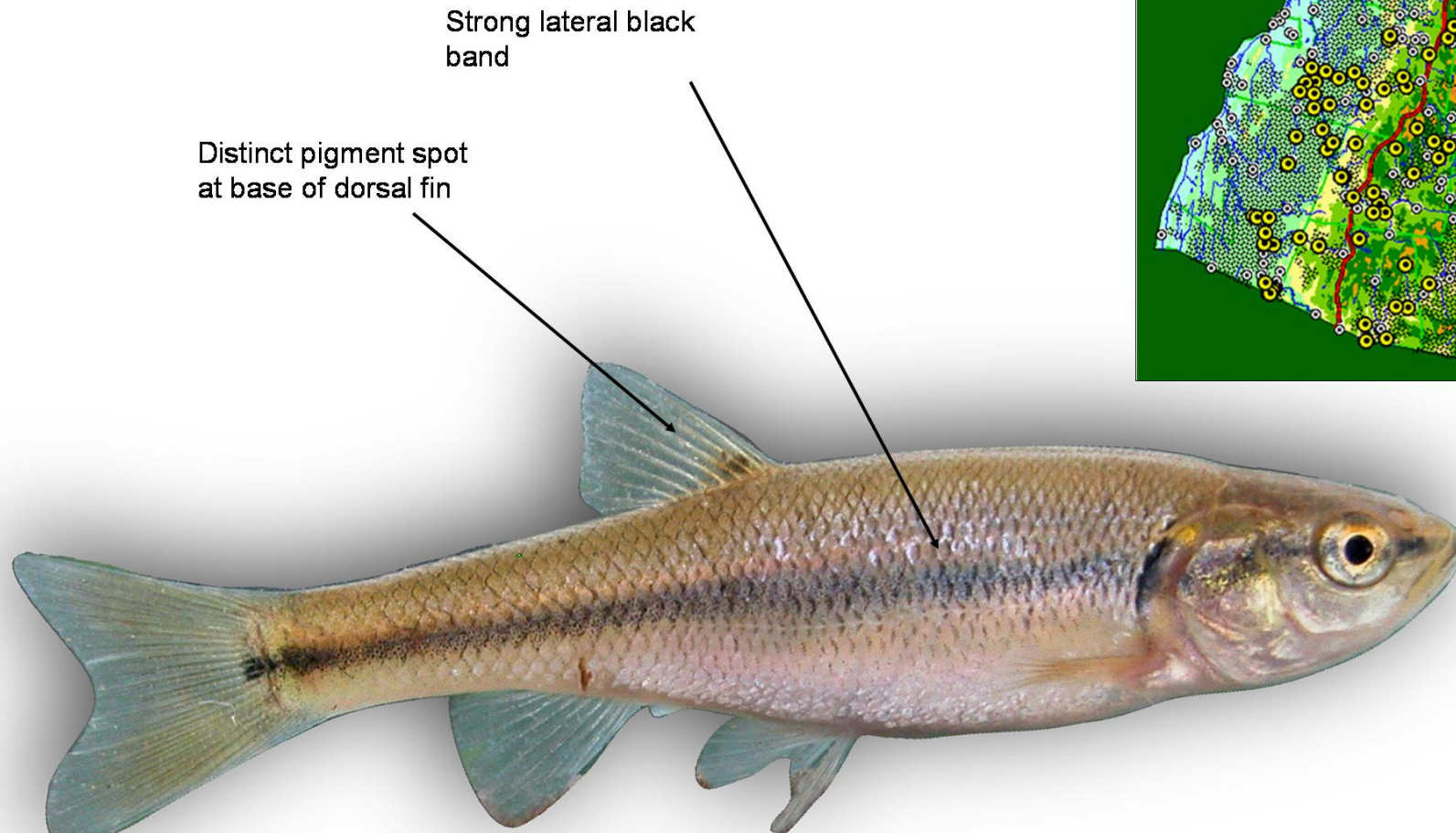
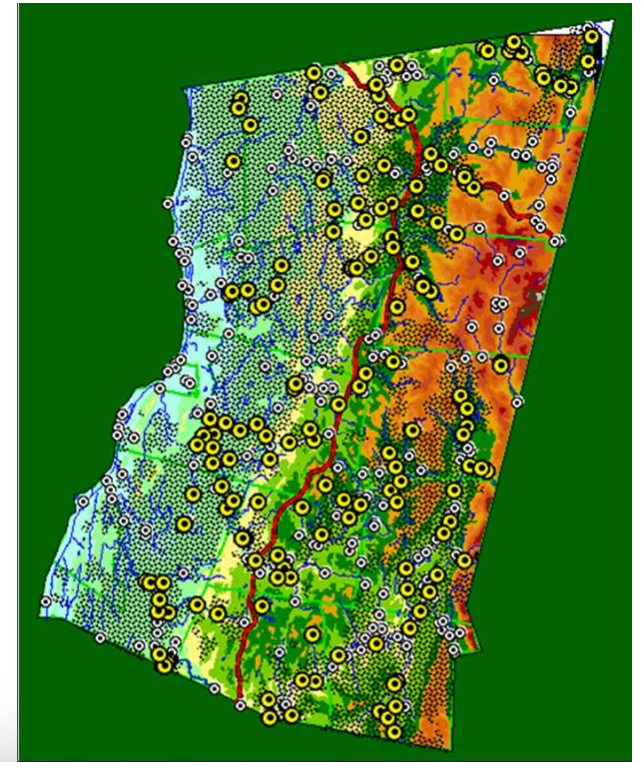


Eastern Blacknose Dace

Rhinichthys atratulus

approx. total length

Creek Chub are omnivorous. They eat plants, algae, insects, plankton and small vertebrates.



Creek Chub

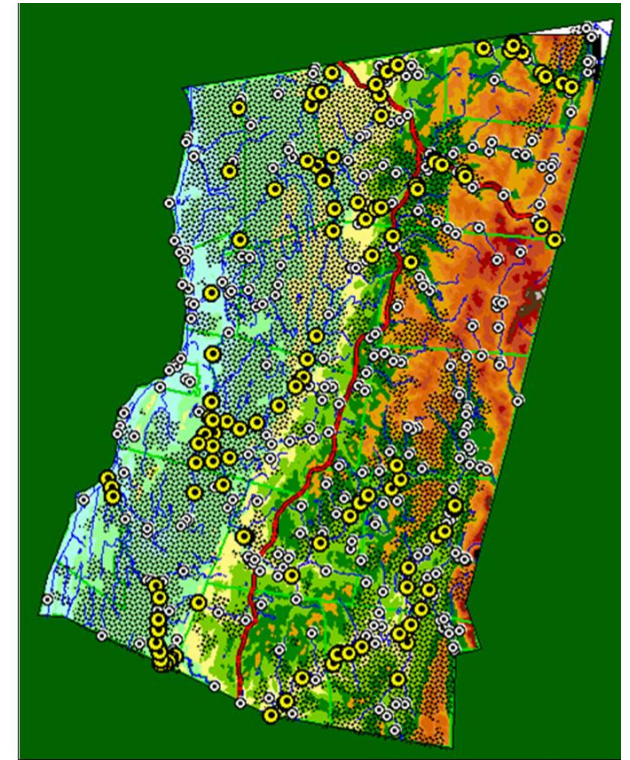
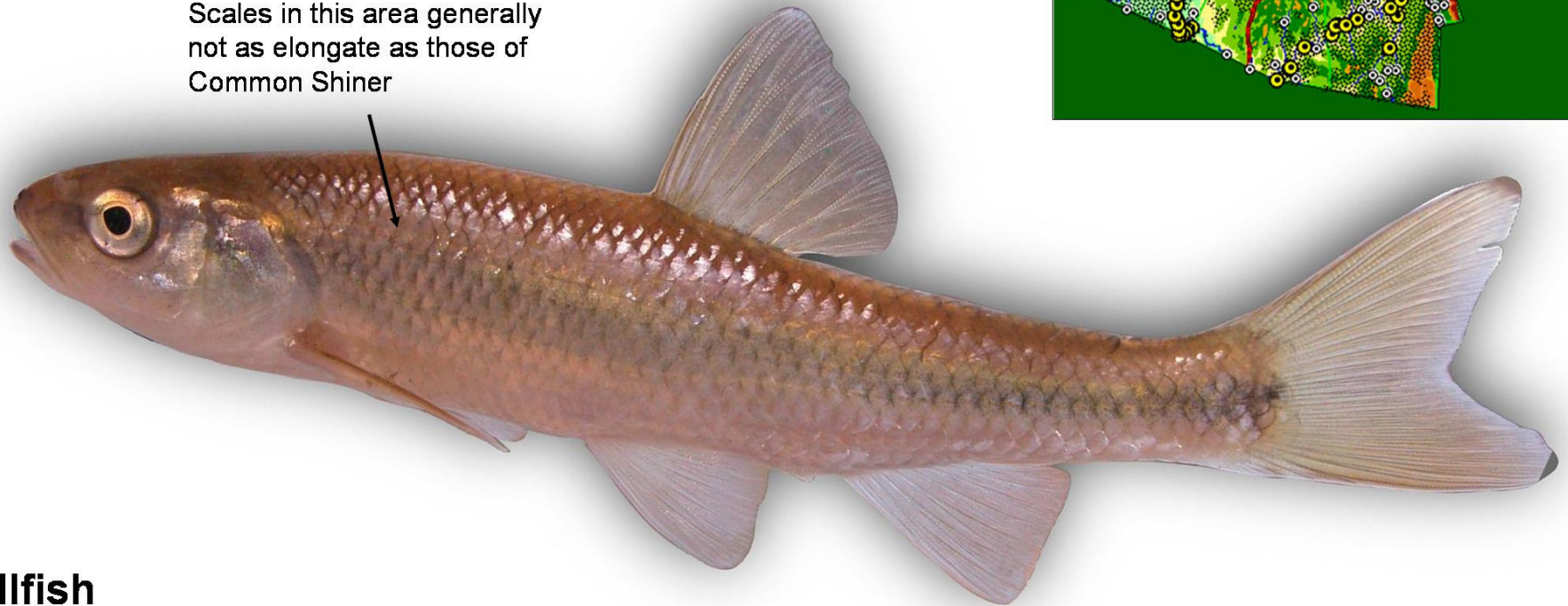
Semotilus atromaculatus

We usually see specimens of this species that range between these lengths

Fallfish are omnivorous; they eat plants, algae, insects, plankton and small vertebrates.

Definitive character is hard to see (flap of tissue on lips); this is a long, relatively slim minnow. Not as blunt as Common Shiners of its size; without the deeply decurved lateral line of the Golden Shiner.

Scales in this area generally not as elongate as those of Common Shiner



Fallfish

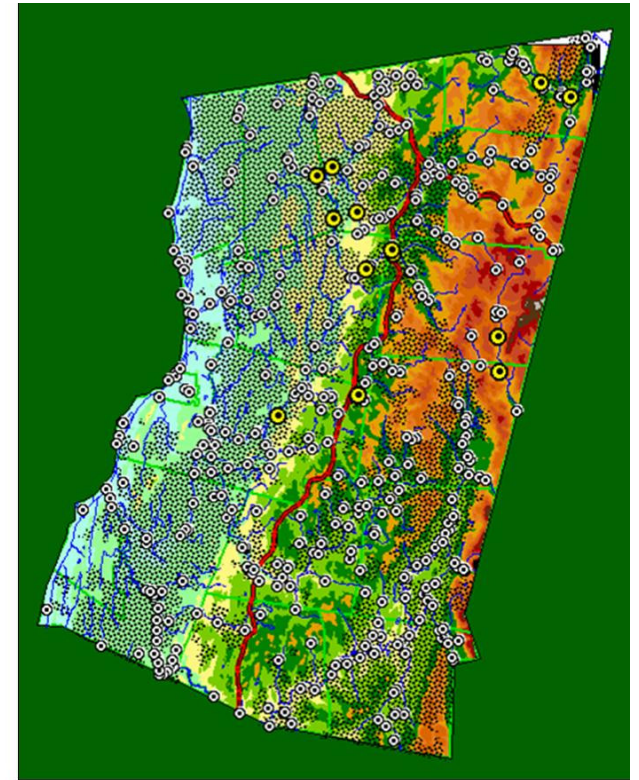
Semotilus corporalis

can be a large fish (up to 16")

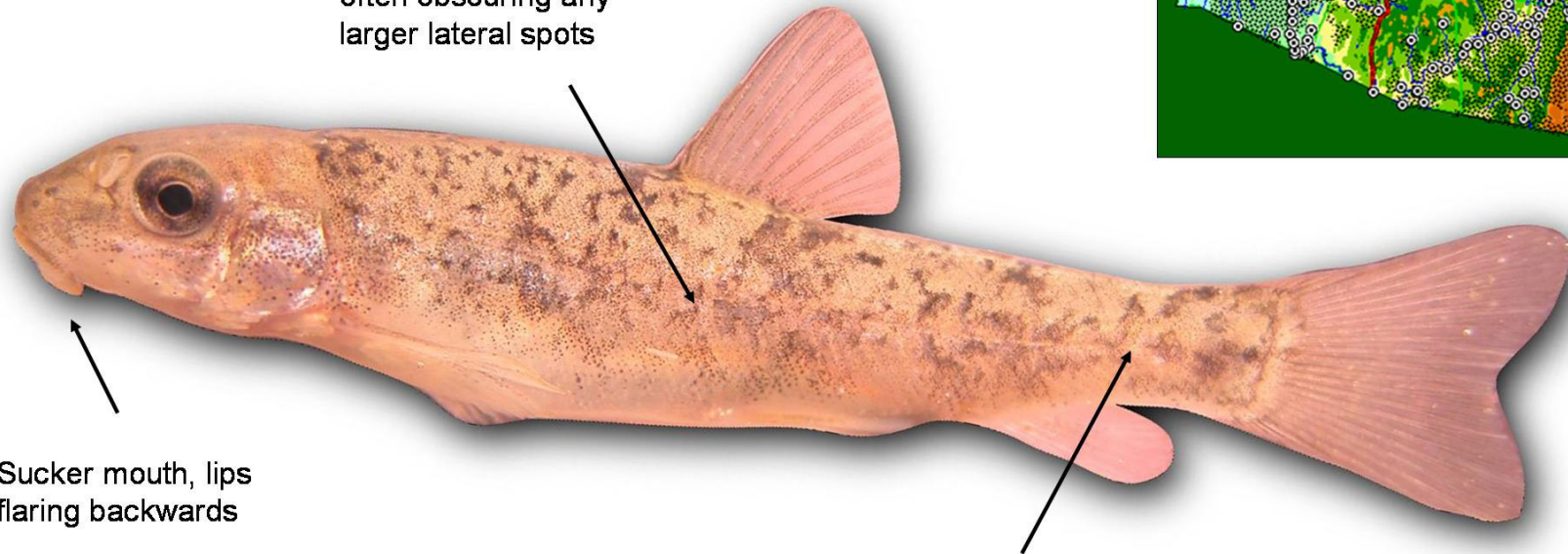


This fish collects
zooplankton and small
insects from the
bottom.

A somewhat older longnose, note small scales
and obscure coloring



Body heavily speckled,
often obscuring any
larger lateral spots



Sucker mouth, lips
flaring backwards

Scales small and
difficult to
distinguish

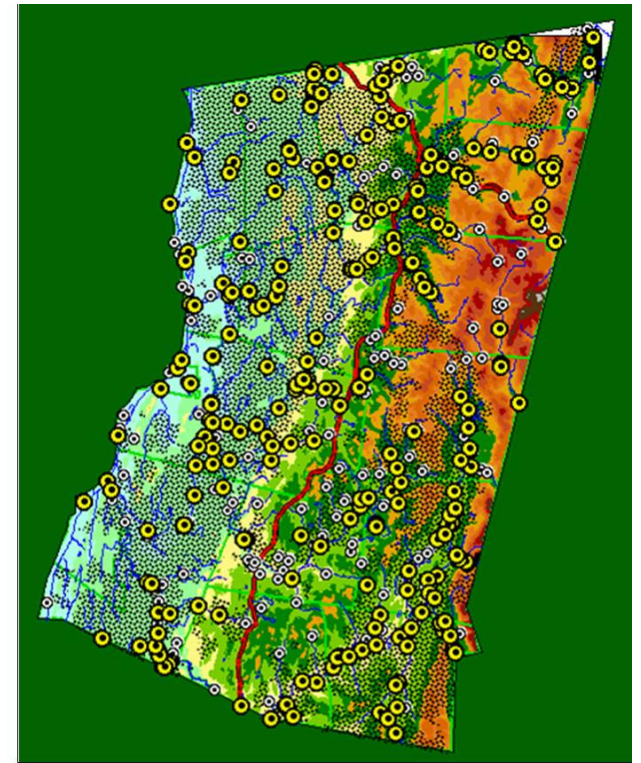
Longnose Sucker

Catostomus catostomus

This is approx. length
of most specimens we
catch; but the species
can grow much longer.

This fish is mainly a bottom scavenger,
eating mostly insects, plankton and plants.

Relatively lightly pigmented body with
large scales; large lateral spots
sometimes quite apparent



Downward-facing, sucker mouth

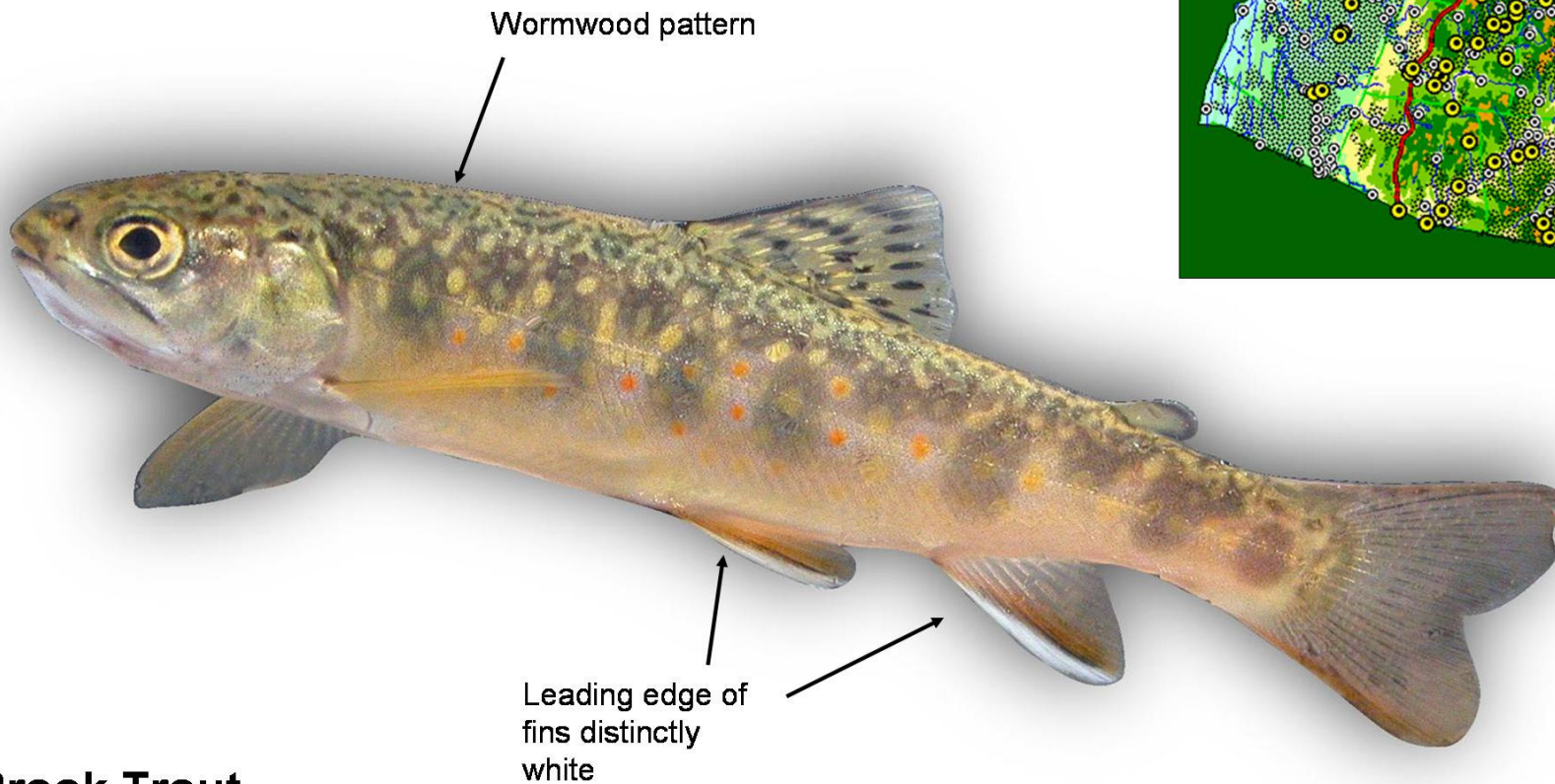
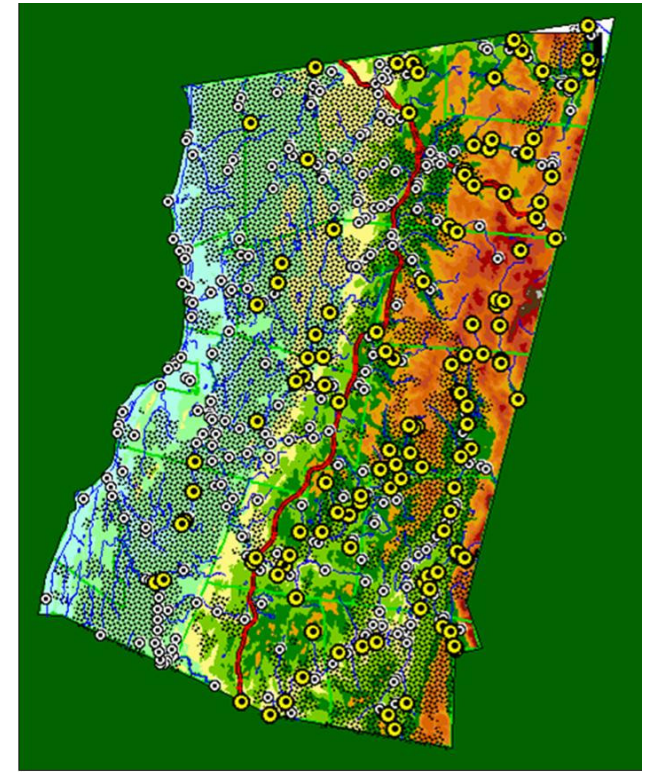
Scales in this area large and
distinct

White Sucker

Catostomus commersoni

—
This is approx. length of most
specimens we catch; but fish
can get much longer

Brook Trout mainly eat insects and invertebrates, many of which are aquatic but it also takes terrestrial organisms that accidentally fall in the water. Larger individuals may eat small vertebrates.

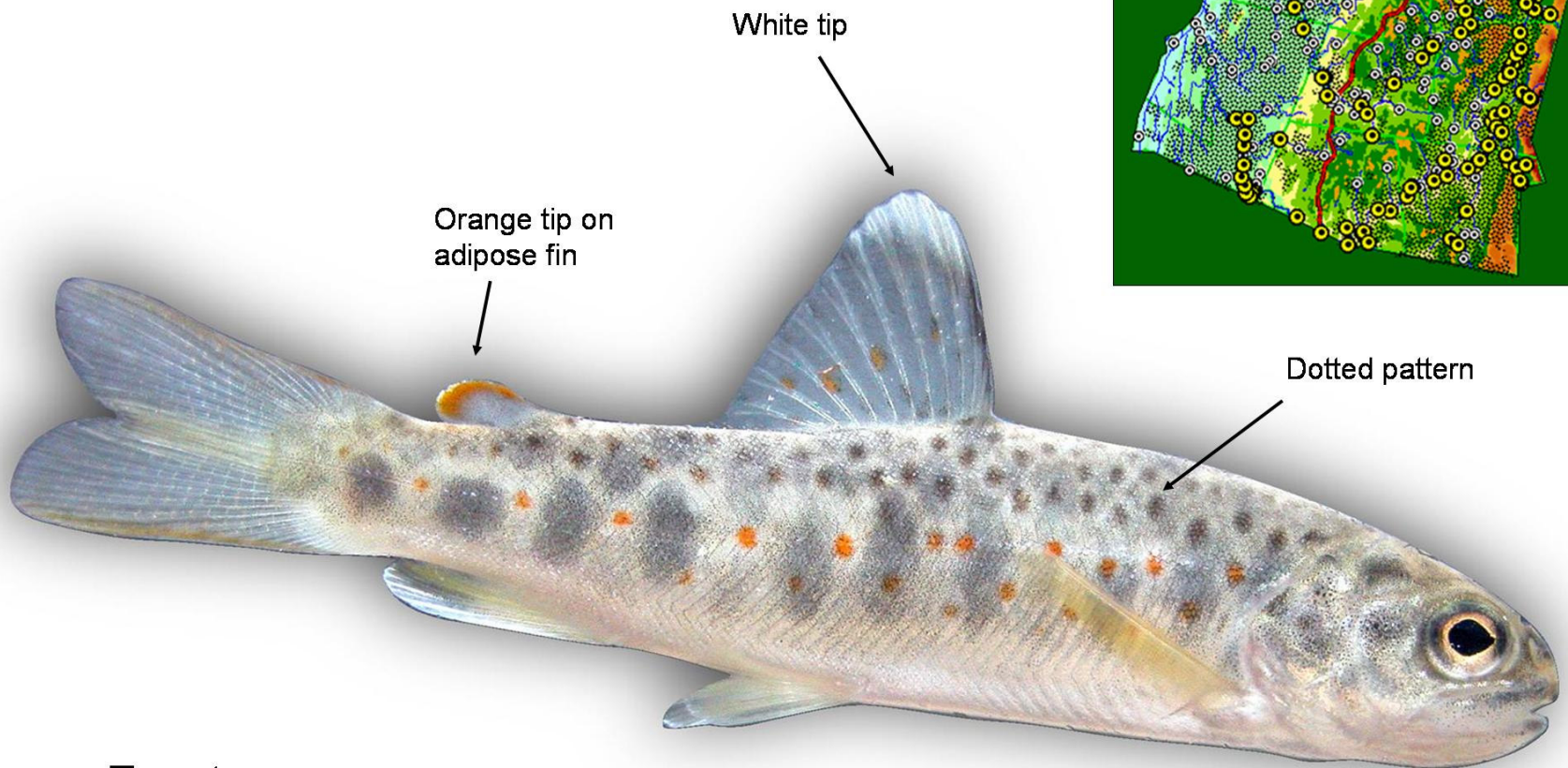


Brook Trout

Salvelinus fontinalis

This specimen was about 6" long; the species can be much longer.

When young, this species eats small invertebrates; older fish take more vertebrates.

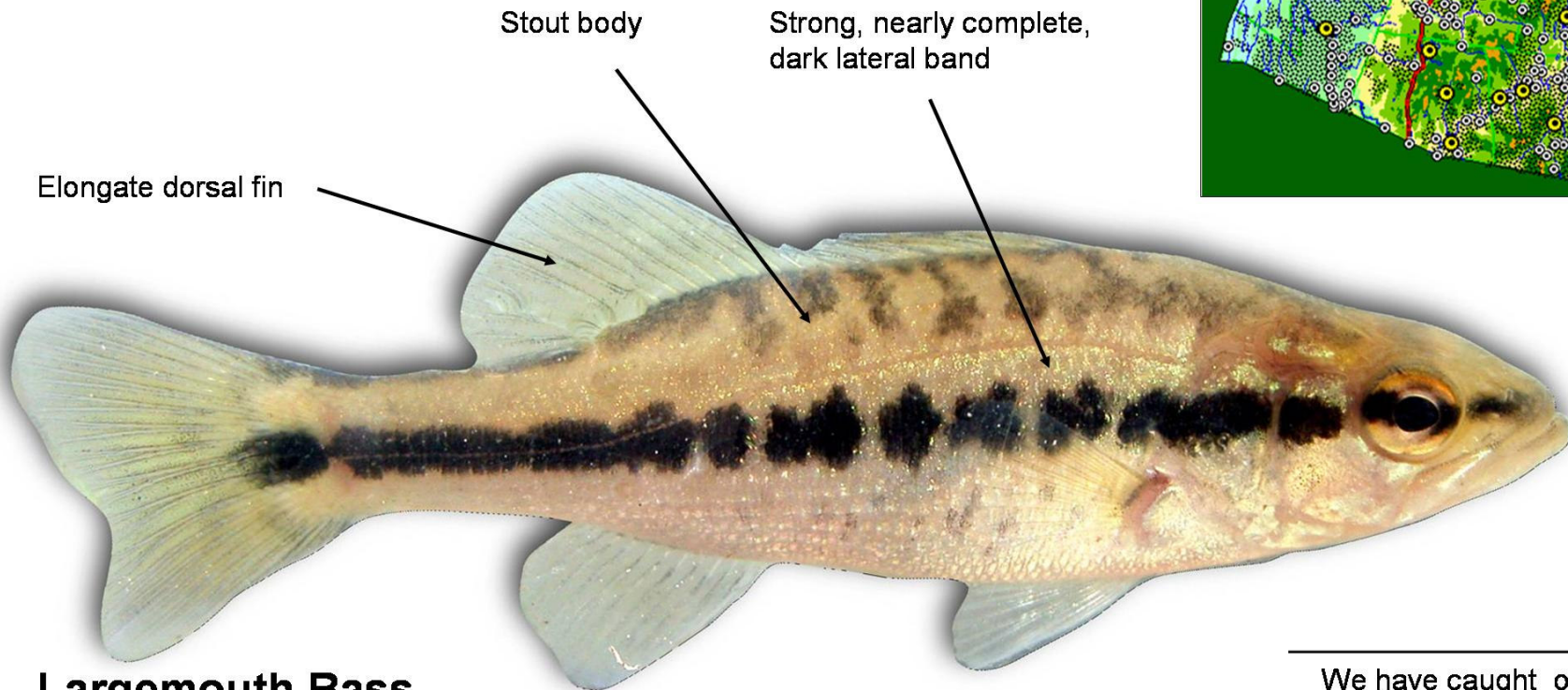
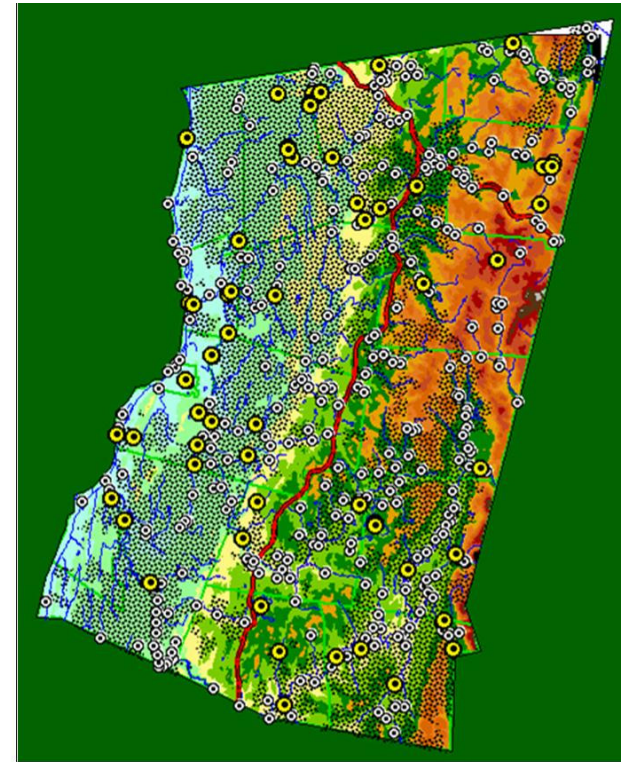


Brown Trout

Salmo trutta

This specimen was about 6"; the species can be much longer.

Largemouth Bass eat plankton and invertebrates when young; they grow more carnivorous with age.

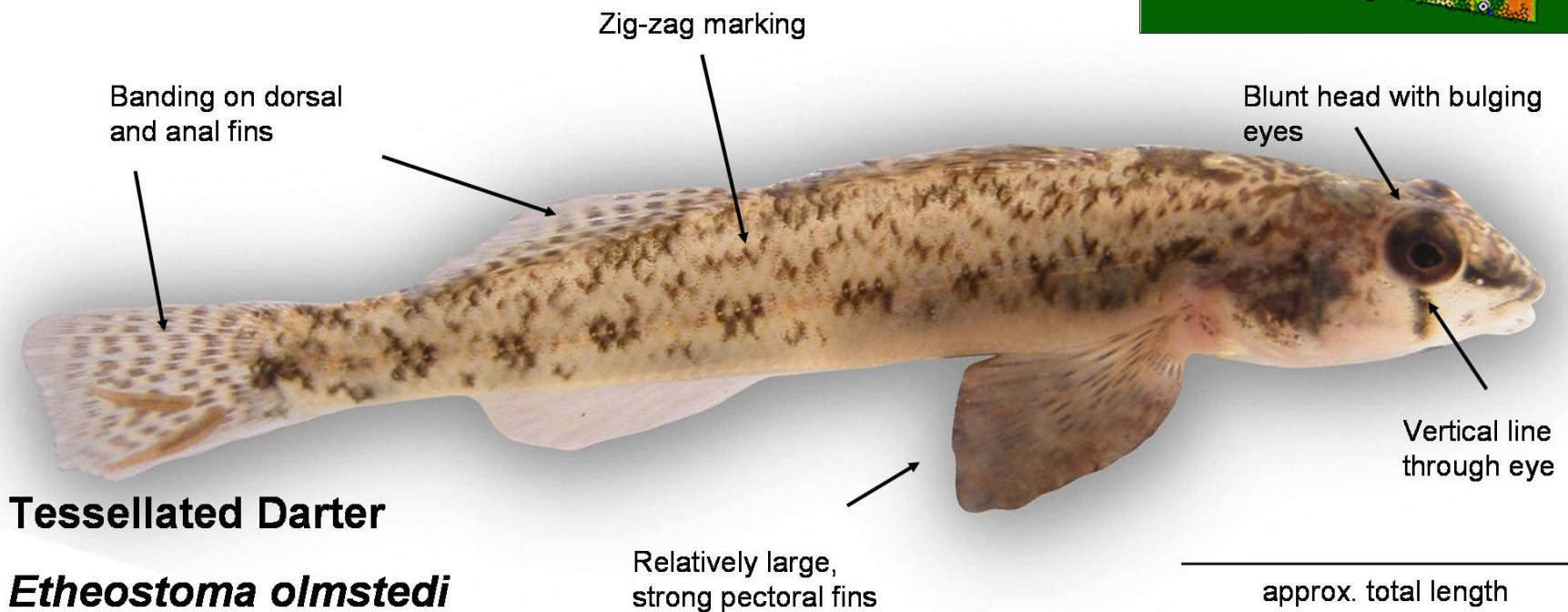
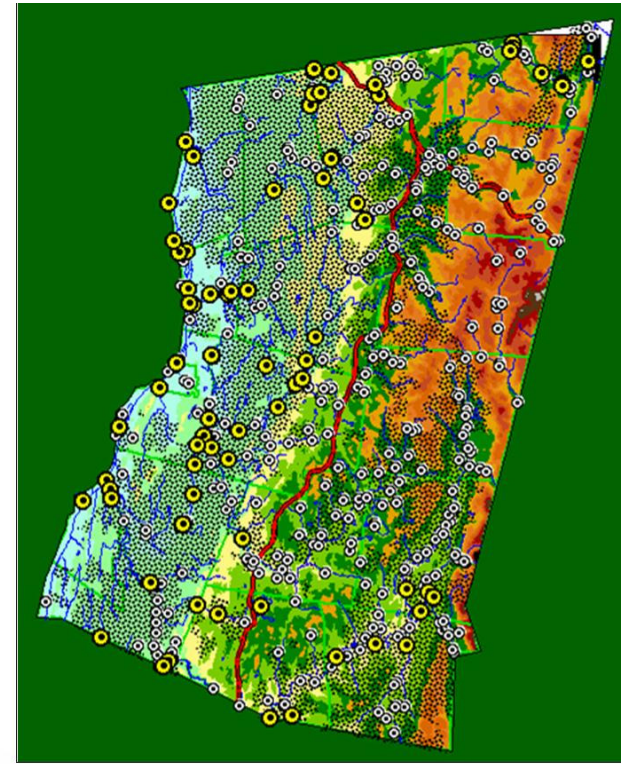


Largemouth Bass

Micropterus salmoides

We have caught only small juveniles; adults can be much longer.

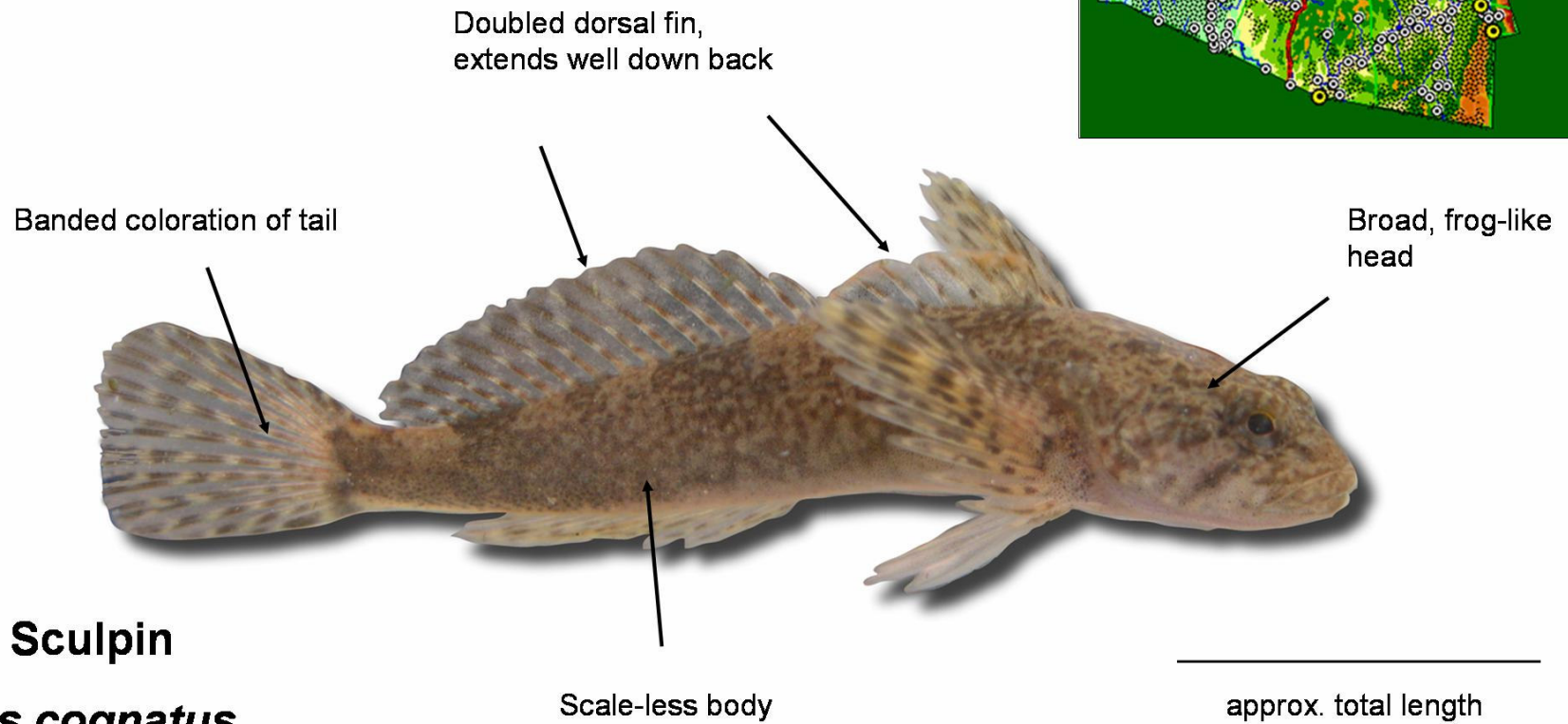
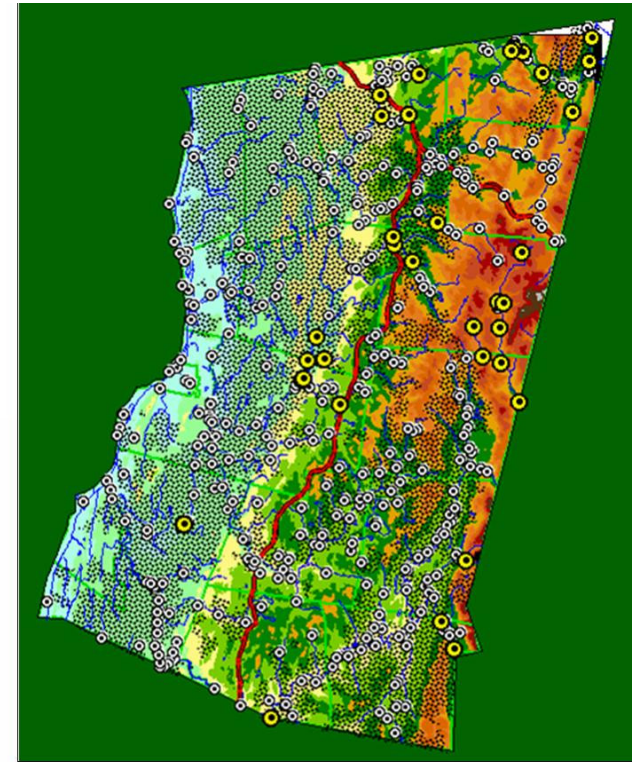
This Darter eats mainly small crustaceans and other invertebrates.



Tessellated Darter

Etheostoma olmstedii

Slimy Sculpin eat mainly the aquatic larvae
of Mayflies, Caddisflies, and True Flies



Slimy Sculpin
Cottus cognatus

Appendix 8. Table of aquatic results from Hawthorne Valley stream studies.

	North Entry of Agawamuck			Center of Agawamuck Prior to Farm Creek			Agawamuck at South End of Property		
	May	July	Sept	May	July	Sept	May	July	Sept
CHEM									
pH	7.1	7.2	6.7	7.3	7.5	6.7	6.8	7.8	7.3
temp (oC)	8.5	9	12	11.5	11	15	9.5	12	11
alkalinity (ppm)	52	44	54	-	60	70	45	66	72
Dissolved O2 (mg/l)	10.5	5.3	8.7	10	5	3.1	11.4	8.4	10.5
Nitrate (ppm)	0.68	0.96	0.38	0.25	1.01	0.33	0.41	1.05	0.76
Phosphate (ppm)	0.01	0.16	0.05	0.03	0.04	0.03	0.01	0.16	0.02
MICROBE									
total/100ml	25,500	3,800	10,100	47,200	8,800	2,200	109,100	6,800	5,500
colliform/100ml	2,400	200	1,200	4,100	1,600	1,000	7,900	4,900	1,900
SALAMS									
water sallys/rock	0.09	0.22	0.04	0.07	0.02	0.05	0.03	0.08	0.15
land sallys/rock	0.01	0.01	0.02	0.01	0 (83 rocks)	0.005	0.02	0 (227 rocks)	0.004424779
INSECTS									
biotic index	2.7	2.4	4.3	2.0	2.9	4.7	2.0	3.0	3.2
FISH									
Blacknose Dace	+	+	+	+	+	+	+	+	+
White Sucker						+	+	+	+
Brown Trout									
Brook Trout				+		+			
Creek Chub			+					+	+
Golden Shiner									
Common Shiner						+	+		+
Longnosed Sucker						+			
Sunny									
Large Mouth Bass								+	

	North End of Farm Creek			Farm Creek Prior to Junction with Agawamuck		
	May	July	Sept	May	July	Sept
CHEM						
pH	7.5	7.5	7.4	7.2	7	6.6
temp (oC)	11	16	14	11	16	14
alkalinity (ppm)	48	60	52	-	68	58
Dissolved O2 (mg/l)	9.5	5.7	9.9	10	6.8	8.9
Nitrate (ppm)	0.14	0.21	0.17	0.4	0.47	0.4
Phosphate (ppm)	0.02	0.09	0	0.05	0.27	0.02
MICROBE						
total/100ml	13,200	4,000	3,200	33,800	40,200	11,200
colliform/100ml	600	1,100	2,000	5,800	?	1,800
SALAMS						
water sallys/rock	0.01	0.00	0.01	0.01	0.00	0.00
land sallys/rock	0 (127 rocks)	0 (74 rocks)	0.027586207	-	0 (114 rocks)	0.015384615
INSECTS						
biotic index	2.3	2.7	2.6	2.4	4.0	3.8
FISH						
Blacknose Dace	+		+	+	+	+
White Sucker	+		+	+	+	+
Brown Trout	+	+	+			
Brook Trout						
Creek Chub	+	+	+	+	+	+
Golden Shiner		+	+			
Common Shiner	+	+	+	+	+	+
Longnosed Sucker						
Sunny			+			
Large Mouth Bass			+			