

Chapter Twelve

Butterfly Monitoring Protocol

BUTTERFLY MONITORING:

Butterfly Transects:

The primary butterfly survey methods used in Iowa entails transect walking, following Pollard and Yates (1993). This transect should be 5 m in width and although the transect lengths may vary due to habitat features, the length should total to approximately 400 m. The transects are expected to pass through several different habitat classifications. Each habitat section should be labeled differently so that presence data can be linked to habitat data. The transect dissecting the sampling hexagon is 400 m in length. This middle transect should be considered the butterfly transect as it should cross through the designated habitat type. Should additional transect distance be necessary (i.e. the middle transect will not work for the butterfly transect) then 1 (or 2) other 200-m transects should be established instead. If possible, these transects are also in a north-south direction and can be either the east or west side of the primary transect at a spacing of at least 173.2 m between transects. For ease of effort, these extra transects connect the poles used in the bird point counts, stations #3 & 4 on the east side, and #6 & 7 on the west side. If either or both of the extra transects are to be used to replace part of the primary transect (due to a lake being in the primary transect, for example), a decision should be made and recorded as to which transect will be used so that future crews survey the same area. The different transect location should be entered as its own site in the database with specific text detailing the exact placement of the transect in the comments.

The primary transect can be divided into habitat sections and is the dividing line of the permanent hexagonal plot. Should a transect cross a paved or major road, this should be treated as a break between sections (Pollard and Yates 1993). The primary transect is 400 m in length. Transects should be flagged to ensure that the observer is in the correct area. Transects should be flagged every 10 m to ensure the same correct path is followed by various observers. It is wise to label flags with distances from the start of the transect to aid in data collection. The transect should be established with the bamboo poles and flagging when the site is first set up in April to ensure it is ready to go by May. Zero meters should be at the northern most end of the transect with 400 m being at the southern-most end, meaning the flagging would be numbered 1 to 40 moving from north to south along the transect, with 1 being at 0 m.

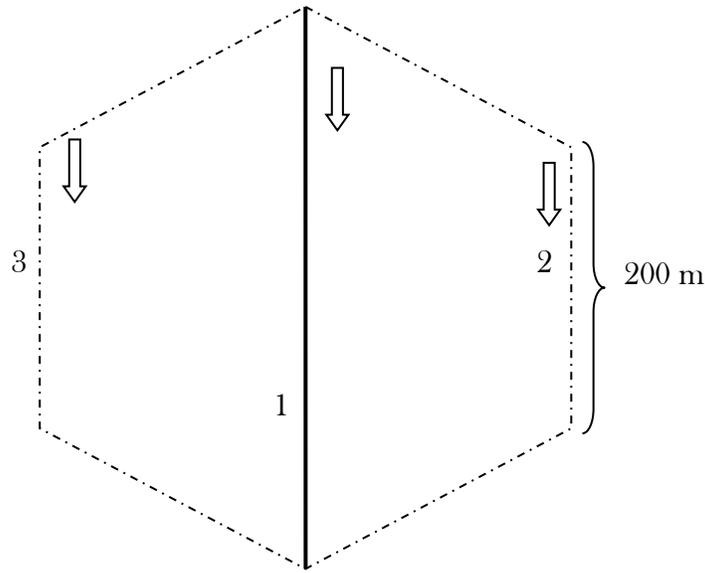
Butterfly Visual Encounter Surveys:

In addition to the transect surveys, a visual encounter survey should be done on the property on at least 2 visits for the butterflies. These surveys can be conducted anywhere on the property that appears to be the best habitat for butterflies, especially skippers and hairstreaks. The 'good habitat' encounter surveys should be 30 minutes in length, conducted in July, and have only one observer. This information will be used to compile species lists for the property and perhaps for occupancy analyses. The purpose of the additional effort is to document butterflies associated with a property in general, not necessarily the habitat the property was chosen to represent. Make sure that the appropriate location name or number is recorded on data sheet. The name for this 'good habitat' should be listed on the aerial photo in the map book created under the Landscape Characteristics protocol (Chapter 3) and should also be

entered as a new site within the given property in the database if it is not already delineated as such.

SURVEY METHODS:

The primary transect follows the same path as the small mammal trap center line and connects the bird point count stations 2 and 5 while passing through bird point count station 1. Care should be taken to avoid attempting to walk the butterfly transect while mammal trapping is ongoing. The observer walks the transect between the bird point count station locations while searching an area 2.5 m on each side (for a total width of 5 m). All butterflies seen within the 5 m width and to a distance of approximately 5 m in front of the observer are recorded. Any butterflies seen outside this area or 'box' (5 m wide by 5 m length by 5 m height) can be recorded as incidentals, however, if the butterfly moves into the box (or doesn't not move as the observer moves forward such that the butterfly is then inside the box) it should be included as part of the transect data.



The observer should maintain a steady pace, unless a butterfly must be captured in order to be correctly identified to species. Individual butterflies should be counted only once. If the observer is unsure whether an individual is new or not, it should be treated as a new individual. Literature suggests that one will spend approximately 5 minutes per every 50 m with additional time being needed to record data and identify species (Ries et al. 2001). Use a stopwatch if needed to record the amount of time spent, and always stop the time count when capturing or identifying an individual.

The butterfly season will begin the last week of May and continue through August 31, depending on weather conditions. A cold start to the summer season will result in the delay of the beginning of the butterfly surveys. If weather conditions are appropriate, the IWAP Butterfly Subcommittee will allow the data collection to begin in early May. All transect searches will be conducted no earlier than 10 am and end by 6:30 pm on any given day. The temperature should be between 21° and 35° C (70-95°F) with winds less than 16 km/hr (~ 10 mph). Most surveys should be conducted on sunny weather days. Transects should be visited

on 4 different occasions, each separated by at least 2 weeks such that each site is visited at least once in each month of June and August, with 2 visits occurring in July. No human activity should occur in the survey area during 2 hours before the surveys are conducted.

Preservation of Voucher Specimens

Some species, especially skippers, will need to have voucher specimens collected for identification in the lab. Traditional chemicals used to preserve insects have been found to be hazardous to human health. Therefore the best method to preserve butterflies will be to collect them in glassine envelopes in the field, freeze them (at least overnight) in the envelope, pin them, and then re-freeze them for several days. They will not need to be stored in the freezer, but will need to be stored in a sealed Insect Drawer (see BioQuip.com catalogue).

HABITAT & PLANT COMPOSITION DATA COLLECTION:

See Chapters 19 and 20. This information will be recorded under those protocols. Any milkweed seen within the transect on any of the surveys should be noted on the datasheet and recorded in the comment field of the survey when entered into the database.

EQUIPMENT NEEDED:

Compass
Flagging, flags & tall bamboo stakes
Stopwatch
Butterfly forceps
Glassine envelopes
Pinning kit
Butterfly net
Hand lens
Field guides
Zip-lock baggies
Digital camera with macro lens
Standard field kit: Clip board, weather kestrel, pencils, ruler, small scissors, Sharpie markers, hand sanitizer, & data sheets, nail polish or spray paint.

STAFF & TRAINING:

Training is recommended and should include 1) field guide use and identification, 2) discussion of defining species characteristics, 3) field practice with an experienced observer, and 4) proficiency testing. Technicians will also need training on habitat data collection.

DATA QUALITY & MANAGEMENT:

This protocol will be difficult to rate for quality:

- Examination of data will not reveal missed detections or misidentifications.
 - o Misidentifications could be checked by either the use of digital cameras, or by the field supervisor working periodically with each technician.
 - o Photos should be sent to the IWAP Butterfly Subcommittee Chair for verification.
- Butterflies collected in the field will be double checked in the lab. See Additional Methods for Special Locations for information on collecting and preserving butterfly specimens.

- Skipper identification is difficult in the field or with photographs. These species may need to have voucher specimens collected.
- All photographs should be reviewed by at least 2 additional people to verify species identifications.

At the end of each survey, each observer should review data sheets to ensure all information present. At the end of the week, the field crew leader should review the collected data sheets.

DATA ANALYSIS:

The basic information should allow the creation of a species list for each site, and data should at least be used to estimate the proportion of area occupied using program PRESENCE or MARK. For more information, see chapter 5 (Data Analysis). The data collected with the transect technique will be used to compute abundance indices when possible.

SAFETY ISSUES & CONSIDERATIONS:

The butterfly technicians will be working alone and therefore should carry a reliable cell phone, GPS unit, maps, and first aid kit. The crew should maintain a sign in/sign out method to ensure everyone returned from the field as well as to know exactly where each crew member is assigned to work every day.

TARGET SPECIES:

The following list of target species represents the species of greatest conservation need as chosen by the Steering committee for the Iowa Wildlife Action Plan (Zohrer et al. 2005). Distribution maps for these species in Iowa can be found in Nekola (1995). Appendix 1 contains a list of additional, more common, butterfly species which may be encountered during the monitoring efforts.

Target butterfly species:

Common Name	Scientific Name	Habitat
Pipevine swallowtail	<i>Battus philenor</i>	Forest, open fields, & roadsides
Zebra swallowtail	<i>Eurytides Marcellus</i>	Woodland along rivers
Spicebush Swallowtail	<i>Papilio troilus</i>	Woodlands
Olympia marble	<i>Euchlow olympia</i>	Open woods, river bluffs, poor soils, & grasslands
Harvester	<i>Feniseca tarquinius</i>	Woodlands and streams
Purplish copper	<i>Lycaena helloides</i>	Moist or disturbed areas
Acadian hairstreak	<i>Satyrium acadica</i>	Riparian & oldfield
Edward's hairstreak	<i>Satyrium edwardsii</i>	Woodlands, clearings, & areas of poor soil
Hickory hairstreak	<i>Satyrium caryaevorum</i>	Forest
Striped hairstreak	<i>Satyrium liparops</i>	Forest openings and edges, prairie streamsidess
White M hairstreak	<i>Parrhasius m-album</i>	Woodland, savanna
Henry's Elfin	<i>Callophrys henrici</i>	Woodlands

Target butterfly species (continued):

Common Name	Scientific Name	Habitat
Reakirt's blue	<i>Echinargus (Hemiargus) isola</i>	Native prairie
Silvery blue	<i>Glaucopsyche lygdamus</i>	Open fields & woodland openings
Melissa blue	<i>Plebejus (Lycaeides) melissa</i>	Xeric prairie and gravel ridges
Aphrodite fritillary	<i>Speyeria aphrodite</i>	High quality prairie, wetlands, and fens
Regal fritillary	<i>Speyeria idalia</i>	Prairie & open grassland
Silver-bordered fritillary	<i>Boloria selene</i>	Fens, wet prairie and meadows
Gorgone checkerspot	<i>Chlosyne gorgone</i>	Oldfields, roadsides, pastures, vacant lots, and native prairie
Baltimore checkerspot	<i>Euphydryas phaeton</i>	Wetlands
Ozark Baltimore checkerspot	<i>Euphydryas phaeton ozarkae</i>	Wetlands, fens, bogs, woodlands
Compton Tortoiseshell	<i>Nymphalis vaualbum (l-album)</i>	Large tracts of forest
Common ringlet	<i>Coenonympha tullia</i>	Prairie & marsh edge
Eyed brown	<i>Satyrodes eurydice</i>	Fens, wet prairies, and marshes
Monarch	<i>Danaus plexippus</i>	Open habitat and disturbed areas
Southern cloudywing	<i>Thorybes bathyllus</i>	Xeric prairie
Hayhurst's scallopwing	<i>Staphylus hayhurstii</i>	Floodplain forest, Loess Hills forests
Dreamy duskywing	<i>Erynnis icelus</i>	Woodland or edge
Sleepy duskywing	<i>Erynnis brizo</i>	Oak barrens, sand or shale soils
Juvenale's duskywing	<i>Erynnis juvenalis</i>	Oak forests
Mottled duskywing	<i>Erynnis martialia</i>	Xeric prairie
Columbine duskywing	<i>Erynnis lucilius</i>	Rocky wooded ravines
*Powesheik skipperling	<i>Oarisma powesheik</i>	High-quality tallgrass prairie
Ottoo skipper	<i>Hesperia ottoe</i>	Mid- and tall grass, high-quality prairie
Leonardus skipper	<i>Hesperia leonardus</i>	Open grassy areas
*Dakota skipper	<i>Hesperia dacotae</i>	Prairie
Crossline skipper	<i>Polites origins</i>	Xeric prairie
Long dash	<i>Polites mystic</i>	Xeric prairie in northwest Iowa, fens and wet prairies in northeast Iowa
Northern broken-dash	<i>Wallengrenia egeremet</i>	Fens, xeric prairie, forst/woodland
Little glassywing	<i>Pompeius verna</i>	Woodland edge
Arogos skipper	<i>Atrytone arogos</i>	Prairies & grasslands
Byssus skipper	<i>Problema byssus</i>	Tallgrass prairie
Mulberry wing	<i>Poanes massasoit</i>	Wetland fens
Zabulon skipper	<i>Poanes zabulon</i>	Riparian, oldfield, & woodland edges
Broad-winged skipper	<i>Poanes viator</i>	Wetland fens
Dion skipper	<i>Euphyes dion</i>	Sedge wetlands
Black dash	<i>Euphyes conspicua</i>	Fens, wet prairies, and marshes
Two-spotted skipper	<i>Euphyes bimacula</i>	Sedge meadows & marshes

Target butterfly species (continued):

Common Name	Scientific Name	Habitat
Dusted skipper	<i>Atrytonopsis hianna</i>	Bluestem grasslands & oldfields
Pepper and salt skipper	<i>Amblyscirtes hegon</i>	Edge of woods & grass waterways
Common roadside skipper	<i>Amblyscirtes vialis</i>	High quality, xeric prairie
Swarthy skipper	<i>Nastra lherminier</i>	

* Federally Endangered or Threatened Species

ADDITIONAL METHODS FOR SPECIAL LOCATIONS:

Mark-Recapture

This technique would involve walking the transect several times during the same day or each day for several days in a row. All butterflies (or all butterflies of a target species) would be captured using a butterfly net and given a mark on the wing using either a permanent marker or a small dab of paint.

SUGGESTED FIELD GUIDES:

Glassberg, J. 1999. Butterflies through Binoculars: The East. Oxford University Press. New York, NY.

Heitzman, JR, and JE Heitzman. 1987. Butterflies and Moths of Missouri. Missouri Department of Conservation. Jefferson City, MO.

Marrone, G. 2002. A Field Guide to Butterflies of South Dakota. South Dakota Department of Game, Fish, and Parks. Pierre, SD.

Scott, JA. 1992. Butterflies of North America: A Natural History and Field Guide. Stanford University Press. Stanford, CA. (This one should be left in the lab or office).

LITERATURE CITED:

Nekola, Jeff. 2005. County distribution maps of Iowa Butterflies and Skippers. Department of Natural and Applied Sciences. University of Wisconsin, Green Bay, WI. 39 pp.

Opler, PA, and GO Krizek. 1984. Butterflies East of the Great Plains. Johns Hopkins University Press. Baltimore, MD.

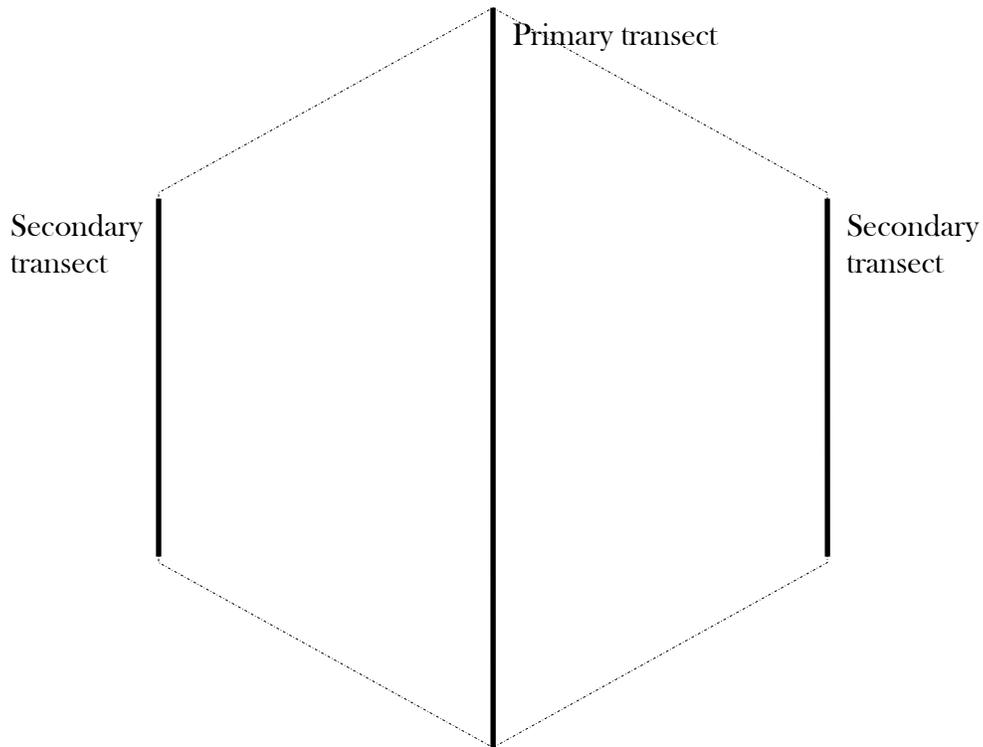
Pollard, E, and TJ Yates. 1993. Monitoring Butterflies for Ecology and Conservation: The British Butterfly Monitoring Scheme. St. Edmundsbury Press Limited. Bury, St. Edmunds.

Ries, L, DM Debinski, and ML Wieland. 2001. *Conservation Value of Roadside Prairie Restoration to Butterfly Communities*. Conservation Biology. 15(2): 401-411.

Zohrer et al. 2005. The Iowa Comprehensive Wildlife Conservation Plan.

Butterfly transect map. Observer: _____ Date: _____ Location: _____
Sketch habitats/section breaks/roads, also record whether the canopy is open or closed for each section of the transect:

Remember, each hexagonal side is 200 m in length and the dividing transect is 400 m long.

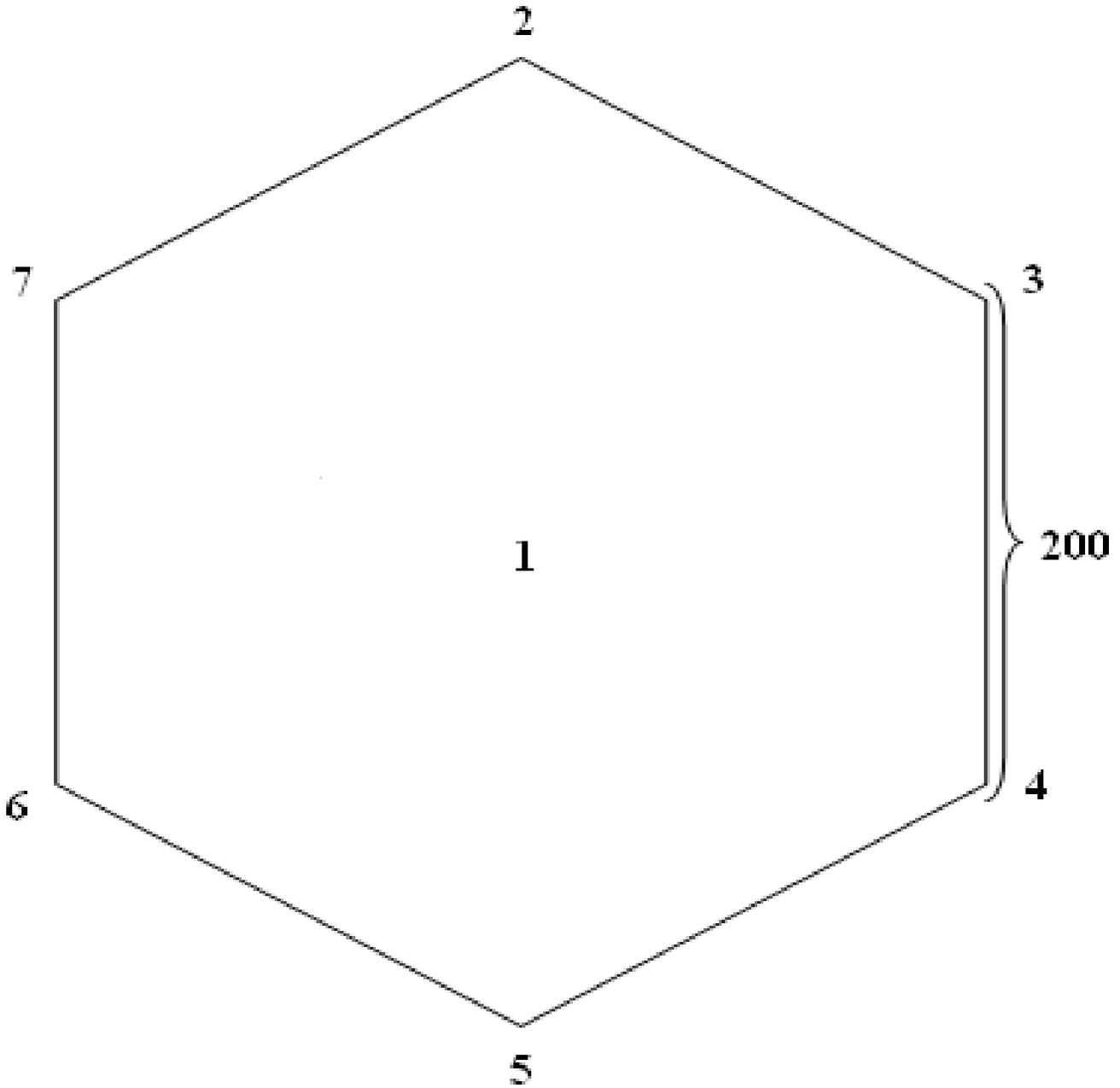


It may be possible to do this in the lab using the GIS database, however, this data should be ground-truthed on the first butterfly transect data collection. Subsequent data collection will not need to re-confirm this information unless conditions have changed (i.e. the site was burned or logged or plowed, etc.)

BUTTERFLY VES LOCATIONS:

PROPERTY: _____ OBSERVERS: _____ DATE: _____

Draw approximate locations of areas where butterfly VES took place. Be sure to include labels for points of interest such as remnant prairies, fields, woodland clearing, etc.



FIELD CHECKLIST OF IOWA BUTTERFLIES

Date _____ Time _____
 Temperature _____ Weather _____
 Observers _____
 Notes _____

Locations:
 1. _____
 2. _____
 3. _____
 4. _____
 5. _____

SWALLOWTAILS

_____ Pipevine Swallowtail *Battus philenor*
 _____ Zebra Swallowtail *Eurytides marcellus*
 _____ **Black Swallowtail** *Papilio polyxenes*
 _____ **Giant Swallowtail** *Papilio cresphontes*
 _____ **Eastern Tiger Swallowtail** *Papilio glaucus*
 _____ Spicebush Swallowtail *Papilio troilus*

WHITES AND SULPHURS

_____ Checkered White *Pontia protodice*
 _____ **Cabbage White** *Pieris rapae*
 _____ Olympia Marble *Euchloe olympia*
 _____ **Clouded Sulphur** *Colias philodice*
 _____ **Orange Sulphur** *Colias eurytheme*
 _____ Southern Dogface *Colias cesonia*
 _____ Cloudless Sulphur *Phoebis semae*
 _____ Mexican Yellow *Eurema mexicana*
 _____ **Little Yellow** *Eurema lisa*
 _____ Sleepy Orange *Eurema nicippe*
 _____ **Dainty Sulphur** *Nathalis iole*

HARVESTERS, COPPERS, HAIRSTREAKS AND BLUES

_____ Harvester *Feniseca tarquinius*
 _____ American Copper *Lycaena phlaeas*
 _____ **Gray Copper** *Lycaena dione*
 _____ **Bronze Copper** *Lycaena hyllus*
 _____ Purplish Copper *Lycaena helloides*
 _____ Coral Hairstreak *Satyrium titus*
 _____ Acadian Hairstreak *Satyrium acadica*
 _____ Edwards' Hairstreak *Satyrium edwardsii*
 _____ **Banded Hairstreak** *Satyrium calanus*
 _____ Hickory Hairstreak *Satyrium caryaevorum*
 _____ Striped Hairstreak *Satyrium liparops*
 _____ Henry's Elfin *Callophrys henrici*
 _____ Juniper Hairstreak *Callophrys gryneus*
 _____ White M Hairstreak *Parrhasius m-album*
 _____ **Gray Hairstreak** *Strymon melinus*
 _____ Marine Blue *Leptotes marina*
 _____ Reakirt's Blue *Hemiargus isola*
 _____ **Eastern Tailed-Blue** *Everes comyntas*
 _____ **Spring Azure** *Celastrina ladon*
 _____ Silvery Blue *Glaucopsyche lydamus*
 _____ Melissa Blue *Lycaeides melissa*
 _____ Swamp Metalmark *Calephelis mutica*

BRUSHFOOTS

_____ **American Snout** *Libytheana carinenta*
 _____ Gulf Fritillary *Agraulis vanillae*
 _____ Variegated Fritillary *Euptoieta claudia*
 _____ **Great Spangled Fritillary** *Speyeria cybele*
 _____ Aphrodite Fritillary *Speyeria aphrodite*
 _____ Regal Fritillary *Speyeria idalia*
 _____ Silver-bordered Fritillary *Boloria selene*
 _____ **Meadow Fritillary** *Boloria bellona*
 _____ Gorgone Checkerspot *Chlosyne gorgone*
 _____ Silvery Checkerspot *Chlosyne nycteis*
 _____ **Pearl Crescent** *Phyciodes tharos*
 _____ Tawny Crescent *Phyciodes batesii*
 _____ Baltimore Checkerspot *Euphydryas phaeton*
 _____ **Question Mark** *Polygonia interrogationis*
 _____ **Eastern Comma** *Polygonia comma*

_____ Green Comma *Polygonia faunus*
 _____ Gray Comma *Polygonia progne*
 _____ Compton Tortoiseshell *Nymphalis vau-album*
 _____ **Mourning Cloak** *Nymphalis antiopa*
 _____ Milbert's Tortoiseshell *Nymphalis milberti*
 _____ **American Lady** *Vanessa virginiensis*
 _____ **Painted Lady** *Vanessa cardui*
 _____ **Red Admiral** *Vanessa atalanta*
 _____ **Common Buckeye** *Junonia coenia*
 _____ **Red-spotted Purple** *Limenitis arthemis*
 _____ **Viceroy** *Limnitis archippus*
 _____ Common Mestra *Mestra amymone*
 _____ Goatweed Leafwing *Anaea andria*
 _____ **Hackberry Emperor** *Asterocampa celtis*
 _____ **Tawny Emperor** *Asterocampa clyton*
 _____ **Northern Pearly-eye** *Enodia anthedon*
 _____ Eyed Brown *Satyrodes eurydice*
 _____ **Little Wood-Satyr** *Megisto cymela*
 _____ Common Ringlet *Coenonympha tullia*
 _____ **Common Wood-Nymph** *Cercyonis pegala*
 _____ **Monarch** *Danaus plexippus*
 _____ Queen *Danaus gilippus*

SKIPPERS

_____ **Silver-spotted Skipper** *Epargyreus clarus*
 _____ Hoary Edge *Achalarus lyciades*
 _____ Southern Cloudywing *Thorybes bathyllus*
 _____ Northern Cloudywing *Thorybes pylades*
 _____ Hayhurst's Scallopwing *Staphylus hayhurstii*
 _____ Dreamy Duskywing *Erynnis icelus*
 _____ Sleepy Duskywing *Erynnis brizo*
 _____ Juvenal's Duskywing *Erynnis juvenalis*
 _____ Horace's Duskywing *Erynnis horatius*
 _____ Mottled Duskywing *Erynnis martialis*
 _____ Columbine Duskywing *Erynnis lucilius*
 _____ Wild Indigo Duskywing *Erynnis baptisiae*
 _____ Persius Duskywing *Erynnis persius*
 _____ Com. Checkered-Skipper *Pyrgus communis*
 _____ **Common Sootywing** *Pholisora catullus*
 _____ **Least Skipper** *Ancyloxypha numitor*
 _____ Poweshiek Skipperling *Oarisma poweshiek*
 _____ **European Skipper** *Thymelicus lineola*
 _____ **Fiery Skipper** *Hylephila phyleus*
 _____ Ottoo Skipper *Hesperia ottoe*
 _____ Leonard's Skipper *Hesperia leonardus*
 _____ Dakota Skipper *Hesperia dacotae*
 _____ Indian Skipper *Hesperia sassacus*
 _____ **Peck's Skipper** *Polites peckius*
 _____ Tawny-edged Skipper *Polites themistocles*
 _____ Crossline Skipper *Polites origenes*
 _____ Long Dash *Polites mystic*
 _____ Whirlabout *Polites vibex*
 _____ Northern Broken-Dash *Wallengrenia egeremet*
 _____ Little Glassywing *Pompeius verna*
 _____ **Sachem** *Atalopedes campestris*
 _____ Arogos Skipper *Atrytone arogos*
 _____ **Delaware Skipper** *Anatrytone logan*
 _____ Byssus Skipper *Problema byssus*
 _____ Mulberry Wing *Poanes massasoit*
 _____ Hobomok Skipper *Poanes hobomok*
 _____ Zabulon Skipper *Poanes zabulon*
 _____ Broad-winged Skipper *Poanes viator*
 _____ Dion Skipper *Euphyes dion*
 _____ Black Dash *Euphyes conspicua*
 _____ Two-spotted Skipper *Euphyes bimacula*
 _____ **Dun Skipper** *Euphyes vestris*
 _____ Dusted Skipper *Atrytonopsis hianna*
 _____ Pepper and Salt Skipper *Amblyscirtes hegon*
 _____ Com. Roadside-Skipper *Amblyscirtes vialis*
 _____ Eufala Skipper *Lerodea eufala*