

**STANDARDIZED SURVEYS OF BUTTERFLIES ON OTTAWA NATIONAL  
WILDLIFE REFUGE AND THE SURROUNDING WESTERN BASIN OF LAKE ERIE  
OHIO**

PROGRESS REPORT-2009  
BSBO-09-5

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INTRODUCTION

Butterflies, as a group, are believed to be declining in Ohio. Habitat loss and pesticide use are potential reasons for this believed decline. Long term data will be required to establish whether these declines are real, and if so, to what extent populations are declining. Data from both local and regional scales are essential to understand the geographic extent of population trends and to determine potential causes of these trends. Such data exist, and are of tremendous importance, for bird populations, and it is logical to expand such sampling strategies to butterflies. To accomplish this, systematic standardized surveys are needed to develop data sets that will be comparable over time and space. With the hobby of butterfly watching increasing in popularity and the establishment of the 4<sup>th</sup> of July Butterfly counts, the opportunity to gather information on these winged creatures has expanded. As with birds, organizations attempting to gather population and distribution data on butterfly species quickly learned that single annual counts are highly inadequate to track population parameters. In response to this problem, the Ohio Lepidopterists Society has adopted a British survey to establish long term monitoring of butterflies in Ohio. The survey uses a standardized methodology and attempts to account for differing periods of butterfly emergence and activity.

Using these criteria, Black Swamp Bird Observatory (BSBO) initiated 3 butterfly survey routes in 1999 using the Ohio Lepidopterists Society methodology. Two surveys were on the Christy Farm Nature Preserve (CFNP) and a third survey is run in and around the Navarre passerine banding station at Davis Besse Nuclear Power Station. In 2004 the CFNP routes were deleted because of land alterations and a new route was initiated on a new property of Ottawa NWR. This site runs through scrub-shrub, woodland and diked wetlands. A third survey route was started in 2006 on the new Cedar Meadow Nature Preserve owned by Catawba Township of Ottawa County. This route runs through mesic and swamp woods, scrub/shrub, grassland, and cedar savanna.

METHODS AND MATERIALS

The survey methodology follows the standardized protocol developed by the Ohio Lepidopterists Society, and consists of transects run at least once a week throughout the time of year of butterfly

activity. Each transect is walked at an even pace and all butterflies within 15 feet of the recorder are counted. The transect is divided into sections by habitat characteristics. Nectar sources are recorded during each survey as they can be related to butterfly distribution and emergence timing. Surveys are conducted weekly from April to October and have restrictions on time of day, temperature, and wind. English name nomenclature used in this report follows Iftner *et al.* (1992). Scientific names are included in Appendix 1.

During 2009, surveys were conducted at the Navarre Marsh unit of Ottawa NWR, located along the Toussaint River (4 transects), the Gaeth-Kurdy property of Ottawa NWR (8 transects) and on the newly created Cedar Meadow Nature Preserve on Catawba Island (10 transects). Descriptions of 2009 routes are in Appendix 2. The targeted time of year for the censuses is April through October. All routes presently being run are within two miles of Lake Erie.

## RESULTS AND DISCUSSION

BSBO conducted the eleventh year of standardized butterfly surveys between April and October, 2009. During this period, routes were run 11 times at Navarre Marsh, 14 times at the Gaeth-Kurdy property, and 15 times at Cedar Meadow Nature Preserve. A total of 32 species were observed on the three routes with 1,918 individuals counted. Nineteen species were recorded on Ottawa (600 individuals), 24 species on Catawba (471 individuals), and 17 species at Navarre (847 individuals).

### Navarre

The Navarre route follows the beach ridge and lakefront dike at the banding station. Surveys were run from 18 April to 18 September, 2009. Seventeen species and 847 individuals were recorded. Abundance averaged 77.0 individuals and diversity averaged 6.0 species per survey. Greatest diversity was 10 species on 26 August and greatest abundance was 326 on 27 July. Species totals are shown in Table 1. This route includes 4 transects. Table 2 shows the butterflies observed by transect. Cabbage White was the dominant species (55.5% of sightings) and was recorded on all four transects, along with the Spring Azure, Summer Azure, Hackberry Emperor, and Comma. The more open dike along the lakefront had the highest observation rate with the Cabbage White (64.0%) and Summer Azure (28.7%) making up the majority of the butterflies on the transect.

### Gaeth-Kurdy, Ottawa NWR

This Ottawa site traverses marsh dike, woodland, and scrub habitats. Surveys were conducted between 20 May and 14 September, 2009. Nineteen species and 600 individuals were recorded. The highest diversity of species was 11, recorded on 13 August. Abundance averaged 42.9 individuals and diversity 7.1 species per survey. The greatest number of individuals was 89 on 3 August. Species totals are shown in Table 1. The route has 8 transects. Butterflies per transect are shown in Table 3. Pearl Crescent was the most often recorded butterfly making up 29.5% of the observations. Summer Azure made up an additional 27.2% on the routes and was the dominant species observed on Transects 3,4,6, and 7. Cabbage White, Pearl Crescent, and Summer Azure were recorded on all transects in 2009. Mourning Cloak, Wild Indigo Dusky

Wing, and Bronze Copper were highlights.

#### Cedar Meadow Nature Preserve, Catawba Island

This new preserve consists of old field, remnant woodland, and red cedar (*Juniperus virginiana*) thickets . Fifteen surveys were conducted from 5 June to 19 September. A total of 471 individuals of 24 butterfly species were identified in 2009. Abundance averaged 31.4 individuals and diversity averaged 5.9 species per survey. The greatest diversity was recorded on 5 July at nine species. Abundance peaked at 96 individuals on 2 August. Species totals are shown in Table 1. Ten transects were run on this route and butterflies per transect are shown in Table 4. Summer Azure (50.3%) was the most often observed and was followed by Cabbage White (18.7%) of the sightings. Summer Azure was the dominant species on 9 of the 10 transects. Transect 5 had by far the highest number of butterflies observed in 2009. Appalachian Eyed Brown, Northern Pearly Eye, Giant Swallowtail, Banded Hairstreak, Bronze Copper, and Tawny Emperor were highlights of the route.

### EDUCATION

Educational programming was supplied upon request. An investigators meeting was held in March and was designed to give prospective volunteers background knowledge in the protocol and butterfly identification as well as guidance in completing field work. A picnic was held in August at the Observatory's headquarters to thank the volunteers for their hours of effort and to discuss future plans. These surveys provide an insight into the diversity and abundance of this beautiful group of insects. For the volunteers conducting surveys is the added enjoyment of seeing the seasons change in one of our natural treasures.

### CONCLUSIONS

With eleven years of field surveys completed, timing of several of the more common species can begin to be evaluated. One of the most dominant species in all three areas was the Cabbage White. It appears to be a generalist with a lot of variation in peak timing; however, the highest numbers were recorded from June to September with July generally having the highest individual count. The Alfalfa Butterfly appears to have a September peak and a late July pulse. The Clouded Sulphur peaks August to September. The Pearl Crescent appears to have two broods with peaks in late May and again in September. The same holds true for the Summer Azure which shows peaks in June and again in late July to August. The Red Admiral which has been one of the dominant species peaks in May. The Silver-spotted Skipper also indicates two broods with peaks in May and again in August. The Buckeye appears to have a northward irruption in some years and is absent in others.

Results of these standardized surveys will be valuable for assessing long-term population trends of Ohio's butterfly species; however, several years of data will be required before such trends can be adequately assessed.

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## LITERATURE CITED

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Table 1. Butterfly species observed on standardized routes, 2009.

Species	Navarre	Cedar Meadow NP	Gaeth-Kurdy
Alfalfa Butterfly	2	9	20
Appalachian Eyed Brown		22	
Banded Hairstreak		2	
Black Swallowtail		2	
Bronze Copper		1	
Buckeye	3		
Cabbage White	470	88	95
Clouded Sulphur	7	3	4
Comma	9		2
Common Wood Nymph		26	
Eastern Tailed Blue		9	6
European Skipper	1	2	3
Giant Swallowtail		1	
Hackberry Butterfly	7	2	10
Least Skipper	24	1	
Little Wood Satyr		13	
Monarch	8	14	33
Mourning Cloak	1	1	15
Northern Pearly Eye		2	
Pearl Crescent		27	177
Question Mark	1		1
Red Admiral	11		
Red-spotted Purple			11
Silver-spotted Skipper	5	3	19
Spring Azure	9		17
Summer Azure	280	237	163
Tawny Emperor		1	
Tiger Swallowtail	1	1	3
Viceroy	8		17
Wild Indigo Dusky Wing			1
Zabulon Skipper		3	1
Unidentified Skipper		1	

Table 2. Butterfly species observed by Transect, Navarre route, 2009.

Species	Transect 1	Transect 2	Transect 3	Transect 4
Alfalfa Butterfly			2	
Buckeye			3	
Cabbage White	78	83	297	12
Clouded Sulphur			5	2
Comma	4	3	1	1
European Skipper				1
Hackberry Emperor	1	3	1	2
Least Skipper	12	10	2	
Monarch		1	6	1
Mourning Cloak			1	
Question Mark			1	
Red Admiral	5	4	2	
Silver-spotted Skipper	2	3		
Spring Azure	6	1	1	1
Summer Azure	44	54	133	49
Tiger Swallowtail			1	
Viceroy			8	
TOTAL	152	162	464	69

Table 3. Butterfly species observed by Transect, Gaeth-Kurdy, ONWR route, 2009.

Species	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8
Alfalfa Butterfly	5	3	1		1	1	6	3
Black Swallowtail							1	
Bronze Copper								1
Cabbage White	9	12	9	18	29	3	15	
Clouded Sulphur	1						2	1
Comma	1					1		
Eastern Tailed Blue	2	2		1	1			
European Skipper		1		1	1			
Hackberry Emperor			10					
Monarch	1	6		7	8	6	5	
Mourning Cloak		4	3	2	1	5		
Pearl Crescent	20	16	2	16	2	3	101	17
Question Mark						1		
Red-spotted Purple	1	2	5			3		
Silver-spotted Skipper		4	2	5	6	1	1	
Spring Azure		2		10	1		4	
Summer Azure	5	10	20	4	21	35	30	2
Tiger Swallowtail	1	1	1					
Viceroy	5		1	4	1	1	3	2
Wild Indigo Dusky Wing						1		
Zabulon Skipper					1			
TOTAL	51	63	54	104	73	61	168	26

Table 4. Butterfly species observed by Transect, Cedar Meadows NP route, 2009.

Species	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9	T-10	T-11
Alfalfa Butterfly					8		1				
Appalacian Eyed Brown				4				12	6		
Banded Hairstreak				2							
Black Swallowtail				1	1						
Bronze Copper					1						
Cabbage White	2	1	10	13	25	8	9	5		15	
Clouded Sulphur					3						
Com. Wood Nymph				6	18	2					
Eastern Tailed Blue			1	1	6	1					
European Skipper											
Giant Swallowtail			1								
Hackberry Emperor	2										
Least Skipper								1			
Little Wood Satyr		2	2	3	5	1					
Monarch			3	2	3	1	1			4	
Mourning Cloak										1	
Northern Pearly Eye		1							1		
Pearl Crescent			2	5	13	7					
Sil.-spotted Skipper			2				1				
Summer Azure	9	4	42	50	36	32	16	4	8	36	
Tawny Emperor				1							
Tiger Swallowtail							1				
Zabulon Skipper			3								
Unknown Skipper					1						
TOTAL	13	8	66	88	120	52	29	22	15	58	

## APPENDIX 1

<b>Common Name</b>	<b>Scientific Name</b>
Alfalfa Butterfly	<i>Colias eurytheme</i>
Appalachian Eyed Brown	<i>Satyrodes appalachia</i>
Banded Hairstreak	<i>Satyrium calanus</i>
Black Swallowtail	<i>Papilio polyxenes</i>
Bronze Copper	<i>Lycaena hylus</i>
Buckeye	<i>Junonia coenia</i>
Cabbage White	<i>Pieris rapae</i>
Clouded Sulphur	<i>Colias philodice</i>
Comma	<i>Polygonia comma</i>
Common Wood Nymph	<i>Cercyonis pegala</i>
Eastern Tailed Blue	<i>Cupido comyntas</i>
European Skipper	<i>Thymelicus lineola</i>
Giant Swallowtail	<i>Papilio cresphontes</i>
Hackberry Emperor	<i>Asterocampa celtis</i>
Least Skipper	<i>Ancyloxypha numitor</i>
Little Wood Satyr	<i>Megisto cymela</i>
Monarch	<i>Danaus plexippus</i>
Mourning Cloak	<i>Nymphalis antiopa</i>
Northern Pearly Eye	<i>Enodia anhedon</i>
Northern Eyed Brown	<i>Satyrodes eurydice</i>
Painted Lady	<i>Vanessa cardui</i>
Pearl Crescent	<i>Phyciodes tharos</i>
Question Mark	<i>Polygonia interrogationis</i>
Red Admiral	<i>Vanessa atalanta</i>
Red-spotted Purple	<i>Limenitis arthemis</i>
Silver-spotted Skipper	<i>Epargyreus clarus</i>
Silvery Checkerspot	<i>Chlosyne nycteis</i>
Southern Dogface	<i>Colias cesonia</i>
Spring Azure	<i>Celastrina ladon</i>
Summer Azure	<i>Celastrina neglecta</i>
Tawny Emperor	<i>Asterocampa clyton</i>
Tiger Swallowtail	<i>Papilio glaucus</i>
Viceroy	<i>Limenitis archippus</i>
Wild Indigo Dusky Wing	<i>Erynnis baptisiae</i>
Zabulon Skipper	<i>Poanes zabulon</i>

## APPENDIX 2

### Navarre Marsh Unit, Ottawa National Wildlife Refuge

Route consists of 4 transects and is located in the Navarre migration banding station.

Latitude: 41 35' 30"

Longitude: 83 03' 30"

Ottawa County, Ohio

#### Transect 1:

Transect begins at the banding station and follows the banding trail north on the mature beach ridge to the final net lane (20). It consists of varying degrees of density of dogwood (*Cornus drummondii*) and Sand Cherry (*Prunus pumila*) with an overstory of Hackberry (*Celtis occidentalis*), Kentucky Coffee-tree (*Gymnocladus dioica*), and Eastern Cottonwood (*Populus deltoides*). The herbaceous layer is dominated by Garlic Mustard (*Alliaria officinalis*) and nettle (*Urtica* spp.).

#### Transect 2:

This section runs from the banding station south along the old interior dike road past banding nets 4-7 to the intersection with the perimeter dike. This transect is more open than T-1 but is dominated by the same shrubs and herbaceous layers. The overstory is similar but includes more Black Willow (*Salix nigra*), Scrub Willow (*Salix* spp.) and no coffee-tree. Considerable Wild Rose (*Rosa palustris*) and Multi-flora Rose (*Rosa multiflora*) occurs along this transect.

#### Transect 3:

This transect runs on the perimeter dike along the lake north to where the interior dike road leaves the lake front. This is a more open transect with dogwood and rose the dominant understory, Eastern Cottonwood, Hackberry, and Sycamore (*Platanus occidentalis*) the primary overstory, and the herbaceous layer dominated by fescue grass (*Festuca* spp.), and cow-vetch (*Vicia* spp.).

#### Transect 4:

This transect runs along the interior dike from the lake front to the banding station. Heavy dogwood and rose species dominate the understory while Eastern Cottonwood and Hackberry are the dominant overstory species. The herbaceous layer is dominated by Garlic Mustard and grasses.

## Gaeth-Kurdy property, Ottawa National Wildlife Refuge

This property was a private hunting club prior to acquisition by the U.S. Fish and Wildlife Service. It is located along the Toussaint River and has areas enclosed by dikes with units drained or flooded. There is a wood lot and several areas of marsh.

Route consists of 8 transects.

Latitude: 41 35' 21"      Longitude: 83 6' 18"

Ottawa County, Ohio

Transect 1: 211 feet long

Start at a big clump of cherry saplings on the south side of lane. To the south is an apple orchard with mown grass. To the north is an old field or pasture which is succeeding into scrub/shrub. The dominant plant in this area is gray dogwood in sapling stage about 4-5 foot high.

Transect 2: 514 feet

Start where a dike intersects the lane from the left. The lane runs along a dike. To the south, on the other side of the dike is open water which is an inlet from the river. In the shallow water is cattail (*Typha* spp.) and phragmites (*Phragmites* spp.). The banks of the dike are overgrown with willow, hawthorn (*Crataegus* spp.), Eastern Cottonwood, and Gray Dogwood. There is a lone current bush (*Ribes* spp.). To the north side is a marshy area.

Transect 3: 1,010 feet

Start where the lane enters the wood lot. Trees are oak, hickory, hawthorn, and locust.

Transect 4: 1,113 feet

Start where the lane emerges from the woods and goes up on top of a dike. The top of the dike is a wide lane of mown grass. To the west of the dike is a farmed field which slopes down into a marshy area at the end of the section. To the east, the dike is enclosing a drained area or an old field which is succeeding to scrub/shrub with gray dogwood as the dominant vegetation. There is a canal or ditch of standing water which surrounds this field at the base of the dike. The edges of the dike are overgrown with Black Locust (*Robinia pseudoacacia*), sumac (*Rhus* spp.), grapevine (*Vitis* spp.), willow, and cottonwood and a clump of Chokecherry (*Prunus virginiana*).

Transect 5: 1,167 feet

Start where the dike turns to the west. This section runs along the river bank. The growth on the edges of the dike is primarily willow on the inside and cottonwood along the river.

Transect 6: 1,003 feet

Start where the dike turns to the north. To the east is a water inlet from the river with cattail and phragmites in shallow areas. Growing on the dike is hawthorn, Box Elder (*Acer negundo*), sumac, Gray Dogwood, cottonwood, and willow.

Transect 7: 932 feet

Get to this section by returning on the path of Transect 2. Start where a lane goes to the left and runs along the same field of Transect 1. When the lane turns to the west it runs along the fence row to the north. Plants in this fence row include Honey Locust (*Gleditsia triacanthos*),

Chokecherry, and hawthorn.

Transect 8: 345 feet

This is a section of road leading into the property and has shrub/scrub fields on both sides.

### **Cedar Meadow Nature Preserve, Catawba Township**

The preserve is a 64 acre parcel acquired by Catawba Island Township in the fall of 2005. It had been used for mixed farming in the past but has not been farmed nor used for any other activity for many years. The various fields are in different stages of succession. There is a large natural pond with Buttonbush (*Cephalanthus occidentalis*). There are two wooded areas, one of which borders the pond. The other wooded area contains the foundation of at least one farmhouse.

Route consists of 15 transects.

Latitude: 41 33' 34"      Longitude: 82 50' 59"

Ottawa County, Ohio

Transect 1: 226 feet

Start at the entrance to the preserve. This section is a wide trail bordered by a woodlot on the west and an overgrown area of mixed trees and shrubs to the east. Plants on both sides include hickory (*Carya* spp.), Basswood (*Tilia americana*), and Black Walnut (*Juglans nigra*) as well as grapevine, Poison Ivy (*Rhus radicans*), Multiflora Rose, Virginia Creeper (*Parthenocissus quinquefolia*), Sweet Cicely (*Osmorhiza* spp.), and Garlic Mustard.

Transect 2: 431 feet

Turn to the west and enter the woodlot. The trees are large and very tall and are primarily Black Walnut and Hackberry. There is not a lot of understory shrub growth. It is an open forest floor with Sweet Cicely, May Apple (*Podophyllum peltatum*), violets (*Viola* spp.), False Solomon's Seal (*Smilacina stellata*), and invasive Garlic Mustard.

Transect 3: 413 feet

Leave the woodlot. The trail curves through an area dominated by mature Gray Dogwood, some Black Walnut saplings, and a tangle of Multiflora Rose, Blackberry (*Rubus pensilvanicus*), Raspberry (*Rubus occidentalis*), Virginia Creeper, honeysuckle (*Lonicera* spp.), and Red Cedar as well as grasses. There is a lone pine tree in this section.

Transect 4: 320 feet

Return to the main trail. This transect skirts the edge of an open field to the east which is in early succession to Gray Dogwood, cedar and grasses. To the west side is the same tangle of mature Gray Dogwood, vines, and grasses.

Transect 5: 670 feet

The trail turns east and cuts through the open field. Grasses are the dominant plant along the trail.

Transect 6: 297 feet

This short transect runs along the edge of a narrow tree line to the north side. The trees include hickory, elm (*Ulmus* spp.), oak (*Quercus* spp.), Hackberry, and Gray Dogwood. On the south side of the trail is unmowed open grass field.

Transect 7: 212 feet

Cut through the tree line. The trail now has the succession field on its west and follows another shrub/scrub line on the east side.

Transect 8: 230 feet

The trail passes under two large ash (*Fraxinus* spp.) trees and comes into a woodland clearing dominated by tall grass. There is also a stand of Sensitive Fern (*Onoclea sensibilis*) in this clearing.

Transect 9: 648 feet

The trail turns west and enters the woods which are around the pond. The dominant trees are oak and both wild (*Prunus serotina*) and domestic cherry. There might have been a cherry orchard here at one time. These are all large and towering trees. There are also ash and elm trees. There are Spring Beauties (*Claytonia virginica*), Jack-in-the-Pulpit (*Arisaema atrorubens*), Sweet Cicely, Poison Ivy, grapevine, and Virginia Creeper. Garlic Mustard is invasive. There are many understory cherry saplings.

Transect 10: 528 feet

Emerging from the woods, the trail goes east through another area of mature shrub/scrub including some large honey suckle, hawthorn, cherry, locust, and Gray Dogwood. In the spring there are Wild Strawberry (*Fragaria* spp.), Blackberry, violets, and non-native Star of Bethlehem (*Ornithogalum umbellatum*).

Transect 11: 347 feet

This transect is the short section missed by making the loop through the woods at the beginning of the trail.

Transect 12, 13, 14, 15: (510, 470, 194, 159 feet respectively)

These four transects are primarily through open unmowed field with grass as the dominant plant. There is a stand of Hackberry trees at the corner of Transect 12 and 13. There is a tree line along a part of Transect 13 which includes Hackberry, hawthorn, Gray Dogwood, cherry, and ash. There are also a small stand of Big Blue Stem (*Andropogon gerardi*) on Transects 12 and 13.