National Park Service
U.S. Department of the Interior

Northeast Region
Philadelphia, Pennsylvania

An Evidence-based Checklist of the Butterflies and Skippers of Delaware Water Gap National Recreation Area

Technical Report NPS/NER/NRTR—2011/153

ON THE COVER
American copper (*Lycaena phlaeas*) pair, Delaware Water Gap National Recreation Area.
Photo credit: Wade and Sharon Wander.

An Evidence-based Checklist of the Butterflies and Skippers of Delaware Water Gap National Recreation Area

Technical Report NPS/NER/NRTR—2011/153

Sharon Wander and Wade Wander

Wander Ecological Consultants
28 Warner Road
Newton, NJ 07860

February 2011

U.S. Department of the Interior
National Park Service
Northeast Region
Philadelphia, Pennsylvania

The Northeast Region of the National Park Service (NPS) comprises national parks and related areas in 13 New England and Mid-Atlantic states. The diversity of parks and their resources are reflected in their designations as national parks, seashores, historic sites, recreation areas, military parks, monuments and memorials, and rivers and trails. Biological, physical, and social science research results, natural resource inventory and monitoring data, scientific literature reviews, bibliographies, and proceedings of technical workshops and conferences related to these park units are disseminated through the NPS/NER Technical Report (NRTR) and Natural Resources Report (NRR) series. The reports are a continuation of series with previous acronyms of NPS/PHSO, NPS/MAR, NPS/BSO-RNR, and NPS/NERBOST. Individual parks may also disseminate information through their own report series.

Natural Resources Reports are the designated medium for information on technologies and resource management methods; "how to" resource management papers; proceedings of resource management workshops or conferences; and natural resource program descriptions and resource action plans.

Technical Reports are the designated medium for initially disseminating data and results of biological, physical, and social science research that addresses natural resource management issues; natural resource inventories and monitoring activities; scientific literature reviews; bibliographies; and peer-reviewed proceedings of technical workshops, conferences, or symposia.

Mention of trade names or commercial products does not constitute endorsement or recommendation for use by the National Park Service.

Print copies of reports in these series, produced in limited quantity and only available as long as the supply lasts, or preferably, file copies on CD, may be obtained by sending a request to the address on the back cover. Print copies also may be requested from the NPS Technical Information Center (TIC) by writing to Denver Service Center, PO Box 25287, Denver, CO 80225-0287, sending an email to TIC-Requests@nps.gov, or calling 303-969-2130. A copy charge may be involved. To order this document from TIC, refer to document NPS 609/106043.

This report may also be available as a downloadable portable document format file from the Internet at http://www.nps.gov/nero/science/.

Please cite this publication as:

Wander, S., and W. Wander. 2011. An Evidence-based Checklist of the Butterflies and Skippers of Delaware Water Gap National Recreation Area. Technical Report NPS/NER/NRTR—2011/153. National Park Service. Philadelphia, PA.

NPS 620/106631, February 2011

Table of Contents

Page

Abstract iv

Objectives 1

Methods 1

Results and Discussion 2

Species Checklist 2

Observations 2

Most-Recent Observations 3

Metadata 4

Appendix. Butterfly and skipper species recorded in Delaware Water Gap National Recreation Area, 1993–2008 5

Abstract

Wander Ecological Consultants developed an evidence-based checklist of butterflies and skippers for Delaware Water Gap National Recreation Area. Eighty-eight species and one subspecies were documented by one or more observations made during 79 field trips, from 1993–2008. Each species was assigned nativity, relative abundance, residency, and breeding status based on data definitions from the National Park Service's NPSpecies database. Thirty-three taxa, including two of special interest, were vouchered by digital images.

Objectives

The main objective of the project was to compile an annotated checklist of butterflies and skippers that have been recorded in the Delaware Water Gap National Recreation Area (hereinafter referred to as DEWA or "the park"). The checklist is documented by both field observations and digital images, and provides information regarding the relative abundance, residency (breeding status), and nativity of each species.

Methods

Sharon Ann Wander and Wade Wander of Wander Ecological Consultants (WEC) originally provided DEWA with a list of the species of butterflies and skippers personally observed by them in the New Jersey portion of the park, or known by them to have been recorded by other reliable observers. Based on this list, Jeffrey Shreiner, of the park's Division of Research and Resource Planning, provided WEC with a Microsoft Excel spreadsheet pre-populated with species' common names, family names, scientific names, and taxonomic authorities. The spreadsheet included six worksheets required to completely document each species: Species List, Data Dictionary for the Species List, Observations Template, Data Dictionary for Observations, Photo Records, and Metadata. WEC added a seventh worksheet listing the dates and locations of the Most Recent Observations for each species.

WEC entered data in the spreadsheet based on the Wanders' personal field records and photographs from August 1993 through June 2008, and—for two species—on the field records of Thomas Halliwell and James Zamos (fellow members of the North Jersey Butterfly Club—a chapter of the North American Butterfly Association). Supporting information regarding residency (breeding status), abundance, and nativity of the species in New Jersey was obtained from several regional publications cited below. WEC used the terms describing abundance and residency provided in the Data Dictionary. These definitions were obtained from the National Park Service's NPSpecies Database for Users (NPSpecies version 2).

Results and Discussion

Species Checklist

The Species Checklist describes the park status (present in park), nativity (native or nonnative), relative abundance (abundant, common, uncommon, rare, or occasional), residency (breeder, migratory, vagrant, or unknown), and exploitation concern (yes or no) of each species. Supporting information provides data sources (for all species) and additional details (when useful for clarification) for each of these categories.

Of the 89 taxa included in the Checklist, 87 are native (only Cabbage White and European Skipper are nonnative). Six species were categorized as abundant, 47 as common, 12 as uncommon, nine as rare, and 14 species and one subspecies as occasional. Of the taxa whose occurrence is defined as occasional, Harvester, Coral Hairstreak, Oak Hairstreak, Milbert's Tortoiseshell, Painted Lady, White Admiral, Swarthy Skipper, Cobweb Skipper, and Broad-winged Skipper are generally seen only every few years, while Zebra Swallowtail, Cloudless Sulphur, Little Yellow, Bronze Copper, Red-banded Hairstreak, and Ocola Skipper are represented by only one record each (scientific names are listed in the Appendix).

Populations of 75 species both breed and overwinter in the park. The list also includes five migratory species that breed definitely (Monarch) or possibly (American Snout, Variegated Fritillary, Painted Lady, Common Checkered-Skipper); three migratory nonbreeding species (Cloudless Sulphur, Little Yellow, Ocola Skipper); five species and one subspecies whose breeding status is unknown (Bronze Copper, Red-banded Hairstreak, Milbert's Tortoiseshell, "White Admiral," Common Buckeye, and Swarthy Skipper); and one vagrant nonbreeder (Zebra Swallowtail).

Two species classified by the State of New Jersey have been observed in the park: Bronze Copper (Endangered) and Silver-bordered Fritillary (Threatened). At present, no breeding colony of Bronze Copper is known in the park (or elsewhere in New Jersey), as this species appears to be just beginning a recovery after more than 10 years of being unreported in the region. The two colonies of Silver-bordered Fritillary in the park (one well-established and one newly discovered) are the only ones known in northern New Jersey.

Observations

The Observations include a separate worksheet—with data on fieldtrip dates and routes, observer name(s), species observed, numbers observed, habitat and specific location where observed (when known), and (in some cases) comments—for each of 79 days of observation in the DEWA during the period August 8, 1993 through June 6, 2008. Fieldtrip routes include places (e.g., Lake Success), roads (e.g., Crater Lake Road), and general areas of the park (e.g., Walpack area). Areas or routes that have produced the most (or most sought-after) butterflies have received the most visits over the years:

1. The Walpack area includes many large open fields along Mountain Road and Rt. 615 with abundant larval foodplants and nectar sources. Mountain Road, which is unpaved, attracts

species that seldom nectar (such as anglewings, tortoiseshells, and emperors) but imbibe moisture and minerals from damp soil.

2. Blue Mountain Lakes Road and Crater Lake Road have roadside nectar sources (especially common milkweed) that attract a variety of sought-after hairstreaks as well as numerous other species.
3. The Flatbrookville area includes large successional fields and redcedar glades southeast of Old Mine Road on the Walpack Bend peninsula. The fields have abundant nectar sources and attract a variety of species.
4. Yard's Creek Generating Station has large open fields with abundant Common Milkweed, emergent wetlands, and ridgetop habitats. Coverage of this area has unfortunately been negligible since public access was restricted post-9/11/2001.
5. In general, most open fields or wetlands in the park that are vegetated with a variety of herbaceous species (that include butterfly nectar sources and/or larval foodplants) will be productive of a variety of butterfly species, and many other species can be found imbibing minerals along dirt roads in both forested and open areas. Extensive forests, cultivated fields, heavily shrubby fields, and fields dominated by nonnative grasses are the least productive areas for observing butterflies.

The number of annual visits to the park varied from one to nine during the period covered, averaging between four and five. Observations were reported for every month from April through November. July saw the most total visits, with 19, as this is generally the month in which the highest diversity of butterflies is likely to be present. An average of 10 trips were made in each of the other months from April through September. Only a few casual observations (as opposed to trips specifically for butterflies) were made in October and November, as butterfly activity largely ceases in colder weather.

Species not yet observed in the park that could possibly occur, or may have already occurred, include Pipevine Swallowtail, Giant Swallowtail, Appalachian Azure, Gray Comma, Eyed Brown, Long-tailed Skipper, Fiery Skipper, Sachem, Two-spotted Skipper, and Pepper and Salt Skipper.

Photo Records

This worksheet pulls together data from the Observations worksheets. Digital images document 33 of the 89 taxa observed; all photos except Bronze Copper were taken by the Wanders in the park on the field trips included in the Observations. Of the 33 images, 24 were originally taken as digital images, while nine are scans of 35-mm Kodachrome slides. A digital filename that includes park code, scientific name of species, location (in most cases), and date is provided for each image.

The photo documentation includes the two state-classified species that have been observed in the park—Bronze Copper (Endangered) and Silver-bordered Fritillary (Threatened).

Most-Recent Observations

A separate worksheet lists the most-recent observation date and location (from the Observations records) for each of the 89 taxa.

Metadata

The following data sources were used to create the Species Checklist and list of Most Recent Observations:

1. Glassberg, J. 1999. Butterflies Through Binoculars: The East. Oxford University Press. 242 pp.
2. Gochfeld, M., and J. Burger. 1997. Butterflies of New Jersey: A Guide to their Status, Distribution, Conservation, and Appreciation. Rutgers University Press. 327 pp.
3. Cech, R., and G. Tudor. 2005. Butterflies of the East Coast: An Observer's Guide. Princeton University Press. 343 pp.
4. Field observation records of Wade and Sharon Wander, August 8, 1993 through June 6, 2008.
5. Field observation records of Thomas Halliwell as published in "The Pearly-Eye" (Field Reports of the NABA North Jersey Butterfly Club), Vol. 7 (March 2008).
6. Unpublished field observation records of James Zamos.

Appendix. Butterfly and skipper species recorded in Delaware Water Gap National Recreation Area, 1993–2008.

Common Name	Scientific Name	Abundance	Residency	Nativity
Swallowtails - Family Papilionidae				
Zebra Swallowtail	*Eurytides marcellus*	occasional	vagrant	native
Black Swallowtail	*Papilio polyxenes*	common	breeder	native
Eastern Tiger Swallowtail	*Papilio glaucus glaucus*	common	breeder	native
Spicebush Swallowtail	*Papilio troilus*	common	breeder	native
Whites and Sulphurs - Family Pieridae				
Cabbage White	*Pieris rapae*	common	breeder	nonnative
Falcate Orangetip	*Anthocharis midea*	common	breeder	native
Clouded Sulphur	*Colias philodice*	common	breeder	native
Orange Sulphur	*Colias eurytheme*	common	breeder	native
Cloudless Sulphur	*Phoebis sennae*	occasional	migratory	native
Little Yellow	*Eurema lisa*	occasional	migratory	native
Gossamer-wing Butterflies - Family Lycaenidae				
Harvester	*Feniseca tarquinius*	occasional	breeder	native
American Copper	*Lycaena phlaeas*	common	breeder	native
Bronze Copper	*Lycaena hyllus*	occasional	unknown	native
Coral Hairstreak	*Satyrium titus*	occasional	breeder	native
Edwards' Hairstreak	*Satyrium edwardsii*	common	breeder	native
Banded Hairstreak	*Satyrium calanus*	abundant	breeder	native
Hickory Hairstreak	*Satyrium caryaevorum*	uncommon	breeder	native
Striped Hairstreak	*Satyrium liparops*	uncommon	breeder	native
Oak Hairstreak	*Satyrium favonius*	occasional	breeder	native
Brown Elfin	*Callophrys augustinus*	common	breeder	native
Eastern Pine Elfin	*Callophrys niphon*	common	breeder	native
Juniper Hairstreak	*Callophrys gryneus*	common	breeder	native
White M Hairstreak	*Parrhasius m-album*	uncommon	breeder	native
Gray Hairstreak	*Strymon melinus*	uncommon	breeder	native
Red-banded Hairstreak	*Calycopis cecrops*	occasional	unknown	native
Eastern Tailed-Blue	*Everes comyntas*	common	breeder	native
Spring Azure complex	*Celastrina ladon*	common	breeder	native
Brushfooted Butterflies - Family Nymphalidae				
American Snout	*Libytheana carinenta*	rare	migratory	native
Variegated Fritillary	*Euptoieta claudia*	rare	migratory	native
Great Spangled Fritillary	*Speyeria cybele*	abundant	breeder	native
Aphrodite Fritillary	*Speyeria aphrodite*	rare	breeder	native
Silver-bordered Fritillary	*Boloria selene*	uncommon	breeder	native
Meadow Fritillary	*Boloria bellona*	common	breeder	native
Pearl Crescent	*Phyciodes tharos*	abundant	breeder	native
Baltimore Checkerspot	*Euphydryas phaeton*	common	breeder	native
Question Mark	*Polygonia interrogationis*	common	breeder	native
Eastern Comma	*Polygonia comma*	common	breeder	native
Compton Tortoiseshell	*Nymphalis vau-album*	common	breeder	native
Mourning Cloak	*Nymphalis antiopa*	common	breeder	native
Milbert's Tortoiseshell	*Nymphalis milberti*	occasional	unknown	native
American Lady	*Vanessa virginiensis*	common	breeder	native
Painted Lady	*Vanessa cardui*	occasional	migratory	native
Red Admiral	*Vanessa atalanta*	common	breeder	native
Common Buckeye	*Junonia coenia*	rare	unknown	native
Red-spotted Purple	*Limenitis arthemis astyanax*	common	breeder	native

Common Name	Scientific Name	Abundance	Residency	Nativity
Brushfooted Butterflies - Family Nymphalidae (cont'd)				
White Admiral	*Limenitis arthemis arthemis*	occasional	unknown	native
Viceroy	*Limenitis archippus*	uncommon	breeder	native
Hackberry Emperor	*Asterocampa celtis*	common	breeder	native
Tawny Emperor	*Asterocampa clyton*	common	breeder	native
Northern Pearly-eye	*Enodia anthedon*	common	breeder	native
Appalachian Brown	*Satyrodes appalachia*	common	breeder	native
Little Wood-Satyr	*Megisto cymela*	common	breeder	native
Common Ringlet	*Coenonympha tullia*	common	breeder	native
Common Wood-Nymph	*Cercyonis pegala*	common	breeder	native
Monarch	*Danaus plexippus*	common	monarch	native
Skippers - Family Hesperiidae				
Silver-spotted Skipper	*Epargyreus clarus*	common	breeder	native
Hoary Edge	*Achalarus lyciades*	uncommon	breeder	native
Southern Cloudywing	*Thorybes bathyllus*	uncommon	breeder	native
Northern Cloudywing	*Thorybes pylades*	common	breeder	native
Dreamy Duskywing	*Erynnis icelus*	common	breeder	native
Sleepy Duskywing	*Erynnis brizo*	uncommon	breeder	native
Juvenal's Duskywing	*Erynnis juvenalis*	common	breeder	native
Horace's Duskywing	*Erynnis horatius*	uncommon	breeder	native
Wild Indigo Duskywing	*Erynnis baptisiae*	common	breeder	native
Common Checkered-Skipper	*Pyrgus communis*	rare	migratory	native
Common Sootywing	*Pholisora catullus*	rare	breeder	native
Swarthy Skipper	*Nastra lherminier*	occasional	unknown	native
Least Skipper	*Ancyloxypha numitor*	common	breeder	native
European Skipper	*Thymelicus lineola*	abundant	breeder	nonnative
Leonard's Skipper	*Hesperia leonardis*	rare	breeder	native
Cobweb Skipper	*Hesperia metea*	occasional	breeder	native
Indian Skipper	*Hesperia sassacus*	common	breeder	native
Peck's Skipper	*Polites peckius*	common	breeder	native
Tawny-edged Skipper	*Polites themistocles*	common	breeder	native
Crossline Skipper	*Polites origenes*	common	breeder	native
Long Dash	*Polites mystic*	common	breeder	native
Northern Broken-Dash	*Wallengrenia egeremet*	common	breeder	native
Little Glassywing	*Pompeius verna*	abundant	breeder	native
Delaware Skipper	*Anatrytone logan*	common	breeder	native
Mulberry Wing	*Poanes massasoit*	uncommon	breeder	native
Hobomok Skipper	*Poanes hobomok*	common	breeder	native
Zabulon Skipper	*Poanes zabulon*	common	breeder	native
Broad-winged Skipper	*Poanes viator*	occasional	breeder	native
Dion Skipper	*Euphyes dion*	rare	breeder	native
Black Dash	*Euphyes conspicua*	common	breeder	native
Dun Skipper	*Euphyes vestris*	abundant	breeder	native
Dusted Skipper	*Atrytonopsis hianna*	uncommon	breeder	native
Common Roadside-Skipper	*Amblyscirtes vialis*	uncommon	breeder	native
Ocola Skipper	*Panoquina ocola*	occasional	migratory	native

Abundance key

Abundant: Seen daily in appropriate habitat/season; Large numbers
Common: Seen daily in appropriate habitat/season; Not in large numbers
Uncommon: Seen monthly in appropriate habitat/season; Locally common
Rare: Seen only a few times each year
Occasional: Seen every few years, but not every year

As the nation's primary conservation agency, the Department of the Interior has responsibility for most of our nationally owned public land and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

NPS 620/106631, February 2011

National Park Service
U.S. Department of the Interior

Northeast Region
Natural Resources and Science
200 Chestnut Street
Philadelphia, Pennsylvania 19106-2878

http://www.nps.gov/nero/science/

EXPERIENCE YOUR AMERICA ™