Conservation Assessment
For
Olympia Marble Butterfly (Euchloe olympia)

USDA FOREST SERVICE, EASTERN REGION
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This Conservation Assessment was prepared to compile the published and unpublished information on the subject taxon or community; or this document was prepared by another organization and provides information to serve as a Conservation Assessment for the Eastern Region of the Forest Service. It does not represent a management decision by the U.S. Forest Service. Though the best scientific information available was used and subject experts were consulted in preparation of this document, it is expected that new information will arise. In the spirit of continuous learning and adaptive management, if you have information that will assist in conserving the subject taxon, please contact the Eastern Region of the Forest Service – Threatened and Endangered Species Program at 310 Wisconsin Avenue, Suite 580 Milwaukee, Wisconsin 53203.

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EXECUTIVE SUMMARY

The Olympia Marble butterfly is a globally secure species. This butterfly is found in the western U.S., and east to the southern Appalachians, and the Ozarks. The greatest concentration in the eastern U.S. is found in Wisconsin and Michigan. The southern Appalachian populations have been impacted by Gypsy Moth control measures, and are now fragmented. This species should be tracked by all states with active colonies. Research needs to be done into the population dynamics of this species for possible conservation measures. This species is considered secure in most of its eastern U.S. range, and it not being tracked by most states. This makes an actuate assessment of the Olympia Marble current status difficult.

ACKNOWLEDGEMENTS

This report could not have been completed without the help of many individuals who shared their research and knowledge. Dr. Robert Dirig graciously shared his life history notes for the Olympia Marble, and reviewed the draft report. Tom Allen shared much information about his experiences in West Virginia, and Dr. Steve Roble freely shared data from surveys conducted in Virginia. Dr. David Wright provided current data from Pennsylvania. Dr. John Rawlins provided copies of pertinent publications, and offered helpful suggestions. Mr. Richard Smith, a volunteer with the Maryland Natural Heritage Program, was most helpful with records, and the species current status in Maryland. Mr. Morgen C. Nielsen provided records from Michigan, and discussed freely his experiences in Michigan. Dr. Steve Passoa of the USDA reviewed a draft of this assessment, and kindly offered suggestions. Valerie Passoa edited this report, and offered many helpful suggestions.

NOMEMCLATURE AND TAXONOMY

Order Lepidoptera, Superfamily Papilionoidea: the True Butterflies, Family Pieridae: the Whites and Sulphurs, Subfamily Pierinae: the Whites, Genus and Species, *Euchloe olympia.* This classification follows Opler 1998. The common name for this species is the "Olympia Marble, or Olympian Marble". While many butterfly species have recently had their common names changed by various authors, the Olympia Marble is one species whose common name remains unchanged. Its common name is derived from the marble-like pattern on the underside of its hindwing.

William Henry Edwards originally described this species in 1871 from specimens near his hometown of Coalburgh, West Virginia (Miller and Brown 1981). No subspecies has ever been described. In 1882, Edwards described the form "*rosa"*, which has rose-colored pigmentation near the base of the ventral hindwings. This pigmentation fades rapidly after death (personal observation of pinned specimens by Parshall). In 1973, M. F. Brown restricted the type locality of this form to Wichita County, Texas.

DESCRIPTION OF SPECIES

The Olympia Marble is a medium sized butterfly with male forewing width from 1.5-2.1 cm and a female forewing width of 1.6-2.3 cm (Opler and Krizek 1984). In Michigan

individuals of the coastal dune populations are smaller than inland populations (Wagner 1977 and Nielsen 1999). In flight, the butterfly appears to be all white. This species is remarkably uniform in appearance throughout its range in the western and eastern U.S. It flies in a rapid and direct pattern, usually less than a meter above the ground. Males patrol widely, stopping to nectar and search for females. Both males and females are found in the greatest numbers where the larval host plants are concentrated. (See Appendix 2 for photos of adult Olympia Marbles.).

LIFE HISTORY

In 1907, C. A. Shull described the early stages of the Olympia Marble's life history. The larvae and pupae were first illustrated by Edwards in his great work, The Butterflies of North America, Vol. II. *Anthocaris* plate I., 1879. In 1974, Opler illustrated aspects of the second, and fifth instar larval segments, T 1-3, A 9 and 10, and the lateral aspect of the pupae. Outstanding photographs of late instar larvae, pupae and adults can be found in The Ontario Butterfly Atlas (Allan 1997, Holmes et al. 1991, and Opler and Krizek 1984). Dr. Robert Dirig provided a general description of the life history of the Olympia Marble in New York State. It is presented here with permission:

> "White bullet-shaped eggs are laid singly on flower buds and leaves of the food plant; they soon turn red, then gray just before hatching. The eggs hatch in about seven days. Larvae feed on flower buds and flowers when young, on siliques (long curved seedpods) and less often on leaves, when older. Solitary older larvae are sedentary, easily found on larger or more isolated plants in early June. At maturity they are 1-in. (25-mm) long, with a grayish-green, black-speckled head capsule; glaucous-green body, with two yellow dorsal stripes, a white spiracular line, yellow basal area, and green venter; glossy black raised speckles and spiracles; and sparse short hairs. The longitudinal stripes produce a less solidly massed appearance and aid in camouflage while the caterpillars rest fully exposed, nibbling down the long seedpods from the tip toward the base. Captive larvae eat day and night, devouring shed skins. Larvae probably develop very rapidly, finishing in 2-3 weeks outdoors; third, fourth, and fifth, instar caterpillars that were collected wild on 2 June 1987 in Jefferson County, N.Y., pupated on 8, 10, 13, and 17 June. The slender, thorn-like chrysalis forms in a sheltered place off the plant. It is 3/4 in. (19-20mm) long, smooth, tapering to a sharp point at both ends, suspended by the cremaster from a button of white silk and reinforced by a white thread around the wing cases. The pre-pupa and new chrysalis are purple, but soon fade to pale brown, with elegantly seamed segments. The wing cases and head are darker mahogany-brown with grayish lines, a darker dorsal median stripe on the thorax, and darker areas jut above the spiracular lines of the sides. Chrysalides form in June, diapausing until May of the next spring. A wild-collected New York larva that turned purple and hung up on 7 June 1987, pupated on 8 June, but the chrysalis turned red on 11 June, and produced a parasitoid fly puparium on 14 June (no adult fly emerged; probably a Tachinid)."

The Olympia Marble is univoltine (has one generation per year) and flies from mid April to mid June, depending on elevation and latitude. In the eastern U.S., the species is on the wing from May 24-June 25 in the Upper Peninsula of Michigan, May 10-28 in Illinois,

May 6 to June 3 in northern New York (Dirig pers. com.), and from mid April to late May in Virginia (Opler and Krizek 1984). All Ohio records are from late April to the first week of May (The Ohio Lepidopterists database).

The larval hosts of the Olympia Marble are from the family Brassicaceae. In the eastern U.S., various species of *Arabis* (Rock Cresses) are used as larval host: *Arabis glabra*, Tower Mustard, in Ontario; *A. drummondi*, Drummond's Rock Cress, in Michigan; *A. lyrata*, Low Rock Cress, in Michigan and Indiana; *A. serotina* and *A. laevigata*, Low Rock Cress, and *A. missouriensis*, Missouri Rock Cress, in Missouri (Opler 1984 and 1974). Its host in Ohio, Pennsylvania and Maryland are not accurately known. Michigan inland populations use *A. drummondi,* and are larger than lake shore Olympia adults, which use *A. lyrata* (Wagner 1977, Nielsen 1999). Parshall found Michigan Upper Peninsula lakeshore populations strongly associated with a *Draba* species. Dirig reports that Purple Rock Cress (*Arabis X divaricarpa*) is the host in New York (Dirig pers. com.). Some contacts reported that pupae of *Euchloe olympia* can diapause for as much as three years. No documentation could be found to support this claim.

Adults freely take nectar from many plants. The list of nectar sources includes: Wood Vetch, *Vicia caroliniana*, Garlic Mustard, *Alliaria petiolata*, Dwarf Cinquefoil, *Potentilla canadensis*, Narrow-leaved Spring Beauty, *Claytonia virginica*, wild strawberry, *Fragaria virginiana*, and various species of *Arabis*, Rock Cress (Dirig pers. com. and Allen 1997).

DISTRIBUTION AND STATUS

The Olympia Marble is found in North America from the eastern plains of Alberta, Canada south through eastern Montana, Wyoming and to the Front Range of Colorado, and then east in isolated populations to southern Ontario, Canada. There are isolated populations in Texas. The eastern U.S. populations are found from northern Minnesota through most of Wisconsin, and Michigan including a part of the Upper Peninsula of Michigan, and Lower Michigan. The Appalachian populations are found in West Virginia, Virginia, Pennsylvania, northern New York, Maryland, North Carolina, Tennessee, and Ohio. Isolated populations are also found in Missouri and Arkansas (see Appendix 1). In the eastern U.S., the largest metapopulations are found in Wisconsin and Michigan.

Status in Eastern U.S. by State

Arkansas: No official state status, but most likely (**S2**, imperiled) (Michael D. Warriner, field biologist, Natural Heritage Commission, pers. com. 2002). Known from eight counties in Arkansas: Carroll, Faulkner, Madison, Montgomery, Polk, Pulaski, Scott, and Washington. This species should be considered sensitive to extirpation in Arkansas (Warriner pers. com. 2002). Uncommon in **Ouachita National Forest**, but absent from **Ozark-St.-Francis National Forest.** A Current survey is being conducted during 2001 and 2002. Arkansas does not provide legal protection for insects.

Illinois: Found in Bureau, Cook, Jersey, Kankakee, Mason, and Jersey Counties. The Olympia Marble is found in small numbers in widely separated populations, with the state's two largest populations found on state property. These populations are given some protection. This species has not been found in **Shawnee National Forest**. Its state rank is (**S2**). The Illinois Natural Heritage Division does not list or track the species. It is considered local and scarce, but at times is locally common in Illinois (Bouseman and Sternburg 2001).

Indiana: Found in four counties: Newton, Porter, Jasper, and Lake. Porter, Jasper, and Lake county colonies confirmed active in the 1990s. The species' state status is (**S2**), and is currently being tracked by the Indiana Department of Natural Resources. Indiana lists insects, but there is no legal state protection. Collecting permits are needed to collect any insect on public lands. This may be a hindrance to finding new sites because it does not encourage amateur lepidopterists. The Olympia Marble has a rapid and continuous flight pattern making it a difficult species to photograph, and identify on the wing. Pinned specimens, or diagnostic photographs are needed for accurate determinations. Most of the Indiana Olympia populations are secure for the present.

Kentucky: Found in five counties: Bullett, Edmonson, Floyd, Larue, and Nelson. The species State rank is uncertain, and is listed as (**S2/S3**, imperiled/vulnerable). Populations are widely separated, and are very small. This species should be considered vulnerable in Kentucky. The State Nature Preserves Commission does not track the Olympia Marble. More surveys are needed to find new sites and to estimate population size. There is no formal legal protection of insects in Kentucky.

Maryland: Once known from Allegheny and Garrett Counties in the northwestern corner of the state. In the 1990s, it has only been found in Green Ridge State Forest in low numbers, typically six to twenty estimated individuals per site. It has been severely impacted by spraying for Gypsy Moths (Smith pers. com. and Dirig pers. com.). The Olympia Marble's state rank is (**S2),** and is listed as **I** (in need of conservation). The Maryland Natural Heritage Program tracks the Olympia Marble. Maryland protects butterflies by law and has 39 listed butterfly species. This is the largest number of state protected butterflies in North America. Some of these are just rarely seen and under-reported. Some are common in neighboring states, and may not be in need of protection in Maryland.

Michigan: Known from 32 counties: Iron, Dickinson, Marquette, Delta, Schoolcraft, Chippewa, Mackinac, Berrien, Allegan, Ottawa, Kent, Montcalm, Oceana, Newaygo, Lake, Mecosta, Osceola, Clarke, Arenac, Huron, Wexford, Roscommon, Ogemaw, Oscoda, Crawford, Otsego, Montmorency, Presque Isle, Cheboygan, Emmet, Charlevoix, and Grand Traverse. Most Michigan records are pre-1990. Current status is difficult to report. Parshall observed a population in Otsego County in 1999, and in **Hiawatha National Forest** in Schoolcraft County in 1999-2001. The Michigan Lepidoptera Survey has records from **Ottawa National Forest**. Rex Ennis, Biologist with **Huron-Manistee National Forest** does not report its occurrence there; although it is found in nearby counties. This butterfly is not listed, or tracked by the Michigan Natural Features Inventory. It must be considered widespread, and locally uncommon to common in much

of northern Lower Peninsula, and in the Upper Peninsula of Michigan. The spraying for Gypsy Moths may have impacted this species. New surveys should be conducted to determine the species status in Michigan. New sites and confirmations of old sites should always be reported to the Michigan Lepidoptera Survey at Michigan State University.

Missouri: Found in nine Counties in Missouri: Nodaway, Jackson, Pettis, Benton, Maries, Franklin, St. Louis, St. Francois, and Pike. Populations are small, secure, and have a state rank of (**S4**, apparently secure). Current status is difficult to report accurately because the Missouri Department of Conservation does not track the species.

New York: John F. Cryan and Robert Dirig discovered the Olympia Marble in Jefferson County, New York in early June of 1986. To date, this is the only know location for this butterfly in New York. It survives today on large tracts of land, much of which is protected by The Nature Conservancy. The species' state rank is (**S1**, critically imperiled) and is listed as Special Concern. The state of New York does not provide legal protection for insects, and does not track the Olympia Marble. The Jefferson County population is presently secured (Dirig pers. com.).

North Carolina: The Olympia Marble was only recently added to the state butterfly fauna list. It was discovered in a malaise trap in **The Great Smokey Mountains National Park**. It was recorded from Swain County in May of 2001 at an elevation of 8,700' (Keith Langdon and Steve Hall pers. com.). The butterfly is known from northeastern Tennessee, and may have been a wind-swept migrant in North Carolina. The terrain in this part of the Park in Tennessee and North Carolina is so steep and wild that a complete survey by foot or car is impossible. North Carolina does not provide legal protection for insects; however, the North Carolina Natural Heritage Program does list insects, and tracks several butterflies like the Olympia Marble and Mitchell's satyr.

Ohio: A young collector on an Ohio Lepidopterists field trip discovered the first Olympia Marble in Ohio on April 28, 1984. The site was the Lake Vesuvius Campground in **Wayne National Forest,** Lawrence County. Several other specimens were recorded that weekend in the same general area. An additional specimen was recorded from a nearby site in Decatur Township on April 13, 1985. On April 23, 1989 David Iftner collected one additional adult at a site discovered the previous year by Parshall and Iftner. This new site was in Monroe County and was also in **Wayne National Forest**, about 120 miles east of the Lawrence County sites. Repeated surveys in both areas over the past twelve years have recorded no additional records.

The Ohio Division of Wildlife presently lists the Olympia Marble as a species of **Special Concern**. Its state rank will be changed when Ohio begins to use (**SI**) **Special Interest** ranking in 2002. If no additional records are found in 2002, its listing will be changed to (**SI)**. Ohio only gives legal protection to Federally Endangered or Threatened species, and species listed as Endangered by the state of Ohio.
This species was only established in Ohio for a short time, and then lost by unknown causes. Larval hosts at the site were scarce. Improvements to the Lake Vesuvius Campgrounds in the late 1980s may have impacted this species in Lawrence County.

Ohio has few areas suitable for this butterfly. Until new colonies can be found, it should probably be regarded as extirpated from Ohio.

On February 29, 2000, *Euchloe olympia*, the Olympia Marble, was listed as a Regional Sensitive Species in Wayne National Forest Region (9). This species was listed as Regionally Sensitive because of its rarity in Ohio, and possible impacts of Gypsy Moth control.

Pennsylvania: The Olympia Marble is known only from Bedford County from specimens collected in 1986-1988. The current status of this colony is not known (David Wright and Betsy Ray pers. com.). The species has a state rank of (**S1**). Pennsylvania does not provide legal protection for butterflies.

Tennessee: Known from records prior to 1983. The source of these records is unknown to the author. Clench and Opler 1983 recorded the species on dot maps, but did not list it in an otherwise complete list of supportive data. It is likely that the records were based on specimens in the Carnegie Museum in Pittsburgh. The butterfly has not been recorded from **Cherokee National Forest**. The State Natural Heritage Program is unaware of any records, and it does not track the species. Tennessee does not provide legal protection for butterflies. The Olympia Marble's current status in Tennessee is not known. There are no active statewide surveys being conducted other than those conducted in the **Great Smoky Mountains National Park.**

Virginia: Known from nine counties: Augusta, Frederick, Giles, Highland, Lee, Page, Rockingham, Russell and Shenandoah. In the last decade, it has only been confirmed from Page, Shenandoah, and Russell Counties. The sites in Page and Shenandoah Counties are both shale barrens in **George Washington National Forest** (Roble pers. com.). Virginia does not provide legal protection for butterflies. The staff of the Virginia Natural Heritage Program tracks and keeps lists of butterfly species. The species' state rank is (**S1/S2**). Surveys for the Olympia Marble have not been officially undertaken; however, the staff of the state Natural Heritage Program looks for this species while doing related surveys. The species has been impacted in Virginia by spraying for Gypsy Moths (Roble pers. com.).

West Virginia: The Olympia Marble was known from nine counties in West Virginia: Hampshire, Grant, Pendleton, Hardy, Putnam, Kanawha, Cabell, and Wayne. The colonies are concentrated mostly in the northeastern corner of the state. Once uncommon to locally common in this part of the state, the population is now fragmented, and found in very low numbers (Tom Allen pers. com.). The metapopulations of northeastern West Virginia and adjacent Virginia and Maryland have been greatly reduced by Gypsy Moth spraying (Tom Allen pers. com). The Olympia Marble has done better in these areas than the Grizzled Skipper, *Pyrgus centaureae*. This may be due to the fact that the Olympia Marble is wider ranging and less localized than the Grizzled Skipper. The Olympia Marble's state rank is (**S2/S3**), and it is listed as Special Concern. West Virginia does not provide legal protection for butterflies.

Wisconsin: The Olympia Marble is known from 32 counties in the state. The butterfly is found statewide (Ebner 1970). The Olympia Marble is not listed or tracked by the state Natural Heritage Program. This species is considered locally common in Wisconsin, and it is more secure in Wisconsin than any other state.

RANGE-WIDE STATUS

The current **Global Rank** is **G4/G5**. It is demonstrably secure globally, although it may be quite rare in parts of its range, especially at the periphery. (Much of the eastern U.S. is at the periphery of the Olympia Marble's range.)

National Heritage Status Rank: **N4/N5** (30 Sep1998).

National Heritage Status Rank: (Canada) **N3/N4** (01 Sep 1998).

HABITAT AND ECOLOGY

The Olympia Marble is found in a variety of xeric habitats throughout its range. It has adapted to these habitats along with its larval hosts. In Michigan and Wisconsin, colonies are found along the dunes of Lake Michigan, in sand prairies, grasslands, fields, and clear-cuts in sandy-soil forests. The habitat in New York is a calcareous alvar barren community (Dirig pers. com.). In the southern Appalachians, colonies are found in shale and limestone barrens. In 1973, Parshall found a large colony on rocky slopes in Hampshire County, West Virginia. The Ohio locations were steep, rocky slopes and ridges. Males often can be seen flying uphill looking for females. This hilltoping behavior is well known for a number of butterfly species (Shields 1967).

CURRENT AND POTENTIAL THREATS

The two main threats to the Olympia Marble, and many other Lepidoptera, are the spraying of chemicals in attempt to control Gypsy Moths and habitat destruction. The use of Dimilin and BT has lethal effects on non-target species of Lepidoptera (Butler 1993 and 1995). All lepidopterists contacted for this assessment felt that the use of these chemicals have caused a decline in eastern forest populations of the Olympia Marble. In addition, the use of prescribed fire, and herbicides to manage prairies and forest openings are real threats. *Euchloe olympia,* cannot withstand a "hot burn". The chrysalis is attached to its host, which becomes part of the ground litter at the end of the growing season. Herbicides sprayed to control weedy growth along power-cuts, and pipelines could destroy the larval hosts, and thus reduce vital resources needed for survival. Dune sites in Michigan are being lost to development. Another round of heavy spraying for Gypsy Moths in northeastern West Virginia and adjacent areas of Maryland could eliminate the species there.

The metapopulations of the Olympia Marble are fragmented, and small through much of its range. It is less concentrated than other local Appalachian butterflies like the Grizzled Skipper. This is one reason why it still survives in the Appalachian spray zones.

CURRENT MONITORING

The Olympia Marble is not tracked by most states in its range, and current surveys are not directed at this species. Because of its early spring flight period, it is inadvertently found while surveys are being conducted for other species. Within Eastern U.S., Ohio, Michigan, West Virginia, and Florida are the only states whose butterfly fauna is well known. Ohio is the only one of these states that has had an official statewide survey. Michigan is currently conducting a statewide survey, and Virginia and West Virginia are conducting local surveys. All states need more complete and current data. Some states maintain state lists based on very outdated information. Many states have polices that close the door to important sources of information from the amateur collector. Most state databases are not as current as those held by private lepidopterists. In summary, the current status of the Olympia Marble is not accurately known, and little tracking or monitoring is being conducted.

OWNERSHIP OF KNOWN ACTIVE SITES

The Olympia Marble is so widespread that only a few of the more important sites are reported here:

Arkansas: The state records are incomplete. One reported site is located in **Ouachita National Forest**, and exact location was not disclosed for this report do to a pending publication.

Illinois: The Beach State Park site in Lake County is protected by the state. The best known colony is in Mason State Forest, Mason County, and also protected by the state. Other sites are likely on private lands.

Indiana: The Porter County sites are owned by the Indiana Department of Natural Resources Division of Parks and Recreation, and Midwest Steel Corporation. Lake County Parks own the Lake County site. The Division of Forestry owns the Jasper site.
Kentucky: One of the Kentucky records is from **Mammoth Cave National Park**, Edmonson County. Other state-protected sites are in Bullet and Floyd Counties.

Maryland: The only active sites are all in Green Ridge State Forest, Allegany County, and are protected by the state.

Michigan: Known active sites are on state, and private lands. Parshall and Davidson found colonies along the eight-mile cut off in **Hiawatha National Forest** in 1999. These sites are all in Schoolcraft County in the Upper Peninsula Michigan.

Missouri: A mix of private and public lands.

New York: The only known site is in Jefferson County on a large tract of land with almost virgin vegetation, some of which is owned by The Nature Conservancy.

North Carolina: The only known site is in **Great Smoky Mountain National Park**, Swain County, and is protected by the National Park Service.

Ohio: All historical sites were in Lawrence and Monroe counties in **Wayne National Forest.** There are no known active colonies of the Olympia Marble in Ohio.

Pennsylvania: The only known site was one mile north of Ingelsmith in Bedford County, and last recorded in 1964. The ownership of this site is likely private, but current ownership and status is not known.

Tennessee: Only historical records are known, but without exact locality data. Status of the Olympia Marble in the state is unknown by Natural Heritage Program, and is not tracked.

Virginia: Both the Page and Shenandoah County sites are in **George Washington National Forest**.

West Virginia: The Natural Heritage Program knows the ownership of only a few sites. Pendleton County has several sites, two of which are in **George Washington-Jefferson National Forest**. One of these sites is extends onto lands owned by the **U.S. Navy**. One site in Mineral County is a County Park. Private hunt clubs own two sites in Hardy County. The ownership of all other sites is unknown, but is most likely private ownership.

Wisconsin: The ownership of the many known sites in Wisconsin was not reported, but is likely to be a mix of private and public lands.

EXISTING MANAGEMENT ACTIVITIES

No existing management activities for the Olympia Marble were reported by any of the contacts for this assessment. This species is perceived as being secure, and not in need of current management. Forest service management of forest openings like those being conducted in **Wayne National Forest** may be helping this and other species of butterflies.

RESEARCH AND MONITORING

The life history of the Olympia Marble is well known. The amount of area this species requires for survival needs to be determined. Judging by the flight habits of males, it likely needs considerable acreage. The density of food plants and nectar sources at known sites should be researched. More species specific surveys are needed in all states to determine the size and location of existing metapopulations. The Ohio experience illustrates that in nature new colonies are established for short periods of time and then disappear (see Distribution and Status section). For this reason old records are not reliable. All known, and any new sites should be monitored for changes in habitat and species abundance. If this species is indeed capable of diapausing for three years, old sites should be revisited. The use of botanical criteria to judge the status of insects by number of sites should be reconsidered. While the percent of ground cover of a particular plant species can be accurately calculated, determining the true population density of insects like the Olympia marble, which wanders over great distances is a much more

difficult task. The timing of site visits to record adult butterflies and plant coverage is important; however, the timing of visits to a site to evaluate the butterfly population is the most critical factor. It typically takes experienced Lepidopterists years to develop a keen sense of timing.

Few Natural Heritage Programs have an entomologist on staff, and many are staffed mainly by botanists. Some of the states included for this report have state butterfly lists mainly prepared with botanical occurrence criteria. This botanical approach could hinder butterfly conservation because the number of sites or individual counts does not always give a clear picture of how the population is doing. Butterflies are more mobile and disperse differently than plants. Many butterfly species are known for having boom or bust years. The Nature Conservancy has made an honest attempt to evaluate site occurrences with other criteria, and their new Eco-region Program is an important step in conservation of all biota.

LIST OF PERSONS CONTACTED FOR IMFORMATION

Arkansas:
Steve Best, Forest Biologist, **Ozark-St. Francis National Forest**
Jerry W. Davis, Forest Wildlife Program Manager, **Ouachita National Forest.**
Lori Spencer, private individual.
Michael D. Warrimer, Arkansas Natural Heritage Commission.

Illinois:
Shawnee National Forest. Respondent did not sign data request form.
Glenn Kruse, Illinois Natural Heritage Division.

Indiana:
Ronald P. Hellnmich, Indiana Natural Heritage Data Center.

Kentucky:
Dr. Charles V. Covell Jr., University of Louisville, Louisville, Kentucky.
Ellis L. Laudermilk, Kentucky State Nature Preserves Commission.

Maryland:
Lori Byron, Maryland National Heritage Program.
Brad Nelson, **Allegheny National Forest**. Richard H. Smith, private individual.

Michigan:
Dr. George Balogh, private individual.
Kenneth Rex Ennis, **Huron-Manistee National Forest**, Cadillac, Michigan.
Mogen C. Nielsen, Adjunct Curator of Lepidoptera, Department of Entomology, Michigan State University.

Missouri:
Dr. Michael W. Hubbard, Missouri Department of Conservation.
Janet Sternburg, Ecologist, Missouri Department of Conservation.

New York:
Dr. Robert Dirig, Cornell University, Ithaca, New York.
Dr. Tim McCabe, New York State Museum, Albany, New York.

North Carolina:
Steve Hall, North Carolina Department of Environmental and Natural Resources, Division of Parks and Recreation, North Carolina Natural Heritage Program.
Keith Langdon, Biologist, Great Smoky Mountains National Park.

Ohio:
David K. Parshall, President The Ohio Lepidopterists.

Pennsylvania
Ryan Evans, Western Pennsylvania Conservancy.
Dr. John Rawlins, Carnegie Museum of Natural History, Pittsburgh, Pennsylvania.
Bestsy Ray, Pennsylvania Natural Diversity Inventory, Harrisburg, Pennsylvania.
Dr. David Wright, private individual.

Virginia:
Dr. Steve Roble, Staff Zoologist, Common Wealth of Virginia, Department of Conservation and Recreation.

West Virginia:
Tom Allen, Wildlife Biologist, West Virginia Department of Natural Resources, Elkins, West Virginia.

Wisconsin:
Les Ferge, U.S. Forest Service, retired.
James Schlanger, Wisconsin Natural Heritage Inventory.

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APPENDICES

Appendix 1: A map of the sites of the Olympia Marble, *Euchloe olympia*, in the eastern U.S.

Appendix 2: Photographs of the adult Olympia Marble, *Euchloe olympia*.