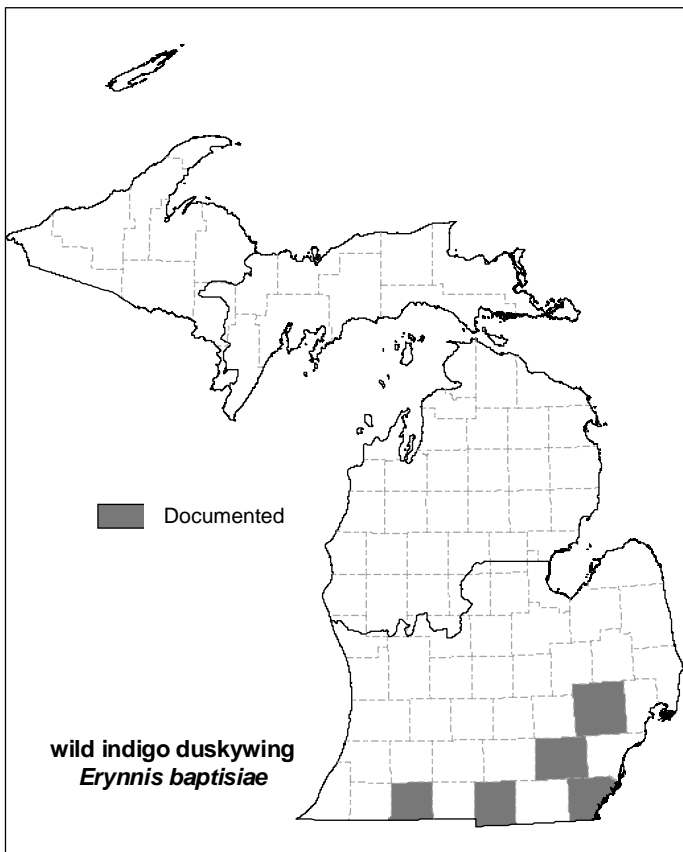


## INSECTS – BUTTERFLIES & MOTHS



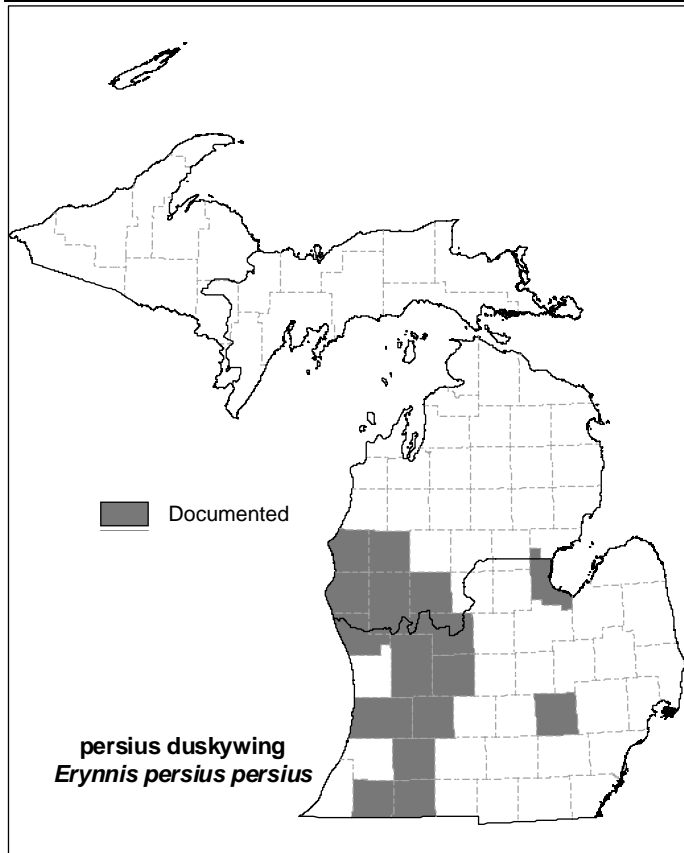
### wild indigo duskywing (*Erynnis baptisiae*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Locally uncommon in southern Michigan, but may be expanding. It is currently considered very rare or imperiled in the State.

**ASSOCIATED LANDSCAPE FEATURES:** prairie; idle/old field; right-of-way; savanna; bog; fen; inland rock/cliff/ledge

**ASSOCIATED THREATS:** conversion to agriculture lands; altered fire regime; fragmentation; invasive plants & animals; lack of scientific knowledge; pesticides & herbicides; unknown

**COMMENTS:** Need surveys to assess abundance and distribution; need to assess threats.



### persius duskywing

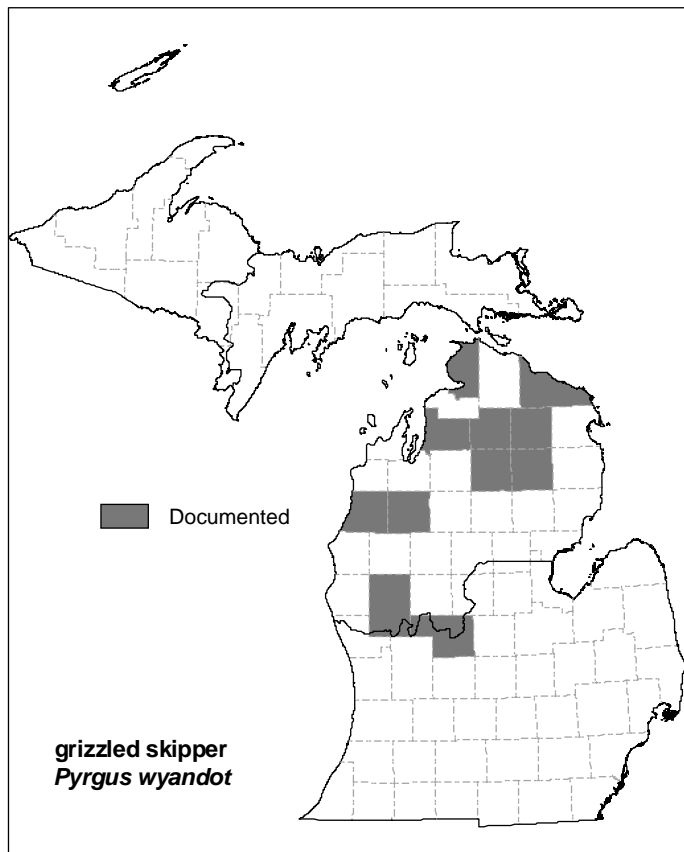
(*Erynnis persius persius*)

**DISTRIBUTION & ABUNDANCE:** Locally uncommon throughout much of the Southern Lower Peninsula. It is considered very rare in Michigan. State listed as threatened.

**ASSOCIATED LANDSCAPE FEATURES:** prairie; idle/old field; right-of-way; savanna; upland shrub; dry hardwood; forest opening; fen

**ASSOCIATED THREATS:** conversion to agriculture lands; altered fire regime; fragmentation; grazing & mowing patterns; incompatible natural resource mgmt; industrial/residential/recreational development; invasive plants & animals; lack of scientific knowledge; other biological interactions (deer browse of host plant); pesticides & herbicides

**COMMENTS:** Need surveys to assess abundance and distribution; need to assess threats. Need to reverse vegetative succession patterns in occupied areas. This species is also known by the name *Erynnis persius*.



### grizzled skipper

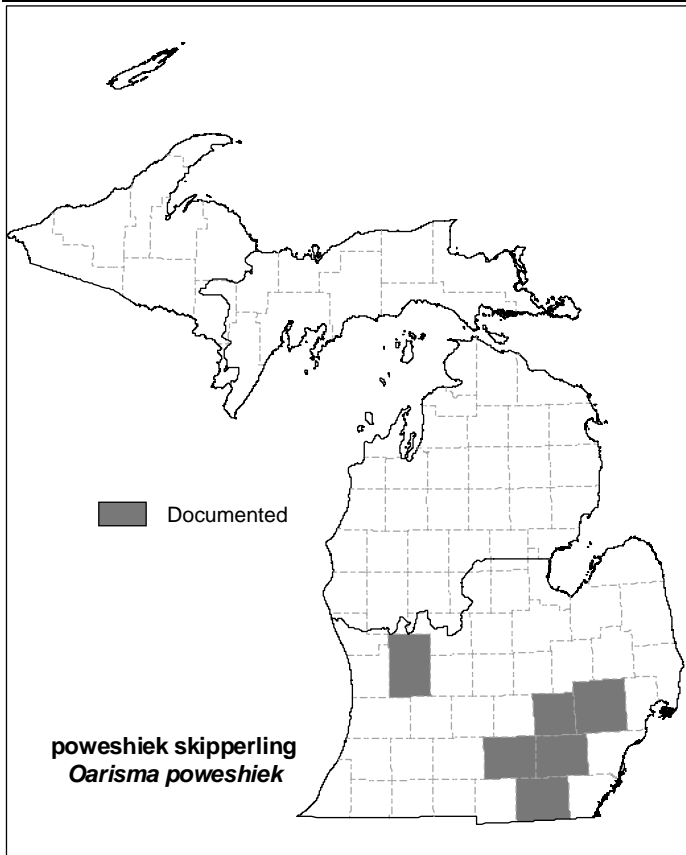
(*Pyrgus wyandot*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. This skipper is rare in the Northern Lower Peninsula and is considered imperiled or critically imperiled in the State. Its global status is currently in question, but recent declines indicate that it may be critically imperiled globally as well.

**ASSOCIATED LANDSCAPE FEATURES:** idle/old field; right-of-way; savanna; lowland shrub; upland shrub; lowland conifer; forest opening; bog; fen; alvar/rock; edge

**ASSOCIATED THREATS:** altered fire regime; grazing & mowing patterns; incompatible natural resource mgmt; industrial/residential/recreational development; lack of scientific knowledge; pesticides & herbicides

**COMMENTS:** Need surveys to assess abundance and distribution; need to assess threats. Prescribed fire is an important management tool, but care should be taken to ensure occupied areas are only partially burned. A rangewide decline in this species is correlated with gypsy moth spraying. This species may also be known by the name *Pyrgus cantataureae wyandot*.



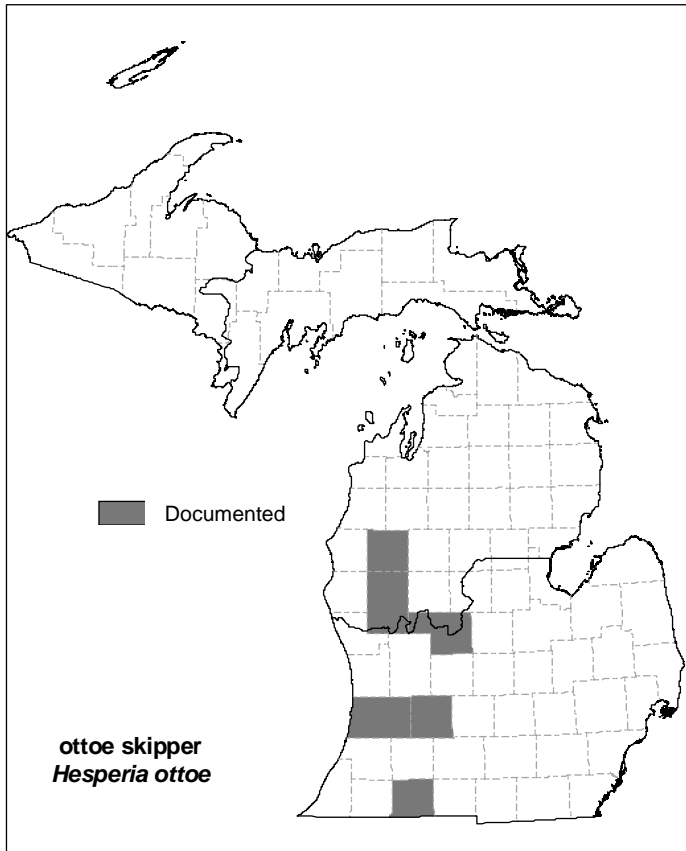
**poweshiek skipperling**  
*(Oarisma poweshiek)*

**DISTRIBUTION & ABUNDANCE:** State listed as threatened. This species is very rare in the Southern Lower Peninsula and is considered imperiled or critically imperiled in Michigan. It is considered very rare to imperiled range-wide.

**ASSOCIATED LANDSCAPE FEATURES:** prairie; lowland shrub; mesic conifer; forest opening; bog; fen; ephemeral wetland; inland lake

**ASSOCIATED THREATS:** conversion to agriculture lands; altered fire regime; fragmentation; altered hydrologic regimes; industrial/residential/recreational development; lack of scientific knowledge; invasive plants and animals; other biological interactions (loss of host plant - *Eleocharis* spp.); pesticides & herbicides; wetland modifications

**COMMENTS:** Need surveys to assess abundance and distribution; need to assess threats. Protection and restoration efforts should consider the status of host plant populations, *Eleocharis* spp.



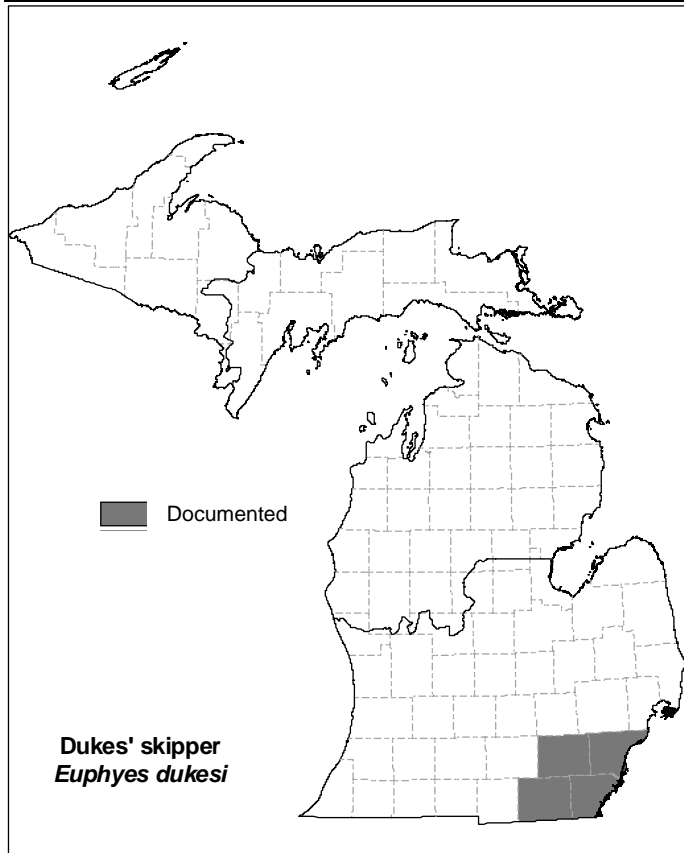
**ottoe skipper**  
*(Hesperia ottoe)*

**DISTRIBUTION & ABUNDANCE:** State listed as threatened. Considered very rare in southwest Michigan and is considered imperiled or critically imperiled in the State. Global status is uncertain, but it may be very rare range wide.

**ASSOCIATED LANDSCAPE FEATURES:** prairie; idle/old field; right-of-way; savanna; upland shrub; coastal dune/beach; large contiguous natural landscape

**ASSOCIATED THREATS:** conversion to agriculture lands; altered fire regime; fragmentation; grazing & mowing patterns; incompatible natural resource mgmt; industrial/residential/recreational development; invasive plants & animals; forestry practices; non-consumptive recreation; pesticides & herbicides

**COMMENTS:** Need surveys to assess abundance and distribution; need to assess threats. Prescribed fire is an important management tool, but care should be taken to ensure that occupied areas are only partially burned.



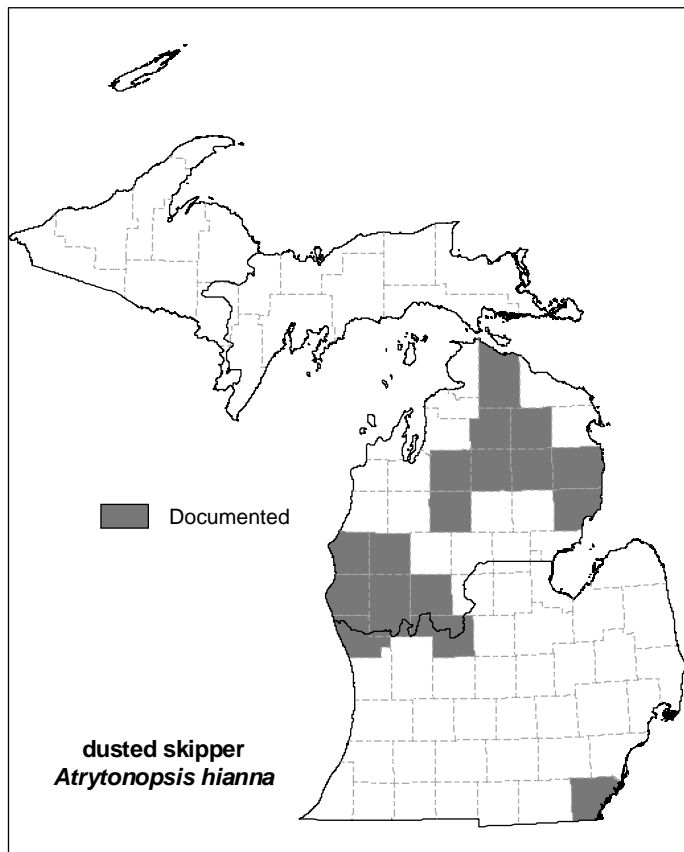
**Dukes' skipper**  
(*Euphyes dukesi*)

**DISTRIBUTION & ABUNDANCE:** State listed as threatened. This skipper is extremely rare in the State and is considered critically imperiled. This species is globally rare.

**ASSOCIATED LANDSCAPE FEATURES:** right-of-way; lowland shrub; forest opening; inland emergent wetland; ephemeral wetland; swamp; river/stream/riparian/floodplain corridor

**ASSOCIATED THREATS:** conversion to agriculture lands; fragmentation; grazing & mowing patterns; altered hydrologic regimes; industrial/residential/recreational development; invasive plants & animals; other biological interactions (decline of host plants - sedges); pesticides & herbicides; wetland modifications

**COMMENTS:** Need surveys to assess abundance and distribution; need to assess threats. Protection and restoration efforts should consider the status of host plant populations, sedges (*Carex* sp.). Mosquito spraying may pose a significant threat.



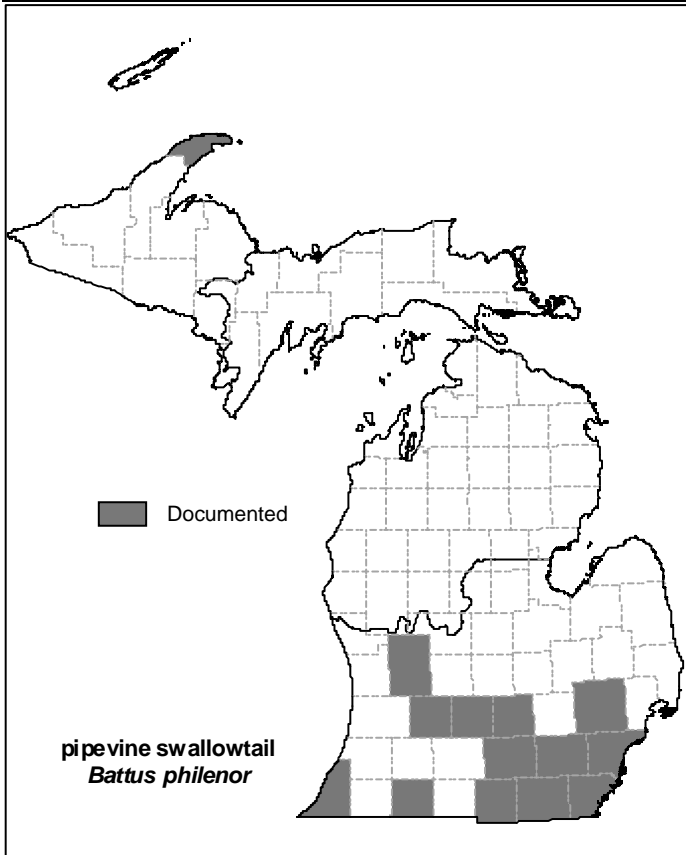
**dusted skipper**  
(*Atrytonopsis hianna*)

**DISTRIBUTION & ABUNDANCE:** State listed as threatened. This species is uncommon locally and is considered rare or imperiled in Michigan.

**ASSOCIATED LANDSCAPE FEATURES:** prairie; idle/old field; right-of-way; right-of-way; savanna; dry conifer; forest opening

**ASSOCIATED THREATS:** conversion to agriculture lands; altered fire regime; fragmentation; incompatible natural resource mgmt; industrial/residential/recreational development; military maneuvers; non-consumptive recreation; pesticides & herbicides

**COMMENTS:** Need surveys to assess abundance and distribution; need to assess threats.



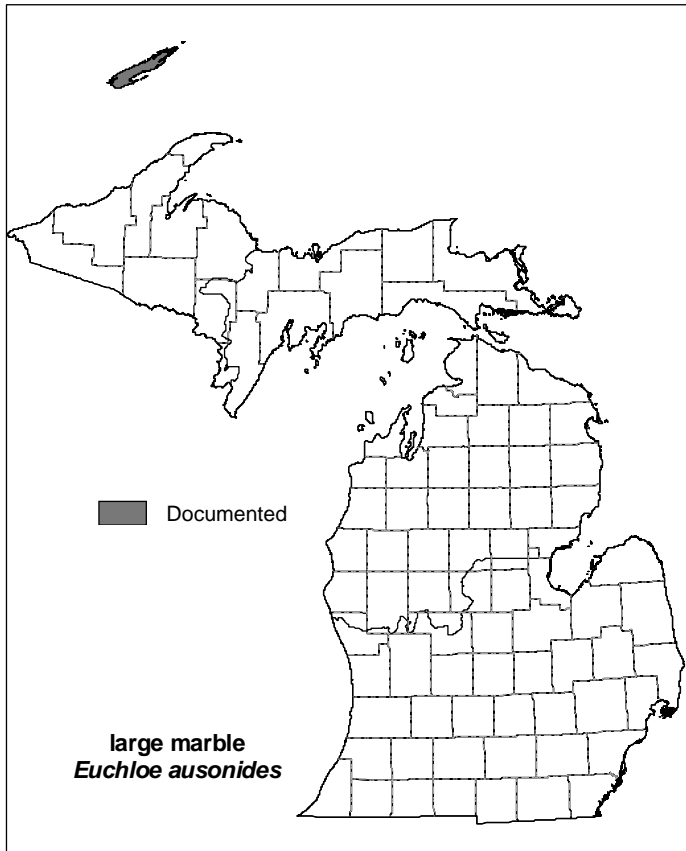
**pipevine swallowtail**  
(*Battus philenor*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Infrequently found throughout much of the Southern Lower Peninsula. It is considered imperiled or critically imperiled in Michigan.

**ASSOCIATED LANDSCAPE FEATURES:** idle/old field; right-of-way; savanna; orchard; mesic hardwood; dry hardwood; ephemeral wetland; river/stream/riparian/floodplain corridor; edge

**ASSOCIATED THREATS:** invasive plants & animals; lack of scientific knowledge; non-consumptive recreation; other biological interactions (loss of host plant - *Aristolochia* spp.); pesticides & herbicides; removal of non-timber flora

**COMMENTS:** Need surveys to assess abundance and distribution; need to assess threats. Protection or restoration efforts must consider the host plant, *Aristolochia* spp.



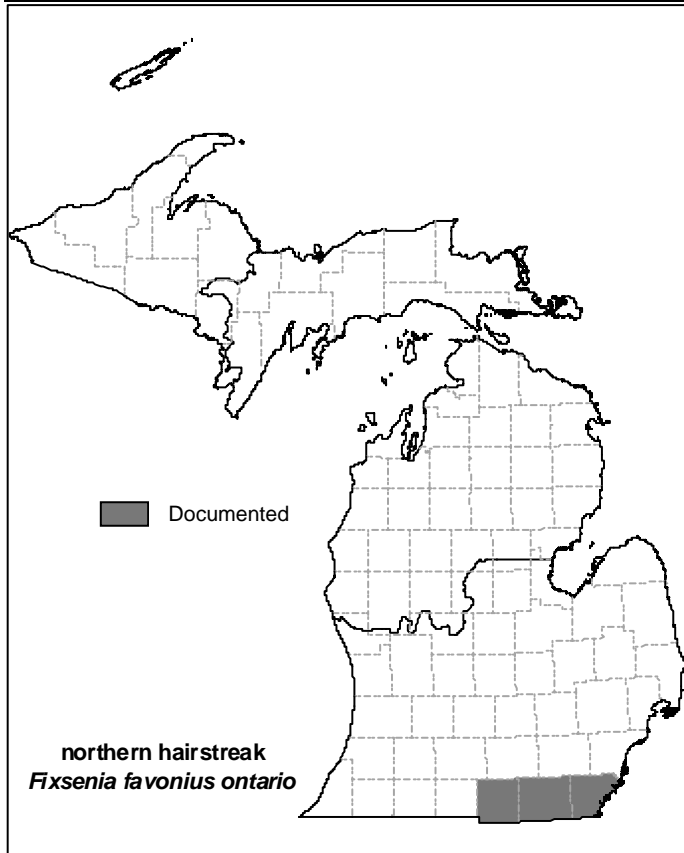
**large marble**  
(*Euchloe ausonides*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Currently known only from Isle Royale in Michigan. It is considered imperiled or critically imperiled in the State.

**ASSOCIATED LANDSCAPE FEATURES:** lowland conifer; mesic conifer; dry conifer; forest opening; Great Lakes island; edge; inland rock/cliff/ledge

**ASSOCIATED THREATS:** lack of scientific knowledge; unknown

**COMMENTS:** Need surveys to assess abundance and distribution—especially in the Porcupine Mountains and the Keweenaw Peninsula; need to assess threats; need to identify adult food source in Michigan.



### northern hairstreak

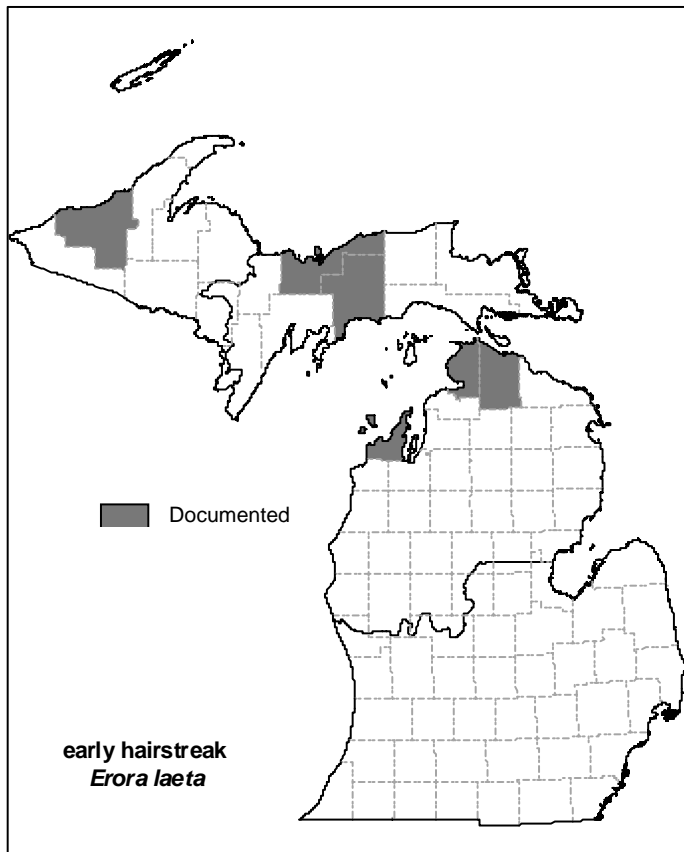
(*Fixsenia favonius ontario*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern.

**ASSOCIATED LANDSCAPE FEATURES:** idle/old field; right-of-way; savanna; upland shrub; lowland hardwood; dry hardwood; edge

**ASSOCIATED THREATS:** conversion to agriculture lands; incompatible natural resource mgmt; industrial/residential/recreational development; invasive plants & animals; lack of scientific knowledge; pesticides & herbicides; unknown

**COMMENTS:** Need surveys to assess presence in the State and, if present, abundance and distribution. Relative severity of listed threats is not well known and other currently unknown threats may exist for this species; a threats assessment is needed for this species.



### early hairstreak

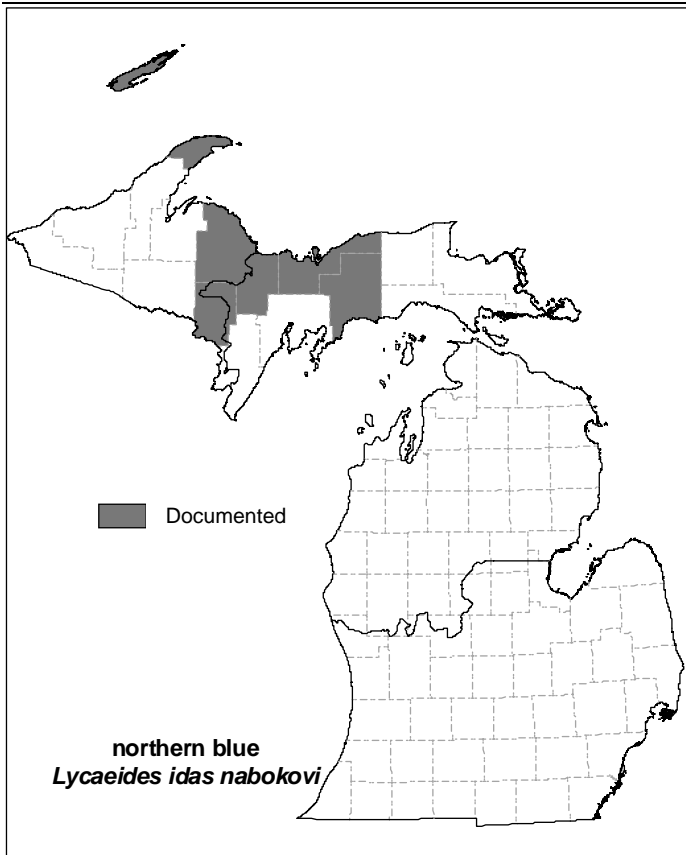
(*Erora laeta*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. This species is rare in Michigan and may be imperiled in the State. This species may be globally rare as well.

**ASSOCIATED LANDSCAPE FEATURES:** right-of-way; lowland hardwood; mesic hardwood; dry hardwood; forest opening; edge

**ASSOCIATED THREATS:** disease, pathogens, & parasites; industrial/residential/recreational development; lack of scientific knowledge; forestry practices; other biological interactions (decline of nectar sources); pesticides & herbicides

**COMMENTS:** Need surveys to assess abundance and distribution; need to assess threats. Decline in nectar sources (e.g. fleabane (*Erigeron* sp.) and ox-eyed daisy (*Chrysanthemum leucanthemum*)) may be a problem in some areas. Gypsy moth spraying may pose a significant threat.



**northern blue**

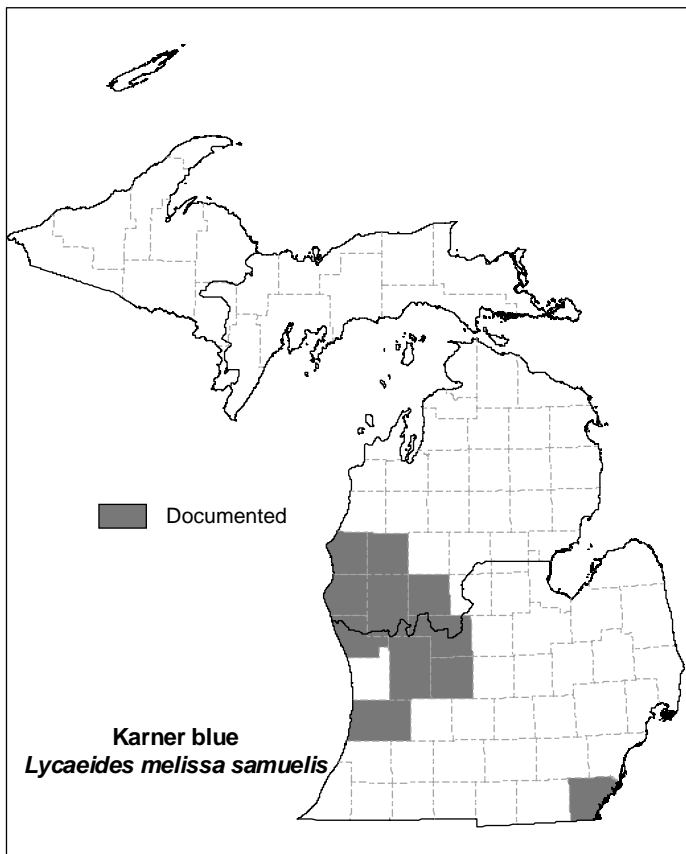
*(Lycaeides idas nabokovi)*

**DISTRIBUTION & ABUNDANCE:** State listed as threatened. It is uncommon in the central and western Upper Peninsula. Overall it is considered rare and imperiled in the State.

**ASSOCIATED LANDSCAPE FEATURES:** right-of-way; savanna; lowland shrub; upland shrub; lowland conifer; dry conifer; forest opening; bog; fen; ephemeral wetland; inland rock/cliff/ledge

**ASSOCIATED THREATS:** altered fire regime; fragmentation; incompatible natural resource mgmt; lack of scientific knowledge; forestry practices; pesticides & herbicides

**COMMENTS:** Need surveys to assess abundance and distribution; need to assess threats; need more information on adult food sources. Prescribed fire is an important management tool, but care should be taken to ensure that occupied areas are only partially burned.



**Karner blue**

*(Lycaeides melissa samuelis)*

**DISTRIBUTION & ABUNDANCE:** State and federally listed as endangered. Restricted to lupine rich savanna areas in southwest Michigan, but it is locally abundant where habitat is available. A historic population in Monroe County is presumed to be extirpated. Overall it is considered rare and imperiled in the State.

**ASSOCIATED LANDSCAPE FEATURES:** prairie; idle/old field; hayland; right-of-way; savanna; dry hardwood; dry conifer; forest opening; edge

**ASSOCIATED THREATS:** climate change; conversion to agriculture lands; disease, pathogens, & parasites; altered fire regime; fragmentation; grazing & mowing patterns; incompatible natural resource mgmt; industrial/residential/recreational development; invasive plants & animals; non-consumptive recreation; other biological interactions (too many deer); pesticides & herbicides; removal of wildlife

**COMMENTS:** Need to determine population responses to various management regimes. Prescribed fire is an important management tool, but care should be taken to ensure that occupied areas are only partially burned. Protection and recovery efforts must consider the status of its host plant, lupine (*Lupinus perennis*). Recovery efforts must deal with connectivity between habitat patches. ORV and foot traffic should be redirected around occupied areas. Gypsy moth spraying may also pose a threat.



### Henry's elfin

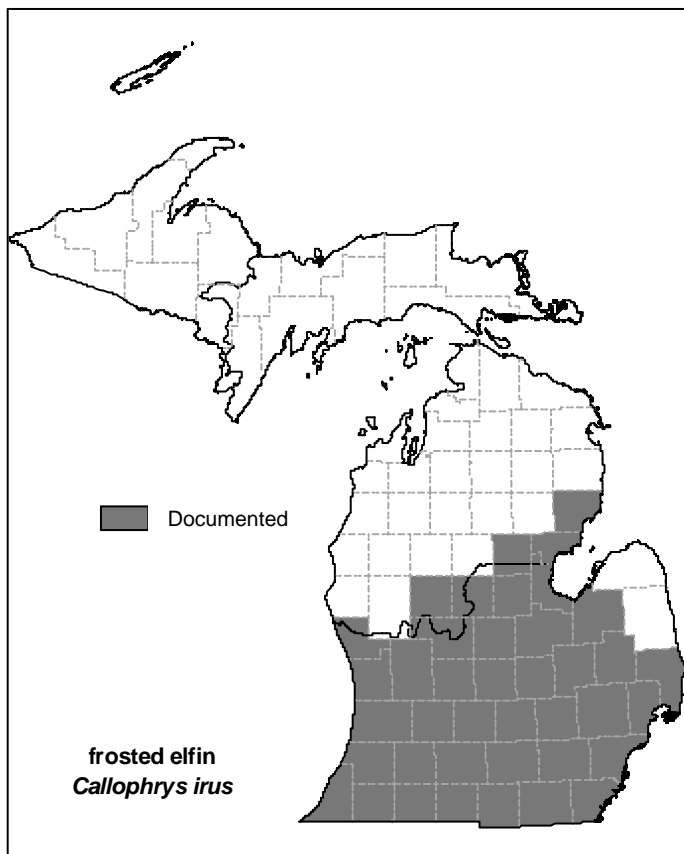
(*Callophrys henrici*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Scattered throughout much of the State, but locally uncommon. Considered rare overall in Michigan and may be imperiled.

**ASSOCIATED LANDSCAPE FEATURES:** idle/old field; savanna; upland shrub; dry hardwood; dry conifer; forest opening; swamp; edge

**ASSOCIATED THREATS:** conversion to agriculture lands; altered fire regime; fragmentation; incompatible natural resource mgmt; industrial/residential/recreational development; invasive plants & animals; lack of scientific knowledge; pesticides & herbicides

**COMMENTS:** Need surveys to assess abundance and distribution; need to assess threats. This species is also known by the name *Incisalia henrici*.



### frosted elfin

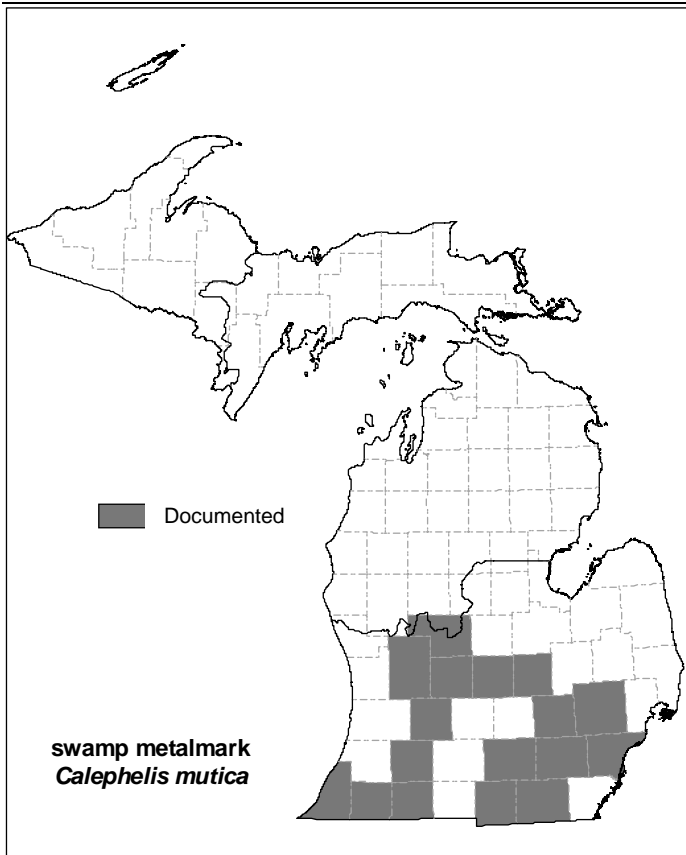
(*Callophrys irus*)

**DISTRIBUTION & ABUNDANCE:** State listed as threatened. Scattered throughout the Lower Peninsula and locally uncommon where found. Overall this species is rare to imperiled in Michigan. This species is considered rare globally.

**ASSOCIATED LANDSCAPE FEATURES:** prairie; idle/old field; right-of-way; savanna; upland shrub; dry hardwood; forest opening; edge

**ASSOCIATED THREATS:** conversion to agriculture lands; altered fire regime; fragmentation; incompatible natural resource mgmt; industrial/residential/recreational development; invasive plants & animals; forestry practices; non-consumptive recreation; other biological interactions (loss of host plant; too many deer eating host plant); pesticides & herbicides

**COMMENTS:** Need surveys to assess abundance and distribution; need to assess threats; need more information on adult nectaring sources. Gypsy moth spraying may be a problem to this species. Protection and restoration efforts must consider the status of its host plant, lupine (*Lupinus perennis*). Excessive ORV traffic can disturb frosted elfin habitat and result in significant mortality of larvae. This species is also known by the name *Incisalia irus*.



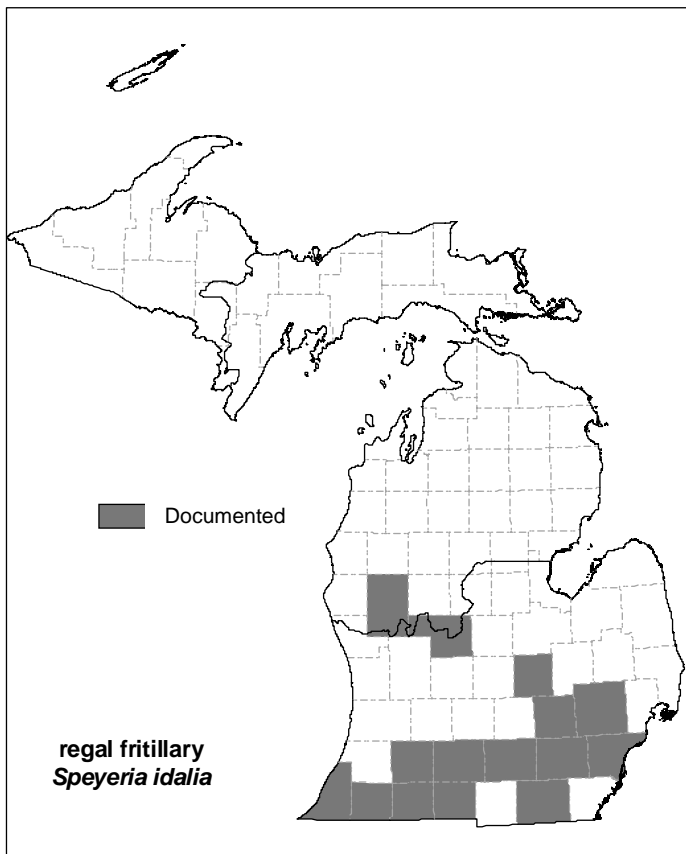
**swamp metalmark**  
*(Calephelis mutica)*

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Scattered throughout much of the Southern Lower Peninsula. This species is rare and is considered imperiled or critically imperiled in the State. It is considered rare globally.

**ASSOCIATED LANDSCAPE FEATURES:** lowland shrub; lowland conifer; forest opening; bog; fen; ephemeral wetland; swamp; pond; inland lake; river/stream/riparian/floodplain corridor

**ASSOCIATED THREATS:** conversion to agriculture lands; dams; altered fire regime; fragmentation; grazing & mowing patterns; altered hydrologic regimes; industrial/residential/recreational development; invasive plants & animals; lack of scientific knowledge; pesticides & herbicides; removal of wildlife; wetland modifications

**COMMENTS:** Need surveys to assess abundance and distribution; need to assess threats. Need to maintain hydrologic integrity at occupied sites.



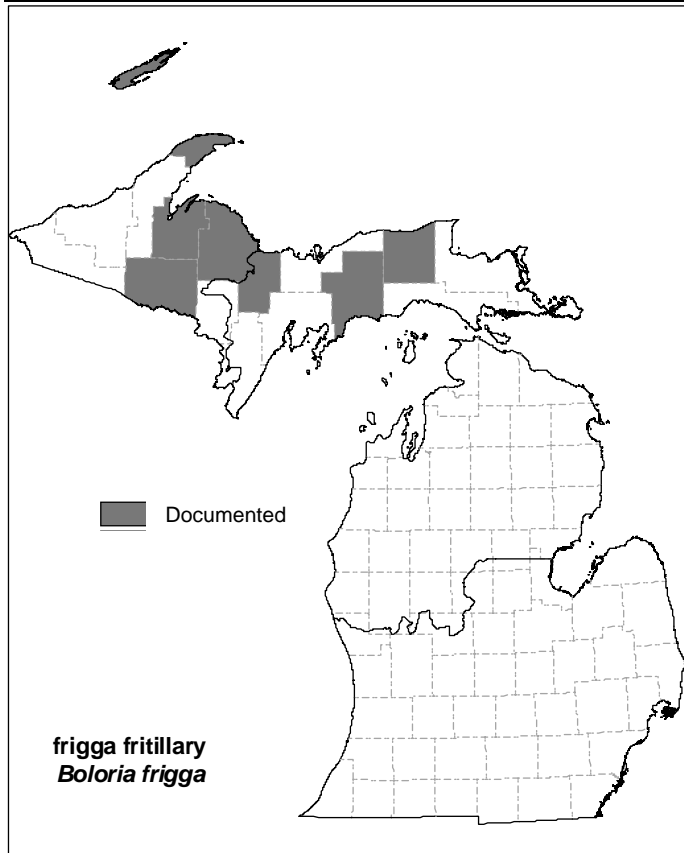
**regal fritillary**  
*(Speyeria idalia)*

**DISTRIBUTION & ABUNDANCE:** This species is State listed as endangered. It is scattered across much of the Southern Lower Peninsula, but it occurs sporadically and generally in low abundance. It has been in decline across the Great Lakes region and its status in Michigan is currently undetermined. This species is considered globally rare.

**ASSOCIATED LANDSCAPE FEATURES:** prairie; idle/old field; hayland; pasture; savanna; forest opening; inland emergent wetland; ephemeral wetland; river/stream/riparian/floodplain corridor; edge

**ASSOCIATED THREATS:** conversion to agriculture lands; disease, pathogens, & parasites; altered fire regime; fragmentation; incompatible natural resource mgmt; industrial/residential/recreational development; invasive plants & animals; lack of scientific knowledge; pesticides & herbicides

**COMMENTS:** Need surveys to assess abundance and distribution; need to assess threats. Prescribed fire is an important management tool, but care should be taken to ensure that occupied areas are only partially burned.



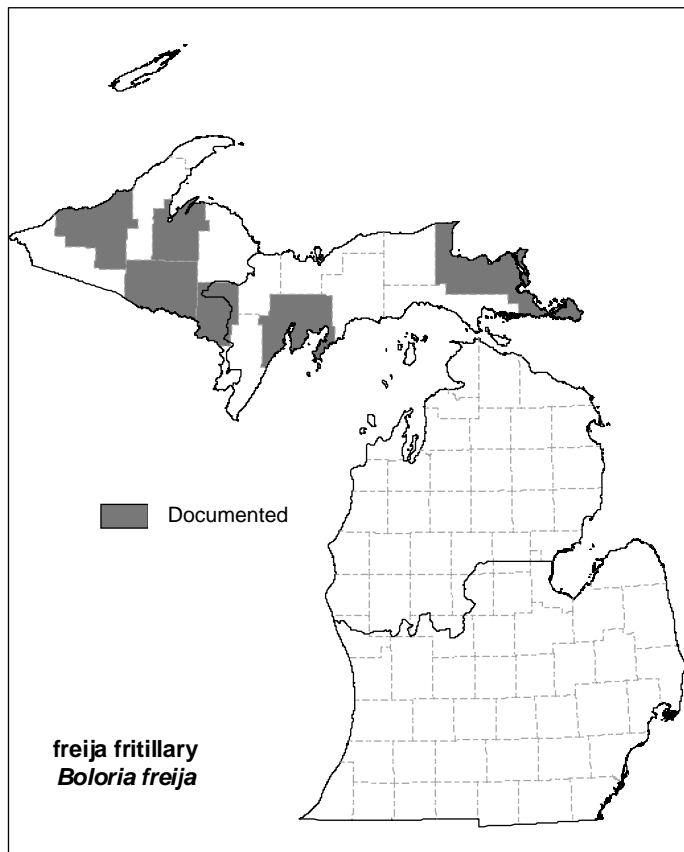
**frigga fritillary**  
(*Boloria frigga*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Scattered throughout much of the Upper Peninsula. It is locally uncommon and may be rare overall in the State.

**ASSOCIATED LANDSCAPE FEATURES:** lowland shrub; lowland conifer; mesic conifer; dry conifer; bog; pond

**ASSOCIATED THREATS:** climate change; fragmentation; mining practices; lack of scientific knowledge; other biological interactions (decline in larval host plant and nectar sources); unknown

**COMMENTS:** Need surveys to assess abundance and distribution; need to assess threats. As a boreal species, this species may be susceptible to climate change in Michigan. Protection or restoration efforts must consider the status of the host plant, dwarf birch (*Betula nana*). Peat mining also poses a threat to this species.



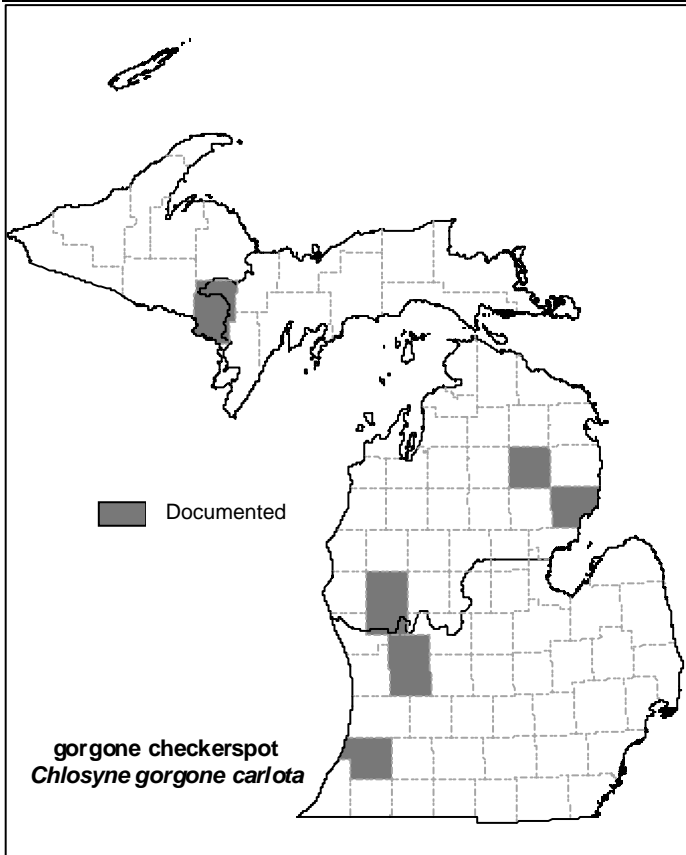
**freija fritillary**  
(*Boloria freija*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Scattered throughout much of the Upper Peninsula. They are locally uncommon and may be rare overall across the State.

**ASSOCIATED LANDSCAPE FEATURES:** lowland shrub; lowland conifer; mesic conifer; dry conifer; bog; submergent wetland

**ASSOCIATED THREATS:** climate change; mining practices; lack of scientific knowledge; other biological interactions (decline in host plant populations (dwarf birch)); unknown

**COMMENTS:** Need surveys to assess abundance and distribution; need to assess threats. Identification of host plant(s) in Michigan is needed and subsequent protection or restoration efforts should consider the status of the host plant. Peat mining also poses a threat to this species.



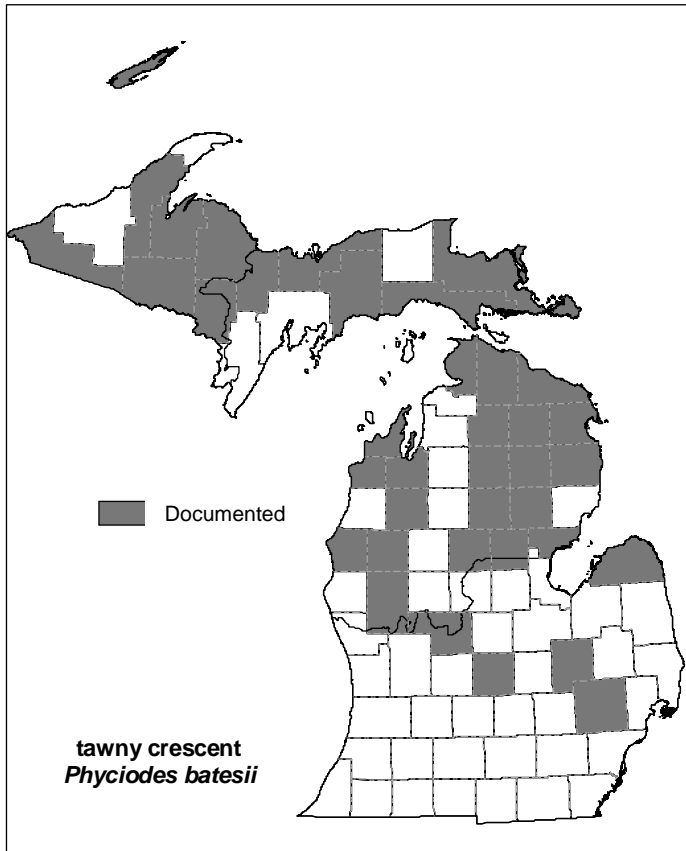
**gorgone checkerspot**  
*(Chlosyne gorgone carlota)*

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Occurs at scattered locations across much of the State. They are rare and may be imperiled in the State.

**ASSOCIATED LANDSCAPE FEATURES:** prairie; idle/old field; savanna; dry hardwood; dry conifer; forest opening; river/stream/riparian/floodplain corridor; edge

**ASSOCIATED THREATS:** lack of scientific knowledge; pesticides & herbicides; unknown

**COMMENTS:** Need surveys to assess abundance and distribution; need to assess threats; host plant assessment may be warranted for Michigan.



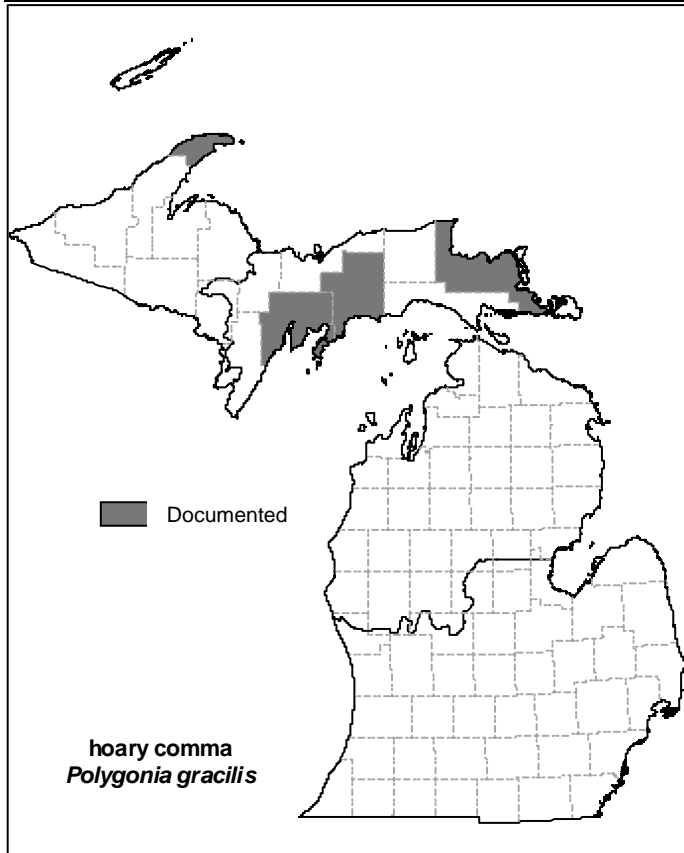
**tawny crescent**  
*(Phyciodes batesii)*

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Occurs throughout much of the Upper Peninsula and Northern Lower Peninsula and at scattered locations in the Southern Lower Peninsula. Abundances generally increase from south to north.

**ASSOCIATED LANDSCAPE FEATURES:** idle/old field; pasture; right-of-way; savanna; forest opening; fen; ephemeral wetland; river/stream/riparian/floodplain corridor; alvar/rock

**ASSOCIATED THREATS:** conversion to agriculture lands; altered fire regime; altered hydrologic regimes; industrial/residential/recreational development; invasive plants & animals; other biological interactions (decline in host plant populations (*Aster undulatus*); too many deer); pesticides & herbicides

**COMMENTS:** Need surveys to assess abundance and distribution; need to assess threats. Protection or restoration efforts must consider the status of the host plant, *Aster undulates*. High deer densities may be impacting this species in some areas. Spraying of gypsy moths may pose a threat to this species.



### hoary comma

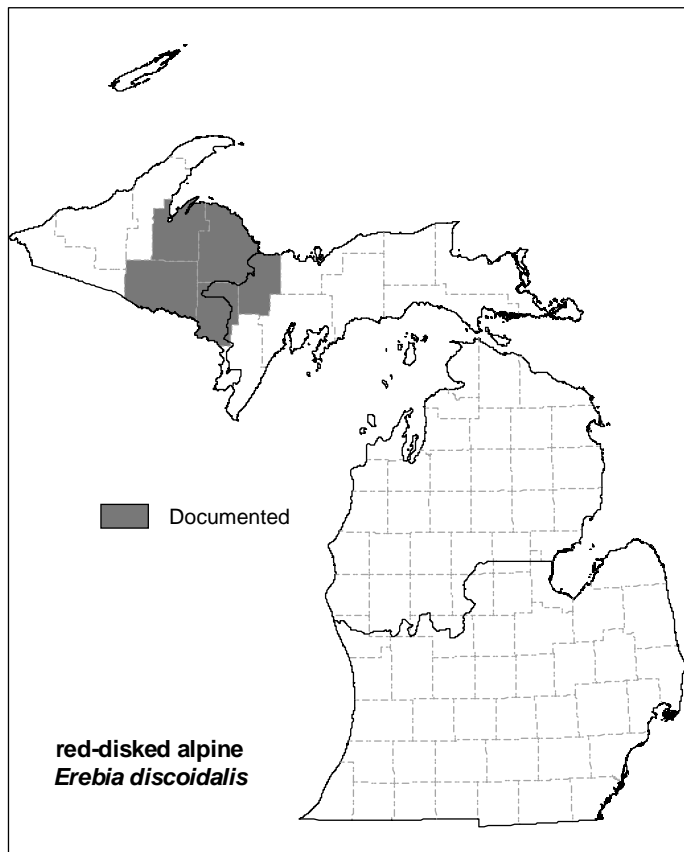
*(Polygonia gracilis)*

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Hoary comma populations are scattered across the Upper Peninsula. This species is uncommon to rare in the State.

**ASSOCIATED LANDSCAPE FEATURES:** lowland shrub; upland shrub; lowland conifer; mesic conifer; dry conifer; forest opening; river/stream/riparian/floodplain corridor; edge

**ASSOCIATED THREATS:** lack of scientific knowledge; forestry practices; pesticides & herbicides; unknown

**COMMENTS:** Need surveys to assess abundance and distribution; need to assess threats; need to identify host plants and nectaring sources.



### red-disked alpine

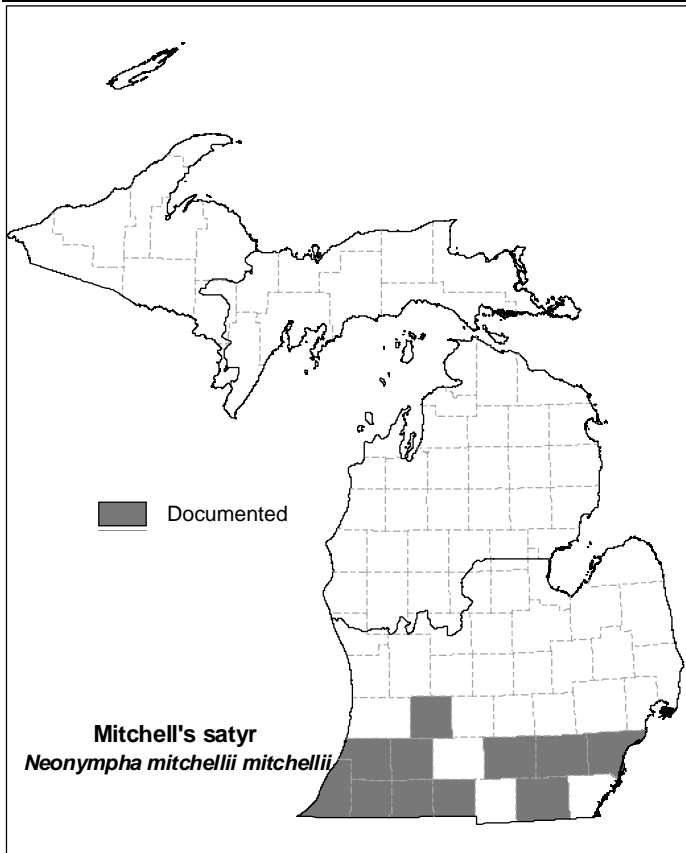
*(Erebia discoidalis)*

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Occurs across four counties in the Western Upper Peninsula where it is uncommon.

**ASSOCIATED LANDSCAPE FEATURES:** idle/old field; mesic conifer; forest opening; bog; ephemeral wetland; large contiguous natural landscape

**ASSOCIATED THREATS:** climate change; lack of scientific knowledge; pesticides & herbicides; unknown

**COMMENTS:** Need surveys to assess abundance and distribution; need to assess threats.



### Mitchell's satyr

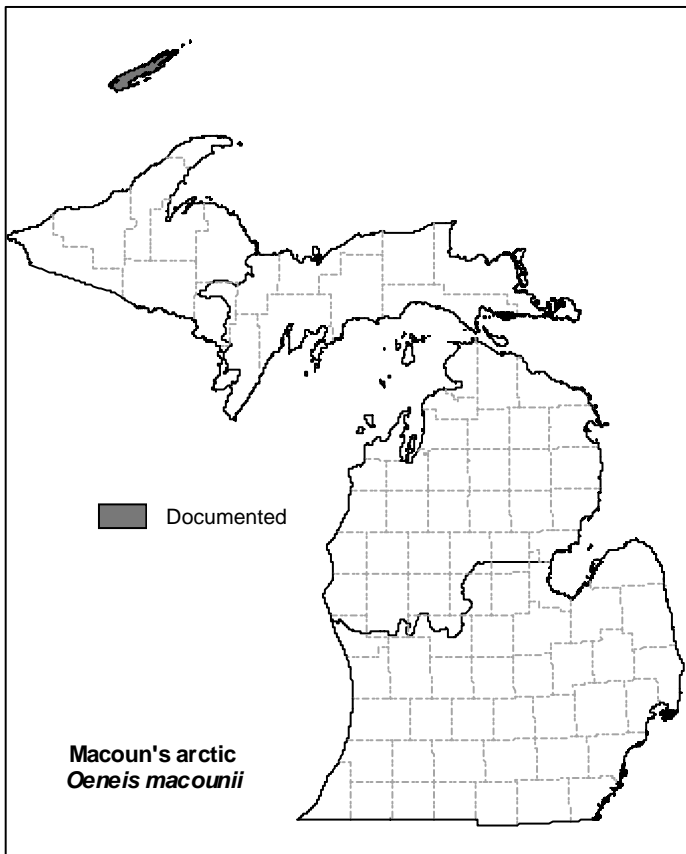
(*Neonympha mitchellii mitchellii*)

**DISTRIBUTION & ABUNDANCE:** State and federally listed as endangered. This species is scattered throughout parts of the Southern Lower Peninsula. It is very rare, occurring in isolated fens and similar habitat. It is considered critically imperiled in Michigan and imperiled or critically imperiled globally.

**ASSOCIATED LANDSCAPE FEATURES:** prairie; lowland shrub; lowland conifer; inland emergent wetland; fen; pond; river/stream/riparian/floodplain corridor; edge

**ASSOCIATED THREATS:** conversion to agriculture lands; altered fire regime; fragmentation; grazing & mowing patterns; altered hydrologic regimes; incompatible natural resource mgmt; industrial/residential/recreational development; invasive plants & animals; lack of scientific knowledge; non-consumptive recreation; pesticides & herbicides; removal of wildlife; wetland modifications

**COMMENTS:** Need to determine population responses to restoration techniques. Prescribed fire is an important management tool, but must ensure occupied areas are only partially burned. During protection and recovery efforts, consider the status of its host plant, *Carex stricta* And redirect ORV and foot traffic around occupied areas. Beaver may create suitable habitat; their removal from the landscape may remove critical ecological processes. Over collecting has been believed to impact populations and mosquito spraying may also result in impacts. Groundwater patterns must be protected.



### Macoun's arctic

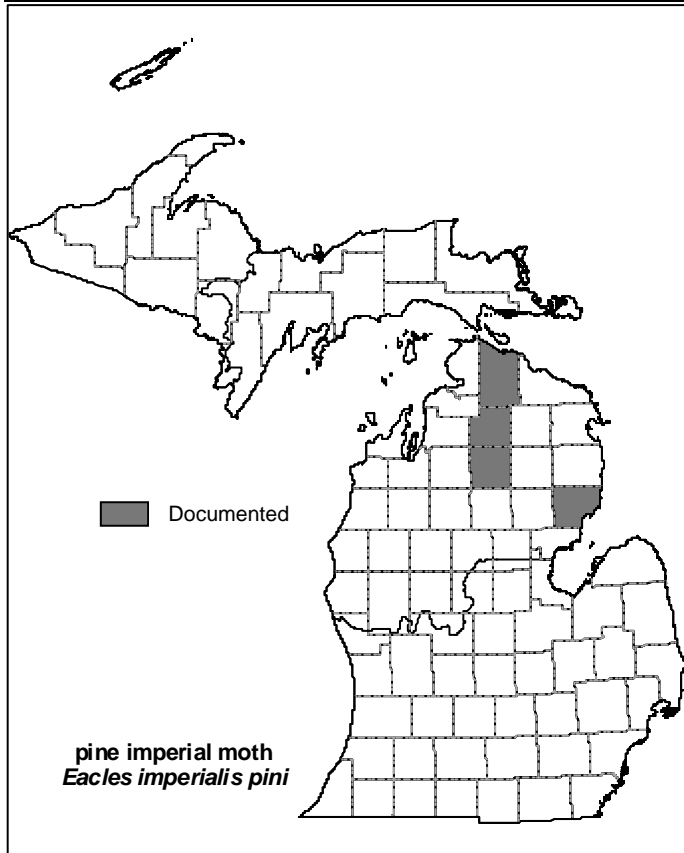
(*Oeneis macounii*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Generally widespread and abundant on Isle Royale. It is considered uncommon or rare in Michigan and may be imperiled.

**ASSOCIATED LANDSCAPE FEATURES:** upland shrub; lowland conifer; mesic conifer; dry conifer; Great Lakes island; edge; inland rock/cliff/ledge

**ASSOCIATED THREATS:** altered fire regime; lack of scientific knowledge; forestry practices; unknown

**COMMENTS:** Need surveys to assess abundance and distribution—particularly in Keweenaw, Houghton, and Ontonagon Counties; need to assess threats; need to identify host plant.



### pine imperial moth

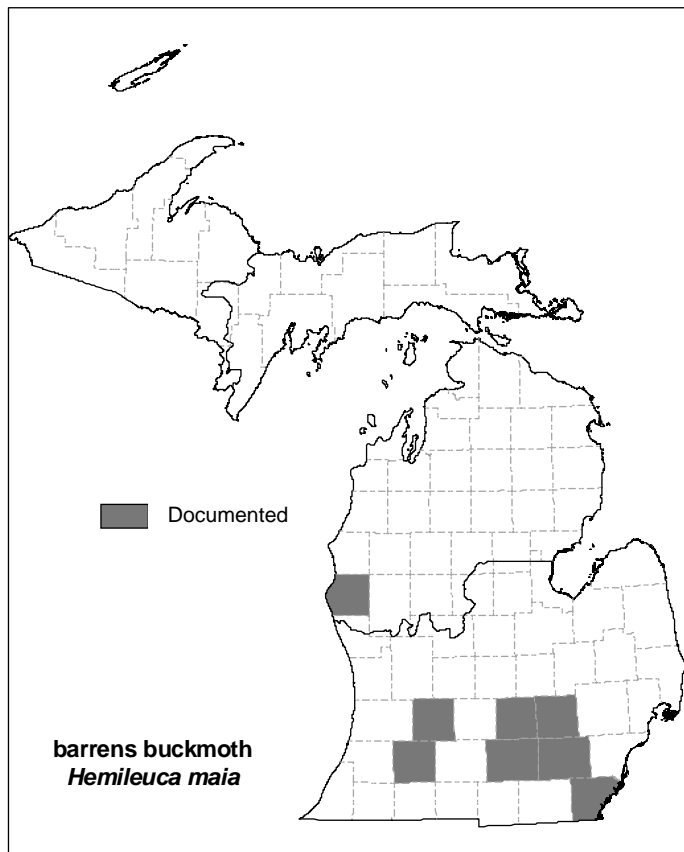
(*Eacles imperialis pini*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Occurs scattered across the Northern Lower Peninsula. It is considered rare in the State and may be imperiled.

**ASSOCIATED LANDSCAPE FEATURES:** lowland conifer; mesic conifer; dry conifer

**ASSOCIATED THREATS:** lack of scientific knowledge; forestry practices; pesticides & herbicides; unknown

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats.



### barrens buckmoth

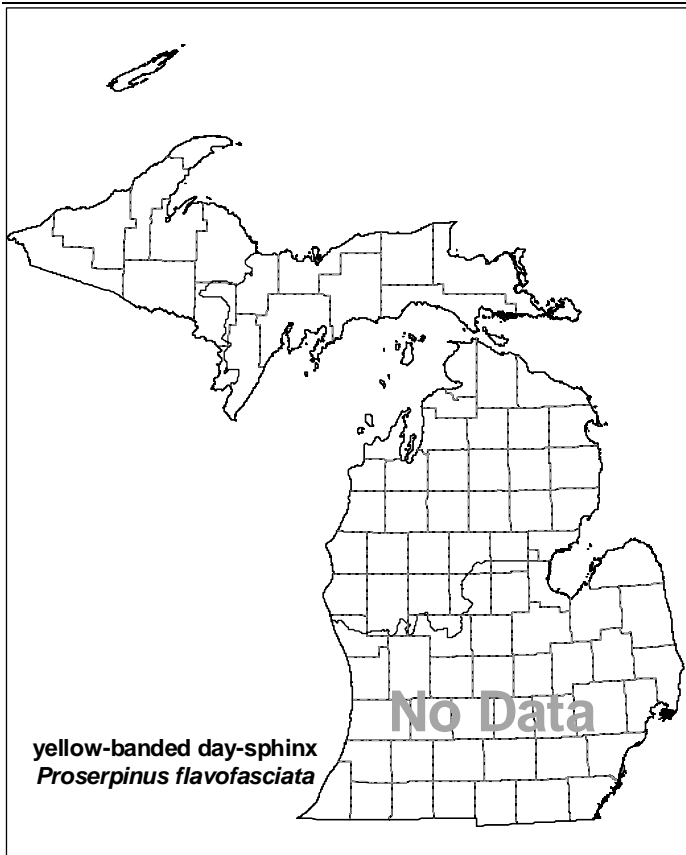
(*Hemileuca maia*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Occurs scattered across the Lower Peninsula. It is considered rare in the State and may be imperiled.

**ASSOCIATED LANDSCAPE FEATURES:** savanna; lowland hardwood; dry hardwood; suburban/small town

**ASSOCIATED THREATS:** conversion to agriculture lands; altered fire regime; incompatible natural resource mgmt; industrial/residential/recreational development; lack of scientific knowledge; pesticides & herbicides

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats.



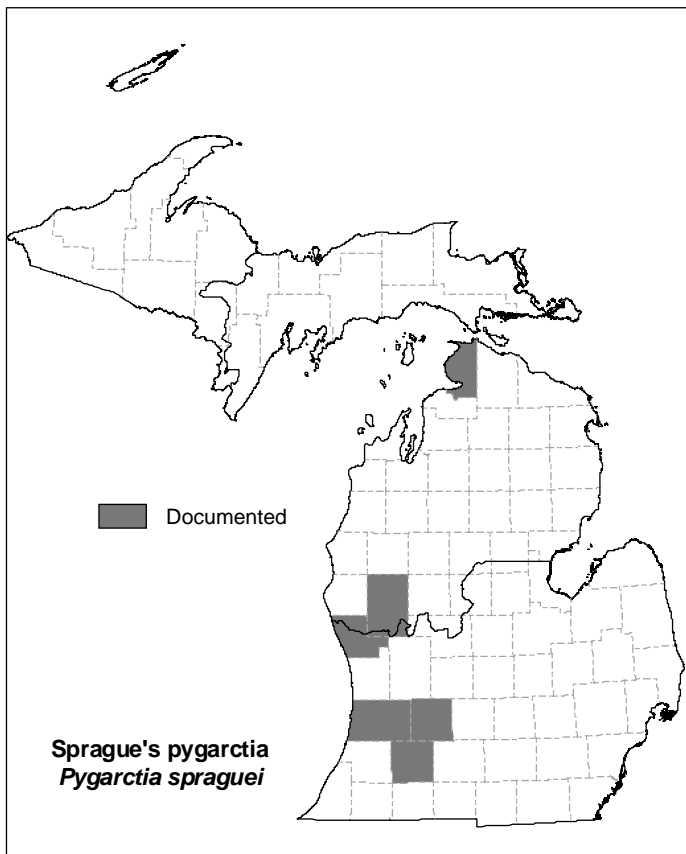
**yellow-banded day-sphinx**  
(*Proserpinus flavofasciata*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. It is considered rare in the State and may be imperiled. Data on current distribution and abundance is unavailable.

**ASSOCIATED LANDSCAPE FEATURES:** right-of-way; lowland conifer; mesic conifer; dry conifer; forest opening; edge; unknown

**ASSOCIATED THREATS:** altered fire regime; lack of scientific knowledge; pesticides & herbicides; unknown

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats.



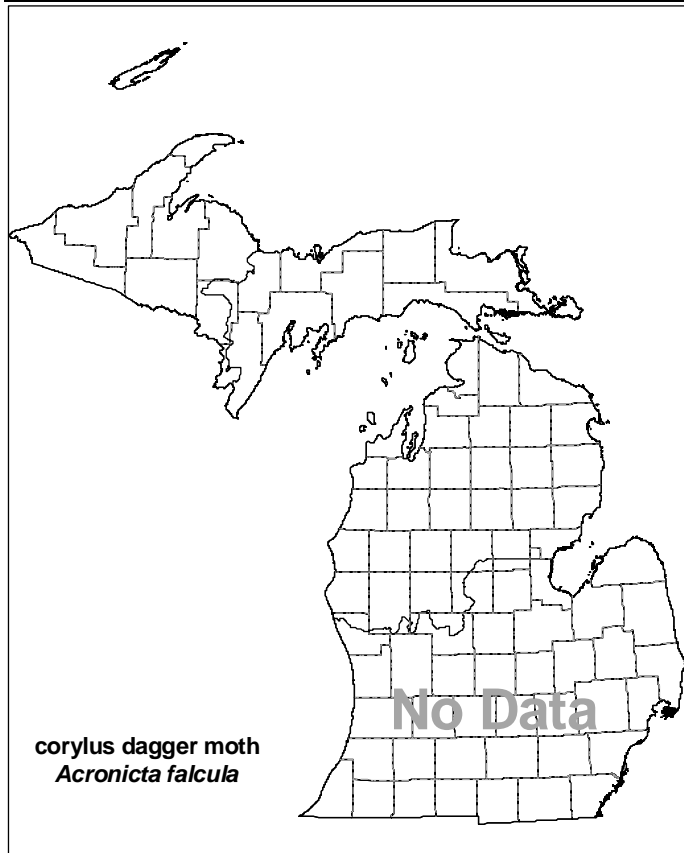
**Sprague's pygarctia**  
(*Pygarctia spraguei*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. It is considered rare in the State and may be imperiled.

**ASSOCIATED LANDSCAPE FEATURES:** prairie; idle/old field; right-of-way; savanna; dry hardwood; forest opening

**ASSOCIATED THREATS:** conversion to agriculture lands; altered fire regime; grazing & mowing patterns; incompatible natural resource mgmt; mining practices; industrial/residential/ recreational development; invasive plants & animals; lack of scientific knowledge; forestry practices; non-consumptive recreation; pesticides & herbicides

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats. Prescribed fire is an important management tool, but care should be taken to ensure occupied areas are only partially burned. At some sites sand mining and ORV traffic may threaten populations.



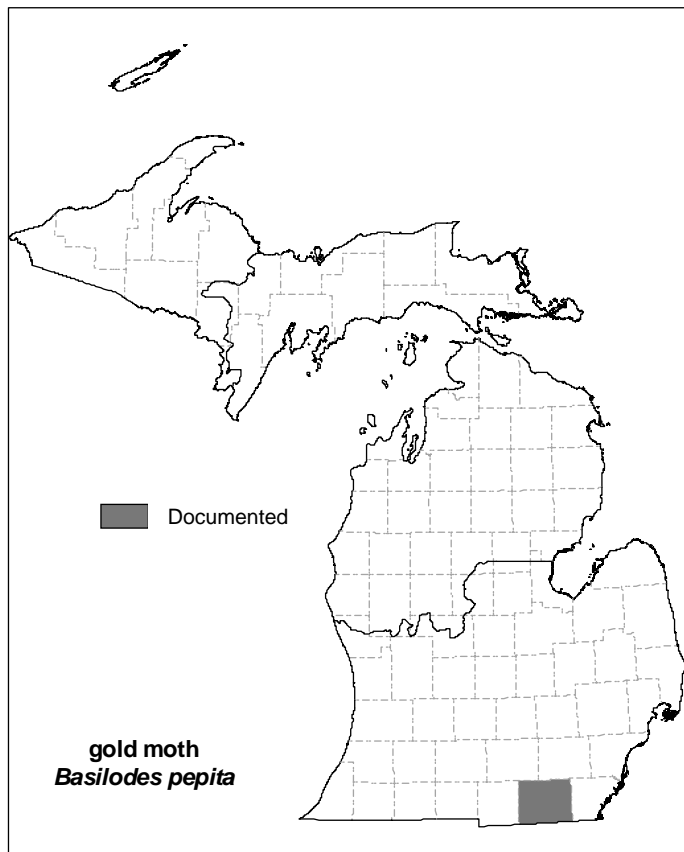
**corylus dagger moth**  
(*Acronicta falcula*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. It is considered rare in the State and may be imperiled. Current distribution and abundance is unknown. Its global status is unknown at this time.

**ASSOCIATED LANDSCAPE FEATURES:** lowland hardwood; mesic hardwood; unknown

**ASSOCIATED THREATS:** lack of scientific knowledge; unknown

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats.



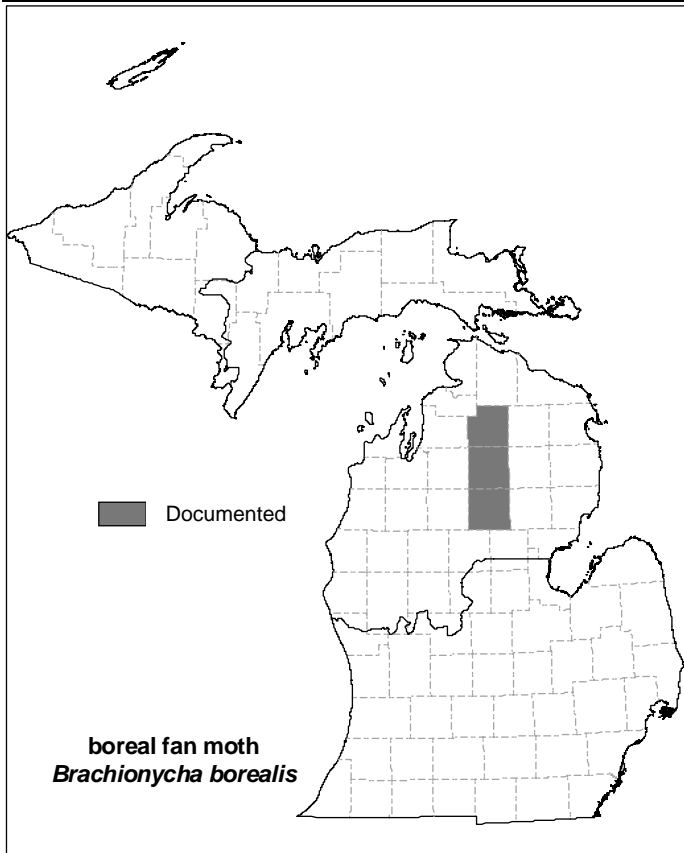
**gold moth**  
(*Basilodes pepita*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Extremely rare in Michigan and considered imperiled or critically imperiled.

**ASSOCIATED LANDSCAPE FEATURES:** lowland hardwood; swamp; river/stream/riparian/floodplain corridor

**ASSOCIATED THREATS:** lack of scientific knowledge; unknown

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats.



### boreal fan moth

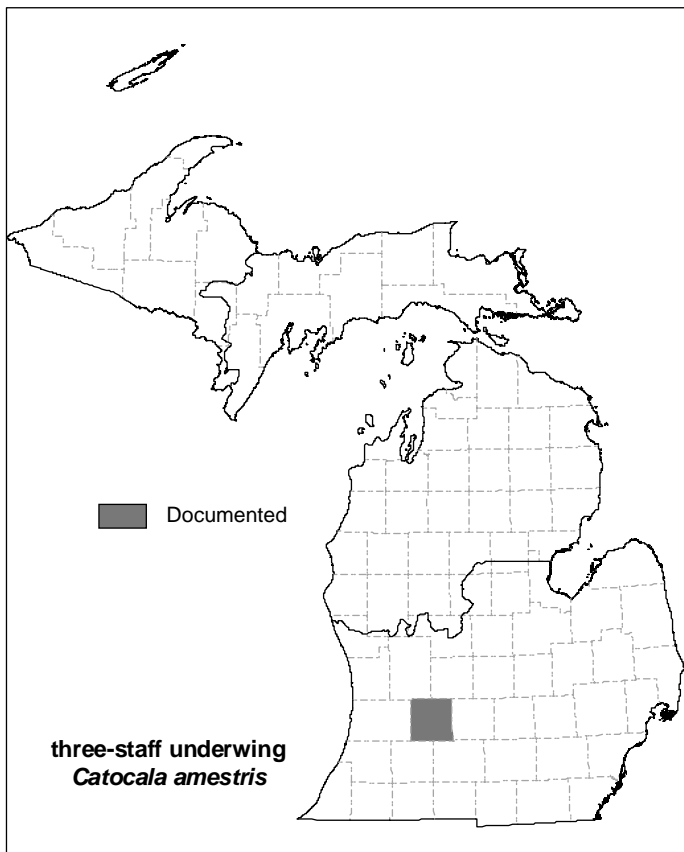
(*Brachionycha borealis*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. It is considered extremely rare in Michigan and may be critically imperiled.

**ASSOCIATED LANDSCAPE FEATURES:** savanna; dry hardwood; mesic conifer; dry conifer; forest opening

**ASSOCIATED THREATS:** incompatible natural resource mgmt; lack of scientific knowledge; pesticides & herbicides; unknown

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats.



### three-staff underwing

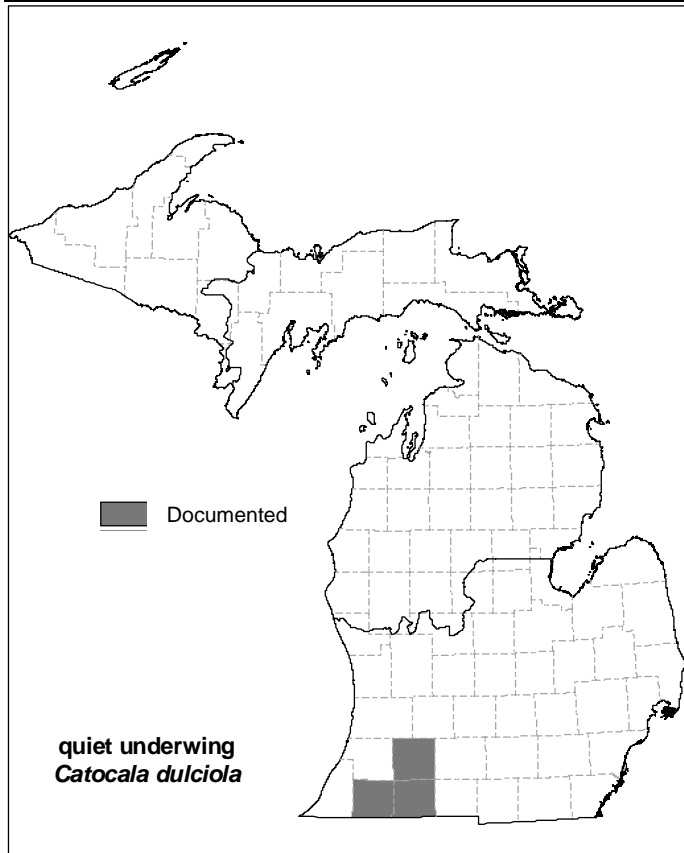
(*Catocala amestris*)

**DISTRIBUTION & ABUNDANCE:** State listed as endangered in Michigan. It is considered extremely rare in Michigan and may be critically imperiled.

**ASSOCIATED LANDSCAPE FEATURES:** prairie; idle/old field; right-of-way; savanna; upland shrub; dry hardwood; forest opening

**ASSOCIATED THREATS:** conversion to agriculture lands; altered fire regime; fragmentation; incompatible natural resource mgmt; invasive plants & animals; lack of scientific knowledge; removal of wildlife

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats. Site management for this species requires fire to negate vegetative succession, particularly from the invasive autumn olive. However, excessive fire coverage in occupied areas should be avoided to prevent or minimize incidental take. In some cases, emphasis may be on restoration of highly degraded sites, with subsequent reintroductions.



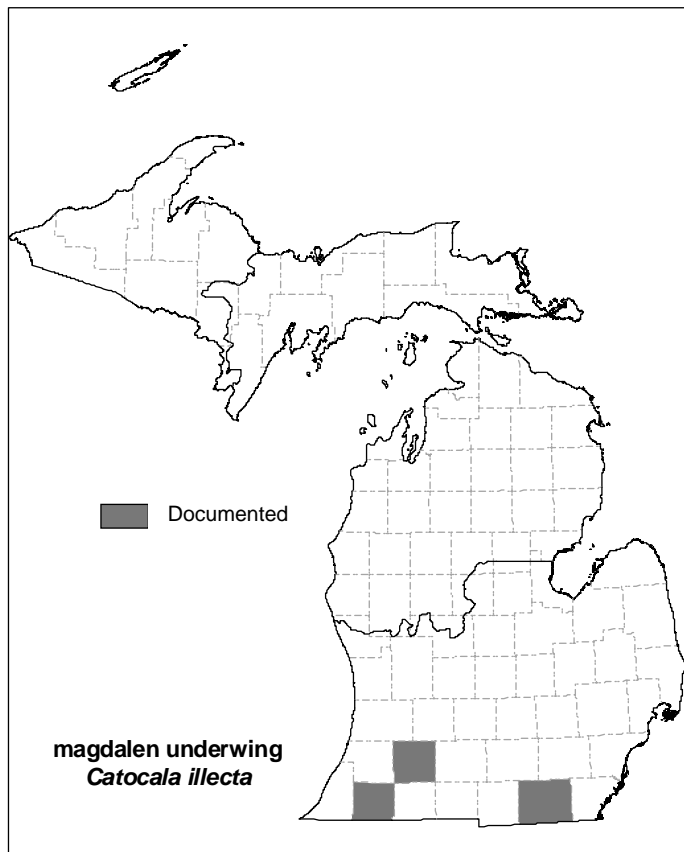
**quiet underwing**  
*(Catocala dulciola)*

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Very rare in Michigan. It is considered imperiled or critically imperiled in the State. This species is considered uncommon or rare globally.

**ASSOCIATED LANDSCAPE FEATURES:** idle/old field; right-of-way; savanna; lowland hardwood; mesic hardwood; dry hardwood; river/stream/riparian/floodplain corridor; edge

**ASSOCIATED THREATS:** altered fire regime; lack of scientific knowledge; pesticides & herbicides; unknown

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats.



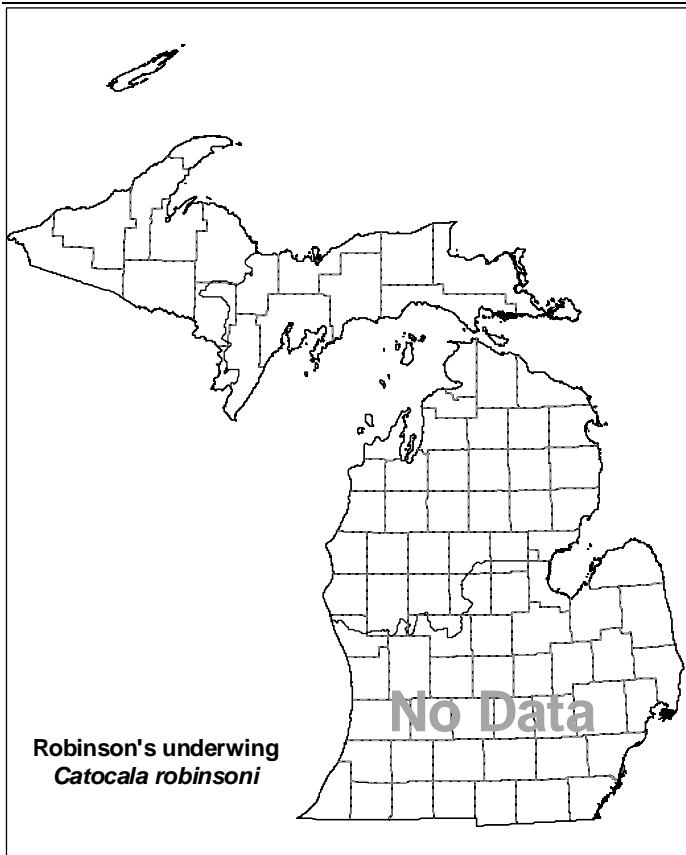
**magdalen underwing**  
*(Catocala illecta)*

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. It is considered uncommon or rare in Michigan and it may be imperiled.

**ASSOCIATED LANDSCAPE FEATURES:** lowland shrub; lowland hardwood; river/stream/riparian/floodplain corridor

**ASSOCIATED THREATS:** incompatible natural resource mgmt; lack of scientific knowledge; pesticides & herbicides; unknown

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats.



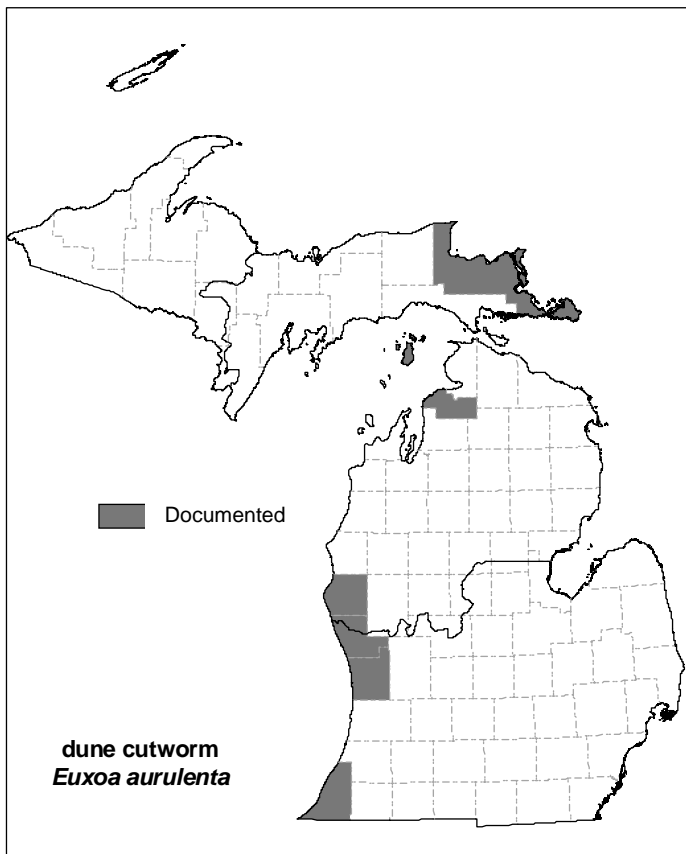
**Robinson's underwing**  
(*Catocala robinsoni*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. It is considered uncommon or rare in Michigan and it may be imperiled. Current distribution and abundance is unknown.

**ASSOCIATED LANDSCAPE FEATURES:** dry hardwood

**ASSOCIATED THREATS:** lack of scientific knowledge; unknown

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology—including larval host plant; need to assess threats.



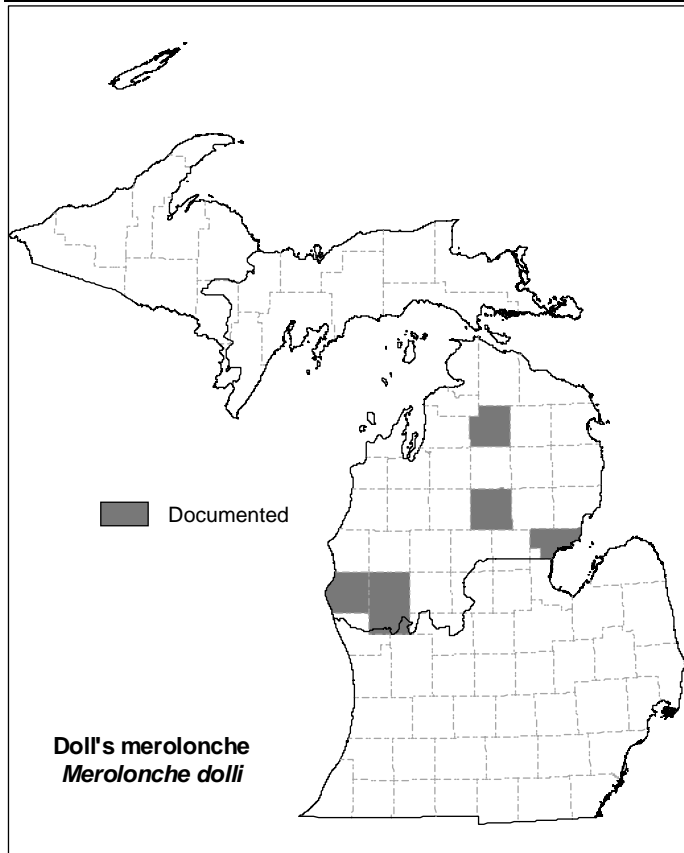
**dune cutworm**  
(*Euxoa aurulenta*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Collected from nine locations scattered along Great Lakes shoreline areas. It is considered rare in Michigan and may be critically imperiled in the State.

**ASSOCIATED LANDSCAPE FEATURES:** coastal dune/beach

**ASSOCIATED THREATS:** industrial/residential/recreational development; invasive plants & animals; lack of scientific knowledge; non-consumptive recreation; pesticides & herbicides

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats.



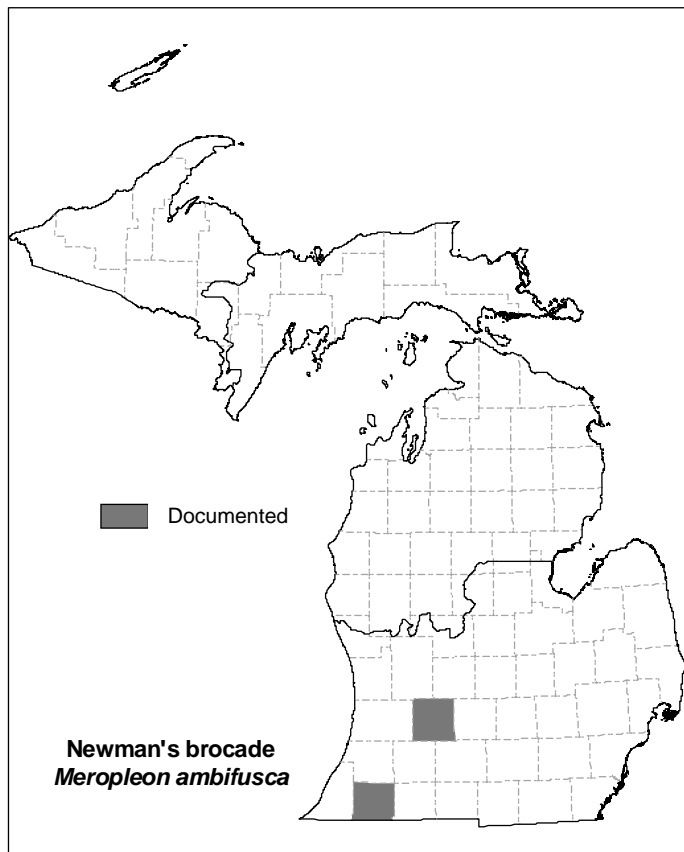
**Doll's merolonche**  
(*Merolonche doli*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Known from only a few sites in the Northern Lower Peninsula. It is considered imperiled or critically imperiled in the State due to extreme rarity.

**ASSOCIATED LANDSCAPE FEATURES:** savanna; lowland hardwood; mesic hardwood; dry hardwood; lowland conifer; mesic conifer; dry conifer; bog; fen

**ASSOCIATED THREATS:** altered fire regime; altered hydrologic regimes; incompatible natural resource mgmt; industrial/ residential/recreational development; lack of scientific knowledge; forestry practices; pesticides & herbicides; wetland modifications

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats. Gypsy moth spraying may impact this species.



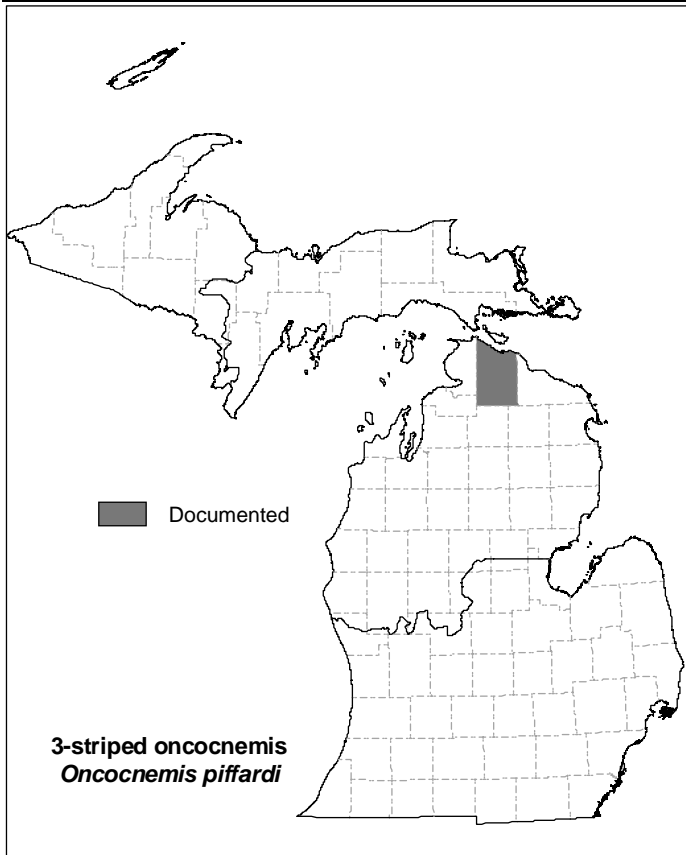
**Newman's brocade**  
(*Meropleon ambifusca*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. It is considered extremely rare in Michigan and may be critically imperiled in the State.

**ASSOCIATED LANDSCAPE FEATURES:** prairie; forest opening; inland emergent wetland; fen; ephemeral wetland

**ASSOCIATED THREATS:** lack of scientific knowledge; unknown

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats.



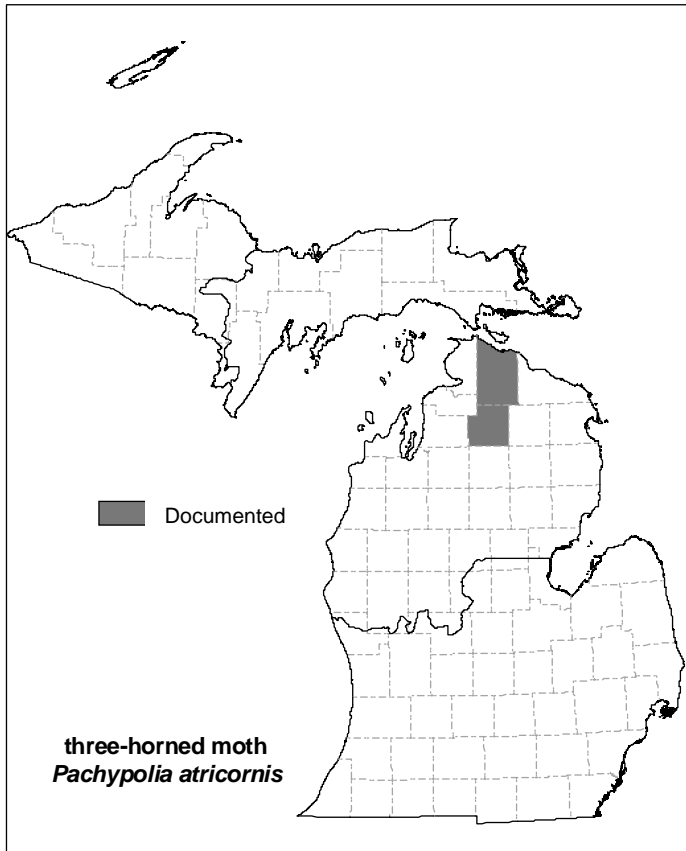
**3-striped oncocnemis**  
(*Oncocnemis piffardi*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. It is considered extremely rare in Michigan and may be critically imperiled in the State.

**ASSOCIATED LANDSCAPE FEATURES:** inland emergent wetland; ephemeral wetland; river/stream/riparian/floodplain corridor; coastal dune/beach

**ASSOCIATED THREATS:** lack of scientific knowledge; unknown

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats.



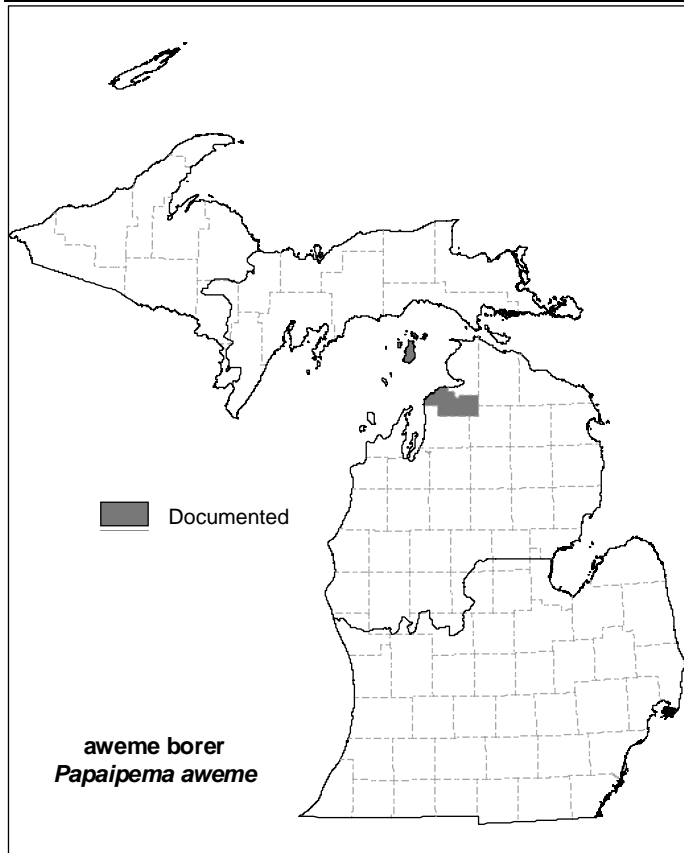
**three-horned moth**  
(*Pachypolia atricornis*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. This species is considered extremely rare in Michigan and may be critically imperiled in the State.

**ASSOCIATED LANDSCAPE FEATURES:** lowland hardwood; mesic hardwood; lowland conifer; mesic conifer

**ASSOCIATED THREATS:** industrial/residential/recreational development; lack of scientific knowledge; pesticides & herbicides; unknown

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats. Development has probably already resulted in significant habitat loss. Mosquito spraying may pose a significant threat.



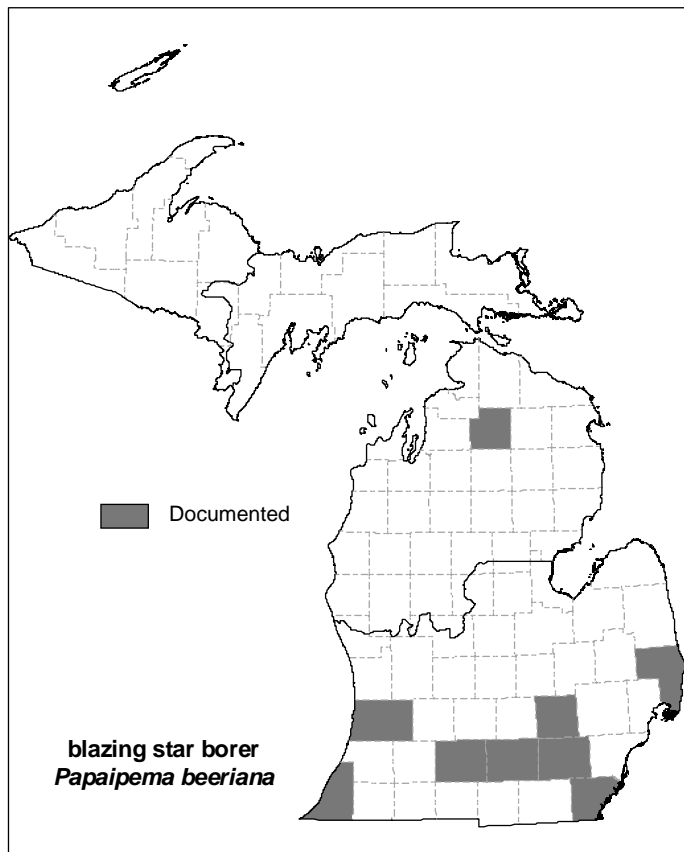
**aweme borer**  
(*Papaipema aweme*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. This species has only been collected once from the State; at Beaver Island several decades ago. It is currently undetermined whether this species is extirpated; more survey areas needed. This species may be globally extinct. Of the four sites it has been collected from (range wide), the Beaver Island site holds the most potential.

**ASSOCIATED LANDSCAPE FEATURES:** coastal dune/beach; Great Lakes island; other (sandy inland former lakeshores; occupation of this habitat has never been documented in Michigan; species may now be extinct); unknown

**ASSOCIATED THREATS:** industrial/residential/recreational development; invasive plants & animals; lack of scientific knowledge; other biological interactions (alterations to habitat due to deer browsing)

**COMMENTS:** Need surveys to determine presence or absence and, if present, assess abundance and distribution. If it is still present, high deer densities on Beaver Island or elsewhere may pose a significant threat.



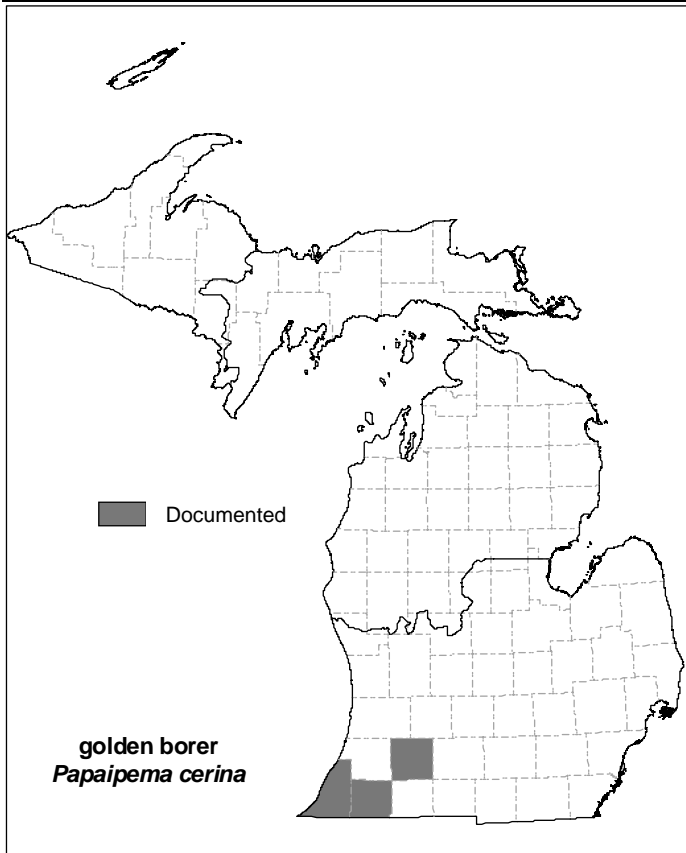
**blazing star borer**  
(*Papaipema beeriana*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Known from less than 12 sites scattered across southern Michigan and one site in the Northern Lower Peninsula. This species is considered very rare and it may be very imperiled in Michigan. This species is considered rare or uncommon globally.

**ASSOCIATED LANDSCAPE FEATURES:** prairie; idle/old field; savanna; lowland hardwood; inland emergent wetland; fen; large contiguous natural landscape

**ASSOCIATED THREATS:** conversion to agriculture lands; dams; altered fire regime; fragmentation; altered hydrologic regimes; incompatible natural resource mgmt; industrial/residential/recreational development; invasive plants & animals; lack of scientific knowledge; pesticides & herbicides

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology including habitat requirements; need to assess threats; need info on response to controlled burns. Prescribed fire is an important management tool, but care should be taken to ensure occupied areas are only partially burned. Impoundment is a threat at least one site in Michigan.



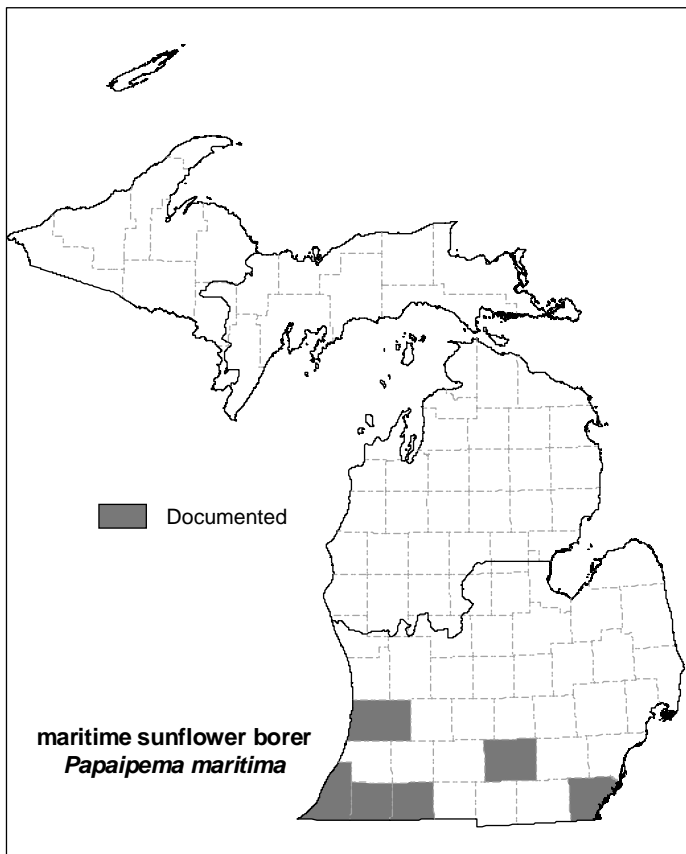
**golden borer**  
*(Papaipema cerina)*

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Occurs in three southwest Michigan counties. It prefers a complex mosaic of wetland and upland habitats, so it is rare and populations tend to occur patchily. It is considered imperiled or critically imperiled in the State.

**ASSOCIATED LANDSCAPE FEATURES:** prairie; idle/old field; right-of-way; mesic hardwood; dry hardwood; lowland conifer; inland emergent wetland; fen; swamp; large contiguous natural landscape

**ASSOCIATED THREATS:** conversion to agriculture lands; fragmentation; grazing & mowing patterns; industrial/residential/recreational development; invasive plants & animals; lack of scientific knowledge; forestry practices; pesticides & herbicides; wetland modifications

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats. Golden borers are poor fliers and are therefore highly susceptible to fragmentation. Protection or restoration of complex habitat mosaics, particularly those containing fens or other wetlands, forest, and prairie, is critical to the conservation of this species. More information on the use of these mosaics and comprehensive planning efforts will benefit this species.



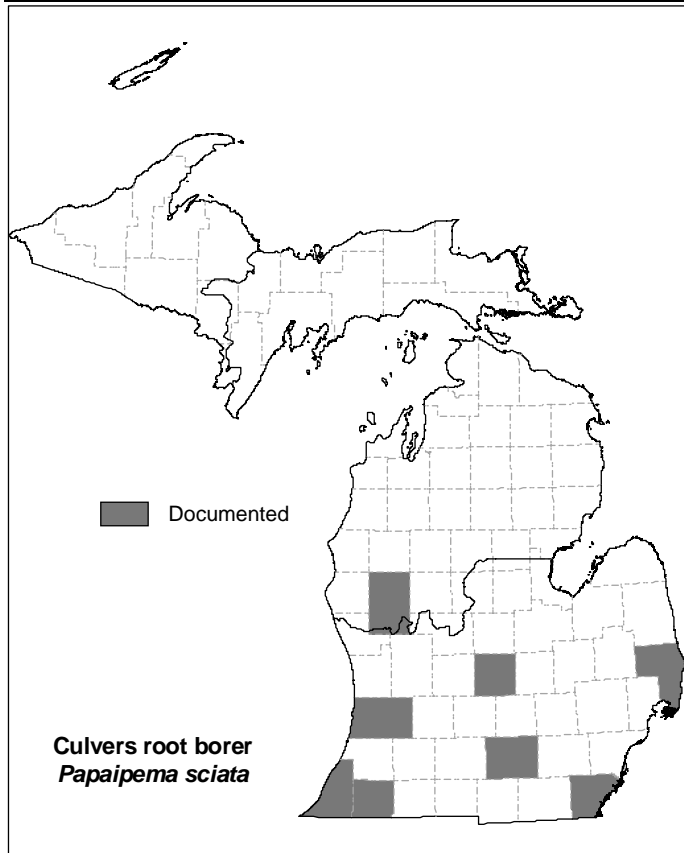
**maritime sunflower borer**  
*(Papaipema maritima)*

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Occurs scattered across far southern Michigan. It is considered very rare and may be critically imperiled in the State.

**ASSOCIATED LANDSCAPE FEATURES:** prairie; idle/old field; right-of-way; inland emergent wetland; fen

**ASSOCIATED THREATS:** conversion to agriculture lands; altered fire regime; altered hydrologic regimes; incompatible natural resource mgmt; industrial/residential/recreational development; invasive plants & animals; lack of scientific knowledge; pesticides & herbicides

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats.



### Culvers root borer

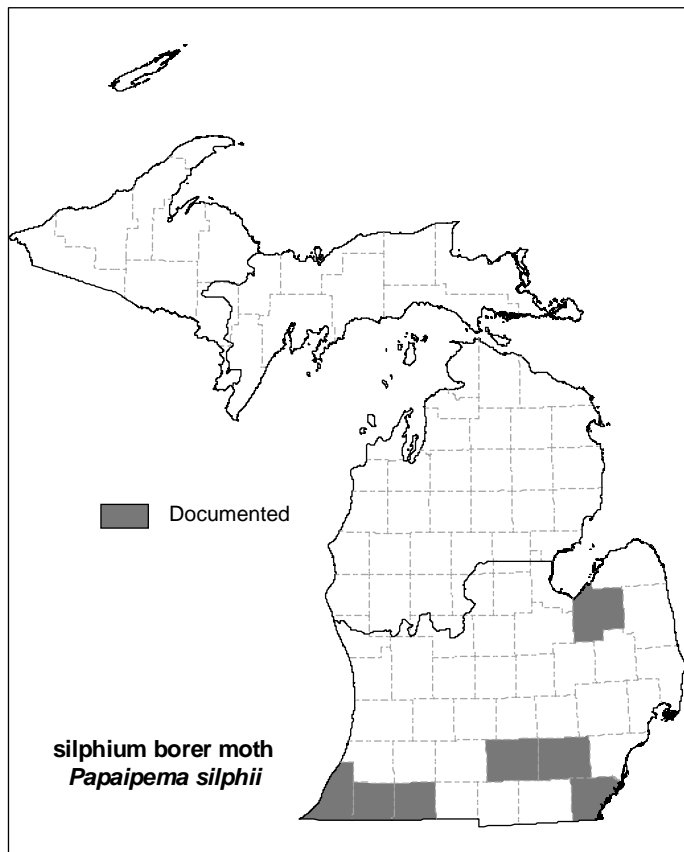
(*Papaipema sciata*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Known from 9 sites that are scattered across the Southern Lower Peninsula. It is considered rare and may be imperiled in Michigan.

**ASSOCIATED LANDSCAPE FEATURES:** prairie; fen

**ASSOCIATED THREATS:** conversion to agriculture lands; altered fire regime; fragmentation; altered hydrologic regimes; incompatible natural resource mgmt; industrial/residential/ recreational development; invasive plants & animals; lack of scientific knowledge; other biological interactions (deer browse of host plant); pesticides & herbicides

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats. Prescribed fire is an important management tool, but care should be taken to ensure that occupied areas are only partially burned.



### silphium borer moth

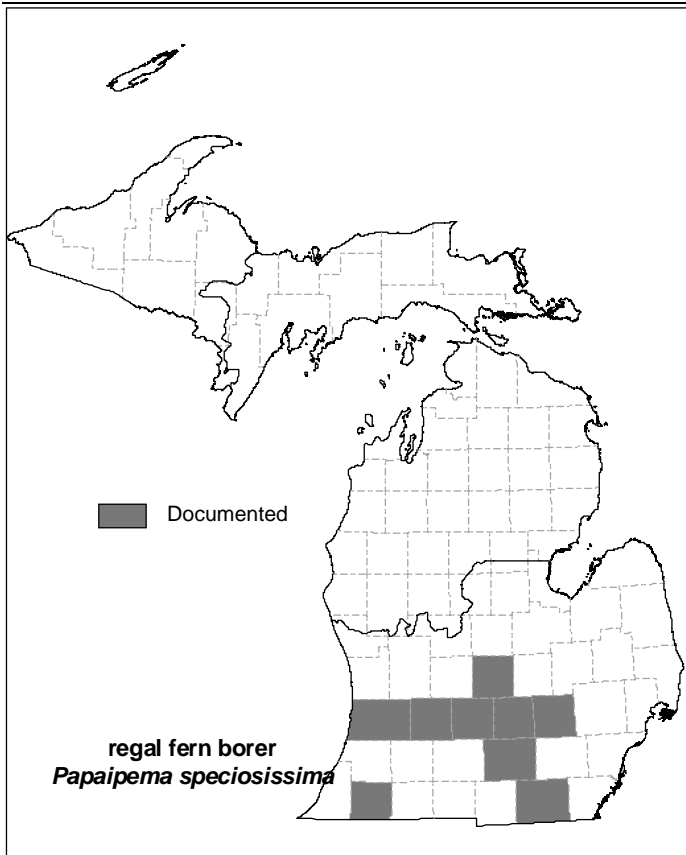
(*Papaipema silphii*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Documented from less than 10 sites in the Southern Lower Peninsula. The populations are isolated due to fragmentation and loss of habitat. This species is considered imperiled or critically imperiled in Michigan and may be rare globally.

**ASSOCIATED LANDSCAPE FEATURES:** prairie; right-of-way; lowland conifer; fen; ephemeral wetland

**ASSOCIATED THREATS:** conversion to agriculture lands; altered fire regime; fragmentation; incompatible natural resource mgmt; industrial/residential/recreational development; invasive plants & animals; lack of scientific knowledge; other biological interactions (decline in host plant); pesticides & herbicides; wetland modifications

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats. Prescribed fire is an important management tool, but care should be taken to ensure that occupied areas are only partially burned. Protection and recovery efforts must consider the status of its host plant, prairie dock (*Silphium terebinthinaceum*). ORV traffic should be redirected around occupied areas.



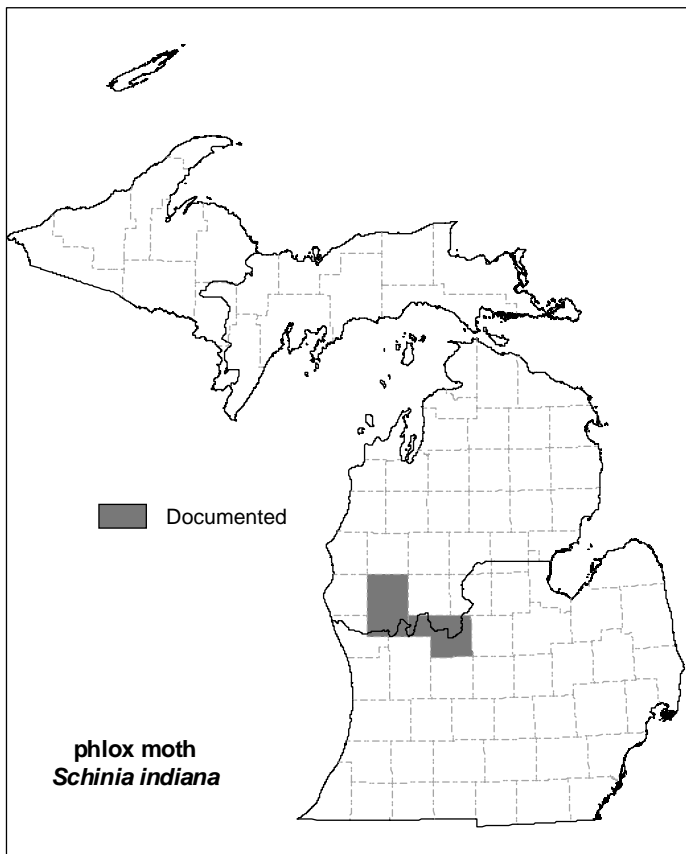
**regal fern borer**  
*(Papaipema speciosissima)*

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. Considered rare in Michigan and may be imperiled.

**ASSOCIATED LANDSCAPE FEATURES:** prairie; idle/old field; lowland shrub; lowland hardwood; fen; swamp; river/stream/riparian/floodplain corridor

**ASSOCIATED THREATS:** conversion to agriculture lands; altered fire regime; altered hydrologic regimes; industrial/residential/recreational development; invasive plants & animals; lack of scientific knowledge; pesticides & herbicides

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats.



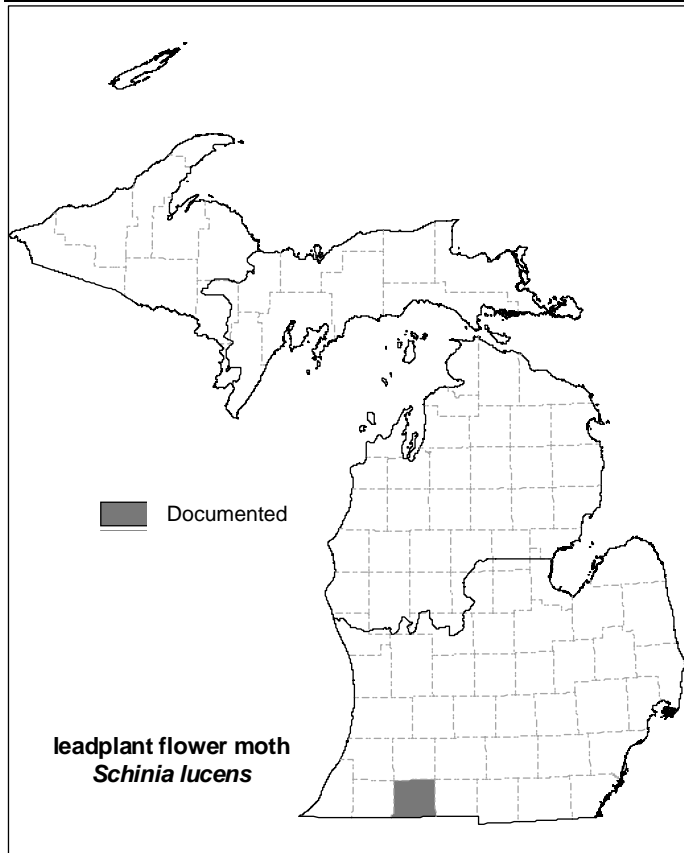
**phlox moth**  
*(Schinia indiana)*

**DISTRIBUTION & ABUNDANCE:** Listed as endangered in Michigan. The phlox moth is known from only two locations in the west-central Lower Peninsula. It is considered imperiled or critically imperiled in Michigan and it may be imperiled across its range. This species is listed as endangered in the State.

**ASSOCIATED LANDSCAPE FEATURES:** prairie; idle/old field; right-of-way; savanna

**ASSOCIATED THREATS:** conversion to agriculture lands; altered fire regime; fragmentation; grazing & mowing patterns; incompatible natural resource mgmt; lack of scientific knowledge; forestry practices; pesticides & herbicides

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats. Any efforts to protect or restore this species should consider its host plant, downy phlox (*Phlox pilosa*). Mowing or prescribed burns can delay flowering and result in the absence of blossoms and seeds following adult emergence. Phlox moths are poor dispersers, so they are highly susceptible to habitat fragmentation.



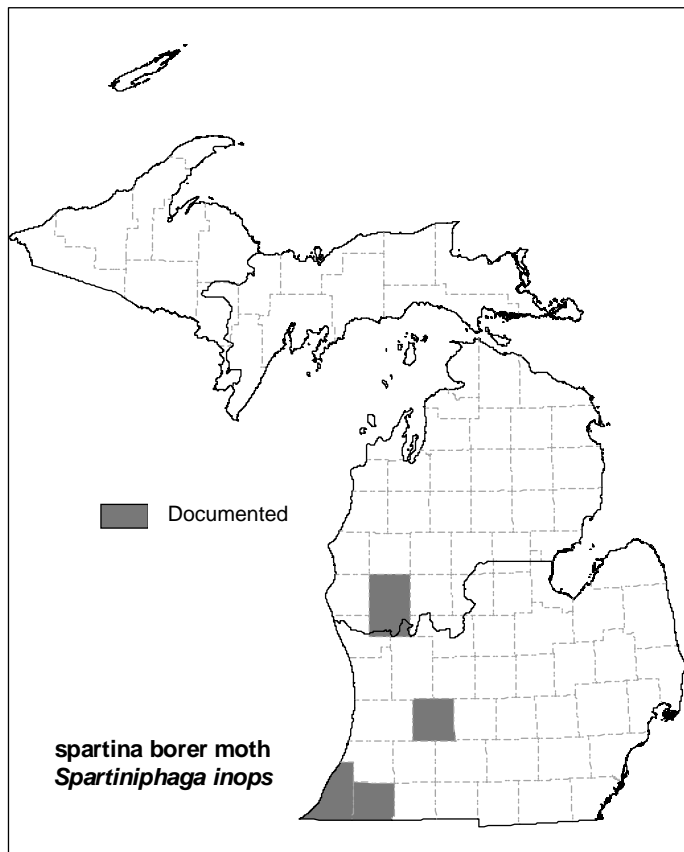
**leadplant flower moth**  
(*Schinia lucens*)

**DISTRIBUTION & ABUNDANCE:** Listed as endangered in Michigan. It is considered critically imperiled in the State.

**ASSOCIATED LANDSCAPE FEATURES:** right-of-way

**ASSOCIATED THREATS:** conversion to agriculture lands; altered fire regime; fragmentation; incompatible natural resource mgmt; industrial/residential/recreational development; invasive plants & animals; other biological interactions (decline in host plant (leadplant) populations); pesticides & herbicides; removal of wildlife

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats. Protection or recovery efforts must consider the status of its host plant, the special concern leadplant (*Amorpha canescens*). Mechanical disturbance may be an important management tool in preventing succession to woody vegetation in rights-of-ways, but care should be taken to avoid impacts to the species by considering the timing, extent, and location of these disturbances. Prescribed fire may be an important management tool, but care should be taken to ensure that occupied areas are only partially burned. Collection may pose a threat to this species.



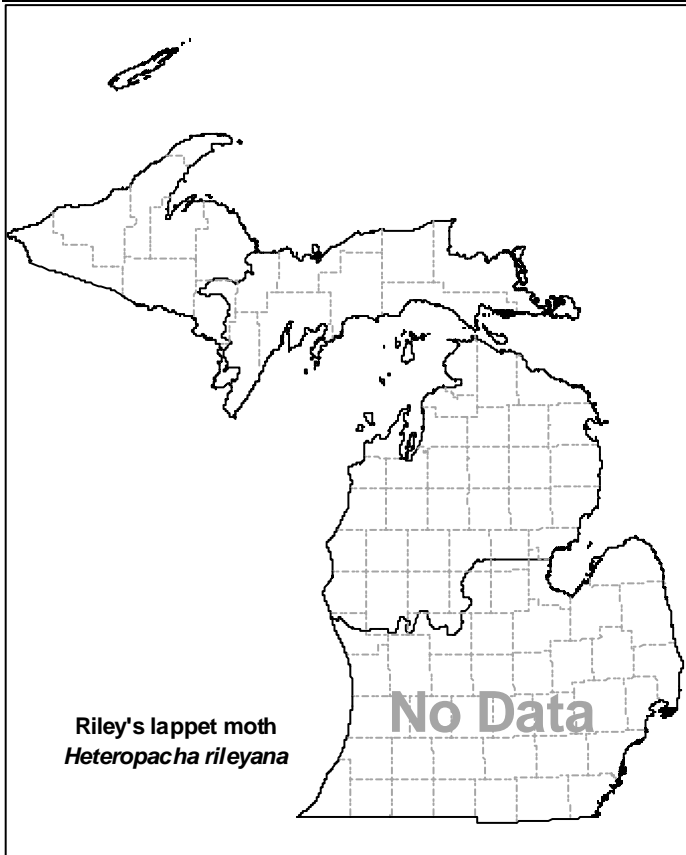
**spartina borer moth**  
(*Spartiniphaga inops*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. This species is extremely rare and is considered imperiled or critically imperiled in the State. This species may be imperiled across its range.

**ASSOCIATED LANDSCAPE FEATURES:** prairie; inland emergent wetland

**ASSOCIATED THREATS:** conversion to agriculture lands; altered fire regime; fragmentation; incompatible natural resource mgmt; invasive plants & animals; lack of scientific knowledge

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats. Protection and recovery efforts need to address declines in host plant, prairie cord-grass, *Spartina pectinata*. Displacement of host plant populations by *Phragmites* sp. invasion is a significant risk to the species. Prescribed fire is an important management tool, but care should be taken to ensure that occupied areas are only partially burned.



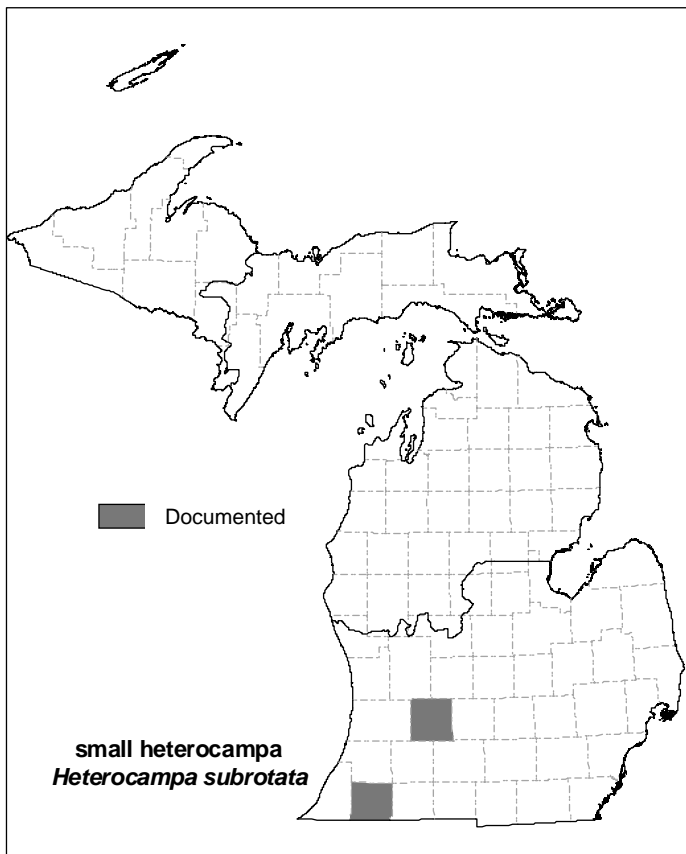
**Riley's lappet moth**  
(*Heteropacha rileyana*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. This species is considered extremely rare and may be critically imperiled in the State. Current distribution and abundance is unknown.

**ASSOCIATED LANDSCAPE FEATURES:** lowland shrub; lowland hardwood; swamp; river/stream/riparian/floodplain corridor

**ASSOCIATED THREATS:** lack of scientific knowledge; unknown

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats.



**small heterocampa**  
(*Heterocampa subrotata*)

**DISTRIBUTION & ABUNDANCE:** State listed as special concern. This species is extremely rare and considered imperiled or critically imperiled in the State.

**ASSOCIATED LANDSCAPE FEATURES:** lowland shrub; lowland hardwood; swamp; river/stream/riparian/floodplain corridor

**ASSOCIATED THREATS:** lack of scientific knowledge; unknown

**COMMENTS:** Need surveys to assess abundance and distribution; need information on life history and ecology; need to assess threats.