2024 Lepidoptera Surveys

on

Bayfield County Forestry Lands

Figure 1. *Catocala concumbens*, Barnes Barrens (30 July 2024).

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Study Purpose

The purpose of this study was to gather baseline biodiversity data on Lepidoptera (moths and butterflies) from Barnes Barrens and other Bayfield County forestry lands in northwestern Wisconsin. Emphasis was on barrens habitats, species of conservation concern, and management considerations. A secondary goal was to explore the value of managed "wildlife openings" on Bayfield County forestry lands.

Study Sites

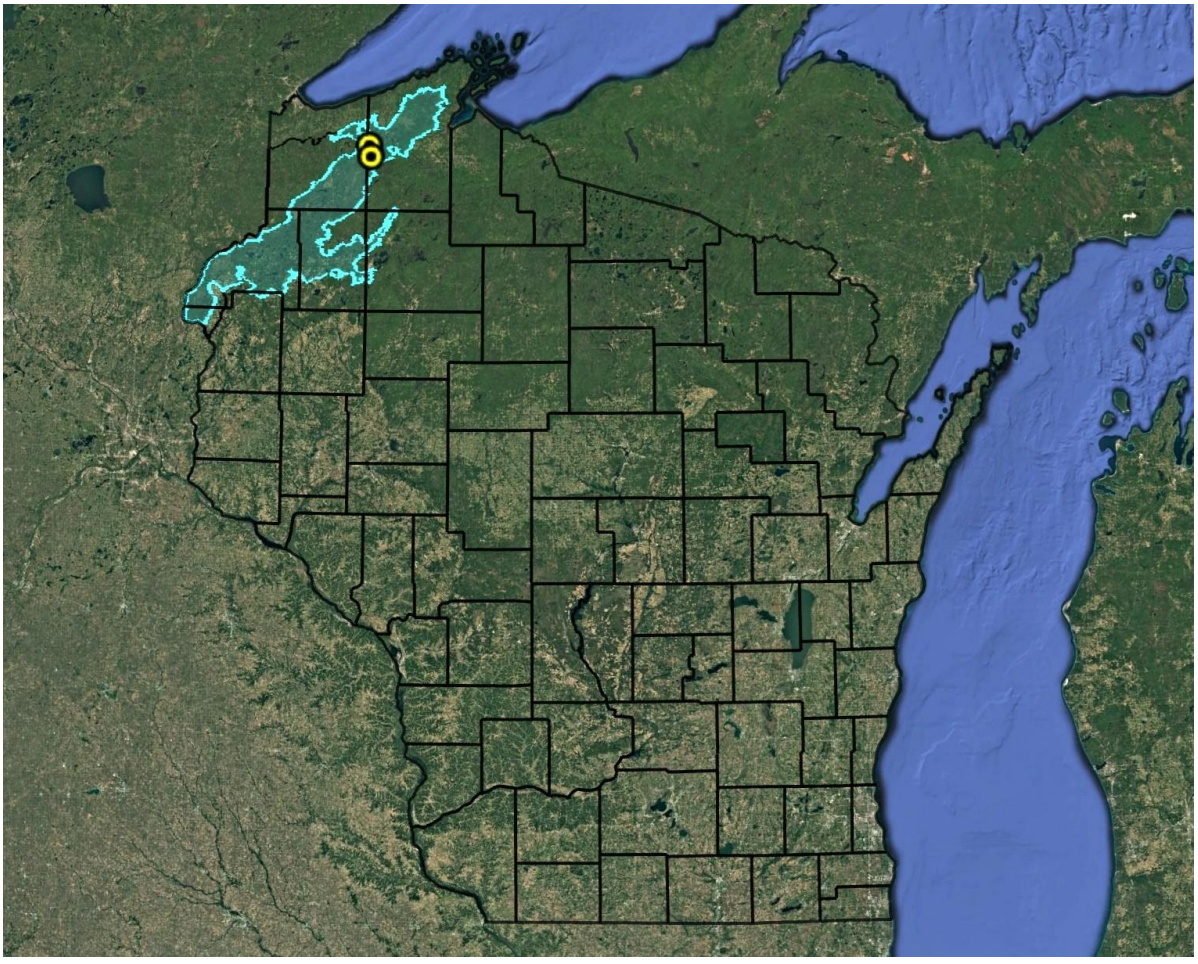

Figure 2. Study sites and ecological landscapes in northwestern Wisconsin. The Northwest Sands are highlighted light blue.

Barnes Barrens (Figures 3, 4,) is a large barrens complex featuring various types of open and semi-wooded barrens, as well as dry pine-oak woodlands and pine plantations. The barrens have floristic elements of boreal pine barrens (e.g. ericaceous shrubs, poverty grass, *Cladina* lichens) and transition zone prairie-barrens (e.g. oaks, New Jersey tea, big bluestem). The barrens core area (Figure 3) is largely treeless, with scattered deciduous brush, including abundant oaks and prairie willow. The barrens are managed by a mix of prescribed fire (esp. the core) and mechanical treatments (mowing, logging).

Banana Belt Pocket Barrens (Figures 5, 28), named after Banana Belt Road, is a series of eleven "pocket barrens" mowed wildlife openings within stands of dry pine-aspen-oak dominated woodland. The barrens vegetation is mostly akin to boreal pine barrens but also has some prairie elements (e.g. big bluestem). The site lies 4 miles north of the Barnes Barrens core and serves as a link to the Bass Lake Barrens 2.6 miles to the north/northeast.

Figure 3. Barnes Barrens open "core" area (30 July 2024). Sweet fern-blueberry-graminoid barrens with sparse oak-prairie willow brush. Prairie elements include plentiful big bluestem. This section (near 46.44688°N 91.52058°W) is particularly good habitat for barrens Lepidoptera.

Figure 4. Barrens opening (with abundant big bluestem) in dry jack pine (oak) woodland, Barnes Barrens (30 July 2024).

Figure 5. Low graminoid-blueberry (bracken) barrens in managed wildlife opening, Banana Belt Pocket Barrens (28 September 2024). The low vegetation stature looks promising for many rare barrens Lepidoptera.

Methods

Barnes Barrens was surveyed in May, July, and September of 2024; one set of wildlife openings was surveyed in September (Table 1). Surveys by RDR in May were visual-based diurnal surveys (aided with close-focusing binoculars and netting) with photographic documentation of noteworthy species. Surveys by KEJ in July and September were voucher specimen-based surveys, supplemented by photographs. Methods included diurnal searches, MV (mercury vapor) sheets (Figure 6), UV light traps, fermenting banana-brown sugar baits, and pheromone lures (combined with diurnal surveys in July and September). Emphasis was on a variety of open and semi-wooded barrens, particularly those stands likely to yield barrens specialists. At least one voucher specimen per species was kept for each site, for each main method (diurnal search, light, and bait). To document more species (and reduce specimen backlog) a synoptic set of species was collected from the MV sheet on September 27; only new and/or significant species were documented from the additional light traps. Specimens will primarily be deposited at the University of Wisconsin-Madison Insect Research Collection (WIRC) with other research collections as secondary repositories (see specimen data file). Both of our surveys covered a wide variety of barrens (from open to woodland), with emphasis on areas likely to yield barrens specialists. All photographs were taken by KEJ except for Figure 9 by RDR.

Table 1. Sampling efforts in 2024. Note: diurnal searches are within a 2km radius of point.

Date	Site	Lat/Lon	Method	Habitat
May 14	Barnes Barrens	46.44398°N 91.53129°W	diurnal search	open, semi-treed, and wooded barrens
July 30	Barnes Barrens	46.44267°N 91.50451°W	diurnal search	open, semi-treed, and wooded barrens
July 30	Barnes Barrens	46.44701°N 91.52081°W	MV sheet	open and semi-treed barrens
July 30	Barnes Barrens	46.44580°N 91.52100°W	rotten banana-brown sugar bait	open, semi-treed, and wooded barrens
Sept. 27	Barnes Barrens	46.44688°N 91.52058°W	diurnal search	open, semi-treed, and wooded barrens
Sept. 27	Barnes Barrens	6.44503°N 91.52097°W	MV sheet	open, semi-treed, and wooded barrens
Sept. 27	Barnes Barrens	46.44466°N 91.52322°W	rotten banana-brown sugar bait	open, semi-treed, and wooded barrens
Sept. 27	Barnes Barrens	46.44473°N 91.52027°W	UV light trap	open and semi-treed barrens
Sept. 27	Barnes Barrens	46.44688°N 91.52058°W	UV light trap	open and semi-treed barrens
Sept. 28	Barnes Barrens	46.44688°N 91.52058°W	diurnal search	open and semi-treed barrens
Sept. 28	Banana Belt Pocket Barrens	46.50488°N 91.52515°W	diurnal search	pocket barrens managed wildlife openings, dry mixed woodland

Figure 6. MV sheet, Barnes Barrens (30 July 2024).

Results

Over **141 species** of Lepidoptera were recorded (Table 2; see also specimen data file); further identifications will increase this number. Among these are at least 25 species affiliated with barrens and related habitats (e.g. dunes, savannas, prairies), and nine of these are – to the best of our knowledge – known solely from these habitats in the Midwest (see Table 2). Species worthy of conservation mention include *Carmenta anthracipennis, Euchloe olympia, Bandera binotella, Prionapteryx nebulifera, Acronicta lithospila, Chytonix sensilis,* and *Chaetaglaea cerata.*

Carmenta anthracipennis is an infrequently encountered species in the Midwest, in part due to its elusive nature (most records are from pheromone lures). It is a blazing star (*Liatris*) specialist and has been found in dry prairies and barrens. It is worth considering for a Species of Greatest Conservation Need (SGCN) in Wisconsin.

Euchloe olympia occurs in a variety of dry, typically sandy habitats such as barrens, sand prairies, savannas, and dunes. It is quite common/widespread in Wisconsin's Central Sand Plains and Central Sand Hills ecological landscapes. In the Northwest Sands it is common/widespread in Burnett County but becomes much less common northeastward into Bayfield County.

Bandera binotella is an infrequently encountered species in the Midwest, occurring most commonly on dunes but also in sand prairie and barrens. It is worth considering for SGCN.

Prionapteryx nebulifera is an infrequently encountered species in the Midwest, occurring most commonly on dunes but also in barrens and some dry prairies. It is worth considering for SGCN.

Acronicta lithospila is an infrequently encountered species in the Midwest, occurring most commonly on barrens and dry savannas. It is worth considering for SGCN.

Chytonix sensilis is known from barrens, savannas, and dunes in the Midwest. Barnes Barrens supports a robust population. It is worth considering for SGCN.

Chaetaglaea cerata is known from barrens – and larger, open barrens in particular – in Wisconsin and Michigan. In western Minnesota it also occurs in dry prairies. It does not appear to persist in small barrens openings, unlike many other barrens specialists. The robust population at Barnes Barrens is a sign of restoration success.

Many lepidopterists found that 2024 was one of the worst years in memory for Lepidoptera diversity/abundance. Late fall was particularly poor, with normally abundant species (e.g. *Sunira bicolorago*) sparse or absent from samples. Therefore, the lack of certain "high quality" barrens indicators (e.g. *Psectraglaea carnosa*, the Pink Sallow) should be viewed cautiously. Also, the single species (*Nomophila nearctica*) documented from the Banana Belt Pocket Barrens is not a signal of habitat quality, just of the poor season. The 25 barrens-affiliated species documented from Barnes Barrens are an encouraging sign, and proof that the barrens habitat management is having some success.

Additional Figures

Figure 7. *Acleris minuta*, Barnes Barrens (27 September 2024)

Figure 8. *Anacampsis innocuella*, Barnes Barrens (30 July 2024)

Figure 9. *Euchloe olympia* (Olympia Marble), Barnes Barrens (14 May 2024); photo by RDR

Figure 10. *Satyrium titus* (Coral Hairstreak), Barnes Barrens (30 July 2024)

Figure 11. *Satyrium edwardsii* (Edward's Hairstreak), Barnes Barrens (30 July 2024)

Figure 12. *Prionapteryx nebulifera*, Barnes Barrens (30 July 2024)

Figure 13. *Hemileuca nevadensis*, Barnes Barrens (28 September 2024)

Figure 14. *Smerinthus jamaicensis*, Barnes Barrens (30 July 2024)

Figure 15. *Cyclophora pendulinaria*, Barnes Barrens (30 July 2024)

Figure 16. *Pheosia rimosa*, Barnes Barrens (30 July 2024)

Figure 17. *Apantesis parthenice*, Barnes Barrens (30 July 2024)

Figure 18. *Catocala antinympha*, Barnes Barrens (30 July 2024)

Figure 19. *Schinia florida*, Barnes Barrens (30 July 2024)

Figure 20. *Chaetaglaea cerata*, Barnes Barrens (30 July 2024)

Figure 21. *Xanthia tatago*, Barnes Barrens (27 September 2024)

Figure 22. *Agrotis ipsilon*, Barnes Barrens (27 September 2024)

Table 2. Lepidoptera documented in 2024 (141 taxa total).
Species = only known from barrens, savanna, prairie, and/or dune habitat in Wisconsin.
Species = most frequently encountered in such habitats, but not completely restricted to them.
Species = illustrated above.
Habitat comments are based largely on personal experience and discussion with other researchers, and in some instances are tentative. For detailed data (e.g. lat/lon) see specimen data file (sight/photo records by RDR are noted in the comments column).

Family	Species	Comments
Gracillariidae	*Caloptilia vacciniella*	blueberry (*Vaccinium*) specialist common in barrens and peatlands
Tortricidae	*Acleris obtusana*	
Tortricidae	*Acleris oxycoccana*	most common in peatlands, but some records from barrens
Tortricidae	***Acleris minuta***	most records from barrens; much less common in peatlands
Tortricidae	*Acleris* sp.	
Tortricidae	*Decodes macdunnoughi*	
Tortricidae	*Choristoneura pinus*	
Tortricidae	*Archips fervidana*	
Tortricidae	*Clepsis peritana*	
Tortricidae	*Sparganothis sulfureana*	
Tortricidae	*Sparganothis tristriata*	
Tortricidae	*Sparganothis unifasciana*	most frequently encountered in prairies, savannas, and barrens
Tortricidae	*Ancylis diminuatana*	
Tortricidae	*Eucosma ochroterminana*	
Tortricidae	*Eucosma tomonana*	

Family	Species	Comments
Tortricidae	*Pelochrista palabundana*	Midwestern records generally associated with barrens and dry prairie; includes barrens elements in dry northern woodland openings
Tortricidae	*Pelochrista cataclystiana*	
Tortricidae	*Cydia latiferreana*	
Tortricidae	Unidentified Tortricidae	
Sesiidae	*Carmenta anthracipennis*	blazing star (*Liatris*) specialist; a seldom encountered species
Gelechiidae	***Anacampsis innocuella***	
Gelechiidae	*Anacampsis niveopulvella*	
Gelechiidae	*Chionodes thoraceochrella*	
Gelechiidae	Unidentified Gelechiidae	
Coleophoridae	*Coleophora* sp.	
Hesperiidae	*Erynnis* sp. (unidentified Duskywing)	sight record by RDR
Hesperiidae	*Euphyes vestris* (Dun Skipper)	
Hesperiidae	*Anatrytone logan* (Delaware Skipper)	grassland generalist; formerly common in old field as well as prairies and some barrens, but declining in recent years; Barnes is a nice northerly record
Pieridae	*Pyrisitia lisa* (Little Yellow)	notable southern stray this far north
Pieridae	***Euchloe olympia* (Olympia Marble)**	photo record by RDR; rock cress (*Arabidopsis*) specialist; most records from sand prairies, barrens, savannas, and dunes
Lycaenidae	*Lycaena hypophlaeas* (American Copper)	
Lycaenidae	*Callophrys niphon* (Eastern Pine Elfin)	sight record by RDR; pine specialist
Lycaenidae	*Callophrys polios* (Hoary Elfin)	sight record by RDR; bearberry (*Arctostaphylos uva-ursi*) specialist in barrens (including openings in dry coniferous woodlands) and sometimes dunes
Lycaenidae	***Satyrium titus* (Coral Hairstreak)**	
Lycaenidae	***Satyrium edwardsii* (Edward's Hairstreak)**	most common in dry scrub oak habitats
Nymphalidae	*Boloria bellona* (Meadow Fritillary)	
Nymphalidae	*Argynnis aphrodite* (Aphrodite Fritillary)	occurs in a variety of open, often dry habitat, but is particularly common in barrens and dry praries
Nymphalidae	*Vanessa virginiensis* (American Lady)	sight record by RDR
Nymphalidae	*Junonia coenia* (Common Buckeye)	southern stray
Nymphalidae	*Cercyonis pegala* (Common Wood Nymph)	

Family	Species	Comments
Pyralidae	*Acrobasis comptoniella*	most common in barrens with sweet fern (*Comptonia peregrina*), but also wetlands with sweet gale (*Myrica gale*)
Pyralidae	*Bandera binotella*	particularly common on dunes; less frequent in non-dune dry prairies and pine barrens
Pyralidae	*Peoria approximella*	locally common in dry and/or sandy habitats, including prairies, dunes, and barrens
Pyralidae	Unidentified Pyralidae	
Crambidae	*Udea rubigalis*	
Crambidae	*Herpetogramma aquilonalis*	
Crambidae	*Nomophila nearctica*	
Crambidae	*Parapoynx badiusalis*	aquatic specialist
Crambidae	*Parapoynx allionealis*	aquatic specialist
Crambidae	*Scoparia biplagialis*	
Crambidae	***Prionapteryx nebulifera***	most records from dunes; less frequent in non-dune dry prairies and pine barrens
Crambidae	*Microcrambus elegans*	
Crambidae	*Neodactria* sp.	
Crambidae	*Chrysoteuchia topiarius*	
Crambidae	*Crambus albellus*	
Lasiocampidae	*Malacosoma americana*	
Saturniidae	***Hemileuca nevadensis***	northwestern WI records are primarily from barrens with abundant prairie willow (*Salix humilis*) but occurs more widely in Midwest in open willow/scrub aspen habitats, esp. wetlands
Sphingidae	***Smerinthus jamaicensis***	
Geometridae	***Cyclophora pendulinaria***	
Geometridae	*Scopula inductata*	
Geometridae	*Eupithecia* sp.	
Geometridae	*Xanthorhoe ferrugata*	
Geometridae	*Anavitrinella pampinaria*	
Geometridae	*Euchlaena johnsonaria*	
Geometridae	*Nepytia canosaria*	
Geometridae	*Prochoerodes lineola*	
Notodontidae	*Clostera albosigma*	
Notodontidae	***Pheosia rimosa***	
Notodontidae	*Gluphisia septentrionis*	
Notodontidae	*Peridea angulosa*	
Notodontidae	*Ianassa lignicolor*	
Erebidae	*Dasychira basiflava*	
Erebidae	*Orgyia leucostigma*	
Erebidae	*Hypoprepia fucosa*	
Erebidae	*Manulea bicolor*	
Erebidae	*Crambidia pallida*	

Family	Species	Comments
Erebidae	***Apantesis parthenice***	
Erebidae	*Phragmatobia assimilans*	
Erebidae	*Virbia aurantiaca*	widespread in a variety of open habitats, esp. dry sandy ones
Erebidae	*Virbia ferruginosa*	
Erebidae	*Idia americalis*	
Erebidae	*Idia aemula*	
Erebidae	*Idia rotundalis*	
Erebidae	*Zanclognatha marcidilinea*	
Erebidae	*Macrochilo orciferalis*	
Erebidae	*Phalaenostola metonalis*	
Erebidae	*Phalaenostola larentioides*	
Erebidae	*Bleptina caradrinalis*	
Erebidae	*Renia flavipunctalis*	
Erebidae	*Palthis angulalis*	
Erebidae	*Pangrapta decoralis*	
Erebidae	*Hypenodes sombrus*	wetland specialist
Erebidae	***Catocala antinympha***	sweet fern (*Comptonia peregrina*) specialist; common in barrens, including barrens elements along roadsides, etc.
Erebidae	***Catocala concumbens***	
Erebidae	*Catocala sordida*	common in barrens, dry conifer woodlands, and peatlands with blueberries (*Vaccinium*)
Erebidae	*Catocala blandula*	
Erebidae	*Catocala similis*	most common in dry, often scrubby, oak (*Quercus*) habitats in WI, esp. barrens and savannas
Noctuidae	*Trichoplusia ni*	
Noctuidae	*Syngrapha rectangula*	
Noctuidae	*Acronicta funeralis*	infrequently encountered
Noctuidae	*Acronicta tritona*	most frequently encountered in dry, often ericaceous habitats, esp. barrens
Noctuidae	*Acronicta lithospila*	Midwestern records from barrens, sand prairies, and dry savannas
Noctuidae	*Acronicta impressa*	
Noctuidae	*Amphipyra pyramidoides*	
Noctuidae	*Sympistis dentata*	
Noctuidae	***Schinia florida***	infrequently encountered; specialist on evening primroses (*Oenethera*)
Noctuidae	*Callopistria cordata*	
Noctuidae	*Chytonix sensilis*	Midwestern records from barrens, dunes, and dry savannas
Noctuidae	*Proxenus miranda*	
Noctuidae	*Nedra ramosula*	
Noctuidae	*Apamea lignicolora*	
Noctuidae	*Apamea amputatrix*	
Noctuidae	*Apamea devastator*	

Family	Species	Comments
Noctuidae	*Lateroligia ophiogramma*	
Noctuidae	*Mesapamea fractilinea*	
Noctuidae	*Amphipoea* sp.	
Noctuidae	*Papaipema pterisii*	
Noctuidae	*Lithophane tepida*	
Noctuidae	*Lithophane grotei*	
Noctuidae	***Chaetaglaea cerata***	Midwestern records from open barrens and some dry prairies; does not appear to persist in small barrens openings
Noctuidae	*Chaetaglaea sericea*	
Noctuidae	***Xanthia tatago***	
Noctuidae	*Ipimorpha pleonectusa*	
Noctuidae	*Polia purpurissata*	
Noctuidae	*Sideridis maryx*	primarily a barrens species, including small barrens openings in dry conifer woodlands
Noctuidae	*Dargida diffusa*	
Noctuidae	*Mythimna unipuncta*	
Noctuidae	*Leucania commoides*	
Noctuidae	*Lacinipolia meditata*	
Noctuidae	*Lacinipolia sareta*	most common in barrens and other dry open habitats
Noctuidae	*Lacinipolia renigera*	
Noctuidae	*Peridroma saucia*	
Noctuidae	*Anicla forbesi*	most common in barrens and other dry open habitats
Noctuidae	*Striacosta albicosta*	
Noctuidae	*Feltia tricosa*	
Noctuidae	***Agrotis ipsilon***	
Noctuidae	*Eurois astricta*	
Noctuidae	*Anaplectoides prasina*	
Noctuidae	*Xestia c-nigrum*	
Noctuidae	*Abagrotis alternata*	
Noctuidae	*Abagrotis brunneipennis*	most common in barrens, dry conifer woodlands, and other dry open habitats

Barrens and Prairie Management

Lepidoptera restricted to high-quality barrens (and other rare and/or isolated habitats) present a conundrum for land managers. On one hand, inaction will lead to woody encroachment and other habitat degradation. On the other hand, management can extirpate rare fauna. The trick is to balance these two facets, while bearing in mind that there is much we don't know.

To conserve rare fauna, one basic principle is to treat a portion of a given habitat at any one time, whether that be fire, mowing, or grazing. However, there is more complexity to this than simply

dividing a barrens into rotational burn units. The following three hypothetical management scenarios (using Barnes Barrens core area) illustrate three levels of complexity.

Figure 23. Management scenario 1. Barrens is a single management unit, burned at once. This scenario hypothetically results in the least diversity/abundance of barrens specialists, due to low diversity of ecological niches and less recolonization potential (fortunately, the large landscape of Barnes Barrens provides recolonization potential from outside the core area).

Figure 24. Management scenario 2. Barrens is divided into four management units, burned rotationally in different years. This scenario hypothetically results in intermediate diversity/abundance of barrens specialists.

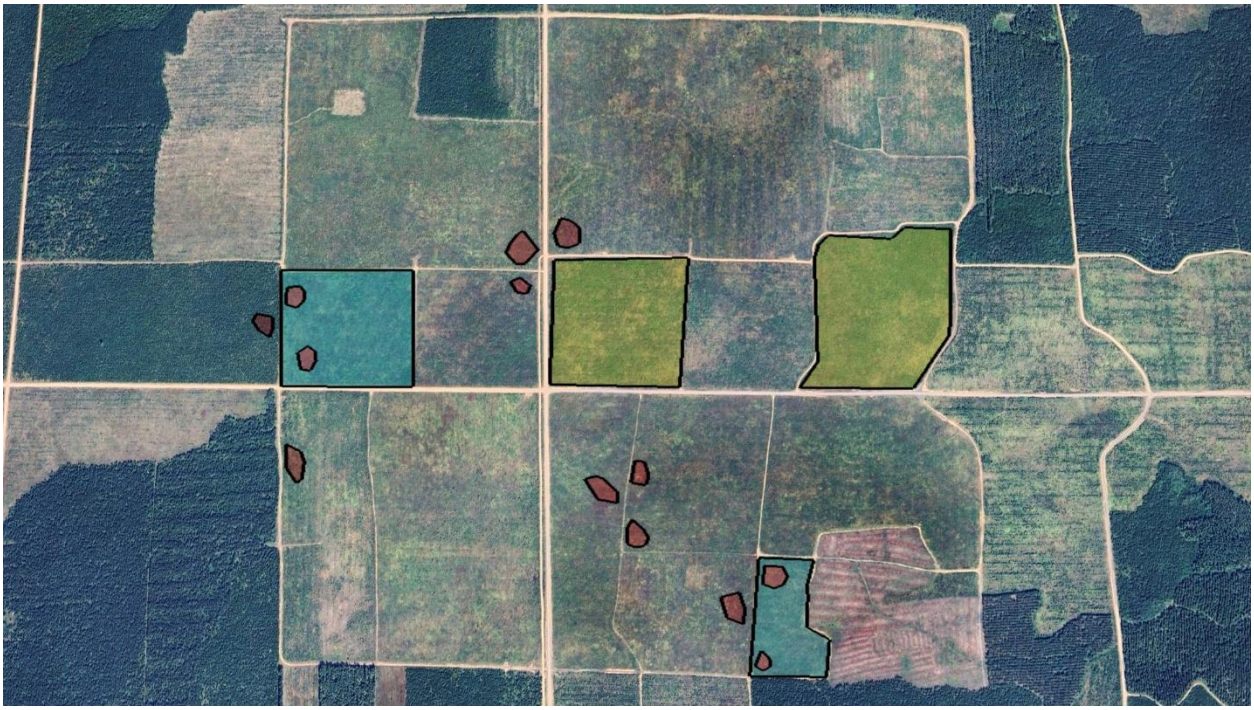

Figure 25. Management scenario 3. Barrens is divided into multiple management units with different management regimes. Blue polygons are mow/mechanical methods only (no fire); yellow polygons are fire only (no mow/mechanical); small brown polygons are high intensity mowing areas (to replicate wildlife openings), remaning sections are mix of mow/mechanical methods and fire. This scenario hypothetically results in the greatest diversity/abundance of barrens specialists due to diversity of ecological niches, in addition to recolonization potential.

In the above examples, increasing the number of management units increases the potential for recolonization following management. But the third example also increases the number of *management regimes*, thereby increasing ecological diversity (different management techniques favor different flora and fauna). The idea is that a particular management technique – say fire – selects against species which can't survive that management technique (*Cladina* lichens, for example, do poorly with frequent burns). If a site is consistently managed with fire, fire-tolerant species will logically comprise the flora and fauna. If a site is consistently mowed, mowing-tolerant species will comprise the fauna, and this list will be different from the fire-tolerant one (with areas of overlap). If a site is consistently managed with both fire and mowing, species which are tolerant of both fire and mowing will comprise the fauna. While the third option may seem least diverse, it is plausible some species do best with both combined, so should be considered. Management frequency can add regime diversity, too. A barrens unit consistently burned every 1-3 years should yield different results than one burned every 5-7 years, in terms of both flora and fauna.

Theoretically, if a site is divided into different management units, and each of those managed units is managed differently and consistently, the site develops greater biodiversity potential since there are more niches to occupy. This concept is sometimes called "consistent diversity of management", as championed by Wisconsin lepidopterists Ann and Scott Swengel.

There is one “consistent diversity of management” practice particularly important to barrens and prairie fauna - long-term fire-free refugia. Refugia benefit Lepidoptera in a variety of Midwestern landscapes (e.g. Swengel & Swengel 2006). They are particularly important for species which are slow dispersers (thus frequent burn rotations might not allow sufficient time for recolonization) or those with demanding microhabitat preferences (frequent burn rotation units may not achieve optimal vegetation before the next burn, thus inhibiting recolonization; see Chryxus Arctic below). This concept can be expanded to other management types (e.g. refugia from grazing, mowing, or herbicides).

Landscape composition is another important consideration. Where are the nearest source habitats? If there are suitable habitat patches within a several mile radius, there may be a good chance of recolonization. Fortunately, Barrens Barrens is part of a large barrens landscape, which greatly increases recolonization potential (and readily explains the good results in the core area thus far). However, there is potential for rare, localized species (e.g. *Psectraglaea carnosa*, the Pink Sallow) which are vulnerable to extirpation.

The dramatic decline of Chryxus Arctic (*Oeneis chryxus*) in northern Wisconsin (REFS) underscores the importance of varied regimes in barrens management (Johnson 2019; Rutherford 2019, 2020, 2021, 2022, 2023; Rutherford & Johnson 2024). Prescribed fire has been a primary tool in barrens management across much of the state. Frequent fire has resulted in a “prairification” of boreal pine barrens, such as at Mott’s Ravine SNA in Douglas County (Figure 26), 4.3 miles west of the Barnes Barrens core. The tall grass structure here is not tolerated by Chryxus Arctic, and likely many other animals as well. Sites managed strictly be mowing tend to have low-stature vegetation and floral diversity more consistent with boreal pine barrens; this vegetation type is becoming rare in northwestern Wisconsin. The Minnesuing Barrens in Douglas County (Figure 27), 6.6 miles west/southwest of the Barnes Barrens core, includes mowed areas on the periphery of a private airstrip; this site has not been surveyed for Chryxus Arctic but is one of the most promising options left in northwestern Wisconsin. At the very least, this site is proof that mowing alone can achieve fine barrens habitat and could add diversity to the management regimes at Barnes Barrens. The Bayfield County wildlife openings (see below) provide more examples of fine barrens habitat created by mowing alone.

While the above provides general guidance, each situation is unique, and there is no substitute for on-the-ground assessment and discussion.

Figure 26. Fire-managed barrens with relatively tall prairie grass structure, Mott's Ravine SNA, Douglas County (28 September 2024). This tall vegetation stature appears unsuitable for some rare barrens Lepidoptera, including the imperiled *Oeneis chryxus* (Chryxus Arctic). The "prairification" of barrens is common at sites with intensive fire management.

Figure 27. Low graminoid (blueberry-sweetfern) barrens in mowed clearing on the periphery of an airstrip, Minnesuing Barrens, Douglas County (28 September 2024). The low vegetation structure looks promising for many rare barrens Lepidoptera, including the imperiled *Oeneis chryxus* (Chryxus Arctic).

Bayfield County Wildlife Openings

Bayfield County manages hundreds of small wildlife openings throughout the county, but funding for their maintanance is dwindling. Which of these openings – if any – are worth maintaining into perpetuity?

Field surveys in 2024 only covered one set of these openings due to logistical contraints (namely two flat tires over two days!). Despite this, survey results combined with aerial photo analysis can give preliminary guidance.

The Banana Belt Pock Barrens (Figures 5, 28) clearly demonstrates that mowed openings can create excellent barrens with potential for rare species, especially the elusive *Psectraglaea carnosa* (Pink Sallow), a species of Special Concern in Wisconsin. This site also creates a link between Barnes Barrens and Bass Lake Barrens. Given these two factors combined with the county's focus on barrens habitat, this site would be top priority for continued management (continue with mowing, since that is what created these nice habitats in the first place).

Figure 28. Blueberry-low graminoid-sweetfern barrens in managed wildlife opening, Banana Belt Pocket Barrens (28 September 2024). The low vegetation stature looks promising for many rare barrens Lepidoptera; this section looks promising for the elusive *Psectraglaea carnosa* (Pink Sallow), a species of Special Concern in Wisconsin.

Aerial photographs reveal other areas worthy of consideration. Four focal areas are listed below; all need ground truthing to better assess their value.

1) Openings within Bass Lake Barrens: continue these as high-intensity mowing areas, to create brush-free areas within the complex.

2) Other barrens openings between Barnes and Bass Lake barrens to improve site connectivity: examples include 46.50930°N 91.50465°W and 46.53024°N 91.49208°W.

3) Boreal openings in the Lake Superior Clay Plain which have potential for unique boreal fauna; examples include 46.82730°N 91.16241°W, 46.66363°N 91.33029°W, and 46.69585°N 91.30028°W.

4) Barrens openings on the north end of Moquah Barrens, which have good potential for more boreal barrens fauna: examples include 46.76052°N 91.13030°W and 46.77563°N 91.06818°W.

Once sites have been ground truthed for habitat quality, targeted surveys may highlight some areas over others due to the presence of rare species (this could be for plants, insects, or other taxa). Another key consideration is logistics – how difficult are these sites to access and mow on a consistent basis? Clusters of sites make sense for logistic (and biological) reasons.

Future Surveys

Lepidoptera are the dominant herbivores in terrestrial ecosystems, both in terms of biodiversity and even biomass (Grimaldi & Engel, 2005). Research in the Great Lakes region (Hugo Kons Jr. and Ken Stead, pers. com.; pers. obs.) suggests that 1000-1500 species is a *low-end estimate* for diversity at a single sizeable site. Thus, a formidable amount of survey work remains. Barrens are treasure troves for rare species, and further surveys will undoubtedly yield more exciting finds. Surveys during different times of year will yield different suites of species. Barnes Barrens is the top priority area, but the wildlife openings (esp. Banana Belt Pocket Barrens) have good potential for rare species as well. Bass Lake Barrens would be interesting to explore, given it is in the early stages of restoration.

Further survey to increase our overall understanding of habitat specialist Lepidoptera fauna is still badly needed. Numerous species of conservation interest need more data to assess their habitat preferences and conservation needs. In particular, management sensitivity of most species is poorly understood. The importance of large vs. small barrens openings is also not well known.

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