



Inventory of Habitats in the Area of Sandy, Jeremiah and Old Pocha Roads for State-listed Insects

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INTRODUCTION

Pitch pine/scrub oak barrens contain a mosaic of globally rare habitats (including pitch pine woodland, scrub oak thickets, heathlands, sandplain grasslands, and acid wetlands) located primarily on the coastal plain from Maine to New Jersey. A few sandy riverine oxbows and serpentine mountain ridgetops also support smaller patches of barrens. Roughly half of the original acreage remains, approximately 900,000 acres. Although most of the remaining barrens habitat (750,000 acres) is in New Jersey, Massachusetts ranks third, with about 53,000 acres in southeastern Massachusetts (Cryan, 1985). As the name indicates, these barrens are dominated by pitch pine (*Pinus rigida*) and scrub oak (*Quercus ilicifolia*). The nutrient poor, acid soils also support a variety of blueberries and huckleberries (Ericaceae) in the understory. Pitch pine/scrub oak barrens is a disclimax habitat that requires disturbance, particularly periodic fires, in order to maintain itself.

Nearly sixty percent (23 out of 39) of the rare moth fauna listed in the Massachusetts Endangered Species Protection Act (Table 1) as of June, 2006 are found primarily in scrub oak barrens (9 species), coastal heathlands (8 species), or sandplain grasslands (7 species). Forty-four percent (17 of 39) are restricted to native heathland or shrubland (including scrub oak barrens) habitat as described by Wagner et al (2003); and this number represents only a fraction of the 56 species of "Conservation Concern" they list as uncommon shrubland/heathland specialists. For New England, many of these species reside in, and in some cases are restricted to, southeastern Massachusetts - particularly Marthas Vineyard and Nantucket. In fact, the sandplain grassland, coastal heathland and scrub oak habitats on Massachusetts offshore islands have been identified as significant globally rare natural communities (Swain and Kearsley, 2000).

In 2005, the Massachusetts Natural Heritage and Endangered Species Program (NHESP) identified priority habitat (PH1730) for four state-listed insects that occur within the Chappaquiddick portion of this block:

Cicindela purpurea (Special Concern = "SC") – Purple Tiger Beetle

Cingilia catenaria (SC) – Chain Dot Inchworm
Euchlaena madusaria (SC) – Sandplain Euchlaena
Papaipema sulphurata (SC) – Water-willow Stem Borer

However, much of Chappaquiddick has not been inventoried for moths, including the land abutting Sandy Road. Thus, no records for state-listed or any other moth species exist for this area. Current residents within and abutting the seven-acre parcel of land on the west side of Sandy Road have questioned whether state-listed species are in fact present. Thus, I was contracted by the property owner of Lot 5, Dr. & Mrs. Robert Finkelstein, to assess the likelihood of the habitat on the parcels bordering Sandy Road to support state-listed insects (Figure 1).

Because permission for access to parcels that are slated for development was not given, my assessment was made primarily from the vantage of Sandy Road, from Lots' 2, 5, and 8, from the MBLU 34/249 property, and from properties east of the proposed development parcel. The site visit was made on March 17, 2006. Most of the parcels visible from the aforementioned vantage spots are dominated by a young, 20 -30 foot tall even age stand of both black (*Quercus velutina*) and white (*Q. alba*) oaks, and probably scarlet oak *Q. coccinea* and post oak (*Q. stellata*) as well (Figure 2). The tree oaks are somewhat taller at the north end of Sandy Road than in the middle portion and southern end. The understory is predominately ericaceous (blueberry [*Vaccinium* spp.] and huckleberry [*Gaylussacia* spp.]), with sapling tree oaks and scattered scrub oak (*Q. ilicifolia*). South and west of Sandy Road pitch pine (*Pinus rigida*) increases in predominance (Figure 3). The tree oaks at the southern end of the property (Figure 4) are shorter and probably younger than those in the middle portion, with a higher percentage of scrub oak in the understory. The habitat adjacent to, and south of the MBLU 34/249 property (Figure 5) opens up into patches of partial canopy areas with a dense scrub oak understory.

No wetlands are on or near the parcels abutting Sandy Road, thus no wetlands affiliated Lepidoptera, including *P. sulphurata*, would be breeding at this site.

Given the density of the Ericaceous understory throughout the observable portions of this site, and the scrub oak and pitch pine bordering this site, it is likely that one or more state-listed species might be documented in this area (see Assessment, Mello 2006). Thus the Lloyd Center was contracted to conduct a season-long moth survey of properties along Sandy, Jeremiah and Old Pocha Roads for which permission for access was given.

METHODS

Nine stations were established that would cover the full range of habitats found in the vicinity of Sandy Road. Fifteen trap-nights were conducted on the following schedule:

May 31	September 24, 25
June 1, 22, 23	October 10, 11, 31
July 4, 5, 17, 18, 26, 27	

This schedule was chosen to optimize the coverage of the flight periods of state-listed species that would possibly be encountered.

Three portable quantum ultraviolet (uv) light traps charged with ethyl acetate were set on each sampling night at three separate stations before dusk and retrieved after

dawn. Traps were processed on Chappaquiddick the day following trap set-up. Each species encountered was recorded as present, and state-listed species were also counted. At least one voucher of each species encountered was saved and entered into the Lloyd Center reference collection.

Documentation of species attracted to the porch light on the house at Station 4 where the author was lodged was also made on several nights. A mercury vapor light or blacklight/sheet was operated on two nights, also at Station 4; and baiting was utilized one night to inventory species that more readily come to bait rather than light in the fall.

The general area within the footprint of the stations was traversed on foot at least once per trip (unless raining or cloudy) to inventory day-flying Lepidoptera or tiger beetles.

RESULTS

A total of 358 species of nocturnal macrolepidoptera was documented by this survey (Table 2). A total of 48 samples were obtained: 42 portable uv trap, three porch light, one blacklight, one mercury vapor light and one bait sample. Given that most of the spring-flying (March – May) and August flying species were not inventoried (the former due to the relatively late project start date, and the latter due to the lack of new listed species likely to be encountered in August), the 358 species represents a substantial majority of species present during the actual sampling period.

Eleven of these species (Table 3; Appendix II - photographs) are listed as rare in the Massachusetts Endangered Species Act (2006). One (*Eacles imperialis*) is a pitch pine woodland species, one (*Stenoporpia polygrammaria*) is an oak woodland species, one (*Bagisara rectifascia*) is a woodland/shrubland species, three (*Cingilia catenaria*, *Psectraglaea carnosus* and *Abagrotis nefascia*) are shrubland/heathland species, three (*Cicinnus melsheimeri*, *Zale* sp. 1, and *Catocala herodias*) are scrub oak barrens species, and two (*Oncocnemis riparia* and *Faronta rubripennis*) are sandplain grassland/dune species. With the exception of *Cingilia catenaria*, all of the listed species encountered are new records for Chappaquiddick.

More than half the records (6 of the 11 species) are represented by one individual. A detailed discussion by species follows. Note that the terms “this area” or “the area” refer to the entire footprint that was surveyed. The Global Rankings (G..) have been taken directly from NatureServe (2006), with G5 being widespread and secure and decreasing rankings having increased habitat restriction and/or vulnerability. “U” means status uncertain, and “T” refers to a subspecies or subpopulation level.

***Stenoporpia polygrammaria* (Geometridae) – Faded Gray Geometer** **Massachusetts – Threatened** **GU**

This species is distributed from Canada to Arkansas and Georgia in oak woodlands and barrens, but is rare or absent in much of the East (Wagner 2001). The larval hostplants include various tree oaks. In New England, the only recent records for this species are on Marthas Vineyard. Adults fly in late June and early July, producing one generation per year. Overwintering occurs as a pupa.

Seven Faded Grays were documented in this survey on June 22-23, 2006, all by the portable uv traps. Appropriate larval hostplants (black and white oaks) occur at each of these stations, and thus breeding is likely occurring throughout this area.

***Cingilia catenaria* (Geometridae) – Chain-dotted Geometer**
Massachusetts - Special Concern **G4**

This is a shrub-dominated heathland species whose larvae feed on variety of ericaceous plants and bayberry in southeastern Massachusetts (pers. obs.), but have also been reported from a wide array of plants from pines, maples (*Acer* spp.) and oaks to poison ivy (*Toxicodendron radicans*), "grasses" and goldenrods (*Solidago* spp.) (Tietz, 1972). It appears to exhibit great fluctuations in population size, making trends difficult to analyze, but it clearly prefers recently burned shrubland. It currently is common in Massachusetts only on the heathlands of Marthas Vineyard, Nantucket and the Elizabeth Islands, however, the author has found it in increasing abundance along the Dartmouth - Westport coastline in coastal shrubland. Eggs overwinter, larvae feed during early to mid-summer and adults appear in late September. Jones and Kimball (1943) reported *catenaria* to be common on both Marthas Vineyard and Nantucket.

Three Chain-dotted Geometers were documented during this survey on September 24, 2006. These individuals all appeared on the sheet with the mercury vapor lamp set at the edge of the field. The field/woodland interface is colonized by bayberry, blueberry and huckleberry - all potential larval hostplants. Thus, breeding at this site is a possibility. This species usually is more active during the day, however, a daytime survey the following morning both at this station and throughout the area did not produce any additional records.

***Cicinnus melsheimeri* (Mimallonidae) – Melsheimer's Sack-bearer**
Massachusetts - Threatened **G4**

In the northeast, scrub oak and probably chinquapin oak (*Quercus prinoides*) are the sole larval hostplants for this species; and large open areas of sandplain oak barrens seem to be needed to support it (Franclemont, 1973). In Massachusetts it currently occurs only in large areas of well-developed open canopy barrens in Plymouth (Camp Cachalot), Dukes (Marthas Vineyard – Manuel Corellus State Forest), Nantucket, and Barnstable (Wellfleet Bay Audubon Sanctuary, Camp Edwards) Counties. Although historical records occur in the central and western part of the state (Montague Plain and Fort Devens areas - NHESP database), Schweitzer (pers. comm.) disputes the validity of the Montague Plain record. It is absent from Rhode Island and Connecticut. Adults have a relatively short flight period peaking in mid to late June. Larvae build a protective "sack" that is a mixture of silk and dead leaves in which they overwinter as a pupa. Jones and Kimball (1943) reported *melsheimeri* to be, "Well distributed but not usually common."

One Sack-bearer was documented by light trap during this survey on June 22, 2006. Scrub oak is common bordering the path at this site, thus breeding is a possibility.

***Eacles imperialis* (Saturniidae) – Imperial Moth**
Massachusetts – Threatened **G5**

This species, once well distributed to at least central New England, now breeds

only on Marthas Vineyard, despite being common in the more southern part of its range. Jones & Kimball (1943) referred to this species as being “infrequent” at light; however, it currently appears to be well distributed within the pitch pine barrens on the island. Further south, the larvae of this species feed on a wide variety of deciduous and pine trees, however on Marthas Vineyard, the larvae appear to only use pitch pine. Adults appear in throughout July to early August and overwinter as a pupa.

Eleven Imperial Moths were documented in this survey from July 17-26, 2006, all by the portable light traps. The larval hostplant, pitch pine, occurs at or in the near vicinity of all these stations, thus breeding it likely in this area.

Zale undescr. sp. near “lunifera” (Noctuidae: Catocalinae) – Barrens Zale

Massachusetts - Special Concern

G3Q

This undescribed, but scientifically accepted species occurs irregularly in pitch pine/scrub oak barrens from New Hampshire to New Jersey, and a similar looking moth occurs in Florida (Schweitzer [EGR], 1994). The larval hostplant is primarily, if not exclusively, scrub oak. Although estimated to occur at 100 or more sites, currently less than 20 are known (Schweitzer [EGR], 1994), with the populations at Myles Standish State Forest in Plymouth, MA and Madison, NH being the most abundant. The author has found it in Rhode Island (Mello et al, 1995) and on Cape Cod (Mello, 1990), but in low numbers compared to those seen in Myles Standish State Forest. A large population was recently documented in western Massachusetts at the Montague Plain barrens (Mello, 2000). It is probably extirpated (Status Uncertain) from Connecticut (Wagner et al, 2003). Its G3 (rare to uncommon) global ranking may change once the taxonomy of this species group is worked out. Jones and Kimball (1943) recorded a single record of *Zale lunifera*, the closest congener, on Marthas Vineyard, the only species in which the undescribed *Zale* would have been lumped. However, the late date (July 19) would seem to preclude both *lunifera* and the undescribed *Zale*.

One Barrens Zale was documented by light trap at during this survey on June 1, 2006. Scrub oak is scattered at this station, becoming more common south towards and bordering Jeremiah Road. Thus, breeding is possible at or near this site. This species may also been in flight during mid to late May, prior to the inception of this survey.

Catocala herodias gerhardi (Noctuidae: Catocalinae) – Gerhard's Underwing

Massachusetts - Threatened

G3T3

"An outstanding indicator species for Northeastern Sandplain Pitch Pine/Scrub Oak Barrens" (Schweitzer, EGR, 1994), *herodias* is seldom seen far from extensive high quality barrens habitat containing the larval host plant, scrub oak. However, it is a highly vagile species, with females encountered at least ten miles from appropriate breeding habitat (Schweitzer, pers. com.). Ranging from Massachusetts through New Jersey and in the mountains to North Carolina, this subspecies is more widespread than previously discussed barrens species, with more than 100 estimated occurrences (Schweitzer [EGR], 1994). However, it appears to be widely distributed and common only within the New Jersey Pinelands, while the remaining populations are smaller and discrete (Schweitzer [EGR], 1994) even when locally common. It global rank G3T3 reflects the restricted nature of its habitat requirements.

Common in Myles Standish State Forest and on the Outer Cape scrub oak barrens, this species often co-occurs with the scrub oak feeders, *Hemileuca maia* (Barrens Buck Moth) and *C. melsheimeri*. However the author has found *herodias* to be more widespread (Mello, 1990, 1991, 1993), including as far west as Shirley (Peters, pers. comm.). Schweitzer (pers. comm.) disputes the validity of the historical Montague Plain record in the western part of the state (NHESP database). The latter records may be wanderers. However, recent observations of *herodias* on ridgetop barrens at Canaan Mountain in Connecticut (Nelson, et al, 1998) and at Mount Everett in Massachusetts (Wagner, 1999) strengthens the validity of western Massachusetts records and broadens the range of suitable habitat in New England. Adults fly primarily during the latter half of July. Eggs overwinter and hatch in the spring. Jones and Kimball (1943) did not report this species from Nantucket, although it is currently present there; and they reported it as "occasional" on Marthas Vineyard.

One Gerhard's Underwing was documented by light trap during this survey on July 26, 2006. Scrub oak is common bordering the path at this site, thus breeding is a possibility.

***Bagisara rectifascia* (Noctuidae: Acontinae) – Straight Lined Mallow Moth
Massachusetts - Special Concern G4**

Forbes (1954) reports that *rectifascia* is "very rare" in the northern part of its range, although widespread in distribution, from eastern Massachusetts to Manitoba and south to Alabama and Texas. Crumb (1956) reports members of the Malvaceae as larval host plants, but Prentice (1962) also reports larvae from "hazel" (most likely an error - Schweitzer, pers. comm.). Mello has collected adults from Bristol County (Dartmouth), Cape Cod, Marthas Vineyard and Nantucket in Massachusetts and Arcadia WMA in Rhode Island. The author has often found this species far from any Malvaceae (Mello et al, 1998), thus it appears possible that another, as of yet, unrecorded hostplant may be supporting *rectifascia* populations. On Nantucket, the author has found adults to be common in the vicinity of beaked hazelnut stands, thus Prentice's aforementioned hostplant record may be correct. Jones and Kimball (1943) reported this species as rare on Marthas Vineyard.

Three Mallow Moths were documented by portable light trap during this survey from May 31 to July 5, 2006. Although the use of beaked hazelnut has not yet been positively confirmed for this species, it is likely that this is in fact the hostplant. It occurs as a minor, but regular component of the woodland understory throughout this area, this breeding is a possibility. Malvaceae species, however, were not seen in or near this area.

***Psectraglaea carnosa* (Noctuidae: Cuculliinae) – Pink Sallow Moth
Massachusetts – Special Concern G3**

Ranging from Maine to New Jersey, *carnosa* is currently found primarily in Massachusetts and New Jersey. The senior author has found it across Cape Cod, on Nantucket and Marthas Vineyard, at Myles Standish State Forest in Plymouth, Fort Devens (Middlesex County), and at Montague in Franklin County. The larvae probably feed of a variety of Ericaceae. Adults emerge in October and lay eggs that overwinter. Larvae hatch the following spring as hostplant buds begin to open. Jones and Kimball

(1943) considered *carnosa* to be “irregularly common” on Nantucket and present on Marthas Vineyard.

One Pink Sallow was documented by light trap at Station 1 (Figure 14) during this survey on October 10, 2006. Ericaceae, including blueberry are common at this station, and thus breeding is a possibility.

***Onconemis riparia* (Noctuidae: Cuculliinae) – Dune Noctuid Moth**
Massachusetts – Special Concern **G4**

This species occurs along the Atlantic coastal plain from Maine to New Jersey and along the Great Lakes. It is restricted to coastal dune and sandplain habitats in Massachusetts. In Massachusetts it occurs on Cape Cod, Marthas Vineyard and Nantucket. The senior author as also encountered individuals from South Dartmouth (Bristol County), Crane Beach in Ipswich (Essex County,) and on Block Island in Rhode Island. The larval hostplant is unrecorded, but is likely a low herbaceous plant like other members of the genus. Adults are in flight from mid June through mid July. Jones and Kimball (1943) referred to *riparia* as “well distributed, not rare” on Marthas Vineyard.

One Dune Noctuid was documented by light trap at during this survey on July 18, 2006. Unless this species is able to utilize closely cropped lawn with sandplain grassland characteristics, this individual appears to be out of habitat and not likely breeding in the immediate area. It is possible that the yearly mowed field at could provide breeding habitat, however none were found at this site despite trapping here during its flight period.

***Faronta rubripennis* (Noctuidae: Hadeninae) – The Pink Streak**
Massachusetts – Threatened **G3/4**

Associated with large Switchgrass (*Panicum virgatum*)-dominated grasslands, this species is sporadic in distribution, particularly in the northeast. The larvae feed on *Panicum virgatum* in New Jersey and likely in Rhode Island as well, although other graminoids cannot be ruled out. There are only three currently known colonies of this species in southern New England; at Camp Edwards on Cape Cod, one in Connecticut (Nelson, pers. comm.), and a large colony on Prudence Island in Rhode Island (Mello, 2002); however, it is historic from Marthas Vineyard (two records) and Nantucket (one record) (Jones and Kimball, 1943). All of the currently colonies are within extensive *Panicum virgatum* fields

One Pink Streak was documented by light trap during this survey on July 18, 2006. This individual appears to be out of habitat, as no *Panicum* was observed at this station or in the area except for a smattering of plants; thus breeding is unlikely in this area.

***Abagrotis nefascia* (Noctuidae: Agrotinae) – Coastal Heathlands Cutworm**
Massachusetts - Special Concern **G4T3**

A. nefascia has a widely disjunct range. One population is widely dispersed from the Rocky Mountains west to California, but the east coast populations has a narrow range along the coast from New Hampshire to New Jersey. This coastal heathland species is regularly encountered on Cape Cod, Marthas Vineyard and Nantucket and is also common on Block Island, RI (Mello, 1996). Recently, the senior author has also

found it on one of the Boston Harbor Islands, Crane Beach in Ipswich and in coastal locations in Dartmouth. Adults emerge in July and apparently undergo a diapause stage, then reappear in September. Shadbush and wild currant are reported as larval hostplants (Lafontaine, 1998), however other coastal shrubs are also possible. Jones and Kimball (1943) recognized this as a distinct but unnamed species that was fairly common on both Nantucket and Marthas Vineyard.

Four Heathland Cutworms were documented by portable light trap during this survey from May 31 to July 5, 2006. The larval hostplant has not been positively determined on Marthas Vineyard, but the larvae are likely polyphagous on several species of shrubs. Thus, breeding is a possibility within this area based upon the multiple records found.

The only two tiger beetles that were observed during this survey were *Cicindela sexguttata* and *C. punctulata*, both along sections of Jeremiah Road. Both of these species are common and widespread in distribution.

SUMMARY

With the exception of one station, all sites produced at least one individual of a state-listed rare species. This suggests that although not common, listed species are generally distributed throughout the footprint of the survey area. It would therefore appear that state-listed barrens species would likely continue to be found throughout the footprint of the study area, albeit in low numbers.

Two species, the Imperial Moth and the Faded Gray Geometer, are likely breeding within the survey area. Four others, the Chain-dotted Geometer, Straight-lined Mallow, Pink Sallow and Coastal Heathland Cutworm probably breed at least sporadically within the survey area; and three, Melsheimer's Sack-bearer, Barrens Zale, and Gerhard's Underwing could occasionally be breeding in the study area. There does not appear to be suitable breeding habitat within the survey area for two species, the Dune Noctuid and the Pink Streak.

ADDENDUM (please add this page to the report, "Inventory of Habitats in the Area of Sandy, Jeremiah and Old Pocha Roads for State-listed Insects".)

In the process of incorporating the moths collected for various projects during 2006 into the Lloyd Center's reference collection, I came across a specimen from Chappaquiddick that I previously identified as *Eilema bicolor*, a smallish gray Arctiid. Upon closer examination I find that it is actually *Cycnia inopinatus*, a similar looking, but state-listed species. This increases to 12, the number of state-listed moths documented within the survey area.

***Cycnia inopinatus* (Unexpected *Cycnia*) – Threatened G4**

This species ranges from Massachusetts to the Dakotas, south to Florida, but is locally distributed within this range. In Massachusetts, *C. inopinatus* is currently known only from Marthas Vineyard and Cape Cod. The larval hostplant is Butterfly Weed,

Asclepias tuberosa. This is a plant of open fields, prairies and pastures, and is somewhat dependent upon periodic fires, grazing or mowing. Adults appear in May and July, with the second brood overwintering as a partially grown caterpillar.

One individual was documented on May 31, 2006. Although butterfly weed is locally distributed along roadsides, and abundantly so in some fields, no hostplants were seen within the survey area. Thus, this specimen likely flew in from another part of Chappaquiddick where the hostplant is present. Because this plant is commonly used in landscaping and gardens, residential gardens containing the hostplant might provide appropriate habitat.

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