Contributions to a Biodiversity Inventory of the Late Summer Lepidoptera Species of Twin Swamps Nature Preserve in Posey County, Indiana

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Abstract

We present records for 435 species of Lepidoptera collected during mid and late August at Twin Swamps Nature Preserve in Posey County in southwestern Indiana, including 423 species of Macrolepidoptera and 29 species of *Catocala* (Noctuidae). Surveys were conducted with MV sheets, UV light traps, rotten banana bait, and diurnal searching. Habitat types surveyed in the preserve include hydric hardwood forest (swamp flatwoods), overcup oak slough, swamp cottonwood-bald cypress swamp, and old field with extensive sweet gum encroachment. All recorded *Catocala* species and twenty-five species potentially near the northern limit of their range are discussed.

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Introduction

Twin Swamps Nature Preserve is located in Posey County, Indiana. Habitat types present in the preserve include an extensive hydric hardwood forest (swamp flatwoods), a swamp cottonwood-cypress swamp, an overcup oak slough, and old fields with extensive sweet gum *(Liquidambar*) encroachment. Excluding the old field, these communities were formerly extensive in the Ohio and Wabash valleys (Indiana DNR 2008) but much of the land has been converted to agriculture.

Twin Swamps Preserve is managed by the Division of Nature Preserves of the Indiana Department of Natural Resources. Research we conducted at Twin Swamps during 2002 and 2008 was authorized under a permit from the Indiana Department of Natural Resources Division of Nature Preserves. Lepidopterists interested in conducting research at this site should contact the Division of Nature Preserves and obtain proper authorization prior to beginning research at this site.

One reason we selected Twin Swamps as a study site is the presence of natural communities and plants near the northern most limit of their range (inland from the Atlantic Coastal Plain). We have been accumulating biodiversity blitz data for a wide variety of sites and habitats in eastern North America to investigate patterns of Lepidoptera distribution, habitat dependency, and phenology. Sites with habitat types near the periphery of their range are especially useful to include in analyses of distributional and habitat data.

The second reason Twin Swamps was of special interest to us is the high diversity of *Catocala* (Noctuidae: Catocalinae) species present in the preserve, many of which can be found commonly and reliably in a single short trip. We have been working on a study of the genetics and morphology of this genus. Twin Swamps specimens for most of the *Catocala* species we found there have been sequenced for mitochondrial DNA, from the 658 base pair barcode region of the cytochrome oxidase subunit I gene (COI). This DNA data will be published in an upcoming series of papers on the genetics, morphology, and phylogeny of *Catocala.*

Beyond scientific curiosity, establishing a historical baseline of species that occur on lands managed for conservation purposes is critical to long term conservation goals. Many conservation lands throughout the country have little if any data on the insect species present, and management decisions must often proceed with no information on the majority of species present or how they will be affected. In the future, the extent it will be possible to evaluate if natural communities are being preserved or changed will be determined by the extent of historical data on the component species. For the diverse array of similar and variable and insect species present in any natural habitat, it is imperative that this data is based upon voucher specimens with authoritative determinations.

We made several research/collecting trips to Twin Swamps Nature Preserve from mid to late August. From 11-16 August 2002 and 20-24 August 2008 we conducted biodiversity blitzes where we attempted to document as many Macrolepidoptera species as possible with MV Sheets, UV light traps, rotten banana bait, and diurnal searching. RJB also visited the site on 17 and 20 August of 1995 and 14-17 August 2001 for trips focusing on *Catocala.* The primary purpose of this paper is to report the results of these Lepidoptera inventories.

Materials and Methods

Lepidoptera surveys were conducted with MV Sheets, UV light traps, rotten banana bait on trees, rotten banana bait in live traps, and diurnal searching, including searching for *Catocala* on tree trunks. These methods are discussed in detail in Kons and Borth (2006). The MV Sheet included a 400 watt MV light on one side and a 33 watt BLB UV light on the opposite side. Light traps were run with 15 watt BioQuip DC BL UV lights, except as noted in Table 1 for 15 August 2002. All MV Sheets, light traps, and bait traps were run all night for the 2002 and 2008 survey dates, except for 15 August 2002 when our batteries were dead and we ran the light traps part of the night on a generator. MV Sheets were only run part of the night for the previous trips.

The location and date of each survey station is provided in Table 1. The location of each MV sheet, UV trap, and bait trap was recorded with a GPS unit accurate to within 25 feet. Figures 1-3 show the location of survey stations within the preserve. The diurnal search area included the northern half of the preserve from the field to the edge of the cypress swamp. Diurnally collected specimens from the field were segregated from those from the forest.

For each MV Sheet, UV Trap, bait traps, and bait trail, an effort was made to document all Macrolepidoptera species encountered on each night during the 2002 and 2008 trips, although a narrower range of taxa were documented on the earlier trips in 1995 and 2001. In addition, all species encountered in the microlepidoptera families Attevidae, Sesiidae, Cossidae, Limacodidae, and Epipyropidae, were documented at these survey stations as well. For live bait traps we documented all *Catocala* species but we did not do thorough inventories of all the common species in these traps. For diurnal searches we attempted to document as many *Catocala* species as possible, although some common nocturnal species recorded from the night survey stations were not documented when they were flushed up during the day. We documented all Rhopalocera species found each year in 2002 and 2008, but not all of the species encountered on each date. Some additional specimens were collected in other microlepidoptera families, but these specimens have not yet been identified and are not included in this paper.

Lepidoptera records are based on collected voucher specimens, currently housed in the research collections of Hugo Kons Jr., Robert J. Borth, and in a joint collection of Kons and Borth. In addition, duplicate specimens of various taxa from the 2002 trip have been donated to the Milwaukee Public Museum. All determinations were made or verified by HLK, who accepts full responsibility for the accuracy of all identifications in this paper.

Results

We have documented 435 species of adult Lepidoptera in the included families at Twin Swamps Preserve during mid and late August, including 423 species of Macrolepidoptera, and 29 species of *Catocala*. During the 2002 and 2008 trips, 354 and 359 of these species were recorded, respectively, with 77 species added during the 2008 trip that were not recorded on the previous trips.

A check list of the Lepidoptera species we have recorded from Twin Swamps Preserve is presented in Table 2. This table also provides the number of unique species records for each species, in total and from each type of survey method. A unique species record is defined as one or more specimens of a species with unique data; two or more specimens from the same sheet, trap, or diurnal search area on the same date would be counted as one unique species record. This table also indicates what percentage of samples each species was recorded from for each type of survey method for 2002 and 2008.

All of the unique species records (for the included families) from our Twin Swamps surveys are presented in Tables 3-5, which include records from lights, rotten banana bait, and diurnal searching, respectively. The total number of species recorded from lights (MV sheets and UV traps), rotten banana bait, and diurnal survey is 382, 92, and 73, respectively. Tables 3-5 include species totals for each survey station on each survey date. Figure 6 compares the nocturnal species totals for each survey date with the number of species recorded from each survey station on each date. Figure 7 provides this information for species recorded exclusively from a single survey station on a survey date.

Discussion

Lepidoptera Species Potentially at or Near the Northern Limit of their Range

One reason we selected Twin Swamps as a locality to conduct Lepidoptera surveys is because it contains plant communities near the northern limit of their range at this longitude. It is possible to derive hypotheses as to which Lepidoptera species recorded from Twin Swamps may be at or near the northern limit of their range from the distributional data presented in Rings et al. (1992) and Covell (1999) for Ohio and Kentucky, respectively. However, to our knowledge there is only limited and scattered Lepidoptera distributional data available for Indiana and Illinois, and nothing comprehensive for any family. Most of the species that may be at or near the northern limit of their range at the longitude of Twin Swamps extend their range farther north near the coast on the Atlantic Coastal Plain.

Cypress Habitat Specialists: Two species of cypress occur in the southeastern United States, but only bald cypress is present at Twin Swamps. Several eastern U.S. Macrolepidoptera species exclusively utilize cypress species as their larval host, as far as is known. These species include *Macaria aequiferaria* (Geometridae), *Iridopsis pergracilis* (Geometridae), *Iridopsis cypressaria* (Geometridae), *Tolype minta* (Lasiocampidae), *Isoparce cupressi* (Sphingidae), *Dasychira dominickaria* (Lymantriidae), *Cutina distincta, C. arcuata, C. aluticolor,* and *C. albopunctella* (Noctuidae), and *Lithophane albita* (Noctuidae) (Covell 1984, Pogue and Ferguson 1998, Robinson et al. 2002, Wagner et al. 2011). We recorded seven of these species from Twin Swamps in mid and late August, including *M. aequiferaria, I. pergracilis, I. cupressi,* and all four *Cutina* species. While all of these seven species are widespread in cypress habitats in the southeastern United States, all of these species are likely at or near the northern limit of their range at this longitude, based on the distribution of cypress. We do not know if the remaining four species might occur at Twin Swamps. *Iridopsis cypressaria* and *Lithophane albita* are univoltine species that would not be present in the adult stage in mid or late August (Kons and Borth 2006). *Tolype minta* and *Dasychira dominickaria* appear to be more localized than the other cypress specialist species, and we are uncertain if our surveys were potentially within the flight season of these species. *Tolype minta* is reported from McCracken County, Kentucky, from 6 Oct. 1989, and therefore this species is a strong possibility for the cypress swamp at Twin Swamps. Covell (1999) reported *Pero zalissaria* (Wlk.) was locally common in Kentucky, and "associated with bald cypress;" however, the recorded Kentucky flight season is 5-13 September so our Indiana surveys may have been too early. However, in northern Florida, we have recorded this species from mid March-late September, and we have found it locally common in coastal salt marsh habitats (with cypress) but not in cypress swamps or other cypress habitats. Other than *M. aequiferaria* and *P. zalissaria* (which to our knowledge has not

been confirmed as a cypress specialist), Covell (1999) lists few Kentucky records for cypress habitat dependent species for Kentucky, and only included four of the seven species we recorded from Twin Swamps (plus *T. minta* which we did not find at Twin Swamps).

***Macaria aequiferaria* (Geometridae):** This is perhaps the most common and widespread of the southeastern U.S. cypress habitat dependent species, although the *Cutina* are common and widespread as well. This species was recorded from every light trap sample in the cypress swamp, and many individuals were seen during the day along the edge of the cypress swamp landing in low vegetation. In addition, 22 individuals were encountered at sheets and in light traps in the other habitats (Table 3), indicating frequent dispersal out of the breeding habitat. In northern Florida, while this species is always most common in cypress habitats, there are also frequent dispersers found in other habitats. In northern Florida this species occurs in a wide range of wetland types with cypress, including hydric hardwood forest, cypress swamp, herb bog, salt marsh, and the edges of ponds and rivers (Kons and Borth 2006). Covell (1999) reports this species is common in Kentucky with a flight season from 18 April to 2 October.

***Iridopsis pergracilis* (Geometridae):** This species was not reported from Kentucky at all in Covell (1999), but it was common in the cypress swamp and recorded from every light trap sample in this habitat in 2002 and 2008. While dispersers to non cypress habitats such as mesic hardwood-pine forest are not unusual in northern Florida, at Twin Swamps all individuals we encountered were right in the cypress swamp habitat. In northern Florida this species occurs in a wide variety of wetlands with cypress, including cypress swamp, herb bog, salt marsh, maritime forest, and hydric hardwood forest (Kons and Borth 2006). The flight season in northern Florida ranges from early March to late November (Kons and Borth 2006).

***Isoparce cupressi* (Sphingidae):** This species is less common and widespread than the other cypress specialists recorded from Twin Swamps. In 2008 it was recorded from every light trap sample in the cypress swamp, but in 2002 we found only one individual (at a MV Sheet near the parking lot). RJB also found three individuals at a MV Sheet in the cypress swamp in 2001 and another individual in the field near the parking lot. In total we encountered 18 individuals in the cypress swamp and two in the old field near the parking lot, suggesting that when surveying for this species it can often be missed if lights are not located right in the cypress habitat. For Kentucky, Covell (1999) reported a single record of this species from 6 September 1985 in Fulton County (the western most county) and stated it occurred only in cypress swamps. In northern Florida it occurs in salt marsh/maritime forest and hydric hardwood forest in addition to cypress swamps, with dispersers recorded from mesic hardwood-pine forest (Kons and Borth 2006). In northern Florida this species is multivoltine and we have records ranging from early March to late August (Kons and Borth 2006).

***Cutina distincta, Cutina albopunctella, Cutina arcuata,* and *Cutina aluticolor* (Noctuidae):** All four of these species are common and widespread in cypress habitats in the southeastern United States, and in our experience all four of them usually fly together except sometimes in Florida, where the *C. albopunctella* are more boldly marked and contrasting than elsewhere. In northern Florida on some nights we have found *C. albopunctella* common when the other three species were sparse or unrecorded and vice versa, but in east Texas and Indiana we have found all species common together, and all four

species were recorded from every light trap sample in the cypress swamp during 2002 and 2008. *C. albopunctella* specimens from Twin Swamps are like east Texas specimens in pattern, with little intraspecific variation and a washed out pattern, in contrast to the highly variable Florida populations with more boldly and contrastingly patterned individuals. These species are not particular to cypress swamps, and also occur in hydric hardwood forest and salt marsh/maritime forest with cypress (Kons and Borth 2006). At Twin Swamps all but a few individuals of the *Cutina* species were found in light traps right in the cypress swamp; two *C. albopunctella* and one *C. aluticolor* were taken at MV sheet samples in old field, and three *C. distincta* were taken in UV traps in the swamp flatwoods. Two *C. aluticolor* and one *C. arcuata* were taken at rotten banana bait in the swamp flatwoods. HLK also flushed up *Cutina* during the day from low vegetation along the edge of the cypress swamp, but none of these individuals were documented. Surprisingly, Covell (1999) and Pogue and Ferguson (1998) reported only two of the four *Cutina* species from Kentucky, *C. distincta* and *C. arcuata*, both from Fulton County. The Kentucky phenology records reported in Covell (1999) are 22 August and 8 September for *C. distincta* and 12 May and 3 August for *C. arcuata*. We suspect that Covell (1999) must have had very limited data for Kentucky cypress swamps (based on no records for *I. pergracilis, C. albopunctella,* and *C. aluticolor* and few records for *I. cupressi* and the other two *Cutina* species), and that these records are poorly representative of the full flight season. In northern Florida all *Cutina* species are multivoltine with records from late April-early September for *C. albopunctella*, late February-late September for *C. distincta*, mid February to late August for *C. aluticolor*, and early March-late September for *C. arcuata* (Kons and Borth 2006). The true north Florida flight seasons may be longer as we have very limited survey data from cypress habitats in the early spring and late fall.

Additional Species Potentially at or near the Northern Limit of Their Range

***Nemoria elfa* (Geometridae: Geometrinae):** This species inhabitats a variety of wetland types in the southeastern U.S., including hydric hardwood forest, cypress swamp, and herb bog, and can be quite common in these habitats (Kons and Borth 2006). At Twin Swamps the population appears to be associated with the cypress swamp, as all individuals were found in light traps right in the cypress swamp. All five 2008 light trap samples from the cypress swamp contained this species for a total of 14 individuals, but we did not record it in 2002; we may have been between broods at that time. We also collected one specimen of this species at the Wabash Lowlands, at a MV Sheet along a road within a hydric hardwood forest. Covell (1999) reported Kentucky records for Hickman and Jefferson Counties from 2 October and 29 May, and stated the species was local and uncommon in swamp habitats in Kentucky. The flight season is long in northern Florida, with records ranging from early March to early December (Kons and Borth 2006).

***Chloropteryx tepperaria* (Geometridae: Geometrinae):** This species is widespread in the southeast United States. It occurs in a wide variety of habitats (Kons and Borth 2006). Since Covell (1999) reported it from only four counties in Kentucky we suspect southern Indiana could be near the northern edge of this species' range. Twin Swamps specimens are from the swamp flatwoods and field habitats. Kentucky records range from 5 May-27 August (Covell 1999).

***Idaea scintillularia* (Geometridae: Sterrhinae):** This minute species occurs in a variety of habitat types (Kons and Borth 2006) and is widespread in the southeast but usually uncommon on any given night.

Covell (1999) reported Kentucky records from Boone, Gallatin, Jefferson, and Oldham Counties, and stated these records were a significant northwestern range extension. Kentucky records range from 22 June-August 15 (Covell 1999). In Posey County Indiana we found five specimens in 2008, three from Twin Swamps and two from the Wabash Lowlands.

***Cisthene kentuckiensis* (Noctuidae: Arctiinae):** This species is much confused with the similar *Cisthene tenuifascia*, which itself is a complex of two different species, although only one occurs in the southeastern United States (authors, unpublished data). HLK has seen only *C. tenuifascia* from the gulf states, and suspects all reports of *C. kentuckiensis* from the gulf states are based on misidentifications.

We collected two specimens of *C. kentuckiensis* at Twin Swamps, at MV sheet samples in field habitat near the swamp flatwoods edge on 15 August 2002 and 22 August 2008. Covell (1999) reported this species from seven Kentucky Counties, from 28-30 June and 27 August-14 September. It is possible this is a species where our surveys barely touched the beginning of the adult flight of a brood, and that it might become more common later in the season. The reported host is Lichens in Covell (1984), but the distribution in Covell (1984) including the gulf states suggests his records of *tenuifascia* and *kentuckiensis* were mixed. However, many other species of Arctiinae: Lithosiini are reported to feed on Lichens. This species is poorly known to us and we know nothing of its habitat requirements.

***Dyspyralis* new species (Noctuidae):** This minute species is blackish like *Dyspyralis nigella* but is smaller and with a distinctive pattern. We have found deep divergence within this species with COI sequences, and study is needed to investigate if this phenotype is a single species or a species complex. It is widespread in north Florida and east Texas where we have many records, including 14 localities published in Kons and Borth (2006) under the name "atrinanula?" This species occurs in a wide variety of habitat types, and in north Florida we have records from late February to mid November (Kons and Borth 2006). Outside of the gulf states we have also collected this species in Oklahoma County, Oklahoma and Montgomery County, Virginia. No Ohio or Kentucky records are reported in Rings et al. (1992) or Covell (1999).

***Shrankia macula* (Noctuidae: Hypenodinae):** This is a common and widespread species in the gulf states which occurs in a wide variety of habitats (see Kons and Borth (2006) for examples from north Florida). This species was not reported from either Ohio or Kentucky in Rings et al. (1992) and Covell (1999), although it could easily be overlooked by collectors due to its minute size and similarity to *Hypenodes* species. We collected four specimens at Twin Swamps (one specimen per unique species record in Table 3) and two specimens from the Wabash Lowlands. In north Florida this species flies from late January-mid December (Kons and Borth 2006).

***Arugisa latiorella* (Noctuidae):** This species is common and widespread in the southeast U.S., but in Ohio it is reported from only a single county (Scioto) on the southern border of the state in Rings et al. (1992), where it was reported to commonly nectar on a variety of flowers at night. Covell (1999) reports this species is common in Kentucky and lists eleven county distributional records. HLK has collected a single specimen in southeast Wisconsin (Waukesha County) that probably represents a stray and not a resident species. This species occurs in a variety of different habitat types (Kons and Borth 2006), and Twin Swamps specimens were collected in field, swamp flatwoods, and cypress swamp habitats. The

Kentucky flight season reported in Covell (1999) is 29 May-19 August, but we have taken fresh specimens up to 28 August in the Wabash Lowlands in Posey County, Indiana. In north Florida we have recorded this species from late March-early November. Crumb (1934) reported the hosts are green and dead grasses.

***Dysgonia telma* Sullivan (Noctuidae: Catocalinae):** This species was only recently recognized as distinct from *Dysgonia smithii,* and described as a new species in Sullivan (2010). It was discovered as a result of the DNA barcoding effort. After deep divergence was found in COI sequences within the former concept of *D. smithii*, Bo Sullivan found the two COI haplotype groups had distinctive genitalia. While the two species are readily differentiated with COI and genitalia, they cannot be reliably separated from wing pattern (Sullivan 2010). Of the seven specimens collected at Twin Swamps one has been sequenced and another male specimen dissected, but the other five specimens were assumed to be *telma* based on association with the other two and habitat. Our Florida and east Texas specimens determined from DNA sequences or genitalic dissection are from within or in close proximity to hydric hardwood forest habitats, including Austin Cary Forest and Owens Illinois Park (Alachua County, Florida), Apalachicola Bluffs and Ravines (Liberty County, Florida), Aspalaga Road (Gadsden County, Florida), the Sabine National Forest near Sixmile (Sabine County, Texas), and Martin Dies Jr. State Park (Jasper County, Texas). Sullivan (2010) also reported the habitat as hydric forests in North Carolina, whereas he reported the habitat for *D. smithii* as open savannas and mesic forests. The two species can occur at the same locality if hydric hardwood forest and uplands are present, such as at the Apalachicola Bluffs and Ravines Preserve in Liberty County, Florida, but since Twin Swamps has no uplands in the vicinity we doubt *D. smithii* occurs in the preserve.

All six Twin Swamps specimens were collected at rotten banana bait on trees in the swamp flatwoods; 13 Aug. 2002 (1), 14 Aug. 2002 (1), 15 Aug. 2002 (4), and 20 Aug. 2008 (1). The bait trail was utilized on only a single night in 2008, because there was no suitable bait trail near the MV sheet site used on the remaining 2008 survey nights. While no specimens were taken at lights at Twin Swamps, we have collected this species at lights in north Florida and east Texas.

Covell (1999) reported two specimens of *Dysgonia smithii* from Kentucky, but since both *D. smithii* and *D. telma* occur in North Carolina, these records could represent either species. Rings et al. (1992) examined no specimens from Ohio, although *D. smithii* is stated to occur in Ohio in Forbes (1954). Sullivan's (2010) North Carolina records range from 16 May-19 September, and it occurs as early as early March in north Florida (authors).

***Catocala agrippina* (Noctuidae: Catocalinae):** See the following section on *Catocala* species.

***Catocala mamorata* (Noctuidae: Catocalinae):** See the following section on *Catocala* species.

***Catocala carissima* (Noctuidae: Catocalinae):** See the following section on *Catocala* species.

***Cydosia majuscula* (Noctuidae):** There are no reports of the genus *Cydosia* from Ohio or Kentucky in Rings et al. (1992) or Covell (1999). HLK collected a single specimen of *Cydosia majuscula* at Twin Swamps at the MV Sheet on 13 August 2002; however, this species was found every night at the Wabash Lowlands from 24-28 August 2008. It is possible our Twin Swamps surveys were too early in the season when most individuals had not yet emerged, or perhaps the areas we found this species at the Wabash

lowlands are better habitat for this species. Four specimens at the Wabash Lowlands were found in hydric hardwood forest and seven in open hydric field, but survey stations in both habitats were in close proximity and the *Cydosia* could be using either or both habitats. Also, two of the specimens from hydric hardwood forest were from a light trap at the edge of the forest aiming out into a emergent hardwood area on the south end of Goose Pond.

HLK has also examined a series of *C. majuscula* from Mississippi in the Mississippi Entomological Museum, but did not record the data. HLK has also seen a specimen labeled Georgia. We do not have habitat information for specimens other than those we collected in southern Indiana.

Cydosia majuscula was listed as a synonym of *C.* aurivitta in the Hodges et al. (1983) checklist, but HLK thinks it is a valid species. *Cydosia majuscula* is a very drab uniformly greyish black species with no orange or silvery markings. *Cydosia aurivitta* is polymorphic with three forms, one with orange and silvery markings on a black background, another where the silvery markings are absent, and another rare form where both the orange and silvery markings are absent. However, the latter form has a distinct bluish cast which is not present in the southeastern species, *C. majuscula*. We have seen many specimens of *C.* aurivitta from Texas, where it inhabits the south Texas plains, the Edward's Plateau, and the transition area between the Sonoran and Austral Life Zones. We have taken a couple specimens of *C. aurivitta* from the eastern pine-hardwood region of Texas which might be strays. *C. aurivitta* is a widespread generalist of the Sonoran and Subtropical Life Zones whereas *C. majuscula* appears to be limited to the southeastern United States east of the Mississippi Alluvial Basin. To our knowledge the host is unknown.

Hyperstrotia flaviguttata **(Noctuidae):** We documented 16 specimens of this southeastern species at Twin Swamps during 2002 and 2008, 12 in old field and five in swamp forest UV traps located near the edge of the field. The southern Indiana habitat is intriguing, as in Florida, east Texas, and western Louisiana we have found this species almost exclusively in xeric oak-pine/grassland habitats, where it can be common. The few other specimens we have taken from more mesic habitats in the gulf states might represent dispersers. We have also found this species in upland tall grass prairie in southwestern Missouri, and dry prairie and oak savanna in central and southwestern Oklahoma. Red and white oaks are the reported food plants by Wagner et al. (2011). However, this species is possibly dependent on the field habitat for adult habitat requirements at Twin Swamps, as most specimens were collected right in old field and the only ones taken in the swamp forest were close to the edge of a field, and other sites where we have found this species numerous contain a grassland component in addition to oaks. This species was found in the field during the day but not documented. The old field is a much hotter and drier habitat than the swamp forest due to the lack of a closed canopy. The old field habitats in Twin Swamps are rapidly being overgrown with sweetgum trees, and what was a open field near the parking lot on the east side of the preserve in 2002 was almost completely overgrown with sweetgum by 2008. More old field habitat remained on the south side of the preserve along an unpaved access road, but this habitat was being overgrown as well. It is possible if all of the old field habitat is allowed to succeed to sweetgum forest this species might disappear from Twin Swamps Preserve. We only found a single specimen of this species in our more limited survey in the Wabash Lowlands, in a hydric hardwood forest near the edge of an area with open field and wetland, but at this site the open habitats are notably more hydric.

The only Ohio county record shown for this species in Rings et al. (1992) was for Adams County on the southern border of the state. The species is reported from early July in Ohio (Rings et al. 1992).

Covell (1999) reported a single Kentucky record from Christian County on 22 August 1986. It is perplexing that there were so few records reported for Ohio and Kentucky given that the Indiana habitat appears to be old field. There are other common and widespread species of *Hyperstrotia*, including *H. villificans* and *H. secta,* and perhaps *H. flaviguttata* is sometimes overlooked due to these similar species. This species is multivoltine in northern Florida, with our records ranging from late March to early October (Kons and Borth 2006).

***Enigmogramma basigera* (Noctuidae: Plusiinae):** In northern Florida (and probably widely in the southeast) this species is a widespread generalist that occurs in a wide variety of habitat types, including old field and mesic hardwood-pine forest on former agricultural land (Kons and Borth 2006). It is most common in open habitats, and in Florida can be found more commonly at flowers at dusk than at lights. Like numerous other Plusiinae species, it is infrequent at UV lights (including in areas where the adults are known to be common at flowers), but comes more readily to MV lights, and rarely but occasionally comes to rotten banana bait. All six Twin Swamps specimens were collected at the MV sheet, four in old field and two in swamp flatwoods, and one during 2002 and five during 2008.

While HLK has collected a single specimen of this species as far north as Kenosha County, Wisconsin, we suspect this record is an isolated stray, and Plusiinae are strong fliers with many species having records far from their suspected permanent range. It may occur in Ohio as a stray as well, as Rings et al. (1992) only reported a single Ohio specimen collected circa 1900 from Franklin County in the central part of the state. However, it is also possible this species was been found so seldom in Ohio because much of the survey work in that state had been done only with UV traps, which frequently fail to document this species even when it is common at flowers in the area. As far north as Kentucky Covell (1999) reported this species to be common, and listed eight county records with flight dates spanning from 1 June-10 October.

We do not know if this species is a resident in southern Indiana or an annual or ephemeral migrant. Plusiinae species such as *Rachiplusia ou, Ctencoplusia oxygramma, Pseudoplusia includens,* and *Megalographa biloba* all appear to be ephemeral migrants to Wisconsin; some years series of fresh specimens may be collected whereas other years none are found, and years they are recorded the dates of first recorded occurrence vary widely between years.

***Spragueia dama* (Noctuidae: Acontiinae):** This species occurs in a variety of habitats in northern Florida, including hardwood forest and old field, and is hypothesized to be a habitat generalist in Kons and Borth (2006). However, at Twin Swamps it may be primarily associated with the old field. In 2002 it was very common at the MV sheet in the field, and from 13-15 August 2002 HLK estimated 75-100 individuals came to the sheet each night, although most were not documented. Only zero-two specimens were recorded from the UV trap samples within the swamp forest, and one individual was taken at a light trap in the cypress swamp on 15 August 2002. Three and six individuals were found at a MV sheet in the swamp forest on 12 August 2002 and 20 August 2008, respectively, but this site was close to the field. While we did not record quantitative samples at the MV sheets and most individuals were not documented, in 2008 when the field habitats had been much reduced by sweetgum succession, this species was found in distinctly lower numbers, and we estimate no more than 15 individuals came to a sheet on a given night. However, we do not know if this difference in abundance is due to changes in the field habitat or other factors, and in Gainesville, Florida, this is a species that varies greatly in abundance from year to year. We are uncertain if maintaining an early successional field is vital to the survival of

this species in the preserve, although it is a possible hypothesis. While this species is a widespread habitat generalist in the southeast, it may not range as far north as Ohio (Rings et al. (1992) give no Ohio records), and Covell (1999) reports in Kentucky it is apparently restricted to the western counties where it is locally common and recorded from 17 June-13 September. Thus, the Twin Swamps population may be near the northern periphery of this species range (excluding the Atlantic coastal plain). We also found three specimens of this species in the Wabash Lowlands from 27-28 August 2008, two at MV sheets in open field and one at a light trap at the edge of a swamp forest aiming out into a swamp with open water. While the Wabash Lowlands contain extensive open areas, they are more hydric than the old fields at Twin Swamps, and contained areas of standing water during the time of our surveys. Wagner et al. (2011) report two larvae have been reared from bindweed (*Ipomaea*).

***Spragueia apicalis* (Noctuidae: Acontiinae):** In the southeastern U.S. this species occurs in a variety of habitat types, including mesic hardwood-pine forest on former agricultural land and old field (Kons and Borth 2006). It is usually found in low numbers of 1-6 individuals at MV sheet or UV light trap samples on individual nights, although sometimes it can be found more commonly during the day by being flushed out of the grass and low vegetation in field habitats than at lights at night. At Twin Swamps it was found in the old fields, swamp flatwoods, and cypress swamp during the day and at night, although only the individuals found at night were documented. It was most common at MV sheet samples in the fields, and only one individual was found in each of the light trap samples that contained this species. Rings et al. (1992) give five county records for southern Ohio, so Twin Swamps is not the northern edge of this species' range although it may be close to it. It appears to be widespread in Kentucky as Covell (1999) lists 18 county records. The Kentucky flight season reported in Covell (1999) is 2 June-7 September. Wagner et al. (2011) report finding the larvae on prickly fanpetals (*Sida spinosa*) on several occasions.

***Heliocheilus lupatus* (Heliothinae):** We have only a single specimen of this species from Twin Swamps, collected on 14 August 2001 by RJB at a MV sheet in the field near the parking lot. In northern Florida HLK finds this species at lights only occasionally, but there appears to be nothing particular about the habitat, and most of our records are from the most intensively collected site (the American Entomological Institute property in Gainesville) in mesic hardwood-pine forest on former agricultural land. HLK has also found it in Gainesville in common upland oak-pine forest habitat. One to two individuals at lights per night is characteristic of those few nights when any are found. Some members of the subfamily Heliothinae seldom show up at lights, even in areas where they can be found numerous during the day, and some species apparently don't come to lights at all. This may very well be another Heliothinae species that comes poorly to lights and may be difficult to detect in an area with the use of lights unless one lives near there and can run lights on a regular basis. However, we have not yet discovered a way to find the adults of this species other than with lights at night. We do not know if there is breeding habitat at Twin Swamps in the field or in the swamp forest, and we do not know if this is a resident species in the preserve. Wagner et al. (2011) report the host is *Tridens flava* and perhaps other grasses, but we were not familiar with this plant at the time of our Twin Swamps fieldwork. Rings et al. (1992) give no records of this species for Ohio. Covell (1999) lists seven Kentucky Counties and flight dates ranging from 2 July-31 August under the name *Heliocheilus turbatus.* However, HLK does not trust any of this information. Covell's (1984) figure of *Heliothis phloxiphagus* is a misidentified *H. lupatus*. Furthermore, in north Florida *H. lupatus* is a univoltine fall species we have recorded from late August-mid October (Kons and Borth 2006), and HLK questions whether Covell's (1999) phenology records from the middle of summer

are based on correctly identified specimens. Note that *H. turbatus* was listed as a synonym of *H. lupatus* in the Hodges et al. (1983), but at that time the *turbatus* phenotype was only known from a few Florida specimens collected before 1900 with no specific data. HLK collected *H. turbatus* in 1999 and 2000 in Putnam County, Florida, and Kons and Borth (2006) argued that *H. turbatus* is a distinct species from *H. lupatus* based on differences in phenology, habitat, and wing pattern.

***Schinia gracilenta* (Noctuidae: Heliothinae):** This was the second most abundant Macrolepidoptera species in the open fields at the Wabash Lowlands (second to the even more abundant *Meropleon ambifuscum*), with hundreds of individuals coming to the MV sheets in open field on 24 and 26-28 August 2008, although the vast majority of individuals were not documented. In contrast, only 5 individuals came to the MV sheet located within the hardwood forest on 25 August 2008, even though it was near the edge of the field. This is arguably compelling circumstantial evidence that this species is dependent on the open early successional habitats at this site, at least in the adult stage.

We only recorded five specimens from Twin Swamps, all at MV sheets in field habitats. One is from the field near the east parking lot on 12 August 2002, and 2 and 3 specimens were found at the MV sheet on the field/forest interface in the southern part of the preserve on 22 and 23 August 2008. While based only on qualitative observation, this species appeared to become increasingly common each night we had a sheet in the open field at the Wabash Lowlands, and it is possible our Twin Swamps surveys were on the early edge of its flight season, and perhaps in 2002 we nearly missed the flight season entirely except for one individual that emerged unusually early. On the other hand, the open fields at the Wabash Lowlands are more hydric and there are many differences in the flora. It is difficult to know to what extent the differences in abundance between the Twin Swamps and Wabash Lowlands is due to habitat and to what extent they are due to the slightly later survey dates at the Wabash Lowlands. However, given the strong circumstantial association between the adults and open field habitat, a possible hypothesis is that this species will not persist in Twin Swamps if the fields are lost to succession.

Rings et al. (1992) stated this species (under the synonym *S. bifascia*) occurs in the southern U.S. and in Ohio is limited to the bluegrass region of Adams and Scioto Counties on the southern border of the state. Covell (1999) reported Kentucky records from Bath, Henderson, and Jefferson Counties, with flight dates of 12, 17, and 20 August, and 11 September. Wagner et al. (2011) reports one species that goes under this name commonly feeds on *Iva frutescens* (marsh-elder) in salt marshes from Massachusetts to North Carolina, but that the current concept of *gracilenta* may include two species.

***Raphia abrupta* (Noctuidae):** This species is widespread in the southeast U.S. and occurs in a variety of habitat types. Twin Swamps may be near the northern limit of the range as Rings et al. (1992) reported no records for Ohio. Covell (1999) reported nine counties for Kentucky with a flight season from 20 April-22 August, although we have found fresh specimens as late as 26 Aug. 1994 in Posey County, Indiana. At Twin Swamps 15 individuals were found were in light traps in the cypress swamp during 2002 (3) and 2008 (12), and five individuals were found at MV sheets in field habitat near the edge of the swamp flatwoods. We also found three individuals of this species at the Wabash Lowlands from 25-26 August 2008.

***Xanthopastis timais* (Noctuidae):** We were surprised to discover that Twin Swamps has a breeding population of this species. No Ohio records were reported in Rings et al. (1992), and Covell (1999) was

aware of three specimens from Kentucky and hypothesized that the Kentucky records were strays from the deep south. One Kentucky record is from June 1998 but the other two specimens lacked a date.

In 2002 we met a local botany enthusiast at the Twin Swamps parking lot who mentioned he was looking for spider lily and the patch he had located was being defoliated by caterpillars. He showed us the location, at the edge of the overcup oak slough, and HLK recognized the distinctive larvae as *X. timais* from his Florida rearings. At this small patch of spider lily HLK counted 107 larvae on 13 August 2002, most of which appeared to be at or near the final instar. By this point the patch of spider lily had been almost completely defoliated, and some of the larvae were crawling on the ground around the plants. HLK collected several late instar larvae, and reared three adult specimens [NOTE: look up and and insert eclosion dates]] and also preserved some of the larvae in alcohol. We put a light trap right next to the patch of spider lily on 14 Aug. 2002 but failed to collect any adults. This species appears to be poorly attracted to lights; in Florida HLK has seen hundreds of larvae but we have only occasionally found adults at light, typically one individual at a time. It is also possible that on 14 August 2002 none of the population was yet in the adult stage. We did collect one fresh adult specimen at the MV sheet on 21 August 2008.

In Florida, HLK has reared *X. timais* several times on undetermined plant species growing in hydric hardwood forest habitats. Covell (1984) reported hosts as *Ficus,* spider lily, and narcissus. Wagner et al. (2011) reports the hosts include amaryllis, narcissus, spider lily, and other plants in the amaryllis, iris, and lily families. We are uncertain which species of spider lily we reared *X. timais* from in Indiana. We do not know if the Twin Swamps population utilizes multiple species of plants as hosts or only the host we reared it from.

Catocala **Species**

Twin Swamps has a high diversity of late summer *Catocala* species, with 29 species recorded thus far between 11 and 24 August. We have documented an additional species, *Catocala serena*, from the nearby Wabash Lowlands in Posey County, and HLK also saw, but failed to document, one individual of *Catocala atocala* from this site.

Numerous additional *Catocala* species are expected to occur at Twin Swamps, but in most cases our surveys were too late in the season to find them. Species recorded from Ohio and Kentucky that we think have a very high likelihood of occurrence at Twin Swamps earlier in the season include: *Catocala illecta, Catocala coccinata, Catocala ultronia, Catocala mira, Catocala grynea, Catocala clintoni, Catocala similis, Catocala minuta, Catocala micronympha,* and *Catocala connubialis*. These species include widely distributed species that feed on honey locust, oaks, or Rosaceaous plants in the larval stage, and the addition of these species would increase the Twin Swamps list to 39 species of *Catocala*. *Catocala epione, Catocala habilis,* and *Catocala serena* are *Carya* (hickory) specialists, and while their host plants are plentiful in the preserve, in our experience they are common in mesic hardwood forests but we are uncertain if a forest exclusively as hydric as Twin Swamps would support populations of these species. *Catocala sappho*, another Juglandaceae specialist, is recorded from Kentucky but not Ohio, and one of its known hosts, *Carya glabra* (pignut hickory) is reported from Posey County, Indiana (USDA). Our surveys were too late in the year to find *Catocala epione* and probably *C. sappho* but not for *C. habilis* and *C. serena*. We do not know if the single individual of *C. atocala* HLK missed at the Wabash lowlands is a stray or a resident species, but if the latter, the host is likely a species of *Carya* and the species might occur in Twin Swamps but be very difficult to detect. *C. atocala* has been found

sporadically but not reliably in eastern Kentucky in recent years. Several additional Rosaceae specialist species are possibilities for Twin Swamps, but these species are more localized. These species include *Catocala miranda, Catocala pretiosa, Catocala praeclara, Catocala alabamae,* and *Catocala dulciola*. *Catocala pretiosa* and *Catocala alabamae* have recently been found in McCracken County, Kentucky by W. R. Black. In summary, we expect with more thorough survey the list of Twin Swamps *Catocala* species will be between 39 and 49 species.

The majority (20/29) of *Catocala* species present at Twin Swamps in mid and late August utilize Juglandaceae, in most cases *Carya*, for larval hosts. The remaining species include Salicaceae (*Salix* and/or *Populus*) specialists (4), a *Gleditsia* specialist (1), oak specialists (3), and one Leguminosae specialist.

Overall our greatest success in documenting *Catocala* species was searching for the moths on tree trunks during the day under hot and sunny conditions. Seventeen of the 29 *Catocala* species recorded were found with a higher percentage of diurnal searches than with MV sheet, UV trap, or bait samples. Eight species were found exclusively during the day on tree trunks with our Twin Swamps surveys, although we have found all of these species at bait and/or lights at other localities. UV light traps were a vital component of our biodiversity inventory, but they were the least effective survey method for documenting *Catocala* species diversity during the times of our 2002 and 2008 Twin Swamps surveys; 22 of 29 recorded species of *Catocala* were not found in a single UV light trap sample.

The best times to conduct diurnal searches for *Catocala* were between 3:30pm and 7:00pm. Earlier in the day most individuals appear to be high up in the trees where they are difficult to see and out of reach of a net, but when conditions are especially hot the moths can become plentiful on tree trunks earlier in the day, such as on 16 August 2002. The areas with concentrations of hickories, especially shagbark hickory, had the greatest abundance and variety of *Catocala,* but other species were concentrated in different areas, as discussed below under the accounts for individual species. Much of the swamp forest is easy to walk through, but there is an area south of the boardwalk along the east edge of the cypress swamp where there is denser underbrush and it is much more difficult to navigate through the forest. This area received less survey effort, but certain species such as *Catocala nebulosa* and *Catocala subnata* were only found in this area during the day. We checked trees growing out of standing water along the board walk numerous times, but never found any *Catocala* on trees growing out of standing water.

These diurnal surveys in the swamp forest had their challenges. When conditions were good for finding *Catocala,* conditions were hot and unpleasant. The habitat has very dense poison ivy; it blankets the ground and covers many of the tree trunks and hangs down from above. Walking through the swamp flatwoods, we encountered poison ivy from every direction, including from above. Avoiding continuously coming into contact with poison ivy during these searches was a complete impossibility. Furthermore, there was a continuous cloud of small gnats flying around our heads, and individuals frequently fly into our eyes, producing a strong itch. Researchers should also be aware that there are various deep holes scattered around the forest, and when trying to follow *Catocala* flying between these trees stumbling into these holes is a hazard. Also, poisonous snakes are present in the swamp forest and the cypress swamp.

***Catocala* Species Accounts**

***Catocala innubens*:** Our surveys were at the end of this species' flight season and the individuals we encountered were worn. This species was fairly uncommon during our surveys but we expect it would be more common earlier in the season. The adults were primarily found on tree trunks during the day, and distributed throughout the swamp forest. Both medium and large diameter tree trunks were used for perching. One individual was found at a MV sheet, and none at bait, although we have numerous records from bait from other localities. The reported larval host is *Gleditsia* (honey locust) (Sargent 1976).

***Catocala piatrix*:** This species was found most numerous at night with rotten banana bait on trees in the swamp forest. Only one individual was found on a tree trunk during the day. We do not know why we were able to find so few individuals on tree trunks during the day when we saw so many at bait at night. Nine individuals came to the MV sheet in 2008 but none in 2002, and only one individual was recorded from a UV trap (in the cypress swamp). Reported hosts include black walnut, butternut, pignut hickory, and pecan (Sargent 1976, Gall 1991a, Gall 1991b, Rings et al. 1992).

***Catocala robinsoni*:** This is one of the latest *Catocala* species to emerge. By 28-29 August 2008 this species was common around hickory in the swamp flatwoods, and the most numerous *Catocala* species seen on those dates. However, from 20-24 it took extensive searching effort to find less than a dozen individuals in an afternoon. On 20 August 2008 we only found four individuals between the two of us during diurnal searching, but the species become progressively more common. The season appeared to be more advance in 2002 with *C. robinsoni* regular but not common from 11-15 August, but then being found common on 16 August, when conditions were also hot and sunny and especially favorable for finding *Catocala* on tree trunks during the day. Only two individuals were found at rotten banana bait and none at lights. A larval host is shagbark hickory (Gall 1991a, Gall 1991b).

***Catocala judith*:** Our surveys were probably largely too late in the year to find this species, but RJB did find one worn individual on a tree trunk on 17 August 2001. In our experience this species can be common at lights in mesic hardwood forests in Wisconsin, Tennessee, and Kentucky, especially on the slopes of hills or mountains. We do not know to what extent the paucity of Twin Swamps records is due to the late timing of our surveys, or if this species might be uncommon at Twin Swamps because it prefers less hydric forests. Gall (1991a, 1991b) reported the larvae prefer shagbark hickory.

***Catocala flebilis*:** Our surveys were on the tail end of the flight season for this species and most individuals we encountered were worn. This species was regular but not common on tree trunks during the day in the swamp flatwoods, particularly around shagbark hickory. We suspect it would have been more common earlier in the season. Two individuals were found at MV sheets and one in a UV trap. Gall (1991a, 1991b) reported the larvae prefer shagbark and pignut hickory.

***Catocala angusi*:** This species was commonly encountered on tree trunks during the day in the swamp flatwoods, especially on shagbark hickory trees. Six specimens were collected of an interesting form with a white hindwing fringe (most individuals have a grey fringe) and a contrasting lighter forewing costa, one during 2002 and five during 2008. All individuals with these features are shaded like form "lucetta" on the forewing. The white fringed form was illustrated and incorrectly determined as *Catocala robinsoni* form missouriensis in Covell (1984). We investigated if this might be a separate species but *C. angusi* has distinctive genitalia and COI barcodes and individuals of this form were indistinguishable

from other forms of *C. angusi* for these characters. We estimate less than one in 100 of the individuals of *C. angusi* observed were this form. Also, while males were common, we only found six females, one in 2001 and five in 2008. The females have a distinctive wing pattern and were originally described as *Catocala edna*. Among the males, we estimate about 1 in 20 were the shaded form "lucetta" and the remainder were the more common unshaded form. This species was regular at MV sheets but nowhere near as numerous as on tree trunks. One individual came to rotten banana bait in the swamp forest, but none were found with UV traps. Gall (1991a, 1991b) reported the host is shagbark hickory.

***Catocala obscura*:** This species was commonly encountered during the day on tree trunks in the swamp flatwoods, and strongly prefers resting on shagbark hickories over other trees. This is likewise the case for the very similar *C. residua* which was flying with it. This species was regular at the MV sheet but much less common at lights than on tree trunks during the day. Three individuals were found at the bait trail and one in a UV trap. Gall (1991a, 1991b) reported the host is shagbark hickory.

***Catocala residua*:** This species was also commonly encountered on tree trunks during the day in the swamp flatwoods with a strong preference for shagbark hickory. Three individuals were found at the MV sheet but none in UV traps or at banana bait. Almost all of the Twin Swamps specimens collected had white hindwing fringes, but HLK collected a single specimen with a grey fringe on 23 August 2008. In the Appalachians and Wisconsin to our knowledge all individuals have a grey fringe, in Mississippi all individuals have a white fringe, but in Missouri both white fringed and grey fringed individuals occur. From investigations of genitalia and COI we have found no differences between the white fringed and grey fringed specimens and are tentatively treating them as one species for now. We did not find any intermediates between white and grey fringed individuals in southern Indiana. Gall (1991a, 1991b) reports the host is shagbark hickory, based on dark fringed phenotypes.

***Catocala agrippina* (Noctuidae: Catocalinae):** *Catocala agrippina* occurs in the southeastern U.S. and extends its range west into the Sonoran Life Zone in central Texas. In the eastern U.S. we have found it in hydric hardwood forests in association with *Carya aquatica* (Water Pecan), whereas in central Texas it is locally common in habitats with *Carya illinoensis* (pecan) growing near rivers and streams. Gall (1991a, 1991b) reported a host as water pecan in Florida and Arkansas. In Florida we have also occasionally taken it in mesic hardwood forests with *Carya glabra*. Only one specimen was found at Twin Swamps, collected during the day on a tree trunk on 17 August 1995 by RJB. We did not see any *C. aquatica* or *C. illinoensins* at Twin Swamps, but we did see *C. aquatica* at the Wabash Lowlands and found three worn *C. agrippina* specimens in bait traps in close proximity to these trees on 28 August 2008. We suspect this species is associated with *Carya aquatica* in southern Indiana and that the habitats we surveyed at Twin Swamps may not include the breeding habitat, with the likely host occurring closer to the river.

Rings et. al (1992) gave only two southwestern Counties for the recorded Ohio distribution of *C. agrippina,* and stated these records were based on old specimens without specific data circa 1900. Covell (1999) reported records from Fulton and Union Counties in western Kentucky, from 18 August 1978 and 19 July 1952, respectively. This species has a long flight season in northern Florida, with our records spanning from early June-early October (Kons and Borth 2006). All of our Indiana specimens were worn, and the late August Wabash Lowlands specimens were very worn. It is possible we hit the very tail end of the Indiana flight season and that this species might be more plentiful earlier in the season.

***Catocala retecta*:** This is among the most common and widespread of the shagbark hickory specialists in mesic hardwood forests, but at Twin Swamps it was uncommon and seldom encountered despite the abundance of shagbark hickory. Perhaps this species does better in drier sites. We collected five specimens, two from the bait trail in 2002, and two on tree trunks and one at the MV sheet in 2008. Gall (1991a, 1991b) reported the preferred host is shagbark hickory.

***Catocala luctuosa*:** This is among the most common *Catocala* species at Twin Swamps during mid and late August. It was commonly encountered on tree trunks during the day throughout the swamp flatwoods. It was also found at the MV sheet in numbers during 2008 and was regular at rotten banana bait. The suspected host is shellbark hickory, and the Ohio distribution of this species corresponds to the distribution on shellbark hickory (Rings et al. 1992). It is also occurs with shellbark hickory in Shelby County, TN (Rings et al. 1992) and at a site in Missouri (D. Willis, pers. com. 2010). Range wide this is probably one of the more local species of *Catocala* found at Twin Swamps, but it is certainly common at this site.

***Catocala ulalume*:** This is one of the most difficult *Catocala* species to collect in the eastern United States, although it does not appear to be particularly local or specialized in habitat. However, typically even with an intensive collecting effort few if any specimens are found on collecting trips of a few days at a site. Sites where series of specimens have been collected, including Tombigbee State Park in Lee County, Mississippi (collected by Richard Kergosian), and Albita Springs, Louisiana (collected by Vernon Brou), are sites where an intensive MV light trapping effort was made over an extended period of time. We collected one specimen on a tree trunk per year during 2001, 2002, and 2008. HLK saw two additional individuals high up on a single tree in 2008 that might have been this species. All specimens were found in the swamp flatwoods. Larvae have been found in the wild on mockernut hickory (Rings et al. 1992). Pecan (*Carya illinoensis*) is another possible host, as this was the only *Carya* present to our knowledge at a site where we collected this species in Gonzales County, Texas.

***Catocala insolabilis*:** Our surveys hit the end of the flight season of this species, and the individuals we encountered were moderately to very worn. This species was less common than many of the other Juglandaceae specialist *Catocala* during our surveys but it might be more common earlier in the year. A total of ten individuals came to the MV sheet, and single individuals were found in a UV trap and at bait. Most individuals were encountered on tree trunks during the day in the swamp flatwoods, and they did not seem to be concentrated in any areas. One larval host is pignut hickory (Rings et al. 1992) but the distribution of the moth is more extensive than the distribution of pignut hickory. At sites where this species has been collected in southern Wisconsin, including Whitewater Lake Recreation Area in Walworth County and Swamp Lovers Preserve in Dane County, the most common hickory is shagbark. We have also collected it in Comanche County Oklahoma in an area where the only hickory present to our knowledge was pecan. This is among the most wide ranging of the hickory specialist *Catocala,* with a range extending from the southern Transition Life Zone to peninsular Florida and west to the transition area between the Sonoran and Austral Life Zones.

***Catocala vidua*:** This species was common on tree trunks during the day in the swamp forest, and also regular at rotten banana bait. This species has a preference for larger diameter tree trunks. Seven

individuals came to the MV sheet but none were found in light traps. Gall (1991a, 1991b) reports a host is shagbark hickory.

***Catocala maestosa*:** This species was common on tree trunks during the day but individuals were not concentrated in the areas with the greatest variety and abundance of *Catocala* species. This species prefers the largest diameter trees and some of the wettest parts of the swamp forest, and was seldom encountered in the areas where shagbark hickory was concentrated. The overcup oak slough and vicinity was the area where individuals were encountered with the greatest frequency. Another good spot for this species is on large diameter trees along the edge of the cypress swamp. Gall (1991a, 1991b) reported hosts include pecan, water pecan, and black walnut.

***Catocala lacrymosa*:** This species was common on tree trunks during the day in the swamp forest, but only four were found at the MV sheet and three at rotten banana bait, and none in the UV traps. This species could be found throughout the swamp forest but it was more common in certain areas. The best area for it was the forest with denser brush and understory along the east side of the cypress swamp. This species is especially wary and difficult to approach compared to many other *Catocala* species. Gall (1991a, 1991b) reported the larvae preferred shagbark and pignut hickory in laboratory tests. The adults were not concentrated around shagbark hickories at Twin Swamps.

***Catocala paleogama*:** This species was moderately common on tree trunks during the day in the swamp forest. Nine individuals were found at the MV sheet but none at bait or light traps. In some localities with mesic hardwood forest this species is among the most common *Catocala* species at lights and bait, and it can be very abundant at MV sheets in the Appalachians in eastern Kentucky. While this species may be most common in mesic hardwood forest sites, it is regularly encountered at Twin Swamps. Gall (1991a, 1991b) reported the larvae eat shagbark, pignut, mockernut, and shellbark hickories.

***Catocala nebulosa*:** This species was not easy to find at Twin Swamps. Six individuals were found on tree trunks during the day in the swamp forest, two each year in 2001, 2002, and 2008. They were found in dense forest along the east side the cypress swamp south of the board walk. In this area the forest was much more difficult to walk through due to the dense underbrush, and much less time was spent searching in this area than the more easily accessible more open parts of the forest. We also collected one individual at a MV sheet during 2008. Gall (1991a, 1991b) reported the larvae eat only bitternut hickory in laboratory feeding trials.

***Catocala subnata*:** We did not discover this species at Twin Swamps until 24 August 2008 when HLK found two individuals on tree trunks during the day. Both were found in dense, difficult to access swamp forest near the east side of the cypress swamp south of the boardwalk, in the same vicinity where the *Catocala nebulosa* were found. At other sites we have found this species most readily at lights or bait and seldom on tree trunks, but we did not collect any at lights or bait at Twin Swamps. Gall (1991a, 1991b) reported the larvae feed only on bitternut hickory in the northeastern U.S.

***Catocala neogama*:** This species was occasionally encountered on trees during the day in the swamp forest. Four individuals were found at the MV sheet but none in UV traps or at bait, although in WI bait is generally the most effective method for finding this species. Most individuals found during the day

were in the portion of the forest with dense undergrowth east of the cypress swamp and south of the board walk, in the same area where *Catocala nebulosa* and *Catocala subnata* were found. Gall (1991a, 1991b) reported this species does not feed on hickory but rather the larvae feed on black walnut and butternut; however, two different species have been going under the name *neogama*; we recently discovered that differences in COI sequences within the former concept of *C. neogama* correspond to wing pattern differences.

***Catocala communis*:** This species has been considered a synonynm of *neogama*, but we recently discovered differences in COI sequences correspond to differences in wing pattern. This species is apparently less common than *C. neogama* at Twin Swamps, but at the time of our Twin Swamps surveys we didn't realize the *C. communis* and *C. neogama* at Twin Swamps were different species, and we didn't put much effort into collecting what at the time we thought was all *C. neogama*. We ended up with three voucher specimens of *C. communis,* two from 2008 (that have DNA sequences) and one from 15 August 2002. All were found on tree trunks during the day in the swamp forest.

***Catocala ilia*:** This is one of the most common and widespread species of *Catocala*. It occurs in a broad spectrum of oak habitats, from hydric to xeric and densely forested to open grassland with scattered oaks. Numerous examples are provided in Kons and Borth (2006) for Florida. Our Twin Swamps surveys were at the tail end of the flight season and all of the individuals we encountered were worn. It was regular on trees during the day in the swamp forest, at MV sheets, and at bait. The host plants are various oaks (Gall 1991a, 1991b).

***Catocala mamorata*:** Range wide this is probably the most localized of the *Catocala* species we recorded from Twin Swamps. At Twin Swamps it is commonly encountered on tree trunks during the day, but we did not find a single individual at lights or bait during our Twin Swamps surveys. We have occasionally taken this species at bait at other localities, including the Wabash Lowlands and Alexandria, Virginia.

This species has a strong preference for the largest diameter trees, and while the species was found throughout the swamp forest, the adults were concentrated in areas away from the shagbark and other hickories that had a lower variety and abundance of other *Catocala* species. The best area was the east edge of the cypress swamp just east beyond the standing water. There are many large diameter trees in this muddy low area along the edge of the swamp and *C. mamorata* adults were concentrated in this area. We never found the adults on trees growing out of standing water, and many such trees could be observed from the board walk. Farther east, in the area with thick underbrush bordering the low muddy area along the edge of the cypress swamp, *C. mamorata* was also regularly encountered on the larger diameter trees. Another good area was near the beginning of Twin Swamps trail in the low muddy areas with large diameter trees. *C. mamorata* was also regular on large diameter trees in the overcup oak slough. Under hot and sunny conditions, a single observer could find over 20 individuals in a few hours in the best habitats during both 2002 and 2008. However, only occasional individuals were observed in the areas with high density of hickories which were the best for overall abundance and variety of *Catocala*.

The suspected host plant in much of this species' range is swamp cottonwood (*Populus heterophylla*) (Peacock and Gall 2000, Schweitzer et al. 2011), although an alternative host plant must be used for Appalachian populations far removed from any swamp cottonwood. Peacock and Gall (2000) provide life history observations, and reared *C. mamorata* from ova obtained from females collected in

southwestern Indiana, although to our knowledge no larvae of this species have ever been found in the wild. This plant is common in the cypress-swamp cottonwood swamp, and also present at another *C. mamorata* locality in the Wabash lowlands where RJB found one individual at rotten banana bait and HLK saw one individual on a tree. During the time of our surveys the host plant was growing in areas with standing water and no adults were found on trees growing out of standing water. It is likely that both the swamp cottonwood area and the swamp flatwoods are critical to this species habitat requirements, the former for breeding and the latter for the adults. Old trees with large diameter trunks also appear to be critical, as the adults never perch on the medium diameter trees (that dominate most of the forest), except very briefly right after they are disturbed and fly off of a large diameter trunk.

It is interesting to note that had we not looked for *Catocala* on tree trunks during the day, our MV sheet, UV trap, and rotten banana bait surveys would have failed to document this species entirely, despite the observation that this is a common species at Twin Swamps. Many Lepidoptera surveys are conducted with UV traps exclusively, and had our survey been limited to this technique many of the Twin Swamps *Catocala* species present during our surveys would have been overlooked. It is also noteworthy that this species was uncommon in the areas with concentrated hickories that had the greatest overall abundance and variety of *Catocala* species. While we suspect this really is one of the more localized *Catocala* species, it is probably also one of the species most likely not to be detected by general Lepidoptera surveys that do not target it specifically.

The Posey County, Indiana populations may be at or near the northern periphery of this species' range away from the Atlantic coastal plain. Rings et al. (1992) gave four county records for Ohio, including one in the northern part of the state, but stated there were no Ohio records in over 80 years and past occurrence in Ohio may have been ephemeral. In Kentucky *C. mamorata* is reported from Fayette, Jefferson, Lyon, and McCracken Counties (Covell 1999). Covell (1999) considered this species to be "rare" in Kentucky, but as noted above, we suspect the behavior of this species could easily lead to this perception when it is not really the case.

***Catocala cara*:** This species is common and widespread over much of eastern North America except for the deep south, although there is a disjunct population in peninsular Florida. At Twin swamps we only collected two specimens, both at rotten banana bait in the swamp flatwoods during 2002. We suspect this is because the flight season was just beginning in 2002 and had not yet started during our 2008 surveys. In 2008 we found one specimen at bait at the Wabash Lowlands on 27 August and three more at bait on 28 August, but none were found earlier on the 2008 trip at either Twin Swamps or the Wabash Lowlands. All specimens collected were in fresh condition. Gall (1991a, 1991b) reports a host is black willow (*Salix nigra*), and Sargent (1976) reported willows (*Salix* species).

***Catocala carissima*:** This species inhabits hardwood forests of the southeastern United States. The likely hosts are *Salix* and possibly *Populus*, but some years the adults can become common in mesic hardwood forest habitats lacking the likely hosts in Gainesville, Florida (HLK). This species can be common at rotten banana bait at times when bait is attracting many moths, and it can be found on large diameter tree trunks during the day in low lying hardwood forests. We have never taken this species at lights. While this species can emerge as early as mid May during an advanced season in Gainesville, Florida, with our southern Indiana collecting we only found it from 24-28 August 2008, and not on any of the earlier survey dates in 2008 or the other years. It appears to have emerged during our 2008 trip. We found two specimens on tree trunks on 24 August in the swamp flatwoods at Twin Swamps, and four more

specimens at rotten banana bait in hydric hardwood forest habitat at the Wabash Lowlands from 26-28 August 2008. This species was formerly considered a form of *Catocala cara* (Hodges et al. 1983, Covell 1984, Covell 1999, Kons & Borth 2006), but in an upcoming *Catocala* paper we will show that *C. cara* and *C. carissima* are readily separated by mitochondrial DNA, including where they are sympatric in Posey County, Indiana and Alachua County, Florida. Covell (1999) mentioned some Kentucky specimens were form carissima under *Catocala cara,* but did not distinguish these specimens in the distributional or phenology records provided for *C. cara.*

***Catocala amatrix*:** Most of our survey dates were apparently early in the flight season of this species. In 2008 we found no individuals at Twin Swamps from 20-24 August, but it was common on tree trunks during the day in the swamp flatwoods from 28-29 August. It became progressively more common at rotten banana bait at the Wabash Lowlands from 24-28 August, and by 28 August there were multiple individuals in every bait trap and over 50 individuals on rotten banana baited trees. During 2002 this species was already on the wing from 11-15 August 2002, and it became progressively more common each night, and by 15 August 2002 it was common on the bait trail. Two specimens were found at the MV sheet but none in light traps. Most individuals found during the day were very wary and flew long distances after being scared up from a tree trunk. Sargent (1976) reported the hosts are willows and poplars.

***Catocala nuptialis*:** To our knowledge the only recorded host for this species is *Amorpha fruticosa*, a plant we searched for but never located both within Twin Swamps and in the vicinity. The USDA distribution map for *A. fruticosa* indicates the plant is recorded from Posey County, Indiana, http://plants.usda.gov/java/county?state_name=Indiana&statefips=18&symbol=AMFR. We only found and collected five specimens of this species at Twin Swamps, three during 2002 and two during 2008. There is a single specimen for each unique species record for a MV Sheet and UV Trap indicated in Table 3. Unless there is an alternative host we never located the breeding habitat for this species. All of the specimens were somewhat worn and probably approaching the end of the flight season.

***Catocala amica*:** This is a common and widespread species in oak habitats throughout much of eastern north America. Our Indiana surveys were near the end of this species flight season and the specimens encountered were worn. Four specimens were collected at the MV sheet. Additional individuals that were probably this species were seen on trees during the day in the swamp flatwoods, but they were too high up in the trees to collect. The host plants are various oaks (Rings et al. 1992).

***Catocala lineella*:** This is another common and widespread species of oak habitats that was near the end of its flight season during our Twin Swamps surveys. Specimens encountered were moderately to very worn. This species was seen on more days than it was documented on tree trunks in the swamp forest, but often it was high up in the trees. Small numbers of worn specimens came to the MV sheet every night during 2008 surveys. Rings et al. (1992) reported the hosts of *Catocala lineella* are various oaks.

Habitat Dependency Hypotheses

Habitat dependency hypotheses are based on an analysis of mid latitude Lepidoptera habitat data and Wisconsin habitat data (for the mid latitude species) to be published concurrently with this paper, in addition to Kons and Borth (2006) and host records.

The hypothesized habitat dependency in eastern North America of Lepidoptera species recorded from Twin Swamps appears in the right column of Table 2. Figure 4 shows the proportion of recorded Lepidoptera species hypothesized to be dependent on particular habitat types in eastern North America, whereas Figure 5 shows the number of species rather than proportions. We expect the proportions of Lepidoptera species dependent on certain habitats within Twin Swamps Preserve is much higher, as discussed below.

78.9% of the species recorded from Twin Swamps are hypothesized to be habitat generalists, species which have populations in a variety different habitat types. It is important to note that while these species may use multiple habitat types between a variety of localities, they could still be dependent on a particular habitat type at Twin Swamps Preserve. For the north Florida localities covered in Kons and Borth (2006) 68.5-95.0% of the recorded Macrolepidoptera species were hypothesized to be habitat generalists. Localities with the smallest proportion of habitat generalists were localities with a variety of different habitat types ranging from hydric to xeric habitats. Habitat generalists constitute the majority of the fauna at every site we have ever surveyed, no matter how many specialized habitat types are present.

14.3% of the Lepidoptera species recorded from Twin Swamps are hypothesized to be dependent on hardwood forest habitats in eastern North America. We suspect the proportion of species dependent on hardwood forest habitat within the Twin Swamps Preserve is vastly higher. For example, many species that utilize oaks as larval hosts occur in a wide variety of oak habitats, including grasslands and savannas with scattered oaks and no hardwoods, and a wide variety of xeric to hydric forest types. Thus, these species are habitat generalists overall, but since at Twin Swamps all of the oaks occur in the hardwood forest and overcup oak slough within the hardwood forest, the Twin Swamps populations are exclusively breeding in the hydric forest. A few examples include *Catocala ilia, Catocala amica,* and *Catocala novangliae*. A substantial portion of the hardwood forest dependent species recorded from Twin Swamps are *Catocala* species that are host specialists on one or more species of Juglandaceae; all of these are discussed in the species accounts in a previous section on *Catocala* species. Under hot and sunny conditions, we have found a variety of these *Catocala* species only in shaded hardwood forests with at least medium diameter trees, and a few species (as noted show below) show a strong preference for large diameter trees. For some of these species the presence of shaded hardwood forests (with trees old enough to have a large enough diameter for trunk resting behavior) is a possible habitat requirement to sustain a population beyond merely the presence of a sufficient quantity of the host(s).

Habitat intermedialists (as defined in Kons and Borth 2006) are species with populations in multiple different types of habitats in their range, but which appear to be somewhat local and not general to a wide variety of habitats. While the distinction between a generalist and intermedialist is somewhat arbitrary, we adopted this designation in Kons and Borth (2006) because we were concerned it could be misleading to designate certain species that that appear to be somewhat local (but not particular to a certain habitat type) as generalists. Only 1.4% of the species recorded from Twin Swamps are classified as intermedialists, including *Euchlaena tigrinaria, Heteropacha rileyana, Sphingicampa bicolor, Grammia figurata, Hyperstrotia flavigutta, Acronicta lithospila,* and *Papaipema inquaesita*. All these species will be discussed in the paper on habitat dependency to be published concurrently with this one.

3.0% of the Lepidoptera species recorded from Twin Swamps are hypothesized to be wetland dependent in eastern North America. These include some of the same species that are hardwood forest dependent, since a hydric hardwood forest is a type of hardwood forest and a type of wetland. Since all of the hardwood forest at Twin Swamps is hydric, all of the hardwood forest dependent species are dependent on a hydric hardwood forest at Twin Swamps Preserve. However, most of the hardwood forest dependent species have populations at other localities in mesic hardwood forests. Seven of the wetland dependent species are cypress habitat specialists; these species were given species accounts in the previous section on species at or near the northern periphery of their range. Also, as noted in the species account, *Nemoria elfa* appears to be dependent on the cypress swamp at Twin Swamps as well.

Some of the species in Twin Swamps may be dependent on the combination of multiple habitat types, but this is often difficult to detect for nocturnal species from either host data or the distribution of adults. One very good example discussed earlier is *Catocala mamorata*, which we hypothesize requires the combination of the swamp cottonwood-cypress swamp and hydric hardwood forest with large diameter trees. The breeding habitat is likely the swamp cottonwood -cypress swamp as swamp cottonwood is the suspected host, but during the day all of the adults we could locate were in the hardwood forest and none were where the swamp cottonwoods were growing out of standing water.

Species hypothesized to be grassland dependent in eastern North America constitute a small portion of the recorded Twin Swamps Lepidoptera species (.7%); but once again, we suspect that some of the habitat generalists are dependent on the field habitat at Twin Swamps. Some of the species designated as unknown for habitat dependency could be as well.

Species we have found exclusively in areas with grassland habitat include *Ceratomia hageni, Schinia lynx, Schinia thoreaui,* and *Schinia gracilenta*. Some other species that might be dependent on the field habitat at Twin Swamps (although not everywhere) include *Acontia aprica,* and *Schinia rivulosa*. These species were among the most abundant species at the MV sheet in 2002 when the field habitat was more extensive, but in 2008 they were still regular but much less common. *S. rivulosa* and *S. thoreaui* feed on ragweeds which grow in the field habitat. We do not know the hosts of *C. hageni, A. aprica,* or *S. gracilenta* at Twin Swamps. *Hyperstrotia flaviguttata* occurs in xeric oak habitats with grasslands in most localities where we have found it, but at Twin Swamps this species may be dependent on the old field for adult habitat requirements (see species account). The preceding and perhaps other Lepidoptera species may disappear from Twin Swamps if all of the old field habitat becomes overgrown with sweetgum. There are also various common and widespread butterfly species designated as generalists of open areas in Table 2 that were only found in the field habitats at Twin Swamps, some of which may not be permanent residents of the preserve but which visit it for nectar (examples are *Hylephila phyleus, Atalopodes campestris,* and *Agraulis vanillae*).

The old fields could also be important to some of the species that breed in the swamp flatwoods as a nectar source. The old field contained extensive *Solidago*, which is a nectar source utilized by a wide variety of moth species. However, during August we saw little available nectar in the forested habitats at Twin Swamps. While an old field by itself may be a common habitat of little conservation interest, an old field adjacent to a high quality swamp forest could potentially enhance the swamp forest by providing adult food sources for species that breed in the forest. We observed many moths nectaring on *Solidago* in our flashlight beams, but did not do an inventory as we were overwhelmed with our other survey methods. The field can also be difficult to navigate at night due to the dense thorny plants, and the vegetation can become drenched with dew. In addition to Lepidoptera, many Hymenoptera, Diptera, and Coleoptera were observed nectaring on the goldenrods in the field habitat.

Species with a Localized Distribution

While we consider Twin Swamps to be a highly valuable conservation property due to the high Lepidoptera species diversity documented and the presence of natural communities and associated Lepidoptera at or near the northern limits of their range, we did not record nor would we expect to find any Lepidoptera species which are reasonable candidates for being imperiled, threatened, or endangered, either range-wide or in a subset of their range. Species of Lepidoptera that are likely to be imperiled in Indiana are those restricted to early successional remnant habitats, such as prairies and fens. Such habitats can be lost due to natural succession in the absence of active management, but Lepidoptera species such as the prairie dependent *Catocala abbreviatella* and *Catocalal whitneyi* can also be negatively impacted by overzealous management such as burning large portions of a prairie at once (Borth and Barina 1991). Schweitzer et al. (2011) recently published a book on rare, poorly known, and declining Lepidoptera species of forests and woodlands of the eastern United States, and the only species included in this book we recorded from Twin Swamps is *Catocala mamorata*. This is possibly range-wide the most localized Lepidoptera species we recorded from Twin Swamps, although as we noted in the species account, this is also a species that can easily be overlooked due to its behavior.

To our knowledge it is not possible to determine how local or widespread any of the recorded species are within Indiana directly. We are aware of very little reliably identified and vouchered Lepidoptera data published or publicly available for hardwood forests, fields, and wetlands in Indiana. To directly determine which Twin Swamps species are potentially more localized in the subset of their range including Indiana, survey data for a wide selection of hardwood forest, field, and wetland habitats in the state would be needed.

Some of the southeastern species we recorded from Twin Swamps will probably have a small number of colonies in Indiana incidental to the way the political boundary of the state has been delimited. For example, the Indiana range of bald cypress indicated on the USDA map (http://plants.usda.gov/java/county?state_name=Indiana&statefips=18&symbol=TADI2) is limited to five counties in the southwest corner of the state. Therefore, Lepidoptera species which exclusively utilize cypress as a larval host would be expected to have relatively few colonies within the political boundary of Indiana, regardless of how widespread these species are in cypress habitats in the northern portion of their range. This is likely also the case for some of the other species we included in the section on species potentially at or near the northern limit of their range.

Management Recommendations

Between our 2002 and 2008 trips there appeared to be little change to the habitats encompassed by the swamp flatwoods, overcup oak slough, and swamp cottonwood-cypress swamp. We are not aware of any active management necessary to preserve the Lepidoptera in these natural communities, other than ensuring the habitat is not destroyed directly by conversion to agriculture or other economic development.

However, the old field habitats changed markedly between 2002 and 2008. If these habitats and their associated species are to persist in the preserve some active management will be needed to maintain

this habitat in an early successional stage. The old field by the parking lot on the east side of the preserve was almost completely overgrown by 2008. More old field habitat remained along the access road on the south side of the preserve, but this habitat is being overgrown with sweetgum as well. If no steps are taken to maintain the old field in an early successional stage, some species of plants and Lepidoptera dependent on open areas will likely be lost from the preserve. In addition, the extensive nectar source provided by goldenrod is being progressively reduced as more of the old field becomes overgrown.

While old field is a common habitat, certain arguments could be considered for maintaining at least a small part of the preserve as this type of habitat. In mid and late August there did not appear to be much in the way of nectar sources within the swamp forest, but the old field contained extensive nectar, especially goldenrod. Unfortunately we did not do an inventory of nocturnal Lepidoptera species nectaring on goldenrod at Twin Swamps specifically, but goldenrod is used for nectar by a wide variety of Lepidoptera, Coleoptera, Hymenoptera, and Diptera species. An old field in isolation would be expected to host only the most common and widespread species, but an old field with plentiful nectar adjacent to a high quality natural habitat could enhance that habitat by providing nectar resources for the more localized species that inhabit it.

There are also some species of Lepidoptera at Twin Swamps that are potentially dependent on the old field habitat for breeding and/or adult roosting, as discussed in the previous section on habitat dependency. Some are very widespread and common species like *Schinia rivulosa* (the larval host is ragweed) and *Acontia aprica*. Others are more interesting, such as *Hyperstrotia flavigutta* and *Schinia gracilenta* (see species accounts), species potentially slightly south of the northern limit of their range.

Effectiveness of Different Survey Techniques

Figure 6 shows the number of Macrolepidoptera species recorded during each night survey, and the number of species recorded from the MV sheet, each UV light trap, and the bait trail (if used). A high variety of Macrolepidoptera were recorded from every night survey during mid or late August in 2002 and 2008, with the lowest Macrolepidoptera species total for one night at 174 species and the highest at 257 species on 23 August 2008. As noted earlier, the percent of samples for each type of survey method that contained each individual species is provided in Table 2.

Figure 7 provides the same information for Macrolepidoptera species recorded from a single survey station on a given night. The number of Macrolepidoptera species recorded from a single survey station on one night ranged from 100 to 142 species. For 11-15 August 2002, the percent of Macrolepidoptera species recorded from a single survey station each night was 55.6%, 55.9%, 57.3%, 55.1%, and 61.7%, respectively. For 20-23 August 2008 the percents were 60.9%, 64.8%, 61.9% and 54.5%.

The MV Sheet was consistently the most effective survey method for documenting the greatest number of Macrolepidoptera species. Over all survey dates, 351 of the 423 (83.0%) Macrolepidoptera species recorded from Twin Swamps were found at the MV Sheet on at least one night, and 107 species in the included families were only recorded from the MV sheet among our Twin Swamps surveys. Every night the MV sheet documented more species than any UV trap or bait (Figure 6) and more of the species recorded exclusively from a single survey station during one night than the other survey stations (Figure 7).

Consistent with our experience at many other sites, MV sheets located at the edge of the forest in a field attracted more species of Lepidoptera than those located within the forest, including for species

with larval hosts that grow only in the forest and not in the field. The two nights we located MV sheets inside the forest, 12 August 2002 and 20 August 2008, we recorded 95 species of Macrolepidoptera at the sheet. MV sheet samples in the field near the edge of the forest attracted 117-172 species of Macrolepidoptera per night in 2002, and 183-196 species of Macrolepidoptera per night in 2008. The MV sheet spot along the access road on the south side of the preserve in 2008 was an exceptionally good site, with a trail into the forest on one side of the sheet and a road through the field on the other side. We suspect this sheet site may have been especially good because it was located in a flyway. It is less clear why sheets located on the edge of the forest tend to attract more species and individuals than those within the forest, including for forest species, but this has frequently been our experience. While lights located in an open area can be seen from a greater distance than lights within the forest, the MV sheet within the forest could be seen from a greater area of forest than any of the MV sheet spots in the field near the forest edge. Our MV sheet site in the forest was located right among trees where we found many species of Juglandaceae specialist *Catocala* on tree trunks during the day, yet only a single individual of Juglandaceae specialist *Catocala* came to these sheets each night, one *C. insolabilis* and one *C. retecta.* Yet, as shown in Table 3, MV sheets on the edge of the forest in the field routinely attracted a variety of species of Juglandaceae specialist *Catocala*, especially the sheet along the access road on the south side of the preserve. Granted, the number of individuals found at these sheets was far less than could be found on tree trunks during the day within the swamp forest. No *Catocala* at Twin Swamps were ever found during the day at the edge of the forest or in the old field.

The 15 watt UV light traps did not document nearly as many species per night as the MV sheets, but they added substantially to the species totals. On nights when two UV traps were run all night in 2002 and 2008, 15 to 51 species per night were recorded exclusively in one of the UV traps. The UV traps allowed us to greatly expand our habitat coverage, especially for areas far from parking like the cypress swamp. UV traps could also be placed in areas where a MV sheet was not possible or practical, such as over standing water in the cypress swamp (at the end of the board walk) and in the swamp forest over an area blanketed with poison ivy or dense underbrush. We are not aware of any species that are more attracted to 15 watt UV light than to a MV light, but certain species were found in a higher proportion of UV trap samples than MV sheet samples or exclusively in UV trap samples among our Twin Swamps surveys. We suspect this is due to differences in habitat coverage, and with respect to some species with few records, in some cases due to chance. For example, the cypress swamp was sampled at night with lights primarily with UV traps, except for one 2001 survey date when a MV sheet was set up there part of the night, and 15 August 2002 when a MV trap was run there part of the night. Consequently, species associated with the cypress swamp were found in a higher proportion of UV trap samples than MV sheet samples, or exclusively from UV trap samples. Thirty species of Lepidoptera in the included families were recorded exclusively from UV traps during our Twin Swamps surveys. This is an unusually small fraction of the total species recorded.

The effectiveness of rotten banana bait at attracting Lepidoptera is extremely variable spatially and temporally, and much of this variation does not appear to be related to the abundance of Lepidoptera species that will come to bait at times (Kons and Borth 2006). Among our Twin Swamps surveys, rotten banana bait always attracted some Lepidoptera but activity at bait was never that high. When rotten banana bait is working at its best individual baited trees can contain over 100 individuals of moths. Even on our best bait trail night at Twin Swamps (15 August 2002) the majority of trees we baited had no moths at all each time we checked the bait trail (however, this was not the case at the Wabash Lowlands from 24-28 August 2008, when many trees contained multiple moths). Other than 11 August 2002 our

bait trail was very long, and we put rotten banana bait on trees from the start of the trail all the way to the boardwalk into the cypress swamp. Six to 28 species of Macrolepidoptera were found exclusively at rotten banana bait on individual nights, but only four species were found exclusively at rotten banana bait among all of our Twin Swamps surveys. At sites/times when bait is more attractive and/or when such fantastic MV sheet spots are not available, a much larger portion of species can be recorded exclusively from bait over a series of biodiversity blitzes.

Thirty-three species were recorded exclusively from diurnal surveys, which were concentrated in the swamp forest and much sparser in the open field habitats. Seven of these are *Catocala* species and the remainder are butterflies. All of the butterflies are diurnally active but some are not included in the diurnal survey exclusives because they were collected in bait traps, and two species (*Junonia coenia* and *Astereocampa celtis*) came to the MV sheet at night (probably after being disturbed in the surrounding vegetation). The *Catocala* species have been found at lights and/or bait at night in other localities. A total of 73 Macrolepidoptera species were recorded from diurnal surveys, but diurnal surveys were focused on recording the variety of *Catocala* species found each day, and the variety of butterfly species found on each trip, and the and we did not document a number of other nocturnal species we flushed up during the day.

Analysis of Unique Species Records

For the American Entomological Institute property in Gainesville, Florida, HLK calculated the proportion of the total nocturnal Macrolepidoptera species recorded over a third of month interval that had been recorded from each possible combination of survey dates within that interval. HLK then plotted the relationship between proportion of total species recorded from the third of month interval and proportion of species recorded from n or fewer unique species records. As the proportion of species recorded from n or fewer unique species records decreased, on average the proportion of the total species recorded of the third of month total increased. Mid May and late May of 1992 had the two highest species totals recorded for a third of a month during a period of intensive survey at the AEI site from 2001-2005, so the species totals for these third of month intervals are hypothesized to be close to the true species totals present at this site during these times.

For different values of n, we calculated the percentage of species recorded from n or fewer unique species records at Twin Swamps. The number of nocturnal Macrolepidoptera species recorded from n or fewer unique species records during our 2002 and 2008 surveys is provided in Figures 8 and 9, respectively. We then compared these percentages to the proportion of the AEI species in the third of month intervals recorded for the same percentages. For each value of n, the percentage of species recorded from n or fewer unique species records each year was even lower than all the percentages calculated from different combinations of survey dates for the AEI third of month intervals. From the AEI data, when 28% of the species were recorded from 1 unique species record, 83-98% of the species recorded during a third of month interval had been recorded. When 45% of the species were recorded from 2 or fewer unique species records, 93-98% of the species from the third of month interval had been recorded. For the remaining values of n, the lower estimate was never less than 94% for a proportion of species recorded from n or fewer unique species records. If the relationship between the proportion of species recorded from n or fewer unique species records and the proportion of species hypothesized to be present that were actually recorded is comparable between the AEI data and the Twin Swamps data, a conservative estimate of the minimum and maximum percentages of the total nocturnal Macrolepidoptera

species recorded of those present during the time of our Twin Swamps surveys is 83-100%. The lower estimate of 83% is the lowest of the lower estimates for all values of n (for n=1). The upper estimate of 100% is needed because the proportions of Twin Swamps species recorded from n or fewer unique species records is less than the lowest values obtained from the AEI data, that produced an upper estimate of up to 98%. Therefor, the estimated number of nocturnal Macrolepidoptera species present at Twin Swamps from 11-15 August 2002 is 319-384 species, and 323-389 species for 20-24 August 2008.

Note these are estimates of the number of nocturnal Macrolepidoptera species present at Twin Swamps from 11-15 August 2002 and 20-24 August 2008, not estimates of the number of species present at Twin Swamps in total. We do not think it is possible to estimate nocturnal Lepidoptera species richness for a site unless surveys are conducted throughout the season encompassing the flight times of most or all of the resident species.

Future Lepidoptera Surveys

There is no doubt that many additional Lepidoptera species occur at Twin Swamps beyond the 435 species we documented in the families included in this study. Regardless of how thoroughly we may have inventoried the Lepidoptera fauna present in the adult stage during our 2002 and 2008 trips covering portions of mid and late August, there are hundreds of Macrolepidoptera species recorded from Kentucky and Ohio that have flight seasons outside the interval from mid August to late August. We anticipate surveys at any other time of the year could add substantially to the knowledge of what Lepidoptera species inhabit Twin Swamps. We expect additional resident species occur at Twin Swamps during mid and late August as well, but these are probably species which are difficult to detect by the methods we used (such as nocturnal species that seldom come to lights or bait), species which inhabit portions of the preserve away from the immediate vicinity of our regular survey stations, and/or species that were having poor years during the times we conducted surveys. Also, there will be differences in phenology from year to year due to advanced or delayed seasons, so future trips made during the times of our surveys would probably hit the flight season of a different range of species, albeit with considerable overlap. Surveys from 20-24 August 2008 added 77 species not recorded from our previous trips to Twin Swamps, including during the biodiversity blitzes from 11-15 August 2002. Much additional Lepidoptera survey/collecting is needed at Twin Swamps to gain a more thorough understanding of what species inhabit the preserve, especially during the large portion of the season not covered by our surveys.

Furthermore, there can be changes to habitats over time, and while we suspect the swamp forest and cypress swamp are changing very slowly, the open field habitats changed dramatically between 2002 and 2008. Either the fields will become completely overgrown with black gum or they will revert to an earlier successional stage due to active management, but in either case there are likely to be changes in the Lepidoptera fauna as a result. Future changes to the climate, such as a possible warming trend or changes in the amount of rainfall, would also likely result in changes to the Lepidoptera fauna of the preserve. Future survey will always be valuable to update whatever baseline of historical data is available.

In our view the scientific and conservation value of Twin Swamps has increased as a result of the survey data presented in this paper. As of yet, to our knowledge there are very few sites in eastern North America that have published Lepidoptera lists reaching or exceeding 423 species of Macrolepidoptera. With few exceptions, recorded species totals for most sites are generally more a reflection of the amount of survey effort rather than species richness. For many conservation areas there is little or no information

available on the Lepidoptera species present, and no baseline of historical data by which to evaluate how the Lepidoptera component of natural ecosystems is being preserved or changing over time. Our surveys at Twin Swamps provide a good start to obtaining a Lepidoptera inventory for this site, but there is much additional work to do. We hope this paper will encourage other Lepidopterists to visit the site and expand upon the Lepidoptera survey data we have obtained, and that researchers will seek and obtain the appropriate authorization to conduct such research from the Indiana Department of Natural Resources.

References

Borth, Robert J. and Thomas S. Barina. 1991. Observations of *Amorpha*-feeding *Catocala* (Noctuidae) in Wisconsin. J. Lep Soc. 45:371-373.

Covell, Charles V. Jr. 1984. A Field Guide to the Moths of Eastern North America. Boston, Massachusetts, Houghton Mifflin Company. 496 pp.

Covell, Charles V. 1999. The butterflies and moths (Lepidoptera) of Kentucky. Kentucky State Preserves Commission Scientific and Technical Series Number 6.

Crumb, S. E. 1934. A classification of some noctuid larvae of the subfamily Hypeninae. Entomological America 14: 134-197.

Ferguson, Douglas C. 1985. The moths of America north of Mexico Fascicle 18.1, Geometroidea: Geometridae (part). The Wedge Entomological Research Foundation.

Forbes, William T. M. 1954. Lepidoptera of New York and Neighboring States Part III. Cornell University Agricultural Experiment Station Memoir 329.

Gall, Lawrence F. 1991a. Evolutionary Ecology of Sympatric *Catocala* Moths (Lepidoptera: Noctuidae) I: Experiments of Larval Foodplant Specificity. J. of Research on the Lepidoptera 29(3): 173-194.

Gall, Lawrence F. 1991b. Ecology of Sympatric *Catocala* Moths (Lepidoptera: Noctuidae) II: Sampling for Wild Larvae on their Foodplants. J. of Research on the Lepidoptera 29(3): 195-216.

Gall, Lawrence F., John W. Peacock, and Jeffrey R. Slotten. 2002. Life history and immature stages of *Catocala atocala* (Noctuidae). J. of the Lepidopterists' Society 56(1).

Kons, Hugo L. Jr. and Robert J. Borth. 2006. Contributions to a Study of the Diversity, Distribution, Habitat Association, and Phenology of the Lepidoptera of Northern Florida. North American Journal of Lepidoptera Biodiversity I: 1-230.

Hodges, Ronald W. et. al. 1983. Check List of the Lepidoptera of America North of Mexico. Great Britian, University Press, Cambridge. 284 pp.

Lafontaine, Donald J. and Robert W. Poole. 1991. The Moths of America north of Mexico, Fasc. 25.1., Noctuoidea, Noctuidae (part). The Wedge Entomological Research Foundation.

Indiana Department of Natural Resources: Division of Nature Preserves. 2008. Twin Swamps Trail.

Peacock, John W. and Lawrence F. Gall. 2000. Immature stages of the Marbled Underwing, *Catocala mamorata* (Noctuidae). J. of the Lepidopterists' Society 54 (4).

Pogue, Michael G. and Douglas C. Ferguson. 1998. A revision of the cypress feeding moths of the genus *Cutina* Walker (Lepidoptera: Noctuidae). Proc. Of the Ent. Soc. Of Washington. 100(2): 331-352.

Rings, Roy W., Eric H. Metzler, Fred J. Arnold, and David H. Harris. 1992. The Owlet Moths of Ohio. Columbus, Ohio: Ohio State University

Robinson, Gaden S., Phillip R. Ackery, Ian J. Kitching, George W. Beccaloni, & Luis M. Hernandez. 2002. Hostplants of the Moth and Butterfly Caterpillars of America North of Mexico. Memoirs of the American Entomological Institute, Volume 69.

Sargent, Theodore D. 1976. Legion of the night: the underwing moths. Univ. of Mass. Press, Amherst, Mass.

Sullivan, J. Bolling. 2010. A new genus and species for *Dysgonia* (Lepidoptera, Eribidae, Erebinae) from Southeastern United States. Zookeys 39: 85-97.

Wagner, David L., Dale F. Schweitzer, J. Bolling Sullivan, and Richard Reardon. 2011. Owlet Caterpillars of Eastern North America. Princeton University Press. Princeton, New Jersey.

Table 1: Survey Dates and Survey Localities for Twin Swamps Lepidoptera Surveys by Hugo Kons Jr. & Robert J. Borth											
	+/	Survey	Survey Station		Elevation	Exact (E)/	Latitude	Longitude			
Date	-	Method	Code	Locality	to apx. 25'	Vicinity (V)	°N	°W	Habitat	Comments	
	"+"=Survey was conducted focusing on documenting diurnal species; "-" some diurnal species were documented as we were setting up/taking down equipment or field pinning the previous nights catch										
Night survey stations for Twin Swamps Nature Preserve, Posey County, Indiana [Border of Upper and Lower Austral Life Zones]											
17 Aug. 1995	-	Day		Areas on both sides of the full length of Twin Swamps trail	370	V	37.83253	87.98883	Southern swamp flatwoods w. abundant poison ivy	RJB Only	
20 Aug. 1995	-	Day		Areas on both sides of the full length of Twin Swamps trail	370	V	37.83253	87.98883	Southern swamp flatwoods w. abundant poison ivy	RJB Only	
14 Aug. 2001	-	Day		Areas on both sides of the full length of Twin Swamps trail	370	V	37.83253	87.98883	Southern swamp flatwoods w. abundant poison ivy	RJB Only	
15 Aug. 2001	-	Day		Areas on both sides of the full length of Twin Swamps trail	370	V	37.83253	87.98883	Southern swamp flatwoods w. abundant poison ivy	RJB Only	
16 Aug. 2001	-	Day		Areas on both sides of the full length of Twin Swamps trail	370	V	37.83253	87.98883	Southern swamp flatwoods w. abundant poison ivy	RJB Only	
17 Aug. 2001	-	Day		Areas on both sides of the full length of Twin Swamps trail	370	V	37.83253	87.98883	Southern swamp flatwoods w. abundant poison ivy	RJB Only	
13 Aug. 2001	-	MV Sheet 3		Near parking lot (same site as UVT1)	370	E	37.83232	87.98418	Old field w. goldenrod, being overgrown with Black Gum	RJB Only	
14 Aug. 2001	-	MV Sheet		Cypress Swamp at the end of the board walk (=UVT4 site)	365	E	37.83128	87.9953	Swamp cottonwood-bald cypress swamp	RJB Only	
15 Aug. 2001	-	MV Sheet 3		Near parking lot (same site as UVT1)	370	E	37.83232	87.98418	Old field w. goldenrod, being overgrown with Black Gum	RJB Only	
16 Aug. 2001	-	MV Sheet 3		Near parking lot (same site as UVT1)	370	E	37.83232	87.98418	Old field w. goldenrod, being overgrown with Black Gum	RJB Only	
17 Aug. 2001	-	MV Sheet 3		Near parking lot (same site as UVT1)	370	E	37.83232	87.98418	Old field w. goldenrod, being overgrown with Black Gum	RJB Only	
11 Aug. 2002	+	MV Sheet 1	TS:MVS1	Near beginning of Twin Swamps Trail	370	E	37.8326	87.9845	Old field w. goldenrod, being overgrown with Black Gum	72-62F	
11 Aug. 2002	+	UV Trap 1	TS:UVT1	Near parking lot	370	E	37.83232	87.98418	Old field w. goldenrod, being overgrown with Black Gum		
11 Aug. 2002	+	UV Trap 2	TS:UVT2	Twin Swamps Trail near E edge of southern swamp flatwoods	364	E	37.83223	87.9856	Southern swamp flatwoods w. abundant poison ivy		
11 Aug. 2002	+	Bait Trail	TS:BTR	Twin Swamps Trail from E edge of swamp to fork in trail	370	Start	37.8322	87.98547	Southern flatwoods		
11 Aug. 2002	+	Day	TS:SF	Swamp Flatwoods before fork in nature trail	370	V	37.83223	87.9856	Swamp Flatwoods	6-7pm, part. sunny, hot & humid	
12 Aug. 2002	+	MV Sheet 2	TS:MVS2	Twin Swamps Trail near E edge of southern swamp flatwoods	362	E	37.83233	87.98583	Southern swamp flatwoods w. abundant poison ivy	77-73F	
12 Aug. 2002	+	UV Trap 1	TS:UVT1	Near parking lot	370	E	37.83232	87.98418	Old field w. goldenrod, being overgrown with Black Gum		
12 Aug. 2002	+	UV Trap 3	TS:UVT3	Field between parking lot & swamp flatwoods	368	E	37.8323	87.98497	Old field w. goldenrod, being overgrown with Black Gum		
12 Aug. 2002	+	Bait Trail	TS:BTR	Twin Swamps Trail excluding loop to the left (south)	370	Start	37.8322	87.98547	Mostly southern flatwoods, terminating at the edge of the		
					370	End	37.83128	87.9953	swamp cottonwood-bald cypress swamp		
12 Aug. 2002	+	Day	TS:SF	Swamp Flatwoods/Overcup Oak Slough btwn. field & cypress swamp	370	V	37.83253	87.98883	Swamp Flatwoods & Overcup Oak slough	3:20-7pm, part. sunny	
13 Aug. 2002	+	MV Sheet 3	TS:MVS3	Near parking lot (same site as UVT1)	370	E	37.83232	87.98418	Old field w. goldenrod, being overgrown with Black Gum	70-69F, moderate rain at times	
13 Aug. 2002	+	UV Trap 2	TS:UVT2	Twin Swamps Trail near E edge of southern swamp flatwoods	364	E	37.83223	87.9856	Southern swamp flatwoods w. abundant poison ivy		
13 Aug. 2002	+	UV Trap 4	TS:UVT4	W end of Twin Swamps Trail	365	E	37.83128	87.9953	Swamp cottonwood-bald cypress swamp (facing W)		
13 Aug. 2002	+	Bait Trail	TS:BTR	Twin Swamps Trail excluding loop to the left (south)	370	End	37.83128	87.9953	Southern flatwoods to edge of cottonwood-cypress swamp		
13 Aug. 2002	-	Day	TS:PL	Parking lot adjacent to old field	370	V	37.83232	87.98418	Gravel parking lot adjacent to old field & close to swamp flatwoods	Before noon, part. sunny	
13 Aug. 2002	+	Day	TS:SF	Swamp Flatwoods/Overcup Oak Slough btwn. field & cypress swamp	370	V	37.83253	87.98883	Swamp Flatwoods & Overcup Oak slough	4-5:30pm, overcast, cool & rainy	
14 Aug. 2002	+	MV Sheet 3	TS:MVS3	Near parking lot (same site as UVT1)	370	E	37.83232	87.98418	Old field w. goldenrod, being overgrown with Black Gum	73-67F	
14 Aug. 2002	+	UV Trap 2	TS:UVT2	Twin Swamps Trail near E edge of southern swamp flatwoods	364	E	37.83223	87.9856	Southern swamp flatwoods w. abundant poison ivy		
14 Aug. 2002	+	UV Trap 5	TS:UVT5	S fork of Twin Swamps Trail	361	E	37.83047	87.98897	Overcup Oak Slough w. Spider Lily		
14 Aug. 2002	+	Bait Trail	TS:BTR	Twin Swamps Trail excluding loop to the left (south)	370	End	37.83128	87.9953	Southern flatwoods to edge of cottonwood-cypress swamp		
14 Aug. 2002	-	Day	TS:PL	Parking lot adjacent to old field	370	V	37.83232	87.98418	Gravel parking lot adjacent to old field & close to swamp flatwoods	Before noon, 3:45pm, sunny	
14 Aug. 2002	+	Day	TS:SF	Swamp Flatwoods/Overcup Oak Slough btwn. field & cypress swamp	370	V	37.83253	87.98883	Swamp Flatwoods & Overcup Oak slough	3:30-6pm, part. sunny	
Note: UV Trap 5 on 14 Aug. and UV Trap 4 on 15 Aug. were 33wt BLB AC blacklights rather than 15 wt DC blacklights						V					
15 Aug. 2002	+	MV Sheet 3	TS:MVS3	Near parking lot (same site as UVT1)	370	E	37.83232	87.98418	Old field w. goldenrod, being overgrown with Black Gum	76-73F	
15 Aug. 2002	+	UV Trap 4	TS:UVT4	W end of Twin Swamps Trail	365	E	37.83128	87.9953	Swamp cottonwood-bald cypress swamp (facing E)	33 watt BLB UV light on generator	
15 Aug. 2002	+	UV Trap 4b	TS:UVT4	Same as above but facing opposite direction	365	E	37.83128	87.9953	Swamp cottonwood-bald cypress swamp (facing W)	175 watt MV light (part of night)	
15 Aug. 2002	+	Bait Trail	TS:BTR	Twin Swamps Trail excluding loop to the left (south)	370	End	37.83128	87.9953	Southern flatwoods to edge of cottonwood-cypress swamp		
15 Aug. 2002	+	Day	TS:SF	Swamp Flatwoods/Overcup Oak Slough btwn. field & cypress swamp	370	V	37.83253	87.98883	Swamp Flatwoods & Overcup Oak slough	3:15-6:30pm, 77-85F, mostly cloudy	
16 Aug. 2002	-	Day	TS:PL	Parking lot adjacent to old field	370	V	37.83232	87.98418	Gravel parking lot adjacent to old field & close to swamp flatwoods	Before noon, 3:15 & 4:30-5:30pm	
16 Aug. 2002	+	Day	TS:SF	Swamp Flatwoods/Overcup Oak Slough btwn. field & cypress swamp	370	V	37.83253	87.98883	Swamp Flatwoods & Overcup Oak slough	3:30-5:30pm, sunny, hot & humid	
Note: Also for 16 Aug., *C. ulalume, C. mamorata, C. retecta,* and *C. angusii* were found between 12-12:30 on the way to and from retrieving equipment left by survey station UVT5											
*The diurnal search area for 12 & 14-15 Aug. included the full length of the 12 Aug. bait trail (Table 1), the forest to the north, the area between the trail loop, and some area to the south of the trail loop.											
20 Aug. 2008	+	MV Sheet 2	TS:1	Close to Twin Swamps Nature Trail just inside the woods	362	E	37.83233	87.98583	Southern swamp flatwoods w. abundant poison ivy	77.9-70.9F, cloudy	
20 Aug. 2008	+	UV Trap 4	TS:2	Cypress Swamp at the end of the board walk	365	E	37.83128	87.9953	Swamp cottonwood-bald cypress swamp		
20 Aug. 2008	+	UV Trap 6	TS:3	Twin Swamps trail near the parking lot	370	E	37.83260	87.98450	Black gum woodland with some old field remnants		
20 Aug. 2008	+	Bait Trail 1	TS:4	Right fork of Twin Swamps Trail out as far as the board walk	370	Start	37.8322	87.98547	Mostly southern flatwoods, terminating at the edge of the		
20 Aug. 2008						End	37.83128	87.9953	swamp cottonwood-bald cypress swamp		
20 Aug. 2008	-	Bait Trap 1	TS:5	Edge of Twin Swamps Nature Preserve Parking Lot	370	E	37.83249	87.98419	Black gum woodland with some old field remnants		
20 Aug. 2008	-	Bait Trap 2	TS:6	Twin Swamps trail just inside the swamp flatwoods	364	V	37.83262	87.98529	Southern swamp flatwoods w. abundant poison ivy		
20 Aug. 2008	+	diurnal site 1	[+]	Areas on both sides of the full length of Twin Swamps trail	370	V	37.83253	87.98883	Southern swamp flatwoods w. abundant poison ivy	2-6:45pm, cloudy, some sun	
20 Aug. 2008	+	diurnal site 3	[+]	Unpaved road off of Graddy Road, near edge of forest	370	V	37.82225	87.99058	Old field/black gum woodland/swamp flatwoods edge	11-11:55am, sunny	
21 Aug. 2008	+	MV Sheet 4	TS:7	Unpaved road off of Graddy Road, near edge of forest	366	E	37.82225	87.99058	Swamp flatwoods/old field/black gum woodland	73.1-69.8F, cloudy	
21 Aug. 2008	+	UV Trap 4	TS:8	Cypress Swamp at the end of the board walk	365	E	37.83128	87.9953	Swamp cottonwood-bald cypress swamp		
21 Aug. 2008	+	UV Trap 7	TS:9	Unpaved road off of Graddy Road, back into swamp forest	363	E	37.82376	87.99025	Southern swamp flatwoods w. abundant poison ivy		
21 Aug. 2008	-	Bait Trap 1	TS:10	Edge of Twin Swamps Nature Preserve Parking Lot	370	E	37.83249	87.98419	Black gum woodland with some old field remnants		
21 Aug. 2008	-	Bait Trap 2	TS:11	Twin Swamps trail just inside the swamp flatwoods	364	V	37.83262	87.98529	Southern swamp flatwoods w. abundant poison ivy		
21 Aug. 2008	-	Bait Trap 3	TS:12	Unpaved road off of Graddy Road, back into swamp forest	364	E	37.82225	87.99088	Southern swamp flatwoods w. abundant poison ivy		
21 Aug. 2008	-	Bait Trap 4	TS:13	Unpaved road off of Graddy Road, back into swamp forest	364	E	37.82295	87.99055	Southern swamp flatwoods w. abundant poison ivy		
21 Aug. 2008	+	diurnal site 1	[+]	Areas on both sides of the full length of Twin Swamps trail	370	V	37.83253	87.98883	Southern swamp flatwoods w. abundant poison ivy	2-6:30pm, mostly cloudy	
22 Aug. 2008	+	MV Sheet 4	TS:14	Unpaved road off of Graddy Road, near edge of forest	366	E	37.82225	87.99058	Swamp flatwoods/old field/black gum woodland	78.1-65.5F	
22 Aug. 2008	+	UV Trap 4	TS:15	Cypress Swamp at the end of the board walk	365	E	37.83128	87.99530	Swamp cottonwood-bald cypress swamp		
22 Aug. 2008	+	UV Trap 7	TS:16	Unpaved road off of Graddy Road, back into swamp forest	363	E	37.82376	87.99025	Southern swamp flatwoods w. abundant poison ivy		
22 Aug. 2008	-	Bait Trap 1	TS:17	Edge of Twin Swamps Nature Preserve Parking Lot	370	E	37.83249	87.98419	Black gum woodland with some old field remnants		
22 Aug. 2008	-	Bait Trap 2	TS:18	Twin Swamps trail just inside the swamp flatwoods	364	V	37.83262	87.98529	Southern swamp flatwoods w. abundant poison ivy		
22 Aug. 2008	-	Bait Trap 3	TS:19	Unpaved road off of Graddy Road, back into swamp forest	364	E	37.82225	87.99088	Southern swamp flatwoods w. abundant poison ivy		
22 Aug. 2008	-	Bait Trap 4	TS:20	Unpaved road off of Graddy Road, back into swamp forest	364	E	37.82295	87.99055	Southern swamp flatwoods w. abundant poison ivy		
22 Aug. 2008	+	diurnal site 1	[+]	Areas on both sides of the full length of Twin Swamps trail	370	V	37.83253	87.98883	Southern swamp flatwoods w. abundant poison ivy	2:30-7pm, most. cloudy	
22 Aug. 2008	+	diurnal site 3	[-]	Unpaved road off of Graddy Road, near edge of forest	370	V	37.82225	87.99058	Old field/black gum woodland/swamp flatwoods edge	morning, sunny	
23 Aug. 2008	+	MV Sheet 4	TS:21	Unpaved road off of Graddy Road, near edge of forest	366	E	37.82225	87.99058	Swamp flatwoods/old field/black gum woodland	74.6-68.5F	

23 Aug. 2008	+	UV Trap 4	TS:22	Cypress Swamp at the end of the board walk	365	E	37.83128	87.99530	Swamp cottonwood-bald cypress swamp			
23 Aug. 2008	+	UV Trap 8	TS:23	near unpaved road off of Graddy Road, back into swamp	362	E	37.82375	87.99038	Wetland opening with buttonbush in swamp flatwoods			
23 Aug. 2008	-	Bait Trap 1	TS:24	Edge of Twin Swamps Nature Preserve Parking Lot	370	E	37.83249	87.98419	Black gum woodland with some old field remnants			
23 Aug. 2008	-	Bait Trap 2	TS:25	Twin Swamps trail just inside the swamp flatwoods	364	V	37.83262	87.98529	Southern swamp flatwoods w. abundant poison ivy			
23 Aug. 2008	-	Bait Trap 3	TS:26	Unpaved road off of Graddy Road, back into swamp forest	364	E	37.82225	87.99088	Southern swamp flatwoods w. abundant poison ivy			
23 Aug. 2008	-	Bait Trap 4	TS:27	Unpaved road off of Graddy Road, back into swamp forest	364	E	37.82295	87.99055	Southern swamp flatwoods w. abundant poison ivy			
23 Aug. 2008	+	diurnal site 1	[+]	Areas on both sides of the full length of Twin Swamps trail	370	V	37.83253	87.98883	Southern swamp flatwoods w. abundant poison ivy	2:30-7pm, part. sunny		
24 Aug. 2008	+	UV Trap 4	TS:28	Cypress Swamp at the end of the board walk	365	E	37.83128	87.99530	Swamp cottonwood-bald cypress swamp			
24 Aug. 2008	-	Bait Trap 1	TS:29	Edge of Twin Swamps Nature Preserve Parking Lot	370	E	37.83249	87.98419	Black gum woodland with some old field remnants			
24 Aug. 2008	-	Bait Trap 2	TS:30	Twin Swamps trail just inside the swamp flatwoods	364	V	37.83262	87.98529	Southern swamp flatwoods w. abundant poison ivy			
24 Aug. 2008	+	diurnal site 1	[+]	Areas on both sides of the full length of Twin Swamps trail	370	V	37.83253	87.98883	Southern swamp flatwoods w. abundant poison ivy	2:30-7pm, part. sunny		
28 Aug. 2008	+	diurnal site 1	[+]	Areas on both sides of the full length of Twin Swamps trail	370	V	37.83253	87.98883	Southern swamp flatwoods w. abundant poison ivy	2-6pm, sunny, then cloudy		
29 Aug. 2008	+	diurnal site 1	[+]	Areas on both sides of the full length of Twin Swamps trail	370	V	37.83253	87.98883	Southern swamp flatwoods w. abundant poison ivy	1:30-5:30, rain, then most. cloudy w. some sun		

Table 2: Check List of Lepidoptera Collected at Twin Swamps Nature Preserve

				USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	% of	% of	% of	% of	
				Total	MV	MV	MV	UV	Bait	Bait	Bait	Diurnal	Diurnal	Diurnal	Diurnal	MV Sheet	UV Trap	Bait Trail	Diurnal	
					Sheet	Sheet	Sheet	Trap	Total	Trail	Traps	Total	Forest	Forest	Field	Samples	Samples	Samples	HF smpls	
LEPIDOPTERA TAXA COLLECTED					Total	pre '02	02 & '08						Pre '02	02 & 08		02 & 08			02 & 08	**Habitat Dependency Hypothesis**
Total Documented Sp. in Incl. Families			435	**3351**	1530	189	1341	1255	233	190	43	333	39	248	46					
ATTEVIDAE			1																	
2401	*Atteva punctella*		X	**19**	8	0	8	11	0	0	0	0	0	0	0	88.9%	57.9%	0.0%	0.0%	Generalist
SESIIDAE			1																	
2554	*Synanthedon acerni*		X	**4**	4	0	4	0	0	0	0	0	0	0	0	44.4%	0.0%	0.0%	0.0%	Hardwood Forest
COSSIDAE			2																	
Hypoptinae			2																	
2668	*Givira anna*		X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
2671	*Givira francesca*		X	**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Generalist
ZYGAENOIDEA			7																	
LIMACODIDAE			6																	
4653/4	*Tortricidia flexuosa* &/or *pallida*		X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
4665	*Lithacodes fasciola*		X	**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Generalist
4667	*Apoda y-inversum*		X	**3**	3	0	3	0	0	0	0	0	0	0	0	33.3%	0.0%	0.0%	0.0%	Generalist
4669	*Apoda biguttata*		X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
4675	*Isochaetes beutenmuelleri*		X	**4**	3	0	3	1	0	0	0	0	0	0	0	33.3%	5.3%	0.0%	0.0%	Generalist
4697	*Euclea delphini*		X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
EPIPYROPIDAE			1																	
4701	*Fulgoraecia exigua*		X	**2**	2	0	2	0	0	0	0	0	0	0	0	22.2%	0.0%	0.0%	0.0%	Hardwood Forest
PYRALIDAE			1																	
5156	*Nomophila nearctica*		X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
MACROLEPIDOPTERA			423																	
DREPANOIDEA			1																	
THYATIRIDAE			1																	
6237	*Pseudothyatira cymatophoroides*		X	**4**	2	0	2	2	0	0	0	0	0	0	0	22.2%	10.5%	0.0%	0.0%	Generalist
GEOMETROIDEA			67																	
GEOMETRIDAE			67																	
Ennominae			42																	
6270	*Proitame virginalis*		X	**2**	2	0	2	0	0	0	0	0	0	0	0	22.2%	0.0%	0.0%	0.0%	Generalist
6273	*Speranza pustularia*		X	**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Generalist
6322	*Mellilla xanthometata*		X	**27**	10	2	8	16	0	0	0	1	0	1	0	88.9%	84.2%	0.0%	7.7%	Hardwood Forest
6326	*Macaria aemulataria*		X	**22**	8	0	8	13	1	1	0	0	0	0	0	88.9%	68.4%	16.7%	0.0%	Generalist
6331	*Macaria promiscuata*		X	**7**	4	0	4	3	0	0	0	0	0	0	0	44.4%	15.8%	0.0%	0.0%	Generalist (pine habitats)
6335	*Macaria aequiferaria*		X	**17**	4	0	4	13	0	0	0	0	0	0	0	44.4%	68.4%	0.0%	0.0%	Cypress Habitat
6339	*Macaria transitaria*		X	**2**	2	0	2	0	0	0	0	0	0	0	0	22.2%	0.0%	0.0%	0.0%	Generalist (pine habitats)
6340	*Macaria minorata*		X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist (pine habitats)
6341	*Macaria bicolorata*		X	**2**	1	0	1	1	0	0	0	0	0	0	0	11.1%	5.3%	0.0%	0.0%	Generalist (pine habitats)
6386	*Digrammia ocellinata*		X	**31**	14	5	9	17	0	0	0	0	0	0	0	100.0%	89.5%	0.0%	0.0%	Generalist
6405	*Digrammia gnophosaria*		X	**27**	7	0	7	18	2	2	0	0	0	0	0	77.8%	94.7%	33.3%	0.0%	Generalist
6419	*Enconista dislocaria*		X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist (*Celtis* habitats)
6439	*Hypomecis umbrosaria*		X	**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Generalist
6443	*Glenoides texanaria*		X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
6478	*Exelis pyrolaria*		X	**4**	1	0	1	3	0	0	0	0	0	0	0	11.1%	15.8%	0.0%	0.0%	Generalist
6486	*Tornos scolopacinarius*		X	**2**	1	0	1	0	1	1	0	0	0	0	0	11.1%	0.0%	16.7%	0.0%	Generalist
6580	*Iridopsis pergracilis*		X	**8**	0	0	0	8	0	0	0	0	0	0	0	0.0%	42.1%	0.0%	0.0%	Cypress Habitat
6583	*Iridopsis ephyraria*		X	**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Generalist
6586	*Iridopsis defectaria*		X	**14**	7	1	6	7	0	0	0	0	0	0	0	66.7%	36.8%	0.0%	0.0%	Generalist
6588	*Iridopsis larvaria*		X	**2**	2	0	2	0	0	0	0	0	0	0	0	22.2%	0.0%	0.0%	0.0%	Generalist
6590	*Anavitrinelia pampinaria*		X	**27**	12	4	8	15	0	0	0	0	0	0	0	88.9%	78.9%	0.0%	0.0%	Generalist
6597	*Ectropis crepuscularia*		X	**14**	7	0	7	6	1	1	0	0	0	0	0	77.8%	31.6%	16.7%	0.0%	Generalist
6599	*Epimecis hortaria*		X	**8**	6	3	3	1	0	0	0	1	0	1	0	33.3%	5.3%	0.0%	7.7%	Generalist
6620	*Melanolophia canadaria*		X	**30**	11	2	9	16	2	2	0	1	0	1	0	100.0%	84.2%	33.3%	7.7%	Generalist
6640	*Biston betularia*		X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Hardwood Forest
6654	*Hypagyrtis unipunctata*		X	**21**	8	1	7	13	0	0	0	0	0	0	0	77.8%	68.4%	0.0%	0.0%	Generalist

Table 2: Check List of Lepidoptera Collected at Twin Swamps Nature Preserve

				USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	% of	% of	% of	% of	
				Total	MV	MV	MV	UV	Bait	Bait	Bait	Diurnal	Diurnal	Diurnal	Diurnal	MV Sheet	UV Trap	Bait Trail	Diurnal	
					Sheet	Sheet	Sheet	Trap	Total	Trail	Traps	Total	Forest	Forest	Field	Samples	Samples	Samples	HF smpls	
LEPIDOPTERA TAXA COLLECTED					Total	pre '02	02 & '08						Pre '02	02 & 08		02 & 08			02 & 08	**Habitat Dependency Hypothesis**
Total Documented Sp. in Incl. Families			435	**3351**	1530	189	1341	1255	233	190	43	333	39	248	46					
6667	*Lomographa vestaliata*		X	**9**	5	0	5	4	0	0	0	0	0	0	0	55.6%	21.1%	0.0%	0.0%	Generalist
6726	*Euchlaena obtusaria*		X	**7**	2	1	1	2	3	2	1	0	0	0	0	11.1%	10.5%	33.3%	0.0%	Generalist
6729	*Euchlaena johnsonaria*		X	**17**	9	2	7	8	0	0	0	0	0	0	0	77.8%	42.1%	0.0%	0.0%	Generalist
6733	*Euchlaena amoenaria*		X	**16**	8	4	4	4	4	2	2	0	0	0	0	44.4%	21.1%	33.3%	0.0%	Generalist
6737	*Euchlaena tigrinaria*		X	**3**	2	0	2	1	0	0	0	0	0	0	0	22.2%	5.3%	0.0%	0.0%	Intermedialist
6743	*Xanthotype sospeta*		G	**17**	9	1	8	7	0	0	0	1	0	0	1	88.9%	36.8%	0.0%	0.0%	Generalist
6754	*Pero hubneraria*		X	**4**	1	0	1	3	0	0	0	0	0	0	0	11.1%	15.8%	0.0%	0.0%	Generalist
6819	*Metanema inatomaria*		X	**6**	2	1	1	4	0	0	0	0	0	0	0	11.1%	21.1%	0.0%	0.0%	Generalist
6828	*Metarranthis homuraria*		X	**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Generalist
6839.1	*Probole nyssaria*		X	**2**	1	0	1	1	0	0	0	0	0	0	0	11.1%	5.3%	0.0%	0.0%	Generalist
6842	*Plagodis phlogosaria*		X	**2**	2	0	2	0	0	0	0	0	0	0	0	22.2%	0.0%	0.0%	0.0%	Generalist
6844	*Plagodis alcoolaria*		X	**5**	4	0	4	1	0	0	0	0	0	0	0	44.4%	5.3%	0.0%	0.0%	Generalist
6894	*Lambdina fervidaria*		X	**2**	1	0	1	1	0	0	0	0	0	0	0	11.1%	5.3%	0.0%	0.0%	Generalist
6941	*Eusarca confusaria*		X	**3**	1	0	1	2	0	0	0	0	0	0	0	11.1%	10.5%	0.0%	0.0%	Generalist
6966	*Eutrapela clemataria*		X	**8**	4	0	4	1	3	2	1	0	0	0	0	44.4%	5.3%	33.3%	0.0%	Generalist
6982	*Prochoerodes lineola*		X	**19**	8	0	8	7	4	3	1	0	0	0	0	88.9%	36.8%	50.0%	0.0%	Generalist
Geometrinae			6																	
7029	*Nemoria elfa*		X	**5**	0	0	0	5	0	0	0	0	0	0	0	0.0%	26.3%	0.0%	0.0%	Wetlands (various types)
7046	*Nemoria bistriaria*		G	**3**	3	1	2	0	0	0	0	0	0	0	0	22.2%	0.0%	0.0%	0.0%	Generalist
7053	*Dichorda iridaria*		X	**7**	3	1	2	4	0	0	0	0	0	0	0	22.2%	21.1%	0.0%	0.0%	Generalist
7058	*Synchlora aerata*		X	**9**	7	2	5	2	0	0	0	0	0	0	0	55.6%	10.5%	0.0%	0.0%	Generalist
7071	*Chlorochlamys chloroleucaria*		X	**6**	5	1	4	1	0	0	0	0	0	0	0	44.4%	5.3%	0.0%	0.0%	Generalist
7075	*Chloropteryx tepperaria*		X	**5**	4	0	4	1	0	0	0	0	0	0	0	44.4%	5.3%	0.0%	0.0%	Generalist
Sterrhinae			10																	
7087	*Euacidalia sericearia* cpx.		X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
7105	*Idaea scintillularia*		X	**2**	2	0	2	0	0	0	0	0	0	0	0	22.2%	0.0%	0.0%	0.0%	Generalist
7114	*Idaea demissaria*		X	**12**	7	0	7	5	0	0	0	0	0	0	0	77.8%	26.3%	0.0%	0.0%	Generalist
7132	*Pleuroprucha insulsaria*		X	**15**	7	0	7	8	0	0	0	0	0	0	0	77.8%	42.1%	0.0%	0.0%	Generalist
7136	*Cyclophora packardi*		X	**12**	6	0	6	6	0	0	0	0	0	0	0	66.7%	31.6%	0.0%	0.0%	Generalist
7146	*Haematopis grataria*		X	**18**	10	1	9	8	0	0	0	0	0	0	0	100.0%	42.1%	0.0%	0.0%	Generalist
7147	*Timandra amaturaria*		X	**7**	3	0	3	4	0	0	0	0	0	0	0	33.3%	21.1%	0.0%	0.0%	Generalist (hydric hardwoods FL)
7159	*Scopula limboundata*		X	**21**	9	0	9	12	0	0	0	0	0	0	0	100.0%	63.2%	0.0%	0.0%	Generalist
7169	*Scopula inductata*		X	**4**	4	0	4	0	0	0	0	0	0	0	0	44.4%	0.0%	0.0%	0.0%	Generalist
7179	*Leptostales rubromarginaria*		X	**4**	2	0	2	2	0	0	0	0	0	0	0	22.2%	10.5%	0.0%	0.0%	Generalist
Larentiinae			9																	
7197	*Eulithis gracilineata*		X	**2**	1	0	1	0	1	1	0	0	0	0	0	11.1%	0.0%	16.7%	0.0%	Generalist
7388	*Xanthorhoe ferrugata*		X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
7390	*Xanthorhoe lacustrata*		X	**9**	3	0	3	6	0	0	0	0	0	0	0	33.3%	31.6%	0.0%	0.0%	Generalist
7414	*Orthonama obstipata*		X	**10**	0	0	0	10	0	0	0	0	0	0	0	0.0%	52.6%	0.0%	0.0%	Generalist
7416	*Orthonama centrostrigaria*		X	**4**	1	0	1	3	0	0	0	0	0	0	0	11.1%	15.8%	0.0%	0.0%	Generalist
7440	*Eubaphe mendica*		X	**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Generalist
7474	*Eupithecia miserulata*		X	**15**	3	0	3	12	0	0	0	0	0	0	0	33.3%	63.2%	0.0%	0.0%	Generalist
7647	*Heterophleps triguttaria*		X	**3**	0	0	0	2	1	1	0	0	0	0	0	0.0%	10.5%	16.7%	0.0%	Hardwood Forest: Hydric
7648	*Dyspteris abortivaria*		X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
RHOPALOCERA			31																	
HESPERIOIDEA			3																	
HESPERIIDAE			3																	
Pyrginae			1																	
3870	*Epargyreus clarus*		X	**2**	0	0	0	0	0	0	0	2	0	1	1	0.0%	0.0%	0.0%	7.7%	Generalist
Hesperiinae			2																	
4013	*Hylephila phyleus*		X	**1**	0	0	0	0	0	0	0	1	0	0	1	0.0%	0.0%	0.0%	0.0%	Generalist
4049	*Atalopedes campestris*		X	**1**	0	0	0	0	0	0	0	1	0	0	1	0.0%	0.0%	0.0%	0.0%	Generalist
PAPILIONOIDEA			28																	

Table 2: Check List of Lepidoptera Collected at Twin Swamps Nature Preserve

				USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	% of	% of	% of	% of	
				Total	MV	MV	MV	UV	Bait	Bait	Bait	Diurnal	Diurnal	Diurnal	Diurnal	MV Sheet	UV Trap	Bait Trail	Diurnal	
					Sheet	Sheet	Sheet	Trap	Total	Trail	Traps	Total	Forest	Forest	Field	Samples	Samples	Samples	HF smpls	
LEPIDOPTERA TAXA COLLECTED					Total	pre '02	02 & '08						Pre '02	02 & 08		02 & 08			02 & 08	**Habitat Dependency Hypothesis**
Total Documented Sp. in Incl. Families			435	**3351**	1530	189	1341	1255	233	190	43	333	39	248	46					
PAPLIONIDAE			3																	
4176	*Papilio glaucus*		X	**3**	0	0	0	0	0	0	0	3	0	1	2	0.0%	0.0%	0.0%	7.7%	Generalist (hardwoods)
4181	*Papilio troilus*		X	**8**	0	0	0	0	0	0	0	8	0	6	2	0.0%	0.0%	0.0%	46.2%	Hardwood Forest
4184	*Eurytides marcellus*		X	**1**	0	0	0	0	0	0	0	1	0	1	0	0.0%	0.0%	0.0%	7.7%	Hardwood Forest (BUT xeric habitats in SE)
PIERIDAE			6																	
4193	*Pontia protodice*		X	**2**	0	0	0	0	0	0	0	2	0	1	1	0.0%	0.0%	0.0%	7.7%	Generalist of open areas
4197	*Pieris rapae*		X	**1**	0	0	0	0	0	0	0	1	0	1	0	0.0%	0.0%	0.0%	7.7%	Generalist of open areas
4209	*Colias philodice*		X	**1**	0	0	0	0	0	0	0	1	0	0	1	0.0%	0.0%	0.0%	0.0%	Generalist of open areas
4210	*Colias eurytheme*		X	**3**	0	0	0	0	0	0	0	3	0	0	3	0.0%	0.0%	0.0%	0.0%	Generalist of open areas
4228	*Phoebis sennae*		X	**3**	0	0	0	0	0	0	0	3	0	1	2	0.0%	0.0%	0.0%	7.7%	Generalist of open areas
4242	*Eurema nicippe*		X	**1**	0	0	0	0	0	0	0	1	0	0	1	0.0%	0.0%	0.0%	0.0%	Generalist of open areas
LYCAENIDAE			3																	
4249	*Feniseca tarquinius*		X	**1**	0	0	0	0	0	0	0	1	0	1	0	0.0%	0.0%	0.0%	7.7%	Hardwood Forest
4361	*Everes comyntas*		X	**9**	0	0	0	0	0	0	0	9	0	6	3	0.0%	0.0%	0.0%	46.2%	Generalist of open areas
4363	*Celastrina ladon*		X	**1**	0	0	0	0	0	0	0	1	0	1	0	0.0%	0.0%	0.0%	7.7%	Generalist
NYMPHALIDAE			16																	
4411	*Libytheana carinenta*		X	**1**	0	0	0	0	0	0	0	1	0	0	1	0.0%	0.0%	0.0%	0.0%	Generalist (*Celtis* habitats)
4413	*Agraulis vanillae*		X	**1**	0	0	0	0	0	0	0	1	0	0	1	0.0%	0.0%	0.0%	0.0%	Generalist of open areas
4420	*Polygonia interrogationis*		X	**10**	0	0	0	0	3	0	3	7	0	6	1	0.0%	0.0%	0.0%	46.2%	Generalist
4421	*Polygonia comma*		X	**3**	0	0	0	0	0	0	0	3	0	3	0	0.0%	0.0%	0.0%	23.1%	Generalist
4437	*Vanessa atlanta*		X	**5**	0	0	0	0	2	0	2	3	0	2	1	0.0%	0.0%	0.0%	15.4%	Generalist
4440	*Junonia coenia*		X	**5**	1	0	1	0	0	0	0	4	0	1	3	11.1%	0.0%	0.0%	7.7%	Generalist of open areas
4450	*Speyeria cybele*		X	**1**	0	0	0	0	0	0	0	1	0	1	0	0.0%	0.0%	0.0%	7.7%	Generalist
4481	*Phyciodes tharos*		X	**7**	0	0	0	0	0	0	0	7	0	3	4	0.0%	0.0%	0.0%	23.1%	Generalist
4522	*Basilarchia arthemis*		X	**15**	0	0	0	0	1	0	1	14	0	7	7	0.0%	0.0%	0.0%	53.8%	Generalist
4557	*Astereocampa celtis*		X	**10**	1	0	1	1	3	0	3	5	0	2	3	11.1%	5.3%	0.0%	15.4%	Generalist (*Celtis* habitats)
4562.1	*Astereocampa clyton*		X	**4**	0	0	0	0	1	0	1	3	0	2	1	0.0%	0.0%	0.0%	15.4%	Generalist (*Celtis* habitats)
4568.1	*Enodia anthedon*		X	**7**	0	0	0	0	0	0	0	7	0	7	0	0.0%	0.0%	0.0%	53.8%	Hardwood Forest
4569	*Satyrodes appalachia*		X	**10**	0	0	0	0	1	0	1	9	0	9	0	0.0%	0.0%	0.0%	69.2%	Hardwood Forest (hydric)
4573	*Cyllopsis gemma*		X	**3**	0	0	0	0	0	0	0	3	0	3	0	0.0%	0.0%	0.0%	23.1%	Generalist
4574	*Hermeuptychia hermes*		X	**5**	0	0	0	0	0	0	0	5	0	5	0	0.0%	0.0%	0.0%	38.5%	Generalist
4614	*Danaus plexippus*		X	**5**	0	0	0	0	0	0	0	5	0	3	2	0.0%	0.0%	0.0%	23.1%	Generalist
MIMALLONOIDEA			1																	
MIMALLONIDAE			1																	
7659	*Lacosoma chiridota*		X	**2**	1	1	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Generalist
LASIOCAMPOIDEA			2	**2**	1	0	1	1	0	0	0	0	0	0	0	11.1%	5.3%	0.0%	0.0%	
LASIOCAMPIDAE			2	**2**	1	0	1	1	0	0	0	0	0	0	0	11.1%	5.3%	0.0%	0.0%	
7683	*Artace cibraria*		X	**2**	1	0	1	1	0	0	0	0	0	0	0	11.1%	5.3%	0.0%	0.0%	Generalist
7685	*Heteropacha rileyana*		X	**2**	1	0	1	1	0	0	0	0	0	0	0	11.1%	5.3%	0.0%	0.0%	Intermedialist (*Gleditsia* habitats)
BOMBYCOIDEA			24																	
SATURNIIDAE			8																	
Citheroniinae			5																	
7704	*Eacles imperialis*		X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
7706	*Citheronia regalis*		X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
7709	*Sphingicampa bicolor*		X	**7**	6	1	5	1	0	0	0	0	0	0	0	55.6%	5.3%	0.0%	0.0%	Intermedialist (Gleditsia habitats)
7715	*Dryocampa rubicunda*		X	**11**	9	1	8	2	0	0	0	0	0	0	0	88.9%	10.5%	0.0%	0.0%	Generalist
7723	*Anisota virginiensis*		X	**6**	5	2	3	1	0	0	0	0	0	0	0	33.3%	5.3%	0.0%	0.0%	Generalist
Hemileucinae			0																	
7746	*Automeris io*			**1**	0	0	0	0	0	0	0	1	0	0	1	0.0%	0.0%	0.0%	0.0%	Generalist
Saturniinae			3																	
7757	*Antheraea polyphemus*		X	**6**	5	0	5	1	0	0	0	0	0	0	0	55.6%	5.3%	0.0%	0.0%	Generalist
7758	*Actias luna*		X	**4**	4	1	3	0	0	0	0	0	0	0	0	33.3%	0.0%	0.0%	0.0%	Generalist
7765	*Callosamia angulifera*		X	**2**	2	1	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Hardwood Forest

Table 2: Check List of Lepidoptera Collected at Twin Swamps Nature Preserve

				USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	% of	% of	% of	% of	
				Total	MV	MV	MV	UV	Bait	Bait	Bait	Diurnal	Diurnal	Diurnal	Diurnal	MV Sheet	UV Trap	Bait Trail	Diurnal	
					Sheet	Sheet	Sheet	Trap	Total	Trail	Traps	Total	Forest	Forest	Field	Samples	Samples	Samples	HF smpls	
LEPIDOPTERA TAXA COLLECTED					Total	pre '02	02 & '08						Pre '02	02 & 08		02 & 08			02 & 08	**Habitat Dependency Hypothesis**
Total Documented Sp. in Incl. Families			435	**3351**	1530	189	1341	1255	233	190	43	333	39	248	46					
SPHINGIDAE			16																	
Sphinginae			10																	
7775	*Manduca sexta*	X		**13**	10	3	7	3	0	0	0	0	0	0	0	77.8%	15.8%	0.0%	0.0%	Generalist
7784	*Dolba hyloeus*	X		**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Hardwood Forest in mid latitudes
7787	*Ceratomia undulosa*	X		**5**	5	1	4	0	0	0	0	0	0	0	0	44.4%	0.0%	0.0%	0.0%	Generalist
7789	*Ceratomia catalpae*	X		**2**	2	0	2	0	0	0	0	0	0	0	0	22.2%	0.0%	0.0%	0.0%	Generalist
7790	*Ceratomia hageni*	X		**2**	2	1	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Grasslands
7791	*Isoparce cupressi*	X		**8**	3	2	1	5	0	0	0	0	0	0	0	11.1%	26.3%	0.0%	0.0%	Wetlands: Cypress Habitats
7793	*Paratraea plebeja*	X		**6**	5	1	4	0	0	0	0	1	0	1	0	44.4%	0.0%	0.0%	7.7%	Generalist
7821	*Smerinthus jamaicensis*	X		**9**	9	2	7	0	0	0	0	0	0	0	0	77.8%	0.0%	0.0%	0.0%	Generalist
7824	*Paonias excaecatus*	X		**7**	6	0	6	1	0	0	0	0	0	0	0	66.7%	5.3%	0.0%	0.0%	Generalist
7825	*Paonias myops*	X		**9**	7	0	7	2	0	0	0	0	0	0	0	77.8%	10.5%	0.0%	0.0%	Generalist
Macroglossinae			6																	
7861	*Eumorpha achemon*	X		**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
7870	*Sphecodina abbottii*	X		**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
7884	*Darapsa versicolor*	X		**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Hardwood Forest
7885	*Darapsa myron*	X		**6**	3	0	3	2	1	0	1	0	0	0	0	33.3%	10.5%	0.0%	0.0%	Generalist
7890	*Xylophanes tersa*	X		**2**	2	1	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
7894	*Hyles lineata*	X		**4**	4	2	2	0	0	0	0	0	0	0	0	22.2%	0.0%	0.0%	0.0%	Generalist
NOCTUOIDEA			297																	
NOTODONTIDAE			29																	
7896	*Clostera inclusa*	X		**4**	1	0	1	3	0	0	0	0	0	0	0	11.1%	15.8%	0.0%	0.0%	Generalist (willow habitats)
7901	*Clostera apicalis*	X		**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Generalist
7903	*Datana angusii*	X		**13**	6	0	6	7	0	0	0	0	0	0	0	66.7%	36.8%	0.0%	0.0%	Generalist
7906	*Datana contractata*	X		**5**	4	0	4	1	0	0	0	0	0	0	0	44.4%	5.3%	0.0%	0.0%	Generalist
7907	*Datana integerrima*	X		**16**	10	2	8	6	0	0	0	0	0	0	0	88.9%	31.6%	0.0%	0.0%	Generalist
7908	*Datana perspicua*	X		**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
7915	*Nadata gibbosa*	X		**18**	8	0	8	10	0	0	0	0	0	0	0	88.9%	52.6%	0.0%	0.0%	Generalist
7917	*Hyperaeschra georgica*	X		**14**	9	1	8	5	0	0	0	0	0	0	0	88.9%	26.3%	0.0%	0.0%	Generalist
7920	*Peridea angulosa*	X		**16**	9	0	9	7	0	0	0	0	0	0	0	100.0%	36.8%	0.0%	0.0%	Generalist
7922	*Pheosia rimosa*	X		**2**	2	0	2	0	0	0	0	0	0	0	0	22.2%	0.0%	0.0%	0.0%	Generalist
7929	*Nerice bidentata*	X		**2**	1	0	1	1	0	0	0	0	0	0	0	11.1%	5.3%	0.0%	0.0%	Generalist
7931	*Gluphisia septentrionis*	X		**13**	7	0	7	6	0	0	0	0	0	0	0	77.8%	31.6%	0.0%	0.0%	Generalist
7936	*Furcula borealis*	X		**2**	2	0	2	0	0	0	0	0	0	0	0	22.2%	0.0%	0.0%	0.0%	Generalist
7937	*Furcula cinerea*	X		**6**	5	0	5	1	0	0	0	0	0	0	0	55.6%	5.3%	0.0%	0.0%	Generalist
	Symmerista sp. 7951/7952/7953	X		**5**	4	0	4	1	0	0	0	0	0	0	0	44.4%	5.3%	0.0%	0.0%	Generalist
7957	*Dasylophia anguina*	X		**18**	10	1	9	8	0	0	0	0	0	0	0	100.0%	42.1%	0.0%	0.0%	Generalist
7974	*Misogoda unicolor*	X		**3**	2	0	2	1	0	0	0	0	0	0	0	22.2%	5.3%	0.0%	0.0%	Generalist
7975	*Macrurocampa marthesia*	X		**5**	4	0	4	1	0	0	0	0	0	0	0	44.4%	5.3%	0.0%	0.0%	Generalist
7983	*Heterocampa obliqua*	X		**20**	9	0	9	11	0	0	0	0	0	0	0	100.0%	57.9%	0.0%	0.0%	Generalist
7985	*Heterocampa subrotata*	X		**16**	8	0	8	8	0	0	0	0	0	0	0	88.9%	42.1%	0.0%	0.0%	Generalist
7994	*Heterocampa guttivitta*	X		**9**	7	1	6	2	0	0	0	0	0	0	0	66.7%	10.5%	0.0%	0.0%	Generalist
7998	*Lochmaeus manteo*	X		**4**	2	0	2	2	0	0	0	0	0	0	0	22.2%	10.5%	0.0%	0.0%	Generalist
7999	*Lochmaeus bilineata*	X		**18**	8	0	8	10	0	0	0	0	0	0	0	88.9%	52.6%	0.0%	0.0%	Generalist
8005	*Schizura ipomoeae*	X		**15**	9	3	6	6	0	0	0	0	0	0	0	66.7%	31.6%	0.0%	0.0%	Generalist
8007	*Schizura unicornis*	X		**7**	6	0	6	1	0	0	0	0	0	0	0	66.7%	5.3%	0.0%	0.0%	Generalist
8010	*Schizura concinna*	X		**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Generalist
8011	*Schizura leptinoides*	X		**4**	4	0	4	0	0	0	0	0	0	0	0	44.4%	0.0%	0.0%	0.0%	Generalist
8012	*Oligocentria semirufescens*	X		**2**	2	0	2	0	0	0	0	0	0	0	0	22.2%	0.0%	0.0%	0.0%	Generalist
8017	*Oligocentria lignicolor*	X		**11**	7	0	7	4	0	0	0	0	0	0	0	77.8%	21.1%	0.0%	0.0%	Generalist
NOCTUIDAE			268																	
Arctiinae			23																	
Lithosiini			8																	

Table 2: Check List of Lepidoptera Collected at Twin Swamps Nature Preserve

				USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	% of	% of	% of	% of	
				Total	MV	MV	MV	UV	Bait	Bait	Bait	Diurnal	Diurnal	Diurnal	Diurnal	MV Sheet	UV Trap	Bait Trail	Diurnal	
					Sheet	Sheet	Sheet	Trap	Total	Trail	Traps	Total	Forest	Forest	Field	Samples	Samples	Samples	HF smpls	
LEPIDOPTERA TAXA COLLECTED					Total	pre '02	02 & '08						Pre '02	02 & 08		02 & 08			02 & 08	**Habitat Dependency Hypothesis**
Total Documented Sp. in Incl. Families			435	**3351**	1530	189	1341	1255	233	190	43	333	39	248	46					
	8045	*Crambidia lithosioides*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	8045.1	*Crambidia pallida*	X	**14**	3	0	3	11	0	0	0	0	0	0	0	33.3%	57.9%	0.0%	0.0%	Generalist
	8061	*Cisthene kentuckiensis*	X	**2**	2	0	2	0	0	0	0	0	0	0	0	22.2%	0.0%	0.0%	0.0%	Unknown
	8067	*Cisthene plumbea*	X	**17**	4	1	3	13	0	0	0	0	0	0	0	33.3%	68.4%	0.0%	0.0%	Generalist
	8072	*Cisthene packardii*	X	**8**	3	0	3	5	0	0	0	0	0	0	0	33.3%	26.3%	0.0%	0.0%	Generalist
	8090	*Hypoprepia fucosa*	X	**10**	4	0	4	6	0	0	0	0	0	0	0	44.4%	31.6%	0.0%	0.0%	Generalist
	8098	*Clemensia albata*	X	**17**	5	2	3	12	0	0	0	0	0	0	0	33.3%	63.2%	0.0%	0.0%	Generalist
	8099	*Pagara simplex*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	Arctiini		14																	
	8121	*Holomelina aurantiaca*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	8124	*Holomelina immaculata*	X	**2**	2	0	2	0	0	0	0	0	0	0	0	22.2%	0.0%	0.0%	0.0%	Hardwood Forest
	8129	*Pyrrharctia isabella*	X	**7**	4	2	2	3	0	0	0	0	0	0	0	22.2%	15.8%	0.0%	0.0%	Generalist
	8131	*Estigmene acrea*	X	**6**	5	2	3	1	0	0	0	0	0	0	0	33.3%	5.3%	0.0%	0.0%	Generalist
	8134	*Spilosoma congrua*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	8137	*Spilosoma virginica*	X	**20**	8	1	7	12	0	0	0	0	0	0	0	77.8%	63.2%	0.0%	0.0%	Generalist
	8140	*Hyphantria cunea*	X	**6**	6	2	4	0	0	0	0	0	0	0	0	44.4%	0.0%	0.0%	0.0%	Generalist
	8169	*Apantesis phalerata*	X	**11**	8	2	6	3	0	0	0	0	0	0	0	66.7%	15.8%	0.0%	0.0%	Generalist
	8171	*Apantesis nais*	X	**1**	1	1	0	0	0	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	Generalist
	8188	*Grammia figurata*	X	**1**	1	1	0	0	0	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	Intermedialist
	8203	*Halysidota tessellaris*	X	**18**	5	2	3	13	0	0	0	0	0	0	0	33.3%	68.4%	0.0%	0.0%	Generalist
	8230	*Cycnia tenera*	X	**21**	14	5	9	7	0	0	0	0	0	0	0	100.0%	36.8%	0.0%	0.0%	Generalist
	8231	*Cycnia oregonensis*	X	**10**	7	0	7	3	0	0	0	0	0	0	0	77.8%	15.8%	0.0%	0.0%	Generalist
	8238	*Euchaetes egle*	X	**15**	9	5	4	6	0	0	0	0	0	0	0	44.4%	31.6%	0.0%	0.0%	Generalist
	Ctenuchini		1																	
	8267	*Cisseps fulvicollis*	X	**20**	10	1	9	10	0	0	0	0	0	0	0	100.0%	52.6%	0.0%	0.0%	Generalist
	Lymantriinae		2																	
	8292	*Dasychira tephra*	X	**11**	7	0	7	4	0	0	0	0	0	0	0	77.8%	21.1%	0.0%	0.0%	Generalist
	8316	*Orgyia leucostigma*	X	**10**	5	0	5	5	0	0	0	0	0	0	0	55.6%	26.3%	0.0%	0.0%	Generalist
	Herminiinae		28																	
	8322	*Idia americalis*	X	**18**	3	0	3	8	5	4	1	2	0	2	0	33.3%	42.1%	66.7%	15.4%	Generalist
	8323	*Idia aemula*	X	**10**	7	0	7	3	0	0	0	0	0	0	0	77.8%	15.8%	0.0%	0.0%	Generalist
	8323.1	*Idia concisa*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist (WI)
	8326	*Idia rotundalis*	X	**18**	4	0	4	12	2	2	0	0	0	0	0	44.4%	63.2%	33.3%	0.0%	Generalist
	8328	*Idia julia*	X	**3**	1	0	1	0	2	2	0	0	0	0	0	11.1%	0.0%	33.3%	0.0%	Generalist
	8329	*Idia diminuendis*	X	**7**	3	0	3	4	0	0	0	0	0	0	0	33.3%	21.1%	0.0%	0.0%	Generalist
	8334	*Idia lubricalis*	X	**13**	1	0	1	4	8	6	2	0	0	0	0	11.1%	21.1%	100.0%	0.0%	Generalist
	8338	*Phalaenophana pyramusalis*	X	**2**	1	0	1	0	1	1	0	0	0	0	0	11.1%	0.0%	16.7%	0.0%	Generalist
	8349	*Zanclognatha protumnusalis*	X	**5**	4	0	4	1	0	0	0	0	0	0	0	44.4%	5.3%	0.0%	0.0%	Generalist
	8351b	*Zanclognatha cruralis* cpx. sp. *B*	X	**7**	4	0	4	2	1	1	0	0	0	0	0	44.4%	10.5%	16.7%	0.0%	Generalist
	8352	*Zanclognatha jacchusalis*	X	**7**	3	0	3	2	2	2	0	0	0	0	0	33.3%	10.5%	33.3%	0.0%	Generalist
	8356	*Chytolita petrealis*	X	**12**	6	0	6	3	3	3	0	0	0	0	0	66.7%	15.8%	50.0%	0.0%	Generalist
	8357.1	*Macrochilo hypocritialis Fgn.*	X	**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Generalist
	8358	*Macrochilo litophora*	X	**4**	0	0	0	4	0	0	0	0	0	0	0	0.0%	21.1%	0.0%	0.0%	Generalist
	8361	*Macrochilo louisiana*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist (WI & FL)
	8363	*Phalaenostola eumelusalis*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	8364	*Phalaenostola larentioides*	X	**7**	4	0	4	3	0	0	0	0	0	0	0	44.4%	15.8%	0.0%	0.0%	Generalist
	8366	*Tetanolita mynesalis*	X	**27**	8	0	8	17	2	2	0	0	0	0	0	88.9%	89.5%	33.3%	0.0%	Generalist
	8368	*Tetanolita floridana*	X	**17**	5	0	5	10	2	2	0	0	0	0	0	55.6%	52.6%	33.3%	0.0%	Generalist
	8370	*Bleptina caradrinalis*	X	**13**	5	0	5	8	0	0	0	0	0	0	0	55.6%	42.1%	0.0%	0.0%	Generalist
	8372	*Bleptina sangamonia*	G	**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Generalist
	8379	*Renia factiosalis*	X	**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Generalist
	8381	*Renia discoloralis*	X	**2**	1	0	1	0	1	1	0	0	0	0	0	11.1%	0.0%	16.7%	0.0%	Generalist
	8386	*Renia adspergillus*	X	**9**	5	0	5	4	0	0	0	0	0	0	0	55.6%	21.1%	0.0%	0.0%	Generalist
		Renia sp. nr. *adspergillus*	X	**6**	3	0	3	1	2	2	0	0	0	0	0	33.3%	5.3%	33.3%	0.0%	Generalist

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				USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	% of	% of	% of	% of	
				Total	MV	MV	MV	UV	Bait	Bait	Bait	Diurnal	Diurnal	Diurnal	Diurnal	MV Sheet	UV Trap	Bait Trail	Diurnal	
					Sheet	Sheet	Sheet	Trap	Total	Trail	Traps	Total	Forest	Forest	Field	Samples	Samples	Samples	HF smpls	
LEPIDOPTERA TAXA COLLECTED					Total	pre '02	02 & '08						Pre '02	02 & 08		02 & 08			02 & 08	**Habitat Dependency Hypothesis**
Total Documented Sp. in Incl. Families			435	**3351**	1530	189	1341	1255	233	190	43	333	39	248	46					
	8393	*Lascoria ambigualis*	X	**8**	3	0	3	4	1	1	0	0	0	0	0	33.3%	21.1%	16.7%	0.0%	Generalist
	8397	*Palthis angulalis*	X	**3**	3	0	3	0	0	0	0	0	0	0	0	33.3%	0.0%	0.0%	0.0%	Generalist
	8398	*Palthis asopialis*	X	**8**	5	0	5	3	0	0	0	0	0	0	0	55.6%	15.8%	0.0%	0.0%	Generalist
Rivulinae			3																	
	8404	*Rivula propinqualis*	X	**17**	6	0	6	10	1	1	0	0	0	0	0	66.7%	52.6%	16.7%	0.0%	Generalist
	8411	*Colobochyla interpuncta*	X	**9**	1	0	1	8	0	0	0	0	0	0	0	11.1%	42.1%	0.0%	0.0%	Generalist
	8412	*Melanomma auricinctaria*	X	**15**	2	0	2	11	2	2	0	0	0	0	0	22.2%	57.9%	33.3%	0.0%	Hardwood Forest: Hydric
Hypenodinae			5																	
	8421	*Hypenodes fractilinea*	X	**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Generalist
	8428	*Dyspyralis nigella*	X	**8**	1	0	1	5	2	2	0	0	0	0	0	11.1%	26.3%	33.3%	0.0%	Hardwood Forest
		Dyspyralis new sp.	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	8431	*Schrankia macula*	X	**4**	0	0	0	4	0	0	0	0	0	0	0	0.0%	21.1%	0.0%	0.0%	Generalist
	8440	*Nigetia formosalis*	X	**14**	2	0	2	11	1	1	0	0	0	0	0	22.2%	57.9%	16.7%	0.0%	Generalist
Hypeninae			11																	
	8441	*Hypena manalis*	X	**10**	5	0	5	4	1	1	0	0	0	0	0	55.6%	21.1%	16.7%	0.0%	Hardwood Forest
	8442	*Hypena baltimoralis*	X	**13**	8	0	8	4	1	1	0	0	0	0	0	88.9%	21.1%	16.7%	0.0%	Generalist
	8443	*Hypena bijugalis*	X	**4**	4	0	4	0	0	0	0	0	0	0	0	44.4%	0.0%	0.0%	0.0%	Generalist (usually hardwood forest)
	8444	*Hypena palparia*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	8445	*Hypena abalienalis*	X	**8**	7	0	7	1	0	0	0	0	0	0	0	77.8%	5.3%	0.0%	0.0%	Generalist
	8446	*Hypena deceptalis*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Hardwood Forest
	8447	*Hypena madefactalis*	X	**5**	4	0	4	1	0	0	0	0	0	0	0	44.4%	5.3%	0.0%	0.0%	Hardwood Forest
	8448	*Hypena sordidula*	X	**4**	4	0	4	0	0	0	0	0	0	0	0	44.4%	0.0%	0.0%	0.0%	Hardwood Forest
	8461	*Hypena humuli*	X	**2**	2	2	0	0	0	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	Generalist (WI)
	8465	*Hypena scabra*	X	**36**	10	1	9	19	6	4	2	1	0	0	1	100.0%	100.0%	66.7%	0.0%	Generalist
	8479	*Spargaloma sexpunctata*	X	**23**	11	3	8	9	3	3	0	0	0	0	0	88.9%	47.4%	50.0%	0.0%	Generalist
Catocalinae			64																	
	8491	*Ledaea perditalis*	X	**27**	7	2	5	16	4	4	0	0	0	0	0	55.6%	84.2%	66.7%	0.0%	Generalist
	8493	*Isogona tenuis*	X	**3**	2	0	2	1	0	0	0	0	0	0	0	22.2%	5.3%	0.0%	0.0%	Generalist (*Celtis* habitats)
	8499	*Metalectra discalis*	X	**13**	4	1	3	3	6	6	0	0	0	0	0	33.3%	15.8%	100.0%	0.0%	Generalist
	8500	*Metalectra quadrisignata*	X	**6**	0	0	0	1	5	3	2	0	0	0	0	0.0%	5.3%	50.0%	0.0%	Generalist
	8509	*Arugisa latiorella*	X	**11**	2	0	2	9	0	0	0	0	0	0	0	22.2%	47.4%	0.0%	0.0%	Generalist
	8514	*Scolecocampa liburna*	X	**5**	3	0	3	2	0	0	0	0	0	0	0	33.3%	10.5%	0.0%	0.0%	Generalist
	8528	*Hyposoropha hormos*	X	**7**	6	1	5	1	0	0	0	0	0	0	0	55.6%	5.3%	0.0%	0.0%	Generalist
	8534	*Plusiodonta compressipalpis*	X	**29**	9	1	8	15	5	5	0	0	0	0	0	88.9%	78.9%	83.3%	0.0%	Generalist
	8545	*Anomis erosa*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	8555	*Scoliopteryx libatrix*	X	**4**	0	0	0	1	3	3	0	0	0	0	0	0.0%	5.3%	50.0%	0.0%	Generalist (WI)
	8587	*Panopoda rufimargo*	X	**14**	9	1	8	4	1	1	0	0	0	0	0	88.9%	21.1%	16.7%	0.0%	Generalist
	8588	*Panopoda carneicosta*	X	**10**	6	0	6	3	1	1	0	0	0	0	0	66.7%	15.8%	16.7%	0.0%	Generalist
	8607	*Melipotis jucunda*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	8651	*Lesmone detrahens*	X	**12**	6	1	5	5	1	1	0	0	0	0	0	55.6%	26.3%	16.7%	0.0%	Generalist
	8689	*Zale lunata*	X	**12**	5	1	4	2	5	5	0	0	0	0	0	44.4%	10.5%	83.3%	0.0%	Generalist
	8692	*Zale galbanata*	X	**17**	5	1	4	5	7	5	2	0	0	0	0	44.4%	26.3%	83.3%	0.0%	Hardwood Forest
	8717	*Zale horrida*	X	**1**	0	0	0	0	1	1	0	0	0	0	0	0.0%	0.0%	16.7%	0.0%	Generalist
	8719	*Euparthenos nubilis*	X	**6**	4	1	3	0	1	1	0	1	1	0	0	33.3%	0.0%	16.7%	0.0%	Hardwood Forest
	8721	*Allotria elonympha*	X	**10**	2	0	2	2	3	3	0	3	1	2	0	22.2%	10.5%	50.0%	15.4%	Generalist
	8726.1	*Dysgonia telma* Sullivan	X	**4**	0	0	0	0	4	4	0	0	0	0	0	0.0%	0.0%	66.7%	0.0%	Hardwood Forest: Hydric
	8727	*Parallelia bistriaris*	X	**20**	9	1	8	5	6	6	0	0	0	0	0	88.9%	26.3%	100.0%	0.0%	Generalist
	8728	*Cutina albopunctella*	X	**7**	2	0	2	5	0	0	0	0	0	0	0	22.2%	26.3%	0.0%	0.0%	Wetlands: Cypress Habitats
	8729	*Cutina distincta*	X	**11**	1	0	1	10	0	0	0	0	0	0	0	11.1%	52.6%	0.0%	0.0%	Wetlands: Cypress Habitats
		Cutina aluticolor Pogue & Fgn.	X	**12**	2	0	2	8	2	2	0	0	0	0	0	22.2%	42.1%	33.3%	0.0%	Wetlands: Cypress Habitats
		Cutina arcuata Pogue & Fgn.	X	**9**	0	0	0	8	1	1	0	0	0	0	0	0.0%	42.1%	16.7%	0.0%	Wetlands: Cypress Habitats
	8733	*Caenurgia chloropha*	X	**8**	3	0	3	3	2	2	0	0	0	0	0	33.3%	15.8%	33.3%	0.0%	Generalist
	8738	*Caenurgina crassiuscula*	X	**11**	8	0	8	3	0	0	0	0	0	0	0	88.9%	15.8%	0.0%	0.0%	Generalist
	8739	*Caenurgina erechtea*	X	**20**	10	1	9	6	3	2	1	1	0	0	1	100.0%	31.6%	33.3%	0.0%	Generalist

Table 2: Check List of Lepidoptera Collected at Twin Swamps Nature Preserve

				USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	% of	% of	% of	% of	
				Total	MV	MV	MV	UV	Bait	Bait	Bait	Diurnal	Diurnal	Diurnal	Diurnal	MV Sheet	UV Trap	Bait Trail	Diurnal	
					Sheet	Sheet	Sheet	Trap	Total	Trail	Traps	Total	Forest	Forest	Field	Samples	Samples	Samples	HF smpls	
LEPIDOPTERA TAXA COLLECTED					Total	pre '02	02 & '08						Pre '02	02 & 08		02 & 08			02 & 08	**Habitat Dependency Hypothesis**
Total Documented Sp. in Incl. Families			435	**3351**	1530	189	1341	1255	233	190	43	333	39	248	46					
	8743	*Mocis latipes*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	8745	*Mocis texana*	X	**4**	1	0	1	1	2	2	0	0	0	0	0	11.1%	5.3%	33.3%	0.0%	Generalist
	8747	*Celiptera frustulum*	X	**6**	1	0	1	1	4	4	0	0	0	0	0	11.1%	5.3%	66.7%	0.0%	Hardwood Forest
	8764	*Argyrostrotis anilis*	X	**8**	3	0	3	3	2	1	1	0	0	0	0	33.3%	15.8%	16.7%	0.0%	Generalist (more local in WI)
	8769	*Spiloloma lunilinea*	X	**16**	5	0	5	3	8	5	3	0	0	0	0	55.6%	15.8%	83.3%	0.0%	Generalist (*Gleditsia habitats*)
	8770	*Catocala innubens*	X	**4**	1	1	0	0	0	0	0	3	0	3	0	0.0%	0.0%	0.0%	23.1%	Generalist (*Gleditsia habitats*)
	8771	*Catocala piatrix*	X	**14**	3	0	3	1	9	5	4	1	0	1	0	33.3%	5.3%	83.3%	7.7%	Hardwood Forest (w Juglandaceae)
	8780	*Catocala robinsoni*	X	**19**	0	0	0	0	2	1	1	17	5	12	0	0.0%	0.0%	16.7%	92.3%	Hardwood Forest (w Juglandaceae)
	8781	*Catocala judith*	X	**1**	0	0	0	0	0	0	0	1	1	0	0	0.0%	0.0%	0.0%	0.0%	Hardwood Forest: Mesic (w Juglandaceae)
	8782	*Catocala flebilis*	X	**15**	2	1	1	1	0	0	0	12	1	11	0	11.1%	5.3%	0.0%	84.6%	Hardwood Forest (w Juglandaceae)
	8783	*Catocala angusi*	X	**20**	7	3	4	0	1	1	0	12	1	11	0	44.4%	0.0%	16.7%	84.6%	Hardwood Forest (w Juglandaceae)
		Catocala angusi [white fringe]	X	**3**	0	0	0	0	0	0	0	3	0	3	0	0.0%	0.0%	0.0%	23.1%	Hardwood Forest (w Juglandaceae)
	8784	*Catocala obscura*	X	**22**	6	1	5	1	3	3	0	12	2	10	0	55.6%	5.3%	50.0%	76.9%	Hardwood Forest (w Juglandaceae)
	8785	*Catocala residua* White Fringe	X	**15**	2	0	2	0	0	0	0	13	0	13	0	22.2%	0.0%	0.0%	100.0%	Hardwood Forest (w Juglandaceae)
	8785	*Catocala residua* Dark Fringe	X	**3**	1	0	1	0	0	0	0	2	1	1	0	11.1%	0.0%	0.0%	7.7%	Hardwood Forest (w Juglandaceae)
	8787	*Catocala agrippina*	X	**1**	0	0	0	0	0	0	0	1	1	0	0	0.0%	0.0%	0.0%	0.0%	Hardwood Forest: Mesic
	8788	*Catocala retecta*	X	**4**	1	0	1	0	1	1	0	2	0	2	0	11.1%	0.0%	16.7%	15.4%	Hardwood Forest (w Juglandaceae)
	8788.1	*Catocala luctuosa*	X	**26**	6	2	4	0	6	4	2	14	2	12	0	44.4%	0.0%	66.7%	92.3%	Hardwood Forest (w Juglandaceae)
	8789	*Catocala ulalume*	X	**3**	0	0	0	0	0	0	0	3	1	2	0	0.0%	0.0%	0.0%	15.4%	Hardwood Forest (w Juglandaceae)
	8791	*Catocala insolabilis*	X	**15**	6	0	6	1	1	1	0	7	0	7	0	66.7%	5.3%	16.7%	53.8%	Hardwood Forest: Mesic
	8792	*Catocala vidua*	X	**27**	4	0	4	0	8	6	2	15	4	11	0	44.4%	0.0%	100.0%	84.6%	Hardwood Forest (w Juglandaceae)
	8793	*Catocala maestosa*	X	**14**	3	1	2	0	0	0	0	11	1	10	0	22.2%	0.0%	0.0%	76.9%	Hardwood Forest (w Juglandaceae)
	8794	*Catocala lacrymosa*	X	**20**	3	1	2	0	2	2	0	15	4	11	0	22.2%	0.0%	33.3%	84.6%	Hardwood Forest (w Juglandaceae)
	8795	*Catocala palaeogama*	X	**15**	5	2	3	0	0	0	0	10	3	7	0	33.3%	0.0%	0.0%	53.8%	Hardwood Forest (w Juglandaceae)
	8796	*Catocala nebulosa*	X	**7**	1	0	1	0	0	0	0	6	2	4	0	11.1%	0.0%	0.0%	30.8%	Hardwood Forest (w Juglandaceae)
	8797	*Catocala subnata*	X	**1**	0	0	0	0	0	0	0	1	0	1	0	0.0%	0.0%	0.0%	7.7%	Hardwood Forest (w Juglandaceae)
	8798	*Catocala neogama*	X	**8**	3	0	3	0	0	0	0	5	1	4	0	33.3%	0.0%	0.0%	30.8%	Hardwood Forest (w Juglandaceae)
		Catocala communis	X	**3**	0	0	0	0	0	0	0	3	1	2	0	0.0%	0.0%	0.0%	15.4%	Hardwood Forest (w Juglandaceae)
	8801	*Catocala ilia*	X	**26**	9	1	8	5	4	3	1	8	0	8	0	88.9%	26.3%	50.0%	61.5%	Generalist (Oak Habitats)
	8804	*Catocala mamorata*	X	**18**	0	0	0	0	0	0	0	18	6	12	0	0.0%	0.0%	0.0%	92.3%	Cottonwood Swamp & Hydric Hardwood Forest
	8832	*Catocala cara*	X	**2**	0	0	0	0	2	2	0	0	0	0	0	0.0%	0.0%	33.3%	0.0%	Hardwood Forest (also suburban yards)
		Catocala carissima	X	**1**	0	0	0	0	0	0	0	1	0	1	0	0.0%	0.0%	0.0%	7.7%	Hardwood Forest
	8834	*Catocala amatrix*	X	**9**	2	0	2	0	4	4	0	3	0	3	0	22.2%	0.0%	66.7%	23.1%	Hardwood Forest (also suburban yards)
	8842	*Catocala nuptialis*	X	**5**	2	0	2	3	0	0	0	0	0	0	0	22.2%	15.8%	0.0%	0.0%	Unknown (*Amorpha fruticosa* habitats westward)
	8878	*Catocala amica*	X	**3**	3	1	2	0	0	0	0	0	0	0	0	22.2%	0.0%	0.0%	0.0%	Generalist (Oak Habitats)
	8878.1	*Catocala lineella*	X	**9**	4	0	4	3	0	0	0	2	0	2	0	44.4%	15.8%	0.0%	15.4%	Generalist (Oak Habitats)
	Euteliinae		3																	
	8957	*Paectes oculatrix*	X	**10**	9	2	7	1	0	0	0	0	0	0	0	77.8%	5.3%	0.0%	0.0%	Generalist
	8959	*Paectes pygmaea*	X	**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Generalist
	8962	*Paectes abrostoloides*	X	**10**	9	1	8	1	0	0	0	0	0	0	0	88.9%	5.3%	0.0%	0.0%	Generalist (*Liquidambar* Habitats)
	Sarrothripinae		6																	
	8970	*Baileya ophthalmica*	X	**2**	1	0	1	1	0	0	0	0	0	0	0	11.1%	5.3%	0.0%	0.0%	Generalist
	8971	*Baileya dormitans*	X	**7**	5	0	5	2	0	0	0	0	0	0	0	55.6%	10.5%	0.0%	0.0%	Hardwood Forest
	8972	*Baileya levitans*	X	**4**	4	0	4	0	0	0	0	0	0	0	0	44.4%	0.0%	0.0%	0.0%	Hardwood Forest
	8973	*Baileya australis*	X	**3**	3	0	3	0	0	0	0	0	0	0	0	33.3%	0.0%	0.0%	0.0%	Generalist
	8974	*Characoma nilotica*	X	**6**	4	0	4	2	0	0	0	0	0	0	0	44.4%	10.5%	0.0%	0.0%	Generalist
	8978	*Nycteola metaspilella*	X	**2**	0	0	0	2	0	0	0	0	0	0	0	0.0%	10.5%	0.0%	0.0%	Unknown
	Nolinae		1																	
	8991	*Nola cereella*	X	**14**	7	0	7	7	0	0	0	0	0	0	0	77.8%	36.8%	0.0%	0.0%	Generalist
	Bagisarinae		1																	
	9169	*Bagisara rectifascia*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist in southeast U.S.
	Eustrotinae		10																	
	9003	*Tripudia quadrifera*	X	**2**	1	0	1	1	0	0	0	0	0	0	0	11.1%	5.3%	0.0%	0.0%	Generalist
	9030	*Ozarba aeria*	X	**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Hardwood Forest

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				USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	% of	% of	% of	% of	
				Total	MV	MV	MV	UV	Bait	Bait	Bait	Diurnal	Diurnal	Diurnal	Diurnal	MV Sheet	UV Trap	Bait Trail	Diurnal	
					Sheet	Sheet	Sheet	Trap	Total	Trail	Traps	Total	Forest	Forest	Field	Samples	Samples	Samples	HF smpls	
LEPIDOPTERA TAXA COLLECTED					Total	pre '02	02 & '08						Pre '02	02 & 08		02 & 08			02 & 08	**Habitat Dependency Hypothesis**
Total Documented Sp. in Incl. Families			435	**3351**	1530	189	1341	1255	233	190	43	333	39	248	46					
	9038	*Hyperstrotia villificans*	X	**15**	8	0	8	7	0	0	0	0	0	0	0	88.9%	36.8%	0.0%	0.0%	Generalist
	9039	*Hyperstrotia flaviguttata*	X	**10**	7	0	7	3	0	0	0	0	0	0	0	77.8%	15.8%	0.0%	0.0%	Intermedialist
	9040	*Hyperstrotia secta*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	9044	*Thioptera nigrofimbria*	X	**28**	10	3	7	17	1	1	0	0	0	0	0	77.8%	89.5%	16.7%	0.0%	Generalist
	9047	*Lithacodia muscosula*	X	**11**	4	0	4	6	1	1	0	0	0	0	0	44.4%	31.6%	16.7%	0.0%	Generalist
	9051	*Lithacodia musta*	X	**8**	3	0	3	5	0	0	0	0	0	0	0	33.3%	26.3%	0.0%	0.0%	Hardwood Forest
	9053	*Pseudostrotia carneola*	X	**20**	6	0	6	12	2	2	0	0	0	0	0	66.7%	63.2%	33.3%	0.0%	Generalist
	9070	*Amyna octo*	X	**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Generalist
	Condicinae		9																	
	9690	*Condica videns*	X	**9**	4	0	4	4	1	1	0	0	0	0	0	44.4%	21.1%	16.7%	0.0%	Generalist
	9693	*Condica mobilis*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	9696	*Condica vecors*	X	**17**	11	3	8	5	1	1	0	0	0	0	0	88.9%	26.3%	16.7%	0.0%	Generalist
	9699	*Condica sutor*	X	**7**	6	0	6	1	0	0	0	0	0	0	0	66.7%	5.3%	0.0%	0.0%	Generalist
	9720	*Ogdoconta cinereola*	X	**24**	10	1	9	13	1	1	0	0	0	0	0	100.0%	68.4%	16.7%	0.0%	Generalist
	9057	*Homophoberia apicosa*	X	**17**	1	0	1	11	5	4	1	0	0	0	0	11.1%	57.9%	66.7%	0.0%	Generalist
	9065	*Leuconycta diphteroides*	X	**9**	4	1	3	4	1	1	0	0	0	0	0	33.3%	21.1%	16.7%	0.0%	Generalist
	9066	*Leuconycta lepidula*	X	**7**	2	0	2	4	1	1	0	0	0	0	0	22.2%	21.1%	16.7%	0.0%	Generalist
	9661	*Crambodes talidiformis*	X	**3**	3	0	3	0	0	0	0	0	0	0	0	33.3%	0.0%	0.0%	0.0%	Generalist
	Plusiinae		8																	
	8885	*Argyrogramma verruca*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	8886	*Enigmogramma basigera*	X	**4**	4	0	4	0	0	0	0	0	0	0	0	44.4%	0.0%	0.0%	0.0%	Generalist
	8887	*Trichoplusia ni*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	8889	*Ctenoplusia oxygramma*	X	**10**	7	1	6	3	0	0	0	0	0	0	0	66.7%	15.8%	0.0%	0.0%	Generalist
	8890	*Pseudoplusia includens*	X	**8**	7	2	5	1	0	0	0	0	0	0	0	55.6%	5.3%	0.0%	0.0%	Generalist
	8898	*Allagrapha aerea*	X	**24**	12	4	8	12	0	0	0	0	0	0	0	88.9%	63.2%	0.0%	0.0%	Generalist
	8908	*Autographa precationis*	X	**7**	4	0	4	3	0	0	0	0	0	0	0	44.4%	15.8%	0.0%	0.0%	Generalist
	8924	*Anagrapha falcifera*	X	**5**	5	0	5	0	0	0	0	0	0	0	0	55.6%	0.0%	0.0%	0.0%	Generalist
	Acontiinae		7																	
		Cydosia sp.		**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Unknown
	9090	*Tarachidia candefacta*	X	**11**	8	1	7	3	0	0	0	0	0	0	0	77.8%	15.8%	0.0%	0.0%	Generalist
	9095	*Tarachidia erastrioides*	X	**12**	6	0	6	6	0	0	0	0	0	0	0	66.7%	31.6%	0.0%	0.0%	Generalist
	9122	*Spragueia dama*	X	**20**	11	3	8	9	0	0	0	0	0	0	0	88.9%	47.4%	0.0%	0.0%	Generalist
	9127	*Spragueia leo*	X	**20**	10	3	7	10	0	0	0	0	0	0	0	77.8%	52.6%	0.0%	0.0%	Generalist
	9131	*Spragueia apicalis*	X	**20**	10	3	7	9	1	1	0	0	0	0	0	77.8%	47.4%	16.7%	0.0%	Generalist
	9136	*Acontia aprica*	X	**21**	12	4	8	9	0	0	0	0	0	0	0	88.9%	47.4%	0.0%	0.0%	Generalist
	9146	*Acontia delecta*	X	**1**	1	1	0	0	0	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	Unknown
	Amphipyrinae		2																	
	9619	*Phosphila miselioides*	X	**3**	1	0	1	1	1	1	0	0	0	0	0	11.1%	5.3%	16.7%	0.0%	Generalist
	9638	*Amphipyra pyramidoides*	X	**5**	0	0	0	0	5	4	1	0	0	0	0	0.0%	0.0%	66.7%	0.0%	Generalist
	Stiriinae		2																	
	9754	*Plagiomimicus pityochromus*	X	**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Unknown
	9766	*Cirrhophanus triangulifer*	X	**20**	11	4	7	9	0	0	0	0	0	0	0	77.8%	47.4%	0.0%	0.0%	Unknown (apparently old fields in S Indiana)
	Eriopinae		1																	
	9631	*Callopistria mollissima*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	Psaphidinae		1																	
	9725	*Azenia obtusa*	X	**23**	10	4	6	13	0	0	0	0	0	0	0	66.7%	68.4%	0.0%	0.0%	Generalist
	Heliothinae		10																	
	11068	*Helicoverpa zea*	X	**18**	10	2	8	8	0	0	0	0	0	0	0	88.9%	42.1%	0.0%	0.0%	Generalist
	11070	*Heliothis subflexus*	X	**1**	1	1	0	0	0	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	Generalist
	11071	*Heliothis virescens*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	11073.1	*Heliothis lupatus*	X	**1**	1	1	0	0	0	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	Hardwood Forest
	11117	*Schinia lynx*	X	**3**	3	2	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Grasslands (including old field)
	11128	*Schinia arcigera*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	11135	*Schinia rivulosa*	X	**20**	12	5	7	8	0	0	0	0	0	0	0	77.8%	42.1%	0.0%	0.0%	Generalist

Table 2: Check List of Lepidoptera Collected at Twin Swamps Nature Preserve

				USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	% of	% of	% of	% of	
				Total	MV	MV	MV	UV	Bait	Bait	Bait	Diurnal	Diurnal	Diurnal	Diurnal	MV Sheet	UV Trap	Bait Trail	Diurnal	
					Sheet	Sheet	Sheet	Trap	Total	Trail	Traps	Total	Forest	Forest	Field	Samples	Samples	Samples	HF smpls	
LEPIDOPTERA TAXA COLLECTED					Total	pre '02	02 & '08						Pre '02	02 & 08		02 & 08			02 & 08	**Habitat Dependency Hypothesis**
Total Documented Sp. in Incl. Families			435	**3351**	1530	189	1341	1255	233	190	43	333	39	248	46					
	11141	*Schinia thoreaui*	X	**5**	5	4	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Grasslands (including old field)
	11147	*Schinia gracilenta*	X	**3**	3	0	3	0	0	0	0	0	0	0	0	33.3%	0.0%	0.0%	0.0%	Grasslands (including old field)
	11149	*Schinia trifascia*	X	**1**	1	1	0	0	0	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	Generalist
	Agaristinae		3																	
	9299	*Eudryas unio*	X	**11**	6	0	6	5	0	0	0	0	0	0	0	66.7%	26.3%	0.0%	0.0%	Generalist
	9301	*Eudryas grata*	X	**8**	6	0	6	2	0	0	0	0	0	0	0	66.7%	10.5%	0.0%	0.0%	Generalist
	9314	*Alypia octomaculata*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	Pantheinae		2																	
	9189	*Charadra deridens*	X	**7**	5	0	5	2	0	0	0	0	0	0	0	55.6%	10.5%	0.0%	0.0%	Generalist
	9192	*Raphia abrupta*	X	**10**	4	0	4	6	0	0	0	0	0	0	0	44.4%	31.6%	0.0%	0.0%	Generalist
	Acronictinae		25																	
	9199	*Acronicta rubricoma*	X	**11**	6	0	6	4	1	1	0	0	0	0	0	66.7%	21.1%	16.7%	0.0%	Generalist (*Celtis* habitats)
	9200	*Acronicta americana*	X	**17**	9	0	9	7	1	1	0	0	0	0	0	100.0%	36.8%	16.7%	0.0%	Generalist
	9209	*Acronicta radcliffei*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Hardwood Forest
	9219	*Acronicta connecta*	X	**3**	2	0	2	1	0	0	0	0	0	0	0	22.2%	5.3%	0.0%	0.0%	Hardwood Forest
	9221	*Acronicta funeralis*	X	**3**	3	0	3	0	0	0	0	0	0	0	0	33.3%	0.0%	0.0%	0.0%	Hardwood Forest
	9225	*Acronicta vinnula*	X	**8**	7	0	7	1	0	0	0	0	0	0	0	77.8%	5.3%	0.0%	0.0%	Generalist
	9229	*Acronicta hasta*	X	**7**	5	0	5	2	0	0	0	0	0	0	0	55.6%	10.5%	0.0%	0.0%	Generalist
	9236	*Acronicta morula*	X	**8**	4	0	4	2	2	2	0	0	0	0	0	44.4%	10.5%	33.3%	0.0%	Generalist
	9237	*Acronicta interrupta*	X	**7**	4	0	4	2	0	0	0	1	0	1	0	44.4%	10.5%	0.0%	7.7%	Hardwood Forest
	9238	*Acronicta lobeliae*	X	**7**	5	0	5	0	1	1	0	1	0	1	0	55.6%	0.0%	16.7%	7.7%	Generalist
	9242	*Acronicta exilis*	X	**9**	5	0	5	3	1	1	0	0	0	0	0	55.6%	15.8%	16.7%	0.0%	Generalist
	9244	*Acronicta modica*	X	**9**	5	0	5	4	0	0	0	0	0	0	0	55.6%	21.1%	0.0%	0.0%	Generalist
	9245	*Acronicta haesitata*	X	**9**	5	0	5	4	0	0	0	0	0	0	0	55.6%	21.1%	0.0%	0.0%	Generalist
	9246	*Acronicta clarescens*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	9250	*Acronicta inclara*	X	**10**	5	0	5	5	0	0	0	0	0	0	0	55.6%	26.3%	0.0%	0.0%	Generalist
	9251	*Acronicta retardata*	X	**7**	4	0	4	3	0	0	0	0	0	0	0	44.4%	15.8%	0.0%	0.0%	Generalist
	9254	*Acronicta afflicta*	X	**9**	6	0	6	3	0	0	0	0	0	0	0	66.7%	15.8%	0.0%	0.0%	Generalist
	9257	*Acronicta impleta*	X	**3**	2	0	2	1	0	0	0	0	0	0	0	22.2%	5.3%	0.0%	0.0%	Generalist
	9261	*Acronicta impressa*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist (WI)
	9264	*Acronicta longa*	X	**2**	2	0	2	0	0	0	0	0	0	0	0	22.2%	0.0%	0.0%	0.0%	Generalist
	9266	*Acronicta lithospila*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Intermedialist
	9272	*Acronicta oblinata*	X	**17**	8	1	7	9	0	0	0	0	0	0	0	77.8%	47.4%	0.0%	0.0%	Generalist
	9280b	*Simyra henrici* cpx. sp. B	X	**3**	2	0	2	1	0	0	0	0	0	0	0	22.2%	5.3%	0.0%	0.0%	Generalist
	9285	*Polygrammate hebraeicum*	X	**8**	5	0	5	3	0	0	0	0	0	0	0	55.6%	15.8%	0.0%	0.0%	Generalist (Liquidambar Habitats)
	9286	*Harrisimemna trisignata*	X	**9**	6	1	5	3	0	0	0	0	0	0	0	55.6%	15.8%	0.0%	0.0%	Generalist
	Noctuinae		41																	
	9404	*Oligia modica*	X	**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Generalist (WI)
	9428	*Meropleon ambifuscum*	X	**5**	1	0	1	4	0	0	0	0	0	0	0	11.1%	21.1%	0.0%	0.0%	Generalist (most often in wetlands)
	9463	*Parapamea buffaloensis*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Unknown
	9483	*Papaipema inquaesita*	X	**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Intermedialist (*Onoclea* Habitats)
	9485	*Papaipema baptisiae*	X	**5**	5	3	2	0	0	0	0	0	0	0	0	22.2%	0.0%	0.0%	0.0%	Generalist
	9523	*Bellura gortynoides*	X	**4**	1	0	1	3	0	0	0	0	0	0	0	11.1%	15.8%	0.0%	0.0%	Wetlands: Submergent Wetlands
	9545	*Euplexia benesimilis*	X	**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Hardwood Forest in mid lat. & SE
	9556	*Chytonix palliatricula*	X	**7**	7	0	7	0	0	0	0	0	0	0	0	77.8%	0.0%	0.0%	0.0%	Generalist
	9560	*Dypterygia rozmani*	X	**2**	2	0	2	0	0	0	0	0	0	0	0	22.2%	0.0%	0.0%	0.0%	Generalist
	9582	*Nedra ramosula*	X	**4**	4	0	4	0	0	0	0	0	0	0	0	44.4%	0.0%	0.0%	0.0%	Generalist
	9647	*Athetis miranda*	X	**24**	11	2	9	13	0	0	0	0	0	0	0	100.0%	68.4%	0.0%	0.0%	Generalist
	9650	*Anorthodes tarda*	X	**5**	3	0	3	2	0	0	0	0	0	0	0	33.3%	10.5%	0.0%	0.0%	Hardwood Forest
	9664	*Balsa labecula*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Hardwood Forest
	9665	*Spodoptera exigua*	X	**4**	4	0	4	0	0	0	0	0	0	0	0	44.4%	0.0%	0.0%	0.0%	Generalist
	9666	*Spodoptera frugiperda*	X	**11**	7	0	7	4	0	0	0	0	0	0	0	77.8%	21.1%	0.0%	0.0%	Generalist
	9669	*Spodoptera ornithogalli*	X	**16**	9	2	7	7	0	0	0	0	0	0	0	77.8%	36.8%	0.0%	0.0%	Generalist
	9678	*Elaphria versicolor*	X	**6**	4	0	4	2	0	0	0	0	0	0	0	44.4%	10.5%	0.0%	0.0%	Generalist

Table 2: Check List of Lepidoptera Collected at Twin Swamps Nature Preserve

				USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	USR	% of	% of	% of	% of	
				Total	MV	MV	MV	UV	Bait	Bait	Bait	Diurnal	Diurnal	Diurnal	Diurnal	MV Sheet	UV Trap	Bait Trail	Diurnal	
					Sheet	Sheet	Sheet	Trap	Total	Trail	Traps	Total	Forest	Forest	Field	Samples	Samples	Samples	HF smpls	
LEPIDOPTERA TAXA COLLECTED					Total	pre '02	02 & '08						Pre '02	02 & 08		02 & 08			02 & 08	**Habitat Dependency Hypothesis**
Total Documented Sp. in Incl. Families			435	**3351**	1530	189	1341	1255	233	190	43	333	39	248	46					
	9679	*Elaphria chalcedonia*	X	**10**	6	0	6	4	0	0	0	0	0	0	0	66.7%	21.1%	0.0%	0.0%	Generalist
	9684	*Elaphria grata*	X	**18**	6	0	6	12	0	0	0	0	0	0	0	66.7%	63.2%	0.0%	0.0%	Generalist
	9688	*Galgula partita*	X	**11**	9	3	6	2	0	0	0	0	0	0	0	66.7%	10.5%	0.0%	0.0%	Generalist
	9689	*Perigea xanthioides*	X	**5**	4	0	4	1	0	0	0	0	0	0	0	44.4%	5.3%	0.0%	0.0%	Generalist
	9818	*Amolita fessa*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	10288	*Polia detracta*	X	**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Generalist
	10438	*Pseudaletia unipuncta*	X	**6**	5	0	5	0	1	1	0	0	0	0	0	55.6%	0.0%	16.7%	0.0%	Generalist
	10440	*Leucania linita*	X	**9**	4	0	4	5	0	0	0	0	0	0	0	44.4%	26.3%	0.0%	0.0%	Wetlands (Hydric Hardwood Forest & Open)
	10445	*Leucania linda*	X	**12**	6	0	6	6	0	0	0	0	0	0	0	66.7%	31.6%	0.0%	0.0%	Generalist
	10456	*Leucania adjuta*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	10461	*Leucania ursula*	X	**8**	5	0	5	3	0	0	0	0	0	0	0	55.6%	15.8%	0.0%	0.0%	Generalist
	10585	*Orthodes crenulata*	X	**6**	2	0	2	4	0	0	0	0	0	0	0	22.2%	21.1%	0.0%	0.0%	Generalist
	10289	*Orthodes goodelli*	X	**1**	0	0	0	1	0	0	0	0	0	0	0	0.0%	5.3%	0.0%	0.0%	Hardwood Forest
	10640	*Xanthopastis timais*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Hardwood Forest: Hydric
	10663	*Agrotis ipsilon*	X	**12**	4	0	4	7	1	1	0	0	0	0	0	44.4%	36.8%	16.7%	0.0%	Generalist
	10664	*Agrotis subterranea*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	10670	*Feltia jaculifera*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	10870	*Richia acclivis*	X	**3**	1	0	1	2	0	0	0	0	0	0	0	11.1%	10.5%	0.0%	0.0%	Unknown
	10911	*Anicla infecta*	X	**6**	5	0	5	1	0	0	0	0	0	0	0	55.6%	5.3%	0.0%	0.0%	Generalist
	10915	*Peridroma saucia*	X	**2**	2	0	2	0	0	0	0	0	0	0	0	22.2%	0.0%	0.0%	0.0%	Generalist
	10942	*Xestia dolosa*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist
	11006	*Protolampra brunneicollis*	X	**3**	2	0	2	1	0	0	0	0	0	0	0	22.2%	5.3%	0.0%	0.0%	Generalist
	11012.1	*Noctua pronuba*	X	**2**	0	0	0	2	0	0	0	0	0	0	0	0.0%	10.5%	0.0%	0.0%	Generalist
	11029	*Abagrotis alternata*	X	**1**	1	0	1	0	0	0	0	0	0	0	0	11.1%	0.0%	0.0%	0.0%	Generalist

Table 3: Lepidoptera Survey Data For Twin Swamps from MV and UV Lights

Total Macrolep. Species Rec. at Lights: 382					MV1	MV1	MV5	MV1	MV1	MV1	MV1	T1	T2	MV2	T1	T3	MV3	T2	T4	MV3	T2	T5	MV3	T4	MVT	MV2	T4	T6	MV4	T4	T7	MV4	T4	T7	MV4	T4	T8	T4
LEPIDOPTERA TAXA COLLECTED		Light USR	MV Sheet USR	UV Trap USR	17 Aug. 95	13 Aug. 01	14 Aug. 01	15 Aug. 01	16 Aug. 01	17 Aug. 01	11 Aug. 02	11 Aug. 02	11 Aug. 02	12 Aug. 02	12 Aug. 02	12 Aug. 02	13 Aug. 02	13 Aug. 02	13 Aug. 02	14 Aug. 02	14 Aug. 02	14 Aug. 02	15 Aug. 02	15 Aug. 02	15 Aug. 02	20 Aug. 08	20 Aug. 08	20 Aug. 08	21 Aug. 08	21 Aug. 08	21 Aug. 08	22 Aug. 08	22 Aug. 08	22 Aug. 08	23 Aug. 08	23 Aug. 08	23 Aug. 08	24 Aug. 08
Total Documented Sp. in Incl. Families		394	361	264	12	32	34	40	35	36	175	72	89	96	91	72	120	89	48	146	75	65	124	45	47	99	83	68	193	51	65	186	64	68	198	51	57	55
ATTEVIDAE					0	0	0	0	0	0	1	0	1	1	1	0	1	0	1	0	0	1	1	0	1	1	1	0	1	1	0	1	1	1	1	1	0	1
2401	*Atteva punctella*	19	8	11							X		X	X	X		X		X			X	X		X	X	X		X	X		X	X	X	X	X		X
SESIIDAE					0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0
2554	*Synanthedon acerni*	4	4	0													X												X			X			X			
COSSIDAE					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
Hypoptinae					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
2668	*Givira anna*	1	1	0																						X												
2671	*Givira francesca*	1	0	1																								X										
ZYGAENOIDEA					0	0	0	0	0	0	2	0	0	1	0	0	1	0	0	2	1	0	1	1	0	1	0	0	2	0	0	1	0	0	0	0	0	0
LIMACODIDAE					0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	2	1	0	1	1	0	0	0	0	2	0	0	1	0	0	0	0	0	0
4653/4	*Tortricidia flexuosa* &/or *pallida*	1	1	0							X																											
4665	*Lithacodes fasciola*	1	0	1																	X																	
4667	*Apoda y-inversum*	3	3	0							X									X											X							
4669	*Apoda biguttata*	1	1	0																									X									
4675	*Isochaetes beutenmuelleri*	4	3	1													X						X	X					X									
4697	*Euclea delphini*	1	1	0																X																		
EPIPYROPIDAE					0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
4701	*Fulgoraecia exigua*	2	2	0										X												X												
PYRALIDAE					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
5156	*Nomophila nearctica*	1	1	0																						X												
MACROLEPIDOPTERA		382	351	260	12	32	34	40	35	36	172	72	88	94	90	72	117	89	47	144	74	64	122	44	46	95	82	67	189	50	65	183	63	67	196	50	57	54
DREPANOIDEA					0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0
THYATIRIDAE					0	0	0	0	0	0		1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0
6237	*Pseudothyatira cymatophoroides*	4	2	2								X						X											X									
GEOMETROIDEA					3	6	5	8	6	5	30	13	20	22	18	15	19	19	13	24	20	13	20	12	14	20	18	15	32	15	15	28	17	15	25	12	12	16
GEOMETRIDAE					3	6	5	8	6	5	30	13	20	22	18	15	19	19	13	24	20	13	20	12	14	20	18	15	32	15	15	28	17	15	25	12	12	16
Ennominae					3	5	5	6	4	4	20	9	15	17	15	10	12	13	10	16	12	9	16	8	12	13	10	8	19	9	9	16	12	10	14	10	7	12
6270	*Proitame virginalis*	2	2	0																			X			X												
6273	*Speranza pustularia*	1	0	1																							X											
6322	*Mellilla xanthometata*	26	10	16			X		X		X	X	X	X	X			X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X	X	X
6326	*Macaria aemulataria*	21	8	13							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X			X			X	X		
6331	*Macaria promiscuata*	7	4	3							X														X				X			X	X		X			X
6335	*Macaria aequiferaria*	17	4	13										X					X		X	X		X	X		X		X	X	X	X	X	X	X	X	X	X
6339	*Macaria transitaria*	2	2	0							X																		X									
6340	*Macaria minorata*	1	1	0							X																											
6341	*Macaria bicolorata*	2	1	1								X																	X									
6386	*Digrammia ocellinata*	31	14	17		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	
6405	*Digrammia gnophosaria*	25	7	18							X	X	X	X		X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X
6419	*Enconista dislocaria*	1	1	0																			X															
6439	*Hypomecis umbrosaria*	1	0	1											X																							
6443	*Glenoides texanaria*	1	1	0										X																								
6478	*Exelis pyrolaria*	4	1	3									X								X		X													X		
6486	*Tornos scolopacinarius*	1	1	0																X																		
6580	*Iridopsis pergracilis*	8	0	8															X					X	X		X					X			X			X
6583	*Iridopsis ephyraria*	1	0	1											X																							
6586	*Iridopsis defectaria*	14	7	7	X								X		X	X	X	X		X	X	X				X			X	X		X			X			
6588	*Iridopsis larvaria*	2	2	0																			X						X									
6590	*Anavitrinelia pampinaria*	27	12	15		X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X		X	X		
6597	*Ectropis crepuscularia*	13	7	6							X		X				X	X	X	X			X		X	X			X				X	X	X			
6599	*Epimecis hortaria*	7	6	1			X	X		X													X			X						X		X				
6620	*Melanolophia canadaria*	27	11	16		X				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X		X	X
6640	*Biston betularia*	1	1	0							X																											
6654	*Hypagyrtis unipunctata*	21	8	13			X				X		X	X			X	X	X		X			X	X	X	X		X		X	X	X	X	X	X	X	X
6667	*Lomographa vestaliata*	9	5	4										X						X					X	X			X		X		X		X			X
6726	*Euchlaena obtusaria*	4	2	2	X							X			X								X															
6729	*Euchlaena johnsonaria*	17	9	8		X		X			X	X	X	X	X	X	X	X		X			X					X	X			X		X				X
6733	*Euchlaena amoenaria*	12	8	4		X		X	X	X	X		X	X	X			X			X		X						X									
6737	*Euchlaena tigrinaria*	3	2	1							X							X														X						

Table 3: Lepidoptera Survey Data For Twin Swamps from MV and UV Lights

Total Macrolep. Species Rec. at Lights: 382					MV1	MV1	MV5	MV1	MV1	MV1	MV1	T1	T2	MV2	T1	T3	MV3	T2	T4	MV3	T2	T5	MV3	T4	MVT	MV2	T4	T6	MV4	T4	T7	MV4	T4	T7	MV4	T4	T8	T4					
LEPIDOPTERA TAXA COLLECTED		Light USR	MV Sheet USR	UV Trap USR	17 Aug. 95	13 Aug. 01	14 Aug. 01	15 Aug. 01	16 Aug. 01	17 Aug. 01	11 Aug. 02	11 Aug. 02	11 Aug. 02	12 Aug. 02	12 Aug. 02	12 Aug. 02	13 Aug. 02	13 Aug. 02	13 Aug. 02	14 Aug. 02	14 Aug. 02	14 Aug. 02	15 Aug. 02	15 Aug. 02	15 Aug. 02	20 Aug. 08	20 Aug. 08	20 Aug. 08	21 Aug. 08	21 Aug. 08	21 Aug. 08	22 Aug. 08	22 Aug. 08	22 Aug. 08	23 Aug. 08	23 Aug. 08	23 Aug. 08	24 Aug. 08					
6743	*Xanthotype sospeta*	16	9	7	X						X			X	X		X	X		X		X				X			X		X	X		X	X	X		X				
6754	*Pero hubneraria*	4	1	3									X			X												X						X								
6819	*Metanema inatomaria*	6	2	4				X																					X	X			X			X		X				
6828	*Metarranthis homuraria*	1	0	1																						X																
6839.1	*Probole nyssaria*	2	1	1										X		X																										
6842	*Plagodis phlogosaria*	2	2	0							X									X																						
6844	*Plagodis alcoolaria*	5	4	1							X				X		X			X			X																		
6894	*Lambdina fervidaria*	2	1	1									X	X																												
6941	*Eusarca confusaria*	3	1	2											X	X				X																						
6966	*Eutrapela clemataria*	5	4	1							X		X	X			X															X										
6982	*Prochoerodes lineola*	15	8	7							X			X	X					X	X		X			X	X	X	X	X			X	X		X					X
Geometrinae					0	1	0	2	1	1	3	0	0	0	0	0	3	1	0	1	0	0	0	1	0	1	2	2	3	2	0	2	2	0	4	1	1	1					
7029	*Nemoria elfa*	5	0	5																							X			X			X					X			
7046	*Nemoria bistriaria*	3	3	0				X									X																		X						
7053	*Dichorda iridaria*	7	3	4				X			X							X											X	X			X				X			
7058	*Synchlora aerata*	9	7	2					X	X	X						X			X				X				X			X			X						
7071	*Chlorochlamys chloroleucaria*	6	5	1		X					X						X										X		X						X						
7075	*Chloropteryx tepperaria*	5	4	1																						X		X	X			X			X						
Sterrhinae					0	0	0	0	1	0	6	2	2	5	2	3	4	2	1	6	6	3	4	1	1	5	4	3	8	2	3	7	2	3	5	1	2	2					
7087	*Euacidalia sericearia* cpx.	1	1	0																			X																		
7105	*Idaea scintillularia*	2	2	0																						X						X									
7114	*Idaea demissaria*	12	7	5							X		X			X	X			X			X	X				X	X			X		X	X						
7132	*Pleuroprucha insulsaria*	15	7	8							X			X		X			X	X	X					X	X		X		X	X	X	X	X			X			
7136	*Cyclophora packardi*	12	6	6							X	X		X							X	X				X	X		X			X		X	X		X				
7146	*Haematopis grataria*	18	10	8					X		X	X		X	X		X			X	X	X	X		X	X		X	X	X		X			X	X					
7147	*Timandra amaturaria*	7	3	4										X			X	X			X						X		X		X										
7159	*Scopula limboundata*	21	9	12							X		X	X	X	X	X	X		X	X	X	X			X	X	X	X	X	X	X			X		X	X				
7169	*Scopula inductata*	4	4	0							X									X									X			X									
7179	*Leptostales rubromarginaria*	4	2	2																X	X								X					X								
Larentiinae					0	0	0	0	0	0	1	2	3	0	1	2	0	3	2	1	2	1	0	2	1	1	2	2	2	2	3	3	1	2	2	0	2	1					
7197	*Eulithis gracilineata*	1	1	0																X																					
7388	*Xanthorhoe ferrugata*	1	1	0																						X															
7390	*Xanthorhoe lacustrata*	9	3	6									X					X			X			X					X			X		X	X		X			
7414	*Orthonama obstipata*	10	0	10								X	X		X	X			X								X			X	X		X							X
7416	*Orthonama centrostrigaria*	4	1	3														X										X			X		X							
7440	*Eubaphe mendica*	1	0	1																										X											
7474	*Eupithecia miserulata*	15	3	12								X	X			X		X	X		X	X		X	X		X	X	X		X	X			X					
7647	*Heterophleps triguttaria*	2	0	2																											X					X				
7648	*Dyspteris abortivaria*	1	1	0							X																														
RHOPALOCERA					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
PAPILIONOIDEA					0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
NYMPHALIDAE					0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0					
4440	*Junonia coenia*	1	1	0																X																					
4557	*Astereocampa celtis*	2	1	1										X														X													
MIMALLONOIDEA					0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
MIMALLONIDAE					0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
7659	*Lacosoma chiridota*	2	1	1				X								X																								
LASIOCAMPOIDEA					0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0					
LASIOCAMPIDAE					0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0					
7683	*Artace cibraria*	2	1	1								X																				X									
7685	*Heteropacha rileyana*	2	1	1								X																	X												
BOMBYCOIDEA					1	0	4	10	1	3	14	2	1	5	2	3	5	2	0	11	0	0	9	0	0	6	1	0	7	1	1	9	1	0	10	1	1	2					
SATURNIIDAE					0	0	1	4	0	1	5	2	0	3	0	1	1	1	0	4	0	0	5	0	0	3	0	0	2	0	0	2	0	0	2	0	1	0					
Citheroniinae					0	0	1	2	0	1	3	2	0	2	0	0	1	1	0	3	0	0	3	0	0	1	0	0	1	0	0	2	0	0	2	0	1	0					
7704	*Eacles imperialis*	1	1	0										X																										
7706	*Citheronia regalis*	1	1	0							X																														
7709	*Sphingicampa bicolor*	7	6	1			X													X			X						X			X			X		X			
7715	*Dryocampa rubicunda*	11	9	2				X			X	X		X			X	X		X			X			X				X			X							
7723	*Anisota virginiensis*	6	5	1				X		X	X	X								X			X												X						

Table 3: Lepidoptera Survey Data For Twin Swamps from MV and UV Lights

Total Macrolep. Species Rec. at Lights: 382					MV1	MV1	MV5	MV1	MV1	MV1	MV1	T1	T2	MV2	T1	T3	MV3	T2	T4	MV3	T2	T5	MV3	T4	MVT	MV2	T4	T6	MV4	T4	T7	MV4	T4	T7	MV4	T4	T8	T4
LEPIDOPTERA TAXA COLLECTED		Light USR	MV Sheet USR	UV Trap USR	17 Aug. 95	13 Aug. 01	14 Aug. 01	15 Aug. 01	16 Aug. 01	17 Aug. 01	11 Aug. 02	11 Aug. 02	11 Aug. 02	12 Aug. 02	12 Aug. 02	12 Aug. 02	13 Aug. 02	13 Aug. 02	13 Aug. 02	14 Aug. 02	14 Aug. 02	14 Aug. 02	15 Aug. 02	15 Aug. 02	15 Aug. 02	20 Aug. 08	20 Aug. 08	20 Aug. 08	21 Aug. 08	21 Aug. 08	21 Aug. 08	22 Aug. 08	22 Aug. 08	22 Aug. 08	23 Aug. 08	23 Aug. 08	23 Aug. 08	24 Aug. 08
Hemileucinae					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7746	*Automeris io*	0	0	0																																	
Saturniinae					0	0	0	2	0	0	2	0	0	1	0	1	0	0	0	1	0	0	2	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0
7757	*Antheraea polyphemus*	6	5	1							X			X		X				X			X			X											
7758	*Actias luna*	4	4	0				X															X			X			X								
7765	*Callosamia angulifera*	2	2	0				X			X																										
SPHINGIDAE					1	0	3	6	1	2	9	0	1	2	2	2	4	1	0	7	0	0	4	0	0	3	1	0	5	1	1	7	1	0	8	1	0	2
Sphinginae					1	0	3	4	1	1	7	0	1	2	1	2	4	0	0	6	0	0	3	0	0	3	1	0	4	1	1	6	1	0	5	1	0	2
7775	*Manduca sexta*	13	10	3			X	X		X	X		X	X	X	X	X			X			X						X						X			
7784	*Dolba hyloeus*	1	1	0																												X						
7787	*Ceratomia undulosa*	5	5	0				X			X						X			X			X														
7789	*Ceratomia catalpae*	2	2	0							X																					X						
7790	*Ceratomia hageni*	2	2	0				X			X																											
7791	*Isoparce cupressi*	8	3	5			X	X			X																X			X			X			X		X
7793	*Paratraea plebeja*	5	5	0	X															X						X						X			X			
7821	*Smerinthus jamaicensis*	9	9	0			X		X		X			X			X			X									X			X			X			
7824	*Paonias excaecatus*	7	6	1							X									X						X			X			X			X			X
7825	*Paonias myops*	9	7	2												X	X			X			X			X			X		X	X			X			
Macroglossinae					0	0	0	2	0	1	2	0	0	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	1	0	0	1	0	0	3	0	0	0
7861	*Eumorpha achemon*	1	1	0																									X									
7870	*Sphecodina abbottii*	1	1	0																															X			
7884	*Darapsa versicolor*	1	1	0																															X			
7885	*Darapsa myron*	5	3	2							X				X			X		X															X			
7890	*Xylophanes tersa*	2	2	0				X																								X						
7894	*Hyles lineata*	4	4	0				X		X	X												X															
NOCTUOIDEA					8	26	25	21	28	28	128	54	67	67	70	53	93	67	34	109	54	51	93	32	32	69	63	52	148	34	49	145	45	52	160	37	44	36
NOTODONTIDAE					1	3	0	0	1	3	17	10	14	13	13	5	13	12	1	17	7	8	14	3	2	10	3	2	19	2	5	18	4	5	18	1	5	2
7896	*Clostera inclusa*	4	1	3									X		X			X													X						
7901	*Clostera apicalis*	1	0	1																					X													
7903	*Datana angusii*	13	6	7								X	X				X	X			X	X	X			X			X			X			X		X	X
7906	*Datana contractata*	5	4	1							X									X				X					X						X			
7907	*Datana integerrima*	16	10	6					X	X	X	X	X	X		X	X	X		X			X			X			X			X	X			X		
7908	*Datana perspicua*	1	1	0																X																		
7915	*Nadata gibbosa*	18	8	10							X	X	X	X	X	X	X	X		X	X	X	X			X			X		X	X		X			X	
7917	*Hyperaeschra georgica*	14	9	5		X					X	X	X	X	X		X	X		X		X	X						X			X			X			
7920	*Peridea angulosa*	16	9	7							X	X	X	X	X	X	X	X		X	X	X	X			X			X			X			X			
7922	*Pheosia rimosa*	2	2	0													X																		X			
7929	*Nerice bidentata*	2	1	1								X																				X						
7931	*Gluphisia septentrionis*	13	7	6							X			X						X			X	X	X		X		X			X	X		X	X		X
7936	*Furcula borealis*	2	2	0							X									X																		
7937	*Furcula cinerea*	6	5	1							X				X					X			X									X			X			
	Symmerista sp. 7951/7952/7953	5	4	1							X		X	X			X						X															
7957	*Dasylophia anguina*	18	10	8		X					X	X	X	X	X	X	X	X		X	X	X	X			X			X		X	X			X			
7974	*Misogoda unicolor*	3	2	1																							X		X						X			
7975	*Macrurocampa marthesia*	5	4	1																						X			X			X		X	X			
7983	*Heterocampa obliqua*	20	9	11							X	X	X	X	X	X	X	X		X	X	X	X			X		X	X	X	X	X		X	X			
7985	*Heterocampa subrotata*	16	8	8							X		X	X	X		X	X		X	X		X						X		X	X	X	X	X		X	
7994	*Heterocampa guttivitta*	9	7	2						X	X		X	X	X								X						X			X			X			
7998	*Lochmaeus manteo*	4	2	2								X																X	X						X			
7999	*Lochmaeus bilineata*	18	8	10							X	X	X	X	X		X	X		X		X		X		X	X		X		X	X		X	X		X	
8005	*Schizura ipomoeae*	15	9	6	X	X				X	X			X	X			X	X	X	X								X	X		X	X		X			
8007	*Schizura unicornis*	7	6	1							X		X	X			X			X						X			X									
8010	*Schizura concinna*	1	0	1											X																							
8011	*Schizura leptinoides*	4	4	0																				X					X			X			X			
8012	*Oligocentria semirufescens*	2	2	0																X						X												
8017	*Oligocentria lignicolor*	11	7	4							X		X		X		X	X		X		X	X						X			X			X			
NOCTUIDAE					7	23	25	21	27	25	111	44	53	54	57	48	80	55	33	92	47	43	79	29	30	59	60	50	129	32	44	127	41	47	142	36	39	34
Arctiinae					3	5	8	0	7	4	9	10	6	7	8	5	6	9	3	9	2	7	8	3	2	4	7	5	9	4	6	11	6	7	15	6	4	5
Lithosiini					0	1	2	0	0	0	3	2	3	0	2	1	0	5	2	0	1	2	2	1	1	1	4	2	3	2	3	5	3	4	6	4	1	4

Table 3: Lepidoptera Survey Data For Twin Swamps from MV and UV Lights

Total Macrolep. Species Rec. at Lights: 382					MV1	MV1	MV5	MV1	MV1	MV1	MV1	T1	T2	MV2	T1	T3	MV3	T2	T4	MV3	T2	T5	MV3	T4	MVT	MV2	T4	T6	MV4	T4	T7	MV4	T4	T7	MV4	T4	T8	T4					
LEPIDOPTERA TAXA COLLECTED		Light USR	MV Sheet USR	UV Trap USR	17 Aug. 95	13 Aug. 01	14 Aug. 01	15 Aug. 01	16 Aug. 01	17 Aug. 01	11 Aug. 02	11 Aug. 02	11 Aug. 02	12 Aug. 02	12 Aug. 02	12 Aug. 02	12 Aug. 02	13 Aug. 02	13 Aug. 02	14 Aug. 02	14 Aug. 02	14 Aug. 02	15 Aug. 02	15 Aug. 02	15 Aug. 02	20 Aug. 08	20 Aug. 08	20 Aug. 08	21 Aug. 08	21 Aug. 08	21 Aug. 08	22 Aug. 08	22 Aug. 08	22 Aug. 08	23 Aug. 08	23 Aug. 08	23 Aug. 08	24 Aug. 08					
8045	*Crambidia lithosioides*	1	1	0																														X								
8045.1	*Crambidia pallida*	14	3	11								X	X		X	X		X						X			X	X			X	X			X	X		X				
8061	*Cisthene kentuckiensis*	2	2	0																				X							X											
8067	*Cisthene plumbea*	17	4	13			X				X		X		X			X	X			X		X	X			X	X				X	X	X	X		X				
8072	*Cisthene packardii*	8	3	5							X	X						X			X					X						X			X							
8090	*Hypoprepia fucosa*	10	4	6														X							X	X		X		X	X	X			X	X		X				
8098	*Clemensia albata*	17	5	12		X	X				X		X					X	X			X				X		X	X	X		X	X	X	X	X	X				
8099	*Pagara simplex*	1	1	0																											X											
Arctiini					3	4	5	0	7	4	5	7	3	6	5	4	5	3	1	8	1	4	5	1	1	2	3	2	5	2	2	5	2	2	8	2	2	1					
8121	*Holomelina aurantiaca*	1	1	0																														X								
8124	*Holomelina immaculata*	2	2	0																				X				X													
8129	*Pyrrharctia isabella*	7	4	3			X		X			X		X				X		X					X																
8131	*Estigmene acrea*	6	5	1					X	X		X								X											X			X							
8134	*Spilosoma congrua*	1	1	0										X																											
8137	*Spilosoma virginica*	20	8	12					X			X	X	X			X	X		X		X				X	X	X	X		X	X	X	X	X	X	X	X				
8140	*Hyphantria cunea*	6	6	0		X			X		X			X									X											X							
8169	*Apantesis phalerata*	11	8	3	X				X		X	X			X	X	X			X			X						X			X								
8171	*Apantesis nais*	1	1	0			X																																		
8188	*Grammia figurata*	1	1	0						X																															
8203	*Halysidota tessellaris*	18	5	13		X	X				X	X	X		X				X	X	X	X				X			X	X		X	X	X	X	X					
8230	*Cycnia tenera*	21	14	7	X	X	X		X	X	X	X		X	X	X	X			X		X	X			X	X	X	X	X		X			X						
8231	*Cycnia oregonensis*	10	7	3							X	X			X	X	X			X			X						X			X			X						
8238	*Euchaetes egle*	15	9	6	X	X	X		X	X			X	X	X	X	X	X		X		X		X											X						
Ctenuchini					0	0	1	0	0	0	1	1	0	1	1	0	1	1	0	1	0	1	1	1	0	1	0	1	1	0	1	1	1	1	1	0	1	0					
8267	*Cisseps fulvicollis*	20	10	10			X				X	X		X	X		X	X		X		X	X	X		X		X	X		X	X	X	X	X		X				
Lymantriinae					0	0	0	0	0	0	2	0	0	1	0	0	1	0	1	1	0	1	2	0	0	0	1	0	2	0	1	2	1	2	1	0	1	1					
8292	*Dasychira tephra*	11	7	4							X			X			X			X		X	X					X		X	X		X				X				
8316	*Orgyia leucostigma*	10	5	5							X								X				X			X			X	X	X	X	X		X					
Herminiinae					0	0	0	0	0	0	7	2	9	5	3	7	2	7	4	7	7	3	5	3	0	12	7	9	16	2	10	14	2	9	14	4	6	2					
8322	*Idia americalis*	11	3	8									X		X			X	X			X				X			X		X			X	X		X				
8323	*Idia aemula*	10	7	3							X			X				X		X	X					X			X			X		X	X						
8323.1	*Idia concisa*	1	1	0																												X									
8326	*Idia rotundalis*	16	4	12							X		X		X	X		X	X		X			X		X	X		X		X	X		X		X	X				
8328	*Idia julia*	1	1	0																									X											
8329	*Idia diminuendis*	7	3	4																							X		X			X		X	X	X	X				
8334	*Idia lubricalis*	5	1	4									X					X								X		X								X				
8338	*Phalaenophana pyramusalis*	1	1	0										X																										
8349	*Zanclognatha protumnusalis*	5	4	1																X							X		X			X			X					
8351b	*Zanclognatha cruralis* cpx. sp. *B*	6	4	2																	X		X			X			X		X				X					
8352	*Zanclognatha jacchusalis*	5	3	2										X				X		X						X					X									
8356	*Chytolita petrealis*	9	6	3							X						X	X					X			X			X		X			X	X					
8357.1	*Macrochilo hypocritialis Fgn.*	1	0	1																								X											
8358	*Macrochilo litophora*	4	0	4												X												X			X			X					
8361	*Macrochilo louisiana*	1	1	0																											X									
8363	*Phalaenostola eumelusalis*	1	1	0																														X						
8364	*Phalaenostola larentioides*	7	4	3																			X			X			X	X		X			X	X				
8366	*Tetanolita mynesalis*	25	8	17							X	X	X		X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X		X			
8368	*Tetanolita floridana*	15	5	10								X	X	X		X			X		X	X				X	X	X	X		X	X	X		X					
8370	*Bleptina caradrinalis*	13	5	8									X			X				X	X					X	X	X	X		X	X			X		X	X		
8372	*Bleptina sangamonia*	1	0	1												X																								
8379	*Renia factiosalis*	1	0	1																								X											
8381	*Renia discoloralis*	1	1	0																											X								
8386	*Renia adspergillus*	9	5	4							X		X													X		X	X			X			X		X			
	Renia sp. nr. *adspergillus*	4	3	1							X		X							X			X																	
8393	*Lascoria ambigualis*	7	3	4									X	X		X							X				X	X			X									
8397	*Palthis angulalis*	3	3	0																						X			X						X					
8398	*Palthis asopialis*	8	5	3							X									X	X								X		X	X		X	X					
Rivulinae					0	0	0	0	0	0	0	0	1	1	1	2	0	2	2	1	2	1	1	1	1	1	3	0	2	1	2	2	2	3	1	1	2	2					
8404	*Rivula propinqualis*	16	6	10									X	X		X		X		X	X				X	X	X		X		X	X		X	X		X	X			

Table 3: Lepidoptera Survey Data For Twin Swamps from MV and UV Lights

Total Macrolep. Species Rec. at Lights: 382

	LEPIDOPTERA TAXA COLLECTED	Light USR	MV Sheet USR	UV Trap USR	MV1 17 Aug. 95	MV1 13 Aug. 01	MV5 14 Aug. 01	MV1 15 Aug. 01	MV1 16 Aug. 01	MV1 17 Aug. 01	MV1 11 Aug. 02	T1 11 Aug. 02	T2 11 Aug. 02	MV2 12 Aug. 02	T1 12 Aug. 02	T3 12 Aug. 02	MV3 13 Aug. 02	T2 13 Aug. 02	T4 13 Aug. 02	MV3 14 Aug. 02	T2 14 Aug. 02	T5 14 Aug. 02	MV3 15 Aug. 02	T4 15 Aug. 02	MVT 15 Aug. 02	MV2 20 Aug. 08	T4 20 Aug. 08	T6 20 Aug. 08	MV4 21 Aug. 08	T4 21 Aug. 08	T7 21 Aug. 08	MV4 22 Aug. 08	T4 22 Aug. 08	T7 22 Aug. 08	MV4 23 Aug. 08	T4 23 Aug. 08	T8 23 Aug. 08	T4 24 Aug. 08
8411	*Colobochyla interpuncta*	9	1	8														X	X			X					X		X		X		X	X				X
8412	*Melanomma auricinctaria*	13	2	11											X	X			X		X		X	X			X			X		X	X	X		X	X	
Hypenodinae					0	0	0	0	0	0	1	0	2	0	0	0	0	1	1	2	0	0	0	0	0	0	2	2	0	2	1	0	2	2	1	3	2	1
8421	*Hypenodes fractilinea*	1	0	1																																X		
8428	*Dyspyralis nigella*	6	1	5									X							X								X			X			X			X	
	Dyspyralis new sp.	1	1	0																X																		
8431	*Schrankia macula*	4	0	4																							X			X			X			X		
8440	*Nigetia formosalis*	13	2	11							X		X					X	X								X	X		X			X	X	X	X	X	X
Hypeninae					0	2	1	1	2	0	7	2	2	5	2	3	5	3	2	5	4	2	5	1	3	2	2	2	8	1	2	6	2	2	8	1	1	1
8441	*Hypena manalis*	9	5	4							X			X						X	X						X		X			X	X	X				
8442	*Hypena baltimoralis*	12	8	4							X			X		X	X	X	X	X	X		X						X			X			X			
8443	*Hypena bijugalis*	4	4	0													X			X									X						X			
8444	*Hypena palparia*	1	1	0							X																											
8445	*Hypena abalienalis*	8	7	1							X			X			X						X		X				X			X			X			
8446	*Hypena deceptalis*	1	1	0																															X			
8447	*Hypena madefactalis*	5	4	1							X														X				X			X			X			
8448	*Hypena sordidula*	4	4	0																			X						X			X			X			
8461	*Hypena humuli*	2	2	0				X	X																													
8465	*Hypena scabra*	29	10	19		X					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8479	*Spargaloma sexpunctata*	20	11	9		X	X		X		X	X	X	X	X	X	X	X		X	X	X	X			X		X	X		X				X			
Catocalinae					3	2	2	7	5	7	21	6	11	6	8	9	18	11	9	15	4	12	13	8	7	9	11	7	27	7	6	28	5	4	29	6	4	9
8491	*Ledaea perditalis*	23	7	16			X	X					X	X	X			X	X		X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8493	*Isogona tenuis*	3	2	1							X							X																	X			
8499	*Metalectra discalis*	7	4	3				X			X							X										X	X						X			X
8500	*Metalectra quadrisignata*	1	0	1														X																				
8509	*Arugisa latiorella*	11	2	9									X		X		X										X	X	X		X			X		X	X	X
8514	*Scolecocampa liburna*	5	3	2															X			X	X						X			X						
8528	*Hyposoropha hormos*	7	6	1					X							X	X			X			X									X			X			
8534	*Plusiodonta compressipalpis*	24	9	15				X			X	X	X	X	X	X	X	X		X	X	X	X		X		X	X	X	X	X	X		X	X		X	X
8545	*Anomis erosa*	1	1	0							X																											
8555	*Scoliopteryx libatrix*	1	0	1															X																			
8587	*Panopoda rufimargo*	13	9	4					X		X	X					X			X			X			X	X		X	X		X		X	X			
8588	*Panopoda carneicosta*	9	6	3							X			X	X					X		X	X					X	X			X						
8607	*Melipotis jucunda*	1	1	0													X																					
8651	*Lesmone detrahens*	11	6	5		X						X	X			X	X	X		X		X							X			X			X			
8689	*Zale lunata*	7	5	2				X			X					X		X								X						X			X			
8692	*Zale galbanata*	10	5	5	X						X	X	X				X	X	X	X		X										X						
8717	*Zale horrida*	0	0	0																																		
8719	*Euparthenos nubilis*	4	4	0				X			X												X									X						
8721	*Allotria elonympha*	4	2	2							X		X																X									X
8726.1	*Dysgonia telma* Sullivan	0	0	0																																		
8727	*Parallelia bistriaris*	14	9	5					X		X		X	X		X	X			X		X	X	X					X		X	X			X			
8728	*Cutina albopunctella*	10	2	8															X					X	X		X		X	X			X		X	X		X
8729	*Cutina distincta*	11	1	10														X	X		X			X	X	X	X			X			X			X		X
	Cutina aluticolor Pogue & Fgn.	10	2	8															X					X	X		X			X		X	X		X	X		X
	Cutina arcuata Pogue & Fgn.	8	0	8															X					X	X		X			X			X			X		X
8733	*Caenurgia chloropha*	6	3	3								X				X				X		X	X						X									
8738	*Caenurgina crassiuscula*	11	8	3							X				X	X	X			X			X			X		X	X			X			X			
8739	*Caenurgina erechtea*	16	10	6					X		X	X		X	X	X	X			X		X	X	X		X		X	X			X			X			
8743	*Mocis latipes*	1	1	0																X																		
8745	*Mocis texana*	2	1	1																X		X																
8747	*Celiptera frustulum*	2	1	1									X																						X			
8764	*Argyrostrotis anilis*	6	3	3											X		X	X			X											X			X			
8769	*Spiloloma lunilinea*	8	5	3							X						X										X		X		X	X			X		X	
8770	*Catocala innubens*	1	1	0						X																												
8771	*Catocala piatrix*	4	3	1																							X		X			X			X			
8780	*Catocala robinsoni*	0	0	0																																		
8781	*Catocala judith*	0	0	0																																		
8782	*Catocala flebilis*	3	2	1						X														X								X						

Table 3: Lepidoptera Survey Data For Twin Swamps from MV and UV Lights

Total Macrolep. Species Rec. at Lights: 382	LEPIDOPTERA TAXA COLLECTED	Light USR	MV Sheet USR	UV Trap USR	MV1 17 Aug. 95	MV1 13 Aug. 01	MV5 14 Aug. 01	MV1 15 Aug. 01	MV1 16 Aug. 01	MV1 17 Aug. 01	MV1 11 Aug. 02	T1 11 Aug. 02	T2 11 Aug. 02	MV2 12 Aug. 02	T1 12 Aug. 02	T3 12 Aug. 02	MV3 13 Aug. 02	T2 13 Aug. 02	T4 13 Aug. 02	MV3 14 Aug. 02	T2 14 Aug. 02	T5 14 Aug. 02	MV3 15 Aug. 02	T4 15 Aug. 02	MVT 15 Aug. 02	MV2 20 Aug. 08	T4 20 Aug. 08	T6 20 Aug. 08	MV4 21 Aug. 08	T4 21 Aug. 08	T7 21 Aug. 08	MV4 22 Aug. 08	T4 22 Aug. 08	T7 22 Aug. 08	MV4 23 Aug. 08	T4 23 Aug. 08	T8 23 Aug. 08	T4 24 Aug. 08
8783	*Catocala angusi*	7	7	0			X	X		X													X						X			X			X			
	Catocala angusi [white fringe]	0	0	0																																		
8784	*Catocala obscura*	7	6	1						X	X						X		X										X			X			X			
8785	*Catocala residua* White Fringe	2	2	0																												X			X			
8785	*Catocala residua* Dark Fringe	1	1	0							X																											
8787	*Catocala agrippina*	0	0	0																																		
8788	*Catocala retecta*	1	1	0																						X												
8788.1	*Catocala luctuosa*	6	6	0		X				X	X																		X			X			X			
8789	*Catocala ulalume*	0	0	0																																		
8791	*Catocala insolabilis*	7	6	1							X		X	X			X						X									X			X			
8792	*Catocala vidua*	4	4	0																X									X			X			X			
8793	*Catocala maestosa*	3	3	0	X						X																		X									
8794	*Catocala lacrymosa*	3	3	0						X																			X			X						
8795	*Catocala palaeogama*	5	5	0					X	X																			X			X			X			
8796	*Catocala nebulosa*	1	1	0																									X									
8797	*Catocala subnata*	0	0	0																																		
8798	*Catocala neogama*	3	3	0							X						X																		X			
	Catocala communis	0	0	0																																		
8801	*Catocala ilia*	14	9	5				X			X				X	X	X	X		X		X	X		X	X			X			X			X			
8804	*Catocala mamorata*	0	0	0																																		
8832	*Catocala cara*	0	0	0																																		
	Catocala carissima	0	0	0																																		
8834	*Catocala amatrix*	2	2	0													X			X																		
8842	*Catocala nuptialis*	5	2	3									X				X					X									X				X			
8878	*Catocala amica*	3	3	0	X																								X						X			
8878.1	*Catocala lineella*	7	4	3									X									X				X	X		X			X			X			
Euteliinae					0	1	1	1	0	0	2	0	0	2	0	0	1	1	0	2	1	1	1	0	0	2	0	0	2	0	0	2	0	0	1	0	0	0
8957	*Paectes oculatrix*	10	9	1		X	X				X			X				X		X			X			X			X			X						
8959	*Paectes pygmaea*	1	0	1																	X																	
8962	*Paectes abrostoloides*	10	9	1				X			X			X			X			X		X				X			X			X			X			
Sarrothripinae					0	0	0	0	0	0	2	0	0	0	0	0	3	1	0	1	0	0	0	0	1	2	1	1	3	1	1	2	1	0	4	0	0	0
8970	*Baileya ophthalmica*	2	1	1							X																				X							
8971	*Baileya dormitans*	7	5	2													X	X								X			X			X	X		X			
8972	*Baileya levitans*	4	4	0																						X			X			X			X			
8973	*Baileya australis*	3	3	0							X						X																		X			
8974	*Characoma nilotica*	6	4	2													X			X					X			X	X						X			
8978	*Nycteola metaspilella*	2	0	2																							X			X								
Nolinae					0	0	0	0	0	0	1	1	0	0	1	1	1	0	1	1	0	0	1	0	0	0	1	0	1	0	0	1	1	0	1	1	0	0
8991	*Nola cereella*	14	7	7							X	X			X	X	X		X	X			X				X		X			X	X		X	X		
Bagisarinae					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
9169	*Bagisara rectifascia*	1	1	0																															X			
Eustrotinae					0	0	1	0	1	1	3	2	4	2	2	2	4	4	2	3	4	1	4	2	2	4	4	4	6	2	5	5	2	3	6	2	2	4
9003	*Tripudia quadrifera*	2	1	1													X																					X
9030	*Ozarba aeria*	1	0	1																																		X
9038	*Hyperstrotia villificans*	15	8	7							X		X	X		X		X		X	X		X			X	X	X	X			X			X			X
9039	*Hyperstrotia flaviguttata*	10	7	3							X						X	X		X			X						X		X	X		X	X			
9040	*Hyperstrotia secta*	1	1	0																									X									
9044	*Thioptera nigrofimbria*	27	10	17			X		X	X	X	X		X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
9047	*Lithacodia muscosula*	10	4	6									X						X							X	X	X	X		X	X			X	X		
9051	*Lithacodia musta*	8	3	5									X							X	X			X						X	X	X			X			
9053	*Pseudostrotia carneola*	18	6	12								X	X		X		X	X			X		X			X	X	X	X		X	X	X	X	X		X	X
9070	*Amyna octo*	1	0	1																					X													
Condicinae					0	3	0	1	1	0	3	1	3	3	3	3	3	1	1	5	4	1	5	2	1	4	3	2	4	2	3	6	3	3	4	2	1	3
9690	*Condica videns*	8	4	4											X								X	X		X		X				X			X	X		
9693	*Condica mobilis*	1	1	0																			X															
9696	*Condica vecors*	16	11	5		X		X	X		X			X						X	X		X			X			X	X	X	X			X		X	X
9699	*Condica sutor*	7	6	1							X					X	X			X			X						X			X						
9720	*Ogdoconta cinereola*	23	10	13		X					X	X	X	X	X	X	X	X		X	X	X	X			X	X	X	X		X	X	X	X	X			X
9057	*Homophoberia apicosa*	12	1	11									X		X				X	X	X			X	X		X				X		X	X		X		

Table 3: Lepidoptera Survey Data For Twin Swamps from MV and UV Lights

Total Macrolep. Species Rec. at Lights: 382					MV1	MV1	MV5	MV1	MV1	MV1	MV1	T1	T2	MV2	T1	T3	MV3	T2	T4	MV3	T2	T5	MV3	T4	MVT	MV2	T4	T6	MV4	T4	T7	MV4	T4	T7	MV4	T4	T8	T4
LEPIDOPTERA TAXA COLLECTED		Light USR	MV Sheet USR	UV Trap USR	17 Aug. 95	13 Aug. 01	14 Aug. 01	15 Aug. 01	16 Aug. 01	17 Aug. 01	11 Aug. 02	11 Aug. 02	11 Aug. 02	12 Aug. 02	12 Aug. 02	12 Aug. 02	13 Aug. 02	13 Aug. 02	13 Aug. 02	14 Aug. 02	14 Aug. 02	14 Aug. 02	15 Aug. 02	15 Aug. 02	15 Aug. 02	20 Aug. 08	20 Aug. 08	20 Aug. 08	21 Aug. 08	21 Aug. 08	21 Aug. 08	22 Aug. 08	22 Aug. 08	22 Aug. 08	23 Aug. 08	23 Aug. 08	23 Aug. 08	24 Aug. 08
9065	*Leuconycta diphteroides*	8	4	4		X							X	X		X	X				X									X							X
9066	*Leuconycta lepidula*	6	2	4																						X			X			X	X	X	X				
9661	*Crambodes talidiformis*	3	3	0																X						X			X										
Plusiinae					0	1	1	1	1	3	4	1	1	3	0	1	1	1	1	4	1	0	2	1	0	4	3	4	4	1	0	5	2	1	7	1	0	0
8885	*Argyrogramma verruca*	1	1	0																						X												
8886	*Enigmogramma basigera*	4	4	0							X															X						X			X			
8887	*Trichoplusia ni*	1	1	0																															X			
8889	*Ctenoplusia oxygramma*	10	7	3						X	X			X												X	X	X	X			X	X		X			
8890	*Pseudoplusia includens*	8	7	1				X		X				X			X			X								X	X						X			
8898	*Allagrapha aerea*	24	12	12		X	X		X	X	X	X	X	X		X		X		X	X		X	X		X	X	X	X	X		X	X	X	X	X		
8908	*Autographa precationis*	7	4	3							X								X	X							X	X				X			X			
8924	*Anagrapha falcifera*	5	5	0																X				X					X			X			X			
Acontiinae					0	0	4	4	2	5	6	3	3	3	5	3	6	4	2	6	4	3	6	2	3	1	3	3	6	0	1	5	1	2	5	1	2	1
	Cydosia sp.	1	1	0													X																					
9090	*Tarachidia candefacta*	11	8	3					X		X	X		X	X		X			X			X	X					X						X			
9095	*Tarachidia erastrioides*	12	6	6							X		X			X		X		X	X		X						X			X		X	X		X	
9122	*Spragueia dama*	20	11	9			X	X		X	X	X	X	X	X		X			X	X	X	X		X	X	X	X	X			X					X	
9127	*Spragueia leo*	20	10	10			X	X		X	X				X	X	X	X		X		X	X		X			X	X		X	X		X	X	X		
9131	*Spragueia apicalis*	19	10	9			X	X		X	X				X	X	X	X	X	X	X	X	X		X			X	X			X			X			X
9136	*Acontia aprica*	21	12	9			X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X				X			X	X		X			
9146	*Acontia delecta*	1	1	0						X																												
Amphipyrinae					0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9619	*Phosphila miselioides*	2	1	1											X					X																		
9638	*Amphipyra pyramidoides*	0	0	0																																		
Stiriinae					1	1	0	1	0	1	0	1	0	1	1	1	1	1	0	1	0	0	1	0	0	0	0	1	1	0	1	1	1	1	1	1	1	0
9754	*Plagiomimicus pityochromus*	1	0	1																													X				
9766	*Cirrhophanus triangulifer*	20	11	9	X	X		X		X		X		X	X	X	X	X		X			X					X	X		X	X		X	X	X	X	
Eriopinae					0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9631	*Callopistria mollissima*	1	1	0							X																											
Psaphidinae					0	1	0	1	1	1	1	1	1	0	1	0	1	1	1	1	0	1	1	1	0	1	1	1	0	1	0	0	1	0	1	0	1	1
9725	*Azenia obtusa*	23	10	13		X		X	X	X	X	X	X		X		X	X	X	X		X	X	X		X	X	X		X			X		X	X	X
Heliothinae					0	4	5	2	3	2	5	2	0	1	2	2	2	0	0	3	1	0	2	2	1	1	0	1	2	1	0	3	0	0	3	1	2	1
11068	*Helicoverpa zea*	18	10	8		X			X		X	X			X	X	X			X			X	X		X		X	X			X			X	X	X	X
11070	*Heliothis subflexus*	1	1	0			X																															
11071	*Heliothis virescens*	1	1	0							X																											
11073.1	*Heliothis lupatus*	1	1	0			X																															
11117	*Schinia lynx*	3	3	0		X	X				X																											
11128	*Schinia arcigera*	1	1	0							X																											
11135	*Schinia rivulosa*	20	12	8		X	X	X	X	X	X	X			X	X	X			X	X		X	X	X				X	X		X			X		X	
11141	*Schinia thoreaui*	5	5	0		X		X	X	X										X																		
11147	*Schinia gracilenta*	3	3	0										X																		X			X			
11149	*Schinia trifascia*	1	1	0			X																															
Agaristinae					0	0	0	0	0	0	1	1	0	1	1	0	2	0	1	1	1	1	2	0	0	1	0	0	2	0	0	1	0	0	2	1	1	0
9299	*Eudryas unio*	11	6	5							X	X			X		X				X	X	X						X			X			X	X		
9301	*Eudryas grata*	8	6	2													X		X	X			X			X			X						X		X	
9314	*Alypia octomaculata*	1	1	0										X																								
Pantheinae					0	0	0	0	0	0	1	0	1	0	1	0	1	0	0	1	0	0	1	0	1	0	1	0	2	1	0	1	1	0	2	1	0	1
9189	*Charadra deridens*	7	5	2							X		X		X		X			X									X						X			
9192	*Raphia abrupta*	10	4	6																			X		X		X		X	X		X	X		X	X		X
Acronictinae					0	0	0	1	1	0	18	4	6	6	10	1	9	6	1	10	7	3	5	1	3	6	5	1	16	3	1	15	1	1	17	0	3	1
9199	*Acronicta rubricoma*	10	6	4							X			X	X	X	X			X	X	X							X						X			
9200	*Acronicta americana*	16	9	7							X	X	X	X	X		X	X		X		X	X	X		X	X	X	X			X			X			
9209	*Acronicta radcliffei*	1	1	0							X																											
9219	*Acronicta connecta*	3	2	1							X																		X	X								
9221	*Acronicta funeralis*	3	3	0							X															X									X			
9225	*Acronicta vinnula*	8	7	1										X						X			X		X	X			X			X			X			
9229	*Acronicta hasta*	7	5	2							X	X					X	X											X			X			X			
9236	*Acronicta morula*	6	4	2							X		X				X				X								X			X						
9237	*Acronicta interrupta*	6	4	2							X				X		X															X			X		X	

Table 3: Lepidoptera Survey Data For Twin Swamps from MV and UV Lights

	Total Macrolep. Species Rec. at Lights: 382				MV1	MV1	MV5	MV1	MV1	MV1	MV1	T1	T2	MV2	T1	T3	MV3	T2	T4	MV3	T2	T5	MV3	T4	MVT	MV2	T4	T6	MV4	T4	T7	MV4	T4	T7	MV4	T4	T8	T4
	LEPIDOPTERA TAXA COLLECTED	Light USR	MV Sheet USR	UV Trap USR	17 Aug. 95	13 Aug. 01	14 Aug. 01	15 Aug. 01	16 Aug. 01	17 Aug. 01	11 Aug. 02	11 Aug. 02	11 Aug. 02	12 Aug. 02	12 Aug. 02	12 Aug. 02	13 Aug. 02	13 Aug. 02	13 Aug. 02	14 Aug. 02	14 Aug. 02	14 Aug. 02	15 Aug. 02	15 Aug. 02	15 Aug. 02	20 Aug. 08	20 Aug. 08	20 Aug. 08	21 Aug. 08	21 Aug. 08	21 Aug. 08	22 Aug. 08	22 Aug. 08	22 Aug. 08	23 Aug. 08	23 Aug. 08	23 Aug. 08	24 Aug. 08
9238	*Acronicta lobeliae*	5	5	0						X												X						X			X			X			
9242	*Acronicta exilis*	8	5	3						X		X				X	X								X	X		X			X						
9244	*Acronicta modica*	9	5	4						X	X			X			X		X	X								X			X			X			
9245	*Acronicta haesitata*	9	5	4						X				X					X	X						X		X	X		X			X			
9246	*Acronicta clarescens*	1	1	0																														X			
9250	*Acronicta inclara*	10	5	5						X				X			X		X	X				X				X	X		X			X			
9251	*Acronicta retardata*	7	4	3						X		X	X					X		X											X			X			
9254	*Acronicta afflicta*	9	6	3						X				X		X						X				X		X			X			X		X	
9257	*Acronicta impleta*	3	2	1						X		X																X									
9261	*Acronicta impressa*	1	1	0															X																		
9264	*Acronicta longa*	2	2	0																					X						X						
9266	*Acronicta lithospila*	1	1	0																														X			
9272	*Acronicta oblinata*	17	8	9			X			X	X		X	X		X	X		X	X		X			X	X				X			X	X		X	X
9280b	*Simyra henrici* cpx. sp. B	3	2	1										X														X			X						
9285	*Polygrammate hebraeicum*	8	5	3								X	X	X					X		X							X			X			X			
9286	*Harrisimemna trisignata*	9	6	3				X		X						X			X				X	X				X				X		X			
Noctuinae					0	3	2	1	3	1	16	7	3	7	7	8	13	2	1	12	5	6	14	2	5	5	5	7	16	3	4	17	7	7	18	4	6	1
9404	*Oligia modica*	1	0	1																													X				
9428	*Meropleon ambifuscum*	5	1	4																										X		X	X	X	X		
9463	*Parapamea buffaloensis*	1	1	0																														X			
9483	*Papaipema inquaesita*	1	0	1																						X											
9485	*Papaipema baptisiae*	5	5	0		X	X	X						X			X																					
9523	*Bellura gortynoides*	4	1	3																	X							X				X			X		
9545	*Euplexia benesimilis*	1	0	1																												X					
9556	*Chytonix palliatricula*	7	7	0						X			X						X						X			X			X			X			
9560	*Dypterygia rozmani*	2	2	0																		X						X									
9582	*Nedra ramosula*	4	4	0						X												X									X			X			
9647	*Athetis miranda*	24	11	13					X	X	X	X		X	X		X		X	X	X		X	X	X	X	X	X	X		X	X	X	X	X		X	X
9650	*Anorthodes tarda*	5	3	2																								X	X		X		X	X			
9664	*Balsa labecula*	1	1	0																														X			
9665	*Spodoptera exigua*	4	4	0						X						X			X									X									
9666	*Spodoptera frugiperda*	11	7	4						X			X			X			X			X		X			X	X		X				X		X	
9669	*Spodoptera ornithogalli*	16	9	7		X			X		X	X	X		X		X	X		X	X	X	X						X			X			X		X	
9678	*Elaphria versicolor*	6	4	2						X						X	X					X		X										X			
9679	*Elaphria chalcedonia*	10	6	4									X		X	X			X		X	X		X	X					X	X						
9684	*Elaphria grata*	18	6	12								X		X	X	X			X	X	X	X	X			X	X	X	X		X	X	X	X	X		
9688	*Galgula partita*	11	9	2		X	X		X		X				X	X	X			X			X						X						X			
9689	*Perigea xanthioides*	5	4	1						X						X				X		X									X						
9818	*Amolita fessa*	1	1	0																											X						
10288	*Polia detracta*	1	0	1																							X										
10438	*Pseudaletia unipuncta*	5	5	0						X			X						X						X			X									
10440	*Leucania linita*	9	4	5						X	X	X		X	X	X			X			X														X	
10445	*Leucania linda*	12	6	6						X	X				X	X						X		X			X	X			X	X	X	X			
10456	*Leucania adjuta*	1	1	0																														X			
10461	*Leucania ursula*	8	5	3						X	X				X	X			X	X		X									X						
10585	*Orthodes crenulata*	6	2	4						X	X				X						X						X				X						
10289	*Orthodes goodelli*	1	0	1										X																							
10640	*Xanthopastis timais*	1	1	0																								X									
10663	*Agrotis ipsilon*	11	4	7										X											X	X	X	X			X	X	X	X	X	X	
10664	*Agrotis subterranea*	1	1	0																											X						
10670	*Feltia jaculifera*	1	1	0															X																		
10870	*Richia acclivis*	3	1	2																						X		X	X								
10911	*Anicla infecta*	6	5	1						X					X							X						X			X			X			
10915	*Peridroma saucia*	2	2	0																											X			X			
10942	*Xestia dolosa*	1	1	0																											X						
11006	*Protolampra brunneicollis*	3	2	1						X			X								X																
11012.1	*Noctua pronuba*	2	0	2							X																									X	
11029	*Abagrotis alternata*	1	1	0																														X			

Table 4: Lepidoptera Survey Data For Twin Swamps from Rotten Banana Bait

		Total	Unique																
		species	Species	BTR	BTR	BTR	BTR	BTR	BTR	btp PL	btp PL	btp PL	btp3	btp4	btp	btp	btp PL	btp	btp
LEPIDOPTERA TAXA COLLECTED		at bait	Records	11 Aug. 02	12 Aug. 02	13 Aug. 02	14 Aug. 02	15 Aug. 02	20 Aug. 08	20 Aug. 08	21 Aug. 08	22 Aug. 08	22 Aug. 08	22 Aug. 08	23 Aug. 08	23 Aug. 08	24 Aug. 08	24 Aug. 08	24 Aug. 08
MACROLEPIDOPTERA		92		17	31	24	37	57	24	4	1	8	3	2	8	11	1	2	2
GEOMETROIDEA		11		0	3	2	5	8	0	2	0	1	1	0	1	0	0	0	0
GEOMETRIDAE		11		0	3	2	5	8	0	2	0	1	1	0	1	0	0	0	0
Ennominae		9		0	3	2	5	6	0	2	0	1	1	0	1	0	0	0	0
6326	*Macaria aemulataria*	X	1				X												
6405	*Digrammia gnophosaria*	X	2		X			X											
6486	*Tornos scolopacinarius*	X	1			X													
6597	*Ectropis crepuscularia*	X	1					X											
6620	*Melanolophia canadaria*	X	2		X			X											
6726	*Euchlaena obtusaria*	X	3				X	X				X							
6733	*Euchlaena amoenaria*	X	4				X	X					X		X				
6966	*Eutrapela clemataria*	X	3			X	X			X									
6982	*Prochoerodes lineola*	X	4		X		X	X		X									
Larentiinae		2		0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
7197	*Eulithis gracilineata*	X	1					X											
7647	*Heterophleps triguttaria*	X	1					X											
RHOPALOCERA		6		0	0	0	0	0	0	1	0	4	0	0	3	3	0	0	0
PAPILIONOIDEA		6		0	0	0	0	0	0	1	0	4	0	0	3	3	0	0	0
NYMPHALIDAE		6		0	0	0	0	0	0	1	0	4	0	0	3	3	0	0	0
4420	*Polygonia interrogationis*	X	3									X			X	X			
4437	*Vanessa atlanta*	X	2									X				X			
4522	*Basilarchia arthemis*	X	1									X							
4557	*Astereocampa celtis*	X	3							X		X			X				
4562.1	*Astereocampa clyton*	X	1												X				
4569	*Satyrodes appalachia*	X	1													X			
SPHINGIDAE		1		0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
7885	*Darapsa myron*	X	1													X			
NOCTUOIDEA		75		17	28	22	32	49	24	1	1	3	2	2	4	8	1	2	2
NOCTUIDAE		75		17	28	22	32	49	24	1	1	3	2	2	4	8	1	2	2
Herminiinae		13		3	3	1	8	10	4	0	0	0	0	0	1	2	0	0	0
8322	*Idia americalis*	X	5	X			X	X	X							X			
8326	*Idia rotundalis*	X	2				X	X											
8328	*Idia julia*	X	2	X					X										
8334	*Idia lubricalis*	X	8	X	X	X	X	X	X						X	X			
8338	*Phalaenophana pyramusalis*	X	1					X											
8351b	*Zanclognatha cruralis* cpx. sp. *B*	X	1					X											
8352	*Zanclognatha jacchusalis*	X	2				X	X											
8356	*Chytolita petrealis*	X	3		X		X	X											
8366	*Tetanolita mynesalis*	X	2				X	X											
8368	*Tetanolita floridana*	X	2				X	X											
8381	*Renia discoloralis*	X	1						X										
	Renia sp. nr. *adspergillus*	X	2				X	X											
8393	*Lascoria ambigualis*	X	1		X														
Rivulinae		2		0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0
8404	*Rivula propinqualis*	X	1					X											
8412	*Melanomma auricinctaria*	X	2				X	X											
Hypenodinae		2		0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0
8428	*Dyspyralis nigella*	X	2		X				X										
8440	*Nigetia formosalis*	X	1					X											
Hypeninae		4		0	1	1	1	4	2	1	0	1	0	0	0	0	0	0	0
8441	*Hypena manalis*	X	1					X											
8442	*Hypena baltimoralis*	X	1					X											
8465	*Hypena scabra*	X	6		X	X		X	X	X		X							
8479	*Spargaloma sexpunctata*	X	3				X	X	X										
Catocalinae		35		12	16	18	18	24	13	0	1	2	2	2	3	4	1	2	2
8491	*Ledaea perditalis*	X	4		X	X	X	X											
8499	*Metalectra discalis*	X	6	X	X	X	X	X	X										
8500	*Metalectra quadrisignata*	X	5			X	X	X							X	X			
8534	*Plusiodonta compressipalpis*	X	5		X	X	X	X	X										
8555	*Scoliopteryx libatrix*	X	3		X		X		X										
8587	*Panopoda rufimargo*	X	1		X														
8588	*Panopoda carneicosta*	X	1					X											
8651	*Lesmone detrahens*	X	1		X														
8689	*Zale lunata*	X	5	X	X	X	X	X											
8692	*Zale galbanata*	X	7	X	X	X	X	X					X		X				
8717	*Zale horrida*	X	1					X											
8719	*Euparthenos nubilis*	X	1					X											
8721	*Allotria elonympha*	X	3	X			X	X											
8726.1	*Dysgonia telma* Sullivan	X	4			X	X	X	X										

Table 4: Lepidoptera Survey Data For Twin Swamps from Rotten Banana Bait

			Total species at bait	Unique Species Records	BTR 11 Aug. 02	BTR 12 Aug. 02	BTR 13 Aug. 02	BTR 14 Aug. 02	BTR 15 Aug. 02	BTR 20 Aug. 08	btp PL 20 Aug. 08	btp PL 21 Aug. 08	btp PL 22 Aug. 08	btp3 22 Aug. 08	btp4 22 Aug. 08	btp 23 Aug. 08	btp 23 Aug. 08	btp PL 24 Aug. 08	btp 24 Aug. 08	btp 24 Aug. 08
LEPIDOPTERA TAXA COLLECTED																				
	8727	*Parallelia bistriaris*	X	6	X	X	X	X	X	X										
		Cutina aluticolor Pogue & Fgn.	X	2					X	X										
		Cutina arcuata Pogue & Fgn.	X	1					X											
	8733	*Caenurgia chloropha*	X	2				X		X										
	8739	*Caenurgina erechtea*	X	3				X		X							X			
	8745	*Mocis texana*	X	2			X			X										
	8747	*Celiptera frustulum*	X	4			X	X	X	X										
	8764	*Argyrostrotis anilis*	X	2					X			X								
	8769	*Spiloloma lunilinea*	X	8	X	X	X	X		X			X	X	X					
	8771	*Catocala piatrix*	X	9	X	X	X	X	X				X		X		X	X		
	8780	*Catocala robinsoni*	X	2			X												X	
	8783	*Catocala angusi*	X	1					X											
	8784	*Catocala obscura*	X	3			X	X	X											
	8788	*Catocala retecta*	X	1	X															
	8788.1	*Catocala luctuosa*	X	6		X	X	X		X									X	X
	8791	*Catocala insolabilis*	X	1		X														
	8792	*Catocala vidua*	X	8	X	X	X	X	X	X						X				X
	8794	*Catocala lacrymosa*	X	2		X			X											
	8801	*Catocala ilia*	X	4	X		X		X								X			
	8832	*Catocala cara*	X	2	X				X											
	8834	*Catocala amatrix*	X	4	X	X	X		X											
	Eustrotinae		3		0	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0
	9044	*Thioptera nigrofimbria*	X	1		X														
	9047	*Lithacodia muscosula*	X	1						X										
	9053	*Pseudostrotia carneola*	X	2		X			X											
	Condicinae		6		1	3	0	2	2	1	0	0	0	0	0	0	1	0	0	0
	9690	*Condica videns*	X	1						X										
	9696	*Condica vecors*	X	1				X												
	9720	*Ogdoconta cinereola*	X	1					X											
	9057	*Homophoberia apicosa*	X	5	X	X		X	X								X			
	9065	*Leuconycta diphteroides*	X	1		X														
	9066	*Leuconycta lepidula*	X	1		X														
	Acontiinae		1		0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	9131	*Spragueia apicalis*	X	1			X													
	Amphipyrinae		2		0	1	0	1	2	1	0	0	0	0	0	0	1	0	0	0
	9619	*Phosphila miselioides*	X	1					X											
	9638	*Amphipyra pyramidoides*	X	5		X		X	X	X							X			
	Acronictinae		5		1	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0
	9199	*Acronicta rubricoma*	X	1				X												
	9200	*Acronicta americana*	X	1					X											
	9236	*Acronicta morula*	X	2		X	X													
	9238	*Acronicta lobeliae*	X	1	X															
	9242	*Acronicta exilis*	X	1					X											
	Noctuinae		2		0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
	10438	*Pseudaletia unipuncta*	X	1						X										
	10663	*Agrotis ipsilon*	X	1					X											

Table 5: Lepidoptera Survey Data For Twin Swamps from Diurnal Survey

	SF	Swamp Hardwood Forest			SF	SF	SF	SF	SF	SF	SF	SF	PL	SF	SF	PL	SF	SF	PL	SF	field	SF	PL/field	SF	SF	SF	SF	field	SF	field
	PL	Parking Lot			IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN
	L	Larvae not adults collected	IN	Day	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS
			TS		day	day	day	day	day	day	Day	Day	Day	Day	Day	Day	Day	Day	Day	day1	day3	DAY	PL:day	DAY	day	day	day	day	day	day	day
LEPIDOPTERA TAXA COLLECTED			N/D	usr total	17 Aug. 95	20 Aug. 95	14 Aug. 01	15 Aug. 01	16 Aug. 01	17 Aug. 01	11 Aug. 02	12 Aug. 02	13 Aug. 02	13 Aug. 02	14 Aug. 02	14 Aug. 02	15 Aug. 02	16 Aug. 02	16 Aug. 02	20 Aug. 08	20 Aug. 08	21 Aug. 08	21 Aug. 08	22 Aug. 08	23 Aug. 08	24 Aug. 08	28 Aug. 08	28 Aug. 08	29 Aug. 08	29 Aug. 08
	MACROLEPIDOPTERA		73		10	3	6	9	6	4	15	24	3	7	19	7	28	23	6	19	13	16	3	20	14	23	21	11	19	3
	GEOMETROIDEA		4		0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	GEOMETRIDAE		4		0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	Ennominae		4		0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
6322	*Mellilla xanthometata*		X	1							X																				
6599	*Epimecis hortaria*		X	1										X																	
6620	*Melanolophia canadaria*		X	1										X																	
6743	*Xanthotype sospeta*		G	1																	X										
	RHOPALOCERA		31		0	0	0	0	0	0	3	11	3	2	9	7	11	9	6	4	10	2	2	7	0	4	7	11	5	3
	HESPERIOIDEA		3		0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2	0	0
	HESPERIIDAE		3		0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2	0	0
	Pyrginae		1		0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
3870	*Epargyreus clarus*		X	2													X				X										
	Hesperiinae		2		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
4013	*Hylephila phyleus*		X	1																								X			
4049	*Atalopedes campestris*		X	1																								X			
	PAPILIONOIDEA		28		0	0	0	0	0	0	3	11	3	2	9	7	10	9	6	4	9	2	2	7	0	4	7	9	5	3
	PAPLIONIDAE		3		0	0	0	0	0	0	1	1	0	0	1	2	2	1	2	0	0	0	0	1	0	0	1	0	0	0	0
4176	*Papilio glaucus*		X	3												X	X		X												
4181	*Papilio troilus*		X	8								X			X	X	X	X	X					X				X			
4184	*Eurytides marcellus*		X	1							X																				
	PIERIDAE		6		0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	4	0	0	1	0	0	0	3	0	0
4193	*Pontia protodice*		X	2																X								X			
4197	*Pieris rapae*		X	1							X																				
4209	*Colias philodice*		X	1																	X										
4210	*Colias eurytheme*		X	3												X					X							X			
4228	*Phoebis sennae*		X	3																	X			X				X			
4242	*Eurema nicippe*		X	1																	X										
	LYCAENIDAE		3		0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	1	1	0	0	1	0	1	1	1	1	1	
4249	*Feniseca tarquinius*		X	1								X																			
4361	*Everes comyntas*		X	9														X		X	X			X		X	X	X	X	X	
4363	*Celastrina ladon*		X	1								X																			
	NYMPHALIDAE		16		0	0	0	0	0	0	1	8	3	2	8	4	8	7	4	2	4	2	2	4	0	3	5	5	4	2	
4411	*Libytheana carinenta*		X	1																			X								
4413	*Agraulis vanillae*		X	1																								X			
4420	*Polygonia interrogationis*		X	7								X		X	X		X	X										X	X		
4421	*Polygonia comma*		X	3											X		X	X													
4437	*Vanessa atlanta*		X	3									X		X		X														
4440	*Junonia coenia*		X	4								X									X							X		X	
4450	*Speyeria cybele*		X	1											X																
4481	*Phyciodes tharos*		X	7								X	X			X	X	X	X		X										
4522	*Basilarchia arthemis*		X	14								X	X		X	X	X	X	X		X		X	X			X	X	X	X	
4557	*Astereocampa celtis*		X	5								X				X		X	X									X			
4562.1	*Astereocampa clyton*		X	3								X						X	X												

Table 5: Lepidoptera Survey Data For Twin Swamps from Diurnal Survey

	SF	Swamp Hardwood Forest			SF	SF	SF	SF	SF	SF	SF	SF	PL	SF	SF	PL	SF	SF	PL	SF	field	SF	PL/field	SF	SF	SF	SF	field	SF	field
	PL	Parking Lot			IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN
	L	Larvae not adults collected	IN	Day	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS
			TS		day	day	day	day	day	day	Day	Day	Day	Day	Day	Day	Day	Day	Day	day1	day3	DAY	PL:day	DAY	day	day	day	day	day	day	day
	LEPIDOPTERA TAXA COLLECTED		N/D	usr total	17 Aug. 95	20 Aug. 95	14 Aug. 01	15 Aug. 01	16 Aug. 01	17 Aug. 01	11 Aug. 02	12 Aug. 02	13 Aug. 02	13 Aug. 02	14 Aug. 02	14 Aug. 02	15 Aug. 02	16 Aug. 02	16 Aug. 02	20 Aug. 08	20 Aug. 08	21 Aug. 08	21 Aug. 08	22 Aug. 08	23 Aug. 08	24 Aug. 08	28 Aug. 08	28 Aug. 08	29 Aug. 08	29 Aug. 08
	4568.1	*Enodia anthedon*	X	7							X	X		X	X		X			X					X					
	4569	*Satyrodes appalachia*	X	9								X			X		X			X		X			X	X		X		
	4573	*Cyllopsis gemma*	X	3											X		X	X												
	4574	*Hermeuptychia hermes*	X	5																		X		X		X	X		X		
	4614	*Danaus plexippus*	X	5												X					X			X			X		X		
	BOMBYCOIDEA		2		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	SATURNIIDAE		1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	7746	*Automeris io*	X	1																			X								
	SPHINGIDAE		1		0	0	0	0	0	0	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7793	*Paratraea plebeja*	X	1										X																	
	NOCTUOIDEA		36		10	3	6	9	6	4	11	13	0	3	10	0	17	14	0	15	2	14	0	13	14	19	14	0	14	0	
	NOCTUIDAE		36		10	3	6	9	6	4	11	13	0	3	10	0	17	14	0	15	2	14	0	13	14	19	14	0	14	0	
	Herminiinae		1		0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	8322	*Idia americalis*	X	2										X						X											
	Hypeninae		1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	8465	*Hypena scabra*	X	1																	X										
	Catocalinae		31		10	3	6	9	6	4	11	13	0	2	10	0	16	14	0	14	1	14	0	13	14	19	14	0	13	0	
	8719	*Euparthenos nubilis*	X	1				X																							
	8721	*Allotria elonympha*	X	3	X										X		X														
	8739	*Caenurgina erechtea*	X	1																	X										
	8770	*Catocala innubens*	X	3								X												X			X				
	8771	*Catocala piatrix*	X	1																						X					
	8780	*Catocala robinsoni*	X	17	X		X	X	X	X	X	X			X		X	X		X		X		X	X	X	X		X		
	8781	*Catocala judith*	X	1						X																					
	8782	*Catocala flebilis*	X	12	X						X	X			X		X	X		X		X		X		X	X		X		
	8783	*Catocala angusi*	X	12	X						X	X					X	X		X		X		X		X	X		X		
		Catocala angusi [white fringe]	X	3																X					X	X					
	8784	*Catocala obscura*	X	12	X		X					X			X			X		X		X		X	X	X	X		X		
	8785	*Catocala residua* White Fringe	X	13							X	X		X	X		X	X		X		X		X	X	X	X		X		
	8785	*Catocala residua* Dark Fringe	X	2				X																	X						
	8787	*Catocala agrippina*	X	1	X																										
	8788	*Catocala retecta*	X	2																X				X							
	8788.1	*Catocala luctuosa*	X	14		X			X		X	X			X		X	X		X		X		X	X	X	X		X		
	8789	*Catocala ulalume*	X	3				X										X		X											
	8791	*Catocala insolabilis*	X	7							X	X			X		X					X			X	X					
	8792	*Catocala vidua*	X	15	X		X	X		X	X	X			X		X	X		X		X		X		X	X		X		
	8793	*Catocala maestosa*	X	11	X						X						X	X		X		X		X	X	X	X		X		
	8794	*Catocala lacrymosa*	X	15	X	X		X	X			X		X			X	X		X		X		X	X	X	X		X		
	8795	*Catocala palaeogama*	X	10			X	X	X			X					X	X		X		X			X	X					
	8796	*Catocala nebulosa*	X	6				X	X								X	X		X							X				
	8797	*Catocala subnata*	X	1																						X					
	8798	*Catocala neogama*	X	5			X															X		X	X	X					
		Catocala communis	X	3													X								X	X					
	8801	*Catocala ilia*	X	8							X	X			X		X	X								X	X		X		

Table 5: Lepidoptera Survey Data For Twin Swamps from Diurnal Survey

	SF	Swamp Hardwood Forest			SF	SF	SF	SF	SF	SF	SF	SF	PL	SF	SF	PL	SF	SF	PL	SF	field	SF	PL/field	SF	SF	SF	SF	field	SF	field
	PL	Parking Lot			IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN
	L	Larvae not adults collected	IN	Day	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS
			TS		day	day	day	day	day	day	Day	Day	Day	Day	Day	Day	Day	Day	Day	day1	day3	DAY	PL:day	DAY	day	day	day	day	day	day	day
LEPIDOPTERA TAXA COLLECTED			N/D	usr total	17 Aug. 95	20 Aug. 95	14 Aug. 01	15 Aug. 01	16 Aug. 01	17 Aug. 01	11 Aug. 02	12 Aug. 02	13 Aug. 02	13 Aug. 02	14 Aug. 02	14 Aug. 02	15 Aug. 02	16 Aug. 02	16 Aug. 02	20 Aug. 08	20 Aug. 08	21 Aug. 08	21 Aug. 08	22 Aug. 08	23 Aug. 08	24 Aug. 08	28 Aug. 08	28 Aug. 08	29 Aug. 08	29 Aug. 08
	8804	*Catocala mamorata*	X	18	X	X	X	X	X	X	X	X			X		X	X		X		X		X	X		X		X	
		Catocala carissima	X	1																						X					
	8834	*Catocala amatrix*	X	3							X																X		X		
	8878.1	*Catocala lineella*	X	2													X												X		
	Acronictinae		2		0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	
	9237	*Acronicta interrupta*	X	1																									X		
	9238	*Acronicta lobeliae*	X	1													X														
	Noctuinae		1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	10640	*Xanthopastis timais*	X	0										L	L																

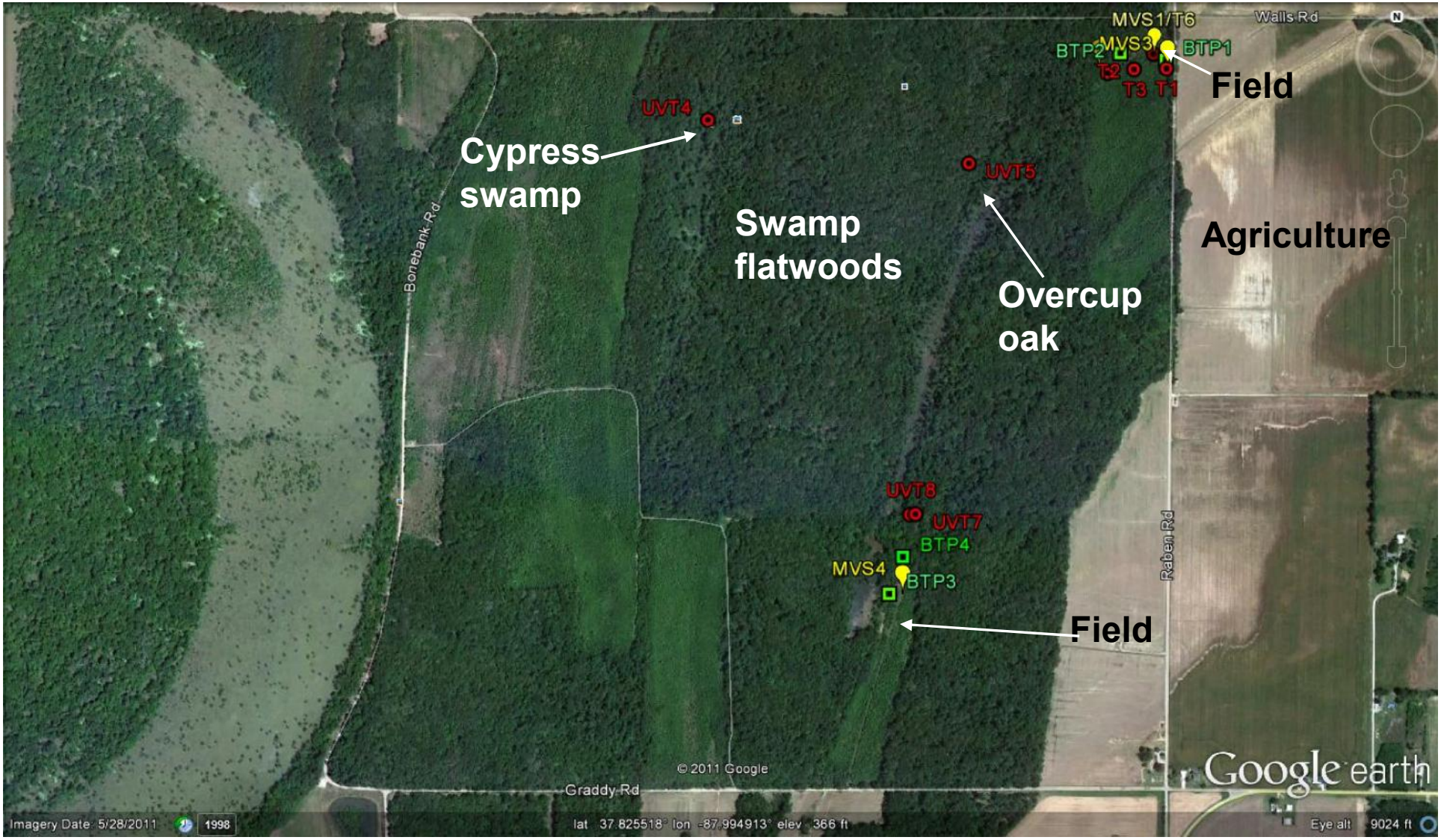

Figure 1: Twin Swamps Nature Preserve with the location of survey stations for nocturnal Lepidoptera. More detail for the clusters of survey stations in the northeast and southeast quadrants of the preserve is provided in Figures 2-3.

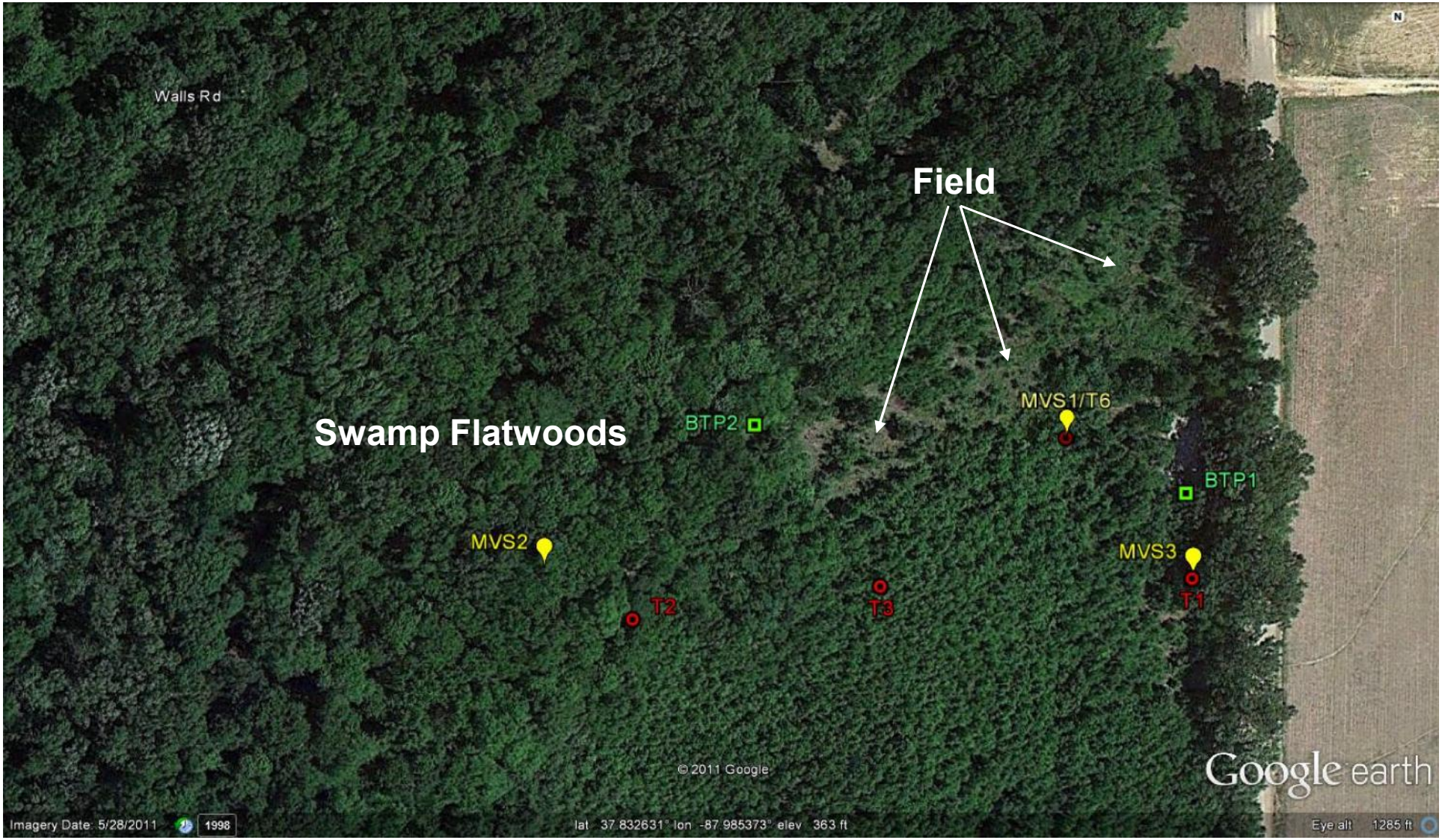

Figure 2: Location of survey stations for nocturnal Lepidoptera in the northeast quadrant of Twin Swamps Nature Preserve.

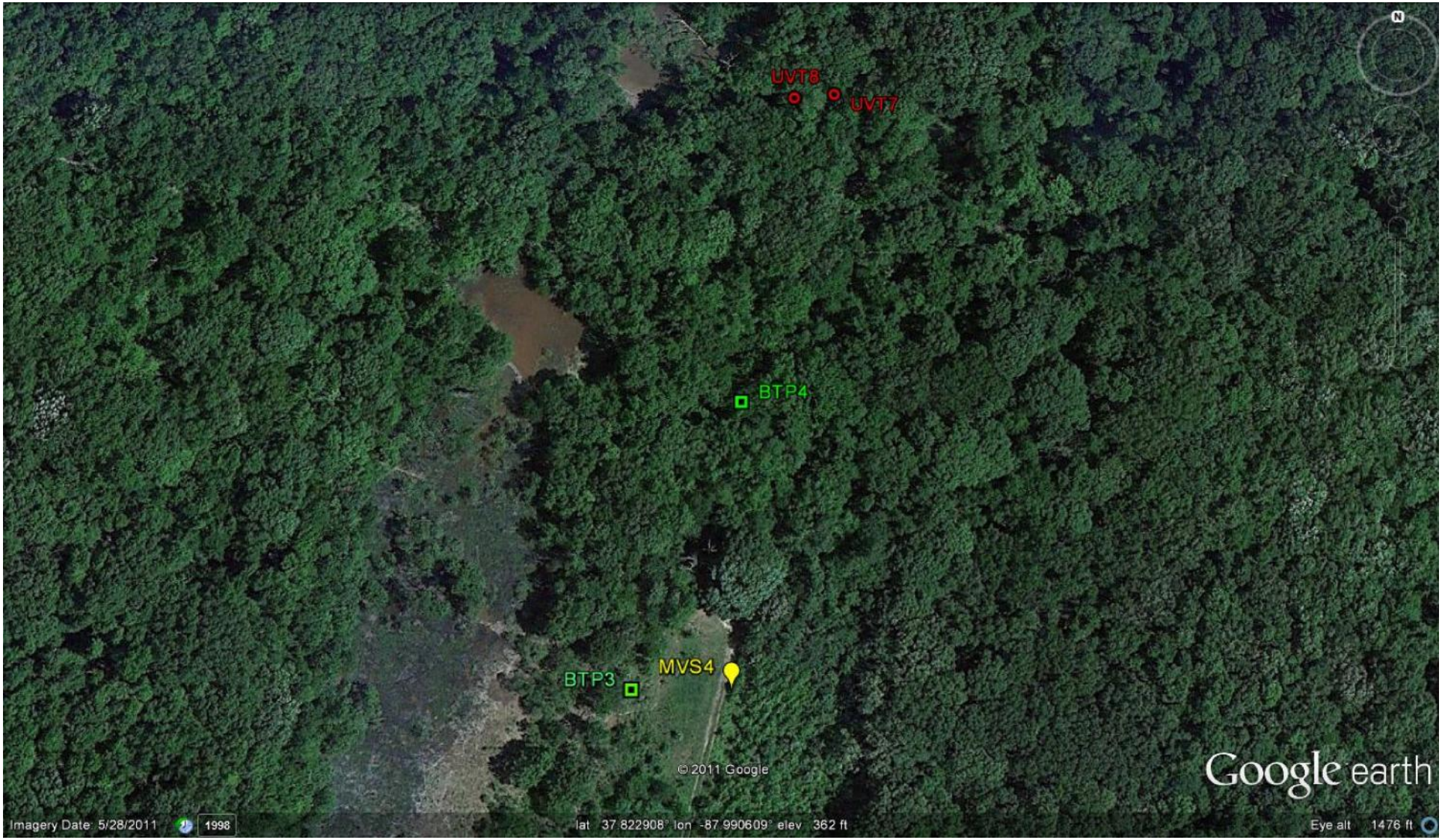

Figure 3: Location of survey stations for nocturnal Lepidoptera in the southeast quadrant of Twin Swamps Nature Preserve.

Figure 4: Proportions of Lepidoptera Species Recorded from Twin Swamps Hypothesized to be Dependent on Particular Habitat Types in Eastern North America

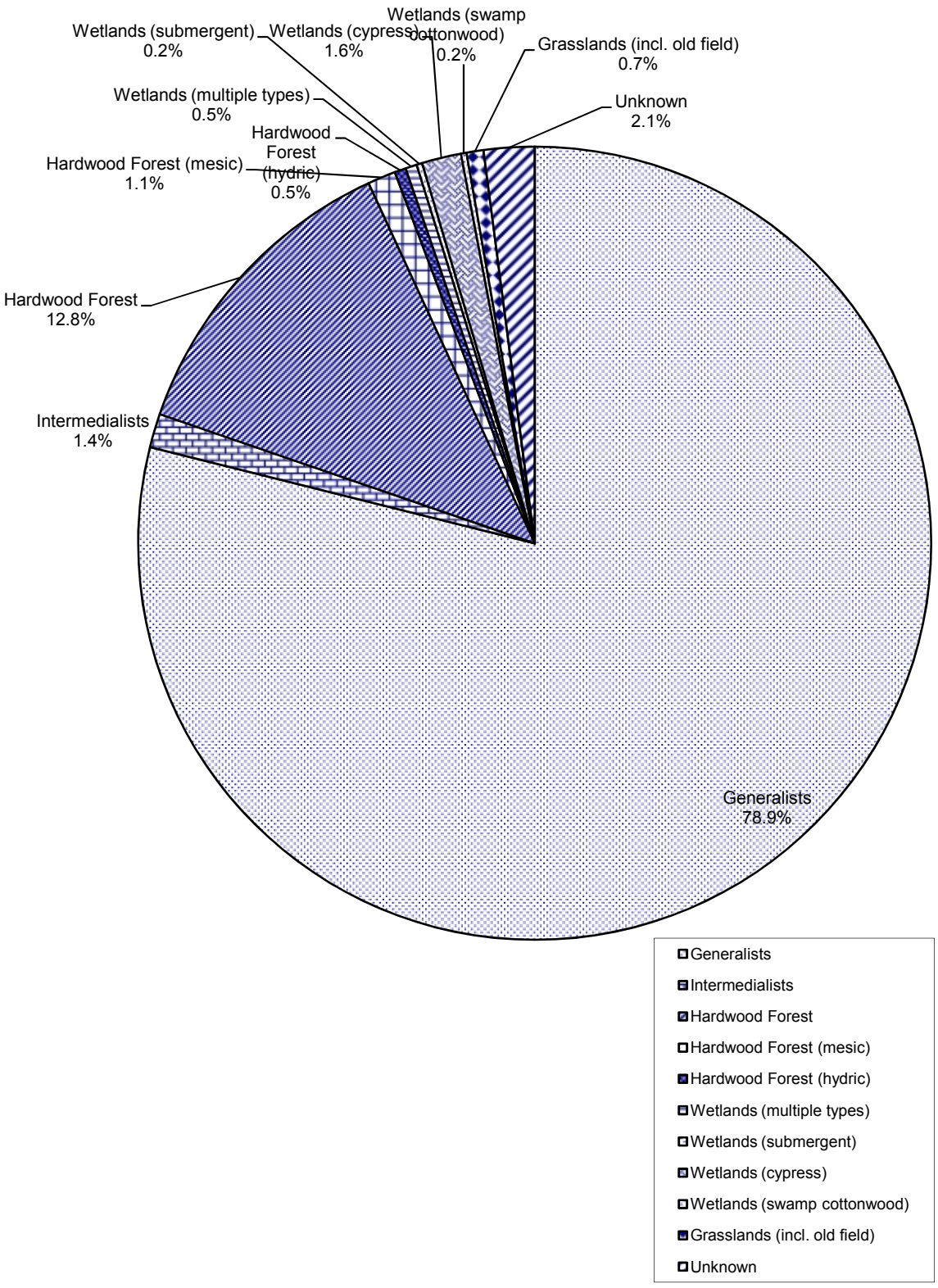

Figure 5: Number of Lepidoptera Species Recorded From Twin Swamps Hypothesized to be Dependent on Particular Habitat Types in Eastern North America

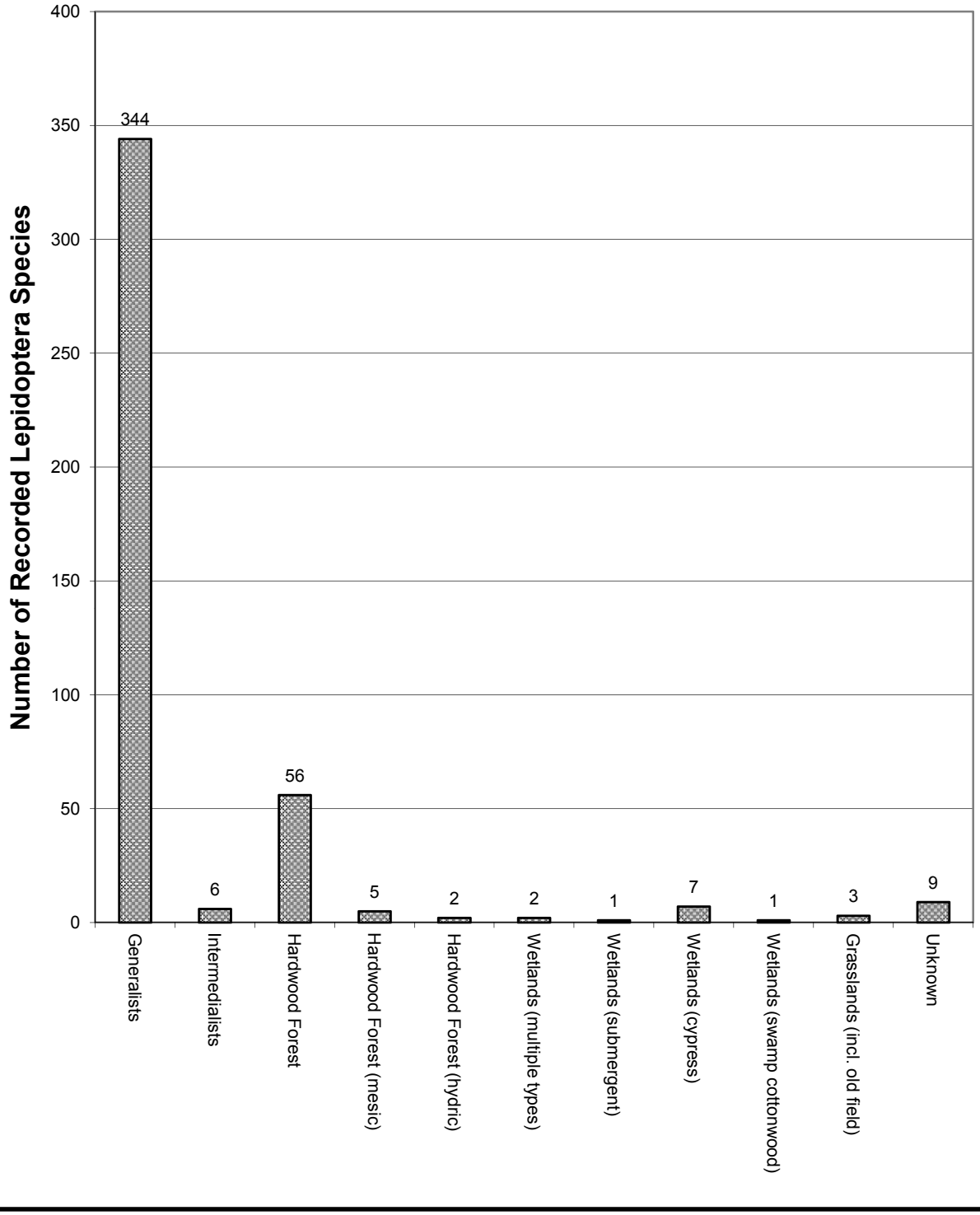

Figure 6: Number of Nocturnal Macrolepidoptera Species Recorded from Each Survey Station on Each Survey Date

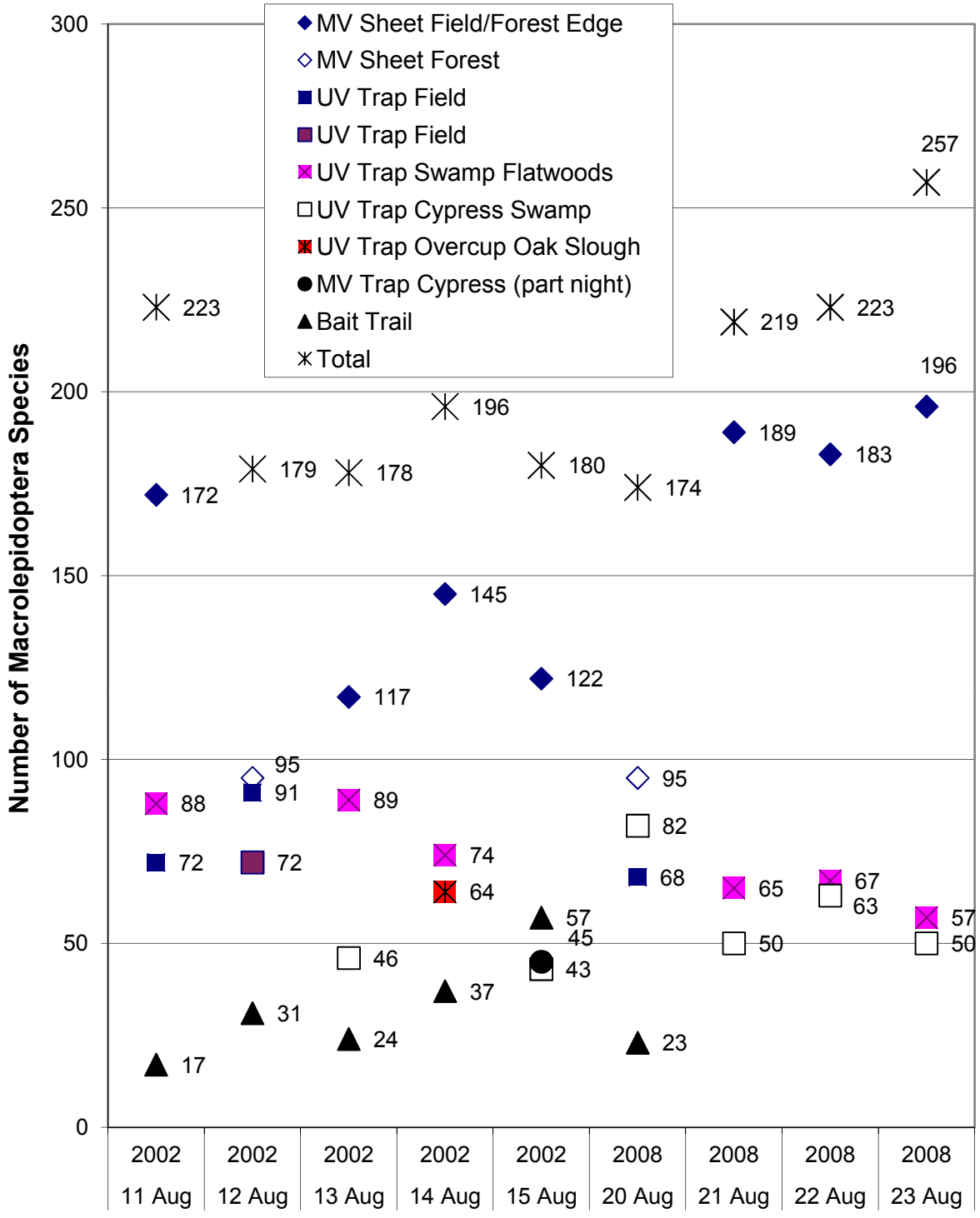

Figure 7: Number of Macrolepidoptera Species Recorded Exclusively from Particular Survey Stations on Different Survey Dates

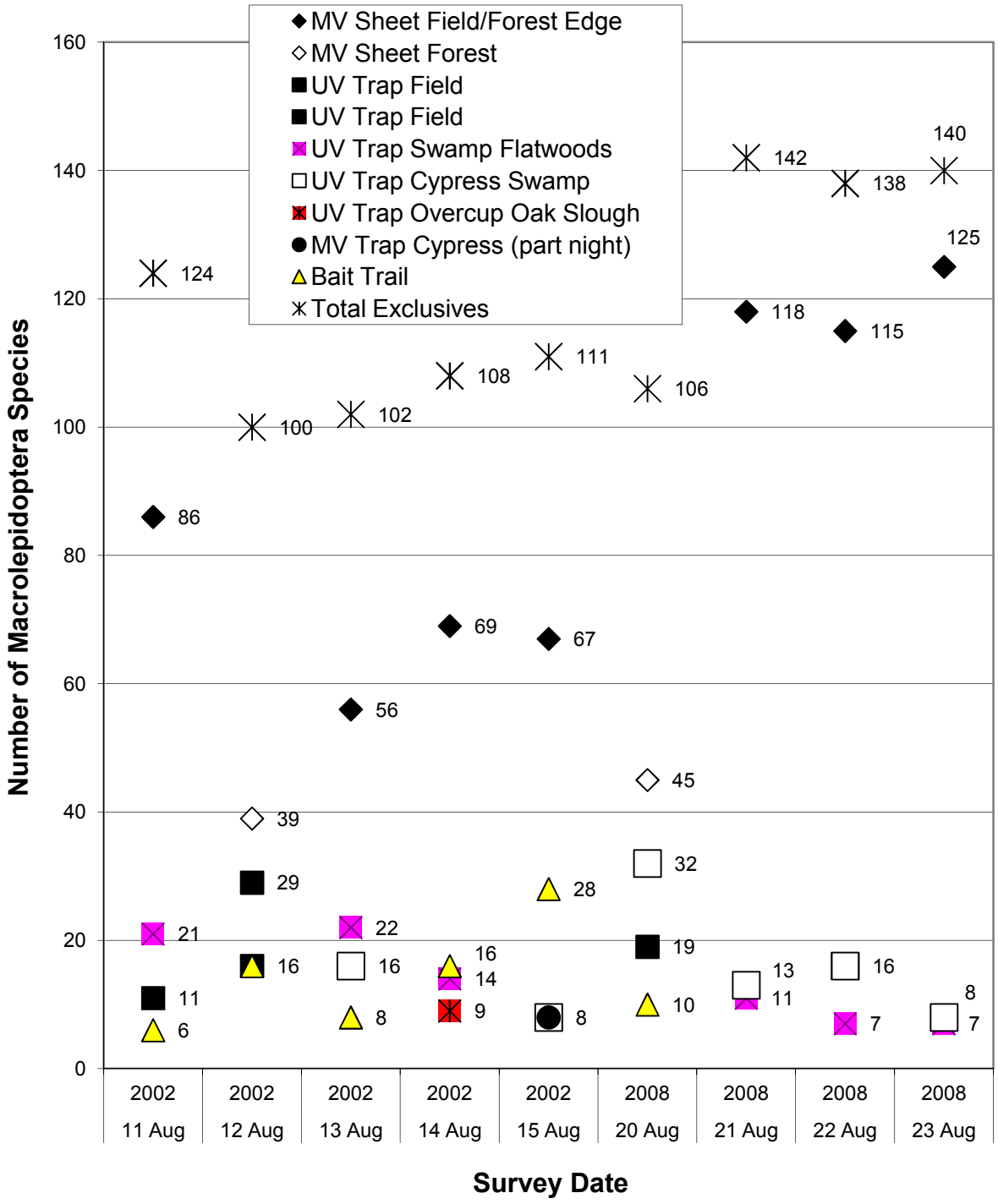

Figure 8

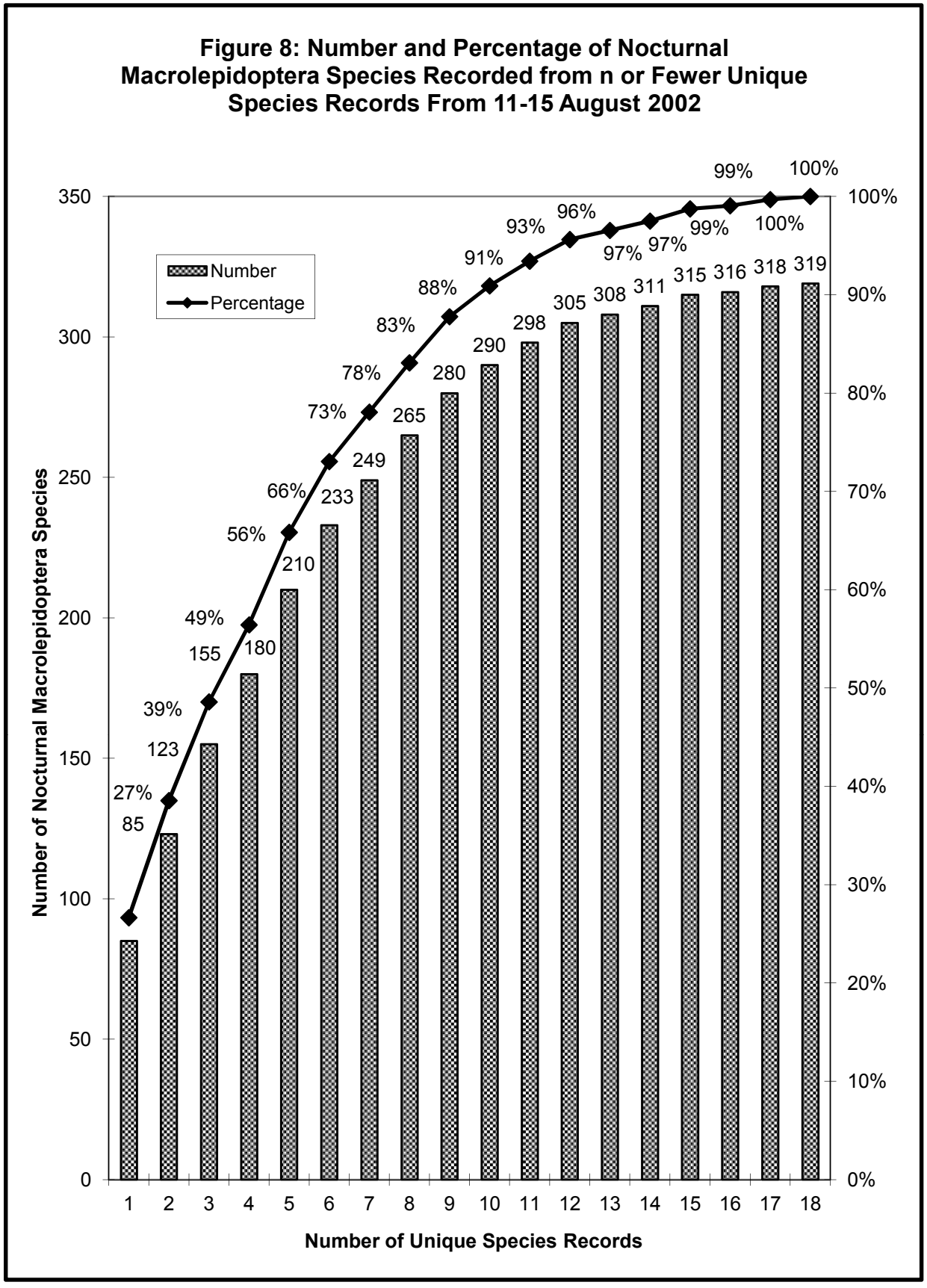
Figure 8: Number and Percentage of Nocturnal Macrolepidoptera Species Recorded from n or Fewer Unique Species Records From 11-15 August 2002
Number
Percentage
Number of Nocturnal Macrolepidoptera Species
Number of Unique Species Records
0
50
100
150
200
250
300
350
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
27% 39% 49% 56% 66% 73% 78% 83% 88% 91% 93% 96% 97% 97% 99% 100% 99% 100%
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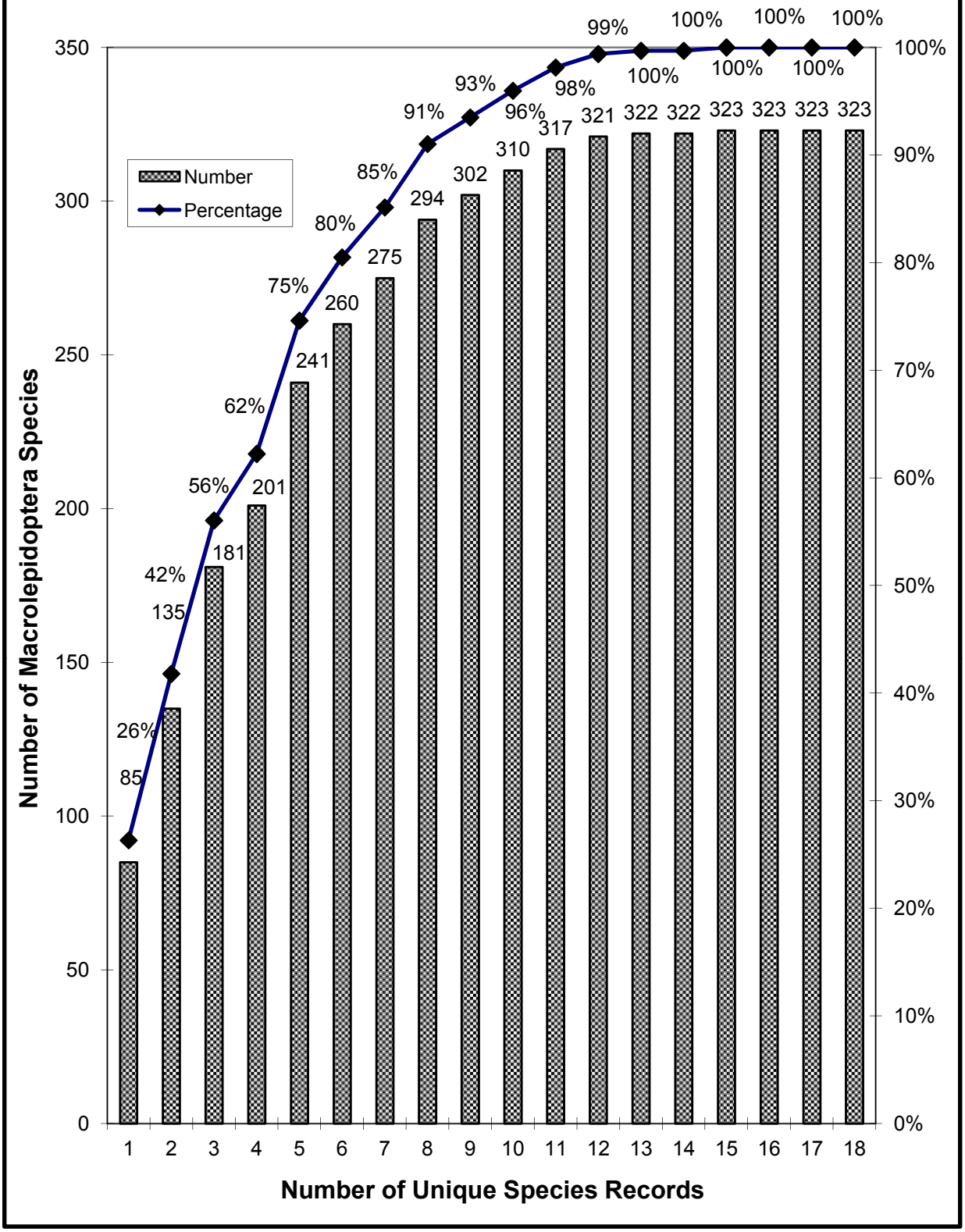
Figure 9: Number and Percentage of Nocturnal Macrolepidoptera Species Recorded from n or Fewer Unique Species Records from 20-24 August 2008