
**Surveys, assessing impacts of management, and
conservation plans for Mitchell's satyr (*Neonympha
mitchellii*) in southern Michigan:
2004 progress report**



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Cover Photos: Berrien County East Site, August 2004. **Left Inset:** *Neonympha mitchellii*, Barry County, MI., July 2004. **Right inset:** Eastern box turtle, Barry County, MI., July 2004. Photos by David L. Cuthrell, MNFI

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Introduction

The Mitchell's satyr butterfly (*Neonympha mitchellii mitchellii*) is a rare butterfly species whose worldwide distribution is restricted to Michigan and Indiana. It is currently only known from 18 sites in southern Lower Michigan and two sites in northern Indiana. This species is currently listed as endangered in Michigan and Indiana, and was federally listed as endangered in 1992. The long-term viability of these populations is unknown. Fifteen of the 18 sites in Michigan were confirmed to have satyrs in 2004, while the status of the other three sites is uncertain. All but two of the known satyr sites occur on private land. The butterfly appears to be restricted to calcareous wetlands that range along a continuum from open fen, wet prairie, prairie fen, and sedge meadow to shrub-carr and tamarack savanna (Shuey 1997, Szymanski 1999). It appears that the Mitchell's satyr occupies areas in these fen communities where woody and herbaceous vegetation occurs as a mosaic (Szymanski and Shuey 2002).

To reclassify to federal threatened status, 16 geographically distinct populations or meta-populations must be established range wide, including 12 in Michigan; to de-list, nine more populations must be established. These populations must remain viable for five consecutive years following reclassification, which will require a valid, repeatable monitoring protocol. At least 15 of the 25 recovered populations also must be protected and managed for the benefit of this species (U.S. Fish and Wildlife Service 1997). Currently, only seven occupied sites in Michigan are considered to have potential to contain viable populations. Satyrs at the remaining sites typically occur in much lower numbers or the amount of suitable habitat is limited in size or by threats to the site, making their long-term viability uncertain.

Field studies continue to be extremely difficult for this species because of its ephemeral nature, the fragility of its habitat, the short survey window, and the difficulties in observing this species. Despite these challenges our understanding of the satyr's biological and ecological requirements and habitat affinities has increased over the past decade. In addition, site conservation plans have been completed for over half of the occupied sites and at some sites management is already being implemented.

The Michigan Natural Features Inventory has participated in numerous working group meetings for the Mitchell's satyr butterfly sponsored by the U.S. Fish and Wildlife East Lansing Office since the inception of the working group in 1997. It has been a concern of the group that most of the occupied sites are in dire need of management to control non-native species and to mimic natural disturbance regimes. Working group members have stressed the need to intensively monitor Mitchell's satyr numbers at sites undergoing active management to evaluate the response of the satyr to these activities. This information is crucial to developing effective long term management strategies at occupied sites. Establishing baseline densities and trends is an important part of this process. In addition, long-term monitoring has been identified as essential for determining the overall health of satyr populations.

Expanding searches for the Mitchell's satyr in potential habitat in the vicinity of newly discovered or re-discovered sites as well as at historical sites that have not been re-surveyed is also an important task to determine if there is additional occupied habitat. Many satyr sites were only recently discovered and some historical sites have not been thoroughly surveyed. This report summarizes the work completed during the first year of this project and highlights relevant findings. Objectives for this project are listed below.

Project Objectives

1. Conduct landowner contact to provide information and obtain permission to survey.
2. Develop and begin implementation of a long-term monitoring study to assess the response of the Mitchell's satyr to management activities at two sites.
3. Complete one site conservation plan for a Mitchell's satyr site.
4. Conduct surveys around extant and historic satyr sites in southern Michigan.
5. Transcribe and analyze data collected from surveys and monitoring activities.

Methods

Landowner Contact

In 2004, MNFI contacted landowners of occupied satyr sites as well as at sites with potential for satyr habitat during the month prior to the satyr flight. In addition, we worked closely with staff from Southwest Michigan Land Conservancy (SWMLC) to coordinate landowner contact at sites where their volunteers were conducting surveys. In the year 2004 a total of 35 individual landowners were contacted to request permission to survey their property for Mitchell's satyr and other fen associated species. Landowners were contacted by letter, telephone or in some cases by knocking on their door. Discussions with each landowner emphasized the importance of wetland communities, fens in particular, and the status of the Mitchell's satyr and other associated rare species. Photographs of the Mitchell's satyr butterfly, other butterflies which are often confused with the satyr and prairie fen habitat were copied and laminated and used when talking with landowners and describing the butterfly and its habitat. Landowners were asked to sign an authorization form, indicating their permission to allow us to conduct surveys on their property and stating our intent to hold the landowner harmless from liability for personal injury or property damage claims in connection with our activities. Copies of landowner authorization forms were carried by scientists when conducting satyr surveys and then later kept on file for future reference. Landowners that had a prairie fen on their property were provided with information emphasizing the value of this natural community and outlining activities that threaten fens and fen-associated plants and animals. Those individuals that had Mitchell's satyr on their land were informed of the status of the species and the significance of finding the satyr on their property. They were provided with information on how to manage their land in a way that will preserve or enhance the satyr's habitat and informed about activities that pose a threat to the satyr. Finally they were encouraged to contact us if they had any questions or concerns.

Satyr Surveys and Threat Assessments

Teams of two scientists conducted walk-through surveys of potential habitat during the satyr flight period. Surveys were conducted during optimal weather conditions, avoiding days that had significant wind or rain. Surveys were generally conducted in the late morning, late afternoon and early evening, avoiding the mid-day period since satyrs tend to be more sedentary during this time. Satyrs typically fly during a two to three-week period ranging from late June through mid-July (Lee 2000). Satyr activities (surveys, monitoring, and oviposition behavior study) in 2004 were conducted from June 17 to July 14. Observers walked in a meandering pattern looking forward, to the sides, and behind to increase the likelihood that all butterflies were seen. Particular attention was paid to areas containing fine-leaved sedges growing in association with low growing shrubs and tamarack (*Larix laricina*), seeps and springs, and small openings along streams and between the shrubs. Adult Mitchell's satyr butterflies are most easily confused with the eyed-brown (*Satyroides eurydice*), the Appalachian eyed-brown (*S. appalachia*), and the little wood satyr (*Megisto cymela*). Mitchell's satyr was distinguished from these similar species by its characteristic slow, erratic and low flight pattern, its smaller size and darker coloration, and the number and arrangement of eye spots on the wings. Individuals were identified as they flew or rested. Close-focusing binoculars were often used to aid in this identification and it was not necessary to capture butterflies with a net or handle them in any way. If a Mitchell's satyr was found, extreme care was taken to avoid trampling the vegetation in the event that eggs were present. Surveyors used existing game trails whenever possible to minimize impacts to the habitat. Photographs of sites and the habitat occupied by the satyr were taken and when possible, photographs of adult satyrs were taken as well.

A threat assessment was conducted at all occupied sites visited in 2004 by documenting current disturbances and noting potential threats. Threats may include: altered hydrology; off road vehicle (ORV) use; livestock grazing; shrub encroachment; development and land use changes; lack of landowner

interest in managing for the satyr; point and non-point sources of pollution; or the presence of invasive species such as purple loosestrife (*Lythrum salicaria*), reed canary-grass (*Phalaris arundinacea*), glossy buckthorn (*Rhamnus frangula*), and cattails (*Typha* spp.). Management needs also were identified.

An MNFI Mitchell's Satyr Survey Form was completed at each site where surveys were conducted for the butterfly. Recorded data included site information, land ownership, animal species observed, current disturbances, potential threats and detailed habitat descriptions. In addition an MNFI Special Animal Form was completed for any listed animals that were observed. Similarly an MNFI Special Plant Form or MNFI Natural Community Form was completed when a listed plant or high quality natural community was documented. Data were then entered into the MNFI Database (Biotics 4.02).

Surveys for Associated Rare Species

Observers were vigilant in searching for other rare plant and animal species while conducting Mitchell's satyr surveys at known or potential sites in 2004. Some rare animals and plants were found incidental to satyr behavioral observation work.

The state threatened poweshiek skipper (*Oarisma poweshiek*) occurs in prairie fen communities and its flight period overlaps (at least in part) with that of the satyr. Because of its affinity for nectaring on yellow flowers, surveyors carefully looked for this skipper on shrubs and plants, such as shrubby cinquefoil (*Potentilla fruticosa*) and black-eyed-susan (*Rudbeckia hirta*), while conducting satyr surveys.

The state special concern swamp metalmark (*Calephelis mutica*) is another fen inhabiting lepidopteran species. Its adult flight period also overlaps that of the satyr; however, it flies for an additional one to two weeks after the satyr flight ends. This species also shows an affinity for nectaring on yellow flowers so surveyors carefully looked for this butterfly on species such as black-eyed susan and shrubby cinquefoil. In addition, this butterfly exhibits moth-like flight behavior (flying and alighting under the surface of leaves) so surveyors walked through the fen looking for any lepidopteran which exhibited this behavior and occasionally tapped the stem of certain plants to potentially knock roosting butterflies from their perches. These surveys focused on areas with concentrations of the larval host plant, swamp thistle (*Cirsium muticum*). In addition, some time was spent looking for larval feeding damage on the thistles.

Surveys for the eastern massasauga rattlesnake (*Sistrurus c. catenatus*, SC), were conducted at all occupied satyr sites while doing surveys for the satyr. Although daily activity cycles appear to vary widely, they tend to be the most active during the warmest parts of the day in spring and fall. In the summer months they typically shift their activity periods to the cooler parts of the day and may even become nocturnal (Seigel 1986). Surveys for this species are difficult. When they are threatened, eastern massasaugas will typically remain motionless, relying on their cryptic coloration to blend into their surroundings. They are often difficult to see in the vegetation that occurs in their preferred wetland habitats. Thus, surveys are usually conducted by simply walking through suitable habitat during times of the year and times of the day when they are likely to be most active. During the numerous visits to occupied and potential satyr habitat that occurred in July, surveyors were always looking for massasaugas.

Mitchell's Satyr Monitoring

Individuals from the Mitchell's Satyr Working Group met on May 24, 1997 to discuss monitoring needs for the Mitchell's satyr. At that time it was agreed that Pollard transects conducted during the Mitchell's satyr flight period were the preferred method for monitoring this species (Pollard and Yates, 1993). The group also discussed a variety of factors that likely affect the number of adults seen during a Pollard walk and recognized the need to evaluate these factors. A Mitchell's satyr monitoring form was developed to document these factors as well as to record observations of satyrs and other butterflies. The group also identified priority sites where monitoring activities would be initiated. Monitoring was conducted at these sites in 1997, and 1998. On February 24, 1999 Working Group members agreed to re-evaluate the

effectiveness of Pollard counts and to consider using a different technique, potentially a timed area search (meander survey). Members agree to do both a Pollard count and timed area search at several sites in 1999 to evaluate the effectiveness of the Pollards and develop an index relating satyr numbers to the Pollard counts.

On January 19, 2000, the Working Group determined that it was important to conduct meander surveys at occupied sites on more than one occasion during the field season to more effectively monitor these populations. It was decided that visiting sites three times during the flight period and conducting timed meander surveys would provide valuable data on the distribution and number of butterflies and would help determine long-term site viability as well as reflect the impacts of various management activities.

Nine known occupied sites were monitored by MNFI staff in 2004 to assess the distribution and population status of the satyr using timed meander surveys. These sites include: Barry County South, Barry County Southwest, Berrien County East, Branch County Site, Cass County East, Jackson County East, Kalamazoo County North, St. Joseph County East and St. Joseph County West. MNFI staff assisted SWMLC on monitoring activities and survey efforts at Van Buren County Northwest. Assessments were conducted at these sites to document current and potential threats and to identify management needs.

Mitchell's Satyr Oviposition Observations

One of the goals of our current work is to better document female satyr concentration areas and to test the methodology of observing satyr oviposition under field conditions. These tasks have become increasingly important as we have begun to actively managing satyr occupied fens. Females were distinguished from males based on their larger average size, lighter coloration, and characteristic flight.

An Eastern Michigan University (EMU) graduate student conducted an intensive oviposition study at Jackson County Central. MNFI focused our oviposition observations at two other occupied sites where management is being planned; Barry County Southwest and Cass County East. These sites were re-visited during the second full week of the satyr flight. Over a 4 day period a total of 32 person hours were spent observing several different female satyrs in hopes of observing oviposition. When oviposition was observed, these locations were marked with wire flags, the location was recorded with a GPS unit and photos were taken of the eggs on the oviposition host. Representative plants that looked identical to the oviposition host were vouchered for identification purposes.

Results

Landowner Contact

MNFI received permission to conduct surveys at 15 sites which includes 34 properties. During visits to monitor the satyr, MNFI staff had many positive discussions with landowners, and 11 landowners from 8 satyr sites expressed that they are very interested in actively supporting conservation efforts for the satyr on their property. As a result, some of these landowners are pursuing management activities on their land through the support of the LIP biologist and the LIP program.

Site Conservation Plan

The site conservation plan for Deep Lake Fen in Barry County is nearly complete. A site visit was conducted during the late fall at Deep Lake Fen with the Stewardship Program Manager and the Stewardship Ecologist from MDNR Parks and Recreation Division, who are supervising fen restoration activities at this site. The management strategy has been determined, boundaries have been marked and restoration activities will commence in early 2005.

Work was initiated on the site conservation plan for Mill Creek Fen in Washtenaw County. A management strategy has been proposed for this site and contract discussions between the landowners, the LIP biologist and the contractor are currently in process. Once an agreement has been reached the plan will be completed and restoration work will commence at the site.

Surveys

In 2004 the flight occurred from June 17 through July 20. Visits to conduct surveys and monitoring for the Mitchell's satyr butterfly by MNFI were conducted at 15 sites on 34 properties. Ten of these sites are known occupied sites and were monitored by conducting timed meander surveys two to three times during the flight. Four of these ten sites are either currently undergoing fen restoration or are slated to have fen management activities initiated. Surveys were conducted at four sites that are associated with areas where satyrs are historically documented or are thought to have occurred in the vicinity at one time. In addition, a *de novo* survey was conducted at one site that appeared to have suitable habitat but that had no historical record for the satyr. See Appendix A for survey results.

Staff and volunteers from Southwest Michigan Land Conservancy conducted surveys for the satyr in 2004 at 6 known sites and also conducted *de novo* surveys at 3 sites. Barb Barton, an EMU graduate student, conducted a mark recapture study in 2004 at a site in Washtenaw County and an oviposition study in 2004 at the Jackson County Central Site.

Monitoring Activities at Managed Sites:

Barry County Southwest: The primary management need at this site is to reduce the encroachment of woody vegetation in the fen and open up areas that still contain a sedge understory. Monitoring was conducted at this site by MNFI staff on three occasions in 2004. Timed-meander surveys were conducted on June 29th and July 6th and oviposition observations were made on July 14th. Additional occupied habitat was discovered (approximately 1.0 acres) to the east of the known occupied site. An additional site visit was made by MNFI staff to provide expert review and help coordinate management activities with staff from MDNR Parks Division on November 17th. Occupied areas were delineated and areas slated for shrub control were marked with flagging as well as recorded with a GPS unit. As a result of the discovery of the new occupied patch, MDNR Parks and Recreation Division, Stewardship Staff will create a corridor to connect this area with the occupied patch located to the west. A total of 4.69 acres of habitat will be "opened up" as a result of the shrub removal which will occur during the winter of 2005.

Branch County Site: The primary management needs at this site are to reduce the amount of woody vegetation and to control or eliminate invasive species (particularly purple loosestrife) that are encroaching into the fen. Monitoring was conducted at five different times in 2004 to support and evaluate the management activities at this site. On March 10th two MNFI staff attended the purple loosestrife workshop at MSU, sponsored by Michigan Sea Grant, to be eligible to receive the purple loosestrife bio-control agent (leaf beetles in the genus *Galerucella*) to release at this site. They agreed to conduct spring and fall sampling at the release site so that the progress and impact of the release can be evaluated and the success or failure of the project can be determined.

On May 20th MNFI staff released 200 beetles in the northeast corner of the fen that has dense stands of purple loosestrife and established sampling quadrats. On June 17th MNFI staff conducted spring sampling at the release site. During this visit they documented the beginning of the flight period for the Mitchell's satyr butterfly (earlier than was expected) and then proceeded to conduct a timed meander survey of the eastern portion of the fen. Two additional timed meander surveys were conducted at this site on June 24th and July 8th. Finally, fall sampling of the beetle release site was conducted on August 4th by MNFI staff. It will be several years before the effectiveness of the beetle release can be evaluated as it generally takes 3-5 years for the beetles to impact the purple loosestrife.

During the summer, staff from SWMLC conducted clearing of shrubs and trees in “priority one” unoccupied areas in the northwestern portion of the fen to expand habitat and create a connecting corridor between the eastern and western portions of occupied habitat. GPS data of satyr locations acquired during timed-meander surveys were provided to SWMLC staff to help guide proposed management activities that they plan to initiate this winter in the southwest area of the fen. These areas will be monitored closely in subsequent years in order to evaluate the response of the vegetation (sedge growth) and the satyrs to the management.

Cass County East: The private conservation organization which owns this site requested that MNFI conduct surveys to determine which areas of the fen are currently occupied in order to guide their management strategies at this site. They would like to conduct shrub removal in the northwest corner of this site where satyrs were previously recorded but have not been documented for several years. Timed-meander surveys were conducted on July 2nd and July 13th and oviposition observations were conducted on July 13th. One satyr was documented ovipositing eggs and the location was recorded with a GPS unit. Additional occupied habitat (approximately 0.5 acres) was documented and this information was provided to the organization.

Jackson County Central: Jackson County Central was one of the original study sites identified for the current study. During 2003 an intensive mark-release-recapture study was conducted by a graduate student (Barton 2003, Barton and Bach 2005). An additional research project was undertaken here in 2004 to study the population ecology and oviposition of the Mitchell’s satyr (Baron and Bach 2004). Since both of these studies were being conducted here, MNFI’s focus shifted to studying additional occupied satyr sites slated for management.

Historical Sites:

Surveys were conducted at or in the vicinity of 4 sites where satyrs were documented historically. Surveys were conducted at a fen in the vicinity of Kellogg Biological Station (KBS) in Kalamazoo County where (we just recently learned) satyrs were documented in 1956. This fen has been mined for marl and the small amount of remaining fen habitat is too small to support the satyr. There are no remaining areas of fen at KBS to survey and it is assumed that this population has been extirpated.

Surveys were conducted at Lamberton Lake Fen and Emerald Lake Fen in Kent County. These two sites are believed to contain the only remaining fen habitat in the vicinity of the location where the satyr was recorded in Kent County in 1885. Very little suitable habitat was found at these sites although permission to access one parcel was not secured and may be pursued in 2005.

Two areas along a stream in Kalamazoo County where satyrs were last recorded in 1984 and 1968 were surveyed. A small area of suitable habitat was found at the location of the 1984 sighting but no satyrs were observed here. Intensive management would be needed at this site to restore the fen if satyrs were to be reintroduced here in the future, including restoring the hydrology of the area. The older historical site is very overgrown with shrubs and trees and has little if any potential for restoration. Satyrs do occur in a small area of fen along this stream just north of these historical locations (Kalamazoo County North) but the viability of this site is very poor due to the limited amount of suitable habitat.

Surveys were conducted at Cass County Northwest where satyrs were last recorded in 1993. No satyrs were recorded and limited suitable habitat is available. It is likely that the satyr is no longer present here.

New Site:

Surveys confirmed the presence of the Mitchell’s satyr at a new site in Berrien County (Berrien County East). Although we learned of this site several years ago, this was the first year that we were able to obtain permission to survey the site. The site was visited on two occasions by an MNFI zoologist and

ecologist and the satyr population and fen community were documented and described. A third site visit was made by a zoologist and conservation planner who met with the stewardship coordinator for the private land conservation organization which owns this site as well as a LIP biologist. Restoration strategies and activities were discussed and areas where the satyr was documented were marked. It is likely that management to control shrub growth and non native species will be initiated in 2005 at this site by the private land conservation with funding from the LIP program.

Additional occupied habitat identified at known sites:

Surveys at 5 known sites revealed additional areas of occupied habitat. Surveys at the Branch County Site documented satyrs in an area (approximately 1.3 acres) that was identified as potential habitat in the site conservation plan but where satyrs had never been previously recorded. This discovery will likely shift the management priorities outlined in the plan in order to create a connecting corridor between this area and adjacent occupied patches of habitat.

Surveys at Barry County Southwest resulted in the documentation of satyrs in a newly discovered area of fen habitat (approximately 1.0 acres) to the east of the known occupied site. As a result of this discovery, MDNR Parks and Recreation Division, Stewardship Staff will create a corridor to connect this area with the other occupied patch.

Additional occupied habitat was discovered at the Jackson County East site. The new area of occupied habitat (approximately 1.4 acres) is located approximately 0.06 miles (90 meters) west of the original area of occupied habitat.

Surveys at the Cass County East site owned and managed by a private conservation organization, revealed an additional area of occupied habitat (approximately 0.5 acres) to the east and north of the areas where the satyrs had previously been documented. This information was shared with the organization so they can incorporate this into their management strategy for this site.

MNFI assisted staff from Southwest Michigan Land Conservancy on a survey of an adjacent parcel at Van Buren County Northwest which had not been previously surveyed due to lack of landowner permission. The landowner provided access to his property in 2004. He accompanied the surveyors on one occasion and allowed them to conduct further surveys one additional time. Surveyors confirmed additional occupied habitat (approximately 5 acres) just west of the known area of habitat.

Associated rare species:

Several rare species associated with prairie fens were documented during surveys for the Mitchell's satyr in 2004 by MNFI and cooperators. MNFI staff recorded three rare plants at the newly documented site in Berrien County including cut-leaved water parsnip (*Berula erecta*), tuberous Indian plantain (*Cacalia plantaginea*) and edible valerian (*Valeriana ciliata*). Barb Barton, an EMU student documented an occurrence of Blanding's turtle (*Emys blandingii*) at the Washtenaw County site. SWMLC and MNFI staff surveyed additional habitat at Van Buren County Northwest and documented the occurrence of two rare animals; Eastern box turtle (*Terrapene c. carolina*) and Blanding's turtle (*Emys blandingii*) and three rare plants; cut-leaved water parsnip (*Berula erecta*), tuberous Indian plantain (*Cacalia plantaginea*) and edible valerian (*Valeriana ciliata*).

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This project would not be possible without the valuable assistance of the following individuals who helped to identify potential satyr habitat and, often under grueling field conditions, conducted satyr surveys: Yu Man Lee, MNFI Zoologist; Ryne Rutherford, MNFI Seasonal Zoology Intern; Ryan O'Connor, MNFI Botanist; John Paskus, MNFI Program Leader-Conservation Planning; Sara Schaefer, MDNR, SW MI Management Unit Supervisor for Wildlife, Christine Hanaburgh, MDNR Wildlife Biologist, Barry SGA; Steve Chadwick, MDNR Wildlife Biologist, Crane Pond SGA; Todd Hogrefe, MDNR Endangered Species Coordinator; John Lerg, MDNR Karner Blue Butterfly HCP Coordinator; Tamika Dandridge, Fish and Wildlife Biologist, USFWS; Chuck Mehne, Owner/Veterinarian, The Animal Clinic; Steve Hamilton, Associate Professor of Biology, MSU Kellogg Biological Station; Eric Thobaben, MSU PhD student; Larry Lyons, outdoor writer, Mogens Nielsen, MSU Department of Entomology and Larry West, nature photographer, author and teacher.

Many partners have been instrumental in providing access for surveys, assisting with surveys and/or planning and initiating management activities at satyr sites. They have worked closely with us to insure that proposed management is compatible with the satyr and that it provides for the long term health of the fen ecosystem. These include: Nate Fuller, Stewardship Coordinator and Jodi Simoes, Land Protection Specialist, Southwest Michigan Land Conservancy; Glenn Palmgren, Stewardship Ecologist and Ray Fahlsing, Stewardship Program Manager, MDNR Parks and Recreation Division; Sue Tangora, Dan Kennedy and Chris Hoving, MDNR LIP Program, Sherri Laier, Stewardship Director, Michigan Nature Association; Doug Powless, Science and Stewardship Coordinator, Land Conservancy of West Michigan; and Jack McGowan-Stinski, Land Steward-Fire Manager, The Nature Conservancy. Finally, Barb Barton, EMU graduate, assisted with satyr surveys and conducted her own research at two satyr sites in a highly professional and comprehensive manner. Her published findings have been very informative to us and the members of the Mitchell's Satyr Working Group.

Helen Enander, MNFI Information Technologist, has offered critical technical assistance related to the interpretation and analysis of data in ArcView, and has been incredibly patient with those of us who are GIS neophytes. John Paskus, Program Leader, Conservation Planning, provided helpful editorial assistance which improved this report. Finally we would like to thank Sue Ridge, Director of Administration, Lyn Scrimger, Project Manager and Connie Brinson, Administrative Assistant who provided help in the countless ways that aid in conducting and completing our work.

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APPENDIX A

Mitchell's Satyr Butterfly 2004 Survey Results

2004 Mitchell's Satyr Butterfly Survey Results

Site (Tract)	Date/Time Visit #1	Date/Time Visit #2	Date/Time Visit #3	# of Satyrs
Barry County South	6/29			19
		7/6		5
			7/7	2
Barry County Southwest	6/29			1
		7/6-1.5		3
			7/14-4	12
Berrien County East	7/2-1.5			15
		7/12-1		10
Berrien County South	7/6			15
Berrien County North	7/11			10
		7/13		7
Branch County- Tract (A)	6/17-1			22
		7/8-1.25		5
Tract (B)	6/24-4			74
		7/8-2.5		8
Cass County East-Tract (A)	7/2			11
		7/13-3		5
Tract B		7/13-1.5		1
Cass County Northwest	7/12-0.75			0
Cass County Southwest				
Tract (A)	7/8-0.75			0
Tract (B)	6/22-0.5			0
		6/30-0.5		1
Tract (C)	6/26-2			10
		7/1-1.25		9
Tract (D)	6/22-0.75			7
		6/30-1.25		18
Tract (E)	6/22-0.5			13
		6/30-0.75		11
Tract (F)	6/29-2			46
Tract (G)		6/30-0.5		2
Jackson County Central	6/22-6/26			38-m
Jackson County East	7/9-1			5
		7/14-2		10
Kalamazoo County North	6/28-1			0
		7/5-0.5		0
			7/11-0.75	0
Kalamazoo County West	6/30-1.5			4
		7/9-1.25		3
St. Joseph County West-private	6/29-1.75			10
		7/1-2		15
			7/6-1.25	11
State land	7/1-5			0

Site (Tract)	Date/Time	Date/Time	Date/Time	# of
	Visit #1	Visit #2	Visit #3	Satyrs
Van Buren County Northeast				
Site A	7/1-1			9
Site B	7/1			8
Site A & B		7/9-3.5		42
Washtenaw County West	6/21-7/11			32- marked
		7/20		1
Shaded areas represent sites where MNFI conducted surveys and monitoring				

APPENDIX B

Summary of 2004 Mitchell's Satyr Activities

Summary of 2004 Mitchell's Satyr Activities

Occupied Satyr Sites:

- Satyrs are **known to be extant at 15 sites** (all reconfirmed in 2004) in Barry, Berrien, Branch, Cass, Jackson, Kalamazoo, St. Joseph, Van Buren and Washtenaw counties. **One of these sites is a new site confirmed in Berrien County!**
- Satyrs are **presumed to be extant at 1 site** (confirmed in Jackson County in 2000, no surveys since).
- Satyrs have **potential to be extant at 2 additional sites** – last observed in 2003 in Kalamazoo and in 1993 in Van Buren County (permission to survey had been denied by landowner at Van Buren site).
- Satyrs are **believed to be extirpated at 3 sites** in Cass, Kalamazoo and Lenawee counties (last observed in 1993, 1978, and 1980 respectively).

Surveys:

1) MNFI- Conducted multiple surveys (2-3 visits) at **10 known satyr sites** (large habitat complexes with multiple landowners) in 6 southern Michigan counties. The satyr was confirmed from **1 new site** in Berrien County (MNA property). The satyr was discovered occupying additional habitat at two sites in Barry and Jackson County. MNFI also conducted de novo surveys at **10 sites** in Barry, Berrien, Jackson, Kalamazoo, Kent and St. Joseph counties but did not find the satyr.

2) Barb Barton (EMU- Graduate Student)- Conducted a mark-recapture study at **1 site** in Washtenaw Co. and an oviposition study at **1 site** in Jackson County.

3) Southwest Michigan Land Conservancy (SWMLC) - Conducted multiple surveys (2-3 visits) at **6 known satyr sites** (large habitat complexes with multiple landowners) in 4 southern Michigan counties. The satyr was discovered occupying additional habitat at 2 sites (Berrien and Van Buren Counties). SWMLC also conducted de novo surveys at **2 sites** in Cass and in Kalamazoo County but did not find any new populations.

4) MDNR Wildlife Biologist's and LIP Program- Assisted with surveys at **10 sites**.

5) USFWS Conducted a survey at **1 site** in Berrien County.

Total: 17 known satyr sites surveyed by 5 groups, (satyrs recorded at 15 sites)

Associated Fen Species:

- Box turtles (*Terrapene c. carolina* SC) - 3 individuals at 2 satyr sites in Berrien and Cass counties.
- Massasauga rattlesnake (*Sistrurus c. catenatus*) – at one satyr site in Cass County.
- Blanding's turtle (*Emys blandingii*) at one satyr site in Washtenaw County.
- Cut-leaved water parsnip (*Berula erecta*) at one satyr site in Van Buren County
- Edible valerian (*Valeriana edulis*) at one satyr site in Van Buren County
- Prairie Indian-plantain (*Cacalia plantaginea*) at one satyr site in Van Buren County.

Landowner contact:

- MNFI received permission from a landowner at a site in Branch County to initiate purple loosestrife control by releasing the *Galerucella* beetle.
- MDNR-LIP Biologist's have met with many landowners and organizations in several counties to discuss habitat mgt which is currently being initiated.
- MNFI, Barb Barton, and an MDNR- LIP Biologist visited a landowner at a site in Washtenaw County to discuss management opportunities.
- SWMLC received permission to begin habitat management from one landowner in Berrien County, one landowner in Van Buren County, and six landowners in Cass County.

Local stewardship:

- MNFI released the *Galerucella* beetle at a **satyr site** in Branch County and conducted spring and fall monitoring as required by requirements of The Purple Loosestrife Project administered by MSU.
- SWMLC conducted management at **4 sites in 4 counties**. This included brush removal, herbicide application and corridor creation.
- TNC conducted management at **2 sites in 2 counties**.

Site Conservation Planning:

MNFI and SWMLC completed site conservation plans for **9 sites** in Southwest Michigan and will complete 5 additional plans by September of 2006.

Future Funding:

MNFI has received funding from USFWS Sec. 6 (through FY 2005) to 1) conduct monitoring of sites receiving management, 2) to conduct surveys at historic sites and 3) to complete site conservation plans for remaining sites. TNC and SWMLC have received funds from the Private Stewardship Grant through USFWS to work with local landowners to implement or continue stewardship activities on their land. SWMLC has to apply for a grant through the Landowner Incentive Program to support additional management at multiple sites. SWMLC has received a grant through USFWS Sec. 6 to purchase a parcel of land which is occupied by the satyr. SWMLC and TNC are discussing a collaborative proposal for an additional Private Stewardship Grant for work in 2005.