Laying the Foundation for Establishment of New Mitchell's Satyr (*Neonympha mitchellii mitchellii*) Populations in Indiana and Michigan and Securing Populations through Updated Species Management Plans

Interim Performance Report
January 1, 2015 - June 30, 2015

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Cover photograph: Mitchell's Satyr, Washtenaw County, MI. Mark Carlson

MNFI Progress Report: January 1, 2015 – June 30, 2015

Project Description:

The purpose of this project is to continue progress made in Year 1 by helping to secure Mitchell's satyr populations at 3 additional viable sites and to lay the groundwork for the introduction of MS at an introduction site where suitable habitat has been restored. These efforts in Year 1 and 2 will result in having updated management plans for 7 viable MS sites as well as 2 potential introduction sites.

Statement of Work

1) Prepare site conservation plans at 3 viable or potentially viable sites and one proposed introduction site; 2) Evaluate the population status at sites proposed for collection or translocation of MS to determine if the numbers meet the threshold criteria for collection; 3) Coordinate with Mississippi Entomological Museum for screening of MS eggs or larvae to determine *Wolbachia* status, 4) Evaluate population status at 6-8 additional sites; 5) Conduct analysis and assessment of potential introduction sites in Michigan and provide recommendations to MS Working Group; and 6) assist with coordination of MSB Working Group tasks;

Comparison of Actual Accomplishments with the Goals and Objectives of the Award

1) Prepare site conservation plans at 3 viable sites and one proposed introduction site

We decided to update management plans for the following 3 viable or potentially viable sites: Cedar Creek/Lime Lake Fen (Van Buren County), Sarett Nature Center (Berrien County) and Tamarack Swamp (Cass County). We determined that useful information could be gathered during Mitchell's satyr surveys in July of 2015 that would be useful for updating and revising current plans for these sites. We decided to gather this information (e.g. updating threats such as invasive species, Mitchell's satyr distribution at the site, photos of the site, etc.) and complete the plans in the fall of 2015 and winter of 2016. In addition we determined that a plan will be developed for 1 potential introduction site. We will provide recommendations for potential Michigan introduction sites to the Mitchell's satyr working group in the fall of 2015 and then will develop a plan for the site that is chosen.

2) Evaluate the population status at sites proposed for collection or translocation of MS to determine if the numbers meet the threshold criteria for collection.

Staff from the Toledo Zoo communicated that they would like to collect Mitchell's satyr for captive rearing from the Coldwater Fen site in Branch County as it was more convenient to collect and return butterflies from this site. An evaluation of the population at Coldwater Fen was conducted on June 28, 2015 by four people. We documented 148 Mitchell's satyr in one portion of the fen (approximately 1/3 of the total area of occupied habitat). We communicated this information to Tameka Dandridge, USFWS as well as Peter Tolson from the Toledo Zoo and recommended that collection from this site should begin shortly after peak flight during the first week of July.

3) Coordinate with Mississippi Entomological Museum for screening of MS eggs or larvae to determine *Wolbachia* status.

A purchase order was developed to contract with the Mississippi Entomological Museum at Mississippi State University to conduct an analysis of Mitchell's satyr adults, larvae or eggs for the intracellular DNA *Wolbachia* virus. Communication between Peter Tolson, Toledo Zoo and Jennifer Seltzer and JoVonn Hill, Mississippi Entomological Museum was facilitated so that arrangements could be made for the collection, preservation and shipment of this genetic material to the museum for analysis.

4) Evaluate population status at 6-8 additional sites.

Arrangements were made with MNFI staff and partners to conduct surveys of 12 sites in July 2015 to evaluate population status. Results will be provided at the fall Mitchell's satyr working group meeting and in the subsequent interim performance report.

5) Conduct analysis and assessment of potential introduction sites in Michigan and provide recommendations to MS Working Group.

MNFI staff met to discuss a process for prioritizing fens for reintroduction. The analysis of fens that was conducted in 2010 was reviewed and we decided to repeat this analysis after updating the rankings of fen element occurrences, adding additional information about some of the fens and taking advantage of recently developed GIS layers to assist with our evaluation. A total of 155 fen element occurrences were analyzed and given a score between 0 and 6 within the following categories: Size of site; Condition/Quality; Local matrix of compatible habitat; Landscape matrix of compatible habitat; Site ownership and Distance to occupied habitat (Appendix 1). The sites were then ranked in order from a high cumulative score of 26 to a low cumulative score of 6. This analysis provided some guidance in choosing sites to visit for an on-the-ground site evaluation.

In addition we ranked the fen sites based on their distance (<400 m) to agricultural lands (corn and soybean crops) that are likely treated with neonicotinoid pesticides since the relationship between the use of these pesticides and the decline of butterflies is being evaluated.

Arrangements were made with MNFI staff and partners to identify and conduct surveys of potential introduction sites between July and October of 2015. Recommendations will be made at the fall Mitchell's satyr working group meeting.

6) Assist with coordination of MSB Working Group tasks

Assistance was provided to Tameka by providing input on the agenda for the spring Mitchell's satyr working group meeting on March 24, 2015. Prior to the meeting an updated satyr distribution map was provided to Scott Hicks as a reference material for the process of designating the Mitchell's satyr an experimental population at the proposed introduction sites. The matrix for site selection criteria was provided to Tameka o assist with the discussion of selecting a potential introduction site in Michigan. Finally, the table depicting current trends for Mitchell's satyr sites was updated and distributed at the meeting.

Appendix 1

Matrix for Site Selection & Prioritization for Potential Satyr Introduction, Augmentation or Reintroduction

Matrix for Site Selection & Prioritization for Potential Satyr Introduction, Augmentation or Reintroduction

PRIMARY CRITERIA	*DESCRIPTION*	*JUSTIFICATION*	*SCORING METHODOLOGY*	*DETAIL*	*Pts*
GIS analysis					
Size of Site	**Acres of fen habitat**	Larger sites can provide refugia from stochastic events and incompatible land use and may contain more varied microclimates and greater biodiversity.	Calculate size of fen polygon	Small-<10 ac	0
				Medium- 11-50 ac	2
				Large 51-150 ac	4
				Very Large >150ac	6
Condition, Quality	**Integrity of hydrology**- % of fen with intact hydrology (i.e not directly impacted by roads, ponds, ditching, drain tiles, etc.)	Intact hydrology is critical ecological process for maintaining fens and providing the proper microclimate for satyrs. Altered hydrology is linked to loss of species & vegetation change.	Buffer channelized streams, ditches and roads and calculate % of fen impacted	Highly Disturbed > 30%	0
				Medium Dist- 11-30%	2
				Low Disturbance-<10%	4
Local Matrix of Compatible Habitat	**Percentage of Undeveloped Land** within a 100 meter buffer around fen site.	Fens with a greater buffer of undeveloped land are less vulnerable to negative effects from nutrient loading, sedimentation, invasive species, grazing and ORV use.	Calculate % of land that is developed within 100m - Anderson layers (ag, res, comm, indust.)	< 10 %	0
				11-25%	2
				26-50%	4
				> 50%	6
Landscape Matrix of Compatible Habitat	Wetland is buffered **from agriculture, development and roads with natural community vegetation (2mi)**	Fens within a compatible habitat matrix are less vulnerable to threats to water quality and incompatible human activities.	Calculate % of land that is undeveloped within 2 miles – (Anderson layers)	<38%	0
				38-52%	2
				53-67%	4
				68-100%	6
Field analysis					
Condition and Quality	Native Fen Vegetation- **Percent cover of native vegetation**	The greater the % of native vegetation, the less impacted the fen is by non-natives and invasives which could out-compete the native flora.	Visit site and collect/estimate this data and/or review community field forms	<50%	0
				51-75%	2
				76-90%	4
				<90%	6
SECONDARY CRITERIA	*DESCRIPTION*			*DETAIL*	*Pts*
GIS analysis					
Site Ownership	**Percentage of land that is public land or owned by a conservation organization**	Land in conservation ownership by a public or nonprofit organization is less vulnerable to incompatible land use and more likely to receive stewardship.	Calculate using CARL data layers of ownership supplemented with knowledge of sites not in CARL	0-25% public/cons. owned	0
				26 -50%% public/conservation owned	2
				51-75% - public or conservation owned	4
				>76% in public or conservation ownership-	6
Distance to Occupied Site	**Distance of fen from currently occupied Mitchell's satyr site**	Sites closer to occupied sites have the potential to be reconnected	Calculate distance of fen polygon to satyr site polygon	> 5miles from occupied site	0
				1-5 miles from occupied site	2
				500-1600 m. from occ.site	4
				<500 meters from occ. site	6