

**NRCS-NHACD**  
**DEMONSTRATION PROJECT**  
**POLLINATOR HABITAT ENHANCEMENT PROJECT**  
**September 2022**

**Introduction:**

The Rockingham County Conservation District (RCCD) collaborated with several partners including Strafford County Conservation District (SCCD), The Nature Conservancy of New Hampshire (TNC), The Xerces Society for Invertebrate Conservation (Xerces), NH Fish and Game (NHFG), and the Natural Resources Conservation Service (NRCS) that assisted with the management and conservation practices implemented at each site selected to enhance common milkweed (*Asclepias syriaca*) stems. The monarch butterfly (*Danaus plexippus L*) requires milkweed species to complete its lifecycle and common milkweed can be found in a variety of landscapes and soil types across New Hampshire. Milkweed is utilized by monarchs as both a host plant for monarchs during their egg and juvenile caterpillar stage and as a nectaring source to feed monarch adults.

In an effort to demonstrate practical management practices this project was developed to test if different mowing regimes increased, decreased or maintained the density of common milkweed stems. Traditionally, fields and field edges have been important habitat types where common milkweed flourishes, and generally fields have been mowed at varying times for hay production. We hypothesized that early season mowing practices would be an effective way to enhance existing milkweed/pollinator habitat. It was also expected that the results of this demonstration project would allow NRCS to utilize this information to develop a conservation standard for landowners to implement on their fields.

**Project Goals:**

The original proposal included demonstrating new methods to increase the number of stems of common milkweed using a variety of methods including early season mowing and late disking to enhance existing milkweed habitats, however the only method that was achievable for all sites was early mowing. Initially, the following sites were included: Great Bog Wildlife Management Area (WMA), Portsmouth; Brentwood Game Farm WMA, Brentwood; Saltbox Farm, Stratham; TNC Lubberland Creek, Newmarket; and Strafford County Farm, Dover. The Xerces Society staff assisted in developing conservation treatment plans and templates for monitoring mowed and un-mowed plots in 2019. Those templates were utilized to be the best of each collaborator's ability, with

some challenges in plot selection, size, and consistency that occurred during the progression of the project.

Toward the end of the project timeframe four sites persisted. Based on equipment and labor availability only early mowing practices were completed for each site. For 2022, the following sites were included in the demonstration project and included: Great Bog Wildlife Management Area (WMA), Portsmouth; TNC Lubberland Creek, Newmarket; Strafford County Farm, Dover, and Wagon Hill, Durham. Please see attached spreadsheet with all common milkweed stem data collections throughout the project duration with representative figure 1.

### **Project Locations & Objectives as of 2018-2022:**

#### **Great Bog, Portsmouth & Brentwood WMAs**

- Both Great Bog and Brentwood WMAs received invasive control practices in June & Sept 2018 to control the invasive plant black swallow-wort (*Cynanchum nigrum*) that can be attractive to egg-laying female monarchs, however studies show that 100% of the resultant caterpillars do not survive, which effectively acts as a “sink” for Monarchs. Black swallow-wort acts as an unwanted trap crop. Please see attached herbicide spreadsheet for timing of all invasive control practices.



Figure 1: Great Bog Milkweed site, July 2021

- Brentwood WMA was removed from the initial site list as it was sold by NHFG. 2019:



Figure 2: Great Bog Milkweed site, mowed, June 2022

### Saltbox Farm, Stratham NH:

- This site was removed in 2018 due to lack of milkweed stands.

### TNC Lubberland Creek, Newmarket:



Figure 3: TNC after herbicide treatment of Spotted knapweed, August 2019

- Two monitoring plots were set up in July 2018. This site received invasive control practices in August 2018 to control spotted knapweed (*Centaurea stoebe L.*). Please see attached herbicide spreadsheet for timing of all invasive control practices.
- Additional funding from the NH SCC involved the TNC site, which provided additional match and pollinator enhancements at this site that included invasive plant control, planting additional common milkweed seedlings, and new pollinator plots



Figure 4: TNC site, common milkweed seedlings planted adjacent to plots, June 2020



Figure 5: TNC mowed plot, June 2020.



### **Strafford County Farm, Dover:**

- Practices included setting up two plots for this site in 2018. Unfortunately, the plots were inadvertently mowed, and the demonstration project was relocated to another area on site. This site has an abundance of milkweed stands. This site received no invasive control practices.



- Two new plots were set up in 2019.

*Figure 5: Strafford plot in process of mowing, June 2022.*



*Figure 6: Strafford un-mowed plot, September 2021.*

### **Wagon Hill, Durham:**

- A new site that was initiated in 2019. Plots were inadvertently incorrectly mowed in 2020, and then re-staked in 2021, with an additional three plots added to the southern side of the trail.



*Figure 7: Wagon Hill mowed plot, June 2022.*

### **Emery Farm, Greenland:**

This site was added in 2019, and then removed due to woody vegetation challenges, invasive plant challenges, and the high density of poison ivy.

### **Complexities of Project Locations & Objectives:**

There were several challenges that were encountered during the length of the pollinator demonstration project. Those challenges included, inadvertent mowing mishaps, differing opinions on conservation practices, ability to access mowing machinery and labor to complete mowing at a similar timeframe each year; as well as using different types of machinery and at different heights to mow. Additionally, encroachment of invasive species; monitoring plots being moved or relocated from initial locations; weather that included two droughty summers; and of course, the challenges of COVID-19 with differing protocols for each collaborator and site access. Nonetheless, we persevered through various challenges, and were able to gather a meaningful amount of data over four sites that remained consistent for three sites throughout the project lifespan.

### **Results/Lessons Learned:**

Site walks with Xerces, and NRCS, and partners were completed to determine practices and challenges at each site. On average, sites that were mowed early had a greater number of milkweed stems over the data collection period, except for the Strafford County Farm site (Figure 1). There are many other factors that influenced each site, and each mowing and monitoring practice. It is interesting to note that for two sites, the highest common milkweed mowed counts were in 2019, and lowest (with one glitch) took place in 2022 during a drought summer (Figure 2). It is also interesting to notice that there is an overall decline in common milkweed numbers from 2019 to 2022 at several sites (Figure 2). This is disturbing news, given that the monarch butterfly will likely be a federally endangered species in the near future. We are hopeful that there will be more studies or demonstrations focused on enhancing monarch habitat.

It is recommended that another demonstration or pilot project be completed that includes additional analysis to see if these methods are statistically significant and test a similar hypothesis over a few of the stable sites during upcoming years and weather patterns. Additional improvements could include soil analysis, timing of mowing, height of mowing, and standardized experimental design (numbers and sizes of plots) to promote statistically stronger data collection. It is now more important than ever to promote extensive common milkweed habitat areas and studies to assist in managing more breeding habitats in our region. Promoting additional conservation practices aimed at contributing to the health and prosperity of the migratory population of monarch butterflies will only benefit the species and should be a major focus for future efforts.

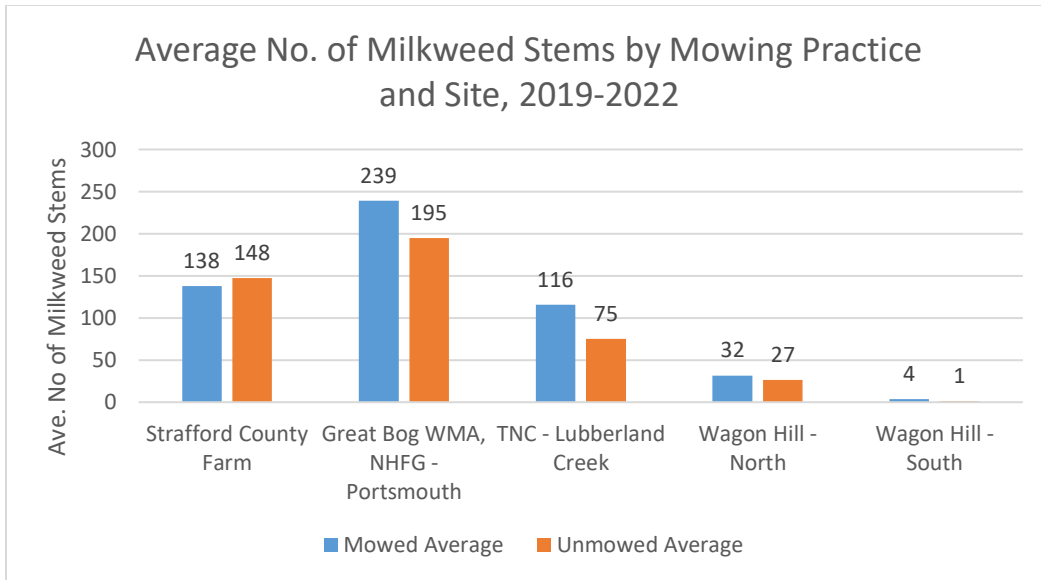


Figure 1. Average number of milkweed stems over all sites in all years that data was collected from 2019-2022





Map compiled by the RCCD July, 2021

0 25.5 51 102 Feet



**Legend**

-  Unmowed Plots
-  Mowed Plots



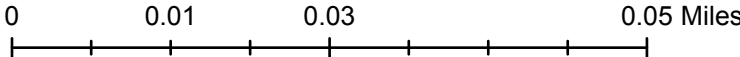
# TNC Pollinator Plots for Milkweed Project



PollinatorPlot\_Corners



Pollinator Plots





# Stafford County Map with pollinator plot locations re-located for 2019





### Three Milkweed Plots

**Wagon Hill Farm  
Durham, NH**

**Each Plot = 10 feet x 75 feet**

**Each plot is marked with flagged grade stakes at each corner**

**Control Plot #3 - NO MOW - is separated from the two mow plots**



Map by Ibis Wildlife Consulting

September 3, 2019



**Milkweed Data - Pollinator Demonstration 2019- 2022**

Strafford County Farm	2019			2020			2021			2022			High Count	Low Count	Average
	Mow Date	Count Date	# Milkweed	Mow Date	Count Date	# Milkweed	Mow Date	Count Date	# Milkweed	Mow Date	Count Date	# Milkweed			
ALL SET	-	9/2/2019	184	6/11/2020	8/26/2020	175	6/6/2021	9/3/2021	102	6/17/2022	9/14/2022	90	184	90	137.75
Block 1, Mowed	-	9/2/2019	167		8/26/2020	164		9/3/2021	132		9/14/2022	127	167	127	147.5
Block 2, Not Mowed	-	9/2/2019													
=															
Great Bog WMA, NHFG - Portsmouth	2019			2020			2021			2022			High Count	Low Count	Average
	Mow Date	Count Date	# Milkweed	Mow Date	Count Date	# Milkweed	Mow Date	Count Date	# Milkweed	Mow Date	Count Date	# Milkweed			
Block 1, mowed (E)	N/A	8/22/2019	297	6/3/2020	8/18/2020	282	5/25/2021	9/3/2021	71	6/10/2022	9/14/2022	22	297	22	168
Block 2, mowed	N/A	8/22/2019	93	6/3/2020	8/18/2020	87	5/25/2021	9/3/2021	49	6/10/2022	9/14/2022	55	93	49	71
<b>TOTAL COUNTS</b>			<b>390</b>			<b>369</b>			<b>120</b>			<b>77</b>			<b>239</b>
Block 3 Not Mowed	N/A	8/22/2019	202		8/18/2020	162		9/3/2021	51		9/14/2022	33	202	33	112
Block 4, Not Mowed (W)	N/A	8/22/2019	191		8/18/2020	107		9/3/2021	20		9/14/2022	13	191	13	82.75
<b>TOTAL COUNTS</b>			<b>393</b>			<b>269</b>			<b>71</b>			<b>46</b>			
TNC - Lubberland Creek	2019			2020			2021			2022			High Count	Low Count	Average
	Mow Date	Count Date	# Milkweed	Mow Date	Count Date	# Milkweed	Mow Date	Count Date	# Milkweed	Mow Date	Count Date	# Milkweed			
Block 1(a) Not-Mowed	< 6/15/2019	9/9/2019	47		8/26/2020	49		9/7/2021	53		9/12/2022	39	53	39	47
Block 1(b) Not-Mowed		9/9/2019	34		8/26/2020	56		9/7/2021	34		9/12/2022	30	56	30	38.5
Block 1(c) Not-Mowed		9/9/2019	26		8/26/2020	28		9/7/2021	22		9/12/2022	44	44	22	30
<b>TOTAL COUNTS</b>			<b>107</b>			<b>133</b>			<b>109</b>			<b>113</b>			
Block 2(a), Mowed	< 6/15/2019	9/9/2019	27	<6/15/2020	8/26/2020	42	<6/15/2021	9/7/2021	21	<7/1/2022	9/12/2022	17	42	17	26.75
Block (b) Mowed	< 6/15/2019	9/9/2019	23	<6/15/2020	8/26/2020	37	<6/15/2021	9/7/2021	26	<7/1/2022	9/12/2022	17	37	17	25.75
Block 2( c) Mowed	< 6/15/2019	9/9/2019	24	<6/15/2020	8/26/2020	26	<6/15/2021	9/7/2021	18	<7/1/2022	9/12/2022	23	26	18	22.75
<b>TOTAL COUNTS</b>			<b>74</b>			<b>105</b>			<b>65</b>			<b>57</b>			
Wagon Hill, Durham	2019			2020			2021			2022			High Count	Low Count	Average
	Mow Date	Count Date	# Milkweed	Mow Date	Count Date	# Milkweed	Mow Date	Count Date	# Milkweed	Mow Date	Count Date	# Milkweed			
North Side of Trail															
Block 1, Mowed	< 6/15/2019	8/16/2019	73	N/A	N/A	N/A	N/A	9/30/2021	4	6/14/2022	8/16/2022	2	4	2	3
Block 2, Mowed	< 6/15/2019	8/16/2019	84	N/A	N/A	N/A	N/A	9/30/2021	6	6/14/2022	8/16/2022	4	6	4	5
<b>TOTAL COUNTS</b>			<b>157</b>						<b>10</b>			<b>6</b>			
Block 3, Not Mowed	-	8/16/2019	73				N/A	9/30/2021	2	6/14/2022	8/16/2022	5			
South Side of Trail	2019			2020			2021			2022			High Count	Low Count	Average
	Mow Date	Count Date	# Milkweed	Mow Date	Count Date	# Milkweed		Count Date	# Milkweed	Mow Date	Count Date	# Milkweed			
Block 4, Mowed	N/A	N/A	N/A	N/A	N/A	N/A	N/A	9/30/2021	5	6/14/2022	8/16/2022	1	5	1	3
Block 5, Mowed	N/A	N/A	N/A	N/A	N/A	N/A	N/A	9/30/2021	4	6/14/2022	8/16/2022	1	4	1	2.5
<b>TOTAL COUNTS</b>									<b>9</b>			<b>2</b>			
Block 6, Not Mowed	N/A	N/A	N/A	N/A	N/A	N/A	N/A	9/30/2021	0	6/14/2022	8/16/2022	3	3	0	1.5

Site:	The Nature Conservancy					NHFG-Great Bog		
Year:	2018	2019	2020	2021	2021	2018	2018	2019
Month:	August	June	August	June	August	July	September	June
Practice/Site Prep:	RCCD Staff completed herbicide treatment to knapweed @ 1.25 +/- acres using milestone, August 20 2018	RCCD Staff completed herbicide treatment to spotted knapweed on June 5, 2019 @ 2.3 acres using milestone and on June 7, 2019 @ 2 acres using milestone	RCCD Staff completed herbicide treatment to spotted knapweed on August 20, 2020 @ 4.5 acres using milestone, and on August 24, 2020 @ 3.4 acres using milestone (partial NH SCC assistance)	RCCD Staff completed herbicide treatment to Oriental bittersweet on June 24, 2021 @ 0.25 acres using Rodeo around pollinator plots	RCCD Staff completed herbicide treatment to Spotted Knapweed on 1.5 acres on August 18, 2021	RCCD Staff completed herbicide treatment using vastlan/milestone to blackswallow wort on 7/2/18 @ 3.25 acres	Planned 2nd treatment using rodeo at end of September 19, 2018 @ 3.25 acres	RCCD Staff completed herbicide treatment to blackswallow wort 6/12/19 @ 2.5 acres using vastlan/milestone/escort mix
# Plots (strips-10' x 75'):	6					6	6	

Site:	Strafford County Farm		NHFG-Brentwood	
Year:	2018	2019	2018	2018
Month:	N/A	N/A	June	September
Practice/Site Prep:	Pre-treat wth selective monocot herbicide application - NOT COMPLETED 2018 -2022	Pre-treat wth selective monocot herbicide application - NOT COMPLETED at all	RCCD Staff completed herbicide treatment using vastlan/milestone to blackswallow wort 6/29/18 @ 1.75 acres	Planned 2nd treatment using with vastlan/escort/mileston and polaris on Sept 6, 2018 @1.75 acres followup
# Plots (strips-10' x 75'):	6		3	3