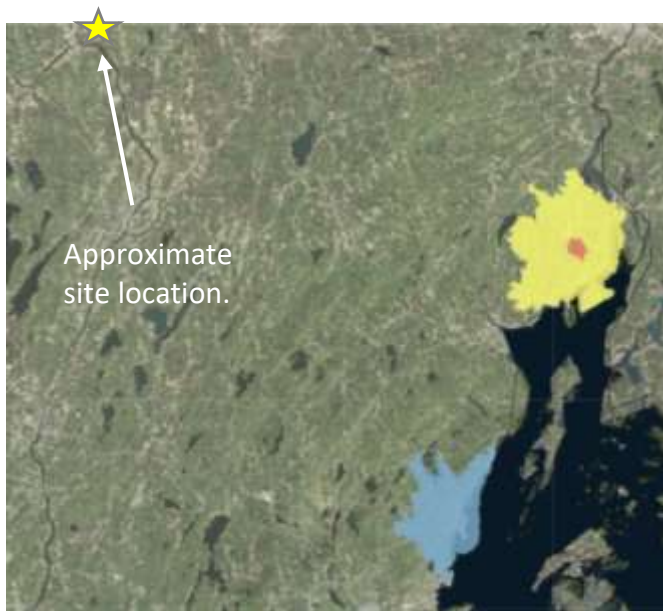


The Xerces Society for Invertebrate Conservation

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Date: 12/17/2018
To: Nancy Williams
Cc: Tony Jenkins, Kelly Gill, Jeremy Markuson
Re.: Pollinator Conservation Trip Report

BACKGROUND AND SITE INFORMATION				
Nancy Williams, Executive Director / Somerset Woods Land Trust; Parsons Family Preserve / Skowhegan, Maine / somersetwoodstrustees@gmail.com		Attended By: Nancy Williams, Eric Venturini	Site Visit Date: 09/14/2018	Program: CTA
<p>Site Description: Somerset Woods Land Trust owns a small, 27-acre parcel along Malbons Mill Road in Skowhegan. The subject of this visit is a 13-acre open field that is part of the larger parcel. This field was managed for years by regular mowing prior to SLT ownership. In 2010 the owners began a reduced mowing management strategy, and quickly thereafter chokecherry (<i>Prunus virginiana</i>) began to encroach the site. To manage this 13-acre field as pollinator habitat, the chokecherry must be controlled. The trust hopes to increase the diversity of flowering plants in the meadow for the benefit of pollinators.</p> <p>At this time, this site visit and this trip report are intended as Conservation Technical Assistance. The preserve has no plans on applying for NRCS cost-share assistance.</p>				
POLLINATOR HABITAT MANAGEMENT POSSIBILITIES				
Site	Actions	Site Prep.	Seeding	Operations and Maintenance
13-acre meadow	Control chokecherry	Multiple possibilities outlined below	N/A	Brush Hog entire meadow once per year.
13-acre meadow	Possible wildflower planting (depending on chokecherry control method used)	Herbicide and/or cultivation	Fall	Brush Hog entire meadow once per year.



Map 2. USFWS designated priority zones for the rusty patched bumble bee (*Bombus affinis*). Red polygon indicates High Priority Zone. Yellow polygon indicates a Primary Dispersal Zone, based upon the HPZ. Blue polygon indicates a low potential zone.

Client Objectives

Land management recommendations to maximize benefit of meadow for pollinators and control chokecherry.

Endangered Species

This site is not within a USFWS Priority Zone for the endangered, rusty patched bumble bee (*Bombus affinis*). Parson Family Preserve is approximately 40 miles from the most recent, 2009, sighting of the species in Maine (indicated in Map 2 at left by a red polygon). If the species recovers, or if populations are discovered in the area, the rusty patched bumble bee may use the habitat on this site as nesting, overwintering, and forage habitat.

The yellow banded bumble bee (*Bombus terricola*) is highly likely to exist on the site. The yellow banded bumble bee is ubiquitous across Maine and the USFWS is considering listing it as endangered and will make a listing decision this

year (2018). Pollinator habitat enhancements here would have a positive effect on this rare and declining species, the yellow banded bumble bee.

The monarch butterfly (*Danaus plexippus*) exists on the site. The monarch butterfly is currently under a Species Status Assessment by the USFWS. The USFWS will make a listing decision for the species in June of 2019. Managing and improving existing pollinator habitat on site would have a positive benefit to the species.

Existing Habitat Quality

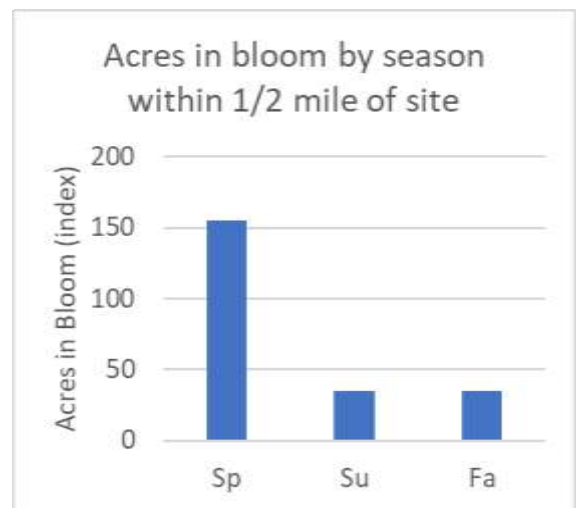
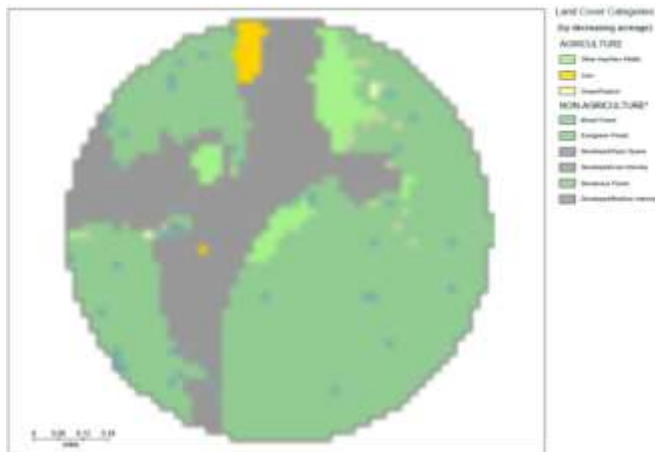
The meadow habitats existing on site serve as prime habitat for pollinators. During the site visit, I recorded five different genera of native bees. Considering that the site visit was in September, this indicates that the meadow probably supports a very high diversity of native pollinators. Unfortunately, this habitat is at risk from the encroachment of choke cherry (*Prunus virginiana*). Choke cherry is a valuable spring flowering native tree/shrub for spring pollinators. However, its encroachment precedes the shift of this open meadow community to forest and over time will decrease the diversity and abundance of flowering plants in the meadow. To manage this habitat for pollinators, management activities should first control this species. Multiple possibilities are described below to help achieve this.

Landscape Site Assessment (next page)

Landscape analysis (below) illustrates that, despite existing meadows, the bloom of this landscape is heavily weighted towards the spring. This is due to the high component of mixed (hardwood and softwood) forest in the surrounding landscape.

Land use and bloom phenology within 0.5 miles of site									
Land Use	Acres	%	Bloom Score			Bloom Score * Ac			
			Sp	Su	Fa	Sp	Su	Fa	
Corn	5.8	1.12%	0	0	0	0	0	0	
Other Hay/Non Alfalfa	26	5.02%	0.5	1	1	13	26	26	
Developed/Open Space	63.8	12.31%	0	0	0	0	0	0	
Developed/Low Intensity	46.9	9.05%	0	0	0	0	0	0	
Developed/Medium Intensity	36.9	7.12%	0	0	0	0	0	0	
Developed/High Intensity	0.4	0.08%	0	0	0	0	0	0	
Barren	0.4	0.08%	0	0	0	0	0	0	
Deciduous Forest	44	8.49%	1	0	0	44	0	0	
Evergreen Forest	110.8	21.39%	0	0	0	0	0	0	
Mixed Forest	169.5	32.72%	0.5	0	0	84.75	0	0	
Shrubland	3.6	0.69%	1	1	1	3.6	3.6	3.6	
Grass/Pasture	0.7	0.14%	0.5	1	1	0.35	0.7	0.7	
Woody Wetlands	9.3	1.80%	1	0.5	0.5	9.3	4.65	4.65	
	518.1	100.00%	4.5	3.5	3.5	155	34.95	34.95	

Note: Land Use data from USDA CropScape. Bloom scores subjectively assigned by partner biologist. Scores refer to bloom in habitat in each season. High quality habitat assigned 1, medium = 0.5, low = 0.0. These values are multiplied by the acres of each habitat present to a measure of bloom phenology (see graph).



Spring bloom outweighs summer and fall due to small percentage of mixed forest in surrounding landscape. These values are low (across all season) relative to other Maine habitats due to high proportions of development and evergreen forest.



Stiff-leaved aster (*Lonactis linariifolia*). Photo taken at site during visit.

Site Level Assessment

The 13-acre meadow in Parson's Family Preserve contains excessively drained sandy loam soils (Adams loamy sand; See attached Soils Report). The meadow supports a unique flower rich community that is well adapted to dry conditions. One of the most evident species at the time of the site visit was stiff-leaved aster (*Lonactis linariifolia*). This plant thrives in dry sandy conditions, producing short statured colonies that flower in August and September. At the time of

the site visit, a diversity of native bees were foraging on the blossoms.

Other species noted at the site, although not necessarily in bloom at the time of the visit, include: common milkweed (*Asclepias syriaca*), shrubby cinquefoil (*Potentilla fruticosa*), common vetch (*Vicia cracca*), wild red raspberry (*Rubus idaeus*),



Encroaching choke cherries overtaking stand of stiff-leaved aster.

meadowsweet (*Spiraea alba*), red clover (*Trifolium pratense*), little bluestem (*Schizachyrium scoparium*), wild strawberry (*Fragaria virginiana*), trailing raspberry (*Rubus* sp.), hawkweed (*Hieracium pilosum*), primrose (*Oenothera* sp.), black-eyed Susan (*Rudbeckia hirta*), various goldenrods (*Solidago* spp.), various asters (*Symphiotrichum* spp., *Erigeron* spp., *Eurybia* sp.), St. John's wort (*Hypericum perforatum*), dandelions (*Taraxacum officinalis*), common cinquefoil (*Potentilla simplex*), bedstraw (*Gallium* spp.), yarrow (*Achillea millefolium*), fall dandelion (*Leontodon autumnalis*), blackberry (*Rubus allegheniensis*), and lowbush blueberry (*Vaccinium angustifolium*).

In the wood edge, I recorded birch (*Betula papyrifera*), oak (*Quercus rubra*), maples (*Acer rubrum*, *Acer saccharinum*), pine (*Pinus strobus*), hemlock (*Tsuga canadensis*), balsam fir (*Abies balsamea*), quaking aspen, Wood-aster (*Eurybia macrophylla*), little bluestem (*Schizachyrium scoparium*), and lowbush blueberry (*Vaccinium angustifolium*).

Certain areas of the meadow are small sandy knolls. These elevated sandy outcroppings, hold less water than the surrounding lower areas – and therefore tend to contain a different suite of flowering plants. At this site, these areas appear to be dominated by colonies of stiff-leaved aster.



Small knoll showing dominance of stiff-leaved aster colonies on excessively well-drained microsites.

A few species were intentionally planted at the site but were restricted to the small area immediately around the sign by the road. These species include big-leaved lupin (or a hybrid; *Lupinus polyphyllus* or *L. polyphyllus x perennis*), lance-leaved coreopsis (*Coreopsis lanceolata*), and highbush blueberry (*Vaccinium corymbosum*).

Choke cherry management recommendations

Option 1: Shifted mowing regime

Description of management: Mow meadow more often. The entire meadow should be mowed once year, in the late spring when chokecherry is at peak flower. This annual mow will help to starve the plant. It will also help to control cool-season grasses in favor of warm-season grasses (like little bluestem).

Even if this option is not used as an eradication measure, it describes a good long-term management strategy. Once choke cherry is controlled, mowing or brush hogging the meadow every year in the late spring should help to prevent the plant from becoming a threat to the meadow's existing plant and pollinator community in the future.

Risks: This is a low-intensity option. The costs of changing mow timing is low, however, this strategy is unlikely to decrease the coverage of choke cherry in the meadow. It *may* maintain the status quo and help to prevent further encroachment.

Option 2: Cut and treat

Description of management: Mow, brush hog, or otherwise cut the entire meadow in the late summer or early fall. Follow the cutting immediately with an appropriate herbicide. The herbicide should be applied to the cut portion of the stem. The herbicide should **not** be applied over the entire meadow, this would quickly change the plant community by killing a high proportion of the flowering plants. It may be possible to use a tractor drawn herbicide applicator called a weed wiper. If cutting is done at a high height and in the spring before herbaceous plants have put on much growth, a wiper drawn just under the cutting height should be able to target the herbicide applications to the recently cut stems of choke cherry.

This option should result in good control of choke cherry, a single application however will not result in complete control. When surviving choke cherries become evident in the following year, I recommend spot treating the survivors with a manual cut and paint approach, or herbicide injection approach (see attached Invasive Plant Treatment Methods document).

Once choke cherry is controlled, mowing or brush hogging the meadow every year late in the spring should help to prevent the plant from becoming a threat to the meadow's existing plant and pollinator community in the future.

Risks: This is a higher-intensity option. Contracting a pesticide applicator to do this work may be expensive – posing an inherently higher cost of failure if this approach does not result in control.

Option 3: Cultivate and reboot

Description of management: Plow chokecherry infested areas of the field in the spring. After plowing, use multiple passes with a heavy disk to break up roots. Use a spike tooth harrow or similar to pull chokecherry roots to the soil surface. Leave roots exposed to desiccate or rake and dispose of. Use harrow to continue to cultivate area each time vegetation appears throughout the season (Alternatively, apply broad spectrum herbicide each time vegetation appears until fall). Fall plant (late October) a perennial wildflower mix (recommendation attached). Immediately after seeding, cultipack area to press seed into the soil surface. Wildflowers will germinate in the spring. Growth will be slow. Expect some flowering late in the first season of growth. Most species will not begin to flower until their second year of growth.

As surviving chokecherries or new seedlings become evident in subsequent years, I recommend spot treatment with a manual cut and paint approach, or herbicide injection approach (see attached Invasive Plant Treatment Methods document).

Once choke cherry is controlled, mowing or brush hogging the meadow every year in the spring or the fall should help to prevent the plant from becoming a threat to the meadow's existing plant and pollinator community in the future.

Risks: Cultivation of this old agricultural field is likely to bring old seed of agricultural weeds to the soil surface, where they will compete with germinating wildflower seedlings. Mowing during the year of establishment will help to control some of these weeds.

The cost of wildflower seeds is expensive (\$500+ per acre). The cost of weed control, and imposing this management is also expensive.

ADDITIONAL INFORMATION ON OPTION 3: ACTIVE SEEDING OF WILDFLOWER MEADOW

Seed Mix: See custom seed mix. Important: Order seed at least 6 months prior to expected seeding date. Seed companies run out of seed each year.

This mix includes high rates of the most competitive, Maine native wildflowers. It also includes the native warm season grass, little bluestem. All listed forbs are very beneficial to pollinators, including the endangered rusty patched bumble bee, the candidate species (for US ESA) yellow banded bumble bee, and the candidate species (for US ESA) the monarch butterfly. This mix includes a very high seeding rate of butterfly milkweed, which thrives on sandy dry soils like those present in these fields. This seed however, is very expensive and is why the mixture is expected to be expensive.

Step by Step Recommendations for Prepping and Seeding Wildflowers

Step	When	Description
Step 1: Mow existing vegetation	Spring, as soon as accessible	Mow down existing vegetation.
Step 2: Cultivate	Spring, as soon as soil can be worked	Plow, followed by several passes with a heavy disk.
Step 3: Repeated tillage or herbicide application	Each time vegetation appears during growing season (appx every 4 weeks)	Use a spike tooth harrow or similar to bring chokecherry roots to the surface. Repeat cultivation each time a new flush of weeds emerges until the first hard frost. OR, instead, apply a broad-spectrum herbicide each time a new flush of weeds appears. Use only herbicides with low residual toxicity.
Step 4: Seeding	October/November	Broadcast wildflower mix. Avoid seeding during wet conditions. See additional information below.
Step 5: Rolling	Same day as Step 4 above	Roll site the same day it was seeded. Use a weighted lawn roller, cultipacker, or roller attached to drill seeder. Roll over entire seeded area to press seed into the soil.
Step 6: Mowing	As/If needed, first growing season	Mow entire plot area as needed in year 2. If annual or biennial weeds are dominant, Mow area each time the vegetation exceeds 12 inches in height, but adjust as needed to prevent weeds from going to seed. Mow at a high height, 6 inches above the soil surface (no lower than 4"). Although this delays flowering, it will increase the establishment success of the full diversity of sown perennials, and decrease competition from weeds to ensure a long-stand life.
Step 7: Annual maintenance	Annually in spring or fall	Mow/brush hog entire planting each year, either in the early spring or the late fall, for as long as the planting persists.

Broadcast Seeding Instructions:

1. Sow seed in fall after site prep is completed. Sow following the first hard frost in the fall (typically October/November) but before permanent snow cover.
2. Combine wildflower seed with an inert carrier (e.g., play sand, cracked corn, kitty litter) to ensure even flow and distribution. Wildflower seed should be combined with the carrier at about 1-part wildflower seed to 6 or more parts carrier by volume.
3. Divide seed into small amounts, fill seeder with flow gate closed, adjust opening as needed.
4. Broadcast seed in several passes in different directions.
5. **Ensure seed-soil contact by rolling seed with a cultipacker or turf roller after seeding. Good seed-soil contact is essential for germination.**

**Avoid seeding during wet conditions*

What to Expect: Most perennial wildflowers are slow-growing in the first year. Do not expect wildflowers to develop enough to flower in their first summer. Wildflower diversity and abundance of blooms will increase as the planting matures, as long as weed pressure is controlled.

ADDITIONAL RESOURCES:

Guides:

Organic Site Preparation for Wildflower Establishment http://xerces.org/wp-content/uploads/2016/10/2016-027_Organic-Site-Prep-Guidelines_May2017_web.pdf

Interseeding Wildflowers to Diversify Grasslands for Pollinators https://xerces.org/wp-content/uploads/2018/10/18-021_01_Interseeding-Wildflowers-Grasslands-Guide_web-1.pdf

Establishing wildflower meadows from seed <http://www.xerces.org/wp-content/uploads/2013/12/EstablishingPollinatorMeadows.pdf>

Pollinator Plants, Northeast Region http://www.xerces.org/wp-content/uploads/2014/09/NortheastPlantList_web.pdf

Creating and Maintaining Healthy Pollinator Habitat: Guidance to Protect Habitat from Pesticide Contamination http://www.xerces.org/wp-content/uploads/2016/10/ProtectingHabitatFromPesticideContamination_oct2016-02.pdf

Acadia National Park Bioblitz (includes native bee diversity per 2010 survey) https://digitalcommons.library.umaine.edu/cgi/viewcontent.cgi?article=1011&context=aes_techbulletin

Websites:

Xerces' Pollinator Conservation Resource Center <http://xerces.org/pollinator-resource-center/>

BUMBLEBEE WATCH: <https://www.bumblebeewatch.org/>

MAINE BUMBLE BEE ATLAS: <http://mainebumblebeeatlas.umf.maine.edu/>

Books:

Attracting Native Pollinators: Protecting North America's Bees and Butterflies (<http://www.xerces.org/announcing-the-publication-of-attracting-native-pollinators/>)

Farming with Native Beneficial Insects (<http://www.xerces.org/farming-with-native-beneficial-insects/>)

100 Plants to Feed the Bees (<http://xerces.org/100-plants-to-feed-the-bees/>)

Managing Alternative Pollinators: A Handbook for Beekeepers, Growers, and Conservationists (<http://www.xerces.org/books-managing-alternative-pollinators/>)