Early Enrollment Targets for the Nationwide Monarch Conservation Agreement on Energy and Transportation Lands

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Introduction

In the paper, *Restoring monarch butterfly habitat in the Midwestern US: 'all hands on deck'*, Thogmartin *et al.* (2017) outlined scenarios under which monarch conservation practices from multiple land management sectors is necessary to meet monarch population targets recommended to mitigate the risk of monarch extinction. Thogmartin *et al.* (2017) targeted the goal of an additional 1.3 billion stems of milkweed being needed to support an overwintering monarch population habitat in Mexico that would occupy 6 ha. This analysis presumed that the majority of this milkweed would require restoration within the North Central Region of the U.S. – a region where milkweed has declined and plays a critical role for more than one generation of monarchs (Thogmartin pers comm. 2020). Expert opinions were elicited to estimate the milkweed restoration potential for various land use sectors within the North Central United States. For our purposes of setting targets for "meaningful" conservation within the Nationwide Monarch Conservation Agreement on Energy and Transportation Lands (i.e. the CCAA/CCA), the sectors specifically of interest are the powerline, rail, and roadside rights-of-way as these sectors overlap with the land use sectors targeted in the CCAA/CCA.

Objective

The goal of this exercise is to demonstrate that the proposed adopted acres of early applicants to the CCAA/CCA will have a "meaningful" conservation impact on achieving the milkweed restoration targets of the rights-of-way sectors identified in Thogmartin *et al.* 2017. For the purposes of this analysis, we define "meaningful" conservation as an *amount of conservation commitment within a timeframe* that demonstrates a sizable commitment on part of the industry sectors included in the CCAA/CCA.

Methodology and Results

Thogmartin *et al.* (2017) included a supplemental data Excel file titled, "ERL_12_7_074005_suppdata.xlsx". This file includes an array of milkweed conservation scenarios run by land use sector(s) and expected milkweed stems/acre resulting in each associated land cover type. This table identifies the current baseline number of milkweed stems within the North Central region of the United States, plus the additional number of milkweed stems that could exist in each land use sector if milkweed restoration practices are undertaken. The land use sectors considered for this analysis were Transportation (Road), Transportation (Rail), and Powerline (W) as these land uses overlap with the land use sectors of the CCAA/CAA. The supplemental data displays two Powerline scenarios, Powerline (W) and Powerline (J). These scenarios represent the two expert groups that were led by Wayne Thogmartin (W) and Jay Diffendorfer (J). For our analysis, the Powerline (W) was used in this analysis as these results were reported in Table 1 of Thogmartin *et al*. (2017).

In the Excel file "ERL_12_7_074005_suppdata.xlsx", column AJ displays the additional number of milkweed stems that are expected to be added to the landscape for each land use sector, or combination scenario. The additional number of milkweed stems that could be added on rights-of-ways like Transportation (Road), Transportation (Rail), and Powerline (W) lands together is 232,183,796 stems (Table 1). This acreage is based on the modeled acres available to those lands throughout the North Central U.S. and assumes the adoption at the levels described by Thogmartin *et al*. (2017). The milkweed density goal within the adopted acres of the CCAA/CCA is 150 stems per acre. This target of 150 stems per acre is what was assumed by the expert panels as being "biologically feasible" on lands where conservation was undertaken. The associated stem density targeted for rights-of-ways are generally lower than the CCAA/CCA adoption rates because they assume region-wide levels of participation, not just the enrolled lands (Thogmartin pers comm. 2020).

We divided the 232,183,796 stems identified by the 150 stems/acre target density, which yields 1,547,982 acres. This is the amount of adopted acres needed in the CCAA/CAA to achieve the milkweed restoration potential of the Transportation (Road), Transportation (Rail), and Powerline (W) sectors identified by Thogmartin *et al.* (2017). The total goal of the CCAA/CCA is to have 2.3 million adopted acres, which if met, would theoretically exceed the cumulative milkweed stems target identified for the rights-of-way sector. Considering geographic extents analyzed by Thogmartin *et al.* (2017), a large portion of these stems would need to be adopted within the North Central Region of the U.S. to achieve the target levels and location envisioned by their study (Thogmartin pers comm. 2020). See our Discussion for additional considerations.

Table 1. Total goal for sum of added milkweed stems from the ROW sectors identified in Thogmartin et al. 2017.

Sector	Additional Milkweed Stems
Transportation (Road)	202,382,735
Transportation (Rail)	3,249,561
Powerline (W elicited)	26,551,500
Total:	**232,183,796**

Early enrollment of applicants to the CCAA/CCA is beginning in April 2020. Table 2 summarizes a breakdown of the potential adopted acres that may be achieved within the early enrollment period and what percentage of the full ROW sector milkweed stem target this would equate to based on the cumulative milkweed stems identified for the Transportation (Road), Transportation (Rail), and Powerline (W) sectors.

Table 2. Interim ROW CCAA/CCA Targets

CCAA/CAA Adopted Acres Early Enrollment Targets	Percentage of Adopted Acres Needed to Achieve ROW Target of Thogmartin et al. 2017
1,238,400	80%
1,083,600	70%
928,800	60%
774,000	50%
619,200	40%
464,400	30%
309,600	20%
154,800	10%

Discussion

The early enrollment period of the CCAA/CCA is currently scheduled through May 31, 2020. Our goal is that the CCAA Program will generate meaningful levels of monarch conservation by the early enrollment deadline, and in subsequent enrollment leading up to the listing decision expected in December 2020. For example, if by June 1, 2020, some 465,000 acres are committed to monarch conservation, we would expect (based on estimated 150 stems/acre) this would add approximately 69,750,000 milkweed stems to the landscape. While it is expected these additional milkweed will occur all across the US, we anticipate that a large contribution to these targets will be located within the North Central U.S. Therefore, this level of commitment during early enrollment period alone will achieve a significant contribution towards the goals identified for the rights-of-way sectors by Thogmartin *et al.* (2017) and to the 1.3 billion stems needed to support a 6 ha overwintering population.

If achieved within two months of CCAA approval, this or a similar level of early enrollment will provide momentum needed to progress enrollment towards the full 2.3 million adopted acres goal of the CCAA/CCA. Following this early enrollment deadline, continued enrollment leading up to the listing decision can still add to the rights-of-way industry targets, although the extent to which these may be considered as part of the Service's Policy for the Evaluation of Conservation Efforts (PECE) is uncertain. If the full 2.3 million adopted acres is achieved, such enrollment could result in the addition of approximately 345,000,000 milkweed stems to the landscape. If the majority of these adopted acres are located in the North Central U.S., then the commitments made in the CCAA/CAA alone may surpass the ROW targets of Thogmartin *et al.* (2017) and could potentially contribute up to 27% of the total 1.3 billion stem goal. The success of the early enrollment period is crucial to unlocking the full potential of the CCAA/CCA to restore monarch habitat and mitigating the risk of monarch extinction.