

## Executive Summary and Research Readiness Level Assessment

### Establishment of Wildflower Islands to Enhance Roadside Health and Aesthetics

#### Research Objectives

- Determined how establishment of wildflower islands impact cover and density of wildflowers and associated floral resources, and plant species composition and diversity of roadside grasslands;
- Evaluated the attractiveness of newly established wildflower mixtures to wild and managed bees by monitoring bee visitations, identifying plant-pollinator interactions, and assessing the diversity and abundance of wildflowers present in bee-collected pollen; and
- Assessed potential impacts of newly established wildflowers on bee health as well as establishment of wild bee communities before and after wildflower planting.

#### Research Benefits

- Assessed seeding methods on wildflower establishment;
- Assessed attractiveness of wildflower mixtures on bee pollinators; and
- Assessed impact of wildflower islands on bee health and establishment.

#### Principal Investigators

**Walter Schacht (P.I.) and  
Judy Wu-Smart (Co P.I.)**  
University of Nebraska

#### Lead TAC Member

**Carol E. Wienhold**

#### Background

Wildflowers are crucial in the ecological function of the low-input roadside plant communities in terms of water and nutrient cycling, nutrient inputs such as nitrogen, total plant canopy cover, stand longevity, and provision of habitat for numerous small animals. Further, wildflowers provide critical foraging and nesting resources for birds, insects, and other wildlife. Unfortunately, habitat loss from agricultural and urban development has led to rapid population declines in wild bees and other pollinators across the US, thereby jeopardizing not only food production but also the sustainability of our natural landscapes (Kearns & Inouye, 1997). One way to mitigate wild bee decline is to establish more habitat corridors on public rights-of-way, such as roadsides. Planting pollinator-friendly native wildflowers on roadsides provides nutrient-rich forage and nesting resources for bees and is aesthetically pleasing. With 97,256 miles of public roadways in Nebraska (~4 million miles of roadways in the United States), roadsides play ever increasing roles in sustaining biodiversity within our state and beyond.

#### Conclusion

Conventional roadside seeding methods yielded plots with lower abundance and richness of forbs and bees compared to plots seeded with wildflowers only (treatments 100, 50, 25x2) but only in the first year of establishment. Bee richness was highest in the late season, while forb abundance and richness were highest in the mid-season. No differences were observed across differently sized wildflower-only patches likely because of the recent establishment of plots. In fact, only ~50% of seeded forbs had established and roughly 14 plants out of the 40 species in the seed mixture did not establish in either survey years and may therefore be replaced in future seed mixtures. Our results indicate that wildflower segregation in strips or islands may be a cost-effective method of improving wildflower establishment and persistence in diverse roadside mixtures. As plots mature and become vulnerable to weed encroachment, the effect of patch size may become more distinguished across treatment groups, therefore, further monitoring and research may be necessary to further address issues with low establishment and high competitive pressure from volunteer species. These data contribute to NDOT's ongoing pursuit to more effectively establish wildflowers on roadsides and to better understand that role floral enhancements have on supporting and sustaining vulnerable wildlife, such as our pollinator communities.

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**Quote:**

*“We were able to show that increases in forb abundance and richness directly promoted bee abundance and nesting in wildflower seeded plots.”* By P.I. and Co P.I.

**NDOT Recommendations Based Off of Research Project**

As NDOT moves into Phase II of this research topic, the study’s findings will be used in shaping the next wildflower and pollinator trials. Phase II -Establishment of Wildflower Islands to Enhance Roadside Health, Ecological Value, and Aesthetics research project began in July 2020 and expected completion date of May 2022.

- As provided by Carol Wienhold, Lead TAC Member

Interested in finding out more?

Final report is available at:  
[NDOT Research Website](#)

### Research Readiness Level (RRL) Assessment

#### Level 3: Development (Field Research)

-Research/Technology is being developed in an operational environment (real-world conditions)

**RRL 3**

**This brief summarizes Project SPR-1 (17) M058  
“Establishment of Wildflower Islands to Enhance Roadside Health and Aesthetics”  
Nebraska Department of Transportation Research Program**