

# SPR RESEARCH PROGRAM

## SECOND-STAGE PROPOSAL SUMMARY

### PROBLEM NUMBER AND TITLE

#### **26-05 Evaluating Mowing Practices for Pollinator Habitat Enhancement: Highway Vegetation Management and Its Impact on Endangered Pollinators**

### PROBLEM SUMMARY

Pollinator protection has increasingly become a state and federal issue regarding vegetation management along highways. See detailed statement online (link below) regarding Endangered Species Act, ORS 634.045, etc for ODOT's requirements toward a bee pollinator safety plan. A recent internal ODOT pilot project successfully demonstrated using a new vegetation app. The data from this app could be used to compare to other databases to analyze pollinator activity. ODOT does not have the knowledge or capacity to measure vegetation which may be beneficial to pollinators to reach legal compliance. ODOT has an opportunity to collect data for compliance, and simultaneously enhance pollinator communities, specifically applied to mowing operations.

### ODOT OBJECTIVES

The research objectives are to study 27 plots of vegetation for pollinator habitat before and after mowing operations for a total of three seasons. The data will populate a database and model for optimal mowing intensity for greater pollinator capacity. The results hope to show operational legal compliance with a focus on cost neutral (or less) operational actions, while enhancing pollinator communities.

### BENEFITS

The benefits are legal compliance, optimal mowing intensity, and education of "high benefit" vegetation per region for pollinators.

### SCHEDULE, BUDGET AND AGENCY SUPPORT

***Estimated Project Length:*** 36 months.

***Estimated Project Budget:*** \$280,000.00

***ODOT Support:*** *Will Lackey, Galen McGill*

### FOR MORE INFORMATION

For additional detail, please see the complete STAGE 2 RESEARCH PROBLEM STATEMENT online at:

<https://www.oregon.gov/odot/Programs/ResearchDocuments/26-05>

# SPR RESEARCH PROGRAM

## SECOND-STAGE PROBLEM STATEMENT

### FY 2025

#### PROBLEM NUMBER AND TITLE

#### **26-05 Evaluating Mowing Practices for Pollinator Habitat Enhancement: Highway Vegetation Management and Its Impact on Endangered Pollinators**

#### RESEARCH PROBLEM STATEMENT

There has been ongoing interest from ODOT on this topic. Pollinator proposals have been submitted twice in the last six years (FY19, FY22) but have not been funded. An internal ODOT pilot study has shown promising results to warrant more investment. Pollinator protection has increasingly become a state and federal issue regarding vegetation management along highways. A 2014 Presidential Memorandum directed the US DOT to work with State DOTs and transportation associations to promote pollinator-friendly practices and corridors. Moreover, the federal Endangered Species Act (ESA) restricts ODOT from disrupting the habitat of listed pollinating insects and requires ODOT to manage Special Management Areas for this habitat. ODOT recently participated in a Nationwide Candidate Conservation Agreement for the Monarch Butterfly. Finally, ORS 634.045 requires several state agencies, including ODOT, to maintain and revise a bee pollinator safety plan to educate the public and increase pollinator habitat. Across multiple levels, pollinator management needs to be addressed better. It is not clear to ODOT how to document habitat on their properties, if current mowing practices enhance or reduce pollinator habitat, and how to prioritize areas for compliance of conservation practices. The US DOT has guidelines for vegetation management for right-of-ways (ROWs)(Hopwood, Black, and Fleury 2015), but there have been contrasting results for key practices, such as mowing (Noordijk et al. 2009; Parr and Way 1988; Wojcik, V. A., & Buchmann, S. 2012)and efforts at establishing pollinator-attractive plants have not resulted in long lasting habitat and may result in costly landscaping (Mitchell et al. 2022). Finally, there are concerns that the habitats near roadway locations with vehicles and environmental pollutants may result low mortality rates to pollinators (Meinzen et al. 2024). Consequently, it is unclear how ODOT routine mowing practices, which covers an estimated 20,000 acres annually, enhances the vegetation that is important to threatened or endangered pollinators. Being able to identify mowing practices that encourage these plants may help meet protection targets without increased costs.

#### RESEARCH OBJECTIVES

This work will build on an ODOT pilot study documenting the diversity and abundance of bee attractive plants(Figure 1). The pilot found considerable plant diversity at four different locations one month after mowing. By comparing these plant records to OSU's [Melittoflora](#) database it was found that these plants supported 32 of the 36 wild bee genera in the Willamette Valley. This pilot demonstrated the value of the plants commonly found on ODOT ROWs and suggests bee pollinator habitat could be enhanced without costly restoration work. The pilot also provided a proof-of-concept for a smart-phone picture app which accurately documented the vegetation. The app's data was evaluated with different mowing history, region climate, and other biogeographic factors to estimate the pollinator community. This new method is quick and the pilot

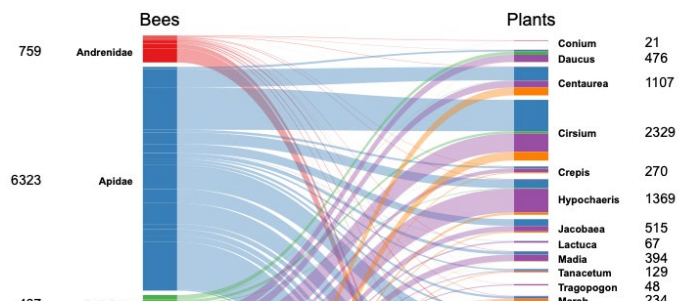


Figure 1. Floral host breadth network for bees collected from Willamette Valley ODOT ROWs. A total of 21 plant genera (right) were associated with all six families of bees (color-coded, left) representing 32 bee genera. Thickness of horizontal denotes the total # of linkage for each bee family and plant genus and numbers indicate the linkages with each taxon.

demonstrated that it can be easily related to OSU's flora database, which is the only one of its kind in the world. The pilot demonstrated the feasibility of being able to quickly survey ROWs to evaluate optimal mowing intensity in promoting the growth of plants that most benefit the bees in a region. The research will study pollinator activity in three geographic regions and develop "high benefit" pollinator vegetation management practices with a neutral (or lessened) cost to ODOT. The research will be conducted over three seasons and have three parts: **1) In-field vegetation documentation using new app and method analysis; 2) Cost-Benefit Analysis; and 3) Feasibility analysis.** The in-field tasks include selecting 27 site locations on ODOT secondary or tertiary roads, with appropriate ROWs, across three ODOT regions (i.e., 9 per region). The study will have three levels of mowing intensity: high (at least once per year), medium (once every other year) and low (less than once every two years). Each location will be monitored for plant diversity and density and bee pollinator activity during the appropriate seasons – with particular measurement directly before and after mowing. The research will determine if mowing intensity and date of mowing influences the density of plants of highest value to pollinators by: 1) relating plants found to Melittiflora records filtered for the region (e.g., Figure 1); and 2) calculating the richness of bee species found at each site. The research will also use historic estimates of average seasonal traffic volume at each site as a covariate to investigate the impact of traffic on the diversity of the bee community for a given plant community. Site characteristics will also be documented (e.g. distance from the roadway). The cost-benefit analysis will focus on detailing normal vs pollinator staff/resource costs, timing for mowing, and comparing to outcomes of high pollinator activity. The feasibility analysis will compare normal maintenance resource availability and use compared to recommended optimal mowing for pollinator benefits.

Finally, the project would result in a regional pocket guide of the most important plants for pollinators that vegetation management crews will encounter, as well as new continuing education trainings for vegetation management staff. This information could be used in future construction (or Maintenance) locations to identify plant species that are both of high value to pollinators and known to persist under ROW conditions that could help inform how to modify seed blends following road construction.

## WORK TASKS, COST ESTIMATE AND DURATION

The proposed research study will include the following essential tasks:

- A literature review of pollinator impacts focused on bees and butterflies, particularly ones that highlight benefits and resiliency with smaller areas like ROWs.
- Interviews with ODOT Maintenance crew leads and manager to pinpoint opportunities for ideal pollinator ROW locations/opportunities.
- Multiple surveys of ODOT district crews to establish normal ROW mowing operations and maintenance. Document changes in practice, availability of equipment, and include timing of actual work with reasons/causes; A national state DOT survey of practices related to pollinator encouragement with ROWs.
- Identification of test locations for data collection (plots). This step will involve input from ODOT to set up the research study to ensure the locations and proposed data collection are adequate.
- In-field data collection of the vegetation, pollinator activity, plot characteristics, ODOT Maintenance activity, etc on actual ROW locations to assess the effects over time.
- Based on the results of the in-field data over multiple seasons, develop a model of optimal mowing practices taking into consideration vegetation, geographic location, and other variables. Further develop optimal vegetation for consideration to add seed with high likelihood to survive and enhance pollinator communities.
- Prepare a final research report and an ODOT pocket guide that provides recommendations and actionable guidance for ODOT's vegetation management program and crews.

## **Key Deliverables:**

- A record of collected plot data, analysis compared to OSU's databases, recommendations or probabilities of successful vegetation to enhance pollinator communities in ODOT ROW per region.
- Pocket guide for ODOT crew leads and management to recognize "high-value" vegetation for pollinators.
- Final report presenting the research activities, results, analysis, conclusions, and recommendations for implementation and further research.

**Estimated Project Length:** 36 months

**Estimated Project Budget:** \$280,000

## **IMPLEMENTATION**

Implementation will be detailed in the Final Report and Pocket Guide.

## **POTENTIAL BENEFITS**

The potential benefits are Stewardship of Public Resources, Process Improvement of Operations, Cost Avoidance, and potential Community Vitality. Using the research results could estimate the acres of pollinator habitat that have been enhanced. The results could be translated into specific recommendations to ODOT staff regionally on the frequency and timing of mowing to encourage the plants that support pollinating insect species. This would ultimately enable ODOT to provide rapid reporting on how it is enhancing pollinator habitat for current and future Nationwide Candidate Conservation Agreements as well as compliance to other state and federal laws. Lastly, enhanced pollinator activity has potential benefit to neighboring private commercial crop growers.

## **PEOPLE**

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## **REFERENCES**

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Dr Andony Melathopoulos' Publications: <https://extension.oregonstate.edu/people/andony-melathopoulos>

Hopwood, Jennifer, Scott Black, and Scott Fleury. 2015. *Roadside Best Management Practices That Benefit Pollinators: Handbook for Supporting Pollinators through Roadside Maintenance and Landscape Design*.

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<sup>1</sup> Problem Statement Contributors

<sup>2</sup> Potential Sponsor/Champion

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## STAFF REVIEW PAGE

### LITERATURE CHECK

#### TRID&RIP

☒ A review of TRID & RIP databases found no existing research that answers the research question  
See references listed

### ODOT DECISION LENSES

**Climate:** The research focuses on improving pollinator habitat in ODOT ROW, which may benefit habitat suitability and food access for pollinators, including threatened or endangered species. There are wildlife resilience benefits to pollinator communities, including species, such as the Monarch butterfly, that are currently struggling to thrive. Climate change and land use changes are challenging pollinator survival nation-wide. At least 20,000 acres of public right of way in Oregon can be leveraged to improve late-season food and quality habitat. Improvements to seasonal vegetation access may provide co-benefits to other wildlife. It is unclear, but conceivable that helping plants reproduce through these ROW pollinators communities has climate benefits, however, the research will not include an analysis of climate.

**Equity:** This research is not focused on equity and will not include analysis of equity.

**Safety:** This research is not focused on safety and will not include analysis of safety.

### TECHNOLOGY & DATA ASSESSMENT

- ☒ No Identified T&D output  
☐ At the end of this project, the implementing unit(s) within ODOT will need to coordinate the adoption of new technology or data in order to realize the full potential of this research.

### CROSS-AGENCY IMPACTS

ODOT Maintenance crews will be impacted; Potential Construction contractors who install landscaping may be affected. An additional benefit is the potential to partner with the Oregon Department of Agriculture (ODA), both in resource sharing and funding.

There were a few questions/concerns expressed about this proposal. Firstly, it is assumed that recommendations would be less mowing than normal, therefore, the concern "Is would high growth affect neighboring land-owners?". This concern will be monitored through the research. A second concern is if any safety aspect would be compromised by more vegetation growth. This concern is intended to be mitigated by using plot locations further away from the roadway and on secondary and tertiary roads.