

SPR RESEARCH PROGRAM

SECOND-STAGE PROPOSAL SUMMARY

PROBLEM NUMBER AND TITLE

24-04 Estimating and Mitigating Disparities in Green Infrastructure in Marginalized Communities nearby Transportation Infrastructure in Oregon

PROBLEM SUMMARY

Over the course of many years ODOT has removed tree and green space in the right of way along transportation infrastructure impacting communities in the vicinity. Removal of vegetation and its replacement with impervious materials results in an increase in air pollution as well as an increase in ambient heat that together combine to significantly elevate health risks for all communities in the vicinity. Certain socio-economic factors unique to marginalized communities likely exacerbate the health risks in these communities in an inequitable manner.

ODOT OBJECTIVES

The objective of this research is to determine the locations of marginalized communities along transportation infrastructure which are subjected to heightened air pollution and ambient heat, and, to propose remedial measures to mitigate these effects in the near term and to prevent further occurrences of these effects resulting from transportation infrastructure development.

BENEFITS

Primary benefit is to bring awareness to the agency of the magnitude of unhealthy environmental conditions resulting from ODOT infrastructure development in marginalized communities along transportation infrastructure. Another benefit resulting from this research is the identification of mitigating measures for communities currently affected by unhealthy environmental conditions.

SCHEDULE, BUDGET, AND AGENCY SUPPORT

Estimated Project Length: 24 months

Estimated Project Budget: \$250,000

ODOT Support: Erika McCalpine, Assistant Director for Social Equity, erika.mccalpine@odot.oregon.gov

FOR MORE INFORMATION

For additional detail, please see the complete STAGE 2 RESEARCH PROBLEM STATEMENT online at: <https://www.oregon.gov/odot/Programs/ResearchDocuments/24-04.pdf>

SPR RESEARCH PROGRAM

SECOND-STAGE PROBLEM STATEMENT

FY 2024

PROBLEM NUMBER AND TITLE

24-04 Estimating and Mitigating Disparities in Green Infrastructure in Marginalized Communities nearby Transportation Infrastructure in Oregon

RESEARCH PROBLEM STATEMENT

ODOT owns thousands of acres of land in their right of way along roads and other transportation infrastructure. Over the course of many years ODOT has removed tree and green space in their right of way impacting communities in the vicinity. Removal of vegetation and its replacement with impervious materials results in an increase in air pollution as well as an increase in ambient heat that together combine to significantly elevate health risks for all communities in the vicinity. Certain socio-economic factors unique to marginalized communities might exacerbate the health risks in these communities in an inequitable manner.

RESEARCH OBJECTIVES

The objective of this research is to determine the locations of marginalized communities along transportation infrastructure which are subjected to heightened air pollution and ambient heat, and also, to propose remedial measures to mitigate these effects in the near term and to prevent further occurrences of these effects resulting from transportation infrastructure development. For practical purposes, the geographical area of investigation may be limited to certain areas, for example: ODOT Region 1 or Lane County. This decision shall be made with guidance from the project's Technical Advisory Board.

The method proposed to identify the intersection between the locations of marginalized communities and the location of heightened air pollution and ambient heat. This can be accomplished by using existing mapping tools and if necessary, to develop tools that can access data not available or not accessible using existing mapping tools. These mapping tools will be used to show a geographical distribution of air pollution and ambient heat using data measured directly or inferred indirectly using interpolations or other methods of estimation.

Complementary to this effort, a review of project records is proposed to determine the location of projects where the level of investment made by ODOT in green infrastructure is lacking or is objectively less than the investment made in green infrastructure in non-marginalized communities. Both, mapping air pollution and excess ambient heat and project review to determine green infrastructure investment disparity will look back a certain number of years to the extent that the data is available, for example 5 years to determine if any trends exists over time.

Finally, the tools used or developed will be employed to establish global healthy/unhealthy indicators in the selected marginalized communities, for example using the number of days per year with average indexes above certain air quality and ambient heat thresholds as a global healthy/unhealthy indicator.

Complementary to this effort, an investigation of socio-economic factors exacerbating unhealthy conditions will be conducted to determine the true impact of unhealthy environmental conditions in marginalized communities.

WORK TASKS, COST ESTIMATE AND DURATION

- 1) Selection of area(s) to be investigated
 - a. Identification of existing work in body of literature

- b. Identification of priority areas to focus investigation
- 2) Determination of air quality and ambient heat indicators appropriate for this study
 - a. Air quality index
 - b. Surface temperature
 - c. Tree canopy and impervious material surface density
 - d. Soil moisture
 - e. Others indicators
- 3) Determination of data requirements
 - a. Verification and validation needs
 - b. Sensor accuracy and calibration traceability needs
 - c. Indirect estimation method review and selection
- 4) Review of existing mapping tools and their limitations
- 5) Data gathering
 - a. Use existing mapping tools and existing data
 - b. Develop tools to access necessary data
- 6) Green infrastructure project record review
- 7) Identification of communities under unhealthy environmental conditions using global indicators
- 8) Investigation of socio-economic factors exacerbating unhealthy environmental conditions
- 9) Final Report: Recommendations

Key Deliverables:

1. Literature Review – Interim Report
2. Research Methods – Interim Report
3. Data Gathering – Interim Report
4. Green Infrastructure Project Record Review Results – Interim Report
5. Identification of Areas Under Unhealthy Environmental Quality – Interim Report
6. Investigation of Socio-economic Factors Exacerbating Unhealthy Environmental Conditions – Interim Report
7. Final Report: Includes all previous interim reports and also, final recommendations for ODOT policy updates.

Estimated Project Length: 24 months.

Estimated Project Budget: \$250,000

IMPLEMENTATION

Implementation of this project will take place primarily by adopting recommendations resulting from the study. This may include informing ODOT Project Planners the urgent need for investment in green infrastructure in the vicinity of marginal communities, and other remedial actions that will be identified in the course of this investigation. Another possible method of implementation is to inform ODOT decision makers the need to develop policies which mandate the evaluation of environmental quality impact of infrastructure in all communities in terms of air quality and ambient heat, in particular in areas identified by this study as historically subjected to unhealthy conditions and exacerbated by socio-economic factors.

POTENTIAL BENEFITS

The benefits resulting from this research are the following:

- Bringing awareness of unhealthy environmental conditions resulting from ODOT infrastructure development in marginalized communities
- Identification of mitigating measures for current communities affected by unhealthy environmental conditions
- Identification of future preventive measures to avoid negatively impacting environmental conditions by transportation infrastructure in particular in marginalized communities
- Identification and development of mapping tools which may be used for other purposes related to the assessment of environmental conditions

PEOPLE

ODOT champion(s):

Erika McCalpine, Assistant Director for Social Equity, erika.mccalpine@odot.oregon.gov

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Problem Statement Contributors:

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REFERENCES

(none)

STAFF REVIEW PAGE

Literature Check

TRID&RIP

A review of TRID & RIP databases found no existing research that answers the research question

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 stakeholders

- List stakeholders or impacted units
 - Office of Equity and Social Justice
 - Climate Office
 - Office of Environmental Quality

- Identify any issues of concern raised by an ODOT stakeholder. Note expected mitigation
 - None at this time