#### **Research Project Work Plan**

for

## PHASE 2: PRIORITIZATION AND SELECTIVE MONITORING OF PREDICTED WILDLIFE CROSSING AREAS

SPR836 Phase 2

#### Submitted by

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> > for

Oregon Department of Transportation Research Unit 555 13<sup>th</sup> St. NE, Ste 2 Salem, OR 97301-6867

#### October 2023

This SPR836 Phase 2 Wildlife Crossing Research Work Plan was amended through a Work Order Amendment on 10/11/2024. The updated Work Plan includes the list below as well as corrected Task Numbering. Updated timeline and budget tables will be reflected in the quarterly reports which can be found <u>here</u>. Updates include the following:

- 1) New end date of April 30, 2026.
- 2) Additional budget of \$82,000.
- 3) Addition of Task 7 subtask 7a: two additional years of monitoring, equipment maintenance, and reporting through March 2026.
- 4) Addition of Task 7 subtask 7b: covers fecal DNA capture-recapture analysis to determine the number of mule deer and elk using ODOT structures, the number approaching but not using these structures, as well as develop gene flow estimation.
- 5) Addition of Task 7 subtask 7c: development and delivery of statewide methodology and analysis that examines how WVC data might be affected by AADT, wildlife populations, resident versus migratory deer, fence end effects, and climate change effects such as wildfire.
- 6) Technical Advisory Committee has expanded full update below:
  - a. Kira Glover-Cutter (ODOT, Chair)
  - b. Cidney Bowman (ODOT, Champion)
  - c. Jennifer Lanzarotta (ODOT)
  - d. Paris Edwards (ODOT)
  - e. Tom Parker (FHWA)
  - f. Rachel Wheat (ODFW)
  - g. Jessica Clark (ODFW)
  - h. Tom Stokely (Nature Conservancy)
  - i. Laura Navarrete (FWS)
  - j. Andrea Lyons (USDA)
  - k. Austin Smith (outreach)
  - 1. Mike Totey (outreach)

## Research Project Work Plan for PHASE 2: PRIORITIZATION AND SELECTIVE MONITORING OF PREDICTED WILDLIFE CROSSING AREAS

#### 1.0 Identification

1.1 Organizations Sponsoring Research

Oregon Department of Transportation (ODOT) Research Section 555 13<sup>th</sup> Street NE Salem, OR 97301 Phone: (971) 338-8415

Federal Highway Administration (FHWA) Washington, D.C. 20590

1.2 Principal Investigator (ODOT requests only one per institution or firm)

Matthew Shinderman, Ph.D. Senior Instructor Human and Ecosystem Resiliency and Sustainability Lab Co-Director Oregon State University, Cascades Campus Graduate and Research Center #214 650 SW Columbia Street Bend, OR 97702 Phone: (541) 322-3159

1.3 Technical Advisory Committee (TAC) Members

Cidney Bowman (Wildlife Coordinator, ODOT), Champion Kira Glover-Cutter (Research Coordinator, ODOT), Chair Yué Zhang (OSU PI for SPR867 Automated Wildlife Detection) Jennifer Lanzarotta, ODOT GIS Paris Edwards (Analyst, Climate Office, ODOT) Thomas Parker (FHWA)

1.4 Research Coordinator

Kira Glover-Cutter, Ph.D.

Phone: (971) 701-0051

1.5 Project Champion

Cidney Bowman (Wildlife Coordinator, ODOT)

#### 2.0 Problem Statement

In 2020 Oregon enacted ORS 496.272 which directs the Oregon Department of Fish and Wildlife, in cooperation with ODOT, to develop a Wildlife Corridor Action Plan. As a part of this effort ODOT has been tasked with developing a program to reduce wildlife-vehicle collisions in areas that intersect with wildlife corridors. To initiate this process, ODOT recently invested in research for the development of wildlife corridor maps to aid in site prioritization along our highway network as a part of Oregon's "Wildlife Corridor and Safe Road Action Plan" in coordination with the Oregon Department of Fish and Wildlife (ODFW). In early 2023 ODFW delivered to ODOT connectivity maps for six species including: mule deer (*Odocoileus hemionus*), black-tailed deer (*O. hemionus columbianus*), Rocky Mountain elk (*Cervus canadensis nelsoni*), Roosevelt elk (*C. canadensis roosevelti*), pronghorn (*Antilocapra americana*), and bighorn sheep (*Ovis canadensis*).

While ODOT has already invested in costly wildlife crossing structures to reduce wildlife vehicle collisions, the wildlife corridor intersections predicted from ODFW's delivered maps are extensive and will need to be prioritized and ideally validated before further infrastructure investment. Further complicating future funding decisions is the likelihood that wildlife crossings and corridor routes are changing as Oregon's climate and population changes. To reduce collisions and protect wildlife, as well as to ensure effective investment of public funds, these predicted wildlife corridor intersections and the technologies used for mitigation must be monitored and validated.

## 3.0 Objectives of the Study

*Objective* #1: Review literature and provide synthesis regarding prediction and validation of wildlife corridors and crossing areas.

*Objective* #2: Optimize prioritization method for predicted wildlife crossing locations using GIS analysis and deliver prioritization tools and final map(s).

**Objective #3:** In collaboration with OSU team SPR867 (Yué Zhang) instrument, maintain, and share data from top location(s) identified from Objective #2 using SPR867 camera prototype(s).

### 3.1 Benefits

The deliverables from this research will be used for infrastructure planning to reduce wildlife-vehicle collisions to improve safety for the traveling public. This work will also assist with validation of connectivity areas, ensuring both appropriate investment and environmental stewardship for the traveling public.

### 4.0 Implementation

The products from outlined objectives will be used for planning needs coordinated by ODOT's wildlife coordinator. This work will also be shared as a collaboration with the SPR867 OSU team led by PI Yué Zhang.

#### 5.0 Research Tasks

The PI will meet with the Research Coordinator at least twice per fiscal year to discuss progress, data, and analysis. If needed, the Research Coordinator will schedule additional TAC meetings to share progress and receive direction.

#### 5.1 Expected tasks:

## Task 1: TAC Meeting #1

Project kick off meeting.
<u>Time Frame</u>: by November 2023
<u>Responsible Party</u>: PI, ODOT Research Coordinator, TAC
<u>Cost</u>: \$2,000
<u>Deliverable</u>: TAC meeting attendance, TAC meeting presentation, TAC Meeting Minutes
<u>TAC Action</u>: Review and understand project research problem statement, research question, the limits of the research, and the project schedule. Advise ODOT Research

Coordinator regarding any critical issues with the project's scope or schedule. Advise PI's regarding related professional practices, standards, methods and context for the project.

<u>ODOT Action or Decision</u>: Review TAC advice, discuss with PI, and if necessary direct PI to make changes to project documents.

### Task 2: Review Existing Literature and Prepare Short Synthesis

Review literature and provide synthesis regarding prediction and validation of wildlife corridors and crossing areas, including predicted changes with a changing climate. <u>*Time Frame:*</u> by December 2023 <u>*Responsible Party:*</u> PI <u>*Cost:*</u> \$5,000 <u>*Deliverable:*</u> Synthesis Section for Technical Brief (Task #8) <u>*TAC Action:*</u> Review Synthesis <u>*ODOT Action or Decision:*</u> Review Synthesis

#### Task 3: Data Review and Organization, QA/QC and Analysis

Gather, organize, QA/QC relevant geospatial data needed for prioritization of crossing site investment. ODOT will provide needed ungulate layers and other information as available. Selected climate change/resiliency predictive layers will be included as a part of the prioritization matrix.

*<u>Time Frame</u>:* by December 2023 <u>Responsible Party</u>: PI and Research Coordinator <u>Cost</u>: \$5,000 <u>Deliverable</u>: Geodatabase with organized data <u>TAC Action</u>: NA. <u>ODOT Action or Decision</u>: Review geodatabase.

## <u>Task 4: Finalize Prioritization Strategy, Deliver Prioritization Tools and Methods, and</u> <u>Deliver final GIS Prioritization Maps with Documentation</u>

After reviewing Task 2 and 3 materials together with TAC meeting input (Task #1), develop and finalize prioritization matrix (with parameter weighting strategy and associated arguments). Deliver final GIS Site prioritization maps with documentation. Ideally at least 2 highway corridors may be evaluated starting with Hwy 97. <u>*Time Frame:*</u> first draft by February 2024, final maps by April 2024

<u>Responsible Party</u>: PI

<u>Cost</u>: \$16,000

<u>Deliverable</u>: Prioritization method/tool, final GIS maps with prioritization strategy documented as section for Technical Brief (Task #8)

TAC Action: NA

ODOT Action or Decision: Review prioritization method/tool

## <u>Task 5: Provide Recommendations for 1) Initial SPR867 Prototype Placement as well as</u> 2) Future Instrumentation for Validation of Predicted Wildlife Crossing Areas along <u>ODOT Highway Network</u>

Using findings from Tasks 2-4 together with recommendations from the TAC identify 1) top locations for initial SPR867 prototype installation, and 2) recommendations for future installations along Oregon highways for future validation of predicted wildlife crossing areas.

*<u>Time Frame</u>*: for #1 by October 2023; for #2 by June 2024

<u>Responsible Party</u>: PI

<u>Cost</u>: \$3,000

<u>Deliverable</u>: Communication by email for recommended locations for 1) Initial SPR867 prototype placement. Technical brief section for Task #8 that covers 2)

Recommendations for future instrument placement along ODOT highway network. *TAC Action:* None

ODOT Action or Decision: Review

## Task 6: TAC Meeting #2

This meeting will review progress, instrumentation plan, and data collection to date. <u>*Time Frame:*</u> February 2024 <u>*Responsible Party:* PLOPOT Response Coordinator</u> TAC

<u>Responsible Party</u>: PI, ODOT Research Coordinator, TAC Cost: \$2,000

<u>Deliverable</u>: TAC meeting attendance, TAC meeting presentation, TAC Meeting Minutes, meeting agenda

<u>TAC Action</u>: Advise ODOT Research Coordinator regarding project next steps. <u>ODOT Action or Decision</u>: Review TAC advice.

## Task 7: Instrument, Maintain, and Report

From TAC Meeting #1 and Task #5, working with SPR867 team: 1) install and secure initial prototype and 2) collect and share with SPR867 wildlife data for analysis. Records will be kept of data collection tools or methods and tool/method calibration and reported as part of the Technical Brief (Task #8). The design of any specialized data collection tools or algorithms will be documented and delivered to ODOT. Data will be recorded in

a standardized and secure form. Data will be collected, stored, and delivered to ODOT in compliance with Federal requirements.

*<u>Time Frame</u>*: September 2023 – September 2024

*Responsible Party*: PI

*Cost*: \$32,000

<u>Deliverable</u>: Monthly email update to Research Coordinator and OSU Yué Zhang, data transfer to OSU Yué Zhang for SPR867 Automated Wildlife Detection. Section in Technical Brief (Task #8) covering Data Collection methodology, QA/QC, and any transformation before delivery to SPR867 team. Also, provide documentation that the raw data is securely stored and protected from data corruption. (Federal projects may require delivery of raw data to the Agency).

TAC Action: NA

ODOT Action or Decision: Review progress

## Task 8: Final TAC Meeting and Delivery of Publishable Technical Brief

Deliver Technical Brief and final presentation of work. Technical Brief will contain synthesis (Task 2), methodology, data descriptions, supported analysis, final maps (Task 4), and recommendations (Task 5). The final geodatabase will also be delivered. <u>*Time Frame:*</u> Draft Technical Brief by July 2024, Final Technical Brief by September 2024, TAC by September 2024

Responsible Party: PI

<u>Cost</u>: \$10,000

*Deliverable*: Final project deliverables: Final TAC Meeting, Technical Brief, geodatabase, camera prototype data.

*TAC Action:* Advise ODOT Research Coordinator regarding project next steps. *ODOT Action or Decision:* Review TAC advice.

## 5.2 Reporting

All reports shall be produced in the standard ODOT Research Section report format provided to the Project Investigator by the Research Coordinator unless some other format is deemed to be more appropriate. The Project Investigator shall be responsible for submitting deliverables as professional-level written composition equivalent to the writing standards of peer-reviewed journals. These writing considerations include grammar, spelling, syntax, organization, and conciseness.

The Project Investigator, in consultation with the TAC and Research Coordinator, shall deliver to ODOT in electronic format the data produced during the project. The Project Investigator shall ensure the data is labeled and organized to facilitate future access. ODOT shall warehouse the data.

### 5.3 Safety and Related Training

Prior to accessing ODOT right-of-way (ROW), all personnel who will work on ODOT ROW shall complete safety training appropriate to the work to be performed within the ROW. The Project Investigator shall notify Project Coordinator in writing (email accepted) prior to the first day of work within the ROW that all project personnel who will access ODOT ROW have been trained. Until all ROW work is completed, the Project Investigator shall notify Project Coordinator in writing (email accepted) annually that an active safety training appropriate to the work to be performed within the ROW has been completed by all personnel who will work on ODOT ROW.

## 6.0 Time Schedule

Task		2023					2024								
		ODOT FY24									ODOT FY25				
		Jul - Sep		Oct - Dec		ec	Jan - Mar		ar	Apr - Jun		ın	Jul - Sep		р
Task 1: TAC Meeting #1					*										
Task 2: Review Existing Literature and Prepare Short Synthesis						*									
Task 3: Data Review and Organization, QA/QC, and Analysis						*									
Task 4: Finalize Prioritization Strategy, Deliver Prioritization Tools and Methods, and Deliver final GIS Prioritization Maps with Documentation								D		F					
Task 5: Provide Recommendations for 1) Initial SPR867 Prototype Placement as well as 2) Future Instrumentation for Validation of Predicted Wildlife Crossing Areas along ODOT Highway Network												*			
Task 6: TAC Meeting #2								*							
Task 7: Instrument, Maintain, and Report															*
Task 8: Final TAC Meeting and Delivery of Publishable Technical Brief													R		F

\*Deliverables

R - Draft report submitted for ODOT review.

F - Revised report submitted to ODOT for publication. End of contract.

# 7.0 Budget Estimate

Task	FY24	FY25	Total
Task 1: TAC Meeting #1	\$2,000		\$2,000
Task 2: Review Existing Literature and Prepare Short Synthesis	\$5,000		\$5,000
Task 3: Data Review and Organization, QA/QC, and Analysis	\$5,000		\$5,000
Task 4: Finalize Prioritization Strategy, Deliver Prioritization Tools and Methods, and Deliver final GIS Prioritization Maps with Documentation	\$16,000		\$16,000
Task 5: Provide Recommendations for 1) Initial SPR867 Prototype Placement as well as 2) Future Instrumentation for Validation of Predicted Wildlife Crossing Areas along ODOT Highway Network	\$3,000		\$3,000
Task 6: TAC Meeting #2	\$2,000		\$2,000
Task 7: Instrument, Maintain, and Report	\$24,000	\$8,000	\$32,000
Task 8: Final TAC Meeting and Delivery of Publishable Technical Brief	\$6,000	\$4,000	\$10,000
Total for tasks (Contract amount)	\$63,000	\$12,000	\$75,000
Support/management (ODOT completes)	\$5,000	\$5,000	\$10,000
Total for ODOT (ODOT completes)	\$68,000	\$17,000	\$85,000

Category	Description	Rate	Units	Amount	Total
SALARIES					
	Research Analyst 2 1.0 FTE	\$3,418/mo	10 mos	\$34,180	
					\$34,180
BENEFITS					
	Research Analyst 2 1.0 FTE	66% of salary	\$34,180.00	\$22,559	
					\$22,559
SUPPLIES					
	Vehicle Rental	\$75/day	22	\$1,628	\$1,628
	Fuel	\$.55/mile	2103	\$1,157	\$1,157
DIRECT COSTS					\$59 <i>,</i> 524
INDIRECT COSTS (26%)					\$15,476
TOTAL PROJECT COSTS					\$75,000

# CONSULTANT BILLING FORM

Agency/Firm Oregon	State University	FAP No. <u>SPR836</u>	Billing No	
Project: SPR836 Phase 2:	Prioritization and Selective	Monitoring of Predicted Wildlife	e Crossing Areas	
Billing Period		through	Final	
Authorized Amount		Percentage of Work C	Completed	
Billing Amount	\$75,000	EA 25RF083	6	

## DETAIL OF PROJECT COSTS ARE ATTACHED.

CERTIFICATION OF CONSULTANT

I certify to the best of my knowledge all amounts invoiced herein are for appropriate purposes and in accordance with the agreements set forth in the contract.

 Signature of Authorized Official
 Title
 Date

 Person to contact for audit
 Address
 Phone No.

 CERTIFICATION OF STATE OFFICIAL

I have reviewed the above project, the local agency narrative report, and related costs and, in my opinion, subject to audit, the costs reflect the progress to date and are eligible for reimbursement in the amount of

\$\_\_\_\_\_

Oregon Department of Transportation Certification

Phone No.