

# ODF Landscape Resilience Program Monitoring Plan

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ECOSYSTEM WORKFORCE PROGRAM MONITORING PLAN NUMBER 1



## About the authors

**Michael R. Coughlan** is a faculty research associate at the Ecosystem Workforce Program, Institute for Resilient Organizations, Communities, and Environments, University of Oregon.

**Heidi Huber-Stearns** is an associate research professor and director of the Ecosystem Workforce Program, Institute for Resilient Organizations, Communities, and Environments, University of Oregon.

**Anna Santo** is a faculty research associate at the Ecosystem Workforce Program, Institute for Resilient Organizations, Communities, and Environments, University of Oregon.

**Andy McEvoy** is a faculty research associate at the College of Forestry, Department of Forest Engineering and Resource Management, Oregon State University.

**Eric M. White** is a research social scientist with the USDA Forest Service Pacific Northwest Research Station.

## About the Ecosystem Workforce Program

*The Ecosystem Workforce Program is a bi-institutional program of University of Oregon's Institute for Resilient Communities, Organizations, and Environments and the College of Forestry at Oregon State University. We conduct applied social science research and extension services at the interface of people and natural resources. Our publications aim to inform policy makers and practitioners, and contribute to scholarly and practical discourse.*

More information available at:  
<http://ewp.uoregon.edu/about/intro>.



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### For more information, contact:

Ecosystem Workforce Program  
Institute for a Sustainable Environment  
5247 University of Oregon  
Eugene, OR 97403-5247



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## Introduction

**The Oregon Department of Forestry’s (ODF) Landscape Resiliency Program (LRP) is a grant program established by Senate Bill 762 (SB762), Section 18-20 (2021) to support cross-boundary forest restoration and resiliency within Oregon. In early 2022, the grant program awarded funding in the amount of \$20 million to nine landscape-scale projects to reduce wildfire risk on public and private forestlands and rangelands and around homes and critical infrastructure through the restoration of forest resiliency and hazardous fuels reduction for the 2021-2023 biennium.**

ODF requested the Ecosystem Workforce Program (EWP) at the University of Oregon (UO) to devise a plan for monitoring investments and outcomes of the LRP. This draft document outlines a monitoring plan that proposes questions, indicators, methods, deliverables, and timelines for the LRP monitoring.

## Monitoring goals and phases

The goal of this monitoring plan is to assess whether and how the LRP has fulfilled its mandate to “reduce wildfire risk through restoration of landscape resiliency and the reduction of hazardous fuel on public or private forestlands and rangelands and in communities near homes and critical infrastructure.” The need for this program monitoring is established in SB762.

This monitoring plan addresses three program phases:

1. Project selection
2. Project implementation
3. Project outcomes

This monitoring plan tracks project investments, responds to the requirements included in SB762, and is informed by feedback from the LRP working group and individual project leaders, as well as the team’s expertise in monitoring forest restoration and related work. It is important to note the following caveats:

- The plans we present in this document for monitoring are subject to change, and are based on best available information, feasibility, timelines, and budget.
- Our ability to monitor some of the intended indicators listed below will be dependent on data availability and accessibility.
- We will report subjective stakeholder perceptions as part of our assessment of perceived fairness, equity, and justness of the project selection and implementation processes.
- The completeness of project monitoring will depend on the timelines for individual project completion and agreed-upon timeline for submission of the final monitoring report. If projects are not completed by the time the monitoring report is due, we will report our best available understanding of projected final outcomes.

## Monitoring questions

We have developed a set of monitoring questions for each phase of the LRP. These questions were developed with reference to SB762, previous monitoring conducted by UO in the area of forest restoration and fuels reduction activities (e.g., ODF Federal Forest Restoration Program), and with reference to well-cited literature on monitoring of forest resto-

ration projects (e.g. Egan and Estrada, 2013<sup>1</sup>). Recognizing that some of the funded projects involve multiple agencies, partners, and organizations, our monitoring efforts will focus on the funded projects as units of evaluation rather than individual funding agreements between ODF and the various entities collaborating on the projects.

### Monitoring questions

#### Project selection

- 1.1 How was the public engaged in the project solicitation and selection process?
- 1.2 How were projects prioritized for funding?
- 1.3 Was the project selection process fair and inclusive?

#### Project implementation

- 2.1 What level of collaborative engagement occurred during project implementation?
- 2.2 How did project implementation impact the socioecological resilience of the local community?
- 2.3 How did projects allocate ODF investments and in-kind contributions from project partners?
- 2.4 What successes and barriers did project partners face during project implementation and how did ODF administrative and other processes facilitate or hinder project implementation?

#### Project outcomes

- 3.1 Were activities conducted and at what scale across the project landscapes?
- 3.2 Were activities individually and collectively located to optimize risk and exposure reduction efforts?
- 3.3 What amount or proportion of exposure to structures and other human development was treated, and what proportion still exists after completion of the projects?
- 3.4 What were the social and economic outcomes of the program?

<sup>1</sup> Egan, A. & V. Estrada. (2013). Socio-economic indicators for forest restoration projects. *Ecological Restoration* 31, 3: 302-316.

## Overview of indicators

In the following sections, we provide summary tables that describe the monitoring indicators that we will use to answer the questions for each phase

of the LRP. We follow the summary of indicators with a description of the data and data collection and analysis methods that we intend to employ.

### Project selection

**Table 1 Summary of indicators for the project selection phase**

Questions	Indicator	Scale	Description
1.1 Public engagement	Adequacy of the decision criteria development process	Program	Interviewee statements about decision processes and decision criteria
	Availability of opportunities for meaningful public involvement	Individual	Interviewee statements about public involvement in developing decision criteria and processes
	Workgroup member selection process	Program	Interviewee statements about workgroup representation and member selection
1.2 Prioritization	Distribution of funded projects among different types of awardees	Project	Type, size, age, and capacity of funded organizations
	Program goals and decision criteria are inclusive of different approaches, worldviews, and knowledge systems for managing fire and smoke	Program	Interviewee statements about inclusiveness of diverse perspectives on fire risk management within the LRP goals and decision criteria
	Perceptions of program's ability to be inclusive of groups with differing respective capabilities	Individual	Interviewee statements about inclusiveness of different types of capacities and capabilities
1.3 Selection	Geographical distribution of funded projects	Program	Distribution of funded projects by county, region, ecotype, and fire activity
	Relationship of project areas with socially vulnerable communities	Project	Zonal statistics (average index score and/or percent area within each class) of social vulnerability index within buffered project area. Comparison of Z-stats for funded vs. non-funded projects
	Project selection process and equity	Individual	Interviewee perceptions of the project selection process and lessons learned
	Perceptions of project recruitment process	Individual	Interviewee perspectives about the process for project proposal recruitment and lessons learned
	Clear, transparent decision criteria	Program	Review call for proposals for decision criteria
	Perceptions of fairness of project selection process	Individual	Interviewee statements about the fairness of the project selection decision process

## Data collection methods

Our intent is to capture project applicants', workgroup members', and other key stakeholders and rights-holders' perceptions about the project selection process while it is still in their recent memories. By Fall of 2022, we will assemble relevant quantitative data from LRP program materials and records about the distribution of funded and unfunded project applications, characteristics of the funded and unfunded applicant organizations, and the flow of decision-processes. We will use this information to refine a semi-structured interview guide that we will use to further gather qualitative data about stakeholders' and rights-holders' perceptions of LRP processes. We will conduct interviews with, at minimum, relevant ODF personnel, working group members, responsible points of contact for funded projects, project partners, and contracted workers. We expect to conduct interviews between August and November 2022, pending interviewee

availability. We will record and take detailed notes during our interviews, which we will analyze using qualitative coding to identify key recurrent themes as well as the range of opinions on each topic. We will summarize themes and send a summary document back to interview participants to validate that we have accurately represented their collective thoughts and opinions about the process.

While conducting interviews, we will work concurrently on a spatial analysis to quantitatively explore the relationship between funded project areas and socially vulnerable communities. We will overlay project areas (from ODF) onto social vulnerability index layers and metadata (from Oregon Explorer) and calculate measures to understand the extent of overlap.



## Project implementation

**Table 2 Summary of indicators for the project implementation phase**

Monitoring question	Indicator	Scale	Description
2.1	Number of agreements	Project, State	Total number of institutional arrangements created at the project and state program level
	Type and number of stakeholders represented in design and implementation	Project, State	Typology and count of different stakeholders (federal/state/local government, national/regional/local organizations, private entities, etc.)
	Number of different land ownerships/management units	Project, State	Total number of different land ownerships or management units involved
2.2	Characteristics of those doing project work	Project, State	Number, type, and location of public and private entities doing project work
	Efforts to create local benefits	Project, State	Type and number of different co-benefits to planned treatment activities – e.g., community outreach events, planned use or enhancement of locally utilized forest products
2.3	ODF and partner in-kind investments	Project, State	Total amount of state dollars and partner in-kind investments to project and program
	On-the-ground labor	Project, State	Total amount of state dollars invested in payroll and OPE for on-the-ground activities
	Technical or professional services in support of projects	Project, State	Total amount of state dollars invested in data collection, technical assessments, monitoring, etc.
	Funds to project organizations	Project, State	Total amount of state dollars invested
2.4	Successes	Project	Interviewee statements about project successes
	Difficulties and lessons learned	Project	Interviewee statements about project difficulties and lessons learned
	Interactions with ODF administrative processes and procedures	Program	Interviewee statements about experiences with the processes of ODF program administration, including: <ol style="list-style-type: none"> <li>1. recognizing and filling needs in partner capacities;</li> <li>2. perception of administrative process efficiency with different aspects of implementation;</li> <li>3. Identification of any challenges or bottlenecks in the agreement and communication processes from project selection to implementation, and any opportunities for improvement</li> </ol>

### Data collection methods

Data on collaborative participation, community resilience, investments, and outreach and education will be collected incrementally throughout project implementation using an online portal accessible to project leads and key contacts. Shortly after the monitoring agreement is executed, we will contact project leads to identify relevant project contacts. We will invite those contacts to participate in an interview and provide feedback on the type of information they would like to request be reported via the online portal. We will request that project leads and key contacts submit information to the portal

between now and early 2023. In March and April 2023, we will conduct interviews with relevant ODF personnel and responsible points of contact for each individual project to ensure relevant information for all projects has been submitted and to assess any emergent issues related to data reliability and validity. In Spring 2023, we will additionally conduct brief follow-up semi-structured, qualitative interviews (in-person, phone, video conference) with key project personnel to discuss successes and set-backs they faced during project implementation, lessons learned, and ideas for program improvements.



## Project outcomes

### Wildfire risk outcomes

We will assess a range of outcomes related to community wildfire risk (Table 3). Given the very short timelines that projects have to implement activities and collect data, and given funding and time restrictions on ODF's monitoring responsibilities, we are proposing a tiered approach to evaluate wildfire risk related outcomes. At a minimum, we will measure and report on the five indicators in Table 3 by the July 15, 2023 deadline. At the same time, we will work with a subset of the awarded projects to collect additional activity data that could facilitate a more robust modeled wildfire risk outcome assessment in the next biennium, contingent on future funding (see Appendix A).

### Methods and rationale

Assessing the five indicators in Table 3 will require minimal data requirements from awarded projects and will leverage updated wildfire risk and exposure maps currently in development and required by SB 762. We will coordinate with ODF and the awarded projects to collect spatially explicit activity polygons describing the activities (e.g., prescribed burn, mechanical thinning, invasive removal, etc.) and where they occurred.

To assess community wildfire risk reduction outcomes (Table 3, percent building exposure and proportion wildfire risk to communities treated), we will use simulated fire model outputs to estimate exposure and risk potential across all of Oregon us-

**Table 3 List of proposed outcome indicators for monitoring LRP implementation and effectiveness**

Monitoring question	Outcome	Indicator	Scale	Description
3.1	Landscape scale implementation	Total acres planned and total acres completed	Project, State	Use spatial activity data and project records to compare total acres completed with total acres planned
	Increased use of prescribed fire	Total acres planned and total acres burned	Project, State	Use spatial activity data and project records to compare total acres burned with total acres planned
3.1 & 3.2	Risk reduction in socially vulnerable communities	Total acres of fuels reduction completed in vulnerable communities	Project, State	Use spatial activity data and social vulnerability index (SVI) maps to measure the magnitude and proportion of risk reduction activities that occurred across the various classifications of SVI in communities with LRP-funded projects
3.2 & 3.3	Community wildfire risk reduction	Percent and magnitude of building exposure treated	Treatment, Project, State	Estimate the degree to which the source of potential community exposure has been mitigated by LRP funded activities relative to the total potential exposure within each project. Estimate the level of exposure mitigation across the state as a result of all LRP funded activities
		Proportion of wildfire risk to communities treated	Treatment, Project, State	Estimate the degree to which community wildfire risk (cNVC) has been mitigated by LRP funded activities relative to the total risk within each project. Estimate the level of exposure mitigation across the state as a result of all LRP funded activities

ing data generated as part of Section 7 in SB 762. The exposure potential map will quantify the parts of each LRP project that have the greatest potential to transmit wildfire into communities. The risk exposure map will quantify which parts of each LRP project are most likely to be the source of wildfires with high risk to structures and other human development. We will overlay activity polygons on top of the modeled wildfire risk and exposure datasets and estimate the proportion of risk and exposure that each project has treated. This metric does not account for estimated changes in fire behavior that might result from management activities, but it will provide insight into whether treatment locations and scale were optimized to reduce risk and exposure.

Specific and detailed spatial data from each activity will be required to assess wildfire risk reduction indicators (Table 4). We will work closely with project leaders and ODF to define, communicate, and facilitate the collection of project activity data. Wherever possible, we will draw on data included in the 2022 Oregon Wildfire Risk Assessment in development at OSU.

By assessing wildfire risk related outcomes and collecting the data required to do so, we will simultaneously be able to evaluate additional outputs relevant to SB 762, specifically:

- Total acres treated
- Total acres treated by activity type (i.e., prescribed fire, invasive vegetation management, mechanical thinning, etc.)

The proposed monitoring strategy is designed to estimate outcomes from investments in wildfire risk reduction and landscape resiliency. The approach described above makes use of best available science and strives to coordinate with other risk assessment processes included in SB 762. In addition, the results of this outcome assessment would provide very useful context to LRP planning in future biennia. Finally, it is important to point out that the approach described here relies on modeled estimates in order to provide a relatively rapid evaluation of LRP impacts. This modeled approach is not a sufficient substitute for long term empirical monitoring that tracks LRP project performance if and when wildfires occur in landscapes where the LRP made investments, but long-term monitoring plans are outside the scope of this proposal.

**Table 4 Description of data required to assess post-treatment wildfire risk outcomes resulting from LRP investments**

Data need	Source	Partners	Description
Project boundaries	Projects	OSU, ODF	The total spatial extent of each project will be used to develop a modelling landscape within which to assess outcomes
Activity polygons	Projects	Projects, ODF, OSU	LRP funded activities will be reported and tracked in a consistent manner to describe what activities took place and where
Activity descriptions	Projects	Projects, ODF	Each spatial activity record will be associated with detailed attributes that describe what kind of activity took place

**Socioeconomic outcomes**

We will assess a range of socioeconomic outcomes resulting from LRP funded activities (Table 5).

**Methods and rationale**

Data to assess the socioeconomic outcomes associated with LRP projects will be gathered via interviews with project leads and key contacts. The interview questions used to assess socioeconomic outcomes will be developed with input from the working group and ODF. Where possible, our questions will be consistent with those used in prior forest restoration monitoring efforts in Oregon. The socioeconomic outcome monitoring will be dependent on projects adequately reporting in the on-line portal the purpose and amount of expenditures.



**Table 5 List of proposed outcome indicators for monitoring LRP implementation and effectiveness**

Monitoring question	Indicator	Scale	Description
3.4	Collaborative institutions supported	Project, State	Number of collaborative institutions engaged in project planning and implementation and number of institutions receiving funding.
	Local community access to forest-related opportunities	Project, State	New recreation opportunities, additional availability of non-timber forest products, new firewood availability, etc., that result from wildfire reduction treatments
	Infrastructure development	Project, State	Establishment of new facilities or infrastructure that would support and improve the feasibility of future landscape resiliency projects
	Business/workforce retention	Project, State	Number and types of businesses that remained in operation because of investments. Number of seasonal employees whose employment duration lengthened because of investments

## Project timeline

Our proposed project timeline is designed to efficiently collect data and report on project outcomes in order to meet ODF biennia reporting requirements.

**Table 6 Proposed project monitoring timeline**

<b>Dates</b>	<b>Description</b>
Summer 2022	Conduct initial outreach to projects, obtain contact info for responsible entities and other participants, identify participant projects for pilot study
Summer/Fall 2022	Conduct monitoring of selection process, contribute to midterm report
Fall/Winter 2022-23	Begin monitoring of project implementation
Winter/Spring 2023	Complete monitoring of project implementation and conduct monitoring of project outcomes and follow-up interviews
Spring/Summer 2023	Data analysis and final reporting



## Appendix A. Wildfire risk reduction outcome pilot

### Wildfire risk reduction

Comprehensive assessment of wildfire risk related outcomes from LRP projects would require the comparison of modeled wildfire behavior on pre- and post-treatment landscapes. However, doing so would require substantially more data collection and analysis than the current monitoring framework allows for. Furthermore, modeled assessments of changes in wildfire risk and exposure would necessarily continue well beyond the end of the biennium which cannot be supported by current funding. The indicators we have proposed to monitor in this document (Table 4) represent a middle ground; they require substantially less expertise and capacity to evaluate, and while they will not yield as much insight as modeled outcome indicators, they are nonetheless very useful for estimating the impact of LRP investments.

Due to the timing and data availability for this project, we propose to conduct a pilot with a subset of the awarded projects that will lay a foundation for

future modeled outcome assessments based on additional indicators in Table A1. This will lay the foundation for future modeled outcome assessments, including potentially a full modeled wildfire risk outcome assessment in the next biennium.

### Pilot questions for project outcomes

A.1 *Did projects accomplish wildfire risk reduction?*

A.2 *Did projects increase landscape resilience?*

- We will coordinate with ODF on a geospatial data collection platform.
- We will invite all nine awarded projects to participate in the pilot.
- Pilot participants will agree to coordinate with ODF to collect and report additional, specific post-treatment fuels and activity data as part of their monitoring requirements (Table A1).
- The additional data collected will be sufficient for future modeled wildfire risk outcome assessments should funding be allocated in the next biennium.

**Table A1 Additional outcome metrics that could be evaluated based on data availability**

Monitoring question	Outcome	Indicators	Scale	Description
A.1	Community wildfire risk reduction	Reduction in estimated particulate matter	Project, State	Use smoke model to estimate post-treatment reduction in PM 2.5 if a fire were to occur
		Change in eNVC	Project, State	Use FSim and state-wide risk assessment data to evaluate pre- and post-treatment risk and attribute changes to LRP projects
		Change in exposure to communities and critical infrastructure	Project, State	Use FSim and state-wide HVRA data to estimate any reduction in exposure that might have resulted from LRP projects
A.2	Landscape resilience	Changes in expected wildfire intensity	Treatment, Project, State	Use FSim to model fire behavior on both pre- and post-treatment landscapes and evaluate mean flame length and flame length exceedances
		Change in exposure to additional HVRA named by the project	Project, State	Use FSim and state-wide HVRA data to estimate any reduction in exposure that might have resulted from LRP projects

Assuming that the pilot is successful, and assuming that funding is allocated for a wildfire risk outcome assessment in the next biennium, we will be able to model post-treatment wildfire risk outcomes in a handful of the LRP projects. Specifically,

- we will be able to attribute spatial and quantified changes in risk and exposure to LRP investments;
- we will be able to attribute changes in wildfire behavior (e.g., size, intensity, etc.) to LRP investments;
- we may be able to attribute changes related to wildfire smoke mitigation and landscape resilience to LRP investments.

### **Assessment of impacts to local communities**

In addition to spatially explicit analysis of wildfire risk reduction on adjacent housing and infrastructure (see above), we will conduct a rapid assessment of the local social context of pilot participant projects in order to better characterize their socioeco-

nomics impacts. We will use publicly available data sources from Oregon Explorer as well as other secondary data sources (e.g., 2020 US Census, school district statistics, housing costs) to describe the current sociodemographic and economic characteristics of the communities within and adjacent to each project area, such as:

- Total population
- Ethnicity, income, and education
- General housing density characteristics
- Other important geographies of sociodemographic factors?
- Brief/general community history, noting social and economic factors that have shaped the current situation.

Lastly, we will contact three to five community leaders (from local government, businesses, or nonprofit organizations) to for a brief qualitative interview on their perceptions of the project and its impacts on to the local community, specifically with regards to socially vulnerable populations.

**Table A2 Additional monitoring data for pilot wildfire risk reduction modeling**

<b>Data need</b>	<b>Source</b>	<b>Partners</b>	<b>Description</b>
Post-treatment fuel characteristics	Projects, OSU	Projects, ODF, OSU	Fuel characteristics can be estimated directly by project participants, or estimated based on activity data and relying on disturbance and treatment “fuel rule” logic
Pre-treatment fuel characteristics	LANDFIRE, 2022 QRA	Projects, ODF, OSU	Our intent is to use the 2022 QRA to reflect pre-treatment conditions and augment as necessary based on feedback from projects
HVRAs of interest	Projects	Projects, ODF	In addition to communities and critical infrastructure, projects will have an opportunity to provide data about additional HVRAs for which they would like to assess outcomes
HVRA maps	2022 QRA	ODF, OSU	HVRA maps and response functions are required to assess changes in risk and exposure



