Natural Climate Solutions Project Guide

Oregon Association of Conservation Districts

Oregon Association of Conservation Districts

THE CLIMATE SOURCE

JANUARY 2025

Introduction

A Guide to Map Natural Climate Solutions to Carbon Benefits & Funding

This guide is designed to help Soil and Water Conservation District (SWCD) staff work with landowners, conservation managers, and stakeholders to identify and develop projects that qualify for carbon funding. By focusing on the intersection of conservation practices and carbon benefits, this guide offers a comprehensive framework for navigating the opportunities available to enhance both environmental outcomes and access to financial resources.

The goal of this guide is to bridge the gap between conservation efforts and climate action by helping users not only secure funding for natural climate solutions, but also prepare for future trends in carbon monitoring and market participation. **By aligning today's projects with tomorrow's carbon priorities, we can ensure that conservation work continues to generate tangible ecological and economic benefits.**

Overview

The following sections are categorized by key resource concerns, discovered by an interview process (See Appendix A: Methodology). Each category contains:

- **Project examples** with carbon benefit and indicators to be used as building blocks for expected outcomes.
- **Decision tree*** evaluates carbon funding potential for one of the project examples.
- **Direct example** applied to carbon monitoring steps.

**Not inclusive of all funding pathways*

Key Considerations from Interview Process

01 Landowners' primary reasons for engaging with SWCDs include efficiency improvement, soil erosion, and water quality.

02 Funding availability differs across districts (e.g., tax bases, resource concerns, project partners).

03 Timing is crucial for grant funding cycles and landowner priorities.

04 Historical trends are not predictive of future federal or state priorities.

05 Grant opportunities have not required or funded carbon sequestration monitoring.

Glossary

Term	Definition
Carbon Sequestration	The uptake and storage of carbon. Trees and plants, for example, absorb carbon dioxide, release the oxygen and store the carbon. Fossil fuels were at one time biomass and continue to store the carbon until burned.
Carbon Sinks	Carbon reservoirs and conditions that take-in and store more carbon (i.e., carbon sequestration) than they release. Carbon sinks can serve to partially offset greenhouse gas emissions. Forests and oceans are large carbon sinks.
Carbon Flux	The direction and rate of transfer, or flow, of carbon between Earth's carbon pools, such as the oceans, atmosphere, land, and other living things, typically measured in units of gigatonnes of carbon per year (GtC/yr.
Avoided Emissions	The prevention or reduction of greenhouse gas emissions that would have occurred in a business-as-usual scenario. This is achieved by implementing more sustainable practices, technologies, or policies.
Soil Organic Matter (SOM)	The portion of organic residues in soil in various stages of decay
Soil Organic Carbon (SOC)	The amount of carbon (C) contained in SOM (% of dry soil by mass).
Competitive Grant[24]	Funding awarded based on a competitive evaluation process where proposals from individuals or organizations are assessed for merit and alignment with specified criteria. The financial award provided by a government agency, foundation, corporation, or entity for a specific purpose or project, with no expectation of repayment.
Cost-Share Program[24]	Initiative requiring the grant recipient to contribute a specified percentage of the project's total costs. Cost share programs typically have a less rigorous application process but have clear guidelines that delineate what will be funded.

Glossary

Term	Definition
Financial Assistance[24]	Funding for equipment, supplies, planning, and infrastructure that support sustainable practice implementation.
Technical Assistance[24]	Expertise, support, and guidance that support sustainable practice implementation.
Match[24]	A portion of project funding that the grant recipient must contribute from its own resources or non-federal sources to supplement the grant award. The match can be an in-kind match (paid or volunteer labor, supplies, administrative expenses, etc.) or cash match (monetary contributions).

Key Acronyms

OACD Oregon Association of Conservation Districts

OAHP Oregon Agricultural Heritage Program

OWEB Oregon Watershed Enhancement Board

OrCP Oregon Conservation Partnership

ODFW Oregon Department of Fish and Wildlife

NRCS National Resources Conservation Service

EQIP Environmental Quality Incentives Program

RCPP Regional Conservation Partnership Program

NWL Natural and Working Lands

NGO Nongovernmental Organization

Communicating About Carbon Benefits

Click image for financial resources.

ENGAGING LANDOWNERS ON CARBON BENEFITS

- **Promote Peer Stories:** Heighten producers' voices about specific methods, time and cost requirements, and productivity improvements. Transparency about long-term climate resilience, drought resistance, and beneficial insect populations, and reduced dependency on inputs.
- **Maximize Financial Opportunities:** By grouping various resource needs, landowners can access funds that ensure consistent payments and maximize soil health benefits.
- **Open Discussions on Robust Monitoring:** Oregon Agricultural Heritage Program's (OAHP) payment-for-practice methodology highlights the value of engaging in carbon monitoring and potential markets.

COLLABORATING WITH PARTNERS ON CARBON MONITORING

- **Focus on Long-Term Goals:** Equipping landowners with training and resources for measuring carbon benefits ensures sustained engagement and success.
- **Monitor for Success:** Greater availability of monitoring equipment will enhance the ability to measure carbon sequestration across larger areas.
- **Leverage Insights:** OAHP's payment-for-practice model incentivizes project partners to quantify carbon and ecological benefits of conservation practices. Sharing this data helps attract additional funding and encourages wider participation from landowners.

> *Until now, we had our observations, yield data, resource agency testimony, field and species counts, and certification to third-party standards in support of our work. However, as ranchers, we had never formally "measured" or quantified our ecosystem deliverables. This work, giving us information we never had before, is a tool to influence future management and practices and supports an increased value of our harvest in markets. Importantly, it provides us with the data needed to potentially enter emerging ecosystem markets – an entirely new income stream.*

~ Jeanne Carver

IMPERIAL STOCK RANCH, SHANIKO WOOL COMPANY

Why Monitoring?

FUNDING PROGRAMS TREND TOWARD INCREASED MONITORING

Monitoring is critical for ensuring that conservation programs achieve measurable outcomes and adapt to changing conditions. Federal, state, and private funding programs are increasingly prioritizing robust monitoring to demonstrate accountability, track progress, and justify continued investments. This trend reflects a broader recognition that data-driven insights are essential for maximizing program efficiency and impact.

Click image for monitoring guidance.

THEORY OF CHANGE FRAMEWORK PROVIDES A SYSTEMATIC APPROACH

A theory of change framework guides monitoring efforts by linking actions to desired outcomes. This approach helps stakeholders to identify successes, address gaps, and apply lessons learned across program cycles. By embedding monitoring within this framework, organizations can drive continuous improvement and deliver more significant, scalable, and lasting positive change.

Input	Output	Outcomes	Impact
Specific activities selected to achieve desired outcomes.	Direct and measurable results of the input.	Quantitative or qualitative indicators of achievement over time.	Long-term, lasting changes that a project aims to achieve beyond immediate outputs or short-term outcomes.

Evaluating Carbon Funding Potential

This decision tree framework is applied to project examples in the following sections.

Practice Selection

Does the selected practice have funding available?

YES

NO

Navigate to Oregon Regional Conservation Partnership (OrCP) Grant Hub

Does the selected practice have a known carbon benefit?

YES

NO

Identify stacked practices that complement the resource concern.

Is there known funding for monitoring?

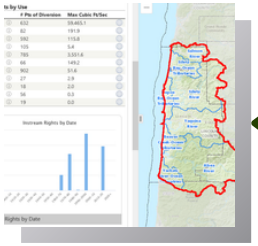
YES

NO

Establish outcome metrics and monitoring capability.

Partner with state agency programs or NGO for an in-kind match.

Apply for separate monitoring grant with OWEB or existing RCPP project.



Click here to navigate to a project example

Navigation Menu

Navigate to each project category using the links described below:

1. Click the **Category** to navigate to a list of project examples mapped to carbon benefits.
2. Click the linked **Example** to navigate to the decision tree.

Category	Description	Project Examples
Soil Management	Improving or maintaining soil quality and productivity.	Cover crops, No-till/ Reduced Tillage, Soil amendments, Crop rotation
Vegetation Management	Managing plant communities to improve health and reduce invasive species.	Invasive species removal, Restoring native vegetation, Intercropping, Windbreaks
Riparian Restoration	Enhancing and restoring the health of riparian zones along waterways.	Restoring streamside vegetation, Gully stabilization, Buffer strip, Fencing
Livestock Management	Implementing practices to improve livestock health and productivity.	Grazing management, Manure management, Planting trees for shade
Forest Management	Enhancing forest health, productivity, and biodiversity.	Oak restoration, Fuels-reduction work, Pest control, Habitat improvement
Infrastructure Improvements	Involving infrastructure intended to optimize water or energy use efficiency.	Irrigation upgrades, Irrigation management, Off-stream watering

Soil Management

Project Examples

Click image for detailed metrics.

	Landowner Value	Carbon Benefit	Success Metrics
 **Cover Crops** [1,2]	Improved soil health & water retention, enhanced biodiversity, reduced need for fertilizers & erosion	Increased soil organic carbon (SOC) through improved water use efficiency	Acres planted Reduction in synthetic fertilizer usage
 **Reduced or No Tillage**[3]	Minimized soil disturbance, maintained structure, improved soil moisture retention, reduced erosion & fuel use	Reduced carbon leakage from soil, enhanced soil carbon sequestration	Acres by tillage regime Reduction in synthetic fertilizer usage
 **Soil Amendments** (biochar[4], compost[5])	Enhanced soil fertility, improved water retention, reduced need for synthetic fertilizers	Long-term carbon sequestration in soil, reduced methane emissions from organic waste	Acres applied Crop yield improvements, reduction in synthetic fertilizer usage
 **Crop Rotation**[6]	Enhanced soil fertility, reduced pest pressure, enhanced biodiversity, break pest and disease cycles	Improved soil organic carbon, reduced greenhouse gas emissions via reduced fertilizer use	Acres by rotation Crop yield improvements, pest pressure reduction

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**Superscript numbers refer to Resource ID listed in Appendix C.*

Soil Management

Decision Tree

Once a practice is selected (e.g., crop rotation), apply the decision tree framework to evaluate carbon funding potential.

Does the selected practice have funding available?

YES

NO

Filter Grant Hub's *Resource Concern** column in to "Soil health" or "Agriculture"

Is there a known carbon benefit?

YES

NO

Improved SOC, reduced fertilizer use

Add intercropping, windbreaks, or replanting native species

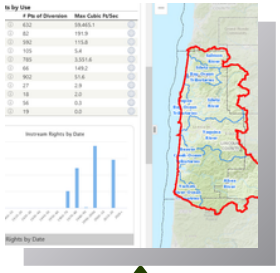
Is there known funding for monitoring?

YES

NO

# of acres, reduction in synthetic fertilizer usage

Partner with an NGO for in-kind match.



Continue to monitoring and reporting steps.

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**selection criteria is subject to change*

Soil Management

Direct Example

Farm Name

BOUNDLESS FARMSTEAD

David, Megan, and Boundless Crew

Resource Concern

Soil and wind erosion

Practice Selection

Cover cropping, Crop rotation

Our farm fertility and health is based around these practices: cover cropping and crop rotation.

Liam Pickhardt Photography

Click the image for project information

Application of Carbon Monitoring

Carbon Benefit

Direct: enhanced organic matter, erosion control; *Indirect:* nutrient cycling, creation of insectaries and pollinator habitats.

Success Metrics

Soil test before and after project implementation (e.g., soil pH, SOC levels, soil texture, crop yield, water retention)

Monitoring Capability

Physical soil tests, lab availability, labor and training

Track Progress

Document annual change in soil health, biodiversity, and productivity to create a compelling narrative and link conservation practices to broader carbon market penetration.

Expand Market + Secure Funding

Vegetation Management

Project Examples

	Landowner Value	Carbon Benefit	Success Metrics
 **Invasive Species Removal**[7]	Restored ecosystem balance, promote native biodiversity, reduced competition for resources	Indirect carbon benefits through the restoration of native vegetation and nutrient use efficiency	Area of invasive species removed Biodiversity improvements, native species recovery
 **Restoring Native Vegetation**[8]	Enhanced wildlife habitat, improved soil health, prevent erosion, restored ecosystem balance	Direct carbon sequestration in restored vegetation and improved soil carbon storage	Native plants established per unit area Species richness
 **Intercropping**[9]	Enhanced biodiversity and resource use, improved nutrient cycling and pest control, increased crop yields	Increased carbon sequestration through diversified plant biomass and improved soil health	Acres planted Crop yield per unit area, pest and disease incidence
 **Drift-Reducing Hedgerows or Windbreaks**[10]	Reduced pesticide drift and wind erosion, enhanced pollinator habitat, provide shelter for livestock	Sequester carbon in biomass, protect adjacent crops and habitats	Length of hedgerows established Reduction in wind erosion, pollinator activity

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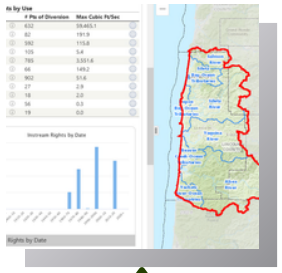
Vegetation Management

Decision Tree

Once a practice is selected (e.g., Juniper removal), apply the decision tree framework to evaluate carbon funding potential.

Does the selected practice have funding available?

- **YES** → **Is there a known carbon benefit?**
  - **YES** → Indirect carbon benefit through restoration of native vegetation → **Is there known funding for monitoring?**
    - **YES** → Area of invasive species removed, biodiversity improvement
    - **NO** → Apply for separate monitoring grant with OWEB
  - **NO** → Add restoring native vegetation → Indirect carbon benefit through restoration of native vegetation
- **NO** → Filter Grant Hub's *Resource Concern** column to "Oak & prairie", "Uplands", "Agriculture", or "Wildlife habitat"



Continue to monitoring and reporting steps.

**selection criteria is subject to change*

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Vegetation Management

Direct Example

Organization Name

HIGH DESERT Partnership

Southeast Oregon Wildfire Resiliency

Click the image for project information

Resource Concern

Fire resiliency

Practice Selection

Juniper removal, Reseeding

Application of Carbon Monitoring

Carbon Benefit

Direct: improved soil organic matter (SOM); *Indirect:* increased water and nutrient use efficiency, biodiversity recovery

Success Metrics

SOM per hectare, native species diversity, acres treated and restored

Monitoring Capability

Flexible resource allocation and management to accomodate unexpected changes, such as geographical scope or impact assessment results

Track Progress

Visual soil assessments, monitoring of native plants, and water retention metrics can highlight ecosystem health and boost Harney SWCD's case for future funding and fire resilience benefits.

Expand Market + Secure Funding

Riparian Restoration

Project Examples

	Landowner Value	Carbon Benefit	Success Metrics
 **Restoring Streamside Vegetation**[11]	Improved water quality, provided wildlife habitat, reduced erosion, enhanced biodiversity	Sequester carbon in plant biomass, soil and riparian zones	Area planted, reduction in sediment runoff Species richness, improved water quality, habitat health
 **Gully Stabilization**[12]	Improved water quality, protect infrastructure, reduced sedimentation, enhanced aquatic habitats, prevent erosion	Indirect carbon benefit from reduced soil erosion and preservation of organic matter	Structures installed, area impacted Reduction in erosion rates, enhanced groundwater recharge
 **Buffer Strip Planting**[13]	Improved water quality, provided wildlife corridors, reduced pesticide and nutrient runoff	Sequester carbon in vegetation and soil, reduced soil carbon loss from erosion	Area planted Fertilizer savings, stabilized topsoil, biodiversity indicators
 **Streamside Fencing**[14,15]	Protected water quality, prevented habitat degradation, reduced nutrient and bacterial contamination	Indirect carbon benefit through reduced soil compaction and erosion, and protection of vegetation	Length of fencing installed Reduction in water contamination, vegetation regrowth

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Riparian Restoration

Decision Tree

Once a practice is selected (e.g., streamside fencing), apply the decision tree framework to evaluate carbon funding potential.

Does the selected practice have funding available?

YES

NO

Filter Grant Hub's *Resource Concern** column to "Wetlands & riparian" or "Water quality"

Is there a known carbon benefit?

YES

NO

Indirect carbon benefit from reduced soil erosion and preservation of organic matter

Add forest buffers and grazing management

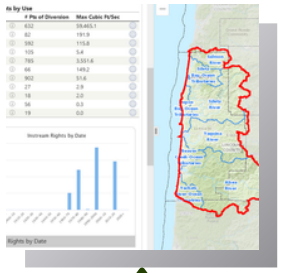
Is there known funding for monitoring?

YES

NO

Length of fencing installed, reduction in water contamination

Apply for OAHP payment-for-practice



Continue to monitoring and reporting steps.

**selection criteria is subject to change*

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Riparian Restoration

Direct Example

Organization Name

the OREGON CONSERVATION STRATEGY

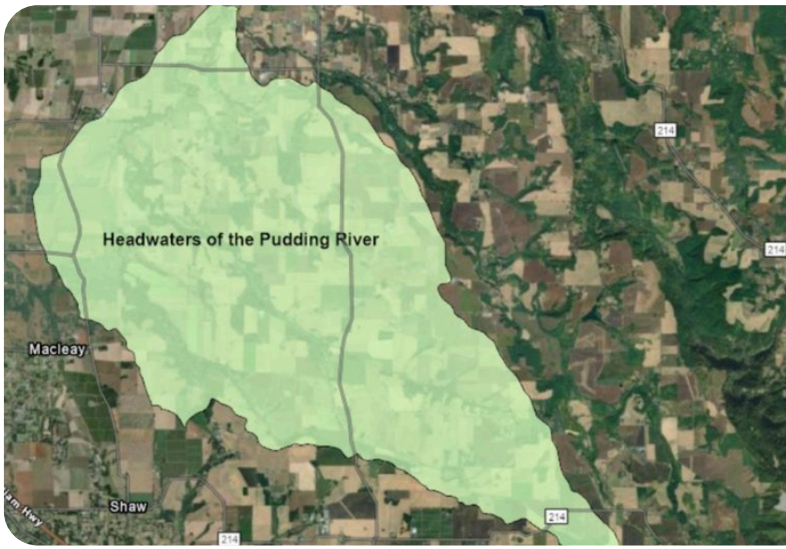
Pudding River Area Project

Resource Concern

Soil runoff, Water quality

Practice Selection

Cover cropping, filter strips, field borders, and riparian buffer enhancements



Click the image for project information

Application of Carbon Monitoring

Carbon Benefit

Direct: improves topsoil, decreases reliance on synthetic fertilizers;
Indirect: improves water quality, boosts habitat health, strengthens ecological resilience

Success Metrics

Soil stability, biodiversity indicators, acres seeded, water retention tests

Monitoring Capability

Equipped for soil and water quality testing, access to lab resources, labor and training

Track Progress

Long-term tracking will demonstrate carbon flux and improve forecast modeling for landowners in the Marion SWCD, supporting better land management decisions.

Expand Market + Secure Funding

Livestock Management

Project Examples

	Landowner Value	Carbon Benefit	Success Metrics
 **Grazing Management**[16]	Improved forage quality, increased biodiversity, reduced soil erosion	Higher SOC levels on permanent pasture systems, lower manure management emissions	Acres grazed, % of feed from grazing Forage production, soil texture, livestock health indicators
 **Manure Management**[17]	Improved water quality, reduced odor and pathogen levels, enhanced nutrient cycling	Reduced methane emissions from manure decomposition, increased carbon sequestration in soils	Manure incorporation Methane emissions reduction, nutrient availability, water quality
 **Planting Trees for Shade in Pastures**[18]	Enhanced animal comfort, reduced heat stress, increased pasture productivity, reduced evaporation	Sequestered carbon in trees and soil, reduced soil carbon loss	Trees planted, pasture temperatures Livestock health and productivity indicators, pasture yield

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Livestock Management

Decision Tree

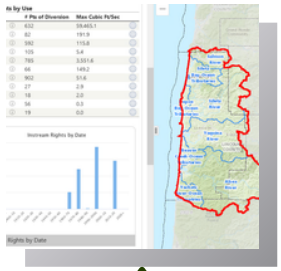
Once a practice is selected (e.g., virtual fencing), apply the decision tree framework to evaluate carbon funding potential.

Does the selected practice have funding available?

- **YES** → **Is there a known carbon benefit?**
  - **YES** → Indirect carbon benefit through improved pasture management; reduced water stress on ecosystems
  - **NO** → Add cover cropping or residual management for improved forage quality
- **NO** → Filter Grant Hub's *Resource Concern** column to "Rangeland health" or *Project Type** to "Pasture management"

Is there known funding for monitoring?

- **YES** → Soil nutrient levels, water quality, pasture yield
- **NO** → Apply for OAHP payment-for-practice



Continue to monitoring and reporting steps.

**selection criteria is subject to change*

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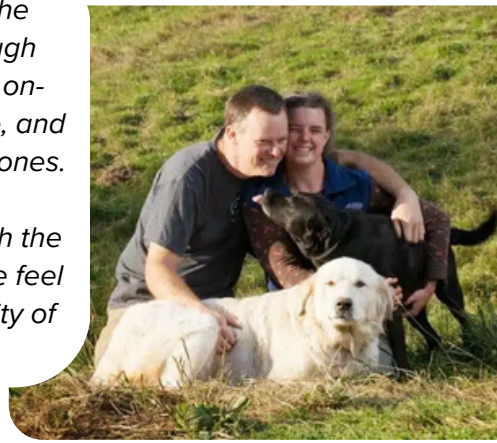
Livestock Management

Direct Example

Farm Name

We strive to continually rebuild the soil fertility on our property through multi-species rotational grazing, on-farm composting, minimal tillage, and protection of sensitive riparian zones. We also care deeply about our animals and treat all of them with the utmost care and respect, and we feel they return this favor in the quality of products they provide.



Click the image for project information

Resource Concern

Soil fertility, Riparian zones, Animal welfare

Practice Selection

Multi-species rotational grazing, minimal tillage, on-farm composting

Application of Carbon Monitoring

Carbon Benefit

Direct - increases soil organic matter, improves nutrient cycling, enhanced water retention; *Indirect* - minimizes soil disturbance, promotes plant diversity.

Success Metrics

Reduction in synthetic fertilizer use and balanced nitrogen levels in soil.

Monitoring Capability

Soil testing equipment, fertilizer purchase receipts; field-level sensors for plant diversity and moisture levels are nice to have.

Track Progress

Monitoring reductions in synthetic fertilizer use and nitrogen loss will provide measurable evidence of environmental impact, linking improved soil health to long-term carbon storage and supporting future funding.

Expand Market + Secure Funding

Forest Management

Project Examples

	Landowner Value	Carbon Benefit	Success Metrics
 **Oak Restoration**[19]	Enhanced wildlife habitat, protected water resources, supported native plant communities	Sequestered carbon in tree biomass and soil, long-term carbon storage	Acres restored Species richness, erosion prevention, increased carbon storage in biomass
 **Fuels Reduction**[20]	Reduced wildfire risk, protected ecosystems, reduced property damage, improved air quality	Prevented carbon release from wildfires, maintained carbon stocks in vegetation	Acres treated, fuel load measurements Reduction in fire severity, carbon retention
 **Pest Control**[21]	Improved crop yield, reduced pesticide use, enhanced biodiversity	Indirect carbon benefit through reduced crop losses and improved plant growth	Acres treated, pesticide usage Reduction in crop damage, biodiversity indicators
 **Habitat Improvement**[22]	Increased biodiversity, improved ecosystem services, enhanced water quality	Sequestered carbon in vegetation and soils, improved carbon storage in ecosystems	Habitats created or restored Species diversity, ecosystem health indicators

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Forest Management

Decision Tree

Once a practice is selected (e.g., fuels reduction), apply the decision tree framework to evaluate carbon funding potential.

Does the selected practice have funding available?

YES

NO

Filter Grant Hub's *Resource Concern** to "Forest health" or "Fire resilience" or *Project Types** to "Forest management"

Is there a known carbon benefit?

YES

NO

Prevent carbon releases from wildfires

Add biochar application

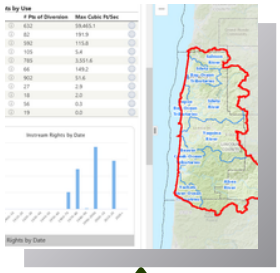
Is there known funding for monitoring?

YES

NO

acres restored, reduction in fire severity, species diversity

Partner with an NGO for in-kind match.



Continue to monitoring and reporting steps.

**selection criteria is subject to change*

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Forest Management

Direct Example

Organization Name

The Klamath Tribes
Klamath-Modoc-Yahooskin

Resource Concern

Forest restoration, habitat improvement

Practice Selection

Eliminate brush using prescribed fire; thinning and clearing of wood debris

Click the image for project information

Application of Carbon Monitoring

Carbon Benefit

Direct: prevents carbon release from wildfires, supports long-term carbon storage;
Indirect: restores ecosystem balance, enhancing biodiversity and habitat quality.

Success Metrics

Acres applied, species diversity, and habitat types restored

Monitoring Capability

Biodiversity surveys, soil sampling, and forest health monitoring assessments supported by GIS mapping tools and carbon accounting models.

Track Progress

Annual reports tracking fire risk reductions and comparisons between treated and untreated areas highlight project effectiveness and broader ecological benefits, while strengthening landowner engagement for future projects.

Expand Market + Secure Funding

Infrastructure Improvement

Project Examples

	Landowner Value	Carbon Benefit	Success Metrics
 **Irrigation Upgrades**[23]	Improved water use efficiency, improved crop yield, reduced water waste, enhanced drought resilience	Indirect carbon benefit through efficiency and reduced energy use	Pumps installed, water and energy savings Crop yield improvements
 **Irrigation Management**[24]	Improved crop quality, reduced runoff, enhanced water conservation	Indirect carbon benefit through efficiency and reduced energy use	Acres monitored, water and energy savings Crop yield, soil moisture levels
 **Off-stream Watering or Livestock Pipeline**[25]	Water use efficiency, reduced pressure on natural water sources, improved pasture distribution, reduced soil compaction	Indirect carbon benefit through improved pasture management and reduced water stress on ecosystems	Length of pipeline installed, acres stabilized Water delivery, livestock and pasture health indicators

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Infrastructure Improvement

Decision Tree

Once a practice is selected (e.g., pivot irrigation), apply the decision tree framework to evaluate carbon funding potential.

Does the selected practice have funding available?

YES

NO

Filter Grant Hub's *Project Types** column to "Infrastructure improvement" or "Water management"

Is there a known carbon benefit?

YES

NO

Add practice that addresses soil health to improve carbon funding potential

Improved water use efficiency

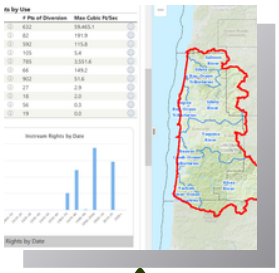
Is there known funding for monitoring?

YES

NO

Partner with an NGO for in-kind match.

Water use efficiency, crop yield, soil moisture levels



Continue to monitoring and reporting steps.

**selection criteria is subject to change*

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Infrastructure Improvement

Direct Example

Organization Name

DESCHUTES RIVER CONSERVANCY

Resource Concern Water use efficiency

Practice Selection Pressurized pipe irrigation upgrade

Click here for project information

Application of Carbon Monitoring

Carbon Benefit *Direct: r*educes energy consumption for water delivery; *Indirect:* supports river ecosystems by maintaining streamflow & improving habitat conditions

Success Metrics Miles of open canal, water savings (cubic feet per second), cost savings, crop yields

Monitoring Capability Flow meters, water utility bills, crop productivity surveys

Track Progress

Reporting reductions in energy use and cost savings strengthen the case for additional federal-funded projects, showcasing both environmental benefits and long-term cost savings.

Expand Market + Secure Funding

Beaver Creek Watershed Restoration

A Ridgetop-to-Ridgetop Example with Future Applications of Carbon Monitoring

Mountain goat in a juniper cut near the watershed boundary of the Beaver Creek Drainage
June 12, 2024

Project Example

The Beaver Creek Watershed Restoration in Jefferson SWCD leveraged $805k funding from multiple sources, including Oregon Watershed Enhancement Board (OWEB), Bonneville Power Administration (BPA), Portland General Electric (PGE), and Jefferson County. Landowners contributed through in-kind matches, demonstrating a collaborative approach to watershed management. Treatment included juniper removal, forest stand improvement, range seeding, prescribed burns, fencing and more. Success indicators for the project were measured by the area restored (e.g., grassland area treated, square footage of fencing construction) and the number of installations (e.g., new spring developments and culvert replacements). These metrics helped illustrate the tangible benefits of the restoration efforts.

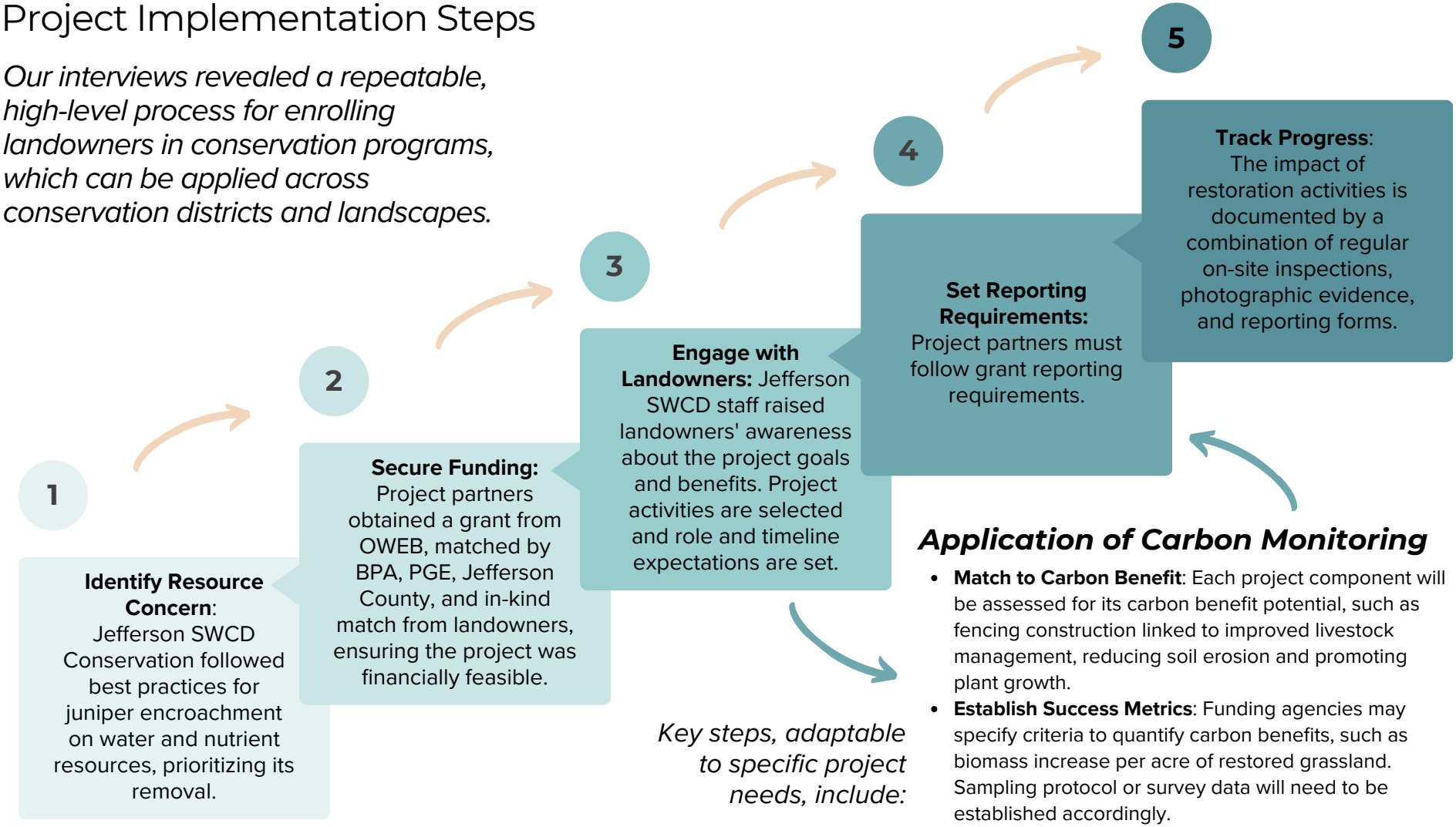
Future Application

In a future where carbon sequestration monitoring is essential for project funding, this ridgetop-to-ridgetop strategy could emphasize its contributions to both water quality and carbon capture. Conservation managers would monitor soil organic carbon before and after practice implementation. Quantifiable metrics can expand the financial and geographical scope of project. Evidence-based storytelling validates the SWCD's investment and sets a model for regions aiming to integrate carbon monitoring into conservation projects. Refer to Oregon Global Warming Commission's 2023 Natural Working Lands Report for recommended metrics. *The next page applies carbon monitoring to existing project implementation steps.*

Beaver Creek Watershed Restoration

Project Implementation Steps

Our interviews revealed a repeatable, high-level process for enrolling landowners in conservation programs, which can be applied across conservation districts and landscapes.



Key steps, adaptable to specific project needs, include:

Application of Carbon Monitoring

- **Match to Carbon Benefit**: Each project component will be assessed for its carbon benefit potential, such as fencing construction linked to improved livestock management, reducing soil erosion and promoting plant growth.
- **Establish Success Metrics**: Funding agencies may specify criteria to quantify carbon benefits, such as biomass increase per acre of restored grassland. Sampling protocol or survey data will need to be established accordingly.
- **Assess Monitoring Capability**: Ensure adequate equipment and labor are allocated for monitoring carbon benefits throughout the project.

Preparing for the Future of Natural Climate Solutions

This guide highlights the growing link between conservation, carbon sequestration, and funding opportunities, providing a foundation for aligning natural climate solutions with environmental and financial goals. The featured projects and practices highlighted offer landowners, conservation managers, and other stakeholders a pathway to leverage current grants while preparing for future carbon benefits.

Though carbon sequestration may not always be the primary focus of today's conservation efforts, its potential to become a key measure of success is clear. Examples in this guide—such as intercropping, livestock fencing, and thinning—demonstrate how forward-thinking approaches can strengthen long-term climate resilience. Integrating carbon monitoring and baseline assessments positions stakeholders to meet evolving federal and state priorities focused on carbon metrics.

By addressing resource concerns through efficiency, productivity, and ecological health, conservation managers can build more compelling narratives for current funding and future participation in carbon markets. Each discovered project provided further insights on tracking ecosystem services emphasizing the importance of monitoring impacts to boost project success and unlock new revenue streams, such as OAHP's payment-for-practice system.

In conclusion, this guide equips SWCDs to work with landowners and conservation partners in an evolving landscape. As more sophisticated tools for carbon monitoring and ecosystem service valuation become available, those who have already laid the groundwork will be well-positioned to benefit from these new opportunities and requirements.

Appendices

Appendix A: Methodology

Appendix B: Funding Entity List

Appendix C: Resources

THE CLIMATE SOURCE

OCTOBER 2024

Methodology

Appendix A

IDENTIFYING RESOURCE CONCERNS LINKED TO CARBON POTENTIAL

To inform this guide, the Climate Source team conducted interviews with Soil and Water Conservation Districts (SWCDs), Watershed Councils, Oregon Watershed Enhancement Board (OWEB) representatives, and land trusts. These conversations revealed critical insights into the landowner value proposition, grant funding mechanisms, and data collection capabilities. Using this feedback, we categorized key resource concerns, matched them to carbon benefits, and outlined relevant funding opportunities.

COLLABORATIVE DECISION-MAKING FOR EFFECTIVE IMPLEMENTATION

We assume that if a landowner has expressed concern to their respective SWCD, and a Conservation Manager has arranged an on-site visit, they may collaborate with experts from the Natural Resources Conservation Service (NRCS) and other relevant specialists to develop recommended solutions. The decision tree was designed to align identified concerns with direct or indirect carbon sequestration benefits, potential opportunities for stacked practices, and funding for monitoring capabilities.

Funding Entity List

Appendix B

Grant Hub coming soon

LEVEL	AGENCY	FUNDING TYPE(S)	PRIMARY FOCUS	PROGRAM EXAMPLE
Federal	Natural Resources Conservation Service (NRCS)	FA + TA; Cost-share programs	Conservation planning and technology adoption	EQIP, CSP, RCPP
Federal	Farm Service Agency (FSA)	FA + TA	High-priority conservation issues and emergency funding	CREP
Federal	U.S. Fish and Wildlife Service (FWS)	FA; Competitive grants	Wildlife habitat conservation	National Fish Habitat Partnership Coordination
Federal	Rural Development (RD)	TA	Rural and tribal communities	Agriculture Innovation Center Program
Federal	Environmental Protection Agency (EPA)	Cost-share programs	Livestock and crop production	CPRG
Federal	Bureau of Reclamation (BOR)	FA	Water management improvements	WaterSMART
Federal	Bureau of Land Management (BLM)	FA	Land acquisition for natural resources and cultural heritage	LWCF
State	Oregon Agriculture Heritage Program (OAHP)	FA + TA	Agricultural heritage preservation; Payment for practice	Conservation management planning
State	Oregon Watershed Enhancement Board (OWEB)	Competitive grants	Watershed enhancement and habitat restoration	Operating Capacity

FA - Financial Assistance; *TA* - Technical Assistance; EQIP - Environmental Quality Incentives Program; *CSP* - Conservation Stewardship Program; *RCPP* - Regional Conservation Partnership Program; *CREP* - Conservation Reserve Enhancement Program; *CPRG* - Climate Pollution Reduction Grants; *LWCF* - Land and Water Conservation Fund

Funding Entity List

Appendix B

Grant Hub coming soon

LEVEL	AGENCY	FUNDING TYPE(S)	PRIMARY FOCUS	PROGRAM EXAMPLE
State	Oregon Department of Agriculture (ODA)	Competitive grants	Agricultural development and environmental management	RFSI
State	Bonneville Power Administration (BPA)	Cost-share programs	Energy efficiency and renewable energy projects	Fish & Wildlife Program
State	Department of Environmental Quality (DEQ)	Competitive grants; Loans	Water infrastructure	CWSRF
State	Oregon Department of Fish & Wildlife (ODFW)	Competitive grants with match criteria	Habitat	OCRF
State	Oregon Parks & Recreation Department (OPRD)	Competitive grants with match criteria	Land acquisition, development, and major rehabilitation projects	LGGP
State	Department of Land Conservation and Development (DLCD)	FA + TA; Competitive grants with match criteria	Local and tribal community focus for planning activities	OCMP, TGM
Private	National Fish and Wildlife Foundation (NFWF)	Competitive grant with match criteria	Fish, wildlife, plants and habitats	Klamath Basin Restoration Program
Private	National Forest Foundation (NFF)	Competitive grants	Forest stewardship activities	Collaborative Capacity Program
Private	Grey Family Foundation	Competitive grants	Community-led or tribal agencies with education programs	Environmental Education Grant

RFSI - Resilient Food Systems Infrastructure; *CWSRF* - Clean Water State Revolving Fund; *OCRF* - Oregon Conservation & Recreation Fund; *LGGP* - Local Government Grant Program; *OCMP* - Oregon Coast Management Program; *TGM* - Transportation and Growth Management

Resources

Appendix C

#	Resource
1	USDA Sustainable Agriculture Research & Education (SARE). (2020). Cover Crops for Sustainable Crop Rotations. https://www.sare.org/resources/cover-crops/
2	C. Ye, S.J. Hall Mechanisms underlying limited soil carbon gains in perennial and cover-cropped bioenergy systems revealed by stable isotopes GCB Bioenergy, 12 (1) (2020), pp. 101-117, 10.1111/gcbb.12657
3	West, T. O., & Marland, G. (2002). A Synthesis of Carbon Sequestration, Carbon Emissions, and Net Carbon Flux in Agriculture: Comparing Tillage Practices in the United States. Agriculture, Ecosystems & Environment, 91(1-3), 217-232.
4	Woolf, Dominic & Amonette, James & Street-Perrott, F. & Lehmann, Johannes & Joseph, S.. (2010). Sustainable biochar to mitigate global climate change. Nat Comm 1:56. Nature communications. 1. 56. 10.1038/ncomms1053.
5	Brown, S., Kruger, C., & Subler, S. (2008). Greenhouse Gas Balance for Composting Operations. Journal of Environmental Quality, 37(4), 1396-1410.
6	USDA Natural Resources Conservation Service (NRCS). Conservation Crop Rotation. https://www.nrcs.usda.gov/resources/guides-and-instructions/conservation-crop-rotation-ac-328-conservation-practice-standard.
7	Beaury, E.M., Fusco, E.J., Jackson, M.R. et al. Incorporating climate change into invasive species management: insights from managers. Biol Invasions 22, 233–252 (2020). https://doi.org/10.1007/s10530-019-02087-6.
8	US FS. (2010). SL Shafer, et al. The Potential Effects of Climate Change on Oregon's Vegetation. https://www.fs.usda.gov/pnw/olympia/silv/publications/opt/660_ShaferEtal2010.pdf.
9	Huss CP, Holmes KD, Blubaugh CK. Benefits and Risks of Intercropping for Crop Resilience and Pest Management. J Econ Entomol. 2022 Oct 12;115(5):1350-1362. doi: 10.1093/jee/toac045. PMID: 35452091.
10	Matthew M. Smith, et al. Windbreaks in the United States: A systematic review of producer-reported benefits, challenges, management activities and drivers of adoption, Agricultural Systems, https://doi.org/10.1016/j.agsy.2020.103032.
11	Richardson, C., et al. (2011). Integrated Stream and Wetland Restoration: A Watershed Approach to Improved Water Quality on the Landscape. Ecological Engineering. 37. 25-39. 10.1016/j.ecoleng.2010.09.005.
12	NRCS Conservation Practice Effects - Network Diagram. https://www.nrcs.usda.gov/sites/default/files/2022-09/Channel_Bed_Stabilization_584_NHCP_NED_2021.pdf
13	USDA NRCS. (2000). Conservation Buffers to Reduce Pesticide Losses. https://efotg.sc.egov.usda.gov/references/public/va/ConservationBuffertoReducePesticideLosses.pdf

Resources

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#	Resource
14	George, M. R., Larsen, R. E., McDougald, N. K., Tate, K. W., Gerlach, J. D., & Fulgham, K. O. (2002). Cattle Grazing Impact on Stream Channels and Vegetation. Journal of Range Management, 55(5), 426-432.
15	Chesapeak Bay Foundation. Streamside Fencing. https://www.cbf.org/issues/agriculture/streamside-fencing.html
16	USDA Climate Hubs. Rotational Grazing for Climate Resilience.https://www.climatehubs.usda.gov/hubs/international/topic/rotational-grazing-climate-resilience.
17	EPA. (2020). AgStar. Practices to Reduce Methane Emissions from Livestock Manure Management. https://www.epa.gov/agstar/practices-reduce-methane-emissions-livestock-manure-management.
18	Sharrow, S., Ismail, S. Carbon and nitrogen storage in agroforests, tree plantations, and pastures in western Oregon, USA. Agroforestry Systems 60, 123–130 (2004). https://doi.org/10.1023/B:AGFO.0000013267.87896.41
19	USDA NRCS. (2011). Livestock Pipeline Practice Standard. https://www.nrcs.usda.gov/resources/guides-and-instructions/livestock-pipeline-ft-516-conservation-practice-standard.
20	Society for Ecological Restoration (2023). Mitigating Climate Change with Woodland Restoration & Oak Regeneration in Polk County, Iowa, USA. https://www.ser.org/news/641638/Mitigating-Climate-Change-with-Woodland-Restoration--Oak-Regeneration-in-Polk-County-Iowa-USA.htm.
21	Reinhardt, E., & Holsinger, L. (2010). Effects of Fuel Treatments on Carbon-Disturbance Relationships in Forests of the Northern Rocky Mountains. Forest Ecology and Management, 259(8), 1427-1435.
22	Oregon State University Extension Service. Oregon Integrated Pest Management Center (OIPMC). https://agsci.oregonstate.edu/oipmc.
23	Oregon Forest Resource Institute Carbon In Oregon's Managed Forests. https://site.oregonforests.org/sites/default/files/2020-07/OFRI_CarbonSpecialReport_DIGITAL.pdf.
24	Irrigation Efficiency for Producers in Oregon. Oregon Department of Energy. September 6, 2024. https://storymaps.arcgis.com/stories/9bcca70dad424d30a567d56e7c51cf09
25	"Grants for Organizations That Support Dairy Sustainability." National Dairy Farm, 1 Mar. 2023, nationaldairyfarm.com/wp-content/uploads/2024/03/Accessing-Conservation-Funds_3.1.2023.pdf.
26	"Stewardship Contracting." U.S. Forest Service, www.fs.usda.gov/restoration/Stewardship_Contracting/faqs.shtml#:~:text=Stewardship%20Contracts%20are%20contracts%20by,revenues%20to%20the%20U.S.%20Treasury%20.

Resources

Appendix C

#	Resource
27	“Soil Health and Carbon Sequestration.” Oregon Association of Conservation Districts. oacdcarbon.org
28	"Natural Benefit Solutions Explorer.” UN Global Compact. https://nbsbenefitsexplorer.net/tool#
29	“Grant Programs.” Oregon Watershed Enhancement Board. https://www.oregon.gov/oweb/pages/index.aspx
30	Oregon Conservation Strategy. https://www.oregonconservationstrategy.org/
31	Figueroa, A. “Oregon commission approves ‘carbon capture’ fund for state’s natural and working lands.” Oregon Public Broadcasting. 29 Jan. 2024, https://www.opb.org/article/2024/01/29/oregon-climate-environment-action-commission-greenhouse-gas-investment-pollution/
32	“Land and Water Conservation Fund.” Oregon Parks and Recreation. https://www.oregon.gov/oprd/GRA/Pages/GRA-lwcf.aspx
33	“Climate-Related Technical Resources.” OWEB. 11 Apr. 2023, https://www.oregon.gov/oweb/Documents/Climate-Related-Technical-Resources.pdf
34	"State Healthy Soil Policy Map”. Nerds for Earth. 10 Feb. 2024, https://nerdsforearth.com/state-healthy-soils-policy/
35	"Oregon Pasture Network.” https://friendsoffamilyfarmers.org/opn/
36	“Natural Working Lands 2023 Report.” Oregon Climate Action Commission. https://climate.oregon.gov/natural-working-lands
37	“Conserved Lands”. North Coast Land Conservancy. https://nclctrust.org/conserved-lands/
38	Graves RA, Haugo RD, Holz A, NielsenPincus M, Jones A, Kellogg B, et al. (2020) Potential greenhouse gas reductions from Natural Climate Solutions in Oregon, USA. PLoS ONE 15 (4): e0230424. https://doi.org/10.1371/journal. pone.0230424
39	Senate Bill 530. Oregon Legislative Assembly 2023. https://olis.oregonlegislature.gov/liz/2023R1/Downloads/MeasureDocument/SB0530/A-Engrossed.
40	“Oregon’s Strategic Approach to Conservation.” United States Department of Agriculture. https://nrcs.maps.arcgis.com/apps/MapSeries/index.html?appid=a7e88f3183584df985133dfaf1a30368
41	Farm and Ranch Protection Plan. Oregon Agriculture Trust. 12 May 2022, https://storymaps.arcgis.com/stories/5e3e8aed72e24b25ab8e6a37c4d0f3ba
42	Funding Opportunities. Oregon Climate & Agriculture Network. https://www.oregonclimateag.org/resources

Thank you!

Oregon Association of Conservation Districts

THE CLIMATE SOURCE

Andrea Kreiner

andrea.kreiner@oacd.org

Benjamin Filippo

benjamin@climatesource.ag

Maggie Greenberg

rooteddatadedesign@gmail.com