

LARIMER COUNTY | ENGINEERING DEPARTMENT

P.O. Box 1190, Fort Collins, Colorado 80522-1190, 970.498.5700, Larimer.gov

The role of the Advisory Board is to advise the Board of County Commissioners and appropriate departments on environmental and science-related issues that affect Larimer County.

Environmental and Science Advisory Board.

MINUTES.

Date: November 12th, 2024.

Time: 6:00 – 9:00 p.m.

Location: Rm 150 Carter Lake, 200 West Oak St., Fort Collins, Colorado and Virtual by Zoom.

Contact: Shelley Bayard de Volo, sbayard@larimer.org or 970.498.5738.

MEMBERS	-	STAFF	-	GUESTS
Rodger Ames – Chair	X	John Kefalas *	X	-
Tasha Carr	X	Shelley Bayard de Volo ¥	X	-
Anna Cloud	X	Joshua Roberts ^α	X	-
Jim Gerek	X	Duane Penny [£]	X	-
Leo Grassens	X	-	-	-
Matthew Haag	X	-		-
Michael Jones	X	-		-
Zachary Maffeo	X	-		-
Lark Murphy	-	-		-
Andrew Newman	-	-		-
Barry Noon	X	-		-
Nicole Poncelet-Johnson	-	-		-
Natalie Walsh	X	-		-
Chris Wood	X	-		-

X = present; * = Commissioner Liaison; ‡ = Engineering; ¥ = ESAB Liaison; § = Climate and Sustainability Program; ^α = Larimer County Office of Emergency Management; [£] = Solid Waste.

Call to Order: 6:00 p.m.

1. **Amendments or additions to the agenda** – Rodger added an AQMAC update and Leo added a CSFR update, both to the Roundtable.
2. **Introduction of members, staff and guests** – New member Michael Jones introduced himself.



3. **Public Comment** – None.
4. **Commissioner's Update** – Currently Planning has four 1041 applications submitted for projects. They are Halligan Reservoir Expansion, Platte River Power Authority New Generation project, Town of Johnstown Water Pipeline, and Town of Berthoud Bacon Lake Sanitary Sewer project. Individual members can weigh in on these projects during the open public hearings. Ballot measure 1A, sales tax to support transportation funding, did not pass. They are analyzing that result to see what they can learn from the results. Larimer on The Move is the transportation master planning process that is currently underway. They are in the process of finalizing the 2025 budget, which will be approved on December 11th. Members should have received the "Open Meetings Law Guide" 1 pager.

Discussion Items

- Woody Biomass Strategy – Joshua presented on the County's woody biomass strategy. The primary goal of the strategy is to estimate the volume of woody biomass is on the landscape within Larimer County, identify end use pathways, convene all partners and stakeholders, and develop cost-benefit and co-benefit analyses for various removal implementation strategies. The program kicked off earlier this year and is anticipated to wrap up in February 2025. Presentation slides are attached with these minutes.
5. **Approval of Minutes** – Tasha motioned to approve the October minutes, and Michael seconded. The October minutes were approved by acclamation.
 6. **Updates and Round Table**
 - Drafting the Woody Biomass Memo - Members discussed the strategy for drafting a memo of comments and recommendations on the woody biomass strategy. Joshua indicated that such a memo would benefit their program. The members agreed that a sub-committee should work on the draft and then bring that to the Board in December. Chris motioned to appoint Anna, Barry, Tasha and Leo to the sub-committee, and Jim seconded. The motion passed by acclamation. The sub-committee will coordinate with Shelley if they meet in person and/or virtually to discuss the draft memo so she can provide public notice.
 - Larimer County Water Master Plan update – Anna presented a few slides that covered the Water Master Plan's recent events, and the resources currently posted to the website. She summarized the draft mitigation strategies that can be found [here](#). The Water Master Plan website is [here](#). Slides and referenced resources are attached with these minutes. The BoCC is expected to approve this plan in December.
 - Climate Smart Future Ready – Leo briefly described his involvement in implementation activities.
 - Air Quality Monitoring Advisory Committee – Rodger summarized his participation with the AQMAC. He recommended that the ESAB pull back from involvement in this outside project. After discussion, the board endorsed this recommendation.
 7. **Issue Index** – will be updated for tonight's meeting.
 1. **Agenda Topics for Future Meetings** – George Rinker (former ESAB member) will be discussing Climate Science in December.
 8. **Adjourn** – The meeting adjourned at 8:42 PM.



Larimer County Woody Biomass Strategy

Update to Environmental &
Science Advisory Board

November 12, 2024

Agenda

- 01 Project Overview
- 02 Progress Report
- 03 Woody Biomass Analysis Preview
- 04 Next Steps

01 Project Overview

Overview

This project will work to develop a comprehensive woody biomass strategy for Larimer County with a focus on liability biomass management. Our goal is to further wildfire mitigation efforts, climate resilience, and the ability of our natural systems to store carbon.





What do we mean by woody biomass?

Woody biomass (sometimes referred to as “liability biomass”) is defined as the by-product of forest management, restoration, and hazardous fuel reduction treatments, as well as the product of disasters, including **trees** and **woody plants** (limbs, tops, needles, leaves, and other woody parts, grown in a forest, woodland, rangeland, or urban/community environment).

Sample end use pathways

SOURCE MATERIAL	PROCESSING	SAMPLE PRODUCT APPLICATIONS
Logs	Milling, drying, finishing	Dimensional lumber, slabs, mass timber
Wood processing by products (slash, sawdust, shavings, etc.)	Chipping, pressing, shaving	Pellets (for biofuel or other), bioenergy, Carbon Dioxide Removal, paper products, animal bedding
Tree limbs, log sections, stumps	Splitting, drying	Firewood
Small diameter trees, branches, leaves, decomposed material	Chipping, grinding, pyrolysis	Chips, mulch, compost, biochar

Scope of Work

Preparation & Project Kickoff

Introduce partners, set the stage for project management, prepare for data collection & audit, develop initial target stakeholder list, and design public-facing website.

Stakeholder Outreach & Interviews

Concurrent. Push out public survey around biomass processing to develop an inventory; select target stakeholders to conduct interviews to gather additional information.

Woody Biomass Volume Analysis

Engagement with PlanIt Geo and Data Advisors. Examine status quo of biomass to be disposed and estimate future biomass requiring management/utilization utilizing both a top-down and bottom-up approach.

Analysis of Potential End-Uses & Co-Benefits Assessment

Asses each potential end-use of woody biomass for effectiveness, efficiency, scalability, readiness, and impact on the public good. See evaluation framework for more detail.

Propose Solutions in Action-Ready Manner

Focus on the most effective and efficient woody biomass solutions to recommend implementation strategies identifying key champions, high-level cost benefit analyses, and an understanding of key constraints.

Finalize & Present Deliverables

Report and Presentation to address strategies for utilizing biomass generated from wildfire mitigation efforts, and recommends the best solutions to implement offering environmental, social, and economic co-benefits.

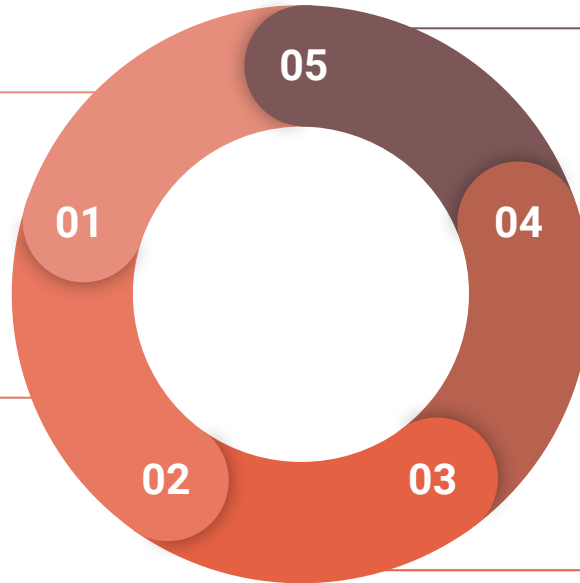
Evaluation Framework

Effectiveness

- How much wood biomass is used/disposed (volume, weight, etc)?
- How much biomass does this particular utilization/disposal solution effect?

Impact on Public Good

- What is the direct & indirect carbon sequestration potential and/or emissions generated?
- What are the co-benefits to climate, wildfire mitigation, forest health, local economy, & potential to engage underserved communities or tribes?



Efficiency

- What is the estimated ROI at a product level?
- What is the high-level estimated range of capital investment required?

Scalability

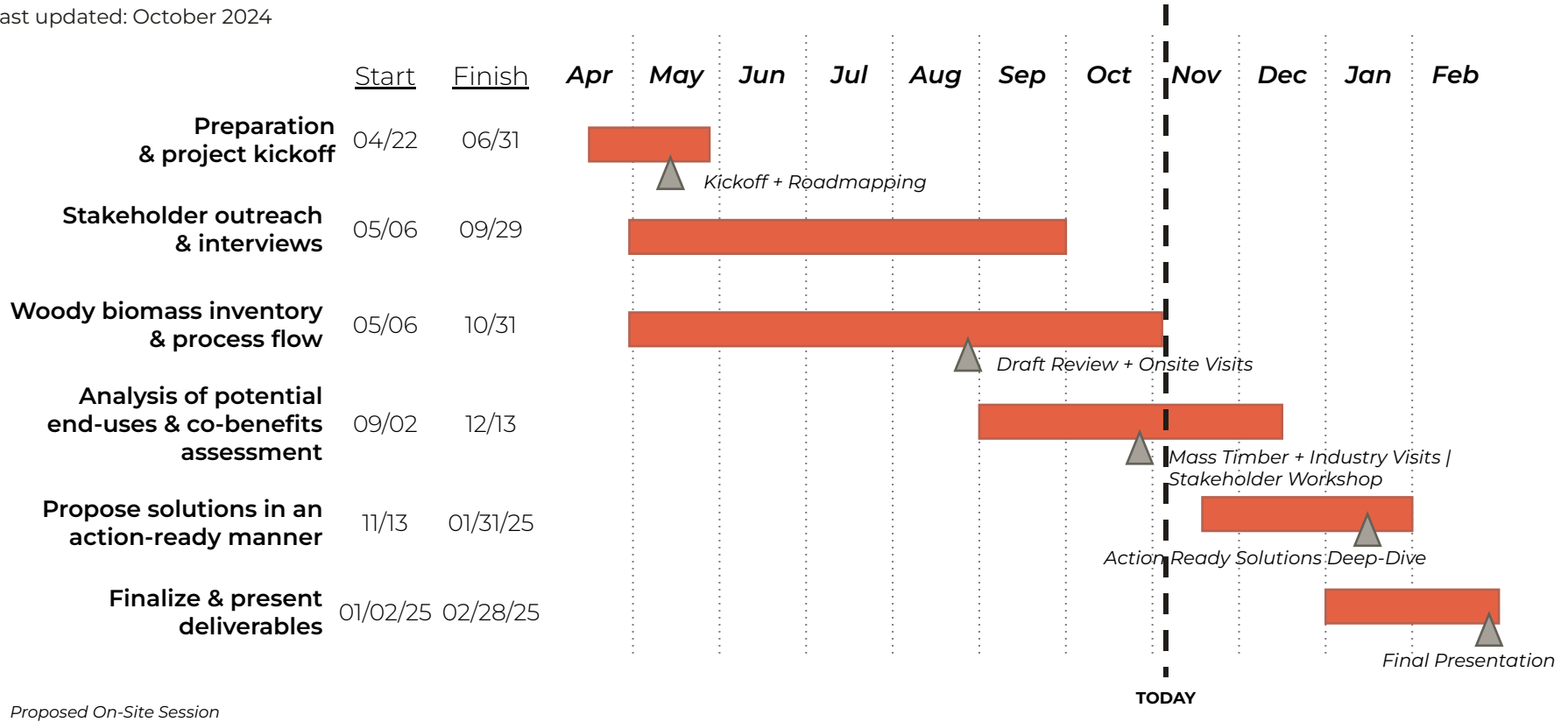
- At what scale does this solution best fit (i.e. project-level, county-wide, beyond county borders)?
- What are current & potential market demand for end use products?

Readiness

- Is this a near- or long-term solution?
- What are potential implementation challenges (i.e. cost, logistics, regulatory requirements, permitting, policy barriers, etc.)?

Estimated Timeline

Last updated: October 2024



Larimer County Advisory Team



The core role of this team will be to provide insight and overview throughout the duration of this project. Commitment will be about 5 hours per month for regular project check-ins, document/product review, and helping to overcome obstacles.

- **Josh Roberts** | Mitigation Coordinator, Larimer County Office of Emergency Management (Project Coordinator)
- **Dylan Alsbach** | Conservation Forester, Larimer Conservation District
- **Srijana Baral** | Assistant Professor, Department of Forest & Rangeland Stewardship, Colorado State University
- **Kendra Boot** | City Forester, City of Fort Collins
- **Adam Crowe** | Economic Development Manager, Larimer County Economic and Workforce Development
- **Max Erickson** | Supervisory Forester, Colorado State Forest Service
- **Derek Rosenquist** | Emergency Services Specialist, Larimer County Sheriff's Office
- **Todd Gardiner** | Forestry Program Manager, Wood Innovations & Biomass Utilization, USDA Forest Service
- **Daniel Godwin** | Wildfire Crisis Strategy Program Manager, USDA Forest Service
- **Jon Landkamer** | Assistant Chief, Support Services. Estes Valley Fire Protection District
- **Duane Penney** | Solid Waste Director, Larimer County Solid Waste

02 Progress Report

Snapshot of progress

- **Stakeholder Interviews:** Over 50 in-depth interviews completed with a variety of participants.
- **Woody Biomass Analysis:**
 - Data audit completed with local SMEs
 - Second iteration of woody biomass analysis is complete
 - Looking forward to sharing a dashboard tool with the public tomorrow!
- **Communications:**
 - Larimer County Landing Page
 - Monthly newsletters & advisory team meetings
 - Three in-depth onsite with consultants engaging local partners



Key stakeholders for interviews and/or surveying



Wood Generators

gov't crews, forest managers, arborist and tree care contractors



Wood Processors

e.g. sawmills, organics recycling, composting, bioenergy, biochar, etc.



Wood Product Buyers

e.g. private companies, local residents, gov't procurement, agricultural users



Community Groups

e.g. WUI communities, tree planting nonprofits, workforce development specialists

	Woody Biomass Generation 	Utilization & Processing 	Government & Policy Partners 
Select Interviewees	- Colorado Timber Industry Association - Estes Valley Tree Care - Rocky Mountain Log and Saw - Watershed Partners - Fire District Partners	- Golden West Pine Mills - Biochar Now - Eco-Tech Biofuels - Yosemite Clean Energy - CO Mass Timber Coalition - Ecostrat	- USDA Forest Service - Colorado State Forest Service - Colorado Forest Restoration Institute - City of Fort Collins - Larimer Economic & Workforce Dev.
Challenges	- Difficult to pile burn due to public concern, liability, regulations, and short season - Lack of workforce and infrastructure to complete needed treatments - Forest roads and access make transportation difficult - Large amounts of non-merchantable (slash) biomass	- Transportation costs of biomass to facilities is high - Interest in Southern CO for biofuels, availability unclear for Front Range - Need guaranteed long-term feedstock to make high capital investments - Stewardship-only contracts with USFS make industry development difficult	- Goal of forest restoration is to allow future prescribed, managed wildfire, and cultural burning - Shared language and measurement of treatment is still being refined - Lack of strong historical timber industry - Volatile political landscape makes future planning difficult
Opportunities	- Consider community sort yards (County-owned) for drop sites - Train existing fire depts. or hire to complete safe pile burning - Enable lower barriers to operate Air Curtain Burner or other treatment technology - Investment in road infrastructure	- Investment in road infrastructure - Permitting and zoning support to enable different types of processing - Continued need for funding to support capital investment and transportation - Support workforce development for long-term viability	- Engage Spanish-speaking community & utilize EWD resources to educate and support job growth - Continue support of innovative woody biomass use via grant funding - Consider alternative funding forms (eg. bonds) for large scale mitigation and biomass mgmt. opportunities

In summary, we have heard the need for/to:

- **Road infrastructure & workforce** to reach and manage the material
- **Process low-grade material** (slash, residue) at high volumes
- **Collect, aggregate and market** woody biomass

03 Woody Biomass Analysis Preview

Woody Biomass Analysis Methodology

A big thank you to our partners at PlanIT Geo, CSFS, CFRI, and others to support methodology development and data collection.

- Spatial Extrapolation of Biomass Using Tree Canopy Data:
 - 30m resolution from 2016 TreeMap
 - 60cm resolution from 2021 EarthDefine for priority ribbon
- Characterize data by the following metrics: live biomass, dead biomass, sawlog vs. non-sawlog, forest type
- Calculate and summarize by several geographies (eg. County, watersheds, fire districts, land ownership, etc.) taking into account historical fires (eg. Cameron Peak) and removal access via CFRI's feasibility treatment areas

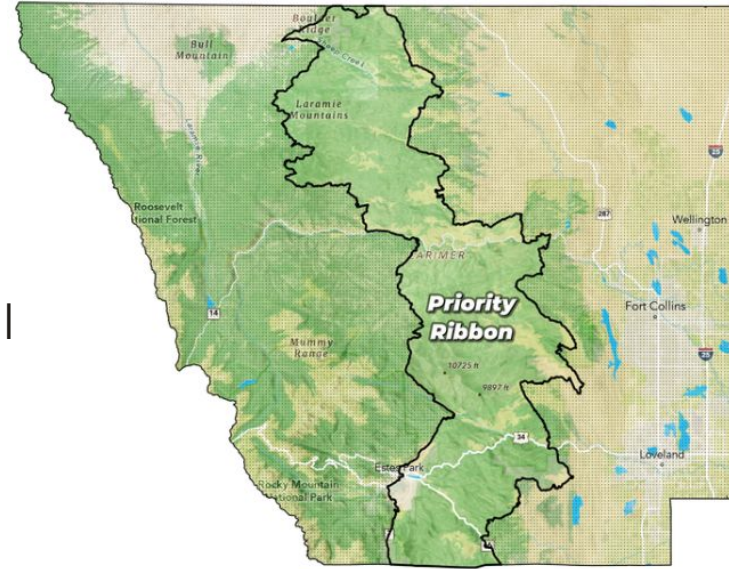


Glossary - Boundaries that inform the data

- **Land ownership:** Land ownership analysis that includes: USFS, NPS, State, Local, BLM, Tribal, NGO/Land Trust, and Private. Example Larimer County Land Status Map.
- **Watersheds:** Key watershed analysis in Cache La Poudre and Big Thompson (including Estes Valley separately) boundaries.
- **Fire Districts:** 18 career and volunteer fire departments within Larimer County. Example Larimer County Fire District Map.
- **PODs:** Potential Operational Delineations. “PODs are spatial units or containers defined by potential control features, such as roads and ridge tops, within which relevant information on forest conditions, ecology, and fire potential can be summarized.”
- **Priority Ribbon:** Key PODs within Larimer County identified as high-priority to create an interconnected fire treatment area that aims to create a more resilient landscape across all land ownership types.
- **1/10 square mile hexagons:** 1/10 square mile hexagons throughout Larimer County. Hexagons connect seamlessly with six neighboring features, effectively reducing gaps and overlaps between cells. This results in a more natural division of space that more closely aligns with ecological processes and patterns.
- **Fire History (eg. Cameron Peak perimeter and others):** Utilizing the respective polygons, have the option to subtract total biomass within these areas in the given geographies.
- **CFRI's Treatment Feasibility:** Mechanically feasible acres split into 4 treatment categories: POD boundary, Roadside, Home Ignition Zone, and Landscape. Note that these are estimations, and all final decisions for treatment are to be made at the project scale.

Biomass Summary Table

Across Larimer County, there is approximately **112,697,422 tons** of total (live + dead) woody biomass. **32%** of it falls within the **Priority Ribbon**.



Study Area	Total Area (Acres)	Canopy (%)	Total Biomass - Live + Dead (tons)	Live Biomass (tons)	Dead Biomass (tons)	Sawlog (board-feet)	Non-sawlog (tons)
Priority Ribbon	363,014	46	35,884,791	32,919,291	2,965,500	6,280,758,661	25,460,890
Non-Priority Area	1,322,727	44	76,812,631	66,315,712	10,496,919	13,604,910,729	50,159,880
County Totals	1,685,741	45	112,697,422	99,235,003	13,462,419	19,885,669,390	75,620,770

Biomass by Land Ownership

Federal Government owned land has the largest amount of total biomass with approximately **91,610,837 tons**, over **80%** of the County.

Owner	Total Area (Acres)	Canopy (%)	Total Biomass - Live + Dead (tons)	Live Biomass (tons)	Dead Biomass (tons)	Sawlog (board-feet)	Non-sawlog (tons)
Federal Government	823,865	46	91,610,837	79,847,120	11,763,717	15,651,274,814	61,261,231
Private / Non-Profit	671,913	39	17,503,855	16,071,220	1,432,636	3,561,374,878	11,842,087
State Government	81,823	41	2,740,641	2,538,394	202,247	502,464,319	1,941,718
Local Government	102,806	39	836,012	772,799	63,213	169,648,457	571,341
Special District	5,253	20	4,859	4,389	470	717,626	3,537

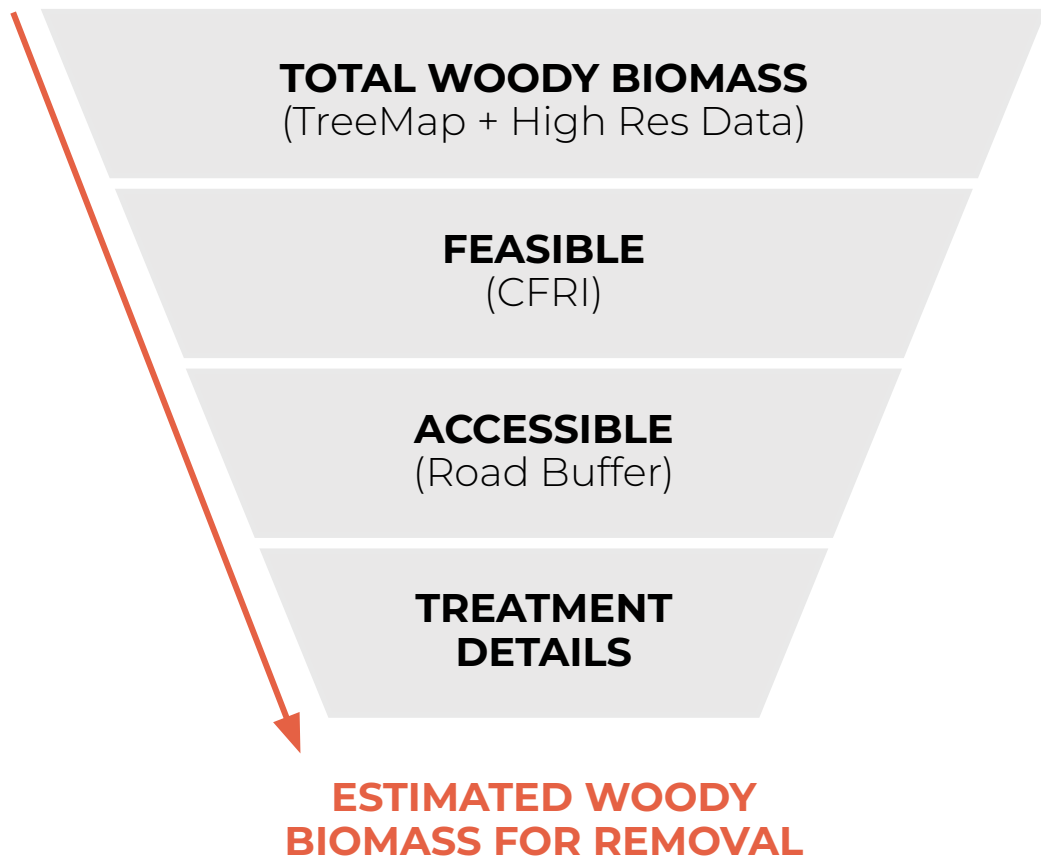
Biomass by TreeMap Forest Type

Of the forest types within Larimer County, Lodgepole and Ponderosa Pine contribute to nearly **70%** of the total biomass with approximately **77,083,518 tons combined**.

Forest Type	Total Area (Acres)	Canopy (%)	Total Biomass - Live + Dead (tons)	Live Biomass (tons)	Dead Biomass (tons)	Sawlog (board-feet)	Non-sawlog (tons)
Lodgepole pine	331,377	50	53,091,758	47,571,547	5,520,211	6,837,816,930	39,451,640
Ponderosa pine	243,129	35	23,991,760	22,225,409	1,766,351	5,640,820,055	15,526,935
Engelmann spruce / subalpine fir	88,097	59	16,130,046	13,328,736	2,801,310	3,506,470,731	9,164,802
Subalpine fir	34,522	54	6,016,445	4,522,082	1,494,363	1,104,814,122	3,210,115
Douglas-fir	34,455	45	4,204,004	3,617,008	586,996	833,311,489	2,627,450
All Other Forest Types	82,208	43	9,156,880	7,877,023	1,279,857	1,943,035,145	5,569,668

Woody Biomass Analysis Methodology

This high-level diagram shows how the team is looking to estimate total biomass removed from any given area.



Adapted Treatment Feasibility: Mechanically feasible acres land area split into 6 treatment categories, adapted from Colorado Forest Restoration Institute's PODs-Based Treatment Planning Dashboard and where applicable, including an additional filter for accessibility due to road access. Note that these are estimations, and all final decisions for treatment are to be made at the project scale. For more details on CFRI and PODs visit [this link](#).

1. POD boundary treatments

- Feasible areas within 500 feet on either side of a POD boundary. This buffer distance is likely wide enough to improve suppression opportunities and follows the maximum distance allowed by the Fuel Break Categorical Exclusion established by Section 40806 of the BIL.

2. Roadside treatments

- Feasible areas within 150 feet on either side of all roads.
- Priority is given to POD boundary treatments when they overlap.

3. Home Ignition Zone treatments

- Feasible areas within 300 feet of all structures identified in the Microsoft Buildings dataset.
- This treatment type takes priority over both POD boundary and Roadside treatments.

4. Landscape treatments - Accessible

- CFRI adapted definition
- Less than or equal to 40% slope, and greater than or equal to 10% canopy cover based on LANDFIRE 2020. Areas with wildfire activity or treatments within 15-years were removed.
- All mechanical feasible areas not identified in 1, 2, or 3 that fall WITHIN 0.5 miles from the edge of a road.
- When possible prescribed fire treatments should be preferred.

5. Landscape treatments - Inaccessible

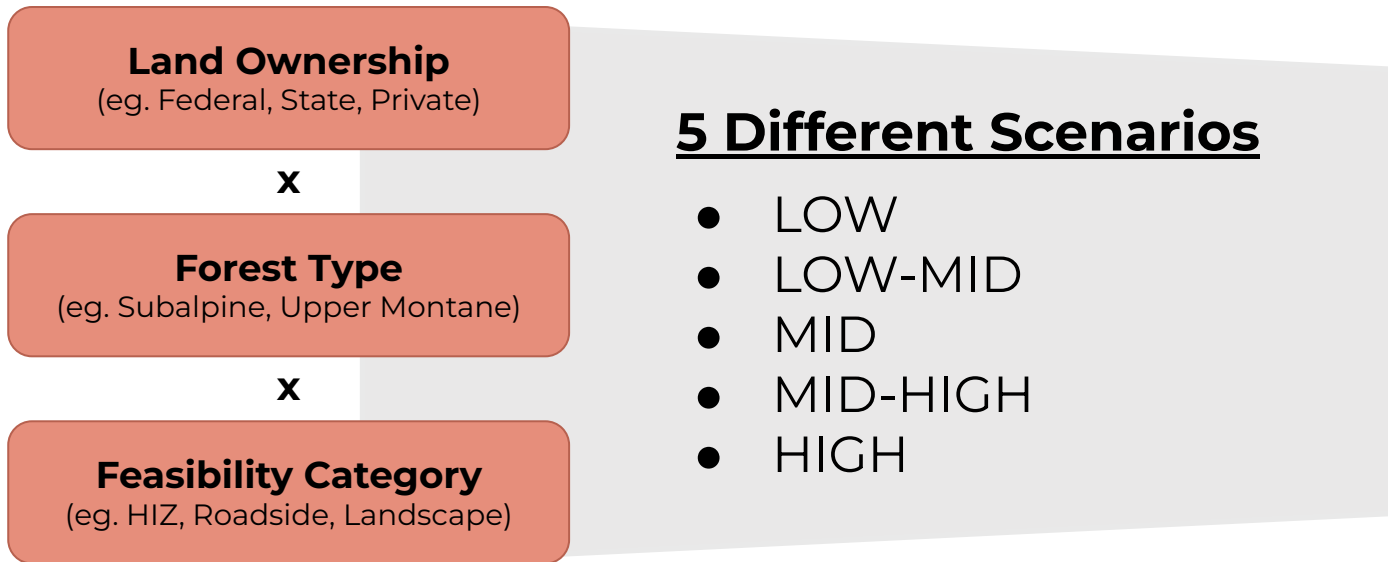
- Same criteria as Landscape - Accessible, but it does NOT fall within 0.5 miles from the edge of a road.

6. Not Feasible

- All land areas not identified in categories 1, 2, 3, 4, or 5.
- Greater than 40% slope and less than or equal to 10% canopy cover based on LANDFIRE 2020. Areas within wildfire activity or treatments within 15-years were removed.
- Possible candidate for prescribed fire treatments and hand treatment.

Biomass Estimates of Treatment Feasibility & Removal Scenarios

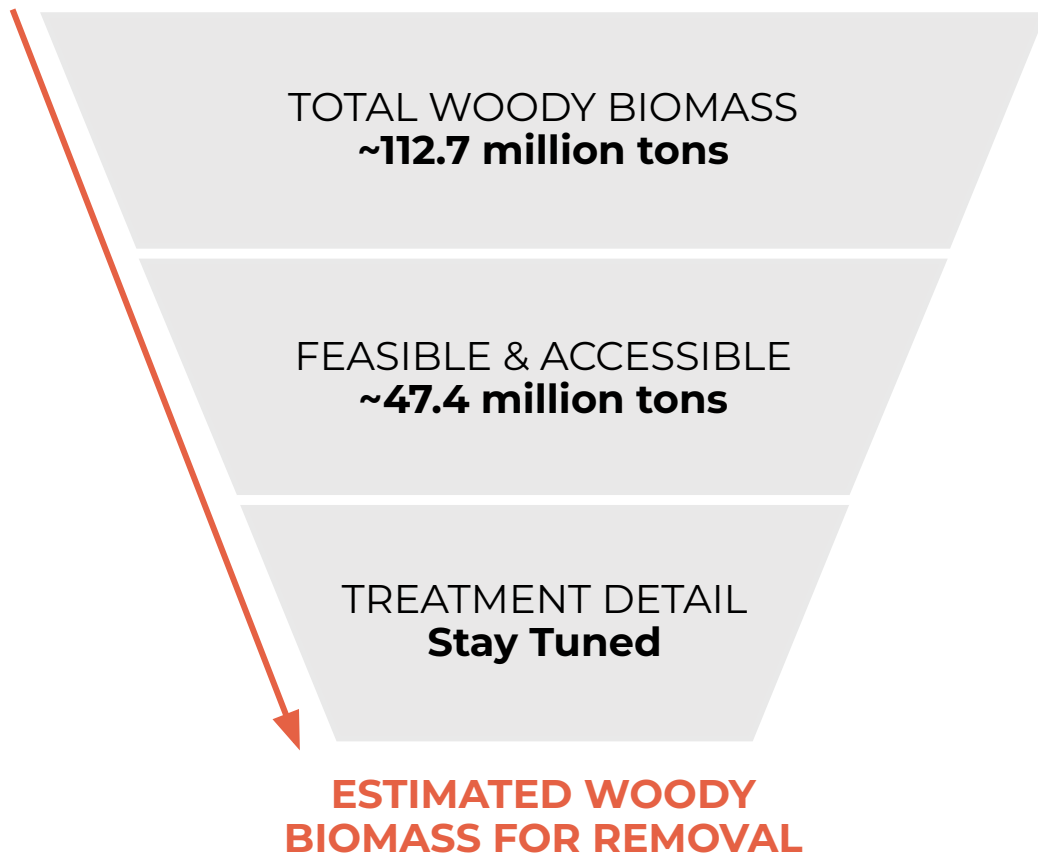
Working with USFS fire experts and conservation district partners, estimates of tonnage removed per acre informed five different scenario analyses.



An Important Discussion*

- Current discussions and estimates suggest that collectively forestland partners are removing between 100k to 150k tons per year
- The need exists to increase our pace & scale, in addition to managing more biomass volume in the future

**This does not include urban canopy volumes*



04 Next Steps

Coming Soon!

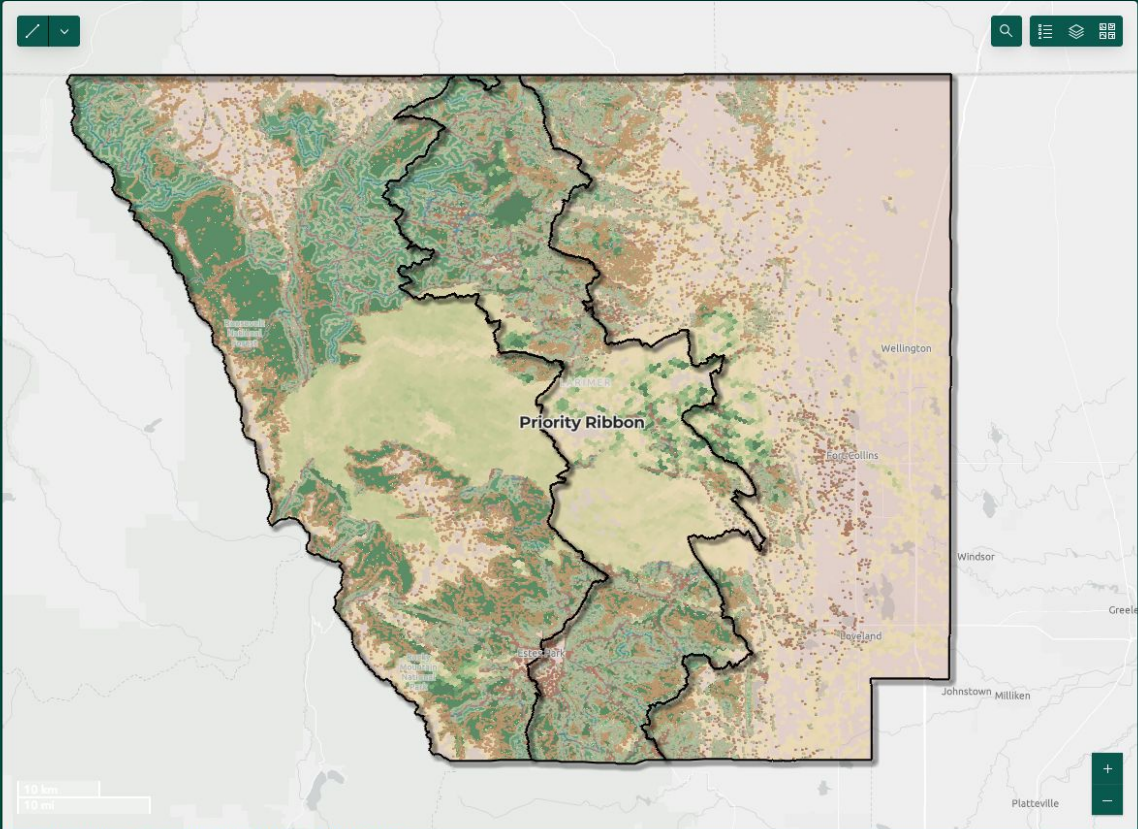
Larimer County Woody Biomass Estimate

In Ribbon Feasibility
Select a feasibility

Out Ribbon Feasibility
Select a feasibility

POD (Potential Operati...
Select a POD

HUC-12 Watershed
Select a watershed



112.7M Tons
of Total Biomass

1.3M
Total Acres

13.5M Tons
of Dead Biomass

99.2M Tons
of Live Biomass

Live Biomass:
23.6M Tons ✓
of Sawlog

37.7%
Average Tree Canopy

10 Tons
of Dead Biomass
Per Acre of Area

77 Tons
of Live Biomass
Per Acre of Area

Live Biomass:
75.6M Tons ✗
of Non-Sawlog



Woody Biomass Study & Strategy Update Meeting

Wednesday, November 13, 2024

11:00 - 12:00 PM MT | Virtual Update

In some cases, the volume of woody biomass generated through wildfire mitigation or forest health treatments is unmanageable and hampers the ability to easily undertake these treatment efforts. Simultaneously, there exists various potential avenues to utilize the materials generated. A local, common understanding of these associated challenges is paramount to increasing the pace and scale of wildfire risk reduction.

In this webinar, we will discuss themes identified through over 50 stakeholders interviewed, provide an overview of estimated woody biomass volume & characterization in Larimer County, and share an evaluation framework that will be used to identify solution sets in the final phase of the project. This is a mid-project update for the Larimer County Woody Biomass Study & Strategy.

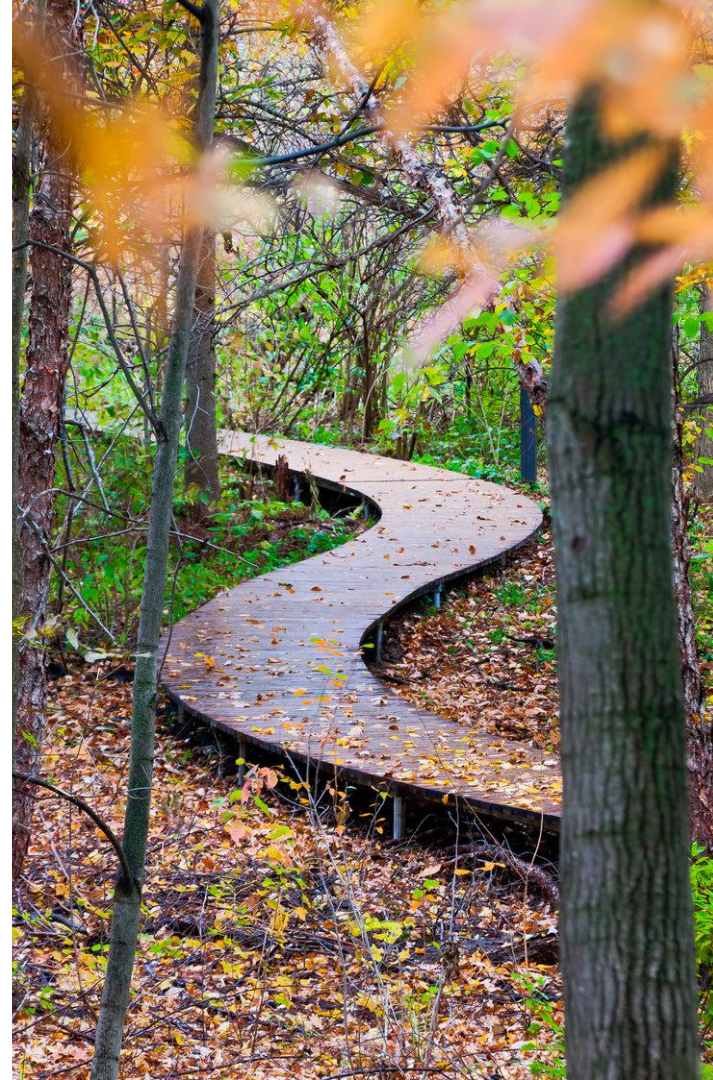
In the coming months, the team will work collaboratively to consider the intersectionality and enabling factors of each solution - **we welcome you to join us in our effort to develop an action-ready strategy for the way forward!**



[Register Here](#)

Next steps

- Share woody biomass estimates dashboard for partner use
- Deep dive of potential solution sets within the evaluation framework
- Community wide virtual update on Wed, Nov 13th and in-person Solutions Workshop planned for mid-January



Let's Connect



Join our
project
communication
list.



Alicia Blake

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Josh Roberts

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Larimer County Water Master Plan

Environmental and Science Advisory Board Update

Project Schedule

Q3 2023: PROJECT START: Identification of stakeholders, invites to advisory groups, creation of a public engagement plan.

Q4 2023: PROJECT UNDERWAY- Data inventory and gap analysis, identification of goals and visions.

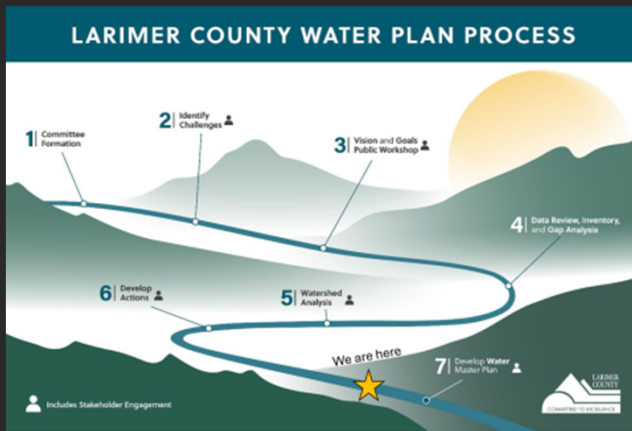
Q1 – Q2 2024: PROJECT MAPPING: Prepare watershed maps and begin analysis of water related risks and vulnerabilities to Larimer County.

Q3 2024: PROJECT RESULTS: Develop strategies, implementation measures, and mitigation that will go into the Water Master Plan.

Q4 2024: PROJECT DRAFT: Water Master Plan drafted and ready for review. **WE ARE HERE!**

Q4 2024 - Q1 2025: PROJECT FINISH: The Water Master Plan to be voted on by Larimer County Board of County Commissioners and ratified by Larimer County Planning Commission. If approved, the plan will become an element of the Comprehensive Plan.

- Requested comments, specific ideas, and feedback from TAG and WAG
- TAG and WAG will not be meeting again
- Planning Commission Meeting - Nov 20th
- Land Use Hearing - Dec 9th



Available Information

- Self-guided, Virtual *Draft Plan* Open House (Oct 9, 2024)
 - Posters explaining the process, purpose, strategies and challenges, etc.
 - Draft Mitigation Strategies
 - <https://www.larimer.gov/sites/default/files/lcwaterplandraftstrategiesprintouts0.pdf>
- Preliminary Draft Plan
 - Explains process for plan development
 - Identifies vision and goals
 - Identifies geographic focus areas
 - Outlines strategies and county actions to achieve mitigation strategies
- Preliminary Draft Plan Appendices

All information available on their website:
<https://www.larimer.gov/planning/water>

