SOUTHWEST COLORADO
Bioeconomy Development Opportunity Zone

RATING GRADE: 'BBB'
Date of Issue: April 25, 2025

BBB
Good Quality

Rating Parameters:

Category	Rated Quantity	Delivered Price	Supply Zone Size
Pulpwood	**36,000 bdt/yr**	**$80-$100/bdt**	**75-mi drive distance**
Forest residues	**22,000 bdt/yr**	**$60-$70/bdt**	**from Mancos, CO**
Sawmill residues	**3,600 bdt/yr**	**$55-$95/bdt**	

BDO ZONE ASSETS

- Existing logging and grinding equipment capacity is sufficient to supply rated biomass quantities.
- Opportunity to co-locate with existing sawmill and pellet mill, sharing infrastructure to expedite operations.
- Limited competition for available sawmill residues, forest residues, and softwood pulpwood within the Supply Zone.
- Low costs for regional utilities, including industrial natural gas, electricity, water, and telecommunications services.

BDO ZONE LIABILITIES

- High risk associated with community opposition to forest restoration and biomass utilization activities.
- High reliance on government subsidies for forest management in public lands.
- Declining sawmilling capacity due to reduced fiber availability from the San Juan National Forest.
- Significant investment risks associated with securing rated quantities from national and state forests.

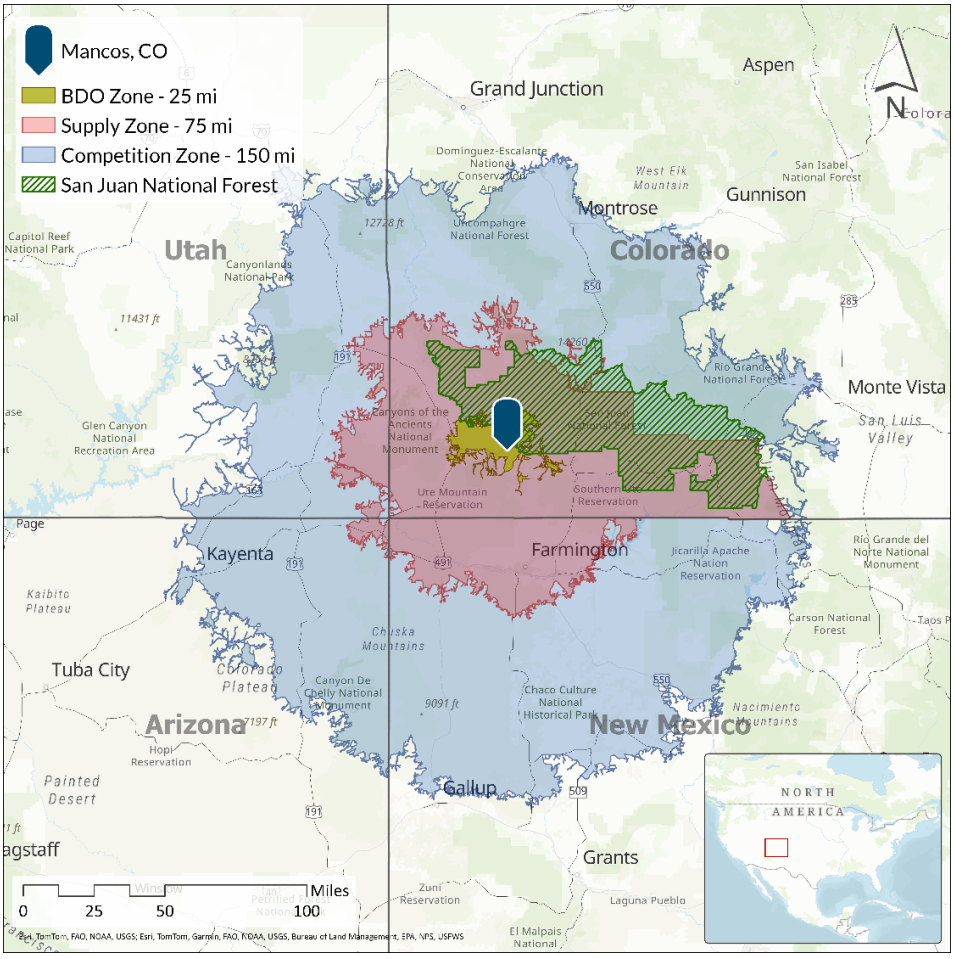
RATING GRADE

The Southwest Colorado Bioeconomy Development Opportunity (BDO) Zone, is rated 'BBB', or 'low-moderate' risk.

Risk Rating Grades are defined as follows: AAA (extremely low risk), AA (very low), A (low), BBB (low-moderate), BB (moderate), B (moderate-high), and C (high).

'BBB' ratings indicate low-moderate prospects for Feedstock Supply and Infrastructure (FS&I) with an elevated vulnerability to risk over time, particularly in the event of adverse business or economic conditions.

SOUTHWEST COLORADO BDO ZONE



ANALYST NOTES

The Supply Zone extends across four states: Colorado, Utah, Arizona, and New Mexico, encompassing 8 million acres of which 1.3 million acres is timberland. Softwood species are most prevalent in the landscape, comprising 77% of standing tree volume (predominantly Engelmann spruce, Ponderosa pine, Douglas fir, and Abies firs), with aspen making up the remaining 23%.

The forest products industry in the region includes two medium-sized operations located in Mancos and Pagosa Springs, with a third operation outside the Supply Zone in Montrose. Additional small wood-based businesses include Cross Laminated Timber (CLT) manufacturing, timber construction, and mulch production, complemented by a seasonal firewood market.

A biomass project located in the Southwest Colorado BDO Zone could access 36,000 bone-dry tons per year (bdt/yr) of pulpwood, 22,000 bdt/yr of forest residues, and 3,600 bdt/yr of sawmill residues. Delivered prices range from $80-$100/bdt for pulpwood, $60-$70/bdt for forest residues, and $55-$95/bdt for sawmill residues.

Public ownership is prevalent across the forestry landscape, with approximately 90% of timberland under national and state forest management. This ownership structure significantly influences forest management policies, harvesting practices, and biomass availability. Recent years have shown declining timber harvest volumes in the San Juan National Forest, with reductions from 90,000 bdt/year to 50,000 bdt/year, with a projected further decrease to approximately 40,000 bdt/year by 2025.

BDO ZONE ASSETS

The forest industry in the Supply Zone maintains reasonable strength, with harvesting operations primarily driven by sawlog demand, which generates pulpwood that is currently underutilized. The closure of a plywood mill located 20 miles west of Mancos five years ago has further increased pulpwood availability. A biomass project in the BDO Zone could capitalize on this available resource and leverage existing logging capacity that previously supplied the now-closed plywood facility.

Local forestry experts confirm that the current logging and transportation infrastructure could adequately supply the rated quantities to a project in Mancos. The region features experienced operators with high-efficiency logging and grinding equipment, minimizing concerns about feedstock quality or production capabilities. Suppliers have extensive experience working in varied weather conditions, including cold temperatures, ensuring year-round operations with minimal disruption.

A significant opportunity exists for a biomass project to co-locate with an existing forest products operation in Mancos. The current owner has expressed willingness to collaborate with a complementary bio-project and share existing infrastructure, which would expedite startup and potentially reduce capital expenditures. This arrangement would provide immediate access to feedstock streams and potentially create synergies in operations, logistics, and administrative functions.

BDO ZONE LIABILITIES

High tree mortality rates in the San Juan National Forest have substantially impacted timber resources. Between 2019 and 2021, standing merchantable timber inventories decreased by 1%, while pulpwood timber decreased by 5%. More concerning is the significant reduction in harvest volumes, which signal elevated risk for pulpwood availability for new projects.

The negative average annual net growth values recorded in the Supply Zone indicate significant concerns regarding the sustainability of current and future harvest levels. This unfavorable growth-to-removal ratio raises questions about long-term feedstock security for a biomass operation in the region.

In recent years, reduced federal funding for forest management has contributed to fiber scarcity, resulting in mill curtailments and closures. While salvage and forest restoration treatments contribute to the local timber supply, these operations are significantly more expensive than commercial harvesting and often produce inconsistent feedstock quality. Additionally, such operations typically require harvesting sawtimber in quantities and qualities that local sawmills may not fully utilize.

Environmental opposition presents a serious risk, with several organizations actively challenging forest harvesting and restoration practices. Recent litigation against proposed timber sales in southwest Colorado demonstrates the contentious nature of forest management in the region, potentially impeding access to biomass resources.

INFRASTRUCTURE PROFILE

The 30-acre industrial site in Mancos, CO, offers an opportunity for a biomass project to co-locate with an existing forest products operation, benefiting from shared infrastructure and expedited permitting. The site has access to natural gas, electricity, water, wastewater, and internet services, with relatively low utility costs.

Transportation options include U.S. Highway 160 and Cortez Airport, though the absence of freight rail and winter weather pose logistical challenges. The area has a low crime rate, affordable housing, and healthcare access, but a higher-than-average unemployment rate and lower median income.

Workforce development is supported by local vocational training programs. Water availability presents a medium risk due to watershed concerns in the Colorado region. Overall, the site presents a viable option for a biomass project with manageable infrastructure risks.

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SCORING & RATING METHODOLOGY

In assessing the biomass supply chain risk for the Bioeconomy Development Opportunity (BDO) Zone, 88 Risk Indicators from the US Standards for Biomass Supply Chain Risk (BSCR) were applied. These BDO Zone Risk Indicators are the subset of BSCR Risk Indicators applicable to evaluating feedstock risk within a BDO Zone. The risk indicators include:

- Twenty physical and social infrastructure risks were assessed for an industrial park located in the BDO Zone. The BDO Zone is a 25-mile drive distance from the center point, which represents the siting area for future biomass projects and is where the industrial site is located.
- Ten supplier risks, 46 supply chain risks, and two feedstock scale-up risks were assessed in the Supply Zone. The Supply Zone is a 75-mile drive distance from the center point, where biomass availability was assessed.
- Ten competition risks were evaluated in the Competition Zone. The Competition Zone is a 150-mile drive from the center point, where consumers can compete for biomass generated in the Supply Zone.

Feedstock quantities are expressed in **bone dry tons per year (bdt/yr)**, while feedstock costs are expressed in **USD ($)**. Maximum transport distance is based on a 75-mile driving distance from the center point (Mancos, CO).

The BDO Zone rating is based on an aggregation of the scores assigned to each BDO Zone Risk Indicator (RI) assessed in this report. First, each BDO Zone Risk Indicator is given a **Raw Risk Likelihood (RRL)** score, which denotes the likelihood of a risk to future BDO Zone projects due to the Risk Indicator. RRL Scores are scaled as either very low (2), low (4), medium (6), high (8), or very high (10).

Each BDO Zone Risk Indicator is given a **Raw Risk Impact (RRI)** score, which denotes the impact on a future BDO Zone project due to the Risk Indicator. RRI scores are scaled as either very low (2), low (4), medium (6), high (8), or very high (10). Impact level scores are based on the impact level of a risk on the successful development and deployment of a BDO Zone project with no mitigation measures.

The **Gross Risk Indicator (GRI)** score is then calculated as the product of the RRL and the RRI scores. For example, if the 'Competitor Price and Price Sensitivity' is scored at an RRL of 2 and an RRI of 8, then the GRI for this risk indicator is 2 X 8 = 16.

If the analyst deems that a typical bio-based project could implement economically reasonable measures or best practices that mitigate the likelihood (RRL), the impact (RRI), or both, then the GRI will be notched accordingly.

The **Loaded RI** score for each Risk Indicator is the product of the GRI score and any notched scores. Loaded RIs are the final score for a Risk Indicator.

Loaded RI scores of 4 or less are deemed very low risk; scores between 5 and 16 are deemed low risk; scores between 17 and 36 are deemed medium risk; scores between 37 and 64 are deemed high risk; and scores of 65 and greater are deemed very high risk.

The total risk rating for the BDO Zone is the average of all Loaded RI scores and Infrastructure Indicators. The score for SW Colorado BDO Zone is ***29.20 out of 100, resulting in a 'BBB' designation.***

All scoring and rationale for each Risk Indicator are provided in Section D.



SECTION A: RISK INDICATOR SUMMARY

Figure A-1. All Risk Indicators Sorted by Risk Level

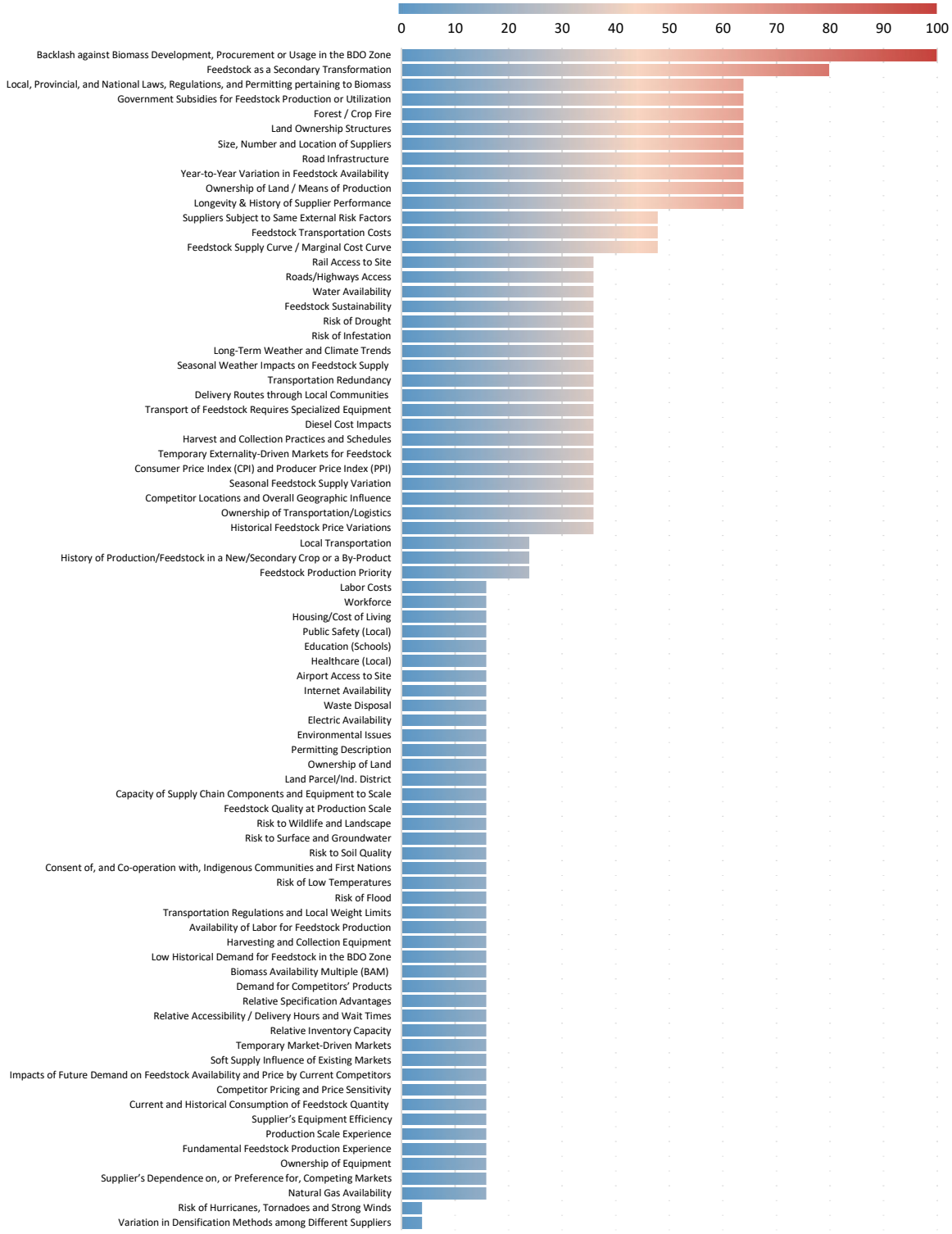


Table A-1. Risk Indicators and Associated Scores

Feedstock Supply Chain Risk Indicators	Raw Risk Likelihood	Raw Risk Impact	Gross Risk Indicator	Mitigation /Notching	Loaded RI Score
Category 1.0: Supplier Risk					
1.1 Risk Factor: Credit-Worthiness/Future Solvency of Suppliers					
1.1.1 Longevity & History of Supplier Performance	8	8	64	NN	64
1.2 Risk Factor: Conflicts of Interest/Vested Interest with Competing Market(s)					
1.2.1 Suppliers' Dependence on, or Preference for, Competing Market(s)	4	4	16	NN	16
1.3 Risk Factor: Supplier Control Over Production and Transportation					
1.3.1 Ownership of Land/Means of Production	8	8	64	NN	64
1.3.2 Ownership of Equipment	4	4	16	NN	16
1.3.3 Ownership of Transportation/Logistics	6	6	36	NN	36
1.3.4 Feedstock as a Secondary Transformation	8	10	80	NN	80
1.4 Risk Factor: Supplier Experience					
1.4.1 Fundamental Feedstock Production Experience	4	4	16	NN	16
1.4.2 Production Scale Experience	4	4	16	NN	16
1.5 Risk Factor: Supplier Harvesting/Collection/Processing Capacity					
1.5.1 Supplier's Equipment Efficiency	4	4	16	NN	16
1.6 Risk Factor: Supplier Motivation					
1.6.1 Feedstock Production Priority	4	6	24	NN	24
Category 2.0: Competitor Risk					
2.1 Risk Factor: Influence on Feedstock Supply of Existing Markets					
2.1.1 Competitor Locations and Overall Geographic Influence	6	6	36	NN	36
2.1.2 Current and Historical Consumption of Feedstock Quantity	4	4	16	NN	16
2.1.3 Competitor Pricing and Price Sensitivity	4	4	16	NN	16
2.1.4 Impacts of Future Demand on Feedstock Availability and Price by Current Competitors	4	4	16	NN	16
2.1.5 Soft Supply Influence of Existing Markets	4	4	16	NN	16
2.1.6 Temporary Market-Driven Markets	4	4	16	NN	16
2.2 Risk Factor: Specific Competitors' Competitive Advantage					
2.2.1 Relative Inventory Capacity	4	4	16	NN	16
2.2.2 Relative Accessibility/Delivery Hours and Wait Times	4	4	16	NN	16
2.2.3 Relative Specification Advantages	4	4	16	NN	16
2.2.4 Demand for Competitors' Products	4	4	16	NN	16
Category 3.0: Supply Chain Risk					
3.1 Risk Factor: Feedstock Availability					
3.1.1 Biomass Availability Multiple (BAM)	4	4	16	NN	16
3.1.2 Feedstock Supply Curve/Marginal Cost Curve	6	8	48	NN	48
3.1.3 Seasonal Feedstock Supply Variation	6	6	36	NN	36
3.1.4 Year-to-Year Variation in Feedstock Availability	8	8	64	NN	64
3.2 Risk Factor: Historical Issues					
3.2.1 Historical Feedstock Price Variations	6	6	36	NN	36
3.2.2 Historical Demand for Feedstock in the BDO Zone	4	4	16	NN	16
3.2.3 History of Production/Feedstock is a New/Secondary Crop or a By-Product	4	6	24	NN	24
3.3 Risk Factor: Non-Weather Based Externalities					
3.3.1 Consumer Price Index (CPI) and Producer Price Index (PPI)	6	6	36	NN	36
3.3.2 Currency Risk	NR	NR	NR	NR	NR
3.3.3 Border Risk	NR	NR	NR	NR	NR
3.3.4 Temporary Externality-Driven Markets for Feedstock	6	6	36	NN	36
3.4 Risk Factor: Risks Related to Feedstock Production, Harvest, and Collection					
3.4.1 Harvest & Collection Practices & Schedules	6	6	36	NN	36
3.4.2 Harvesting & Collection Equipment	4	4	16	NN	16
3.4.3 Variation in Densification Methods Among Different Suppliers	2	2	4	NN	4
3.4.4 Availability of Labor for Feedstock Production	4	4	16	NN	16
3.5 Risk Factor: Transportation					
3.5.1 Feedstock Transportation Costs	8	6	48	NN	48
3.5.2 Diesel Cost Impacts	6	6	36	NN	36
3.5.3 Transport of Feedstock Requires Specialized Equipment	6	6	36	NN	36
3.5.4 Delivery Routes through Local Communities	6	6	36	NN	36
3.5.5 Transportation Regulations & Local Weight Limits	4	4	16	NN	16
3.5.6 Road Infrastructure	8	8	64	NN	64
3.5.7 Transportation Redundancy	6	6	36	NN	36

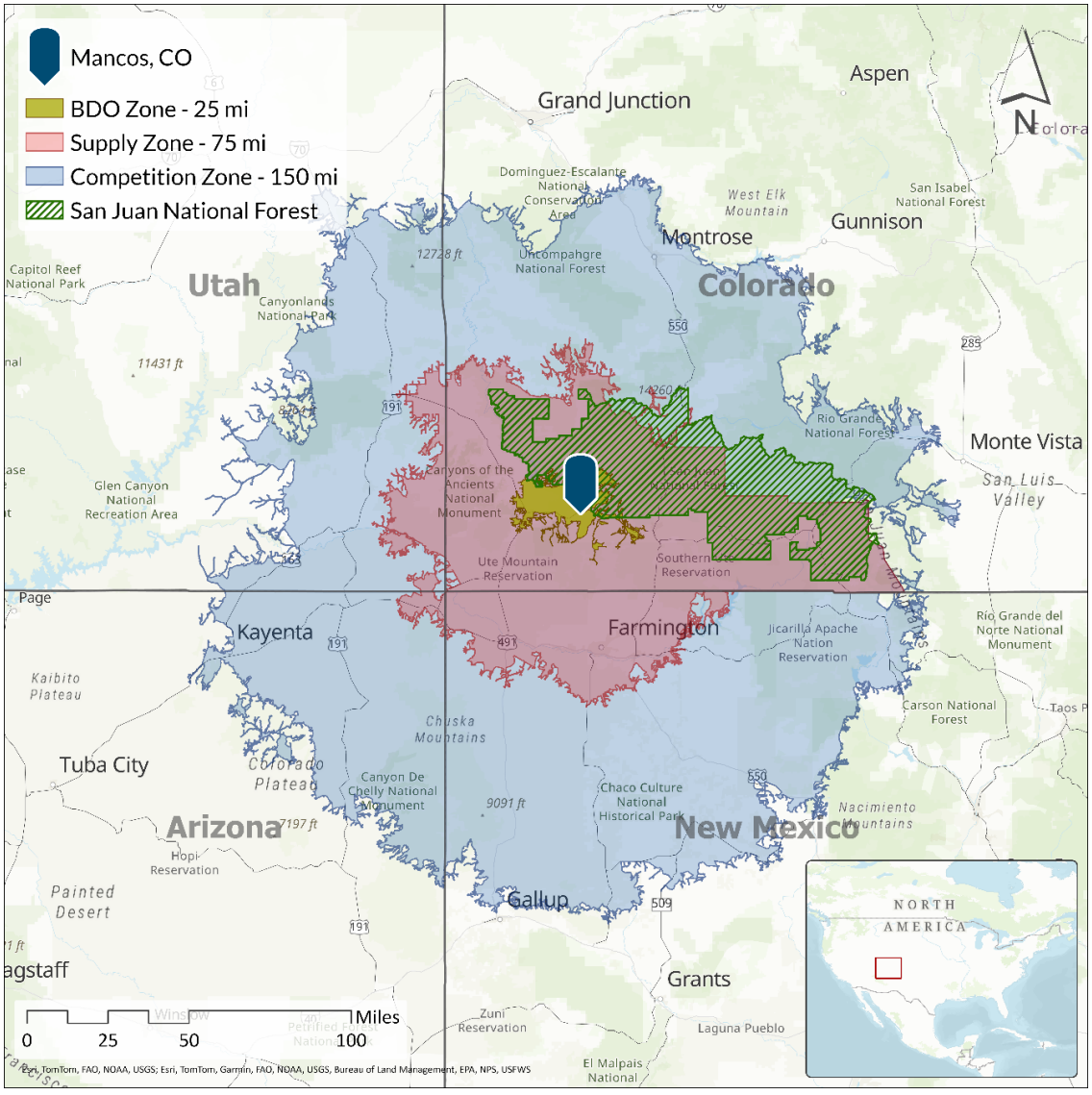
3.6 Risk Factor: Supply Chain Resiliency					
3.6.1 Size, Number, and Location of Suppliers	8	8	64	NN	64
3.6.2 Suppliers Subject to Same External Risk Factors	6	8	48	NN	48
3.6.3 Land Ownership Structures	8	8	64	NN	64
3.7 Risk Factor: Climate and Natural Risks					
3.7.1 Seasonal Weather Impacts on Feedstock Supply	6	6	36	NN	36
3.7.2 Long-Term Weather and Climate Trends	6	6	36	NN	36
3.7.3 Forest/Crop Fire	8	8	64	NN	64
3.7.4 Risk of Infestation	6	6	36	NN	36
3.7.5 Risk of Hail	NR	NR	NR	NR	NR
3.7.6 Risk of Flood	4	4	16	NN	16
3.7.7 Risk of Drought	6	6	36	NN	36
3.7.8 Risk of Hurricanes, Tornadoes, and Strong Winds	2	2	4	NN	4
3.7.9 Risk of Low Temperatures	4	4	16	NN	16
3.8 Risk Factor: Political and Social					
3.8.1 Government Subsidies for Feedstock Production or Utilization	8	8	64	NN	64
3.8.2 Local, Provincial, & National Laws, Regulations, & Permitting pertaining to Biomass	8	8	64	NN	64
3.8.3 Backlash against Biomass Development, Procurement or Usage in the BDO Zone	10	10	100	NN	100
3.8.4 Consent of, and Cooperation with, Indigenous Communities and First Nations	4	4	16	NN	16
3.8.5 Food Security Concerns	NR	NR	NR	NR	NR
3.9 Risk Factor: Sustainability and Environmental Concern					
3.9.1 Feedstock Sustainability	6	6	36	NN	36
3.9.2 Risk to Soil Quality	4	4	16	NN	16
3.9.3 Risk to Surface and Groundwater	4	4	16	NN	16
3.9.4 Risk to Hydrological Flux	NR	NR	NR	NR	NR
3.9.5 Pesticide Risk to Human and Ecosystem Health	NR	NR	NR	NR	NR
3.9.6 Risk to Wildlife and Landscape	4	4	16	NN	16
3.9.7 Biomass Classified as Genetically Modified Organism (GMO)	NR	NR	NR	NN	NR
Category 4.0: Feedstock Scale-up Risk					
4.1 Risk Factor: Feedstock Scale-Up					
4.1.1 Feedstock Quality at Production Scale	4	4	16	NN	16
4.1.2 Capacity of Supply Chain Components & Equipment to Scale	4	4	16	NN	16
Category 5.0: Infrastructure					
5.1 Risk Factor: Physical Infrastructure					
5.1.1 Land Parcel/Industrial District	4	4	16	NN	16
5.1.2 Ownership of Land	4	4	16	NN	16
5.1.3 Permitting Description	4	4	16	NN	16
5.1.4 Environmental Issues	4	4	16	NN	16
5.2 Risk Factor: Utilities					
5.2.1 Natural Gas Availability	4	4	16	NN	16
5.2.2 Electric Availability	4	4	16	NN	16
5.2.3 Water Availability	6	6	36	NN	36
5.2.4 Waste Disposal	4	4	16	NN	16
5.2.5 Internet Availability	4	4	16	NN	16
5.3 Risk Factor: Transportation/Logistics					
5.3.1 Roads/Highways Access	6	6	36	NN	36
5.3.2 Rail Access to Site	6	6	36	NN	36
5.3.3 Airport Access to Site	4	4	16	NN	16
5.3.4 Water Freight Access	NR	NR	NR	NR	NR
5.4 Risk Factor: Social Infrastructure					
5.4.1 Healthcare (Local)	4	4	16	NN	16
5.4.2 Education (Schools)	4	4	16	NN	16
5.4.3 Local Transportation	6	4	24	NN	24
5.4.4 Public Safety (Local)	4	4	16	NN	16
5.4.5 Housing/Cost of Living	4	4	16	NN	16
5.5 Risk Factor: Labor					
5.5.1 Workforce	4	4	16	NN	16
5.5.2 Labor Costs	4	4	16	NN	16
				Average	**29.20**

SECTION B: BIOMASS AVAILABILITY AND PRICING

OVERVIEW

To estimate the available forest biomass for a project in Mancos, three zones are delimited (Map B-1). The BDO Zone is the area delimited by a 25-mile drive distance from Mancos in which a new biomass project can be located to access rated quantities of biomass. The Supply Zone is the area defined by the driving distance of 75 miles from Mancos. The entire area of Archuleta County was included in the Supply Zone,[1] which increases the supply distance from Mancos to the easternmost part of the Supply Zone to 120 miles (see map). The Competition Zone is defined by a driving distance of 150 miles from Mancos in which biomass users/competitors are located that impact the availability of biomass in the BDO Zone.

Map B-1. BDO, Supply, Competition Zones, and Center Point



[1] Per client's request.

The rated feedstock quantities presented here were determined through estimation of potentially harvestable amounts of each biomass type in the Supply Zone, with consideration given to anticipated demand for biomass in the Competition Zone. A Biomass Availability Multiple (BAM) is applied to account for uncertainties in underlying data, models, assumptions, and future operating conditions. The resulting rated quantities represent conservative estimates of biomass availability for new bio-projects. Price ranges were established through market analysis and outreach in the Competition Zone and represent expected delivered prices that a new project will need to pay to secure the rated quantities.

The Supply Zone extends across eight counties and four states: five counties in Colorado, and one county each in Utah, Arizona, and New Mexico. From approximately 8 million acres of land in the Supply Zone, 1.3 million acres are classified as timberland. Softwood tree species predominate in the Supply Zone; 77% of the standing tree volume consists of Engelmann spruce, Ponderosa pine, Douglas fir, and Abies firs. The remaining 23% of standing tree volume is comprised of aspen.[2] Forestry is a main contributor to the local economy in the Supply Zone, although only two medium-size forest products companies are located here, one in Mancos and one in Pagosa Springs. A third forest products company is located outside the Supply Zone in Montrose. Other small wood-based operations include Cross Laminated Timber (CLT), timber construction, and mulch. A seasonal firewood market also exists in the area.

Due to high tree mortality rates in the Supply Zone, particularly in the San Juan National Forest, the period between 2019 and 2021 saw a decrease in standing merchantable timber inventories by 660,000 bdt (1%) and small-diameter/pulpwood timber by 500,000 bdt (5%) (Figures E-1 and E-2). The vast majority of standing timber (88%) and timber harvests (78%) in the Supply Zone are located in public forest ownerships, specifically in national and state forests (Figures E-3, E-4, E-5).[3]

In recent years, reduced federal funding for forest management in public forests, combined with insect infestations and forest fires, has led to scarcity of merchantable fiber and mill curtailments and closures. While salvage and forest restoration treatments have contributed to the local timber supply, these activities are significantly more expensive than conventional timber harvesting operations. Furthermore, the quality of salvage and restoration timber and biomass does not always align with the requirements of local wood processing facilities. In an attempt to leverage the existing fiber basket, some wood processing facilities have endeavored to develop and integrate biomass projects, such as biochar, pellets, CLT, and combined heat and power (CHP). These facilities continue to seek opportunities to further develop these projects and collaborate in a local bio-economy.[4]

EVALUATED FEEDSTOCKS

The three rated biomass types are:

Pulpwood: Underutilized roundwood logs generated from harvesting both live and dead (salvaged) trees with diameters at breast height (DBH) between 5.0 inches and 10.9 inches. This category also includes roundwood logs produced during harvesting of sawlog-size trees (DBH > 11 inches) that do not fall into the sawlog grade specifications.

Forest residues: Tree components that cannot be processed into merchantable logs (i.e., sawlogs or pulp logs). These include stem tops and large branches.

Sawmill residues: Byproducts of sawmill operations (wood chips, sawdust, shavings, and bark/hog fuel) generated from converting sawlogs into finished wood products, such as lumber and engineered wood.

[2] apps.fs.usda.gov/fiadb-api/evalidator
[3] Ibid.
[4] Personal communication with local wood processing company owners

SUPPLY ANALYSIS

Pulpwood

The Supply Zone produces aspen, Ponderosa pine, and spruce sawlogs and pulp logs. Aspen logs are in high demand in the BDO Zone for lumber and specialty products (e.g., wall paneling, flooring, Excelsior fiber). Ponderosa pine and spruce sawlogs have limited applications in the BDO Zone, including CLT panels and timber/log structures. The majority of softwood sawlogs are transported to a sawmill outside the Supply Zone. Softwood pulpwood logs are seasonally utilized for firewood or remain in slash piles at harvesting sites. Whole tree harvesting and transportation represents the predominant logging practice in the region.

Salvage of dead trees and forest restoration treatments also take place in the Supply Zone, mostly in the San Juan National Forest. These treatments tend to be significantly more expensive than conventional commercial harvesting due to reduced productivity and accessibility. Consequently, a large volume of pulpwood and forest residues generated by these treatments is piled and burnt or masticated and left on site.

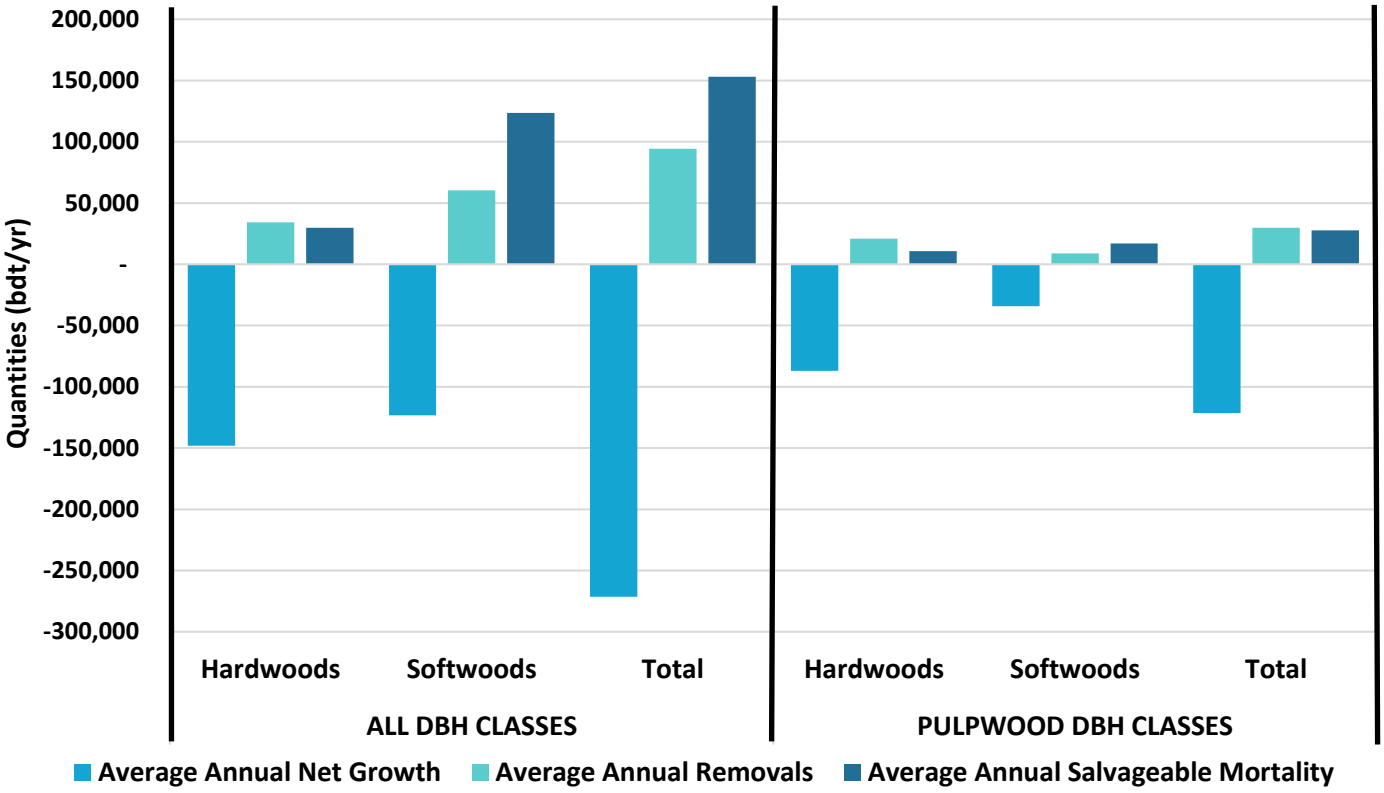
Moreover, pulpwood utilization was further reduced when a plywood mill[5], located 20 miles west of Mancos, ceased operations in 2020. A new biomass project in the BDO Zone could capitalize on the available pulp logs and leverage the existing logging capacity that previously supplied logs to this facility. Local foresters indicated that, although some logging companies relocated outside the region, the remaining logging and transportation capacity could potentially double the current pulpwood supply for a new project in Mancos.

Figure B-1 shows the average annual net growth, salvageable mortality, and removals per major species categories (hardwoods and softwoods) for all DBH classes (left) and pulpwood-size DBH classes (right). Salvageable mortality is the average annual quantity of biomass from standing dead trees that could be accessed by commercial harvesting equipment.[6] The graph indicates that 95,000 bdt of merchantable timber (all DBH classes, including pulpwood) and 29,000 bdt of pulpwood are removed on average annually from the Supply Zone. FIA data indicates that a quantity of 7,000 bdt/yr of pulpwood logs (i.e., non-saw stem portion)[7] is also generated through harvesting operations in the Supply Zone. Total harvest values were corroborated with local forestry experts and the USDA Forest Service timber harvesting reports for the San Juan National Forest.[8]

The USDA records indicate that, in the past two years, a significant decrease of harvest levels occurred in the Supply Zone, from 90,000 bdt/year to 50,000 bdt/year (Figure E-6, Section E). Moreover, the Colorado Timber Industry Association recently announced that the 2025 harvest target for the San Juan National Forest will be approximately 40,000 bdt.[9] This decrease signals a potential high risk for pulpwood availability for a new project in the BDO Zone. Furthermore, the negative average annual net growth values[10] recorded in the Supply Zone (Figure B-1), indicate an increased risk regarding the sustainability of current and future harvest levels. The newly released report "Colorado Forest Carbon Inventory"[11] confirms these concerns.

[5] According to 2024 Forisk database, the plywood mill consumed an estimated 13,200 bdt/yr of softwood logs.
[6] Based on outreach to local foresters 10% salvage accessibility in spruce-fir and aspen forests (high elevation, wet, and located in wilderness) and 50% for pine forests (low elevation, dry, low slopes). These assumptions were also confirmed by the FIA mortality data filtered by slope and distance to road.
[7] apps.fs.usda.gov/fiadb-api/evalidator, Variable 574054: Average annual removals of merchantable bole bark and wood biomass above the sawlog of sawtimber trees, in dry short tons, on timberland
[8] www.fs.usda.gov/forestmanagement/products/cut-sold/index.shtml
[9] CTIA Timber Times Newsletter October 2024 (coloradotimber.org)
[10] Negative annual net growth values indicate that annual mortality is greater than annual growth of standing trees in the Supply Zone
[11] csfs.colostate.edu/forest-carbon/ (Accessed on January 22, 2025)

Figure B-1. Average Net Growth, Average Annual Removals, and Average Annual Salvageable Mortality[12] for All-DBH and Pulpwood DBH Trees in the Supply Zone (2019-2021)[13]



An opportunity exists, however, to salvage some of the dead standing trees, from which approximately 27,000 bdt/year of mostly spruce and aspen pulpwood could be available. While salvageable pulpwood may present an opportunity for a new bio-project in Mancos, it is imperative to note that this opportunity would also require harvesting sawtimber in quantities, qualities, and costs that the two sawmills in the Supply Zone may not be able to fully utilize. Moreover, foresters from San Juan National Forest indicated that most of the accessible salvage has already occurred and significant investments in roads will be required to access additional salvageable material. Consequently, a coordinated effort is needed among all local stakeholders, both government and private, to develop a fully integrated forest products sector that can efficiently and feasibly supply and utilize both timber and biomass.

Table B-1 summarizes the total annual pulpwood production, utilization, and availability estimates from various sources in the Supply Zone. From the total of 63,000 bdt/year of pulpwood generated in the Supply Zone,[14] 9,000 bdt/year of

[12] Mortality values were adjusted for accessibility by dominant species, as follows: aspen = 10% accessible, pine = 50% accessible; spruce-fir = 10% accessible (local FS Expert)

[13] apps.fs.usda.gov/fiadb-api/evalidator. Variables 2636: Average annual net growth of aboveground biomass of trees (at least 5 inches d.b.h./d.r.c.), in dry short tons, on timberland; 574049: Average annual removals of merchantable bole bark and wood biomass of growing-stock trees (at least 5 inches d.b.h.), in dry short tons, on timberland; 574027: Average annual mortality of merchantable bole bark and wood biomass of growing-stock trees (at least 5 inches d.b.h.), in dry short tons, on timberland

[14] Assuming the 2019-21 harvest levels

pulpwood, mostly aspen, is consumed by the local mill.[15] Thus, an average of **54,000 bdt/yr** of pulpwood could be made available to a new project in Mancos.

Table B-1. Annual Pulpwood Production, Utilization, and Availability Estimates

Source	Quantity (bdt/yr)
Pulpwood Harvested	29,000
Pulpwood Dead Salvage	27,000
Pulpwood Logs	7,000
Total Production	**63,000**
Pulpwood Utilized	9,000
TOTAL Pulpwood	**54,000**

Forest residues

FIA data estimated that, on average, approximately 44,000 bdt/yr of forest residues[16] are generated in the Supply Zone from harvesting and possible salvage operations. Local forestry experts indicated that in-woods grinding operations are available in the region and are capable of processing this quantity. However, they also noted the lack of chip vans to transport the ground material from the forest to a project in Mancos. Until chip vans can be acquired, roll-off bins could be utilized, as they are commonly used in the region to transport bark and sawdust from sawmills to mulch operations.

Sawmill residues

The Supply Zone includes two sawmills (Map B-2): one in Mancos and one in Pagosa Springs, with lumber production capacities of 35 MMBF and 10 MMBF, respectively. Outreach indicated that in recent years these two facilities have drastically reduced their capacities due to decreasing access to fiber. The sawmill residue supply analysis estimated that, at their current reduced capacities, approximately 12,700 bdt/year of sawmill residues are generated in the Supply Zone (Table B-2).[17] Currently, approximately 7,300 bdt/yr is consumed by the pellet mill and the remaining 5,400 bdt/yr could be available to a new project in Mancos.[18]

[15] Outreach to local wood processing companies and forisk.com/product/north-american-forest-industry-capacity-database
[16] Ibid. Variables: 574065 - Average annual removals of top and limb bark and wood biomass of growing-stock trees (at least 5 inches d.b.h.), in dry short tons, on timberland. 574040 - Average annual mortality of top and limb bark and wood biomass of growing-stock trees (at least 5 inches d.b.h.), in dry short tons, on forest land. Value rounded to the nearest 1,000 bdt
[17] Ibid. Ecostrat sawmill residue calculator. Values are rounded.
[18] Partially utilized by local mulch operations.

Map B-2. Sawmilling Facilities in the Supply Zone[19]

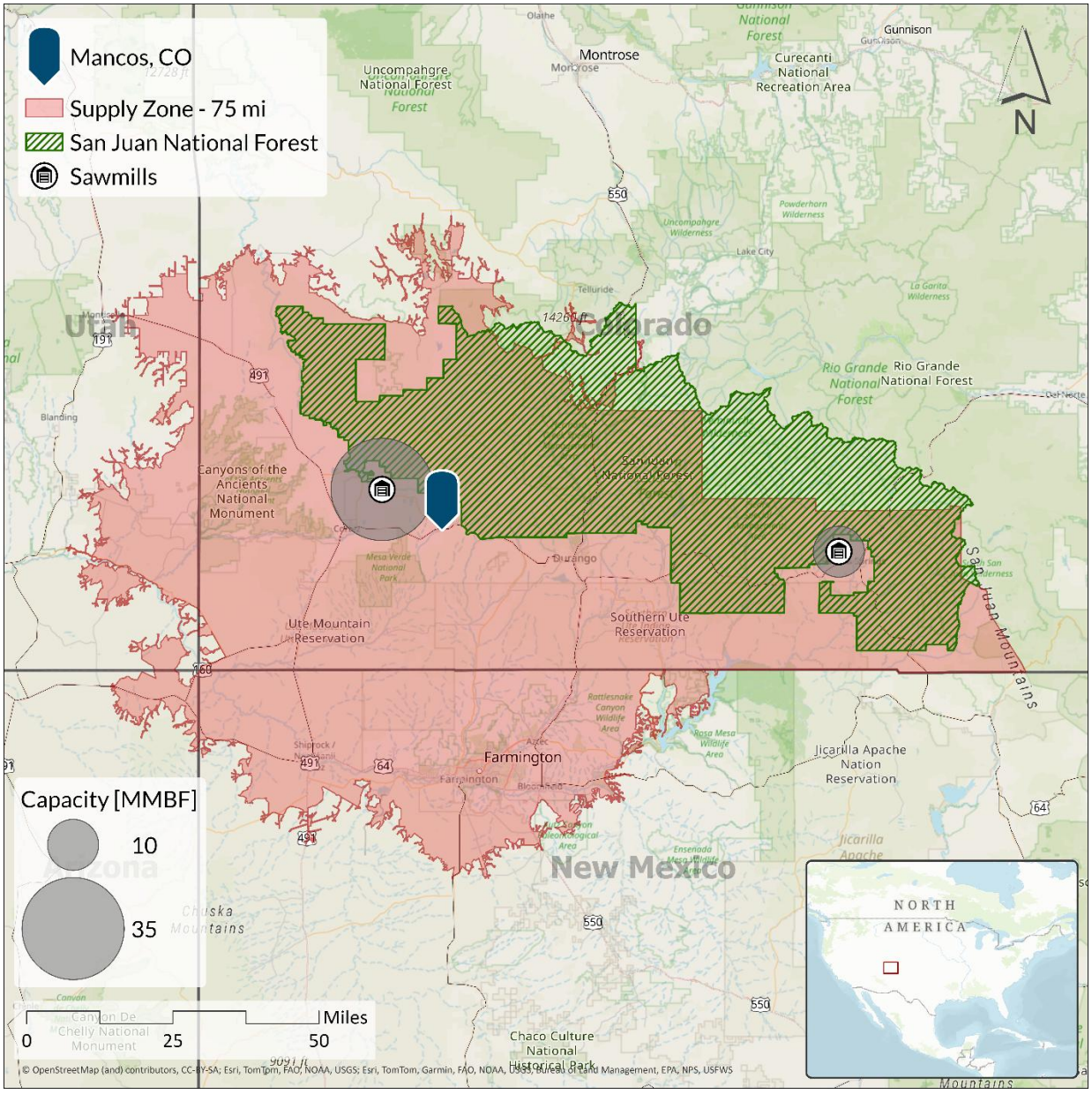


Table B-2. Sawmill Residue Production Estimates in the Supply Zone

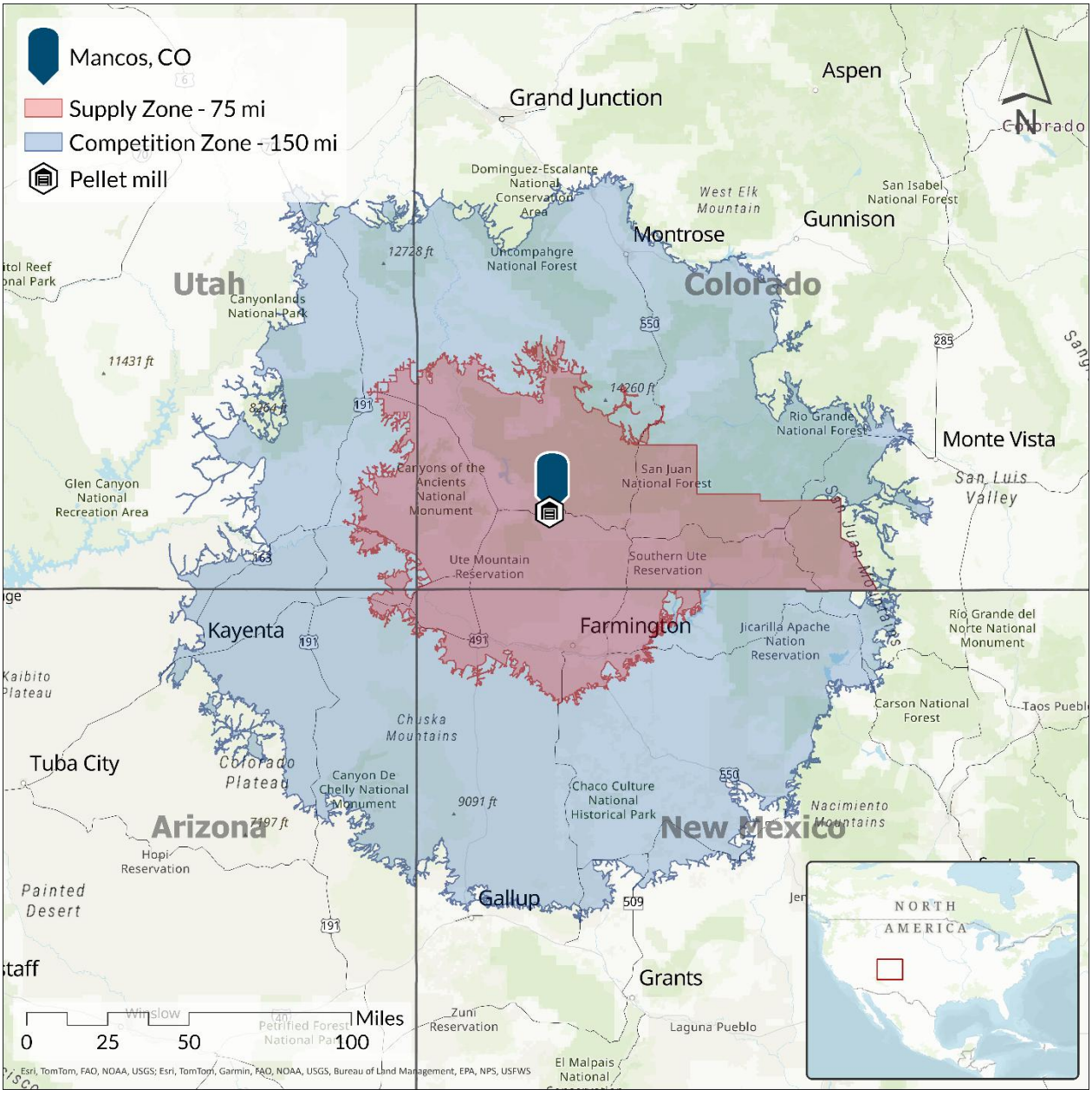
Sawmill Residue	Chips	Sawdust	Shavings	Bark	TOTAL
Estimated Quantity (bdt/yr)	7,400	1,100	1,600	2,600	**12,700**
Committed Quantity (bdt/yr)	5,700		1,600		**7,300**
Estimated Quantity (bdt/yr)	**1,700**	**1,100**		**2,600**	**5,400**

[19] forisk.com/product/north-american-forest-industry-capacity-database

COMPETITION ANALYSIS

The only consumer of sawmill residues and pulpwood in the Competition Zone is a joint pellet mill-Excelsior operation located in Mancos (Map B-3). A large mulch producer in New Mexico, situated outside the Competition Zone, also consumes chips produced in the Supply Zone. However, a new bio-project located in the BDO Zone would have a competitive advantage over this mulch producer due to reduced transportation costs.

Map B-3. Map of Biomass Competitors in the Competition Zone[20]



[20] Ibid.

RATED QUANTITIES AND PRICES

Table B-3 presents technical and rated quantities of pulpwood, forest residues, and sawmill residues. Biomass Availability Multiple (BAM) factors with values between 1.5 and 4.0 are applied to the available quantities of each feedstock type to account for uncertainty in the accuracy of existing inventory, scale-up readiness, historical harvesting practices and volumes, and sudden changes in supply and demand, as follows:

- The **BAM of 1.5** for pulpwood was selected to provide a realistic pulpwood quantity to a new customer, aligned with the quantity that the plywood facility in the Supply Zone was assumed to consume and to which the logging companies previously supplied.
- The **BAM of 2.0** for forest residues was justified by the uncertainty regarding the capability of grinding operations to supply the rated quantity in a timely manner. This BAM factor allows for sufficient capacity to scale up.
- The **BAM of 1.5** for sawmill residues resulted from the supply/competition analysis and outreach interviews, which indicated quantities of sawdust and bark available for a new project.

Table B-3 also presents price ranges of pulpwood, forest residues, and sawmill residues delivered to an average 50-mile drive distance from Mancos. These price ranges were estimated based on outreach to local sawmill operators/forestry professionals and corroborated with regional market prices[21] and Ecostrat biomass supply analyses. Pulpwood prices include stumpage, harvesting, and hauling costs. In addition to these costs, forest residue prices include the chipping cost. The delivered sawmill residue price ranges between the lowest average price of sawdust and bark to the highest average price of wood chips and shavings. It is worth noting that co-locating a new bio-project with the sawmill in Mancos could provide significant long-term price and availability competitive advantages.

Table B-3: Rated Quantities and Delivered Price Ranges of Biomass in the Supply Zone

Biomass type	Available Quantity (bdt/yr)	Biomass Availability Multiple (BAM)	Rated Quantity (bdt/yr)	Delivered Price Range ($/bdt)
Pulpwood	54,000	1.5	36,000	80-100
Forest residues	44,000	2.0	22,000	60-70
Sawmill residues	5,400	1.5	3,600	55-95
TOTALS	**103,400**		**61,600**	

OPERATIONAL CONSIDERATIONS

Pulpwood

To supply the rated quantity of pulpwood to Mancos, CO, an additional logging crew[22] and four logging trucks[23] would be necessary. Local foresters communicated that this capacity exists in the region. However, they also noted the number of logging crews, trucks, and drivers has decreased significantly over the past five years. Local logging companies and forests are currently looking for new opportunities to supply additional volumes of pulpwood and are committed to addressing these labor shortages. Additionally, a training program and a machine simulator were mentioned by local experts in Mancos, which could train future equipment operators.

[21] Forisk 2024-Q4 Report
[22] Estimates assume an average of 12 truckloads/day/crew (2-3 people per crew), 14 bdt/truckload, 9 work months/year (allowing for months and areas with heavy snow)
[23] Estimates assume an average of 4 roundtrips per day

Forest Residues

In addition to the considerations outlined above, which also apply to forest residue recovery, one grinder[24] and three chip vans[25] would be necessary to grind and transport the rated quantity of forest residues to Mancos. Outreach to local foresters indicated availability of grinders in the area. However, they also noted a lack of chip vans. This issue could be mitigated by using the existing roll-off bins and investing in chip vans as additional funding becomes available.

Sawmill Residues

To utilize the rated quantity of sawmill residues, mutually agreeable off-take agreements will be necessary. Outreach indicated that local sawmills are willing to supply the feedstocks that they do not currently utilize. Co-locating the project with the existing sawmill would streamline this process and generate significant savings for all co-located businesses.

As a general note, the consensus among all interviewed experts (forestry, sawmilling, biomass, economic development, Indigenous nations, etc.) was that the likelihood of success for a biomass project in Mancos will depend not only on co-locating the project with an existing wood processing facility, but also on developing and maintaining a regional business environment based on multi-stakeholder collaboration and trust. All interviewees strongly agreed that developing a local bio-economy will not be possible without an integrated approach involving all businesses along the forest to product value chain: logging, transportation, primary and secondary wood processing, and value-added (e.g., CLT and timber operations). They also emphasized that, critical to this value chain integration, is the development of a reliable high-resolution timber and biomass inventory that can support more rigorous supply analyses and planning.

[24] Estimates assume 20 bdt/hr grinder productivity, 9 work months/year (allowing for months and areas with heavy snow)
[25] Estimates assume 4 chip vans per grinder

SECTION C: INFRASTRUCTURE



PROPERTY OVERVIEW

Address:	901 Grand Ave
City:	Mancos
State:	CO
County:	Montezuma
Acres:	30
Pricing Note:	TBD
Topography:	Graded/loose dirt
Zoning:	M Industrial
Building on Site:	Yes (currently occupied)

SITE CONTACTS

Exec Director, Economic Development
Laura Lewis Marchino
Region 9 EDD & SW Colorado
135 Burnette Drive Unit 1
Durango, CO 81301
P: 970-247-9621
laura@region9edd.org

ADDITIONAL NON-RATED SITES

Infrastructure Sites Contact
Bob Buckingham
BDO Zone Infrastructure
bob@ecostrat.com

PROPERTY PROFILE

The rated infrastructure is a 30-acre parcel located on the west side of Mancos, currently occupied by a sawmill and wood pellet facility. The current owner (Aspen Forest Products) is open to co-locating with a complimentary bio-project and sharing existing infrastructure to expedite the start-up. Refer to Sections D and E (Maps E1 to E-4) for additional information on this primary site and two secondary sites.

Transportation

Nearest Highway: Highway 160
Nearest Interstate: I-70 (203 miles)
Nearest Airport: Cortez (19 miles)
Nearest Commercial Airport: Cortez, CO (19 miles) Passenger service to Denver and Phoenix
Rail Served: No
Rail Accessible: No
Nearest rail is Montrose, CO (145 Miles)
Rail Infrastructure in Place: No

Electric Service

Supplier: Empire Electric Association
Ownership: Co-Op (Tri-Star supplier)
Phone: 970-565-4444
Capability: Up to 15kV at the site
Website: www.eea.coop.org
All Utilities Extend to Site: Yes
Nearest Substation: Adjacent

Natural Gas

Supplier: ATMOS Energy
Ownership: Privately Owned
Phone: 866-286-6700
Capability: Industrial
Website: www.atmosenergy.com
Size of Pipe: 4 in
Pressure: 50 psi

Water

Supplier: Town of Mancos - Utilities
Ownership: Municipal
Phone: 970-533-7725
Capability: Industrial
Website: www.mancoscolorado.com
Size of Main: 12 in
Peak Capacity: 1,000,000 gal/day

Wastewater

Supplier: Town of Mancos
Ownership: Municipal
Phone: 970-533-7725
Capability: 1,000,000 gal/day
Website: www.mancoscolorado.com
Size of Main: 6 in

Telecommunications

Supplier: Spectrum Communications
Ownership: Private
Phone: 844-928-2391
Capability: Wireless and fiber optics
Website: www.broadbandnow.com
Platforms: Fiber, Cable, Wireless

SECTION D: RISK INDICATOR SCORING METRICS

CATEGORY 1.0: SUPPLIER RISK

1.1 Risk Factor: Credit-Worthiness/Future Solvency of Suppliers

1.1.1 Longevity & History of Supplier Performance

Rationale: Number of years in business is a positive indicator of future solvency. Historical performance is an indicator of future performance.

Risk Information: The Supply Zone has a well-established history of logging and sawmilling operations. However, in recent years, sawmills, logging operations, and grinding facilities have experienced significant capacity reductions. This declining operational capacity presents heightened risk for potential biomass projects, as the historical performance trajectory indicates potential future solvency concerns among suppliers. The diminishing production capacity suggests vulnerability to market fluctuations and limited resilience among existing operators in the region.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed high, therefore the RRL is 8 out of 10.	**8**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed high, therefore the RRI is 8 out of 10.	**8**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 64 out of 100.	**64**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 64 out of 100.	**64**

1.2 Risk Factor: Conflicts of Interest/Vested Interest with Competing Market(s)

1.2.1 Suppliers' Dependence on, or Preference for, Competing Markets

Rationale: Suppliers may have a vested interest or preference in supplying specific competitors with biomass feedstock. Preferences may be due to historical, long-term, or personal relationships, less stringent feedstock quality requirements, more flexible operating hours by competing markets, or suppliers' dependence on competing markets to accept or purchase other products/by-products. During periods of feedstock shortage, such suppliers may be more likely to allocate the scarce supply to competitors, resulting in supply disruptions for the Issuer.

Risk Information: Within the Supply Zone, there is limited competition for available sawmill residues, forest residues, and softwood pulpwood. The analysis indicates that most suppliers do not have strong vested interests in or dependencies on competing markets that would create significant supply conflicts. This situation presents relatively low risk to a new project in the BDO Zone, as suppliers would likely welcome additional market opportunities rather than prioritize existing customers in supply allocation decisions.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**

The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

1.3 Risk Factor: Supplier Control Over Production and Transportation

1.3.1 Ownership of Land/Means of Production

Rationale: Suppliers that own land or a production facility where feedstock is produced tend to have better control of supply chains and present lower degrees of supply risk.

Risk Information: Approximately 90% of the timberland in the Supply Zone where the majority of rated biomass is generated is publicly owned (Figure E-5), primarily as national and state forests. This high concentration of public ownership creates substantial risk, as demonstrated by steadily diminishing harvesting levels on these lands over recent years (Figure E-6). The limited supplier control over land and means of production introduces significant vulnerability to policy changes, funding allocation decisions, and permitting delays that could affect biomass availability.

Raw Risk Likelihood (RRL) The risk likelihood is deemed high, therefore the RRL is 8 out of 10.	**Score** **8**
Raw Risk Impact (RRI) The risk impact is deemed high, therefore the RRI is 8 out of 10.	**Score** **8**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 64 out of 100.	**Score** **64**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 64 out of 100.	**Score** **64**

1.3.2 Ownership of Equipment

Rationale: In most cases, suppliers that own or lease equipment for harvest, collection, and processing feedstock are at lower risk than those that are not. For example, third-party harvesting equipment may not be available when required. Short harvest windows may be missed if a contractor cannot schedule convenient harvest times, and quantity shortages can result. However, in some circumstances, reliance on third-party equipment to harvest or produce feedstock can decrease supply chain risk.

Risk Information: Harvesting and transportation equipment in the Supply Zone is exclusively owned by logging companies and sawmills. This direct ownership pattern reduces supply chain vulnerability as it eliminates dependencies on third-party equipment leasing or contracting. The established ownership of necessary equipment by operators

presents relatively low risk to biomass supply continuity, as suppliers maintain direct control over their operational capacity and scheduling.
Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed low, therefore the RRL is 4 out of 10. **4**
Raw Risk Impact (RRI) **Score** The risk impact is deemed low, therefore the RRI is 4 out of 10. **4**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 16 out of 100. **16**
Mitigation/Notching **Notch** *RRL Mitigation (Notch)* **NN** No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100. **16**

1.3.3 Ownership of Transportation/Logistics

Rationale: In most cases, suppliers that own or lease transportation equipment necessary to transport biomass from forests are at lower risk than those that do not. However, in some circumstances, reliance on third parties to transport biomass is common practice and does not contribute to risk.
Risk Information: Logging companies in the Supply Zone maintain ownership of their logging truck fleets, while sawmill residues are typically transported using roll-off bins and dump trucks. However, the regional scarcity of chip vans, which represent the most efficient transportation mode for chips and hog fuel, introduces medium risk to the supply chain. This equipment gap could create logistical bottlenecks for a biomass project in Mancos, potentially affecting continuous supply reliability and increasing transportation costs.
Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed medium, therefore the RRL is 6 out of 10. **6**
Raw Risk Impact (RRI) **Score** The risk impact is deemed medium, therefore the RRI is 6 out of 10. **6**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 36 out of 100. **36**
Mitigation/Notching **Notch** *RRL Mitigation (Notch)* **NN** No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100. **36**

1.3.4 Feedstock as a Secondary Transformation

Rationale: Secondary transformation is dependent upon the production of primary products. Forest residues, bark, and sawmill chips (unless from a dedicated chip mill) are all secondary transformations of a primary product.

Risks are higher if the feedstock is a secondary transformation of a primary, more valuable product. In the absence of markets for the primary product, it may not be economical for suppliers to produce biomass on their own. For example, a supplier may produce dimensional lumber as its primary product and wood chips as a by-product, therefore relying on the health of the housing market for production levels. If the demand for dimensional lumber drops, so can the availability of sawmill residues.

Understanding the economic drivers for suppliers' primary products can help gauge risk levels for secondary transformation biomass products.

Risk Information: All three rated biomass types—sawmill residues, forest residues, and pulpwood—are secondary transformations dependent on primary products. This dependency introduces significant risk, as these feedstocks are byproducts of lumber manufacturing and logging operations. The notable decline in sawmilling, logging, grinding, and transportation capacities in the region further elevates this risk.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed high, therefore the RRL is 8 out of 10.	**8**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed very high, therefore the RRI is 10 out of 10.	**10**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 80 out of 100.	**80**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 80 out of 100.	**80**

1.4 Risk Factor: Supplier Experience

1.4.1 Fundamental Feedstock Production Experience

Rationale: Risk is higher when suppliers have limited experience with harvesting, processing, and/or collecting biomass.

Risk Information: The Supply Zone benefits from long-established expertise in harvesting, processing, and collecting biomass feedstocks. The region's experience in forestry operations spans decades, with operators demonstrating competence in handling various biomass types. This extensive operational knowledge presents low risk related to supplier experience, as the technical capability to supply quality feedstock exists within the regional supplier base.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**

Mitigation/Notching	Notch
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	NN
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

1.4.2 Production Scale Experience

Rationale: Scale-up entails risk. Risk is higher when suppliers have limited experience producing the required quantity of feedstock.

Risk Information: The rated quantities of biomass would not necessitate significant scale-up efforts from suppliers. Notably, until approximately five years ago, logging companies in the region regularly supplied similar quantities of logs and forest residues to a plywood mill located in the BDO Zone. This historical production capacity at the required scale suggests suppliers possess relevant experience to meet the projected biomass demand, presenting low risk related to production scale capability.

Raw Risk Likelihood (RRL)	Score
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

1.5 Risk Factor: Supplier Harvesting/Collection/Processing Capacity

1.5.1 Supplier's Equipment Efficiency

Rationale: Equipment efficiency significantly influences the supplier's feedstock production capacity. Understanding the supplier's equipment capability enables understanding of their ability to produce feedstock of suitable quality.

Risk Information: Outreach to local operators indicates that logging companies in the Supply Zone utilize high-efficiency logging and grinding equipment. This modern, efficient equipment reduces the risk of production bottlenecks or quality inconsistencies in the biomass supply chain. The operational efficiency of existing supplier equipment presents low risk to biomass quantity and quality consistency for a potential project in the BDO Zone.

Raw Risk Likelihood (RRL)	Score
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**

The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

1.6 Risk Factor: Supplier Motivation

1.6.1 Feedstock Production Priority

Rationale: When biomass feedstock is a secondary or non-core line of business, a by-product, or a residual from a more valuable product, suppliers may not put in sufficient effort for consistent production. The risk of breach increases when feedstock production and/or delivery compromise a supplier's ability to make a primary product. When biomass feedstock is a by-product of another main higher margin or main product such as forest residues (e.g., pulpwood), supply may not be a top priority for a supplier.

Risk Information: The forest industry in the Supply Zone has traditionally prioritized high-value sawlogs, with pulpwood and forest residues utilized only sporadically. The recent reduction in sawmilling capacity in the BDO Zone suggests companies will likely continue to focus predominantly on their highest-value log grades. This preference creates some risk for biomass projects, as suppliers may deprioritize biomass production during resource constraints or market fluctuations.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**Score** **6**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 24 out of 100.	**Score** **24**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 24 out of 100.	**Score** **24**

CATEGORY 2.0: COMPETITOR RISK

2.1 Risk Factor: Influence on Feedstock Supply of Existing Markets

2.1.1 Competitors' Locations and Overall Geographical Influence

Rationale: Competitors' locations relative to siting locations within a BDO Zone can affect the viability of procuring feedstock and the cost of that feedstock. Accurate and detailed competitor mapping provides an understanding of a competitor's geographical influence on new plants within a BDO Zone, including competitive advantages such as short hauling.

Risk Information: A pellet-Excelsior mill currently operating in Mancos significantly influences the supply of sawmill residues and aspen pulpwood in the local market. This facility location directly within the BDO Zone creates meaningful geographical competition for these specific feedstock types. The competitor's established supply relationships and proximity to sources present medium risk to a new project seeking similar feedstock types, particularly for materials where transportation costs form a significant portion of delivered price.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**36**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	**36**

2.1.2 Current and Historical Consumption of Feedstock Quantity

Rationale: Clear understanding of feedstock consumption by key competitors for each rated feedstock type in the BDO Zone is essential to quantifying competitor risk.

Understanding current consumption and historical trends of feedstock utilization can provide valuable information about feedstock price elasticity during shortages and insight into events that may impact future supply conditions. It can enable more accurate estimates of the sensitivity of feedstock availability to potential future consumption levels or the impact of external events (e.g., weather events, structural economic changes, seasonality, or policy change).

Risk Information: Current analysis indicates that only approximately 10% of the total production of pulpwood, forest residues, and sawmill residues in the Supply Zone is utilized by the existing competitor. Historical utilization rates were higher before pandemic-related disruptions led to the closure of a local plywood mill[26] and operational curtailments at other wood processing facilities. Recovery from these disruptions has been slow, particularly due to decreasing harvest targets and fiber availability from public forests. The limited consumption by existing competitors presents relatively low risk of supply competition, though this could change if economic conditions improve and existing facilities increase production.

[26] See Section B for plywood mill log intake estimate.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

2.1.3 Competitor Pricing and Price Sensitivity

Rationale: Understanding how much competitors pay (or receive) for different feedstock types is essential in determining the Issuer's competitiveness and accurately assessing the delivered cost range in the BDO Zone rating. Current and historical prices paid/received by competitors provide insight into their procurement behaviors and exert pressure on suppliers in the BDO Zone, such as the ability/willingness to pay premiums for feedstock during times of feedstock shortage or reduce prices (or cut-off deliveries) during gluts. Competitors that have the ability to offer higher prices for feedstock during feedstock shortages can pose a significant risk to the Issuer.
Knowledge of competitor pricing and price sensitivity is also an essential prerequisite to formulating a feedstock cost curve, which can enable predictions of feedstock redundancy, i.e., how much feedstock could become available at different pricing levels (see Category 3–Supply Chain Risk 3.1.3).

Risk Information: The current pricing for biomass in the Supply Zone (Table B-3) reflects realistic market conditions based on both published data and direct outreach to market participants. There is only one significant competitor in the Supply Zone affecting supply quantities and prices, but this presents limited risk to a new entrant. A project co-locating with the existing sawmill in Mancos could secure advantageous pricing through proximity, potentially accessing additional feedstock quantities at reduced and more stable prices compared to standalone operations.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score	**Score**

The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

2.1.4 Impacts of Future Demand on Feedstock Availability and Price by Current Competitors

Rationale: Feedstock utilization in a BDO Zone can change over time. Expansion of feedstock demand by current competitors can put additional pressure on feedstock and lead to higher prices, feedstock disruptions, shortages, supplier breaches, or other types of supply chain disruption.

If current markets for feedstock have been publicly signaling the potential for increased demand for feedstock (in the case of a sawmill adding a shift or pulp mill potentially expanding into the production of renewable chemicals, for example), high interest in a supply zone can make suppliers overconfident, leading to a supplier-controlled market where short-term contracting becomes the norm and supply chain reliability is compromised for the Issuer. If and when it occurs, increased demand on feedstock may decrease availability and increase cost for new plants within the BDO Zone.

Risk Information: Local wood processing businesses have expressed interest in expanding operations if additional grant funding becomes available. However, these expansions are expected to be incremental rather than transformative, creating limited competitive pressure on biomass supply or pricing. The modest growth plans of existing operators present low risk to the availability and price stability of biomass for a new project in the BDO Zone, as demand growth is likely to be gradual and predictable.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

2.1.5 Soft Supply Influence of Existing Markets

Rationale: In some cases, existing markets for feedstock may be able to exert high degrees of pressure over local suppliers, effectively enabling control of feedstock, especially during times of shortage. This control can derive from qualitative or "soft" factors, such as long previous relationships between local suppliers and existing markets for feedstock.

Risk Information: The existing competitor maintains direct and significant relationships with suppliers of wood chips and aspen logs. However, when assessed against the total rated quantity of biomass potentially available to a new project, this soft influence represents a relatively small portion of the overall supply.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**

The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

2.1.6 Temporary Market-Driven Markets

Rationale: Alternative, non-traditional, market-driven competitors for feedstock can drive feedstock demand in unusual circumstances.

Risk Information: The firewood market represents an alternative outlet that could compete for pulpwood, particularly during periods of high demand such as extended cold weather. While this seasonal competition could temporarily affect availability and pricing, its impact is generally limited. The intermittent nature of this alternative market presents low risk to the overall security of pulpwood supply for a biomass project, as the competition is both seasonal and relatively small-scale.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

2.2 Risk Factor: Specific Competitors' Competitive Advantage

2.2.1 Relative Inventory Capacity

Rationale: The more inventory a competing biomass facility is able to store, the more competitive pressure it can exert on supply. The ability to store large inventories allows competitors to purchase inventory when the prices are low, potentially giving it an economic advantage. Additionally, the ability to store inventory during feedstock supply surpluses can enable competitors to continue to intake feedstock when the Issuer's plant (with lesser inventory capacity) may be forced to put suppliers on quota. Larger inventory capacity on the part of competing markets creates supplier loyalty and can make it more difficult for new projects to secure supply without paying a significant premium.

Risk Information: Current competitors in the region maintain substantial onsite storage capacities, which could provide competitive advantage during supply fluctuations. However, this potential risk will be substantially mitigated if a new project co-locates with the existing sawmill in Mancos. Such co-location would provide comparable inventory capabilities and eliminate transportation cost disadvantages, effectively neutralizing the inventory capacity advantage of competitors.
Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed low, therefore the RRL is 4 out of 10. **4**
Raw Risk Impact (RRI) **Score** The risk impact is deemed low, therefore the RRI is 4 out of 10. **4**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 16 out of 100. **16**
Mitigation/Notching **Notch** *RRL Mitigation (Notch)* **NN** No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100. **16**

2.2.2 Relative Accessibility/Delivery Hours and Wait Times

Rationale: The value attributed by suppliers to local competing markets for biomass is often directly related to the degree of flexibility the market provides in terms of delivery hours and the more efficient discharge can occur.
Risk Information: No significant accessibility hurdles currently exist for suppliers delivering to existing sawmills in the region. The established delivery protocols and efficient receiving processes create a positive supply environment. A new project co-locating with the sawmill in Mancos will inherit these favorable accessibility conditions, presenting low risk related to logistical barriers that might otherwise discourage suppliers from serving a new facility.
Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed low, therefore the RRL is 4 out of 10. **4**
Raw Risk Impact (RRI) **Score** The risk impact is deemed low, therefore the RRI is 4 out of 10. **4**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 16 out of 100. **16**
Mitigation/Notching **Notch** *RRL Mitigation (Notch)* **NN** No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100. **16**

2.2.3 Relative Specification Advantages

Rationale: When choosing a market for biomass feedstock, suppliers not only look at price but also at relative quality requirements or specifications. It is important to understand feedstock quality specifications for competing markets within the BDO Zone in order to accurately quantify the risk that competitors can exert on the Issuer's supply chain.

Risk Information: The current competitor maintains stringent quality standards for sawmill residues and aspen logs. A new project would likely implement similar quality parameters for these materials, creating parity in specification requirements. This alignment in quality expectations presents low risk of competitive disadvantage based on feedstock specifications, as suppliers are already accustomed to meeting the anticipated quality requirements for a new facility.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

2.2.4 Demand for Competitors' Products

Rationale: Increased demand for the competitor's final product can cause increased demand for feedstock by the competitor. For example, an increased demand for wood pellets due to high energy prices in Europe or for biofuels due to a favorable clean fuels policy can cause increased pellet/biofuel production by competing markets. Thereby driving demand for feedstock within a BDO Zone.

Risk Information: While international wood pellet markets continue to expand, the existing competitor's products primarily serve local markets that have demonstrated stability in recent years. The Excelsior market segment shows growth potential, but not at levels that would significantly impact regional biomass availability.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**

Loaded RI Score	Score
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	16

CATEGORY 3.0: SUPPLY CHAIN RISK

3.1 Risk Factor: Feedstock Availability

3.1.1 Biomass Availability Multiple (BAM)

Rationale: Biomass Availability Multiple (BAM) indicates the degree of redundancy in an Issuer's supply chain in relation to the rated quantity in the BDO Zone. BAM is the mean ratio of biomass feedstock available to a project in relation to delivered cost, divided by the Issuer's mean rated quantity. BAM is a strong indicator of supply chain resilience when stressed by a supply shortage and/or supplier breach. BAMs of 1.5 or higher are generally signals of lower feedstock risk for new projects in BDO Zones.

Risk Information: The Biomass Availability Multiple (BAM) factors applied in this analysis provide conservative quantity redundancy, enhancing confidence in the achievability of project-ready estimates. Specifically, BAM factors of 1.5 for pulpwood, 2.0 for forest residues, and 1.5 for sawmill residues account for variables affecting availability, including inventory accuracy limitations, scale-up readiness considerations, historical harvesting volatility, and potential supply/demand fluctuations. While these BAM values provide reasonable buffer against supply risks, improved timber and biomass inventory data for the region would further enhance forecast accuracy and potentially reduce this risk factor.

Raw Risk Likelihood (RRL)	Score
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	4
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	4
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	16
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	NN
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	16

3.1.2 Feedstock Supply Curve/Marginal Cost Curve

Rationale: The greater the feasible transport distance, the more feedstock is accessible to the Issuer, but at a higher delivered cost. The feedstock supply curve, sometimes referred to as the marginal cost curve, is a function of feedstock availability over its cost, which is primarily, but not exclusively, a function of distance. The feedstock supply curve is used to determine the availability of redundant feedstock at various price points, as well as the cost of replacing feedstock with substitutes located at different distances.

Feedstock cost curves are useful in determining supply chain resilience; they provide information about the cost of feedstock availability in times of supply disturbance. Biomass supply chains are prone to supply disturbances over time; suppliers can become insolvent, or weather events can temporarily disrupt feedstock availability. When a disturbance occurs, the Issuer may need to source replacement feedstock from different suppliers at different locations and at

different costs. A biomass supply curve indicates quantities of feedstock available at various price levels from suppliers generally located further away than the core supplier.

Risk Information: The supply/marginal cost curves (Figure E-7) indicate that rated quantities of forest residues, pulpwood, and sawmill residues would need to be sourced from distances of up to 65, 75, and 90 miles from Mancos, respectively. The analysis suggests that the rated price ranges would not secure significantly larger additional volumes during supply disruptions. This situation creates medium to high risk, as supply shortages would require sourcing from even greater distances at substantially higher costs. The challenging terrain and limited road network in the San Juan National Forest, where most rated quantities originate, further amplifies this risk by increasing incremental costs during supply constraints.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed high, therefore the RRI is 8 out of 10.	**8**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 48 out of 100.	**48**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 48 out of 100.	**48**

3.1.3 Seasonal Feedstock Supply Variation

Rationale: Biomass supply can present significant seasonal variations. Seasonal supply variations, combined with limitations associated with longer-distance transportation and storage, can lead to BDO Zone biomass supply imbalances,[27] which can manifest in shortages and higher costs for Issuers.

Risk Information: Biomass availability in the region experiences seasonal constraints, particularly during winter months (November to March) when heavy snow accumulation limits logging operations at higher elevations. This seasonal variability creates medium risk to consistent feedstock supply. The risk is partially mitigated by the ability to harvest at lower elevations during winter months, but seasonal planning and inventory management remain essential to maintain supply continuity throughout the year.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**36**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment.	**NN**

[27] Golecha & Gan, 2016.

RRI Mitigation (Notch) No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100. **36**

3.1.4 Year-to-Year Variation in Feedstock Availability

Rationale: Biomass can have significant year-to-year supply variations due to variability in yield from biomass harvesting operations.
Risk Information: The Supply Zone has experienced significant decreases in timber harvest from the San Juan National Forest in recent years, as illustrated by historical data (Figure E-6). Furthermore, the recently announced low harvest target indicates continued challenges. This pronounced downward trend and substantial year-to-year variability create high risk to stable biomass supply. The volatility in annual harvesting levels introduces considerable uncertainty for long-term feedstock planning and price stability for a project in the BDO Zone.
Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed high, therefore the RRL is 8 out of 10. **8**
Raw Risk Impact (RRI) **Score** The risk impact is deemed high, therefore the RRI is 8 out of 10. **8**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 64 out of 100. **64**
Mitigation/Notching **Notch** *RRL Mitigation (Notch)* **NN** No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 64 out of 100. **64**

3.2 Risk Factor: Historical Issues

3.2.1 Historical Feedstock Price Variations

Rationale: If the historical feedstock price shows volatility, then the risk of future price fluctuation is elevated. If feedstock prices have historically exceeded the price at which the Issuer would have to cease operations or breach a financial covenant (i.e., the "red line" feedstock cost), then mitigation measures should be put in place.
Risk Information: Historical price data specific to the three rated feedstocks is not available for Southwest Colorado. The broader regional data from Forisk Q3 2024 report for the Northwest Region (East of Cascades and Idaho) indicates decreasing delivered prices for pulpwood and relatively stable prices for sawdust and wood chips. The absence of significant regional price volatility and the limited local historical data introduces some uncertainty to this assessment.
Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed medium, therefore the RRL is 6 out of 10. **6**
Raw Risk Impact (RRI) **Score** The risk impact is deemed medium, therefore the RRI is 6 out of 10. **6**
Gross Risk Indicator (GRI) **Score**

The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**36**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	**Score** **36**

3.2.2 Historical Demand for Feedstock in the BDO Zone

Rationale: If Issuer BDO Zone does not have a history of developed large-scale feedstock procurement, suppliers may not have sufficient expertise in feedstock production to ensure reliable supply, especially in the early years. This can be particularly true for forest residues, where, typically, the infrastructure for collection, processing, and delivery is immature.

Where supply chains are not well-established, risk can be mitigated when new bio-based plants control a higher degree of feedstock processing. For example, if a BDO Zone rating is issued for clean wood chips and the historical demand in the Zone has been exclusively for pulpwood, then supply chain risk will be decreased for new bio-based plants that intake pulpwood and manage log debarking and chipping internally, rather than requiring inexperienced suppliers to deliver debarked wood chips.

Risk Information: Suppliers in the region possess experience in providing the rated quantities of pulpwood, sawmill residues, and forest residues. The established supply chains and long-term expertise in handling these biomass types present low risk related to supplier capability or supply chain development. The historical presence of consistent demand for these materials has created well-established production and logistics systems capable of serving a new biomass project.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

3.2.3 History of Production/Feedstock is a New/Secondary Crop or By-Product

Rationale: If the feedstock is a new/secondary crop or a by-product, suppliers may either lack sufficient experience to mitigate risk or be unable to react to such risk. Secondary crops or by-product producers may be less likely to prioritize production.

Risk Information: None of the three rated feedstocks represents a new material for regional suppliers. However, all three feedstock types are byproducts of sawlog and lumber production, creating inherent dependency on primary forest product markets. This secondary nature of the feedstocks introduces low to medium risk to overall supply stability. During periods of reduced primary product demand (such as housing market downturns affecting lumber production), biomass availability could decline regardless of direct biomass demand.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 24 out of 100.	**24**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 24 out of 100.	**24**

3.3 Risk Factor: Non-Weather Based Externalities

3.3.1 Consumer Price Index (CPI) and Producer Price Index (PPI)

Rationale: CPI and PPI can impact feedstock cost of harvest and collection over time. Sensitivities to worst-case scenarios should be run.

Risk Information: The region has experienced temporary but significant increases in CPI and PPI during 2020-2022[28] due to pandemic disruptions and global supply chain issues, which substantially impacted biomass delivery prices. While economic indicators are expected to stabilize, the fluctuations in both CPI and PPI over the past five years create medium risk to price stability. These macroeconomic variables can significantly affect transportation and processing costs in the biomass supply chain, introducing volatility beyond the control of project operators.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**36**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch)	**NN**

[28] www.bls.gov/charts/consumer-price-index/consumer-price-index-by-category-line-chart.htm; www.bls.gov/charts/producer-price-index/final-demand-1-month-percent-change.htm

No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100. **36**

3.3.2 Currency Risk

Rationale: Where feedstock is purchased in a currency different than that which a new bio-based plant will locate in a BDO Zone, currency exchange rates and volatility can constitute risk exposure. BDO Zones that cross the US-Canada border, for example, which intake feedstock from both countries, are exposed to such currency risk.
Risk Information: Not relevant to this BDO Zone as all supply and operations remain within the domestic U.S. market.
Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed not relevant, therefore the RRL is not rated (NR). **NR**
Raw Risk Impact (RRI) **Score** The risk impact is deemed not relevant, therefore the RRI is not rated (NR). **NR**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is not rated. **NR**
Mitigation/Notching **Notch** The Total Notch (RRL Notch) X (RRI Notch) is NR (Not Rated). **NR**
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is not rated. **NR**

3.3.3 Border Risk

Rationale: Where feedstock is transported cross-border to another country, risk exposure to border closures and crossing delays becomes present. The availability of trucks willing to do cross-border runs is limited, which can decrease supply chain flexibility and resilience. Plants near the US-Canada border, which intake feedstock from both countries, are exposed to these risks.
Risk Information: Not relevant to this BDO Zone as all supply and operations remain within the domestic U.S. market.
Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed not relevant, therefore the RRL is not rated (NR). **NR**
Raw Risk Impact (RRI) **Score** The risk impact is deemed not relevant, therefore the RRI is not rated (NR). **NR**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is not rated. **NR**
Mitigation/Notching **Notch** The Total Notch (RRL Notch) X (RRI Notch) is NR (Not Rated). **NR**
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is not rated. **NR**

3.3.4 Temporary Externality-Driven Markets for Feedstock

Rationale: Alternative, non-traditional, externality-driven competitors for feedstock can drive feedstock demand (and cost) in unusual circumstances.

Risk Information: The firewood market represents an alternative outlet that could compete for pulpwood, particularly during periods of prolonged cold temperatures. This seasonal market fluctuation could create temporary but meaningful competition for certain biomass types. The potential for weather-driven demand spikes in alternative markets presents medium risk to consistent pulpwood availability and price stability, particularly during harsh winter periods.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**36**
Mitigation/Notching	**Notch**
The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	**36**

3.4 Risk Factor: Risks Related to Feedstock Production, Harvest, and Collection

3.4.1 Harvest & Collection Practices & Schedules

Rationale: Differences in harvest timing and practices used can create risk to both the quantity and quality of feedstock. For example, feedstock harvested by different suppliers in different windows can undergo varying levels of exposure to sun, wind, and moisture, leading to variations in delivered feedstock quality.
Risk Information: Salvage and forest restoration activities generate inconsistent quantities and qualities of forest biomass that are difficult to predict and control. These operations, often driven by forest health concerns rather than commercial timber goals, introduce medium risk to feedstock consistency. The variability is further amplified when feedstocks originate from different altitudes and forest types, creating challenges for quality standardization and supply planning for a biomass project.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**36**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	**36**

3.4.2 Harvesting & Collection Equipment

Rationale: Different types of harvesting and collection equipment used by suppliers in a BDO Zone can have a significant impact on the quality and availability of feedstock. Using different types and combinations of harvesting, collection, and

processing equipment among suppliers can lead to non-homogeneous feedstock. Equipment that is not designed specifically for biomass harvesting and collection can increase feedstock quality risks. Relevant equipment should be specified for the sake of product consistency and risk reduction.

Risk Information: Forest operations in the Supply Zone employ modern mechanized forestry equipment, including harvesters, skidders, processors, and loaders. High-productivity grinding equipment is also available in the region. The presence of appropriate, efficient equipment presents low risk related to biomass quality or processing capability. The established technology base is capable of producing biomass that meets quality requirements for potential conversion processes.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

3.4.3 Variation in Densification Methods Among Different Suppliers

Rationale: The shape and density of the unit in which feedstock is supplied can impact feedstock cost and quality. Standard feedstock densification modes for biomass consist of bales, pellets, cubes, chips, or grindings. The size of wood fiber processed in a grinder is less homogenous than if a chipper is used.

Risk Information: Forest biomass harvested in the Supply Zone is produced in formats widely accepted by all wood processing companies in the region. The standardized approach to biomass handling, with chipping/grinding as the primary densification method, presents very low risk related to feedstock format compatibility.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**2**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**2**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**4**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**

The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**4**

3.4.4 Availability of Labor for Feedstock Production

Rationale: Skilled labor shortages can be difficult to remedy in the short term. The availability of suitable labor in an area can impact the ability to procure sufficient feedstock quantities on required schedules. Labor risks are higher where supply chains are not yet active or for Issuers for whom large feedstock requirements or the development of new (or expanded) supply chains demand significant additions to the local labor force.

Risk Information: As detailed in Section B – Operational Considerations, the current logging and grinding capacity in the region could support the rated quantities of biomass. While some workforce challenges exist in the broader forestry sector, the specific labor requirements for the rated biomass volumes appear manageable within existing capacity. The reasonable alignment between labor needs and availability presents low risk to biomass supply, though long-term workforce development remains important for regional forestry sustainability.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

3.5 Risk Factor: Transportation

3.5.1 Feedstock Transportation Costs

Rationale: Transportation can be one of the most significant cost components of biomass supply chains. The average transport cost and percentage of total feedstock cost attributable to transport should be known.

Transport distances of 50-75 miles for biomass feedstocks are typical, but larger distances can be common. Where the average transport distance from suppliers to Issuers is high, the supply chain is subject to greater sensitivities to risks, such as increases in diesel cost, weather impacts, mechanical breakdown, and the demand for scarce feedstock from competitors closer to the source.

Understanding average transport distance can help flag higher-risk BDO Zones where transport distance materially exceeds the average.

Risk Information: Transportation costs represent 20-50% of the total delivered biomass price, varying by biomass type, distribution patterns, and regional supply-demand dynamics. The supply curve analysis (Figure E-7) indicates the rated quantities would require sourcing from considerable distances—up to 65, 75, and 90 miles for forest residues, pulpwood, and sawmill residues respectively. This transportation dependency creates high sensitivity to fuel cost

fluctuations and logistics challenges. Additionally, the regional scarcity of chip vans and truck drivers further elevates this risk, potentially leading to transportation bottlenecks or cost spikes during periods of high demand.
Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed high, therefore the RRL is 8 out of 10. **8**
Raw Risk Impact (RRI) **Score** The risk impact is deemed medium, therefore the RRI is 6 out of 10. **6**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 48 out of 100. **48**
Mitigation/Notching **Notch** *RRL Mitigation (Notch)* **NN** No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 48 out of 100. **48**

3.5.2 Diesel Cost Impacts

Rationale: Changes in diesel costs impact transport costs over time. Sensitivities to worst-case scenarios should be run.
Risk Information: Despite recent decreases in average diesel prices from $5.78/gallon in 2022 to $3.43/gallon in 2025, the long-term price trend remains upward (Figure E-9). Fuel price volatility represents a significant risk factor for biomass operations due to the relatively low bulk density of some biomass types (particularly hog fuel and chips) and the long transportation distances required. While current price trends appear to be stabilizing, the historical volatility and transportation-intensive nature of biomass supply chains create medium risk to operating cost stability.
Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed medium, therefore the RRL is 6 out of 10. **6**
Raw Risk Impact (RRI) **Score** The risk impact is deemed medium, therefore the RRI is 6 out of 10. **6**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 36 out of 100. **36**
Mitigation/Notching **Notch** *RRL Mitigation (Notch)* **NN** No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100. **36**

3.5.3 Transportation of Feedstock Requires Specialized Equipment

Rationale: Requirements for specialized transport equipment (e.g., walking-floor trailers) can increase supply chain risk. Where there is low availability of required transportation equipment, equipment owners have increased leverage over transportation prices, and supply chain resiliency can be lower.

Risk Information: The scarcity of chip vans in the Supply Zone poses significant challenges for efficiently transporting wood chips and hog fuel to a project in Mancos. This specialized equipment gap is currently addressed through less efficient alternatives, including roll-off bins and dump trucks. The limited availability of optimal transportation equipment presents medium risk to supply chain efficiency and cost-effectiveness, potentially affecting both volume capacity and delivered cost of biomass.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**36**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	**36**

3.5.4 Delivery Routes through Local Communities

Rationale: Transportation of biomass can become a nuisance to local communities, especially if a large number of trucks pass through residential and school areas. Local communities often have the power to force regulations regarding truck transport, impeding the ability of BDO Zone suppliers to transport feedstock.
Risk Information: Outreach to local forestry professionals revealed that many communities in the Supply Zone show sensitivity to heavy traffic, emissions concerns, and noise pollution from industrial transportation. This situation is somewhat mitigated in Mancos, where the community has maintained a cooperative relationship with the existing sawmill and pellet mill operations. Nevertheless, the potential for community opposition to increased truck traffic presents medium risk to unimpeded transportation access, potentially affecting delivery schedules or routes.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**36**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	**36**

3.5.5 Transportation Regulations & Local Weight Limits

Rationale: In many BDO Zones, transportation is regulated based on seasonal road conditions. These regulations (e.g., "frost laws") often take the form of weight restrictions or limits on the number of trucks allowed on roads. Such regulations can impede the project's ability to source sufficient feedstock or increase the cost of doing so at certain times of the year.

Risk Information: Road weight limits exist in the Southwest Colorado region, particularly in mountainous terrain during wet and snowy seasons. However, local forestry companies did not identify these regulations as a significant operational constraint. The established weight regulations appear to be manageable within normal operational planning, presenting low risk to biomass transportation. Industry participants are accustomed to working within these limitations and have developed appropriate logistics strategies.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

3.5.6 Road Infrastructure

Rationale: Feedstock cost and availability can be a function of road infrastructure, in particular the accessibility the infrastructure provides to feedstock. Issues with road networks will translate directly to risks to feedstock supply.

Risk Information: Local forestry experts reported poorly developed forest road networks, particularly within the San Juan National Forest. Accessing significant portions of the potential biomass supply would require new road construction, which depends on increased public funding. The inadequate transportation infrastructure presents high risk to efficient and cost-effective biomass recovery, potentially limiting accessible quantities and increasing delivered costs for a project in the BDO Zone.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed high, therefore the RRL is 8 out of 10.	**8**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed high, therefore the RRI is 8 out of 10.	**8**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 64 out of 100.	**64**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)*	**NN**

No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score — **Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 64 out of 100. — **64**

3.5.7 Transportation Redundancy

Rationale: Transport equipment redundancy is important for dealing with seasonally variable feedstock supplies as well as the risk of equipment breakdowns.
Risk Information: As outlined in Section B – Operational Considerations, supplying the rated quantities would require four logging trucks and three chip vans. While sufficient logging trucks exist in the region to support the rated quantity of pulpwood, there is a notable absence of chip vans. This equipment imbalance presents medium risk to transportation redundancy, potentially creating bottlenecks during peak demand periods or when equipment maintenance reduces available capacity.
Raw Risk Likelihood (RRL) — **Score**
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10. — **6**
Raw Risk Impact (RRI) — **Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10. — **6**
Gross Risk Indicator (GRI) — **Score**
The Gross Risk Indicator (RRL X RRI) is 36 out of 100. — **36**
Mitigation/Notching — **Notch**
RRL Mitigation (Notch) — **NN** No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score — **Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100. — **36**

3.6 Risk Factor: Supply Chain Resiliency

3.6.1 Size, Number, and Location of Suppliers

Rationale: In general, a supply portfolio involving multiple suppliers of various sizes (and from multiple BDO Zones) is important for ensuring steady and uninterrupted feedstock supply with minimal price fluctuations. If a small number of large suppliers provides a high proportion of total feedstock, a disruption or supplier breach will have greater impact on the supply chain. In such cases the risk of disruption is lower, but the impact of those disruptions is higher. Conversely, many small suppliers are less likely to have the capacity to withstand internal disruptions and thus may be more likely to breach. Here, risk of disruption is higher, but their likely impact is lower. The number of suppliers as well as the ratio of small to large suppliers should be optimized. There is no pre-determined number or optimal ratio of suppliers, although having too many or too few can both pose higher degrees of risk.
Risk Information: The analysis in Section B indicates that only two sawmills operate in the region, both small, undiversified, and located in close proximity to or co-located with their customers. Approximately five logging crews were reported in the region. This limited supplier base creates high risk to supply chain resiliency.

Raw Risk Likelihood (RRL) The risk likelihood is deemed high, therefore the RRL is 8 out of 10.	**Score** **8**
Raw Risk Impact (RRI) The risk impact is deemed high, therefore the RRI is 8 out of 10.	**Score** **8**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 64 out of 100.	**Score** **64**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 64 out of 100.	**Score** **64**

3.6.2 Suppliers Subject to Same External Risk Factors

Rationale: When a single risk event can impact the feedstock production ability of all (or most) suppliers, then feedstock risk is higher and supply chain resiliency is lower. Resilience is maximized when biomass supply chains exhibit diversity in spatial location (i.e., geography), production practices, and other elements of supply chain structures such that the impact of single high-risk events have varying impacts on suppliers.

Risk Information: Several common risk factors could simultaneously affect multiple suppliers in the region, including reduced sawlog availability, fluctuating housing starts/lumber prices, and inconsistent funding for salvage/forest restoration activities in public forests. These systemic risks have historically impacted the regional forest industry and will likely continue to create challenges. The exposure of the supplier base to common external factors presents medium to high risk to supply chain resilience, as disruptions tend to affect multiple suppliers simultaneously rather than impacting them independently.

Raw Risk Likelihood (RRL) The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**Score** **6**
Raw Risk Impact (RRI) The risk impact is deemed high, therefore the RRI is 8 out of 10.	**Score** **8**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 48 out of 100.	**Score** **48**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 48 out of 100.	**Score** **48**

3.6.3 Land Ownership Structures

Rationale: The ownership (or control) of the land base on which feedstock is produced can have a significant impact on the Issuer's feedstock risks. Risk of long-term variation in stumpage cost for wood fiber (i.e., the cost that one pays to a landowner for the right to cut and purchase their wood fiber), for example, is much higher in the US, where >90% of the land is private, and thus stumpage cost is determined on a competitive auction basis.

Risk Information: Timberland in the Supply Zone is predominantly publicly owned, primarily as national and state forests. This ownership concentration creates high risk to stable biomass supply, as federal policy changes, funding allocations, environmental restrictions, or permitting delays can simultaneously affect large portions of the resource base. The limited diversity in land ownership reduces flexibility in sourcing strategies and increases vulnerability to regulatory or policy shifts affecting public lands.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed high, therefore the RRL is 8 out of 10.	**8**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed high, therefore the RRI is 8 out of 10.	**8**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 64 out of 100.	**64**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 64 out of 100.	**64**

3.7 Risk Factor: Climate and Natural Risks

3.7.1 Seasonal Weather Impacts on Feedstock Supply

Rationale: Seasonal weather impacts are defined as those deriving from natural weather variations (e.g., spring thaws, rainy seasons, or dry seasons—as opposed to singular weather events like fires, droughts, or hurricanes). Seasonal weather changes can be a significant risk factor affecting feedstock availability, quality, and price.

Given the significant influence that weather has on multiple aspects of growing, harvesting, and transporting biomass, it is difficult to predict the availability of biomass at a specific location at different points in the future with a high degree of certainty. However, it is still possible, using past data and statistical models, to generate reasonable upper/lower bound estimates of biomass production in any given year in a wider supply zone. Such estimates are essential in assessing feedstock risk and enable accurate assessment of the efficacy of the Issuer's mitigation methods.

Risk Information: Logging operations at higher elevations face seasonal constraints from heavy snow accumulation, particularly affecting biomass availability during winter months (November to March). While harvesting can shift to lower elevations during these periods, providing some mitigation, the seasonal variability remains significant. Additionally, the increasing frequency and intensity of forest fires in recent years has introduced greater unpredictability to seasonal operations. These weather-related disruptions present medium risk to year-round biomass supply consistency.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**6**

Raw Risk Impact (RRI)	Score
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	6
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	36
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	NN
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	36

3.7.2 Long-Term Weather and Climate Trends

Rationale: In certain BDO Zones, climatic trends and significant potential changes to future weather patterns can create feedstock risk.

Risk Information: The Southwest Colorado region experiences frequent droughts and significant year-to-year climate fluctuations. Forest fires, extended drought conditions, and pest outbreaks are projected to increase if global warming trends continue.[29] Historical records document major droughts and flooding events in Utah and Colorado since 1896, and significant population growth in the region increases wildfire risk and water scarcity concerns.[30] These long-term climate trends present medium risk to sustainable biomass production and availability over the project lifespan.

Raw Risk Likelihood (RRL)	Score
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	6
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	6
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	36
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	NN
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	36

[29] https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-ut.pdf
[30] https://pubs.usgs.gov/fs/fs-037-03/

3.7.3 Forest/Crop Fire

Rationale: Forest fires, especially when occurring on a large scale, destroy feedstock and create shortages.

Fire-prone conditions are predicted to increase. This could potentially result in a doubling of the amount of area burned by the end of this century compared with amounts burned in recent decades. Boreal forests, which have been historically greatly influenced by fire, will likely be especially affected by this change.

Other climate change impacts that could add damaged or dead wood to the forest fuel load (e.g., as a result of insect outbreaks, ice storms, or high winds) may increase the risk of fire activity. New research is aimed at refining these climate change estimates of fire activity and investigating adaptation strategies and options to deal with future fire occurrences. There is growing consensus that as wildfire activity increases, fire agency suppression efforts will be increasingly strained.

Risk Information: Increasingly frequent drought conditions in Southwest Colorado have elevated wildfire risk substantially. In 2018 alone, approximately 570,000 acres (32%) of the San Juan National Forest burned.[31] Local forestry experts anticipate that this wildfire pattern will continue and potentially intensify without immediate, significant fire remediation actions. The high probability and severe impact of forest fires present high risk to biomass supply stability and forest resource sustainability in the region.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed high, therefore the RRL is 8 out of 10.	**8**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed high, therefore the RRI is 8 out of 10.	**8**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 64 out of 100.	**64**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 64 out of 100.	**64**

3.7.4 Risk of Infestation

Rationale: Risk of future infestation, including its estimated consequences on feedstock supply, should be calculated into the overall risk profile.

Since forest insect populations are influenced by environmental conditions, future changes in climate can be expected to significantly alter the outbreak dynamics of certain forest insect species. In some cases, larger and more frequent insect outbreaks may occur, but in other cases, recurring outbreaks may be disrupted or diminished. As the climate continues to change, we can expect more situations, particularly at the margins of tree ranges, where sub-optimal conditions for tree growth and reduced tree vigor can lead to outbreaks of forest insects.

[31] The 416 and Burro Fire Complex.

Risk Information: Forests in the Supply Zone have experienced widespread damage from spruce budworm infestations, with approximately one-third of the annual average mortality of spruce trees attributed to this pest.[32] Such infestations are expected to continue and potentially increase in Southwest Colorado as average annual temperatures rise. The persistent threat of forest insect damage presents medium risk to timber quality and long-term forest productivity, potentially affecting both biomass quantity and quality.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**36**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	**36**

3.7.5 Risk of Hail

Rationale: Hail has negligible impact on forestry biomass. However, there is much uncertainty about the effects of anthropogenic climate change on the frequency and severity of extreme weather events like hailstorms and their subsequent economic losses. Some studies indicate a strong positive relationship between hailstorm activity and hailstorm damage, as predicted by minimum temperatures using simple correlations. This relationship suggests that hailstorm damage may increase in the future if global warming leads to further temperature increases.
Risk Information: Not relevant to this BDO Zone.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed not relevant, therefore the RRL is not rated (NR).	**NR**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed not relevant, therefore the RRI is not rated (NR).	**NR**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is not rated.	**NR**
Mitigation/Notching	**Notch**
The Total Notch (RRL Notch) X (RRI Notch) is NR (Not Rated).	**NR**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is not rated.	**NR**

[32] apps.fs.usda.gov/fiadb-api/evalidator. Variable 574027: Average annual mortality of merchantable bole bark and wood biomass of growing-stock trees (at least 5 inches d.b.h.), in dry short tons, on timberland, by species.

3.7.6 Risk of Flood

Rationale: Floods can cause catastrophic disruption and delay in feedstock supply. Where there is a high risk of flood and thus a negative impact on feedstock supply, the BDO Zone rating should account for this risk.

Risk Information: According to outreach to local forestry professionals, flooding in Southwest Colorado tends to be temporary and localized, with limited impact on forest operations. The typically modest scope and duration of flood events present low risk to biomass supply continuity. The region's topography and drainage patterns generally limit flood impacts on forestry operations and biomass accessibility.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

3.7.7 Risk of Drought

Rationale: Droughts can cause significant disruptions to feedstock supplies across entire BDO Zones for extended periods of time. Tree species are adapted to specific moisture conditions. Having less water available through drought has a range of negative impacts on the health of forest ecosystems. Direct impacts include reduced growth, increased tree mortality, and failure to regenerate. Indirect impacts include reduced ability to defend against insects and disease and increased fire risk. These impacts can affect the availability of wood fiber for an Issuer.

Risk Information: As noted in Risk Indicator 3.7.2, the region experiences prolonged drought conditions that increase susceptibility to wildfire and insect infestation. These extended dry periods can significantly affect forest health, regeneration rates, and accessibility. The recurring drought patterns present medium risk to long-term forest productivity and seasonal biomass harvesting operations, particularly when combined with other climate-related stressors.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**36**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)*	**NN**

No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score — **Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100. — **36**

3.7.8 Risk of Hurricanes, Tornadoes, and Strong Winds

Rationale: Hurricanes, tornadoes, and strong winds can destroy timber stands and feedstock piles. They can also delay forestry operations. Hurricanes and tornadoes can indirectly cause temporary shortages of available transportation as available trucking moves to handle higher-value disaster-related contracts. For example, Katrina cleanup limited the availability of live-bottom trailers in the North and South East of the US for several months as truckers shifted operations to handle more lucrative government contracts. Although scientists are uncertain whether climate change will lead to an increase in the number of hurricanes, warmer ocean temperatures and higher sea levels are expected to intensify their impacts. Recent analyses conclude that the strongest hurricanes occurring in some BDO Zones, including the North Atlantic, have increased in intensity over the past two to three decades.

Risk Information: No significant wind events have been reported in the region that would materially affect forestry operations or biomass availability. The absence of historical impacts from severe wind events presents very low risk from this particular natural hazard.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**2**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**2**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**4**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**4**

3.7.9 Risk of Low Temperatures

Rationale: Low temperatures can cause crop failure, leading to shortages of biomass. Additionally, low temperatures can have adverse impacts on the operations of feedstock processing equipment in Northern BDO Zones.

Risk Information: Winter temperatures in the region regularly drop below 40 degrees Fahrenheit, occasionally causing short operational delays due to equipment maintenance requirements. However, local suppliers have extensive experience operating in cold weather conditions and have developed appropriate mitigation strategies. The predictable and manageable nature of cold weather impacts presents low risk to overall biomass supply, though it may affect seasonal harvesting schedules and equipment efficiency.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**

Gross Risk Indicator (GRI)	Score
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	16
Mitigation/Notching	**Notch**
The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	NN
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	16

3.8 Risk Factor: Political and Social

3.8.1 Government Subsidies for Feedstock Production or Utilization

Rationale: Feedstock that is directly subsidized through government programs can pose greater long-term risk than feedstock that is not. Subsidies may be subject to amendment or repeal, sometimes with minimal notice.

NOTE: This risk indicator refers to direct feedstock subsidies only; it does not apply to government subsidies that pertain indirectly to the Issuer's operations, such as Loan Guarantees, or to the markets for products produced by the Issuer.

Risk Information: Non-timber forestry objectives in the region—including wildfire mitigation, watershed protection, and ecological restoration—depend heavily on government subsidies. The significant decline in timber harvesting from national and state forests, coupled with the substantial interannual volatility of U.S. Forest Service funding[33] for these programs, creates high risk to stable biomass supply. The dependency on federal appropriations, which are subject to political priorities and budget constraints, introduces substantial uncertainty for long-term biomass availability from public lands.

Raw Risk Likelihood (RRL)	Score
The risk likelihood is deemed high, therefore the RRL is 8 out of 10.	8
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed high, therefore the RRI is 8 out of 10.	8
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 64 out of 100.	64
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	NN
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 64 out of 100.	64

3.8.2 Local, Provincial, & National Laws, Regulations, & Permitting Pertaining to Biomass

Rationale: Feedstock whose production is directly dependent on local, provincial, or national laws or government regulations can pose greater long-term risk than feedstock which is not, since laws and regulations may be subject to amendment or repeal.

If biomass utilization requires specific permits (e.g., percentage removal of forest residues, allowable annual cut limits, air emission, storage permits, rights-of-way, overweight permits for trucks, cross-border permitting for shipment of

[33] nationalaglawcenter.org/wp-content/uploads/assets/crs/R43872.pdf

biomass, chain of custody, or certification of sustainability), the likelihood of obtaining such permits and/or complying with permitting requirements should be examined.

Risk Information: Outreach to local forestry companies and experts highlighted significant risks associated with extended permitting periods for forest management activities. These delays result from government staffing and funding shortages, combined with the highly litigious atmosphere in Southwest Colorado communities. National Environmental Policy Act (NEPA) assessments are frequently followed by class action legal challenges that either delay or halt harvesting authorizations. This regulatory and legal environment presents high risk to timely and predictable biomass supply from public lands.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed high, therefore the RRL is 8 out of 10.	**8**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed high, therefore the RRI is 8 out of 10.	**8**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 64 out of 100.	**64**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 64 out of 100.	**64**

3.8.3 Backlash Against Biomass Development, Procurement, or Usage in the Region

Rationale: Public backlash against biomass development in the Issuer BDO Zone can directly impact the Issuer's ability to procure, transport, trans-load, store, or utilize feedstock by affecting local policies, regulations, and the Issuer's ability to obtain necessary permitting.

Risk Information: Multiple environmental organizations operate in the Supply Zone, particularly in the Mancos-Dolores area, with established histories of opposing forest harvesting and even some forest restoration practices. The San Juan Citizens' Alliance recently sued the U.S. Forest Service over a proposed 23,000-acre timber sale in Southwest Colorado.[34] Treatments of pinyon-juniper woodlands by the Bureau of Land Management have faced similar opposition in Utah, potentially extending to forest operations throughout the Supply Zone. The prevalent "Not in My Back Yard" sentiment presents very high risk to new biomass development, creating potential for project delays, operational restrictions, or public relations challenges.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed very high, therefore the RRL is 10 out of 10.	**10**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed very high, therefore the RRI is 10 out of 10.	**10**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 100 out of 100.	**100**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch)	**NN**

[34] www.sanjuancitizens.org/press-release/press-release-lawsuit-targets-timber-sale-threatening-rare-mature-forests

No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 100 out of 100. **100**

3.8.4 Consent of, and Cooperation with, Indigenous Communities and First Nations

Rationale: Where new project development on or near Indigenous or First Nation land, or where near Indigenous or First Nations exert influence over feedstock producing areas, consent of, and cooperation with, Indigenous communities and First Nations decreases Issuer risk.
Risk Information: Several native nations reside in the Supply Zone, including the Southern Ute Indian Tribe, Ute Mountain Ute, and Navajo Nations. Representatives from these groups expressed strong interest in local biomass projects, particularly those focused on wildfire mitigation and forest restoration practices that enhance forest resilience and promote more natural forest structures. The tribes also expressed interest in developing integrated, zero-waste supply chains supporting value-added operations such as sawmills, cross-laminated timber panels, and log construction. With appropriate collaborative approaches including tribal participation, the risk related to Indigenous relations appears low for a properly structured project.
Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed low, therefore the RRL is 4 out of 10. **4**
Raw Risk Impact (RRI) **Score** The risk impact is deemed low, therefore the RRI is 4 out of 10. **4**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 16 out of 100. **16**
Mitigation/Notching **Notch** The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch). **NN**
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100. **16**

3.8.5 Food Security Concerns

Rationale: Despite the fact that any significant correlation between food prices and biofuel production is unclear, claims that biofuel production has driven up food prices, taken food from communities or had a negative impact on land use can fuel public backlash. For example, the removal of biomass may raise public concerns relating to food security if Issuer feedstock requires the use of land that would otherwise be used for growing food.
Risk Information: Not relevant to this BDO Zone.
Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed not relevant, therefore the RRL is not rated (NR). **NR**
Raw Risk Impact (RRI) **Score** The risk impact is deemed not relevant, therefore the RRI is not rated (NR). **NR**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is not rated. **NR**
Mitigation/Notching **Notch** The Total Notch (RRL Notch) X (RRI Notch) is NR (Not Rated). **NR**
Loaded RI Score **Score**

The Loaded RI Score ((1-Total Notch) X GRI Score) is not rated.	NR

3.9 Risk Factor: Sustainability and Environmental Concern

3.9.1 Feedstock Sustainability

Rationale: Public concerns about the sustainability of feedstock production can jeopardize biomass feedstock operations. Sustainability certification schemes should be utilized where applicable to ensure that feedstock comes from sustainable sources.

Risk Information: The U.S. Forest Service planning process incorporates forest inventory, growth and yield projections, wildlife habitat assessments, and environmental impact evaluations under National Environmental Policy Act regulations. While these processes theoretically ensure sustainable forest practices, public opposition to forest management activities suggests potential deficiencies in implementation or communication. Additionally, the negative average annual net growth values identified in Section B indicate significant sustainability challenges for harvesting in this Supply Zone. These factors present medium risk to long-term feedstock sustainability and social license to operate.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**36**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	**36**

3.9.2 Risk to Soil Quality

Rationale: Soil sustainability can be defined as the management of soil in a way that does not exert any negative or irreparable effects either on the soil itself or any other systems. There is a diversity of approaches to soil sustainability in jurisdictional guidelines for forest biomass harvesting and production. For different feedstock types, there are also different thresholds at which feedstock removal causes significant negative consequences on the soil.

Poor soil quality that negatively impacts the long-term sustainability of the feedstock can entail long-term feedstock risk. Sub-optimal soil management can leave exposed soil post residue-harvest, which can lead to soil wash-off and soil carbon loss from precipitation and wind. Over-harvesting of biomass also depletes the carbon stock in the soil and creates a negative feedback loop that can degrade the soil and its nutrients.

Risk Information: Thinning and forest restoration operations in the region generally incorporate considerations for the forest ecosystem. Forest residue removal typically achieves recovery rates below 60%, with the remaining material spread across harvesting sites to maintain soil nutrients and prevent erosion. These practices align with sustainable forestry principles and present low risk to soil quality. The established operational approaches appear sufficient to maintain soil productivity while allowing biomass recovery.

Raw Risk Likelihood (RRL)	**Score**

The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

3.9.3 Risk to Surface and Groundwater

Rationale: Excessive nutrient runoff from biomass feedstock production can accumulate in surface waters and result in algal blooms and hypoxia, which can lead to habitat loss for aquatic species higher up the food chain and alter aquatic ecosystem food webs. Damage to aquatic ecosystems can cause social and regulatory backlash. Water intake issues can also increase risk.

Risk Information: Local forestry companies demonstrate awareness of sensitive aquatic ecosystems and generally employ management practices designed to protect water resources. The industry's experience with sustainable harvesting techniques and regulatory compliance presents low risk of damage to aquatic ecosystems from biomass operations. Established best management practices appear adequate to maintain water quality while supporting biomass recovery activities.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

3.9.4 Risk to Hydrological Flux

Rationale: Biomass feedstock operations can have significant impacts on the hydrological flux (infiltration, groundwater recharge, interception, and transpiration) of ecosystems. This can lead to water shortages, lower yields, and backlash from regulatory bodies if management plans are not properly instituted.

Risk Information: Not relevant to this BDO Zone.	
Raw Risk Likelihood (RRL) The risk likelihood is deemed not relevant, therefore the RRL is not rated (NR).	**Score** **NR**
Raw Risk Impact (RRI) The risk impact is deemed not relevant, therefore the RRI is not rated (NR).	**Score** **NR**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is not rated.	**Score** **NR**
Mitigation/Notching The Total Notch (RRL Notch) X (RRI Notch) is NR (Not Rated).	**Notch** **NR**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is not rated.	**Score** **NR**

3.9.5 Pesticide Risk to Human and Ecosystem Health

Rationale: Application of pesticides (i.e., herbicides, fungicides, and insecticides) on forest landscapes can result in adverse health effects for humans and ecosystems. If pesticide application is required in feedstock production, the impact must be considered in the BDO Zone rating.

Risk Information: Not relevant to this BDO Zone.	
Raw Risk Likelihood (RRL) The risk likelihood is deemed not relevant, therefore the RRL is not rated (NR).	**Score** **NR**
Raw Risk Impact (RRI) The risk impact is deemed not relevant, therefore the RRI is not rated (NR).	**Score** **NR**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is not rated.	**Score** **NR**
Mitigation/Notching The Total Notch (RRL Notch) X (RRI Notch) is NR (Not Rated).	**Notch** **NR**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is not rated.	**Score** **NR**

3.9.6 Risk to Wildlife and Landscape

Rationale: Biomass production and supply chain operations with negative impacts on wildlife and landscape are at a greater long-term risk of encountering project setbacks and disruptions.

Risk Information: While timber harvesting, thinning, forest restoration operations, and residue removal create temporary disruptions, they typically do not affect the long-term viability of wildlife habitats when properly implemented. The U.S. Forest Service requires National Environmental Policy Act approvals for all activities in National Forests, with wildlife surveys and risk assessments as standard components of this process. These regulatory safeguards present low risk to wildlife and landscape values from biomass operations conducted in compliance with federal standards.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)*	**Notch** **NN**

No adjustment.

RRI Mitigation (Notch)
No adjustment.

The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).

Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

3.9.7 Biomass Classified as Genetically Modified Organism (GMO)

Rationale: There are various risks associated with GMOs, such as migration or dispersion across the landscape, which can generate community backlash and create supply chain risk. GMOs can also be heavily regulated. If planning to grow or procure GMO feedstocks, especially purpose-grown energy crops, it is important to understand the risks.

Risk Information: Not relevant to this BDO Zone.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed not relevant, therefore the RRL is not rated (NR).	**NR**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed not relevant, therefore the RRI is not rated (NR).	**NR**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is not rated.	**NR**
Mitigation/Notching	**Notch**
The Total Notch (RRL Notch) X (RRI Notch) is NR (Not Rated).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is not rated.	**NR**

CATEGORY 4.0: FEEDSTOCK SCALE-UP RISK

4.1 Risk Factor: Feedstock Scale-Up

4.1.1 Feedstock Quality at Production Scale

Rationale: The physical and chemical properties of feedstock used in lab, pilot, and field testing can fail to be representative of feedstock generated by large-scale operations.
It is important to conduct tests on feedstock representative of that which will be produced by large-scale operations. Failure to adequately test the full range of parameter values can result in severe problems during scale-up.

Risk Information: No significant quality-related risks were identified for sawmill and forest residues when proper feedstock management practices are followed. Appropriate techniques include allowing forest residues to dry before processing, minimizing soil and rock contamination through careful handling, and properly managing residue piles. Implementation of a quality control plan that incentivizes maintaining and improving feedstock quality would be advisable, particularly for materials originating from salvage, wildfire remediation, and forest restoration activities, which typically generate more heterogeneous products. With these standard practices in place, quality consistency presents low risk to project operations.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**

RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

4.1.2 Capacity of Supply Chain Components & Equipment to Scale

Rationale: Scale-up risk increases if supply chain components or underlying feedstock infrastructure necessary for these components cannot scale to handle Issuer feedstock requirements and throughput capacity. Capacity to scale should be demonstrated.

Risk Information: As described in Section B – Operational Considerations, the rated quantities of biomass could be produced and delivered using existing harvesting, collection, pre-processing, and transportation capacities in the region. The established infrastructure appears capable of supporting the projected biomass demand without requiring significant capital investment or capacity expansion. This alignment between existing capabilities and projected needs presents low risk related to supply chain scalability for a project of the proposed size.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NR (Not Rated).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

CATEGORY 5.0: INFRASTRUCTURE RISKS

5.1 Risk Factor: Physical Infrastructure

5.1.1 Land Parcel/Industrial District

Risk Information: The 30-acre industrial site at 901 Grand Avenue in Mancos (Map E-10 and E-11) offers an opportunity for a biomass project to co-locate with an existing forest products operation. The current owner, Aspen Forest Products, has expressed willingness to collaborate with a complementary bio-project and share existing infrastructure to expedite startup. This site configuration and cooperative ownership present low risk related to land availability and industrial suitability. The co-location opportunity provides significant advantages for project development and operational efficiency.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**

Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

5.1.2 Ownership of Land

Risk Information: The identified site is privately owned and operated by Aspen Forest Products. Once appropriate collaboration or lease agreements are established, land control presents low risk to project development. The existing owner's expressed interest in partnering with complementary operations suggests favorable conditions for negotiating suitable terms for site access and development.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

5.1.3 Permitting Description

Risk Information: Typical permitting timelines for new industrial facilities in Colorado range from four to six months. A project co-locating with existing operations could leverage already-secured permits, potentially streamlining or bypassing substantial portions of the permitting process. This arrangement could significantly reduce startup time and expenses, presenting low risk related to regulatory approvals.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI)	**Score**

The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

5.1.4 Environmental Issues

Risk Information: No environmental concerns or compliance issues were reported for the site by the current owner. The absence of identified environmental liabilities presents low risk related to site contamination or remediation requirements. The established industrial use appears to have maintained appropriate environmental compliance, providing a clean starting point for new development.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

5.2 Risk Factor: Utilities

5.2.1 Natural Gas Availability

Risk Information: The site has existing access to natural gas service provided by ATMOS Energy. Industrial natural gas prices in October 2024 averaged $8.03 per thousand cubic feet, approximately 109% higher than the national average of $3.84. However, year-over-year rates decreased by 12.81% from October 2023 to October 2024. [35] The established connection to natural gas infrastructure presents very low risk to project operations, despite regional price premiums compared to national averages.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**

[35] naturalgaslocal.com/states/colorado/mancos/ (Accessed on January 22, 2025)

Gross Risk Indicator (GRI)	Score
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	16
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

5.2.2 Electricity Availability

Risk Information: Empire Electric, a Touchstone Energy cooperative, provides electrical service to the industrial site. The average industrial bundled electricity rate in Mancos (May 2024) was 8.3¢ per kWh, 4% higher than the US average but 6% lower than the statewide average.[36] The site currently connects to a 12.5 kV service, with expansion capacity available for additional tenants within 30-60 days. This established electrical infrastructure presents low risk to project power needs, with reasonable regional rates and existing connection capacity.

Raw Risk Likelihood (RRL)	Score
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	4
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	4
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	16
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

5.2.3 Water Availability

Risk Information: The Mancos Rural Water Company serves the site, drawing water from the West Mancos River and Jackson Gulch Reservoir. The medium risk rating stems from reduced water flows associated with the Colorado watershed, reflecting broader regional water scarcity concerns. Water availability presents medium risk to project operations, requiring careful water management planning and potential contingency measures during drought conditions.

Raw Risk Likelihood (RRL)	Score
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	6
Raw Risk Impact (RRI)	**Score**

[36] findenergy.com/co/montezuma-county-electricity/#mancos (Accessed on January 22, 2025)

The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**Score** **36**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	**Score** **36**

5.2.4 Waste Disposal

Risk Information: The site benefits from access to municipal wastewater and sewer services. Solid waste disposal is available at the Montezuma County Landfill, located 15 miles west of the site. The facility operates six days per week for commercial and residential waste, though hazardous materials face some restrictions. The established waste management infrastructure presents low risk to project operations, with appropriate disposal options for typical industrial waste streams.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

5.2.5 Internet Availability

Risk Information: Spectrum provides internet service in the Mancos area with speeds up to 1 Gbps at approximately $50 per month.[37] The availability of high-speed internet service presents low risk to project communications and data management needs.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**

[37] https://broadbandnow.com/Spectrum-Internet-deals

Gross Risk Indicator (GRI)	Score
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	16
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	NN
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	16

5.3 Risk Factor: Transportation/Logistics

5.3.1 Road/Highway Access

Risk Information: The site is located along U.S. Highway 160, a critical east-west route connecting to key regional centers including Durango and Cortez. While this highway provides effective transportation across the Four Corners Region, it experiences frequent closures during heavy snowfall. This seasonal accessibility challenge presents medium risk to year-round logistics reliability, potentially affecting both incoming feedstock and outgoing product shipments during winter months.

Raw Risk Likelihood (RRL)	Score
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	6
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	6
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	36
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	NN
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	36

5.3.2 Rail Access

Risk Information: Southwest Colorado lacks accessible freight rail infrastructure for industries requiring rail transportation. Major carriers such as Union Pacific and BNSF operate only in northern and eastern Colorado, while regional short-line railroads primarily serve tourism rather than freight purposes. A railroad spur from Gallup up towards Farmington, NM is planned which can improve transportation options in the region.[38] This absence of rail transportation options presents medium risk to projects requiring rail logistics for product distribution, necessitating reliance on trucking for all material movements.

Raw Risk Likelihood (RRL)	Score

[38] www.trains.com/trn/news-reviews/news-wire/effort-advances-to-develop-new-rail-line-to-four-corners-region-of-new-mexico/

The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI) The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**Score** **6**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**Score** **36**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	**Score** **36**

5.3.3 Airport Access

Risk Information: Cortez Airport (CEZ), located 20 miles from Mancos, offers commercial flights to Denver and Phoenix through Denver Air. The facility features a 7,200-foot runway accommodating most business jets, along with emergency air ambulance services, general aviation facilities, repair services, fueling, and hangar space. Also, Durango/La Plata County Airport is located 40 miles from Mancos,[39] while Pagosa Springs has a private air field.[40] Additionally, Montrose and Grand Junction airports are within three to four hours' drive. This regional air transportation access presents low risk to business travel needs and emergency response capabilities.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

5.3.4 Water Freight Access

Risk Information: Not relevant.	
Raw Risk Likelihood (RRL) The risk likelihood is deemed not relevant, therefore the RRL is not rated (NR).	**Score** **NR**

[39] flydurango.com/1748/Airport
[40] archuletacounty.org/45/Airport

Raw Risk Impact (RRI)	Score
The risk impact is deemed not relevant, therefore the RRI is not rated (NR).	NR
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is not rated.	NR
Mitigation/Notching	**Notch**
The Total Notch (RRL Notch) X (RRI Notch) is NR (Not Rated).	NR
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is not rated.	NR

5.4 Risk Factor: Social Infrastructure

5.4.1 Healthcare (Local)

Risk Information: Southwest Medical Group[41] operates a comprehensive medical practice in Mancos, providing family medicine and counseling services six days weekly. The facility offers primary care, emergency services, a school-based health center, walk-in care, and an EMS training center, employing six physicians across multiple specialties. Additionally, Southwest Memorial Hospital in Cortez (19 miles west) maintains 25 inpatient beds with surgical and emergency capabilities. Also, the Durango Common Spirit Mercy Medical Center is located between Mancos and Pagosa Springs. This healthcare infrastructure presents low risk to workforce attraction and retention, providing adequate medical services for the local community.

Raw Risk Likelihood (RRL)	Score
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	4
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	4
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	16
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	NN
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	16

5.4.2 Education (Schools)

Risk Information: The Mancos School District[42] serves over 500 students through elementary, middle, and high schools that consistently receive ratings of B+ or higher for academics, graduation rates, and GPA.[43] Bus service is available to all schools. Fort Lewis College, a public liberal arts institution in Durango, is known for its small class sizes and its tuition-free policy for qualified Native American students.[44] In addition, Southwest Colorado Community College (a branch of Pueblo Community College) offers associate degrees, technical certificates, and continuing education courses in Mancos

[41] www.swhealth.org/
[42] www.mancosre6.edu/
[43] www.greatschools.org/colorado/mancos/
[44] www.fortlewis.edu/admissions/native-american-tuition

and Durango.[45] These educational resources present low risk to workforce development and employee retention, providing adequate academic preparation and continuing education opportunities.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

5.4.3 Local Transportation

Risk Information: Mancos lacks public transportation services, creating medium risk for workforce mobility. The absence of public transit requires all employees to have personal transportation, potentially limiting the available labor pool and increasing commuting costs.

Raw Risk Likelihood (RRL) The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**Score** **6**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 24 out of 100.	**Score** **24**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 24 out of 100.	**Score** **24**

5.4.4 Public Safety (Local)

Risk Information: Mancos maintains a crime rate 23% below the national average,[46] indicating a relatively safe environment. The Marshal Office manages law enforcement, traffic safety, and emergency services in town and surrounding areas. Fire protection comes from the Mancos Fire Protection District, an all-volunteer department

[45] pueblocc.edu/southwest
[46] www.areavibes.com/mancos-co/crime/

covering 45 square miles. This public safety infrastructure presents low risk to business operations and employee welfare, providing adequate protection services within a relatively low-crime environment.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

5.4.5 Housing/Cost of Living

Risk Information: Mancos offers a cost-of-living index of 94, slightly below the national average of 100.[47] Housing costs remain competitive, with average home prices at $217,000 and 53% homeownership rates.[48] Monthly rent for a two-bedroom unit averages $1,090, below the national average of $1,430.[49] Both housing and rental options exist within reasonable commuting distance. These affordable living conditions present low risk to workforce recruitment and retention, providing accessible housing options for employees across various income levels.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

[47] www.areavibes.com/mancos-co/housing/
[48] Ibid.
[49] www.bestplaces.net/economy/city/colorado/mancos

5.5 Risk Factor: Labor

5.5.1 Workforce

Risk Information: Mancos currently experiences a 7.4% unemployment rate, higher than the 6.0% national average but indicating a potentially available labor pool. The community had a median age of 46.5 and population of 1,200 in 2022.[50] Despite a 4.4% job market decline over the past year, projections indicate modest growth over the next decade. The education institutions mentioned above frequently partner with local businesses and industries to provide programs in trades like agriculture, automotive, and construction trades. A simulator is available for training forest machine operators in Mancos. These workforce development resources present low risk to staffing needs, providing access to both existing skilled workers and training programs for new employees

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

5.5.2 Labor Costs

Risk Information: Montezuma County reported an average per capita income of $34,667 in 2023, below the national average of $43,289. The median household income was $63,005, significantly lower than Colorado's state average of $78,538.[51] These favorable labor cost conditions present low risk to operational expenditures, potentially providing competitive advantages in labor-intensive processes compared to operations in higher-wage regions.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment.	**Notch** **NN**

[50] www.datausa.io/profile/geo/mancos-co
[51] www.census.gov/quickfacts/fact/table/montezumacountycolorado,US/PST045224

The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

SECTION E: TABLES AND FIGURES

Figure E-1. Merchantable Biomass of All Live Trees in the Supply Zone (2013-2021)[52]

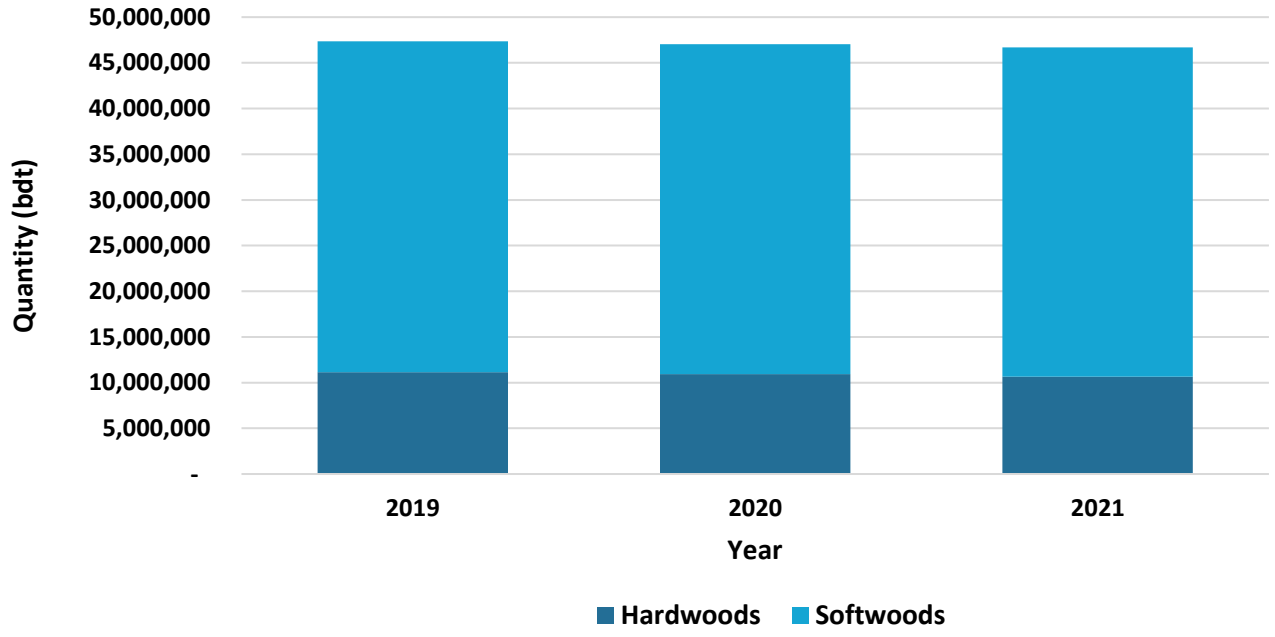
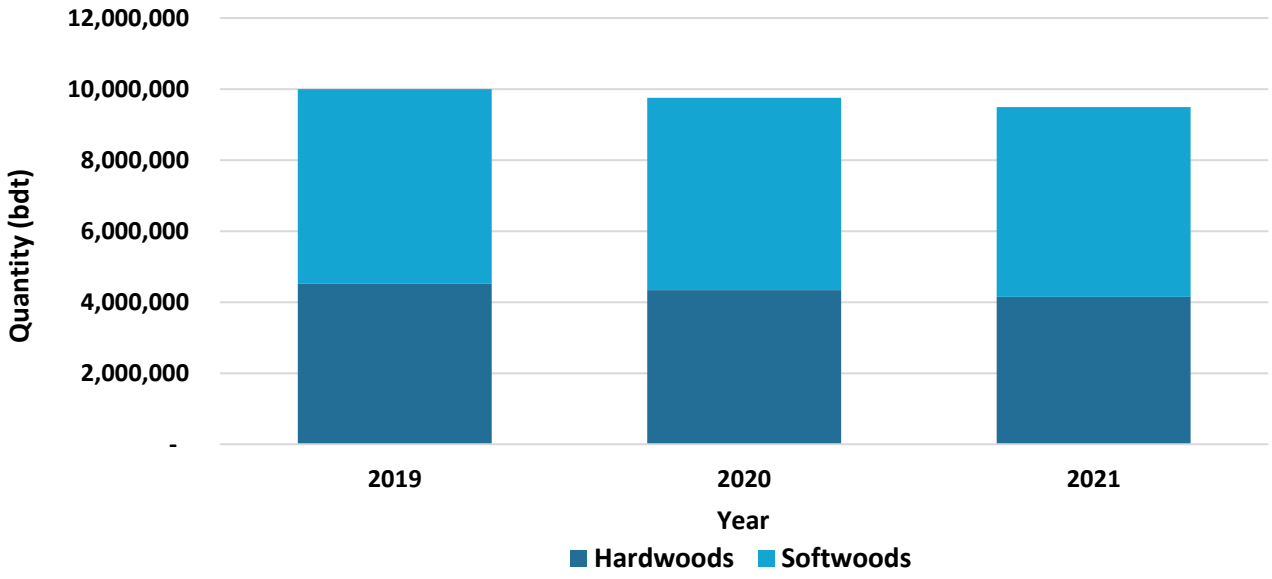


Figure E-2. Merchantable Biomass of Live Pulpwood Size Trees in the Supply Zone (2013-2021)[53]



[52] apps.fs.usda.gov/fiadb-api/evalidator. Variable 12000: Merchantable bole bark and wood biomass of live trees (timber species at least 5 inches d.b.h.), in dry short tons, on timberland
[53] Ibid.

Figure E-3. Percent Merchantable Biomass of Standing Live Trees by Ownership[54]

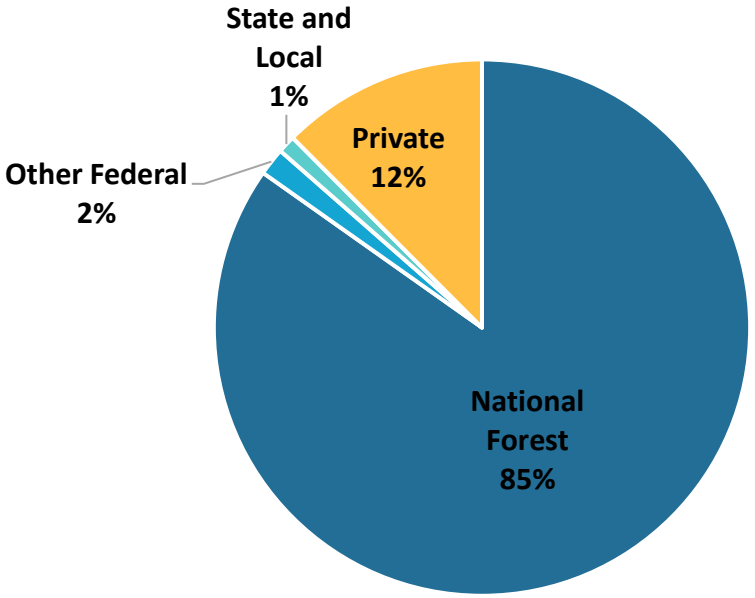
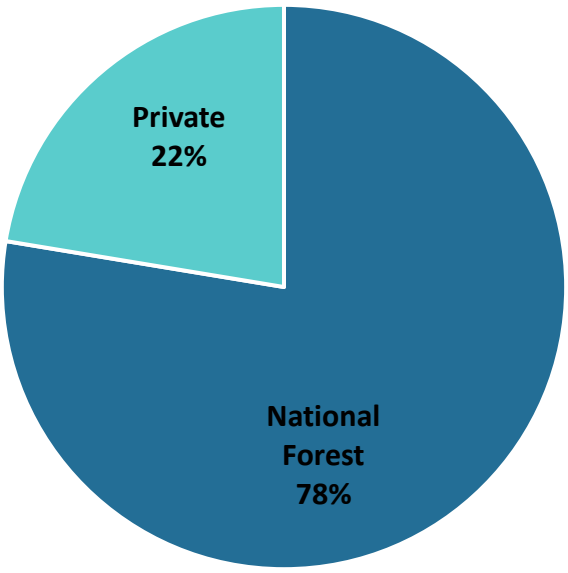


Figure E-4. Percent Timber Removal by Ownership[55]



[54] Ibid.
[55] Ibid.

Figure E-5. Percent Timberland Area by Ownership [56]

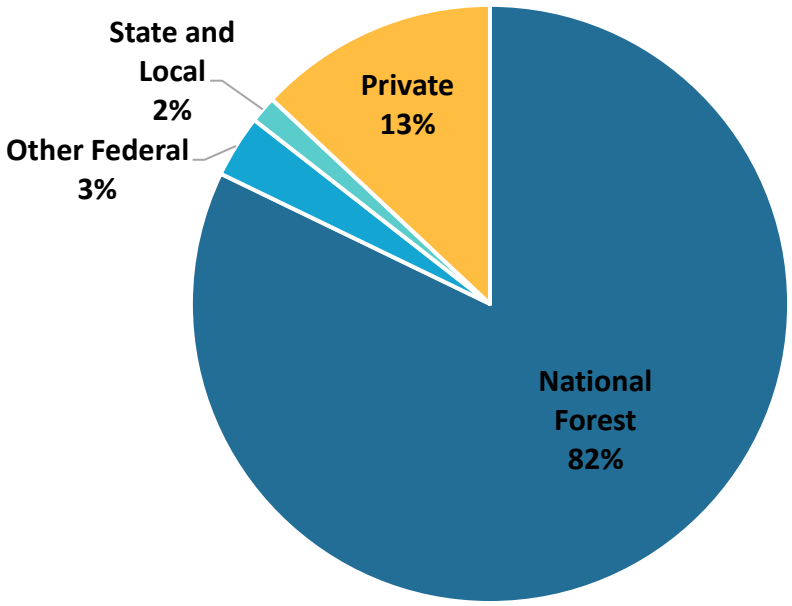
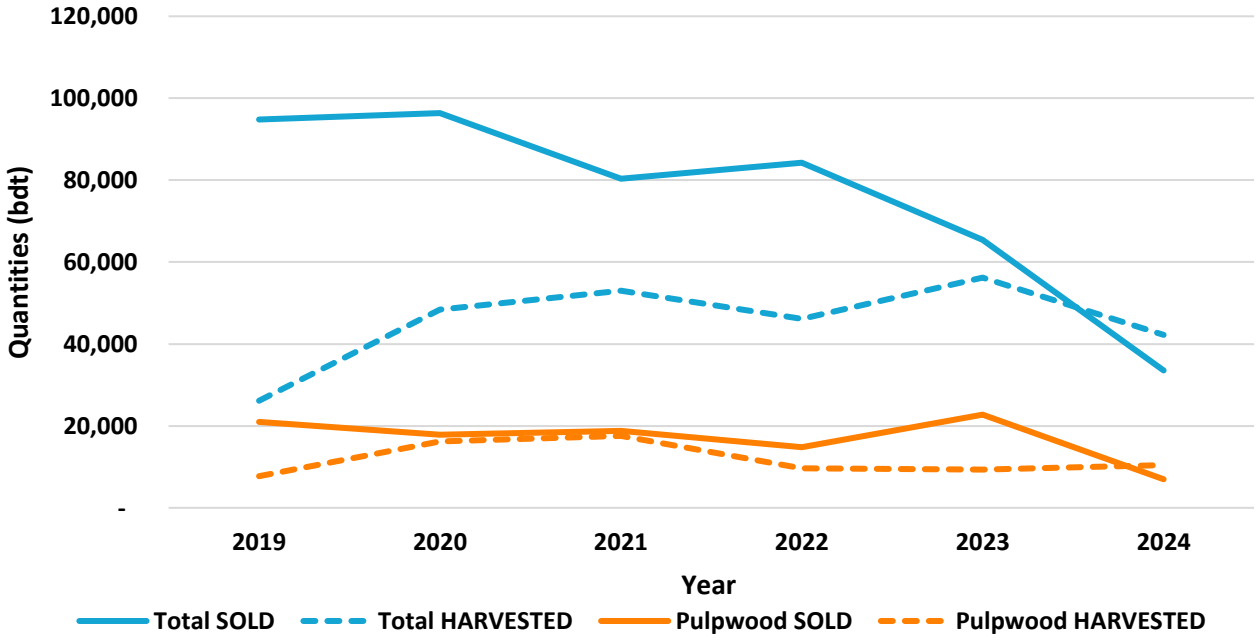
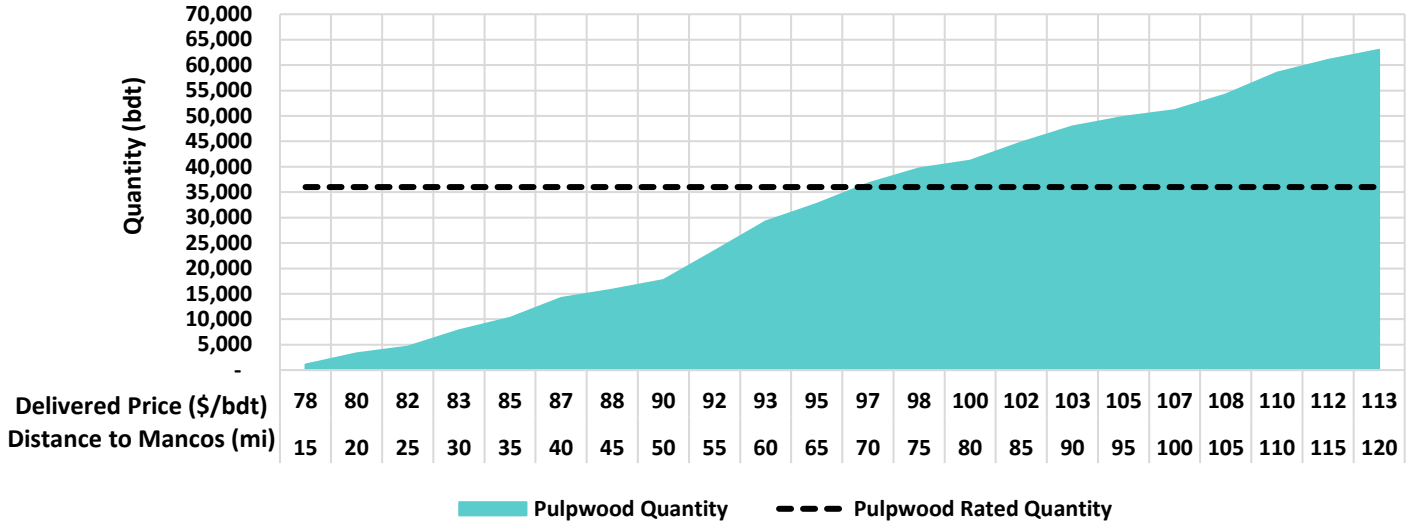


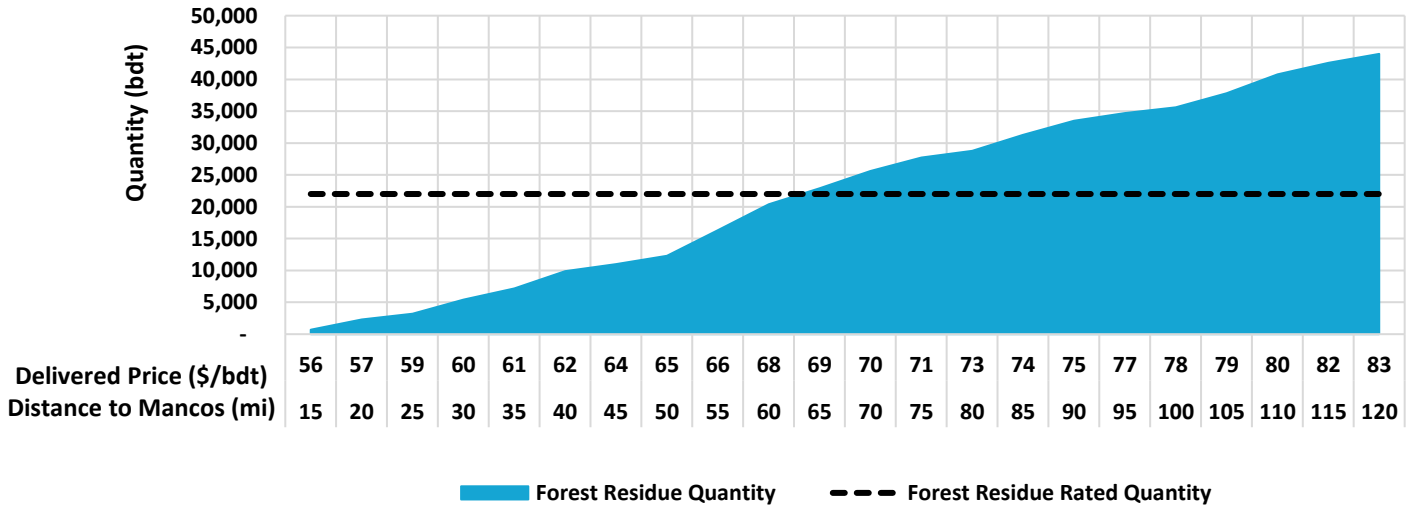
Figure E-6. Total Timber and Pulpwood Sold and Harvested from San Juan National Forest[57]

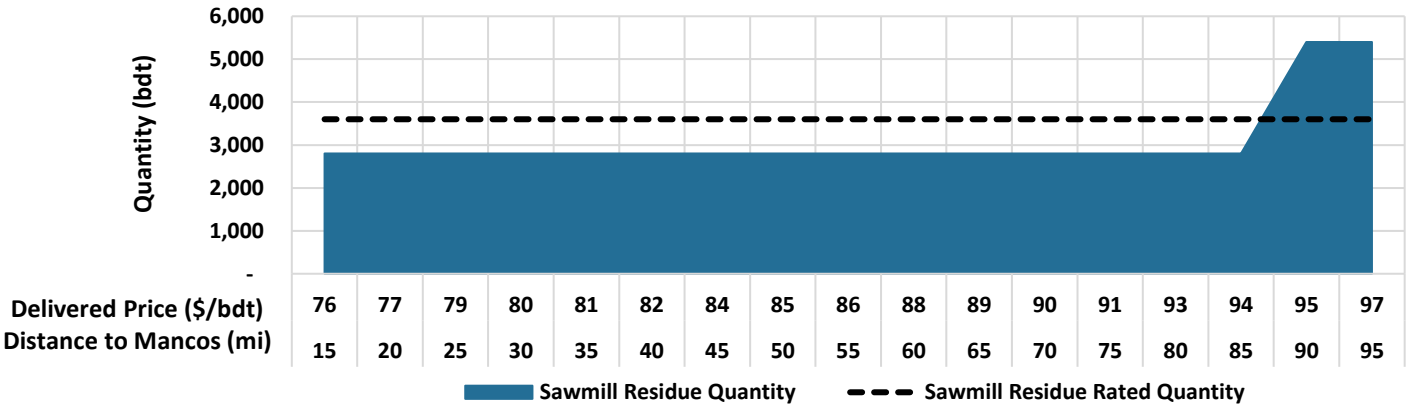


[56] Ibid.
[57] www.fs.usda.gov/forestmanagement/products/cut-sold/index.shtml

Figure E-7. Supply/Marginal Cost Curves for Pulpwood, Forest Residues, and Sawmill Residues Generated in the Supply Zone[58]







[58] apps.fs.usda.gov/fiadb-api/evalidator

Figure E-8. Transportation Costs ($/bdt) by Distance from Mancos CO[59]

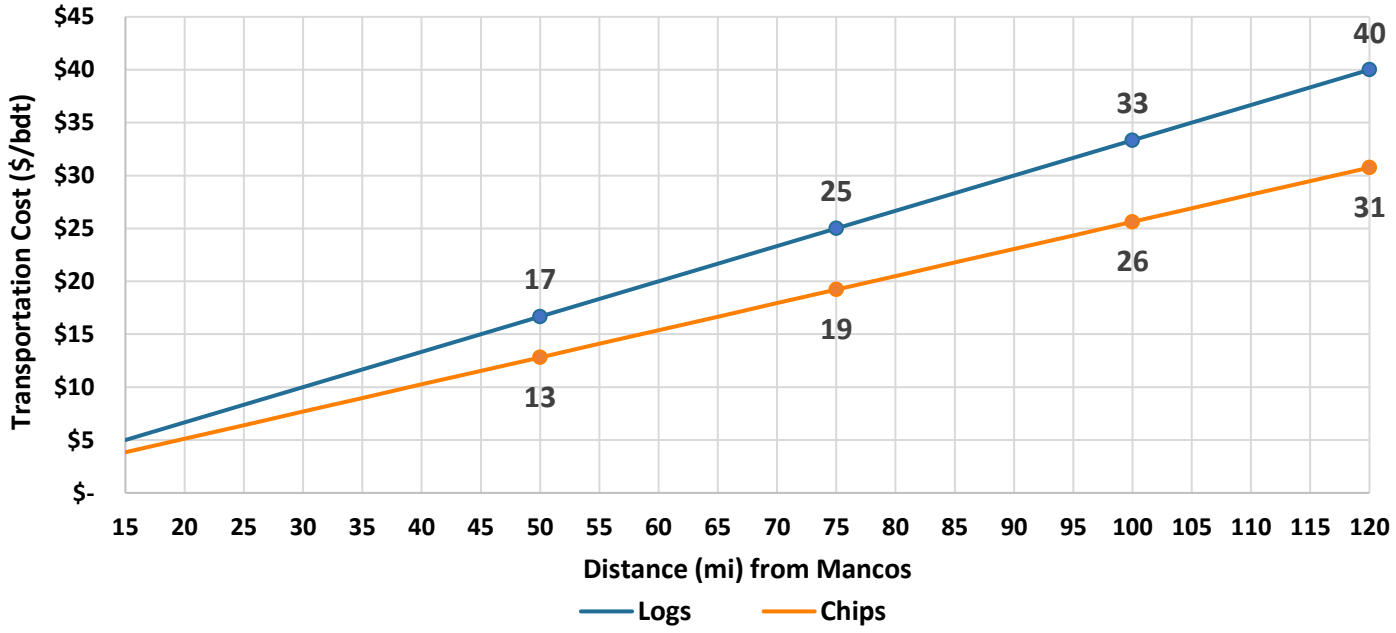
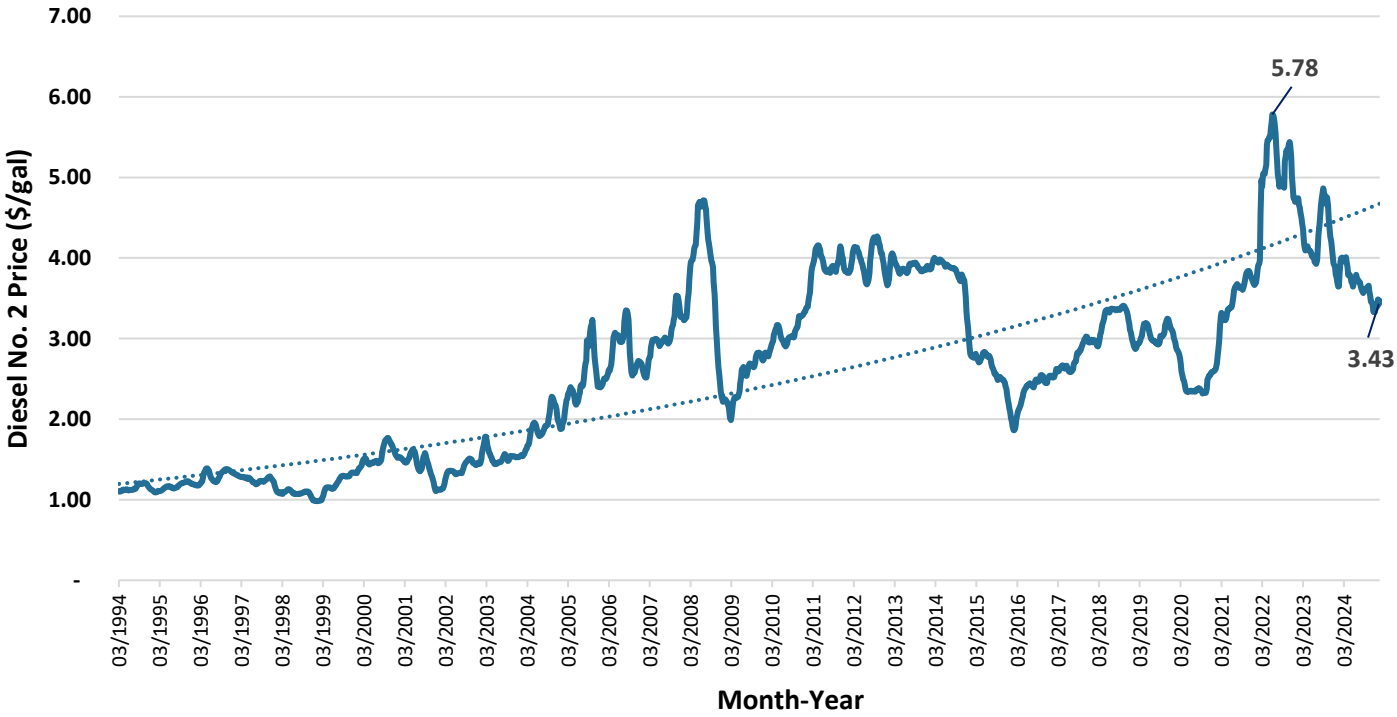
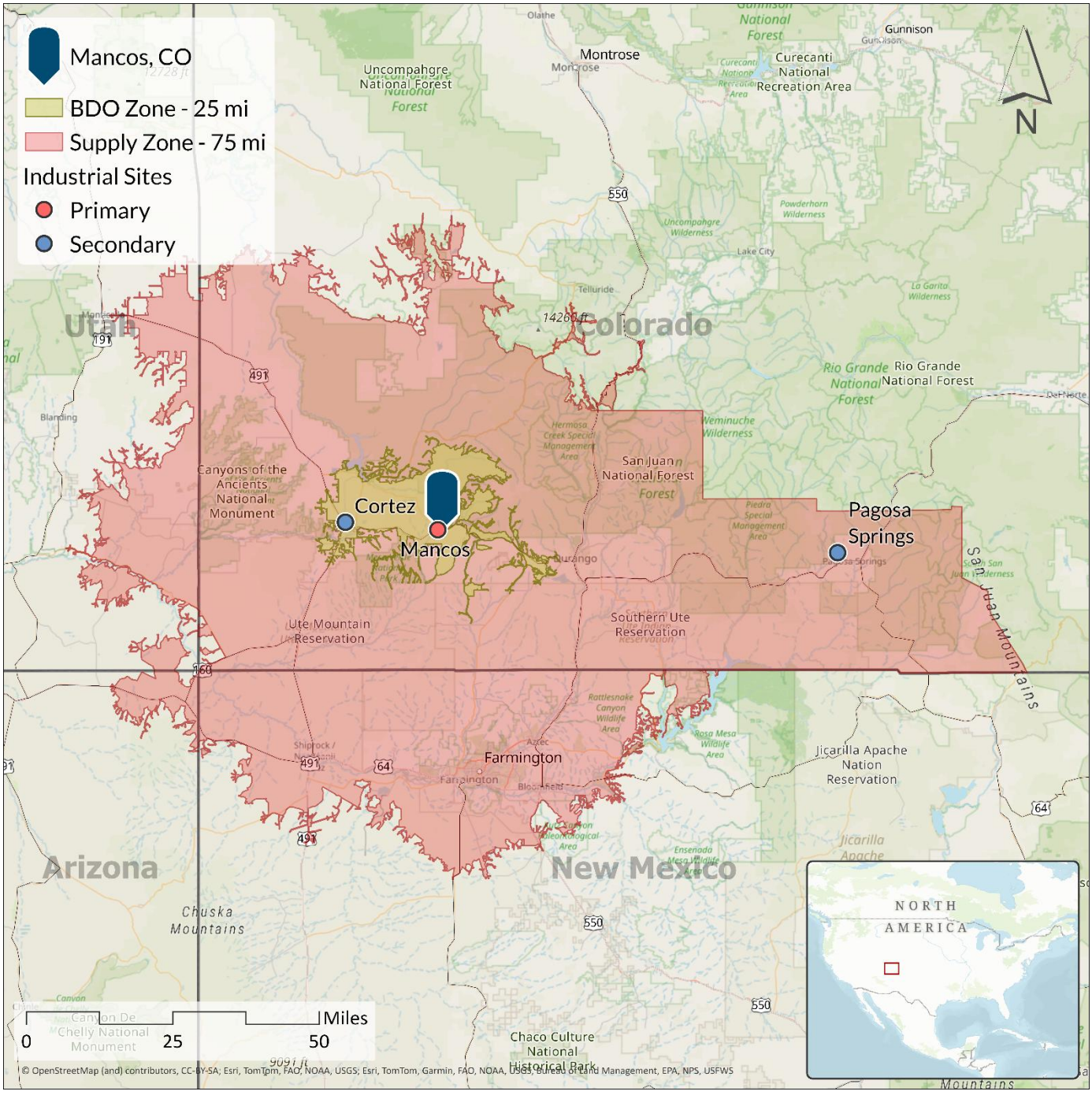


Figure E-9. Historical Diesel Prices ($/gal) and Trendline in the Rocky Mountain Region (1994-2025)[60]



[59] Based on a trucking rate of $125/hr (outreach to local forestry professionals)
[60] www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=EMD_EPD2D_PTE_R40_DPG&f=W

Map E-1. SW Colorado Proposed Industrial Sites



Three sites were suggested:

1. Mancos – primary industrial site – rated
2. Cortez – secondary industrial site – not rated
3. Pagosa – secondary industrial site – not rated

Map E-2. Mancos, CO - Primary Industrial Site



Map E-3. Cortez, CO - Secondary Industrial Site



Cortez, Colorado – Industrial Park

Area: +/- 90 Acres (subdivided)
Zoning: Industrial
Utilities: Electric, Water, Natural Gas, Wastewater, Fiberoptics Internet
Highway Access: Hwy 491
Environmental: No Environmental Issues
Contact: Doug Roth, City of Cortez, 970-565-7320, gis@cortezco.gov

Map E-4. Pagosa Springs, CO - Secondary Industrial Site



Pagosa Springs, Colorado – Industrial Park

Area: 5-10 Acres (sale or lease)
Zoning: Industrial/Commercial
Utilities: Electric, Water, Natural Gas, Wastewater, Fiberoptics Internet
Environmental: No Environmental Issues
Airport: Edison (YET) non-commercial
Contact: Emily Lashbrooke, Pagosa Springs, 970-264-3023, Emily@pagosaspringscdc.org

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