CLEARWATER COUNTY, ID

Bioeconomy Development Opportunity Zone

RATING GRADE: 'A'

Date of Issue: April 24, 2025

A
High Quality

Rating Parameters:

Category	Rated Quantity	Delivered Price	Supply Zone Size
Pulpwood	92,000 bdt/yr	$60-$80/bdt	75-mi drive distance
Forest Residues	22,000 bdt/yr	$55-$90/bdt	from Orofino, ID

BDO ZONE ASSETS

- Supply Zone includes the highest producing timberlands in Idaho, providing reliable feedstock sources.
- Pulpwood growth rates exceed harvest levels by more than 75%, supporting a sustainable supply.
- Minimal competition for pulpwood and forest residues, with material often left unused.
- Low housing costs at 36% below the national average, supporting workforce recruitment and retention.

BDO ZONE LIABILITIES

- Severe shortage of log truck drivers and loggers leads to significant operational constraints.
- Dependence on a stable sawtimber industry for feedstock availability poses supply chain vulnerability.
- Absence of natural gas infrastructure limits potential processing technologies and applications.
- Wildfire and disease threats to forestland present ongoing risks to feedstock supply reliability.

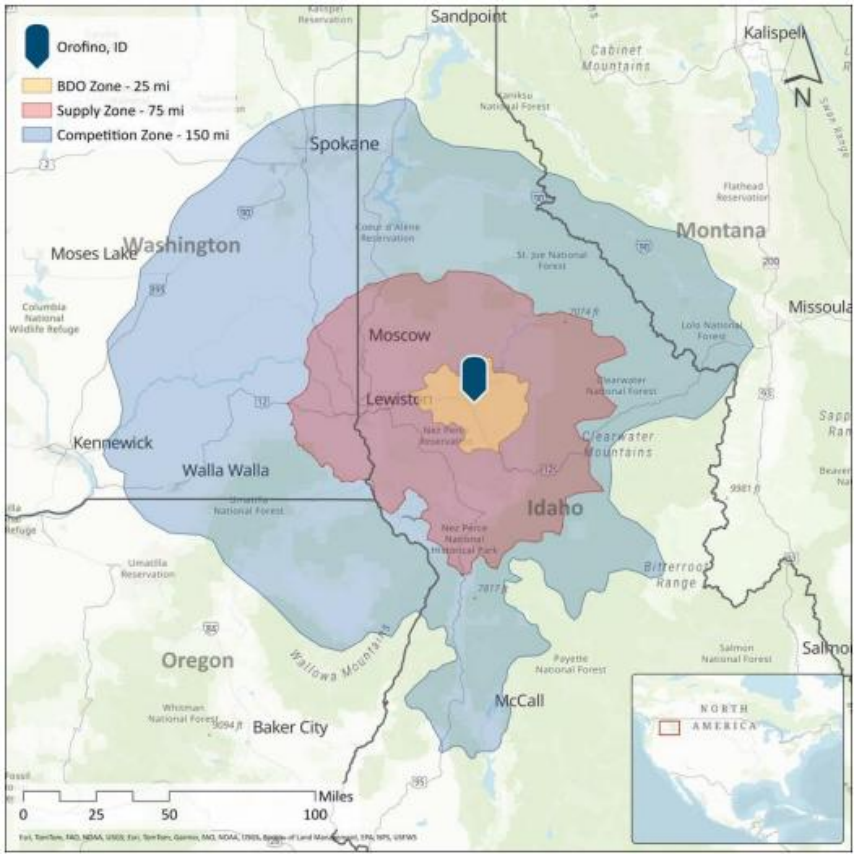
RATING GRADE

The Clearwater County, ID, Bioeconomy Development Opportunity Zone, is rated 'A', or 'low' 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).

'A' ratings indicate high prospective viability of Feedstock Supply and Infrastructure (FS&I) and low expectations of default risk in the Zone. The capacity to support new biobased plant operations is considered strong. However, the capacity may be more vulnerable to labor shortages, supply chain limitations, or trends in weather patterns that may restrict the scale of new projects.

CLEARWATER COUNTY, ID BDO ZONE



ANALYST NOTES

The Clearwater County BDO Zone includes some of Idaho's most productive timberland regions, characterized by coniferous species dominated by Ponderosa pine, Douglas fir, and Western red cedar. Approximately 98% of commercial timber in the area is classified as softwood. Land ownership is predominantly public (62%), managed primarily by the U.S. Forest Service, while private ownership (28%) accounts for over half of the region's timber harvest activities. The remaining land is managed by state, tribal, or other federal agencies.

The forestry industry has maintained operational stability over the past seven years despite the closure of two sawmills in 2015-2016. Currently, the Supply Zone supports four operational sawmills with a collective annual capacity of 635 million board feet, holding steady since 2017. The growth-to-drain ratio average of 1.55 indicates the use of sustainable harvesting practices. Annual growth is approximately 1.9 million bdt while the harvest is 1.3 million bdt/yr.

The region also hosts one pulp and paper mill, two wood pellet facilities, and two biomass energy producers. Pulpwood and forest residues are classified as secondary products as their availability is directly linked to sawtimber harvest rates. These resources represent potential feedstock opportunities as they are currently underutilized, with the majority either left in the forest or burned at landing sites.

BDO ZONE ASSETS

The Clearwater County BDO Zone demonstrates several competitive advantages for biomass project development. The region's forests exhibit exceptional productivity, with a favorable growth-to-drain ratio of 1.55, significantly exceeding the 1.2 threshold required for sustainability. This supports long-term feedstock stability and regulatory compliance. Timber growth exceeds harvest levels by more than 75%, creating substantial feedstock availability with a lower risk of resource depletion.

Competition for pulpwood is minimal, with local experts confirming that the majority of this feedstock remains unutilized in timberlands. Similarly, forest residues currently lack commercial utilization, representing an untapped resource generally burned or left on-site. The combination of underutilized biomass resources and limited competitive pressure on pricing provides a strategic advantage for new entrants.

The region's forestry sector benefits from well-established supply chains with extensive experience in timber harvesting and transportation. Additionally, high adherence to forestry best management practices contributes to strong sustainability performance. Ninety-nine percent of operations demonstrate compliance with the Idaho Forest Practices Act, mitigating regulatory and certification risks. The central location of the BDO Zone within a highly productive forested area provides logistical advantages by reducing transportation distances for potential biomass operations.

BDO ZONE LIABILITIES

The Clearwater County BDO Zone faces several significant supply chain challenges that may affect project viability. Most critical is the severe shortage of log truck drivers, exacerbated by an aging workforce, limited entry of younger drivers, and rising insurance costs. This labor constraint directly impacts feedstock transportation capacity and represents a substantial barrier to supply chain development. The regional workforce challenges extend beyond transportation to include a shortage of skilled logging personnel.

Both pulpwood and forest residues are secondary products dependent on sawtimber harvesting. This situation leads to inherent supply vulnerabilities to housing market fluctuations or industry downturns. Although the U.S. Forest Service occasionally offers dedicated pulpwood sales, these are infrequent and limited in volume. Consequently, any reduction in sawtimber demand would proportionally decrease the availability of biomass feedstocks.

Forest residues, while available, remain unharvested due to the absence of established markets, lack of in-field chipping capacity, and logistical constraints presented by rugged terrain. Development of this feedstock stream would require significant capital investment in specialized equipment and transportation infrastructure.

Climate-related risks pose additional concerns, with increasing wildfire frequency, drought conditions, and insect infestations affecting timberland health. Land managers implement mitigation measures for damaged and diseased trees, but large-scale removal operations remain challenging. Fuel reduction efforts targeting small-diameter trees face funding limitations. These environmental factors lead to unpredictability in long-term feedstock availability and quality.

INFRASTRUCTURE PROFILE

The site consists of a 42-acre parcel previously utilized as a lumber mill, located approximately three miles east of Orofino, Idaho. The property is privately owned, zoned for industrial use, and has existing buildings. Water and electrical service are in place, but natural gas is not available.

The site benefits from three-phase power availability and adequate water supply. The low cost of living in the area, with housing costs approximately 36% below the national average, is a favorable condition for workforce recruitment and retention. The existing road infrastructure provides sufficient access to regional transportation networks via Highway 12, which connects to Interstate 90.

Infrastructure constraints include the absence of natural gas service, which limits options for thermal energy and certain industrial processes. Although existing rail lines and a spur connect to the site, they have been inactive since 2024 and would require substantial rehabilitation to become operational.

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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 Supply 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.
- The Supply Zone is a 75-mile drive distance from the center point, where feedstock availability was assessed.
- The Competition Zone is a 150-mile drive from the center point, where consumers can compete for feedstock 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 (Orofino, ID).

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 BDO Zone score for Clearwater County, ID, is ***22.5 out of 100, resulting in an 'A' 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

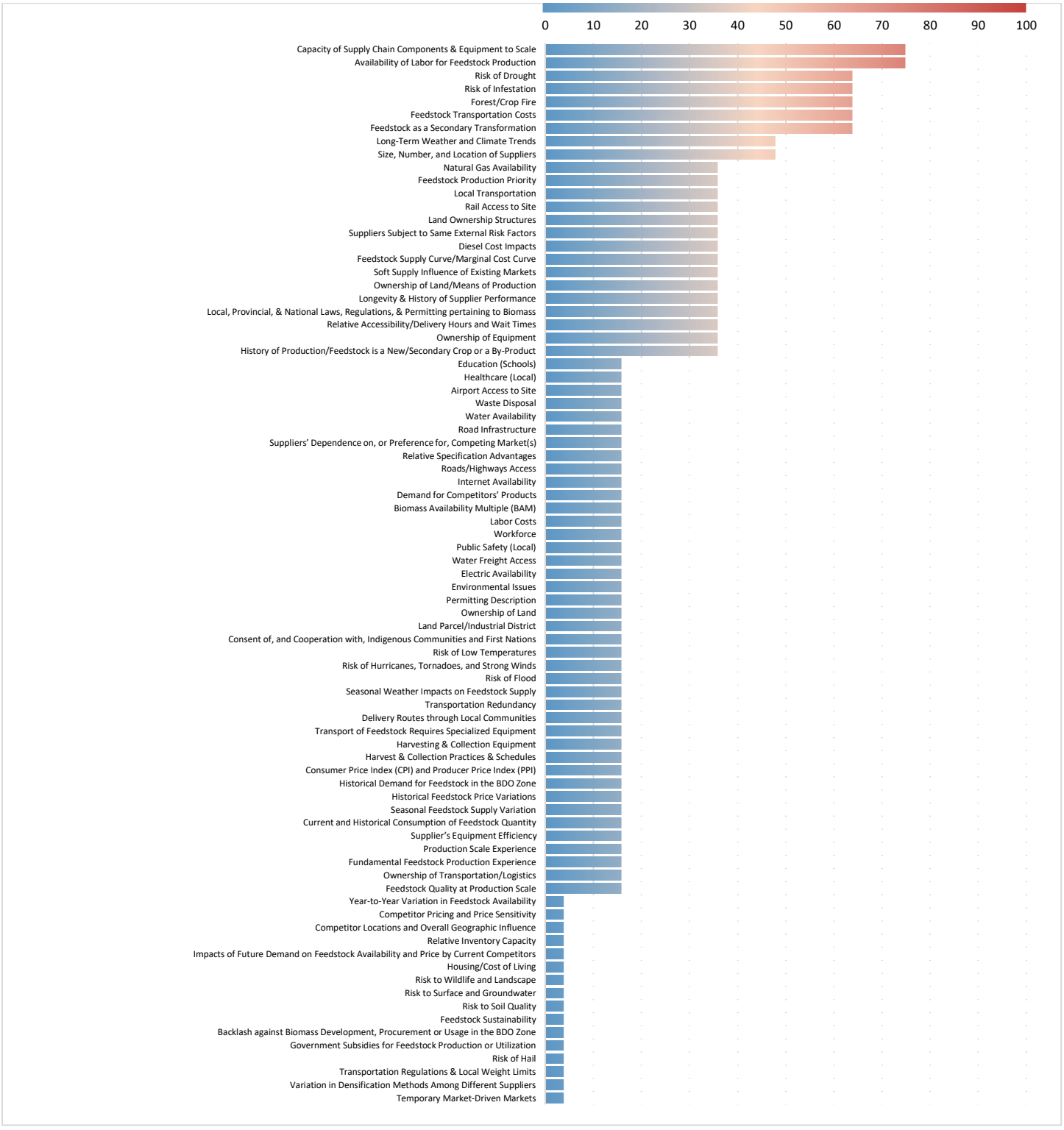


Table A-1. Risk Indicators and Associated Scores

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	6	6	36	NN	36
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	6	6	36	NN	36
1.3.2 Ownership of Equipment	6	6	36	NN	36
1.3.3 Ownership of Transportation/Logistics	4	4	16	NN	16
1.3.4 Feedstock as a Secondary Transformation	8	8	64	NN	64
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	6	6	36	NN	36
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	2	2	4	NN	4
2.1.2 Current and Historical Consumption of Feedstock Quantity	4	4	16	NN	16
2.1.3 Competitor Pricing and Price Sensitivity	2	2	4	NN	4
2.1.4 Impacts of Future Demand on Feedstock Availability and Price by Current Competitors	2	2	4	NN	4
2.1.5 Soft Supply Influence of Existing Markets	6	6	36	NN	36
2.1.6 Temporary Market-Driven Markets	2	2	4	NN	4
2.2 Risk Factor: Specific Competitors' Competitive Advantage					
2.2.1 Relative Inventory Capacity	2	2	4	NN	4
2.2.2 Relative Accessibility/Delivery Hours and Wait Times	6	6	36	NN	36
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	6	36	NN	36
3.1.3 Seasonal Feedstock Supply Variation	4	4	16	NN	16
3.1.4 Year-to-Year Variation in Feedstock Availability	2	2	4	NN	4
3.2 Risk Factor: Historical Issues					
3.2.1 Historical Feedstock Price Variations	4	4	16	NN	16
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	6	6	36	NN	36
3.3 Risk Factor: Non-Weather Based Externalities					
3.3.1 Consumer Price Index (CPI) and Producer Price Index (PPI)	4	4	16	NN	16
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	NR	NR	NR	NR	NR
3.4 Risk Factor: Risks Related to Feedstock Production, Harvest, and Collection					
3.4.1 Harvest & Collection Practices & Schedules	4	4	16	NN	16
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	10	10	100	25%	75
3.5 Risk Factor: Transportation					
3.5.1 Feedstock Transportation Costs	8	8	64	NN	64
3.5.2 Diesel Cost Impacts	6	6	36	NN	36
3.5.3 Transport of Feedstock Requires Specialized Equipment	4	4	16	NN	16
3.5.4 Delivery Routes through Local Communities	4	4	16	NN	16
3.5.5 Transportation Regulations & Local Weight Limits	2	2	4	NN	4
3.5.6 Road Infrastructure	4	4	16	NN	16
3.5.7 Transportation Redundancy	4	4	16	NN	16

3.6 Risk Factor: Supply Chain Resiliency					
3.6.1 Size, Number, and Location of Suppliers	8	8	64	25%	48
3.6.2 Suppliers Subject to Same External Risk Factors	6	6	36	NN	36
3.6.3 Land Ownership Structures	6	6	36	NN	36
3.7 Risk Factor: Climate and Natural Risks					
3.7.1 Seasonal Weather Impacts on Feedstock Supply	4	4	16	NN	16
3.7.2 Long-Term Weather and Climate Trends	8	6	48	NN	48
3.7.3 Forest/Crop Fire	8	8	64	NN	64
3.7.4 Risk of Infestation	8	8	64	NN	64
3.7.5 Risk of Hail	2	2	4	NN	4
3.7.6 Risk of Flood	4	4	16	NN	16
3.7.7 Risk of Drought	8	8	64	NN	64
3.7.8 Risk of Hurricanes, Tornadoes, and Strong Winds	4	4	16	NN	16
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	2	2	4	NN	4
3.8.2 Local, Provincial, & National Laws, Regulations, & Permitting pertaining to Biomass	6	6	36	NN	36
3.8.3 Backlash against Biomass Development, Procurement or Usage in the BDO Zone	2	2	4	NN	4
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	2	2	4	NN	4
3.9.2 Risk to Soil Quality	2	2	4	NN	4
3.9.3 Risk to Surface and Groundwater	2	2	4	NN	4
3.9.4 Water Use	2	2	4	NN	4
3.9.5 Pesticide Risk to Human and Ecosystem Health	NR	NR	NR	NR	NR
3.9.6 Risk to Wildlife and Landscape	2	2	4	NN	4
3.9.7 Biomass Classified as Genetically Modified Organism (GMO)	NR	NR	NR	NR	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	10	10	100	25%	75
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	6	6	36	NN	36
5.2.2 Electric Availability	4	4	16	NN	16
5.2.3 Water Availability	4	4	16	NN	16
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	4	4	16	NN	16
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	4	4	16	NN	16
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	6	36	NN	36
5.4.4 Public Safety (Local)	4	4	16	NN	16
5.4.5 Housing/Cost of Living	2	2	4	NN	4
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	**22.5**

SECTION B: BIOMASS AVAILABILITY AND PRICING

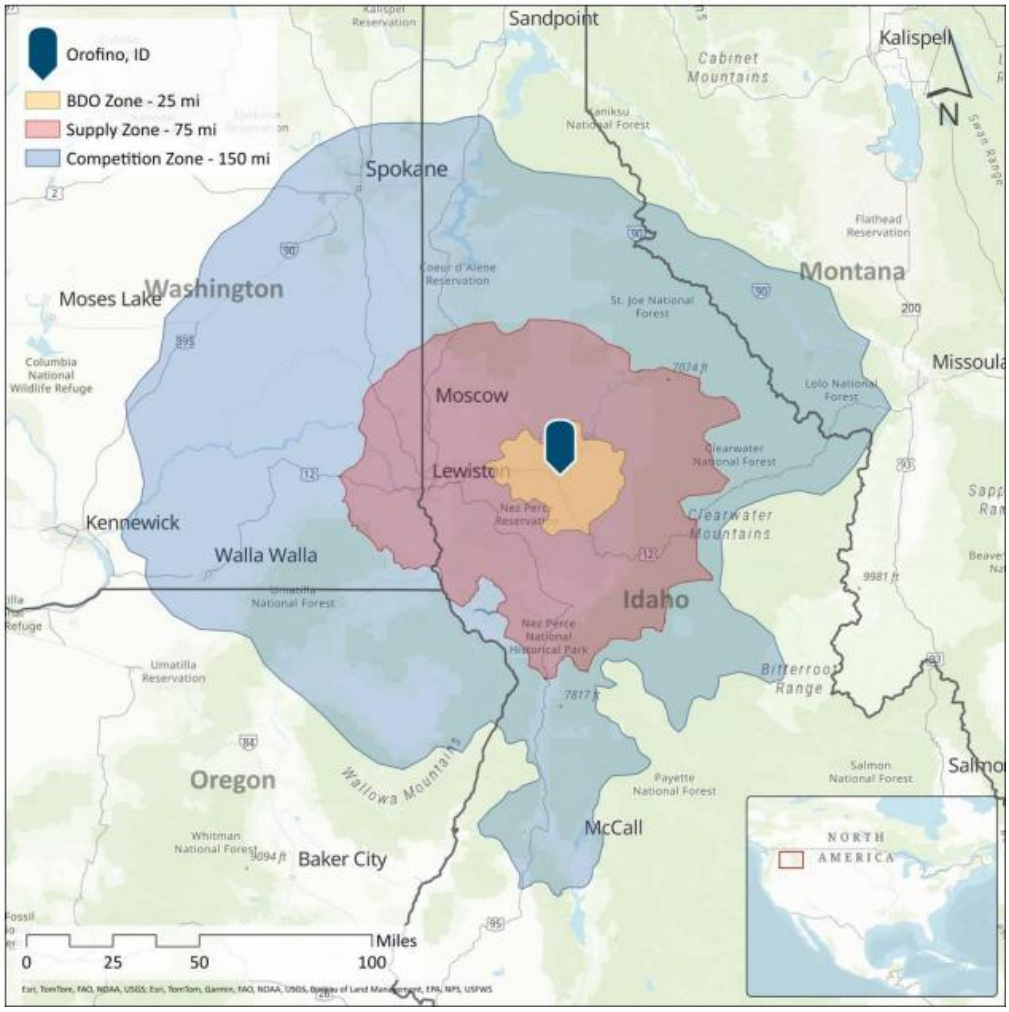
OVERVIEW

This section describes the availability and pricing of woody biomass feedstock for bioenergy, biofuels, and other bio-based products in the Clearwater County, ID Bioeconomy Development Opportunity Zone (BDO Zone). The assessment is centered on Orofino, ID, located in Clearwater County.

The analysis considers three concentric zones (Map B-1). The BDO Zone encompasses a 25-mile driving distance from Orofino, ID, representing the area where new projects may be located. The Supply Zone extends to a 75-mile driving distance from the center point, constituting the primary sourcing region for biomass. The Competition Zone extends to a 150-mile driving distance, where competitors may influence biomass availability within the Supply Zone.

The Supply Zone covers 4,435 square miles across six Idaho counties, while the Competition Zone encompasses 19,415 square miles. Table E-1 in Section E provides a detailed county breakdown.

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



EVALUATED FEEDSTOCKS

The analysis focuses on three primary biomass resources in the Supply Zone:

Pulpwood: Roundwood that fails to meet sawmill specifications due to small diameter, irregular form, or other defects. In the Supply Zone, this material may also be classified as non-saw.

Forest residues: Tops, branches, stumps, bark, and other woody materials generated during timber harvesting operations. The most prevalent forest residues in this BDO Zone are tree tops that typically accumulate at landing sites and are burned on-site due to logistical constraints.

Sawmill residues: Byproducts generated during sawlog processing, including wood chips, sawdust, shavings, and bark. These materials represent 40-60% of sawlog volume. Sawmill residues are excluded from this rating as they are already fully committed to other industries.

SUPPLY ANALYSIS

The region surrounding Orofino, Idaho contains some of Idaho's most productive timberlands, featuring commercially valuable softwood species including Ponderosa pine, Douglas fir, and Western red cedar. Softwood comprises over 98% of commercial timber. The sawmilling industry processes 83% of Idaho's total wood harvest into sawmill products, plywood, and veneer, while 13% is allocated to pulp, boards, and chips.[1] Private ownership accounts for only 28% of Idaho's forestland but represents 51% of productive timberland, underscoring the significant role of private landowners in timber production.[2]

Growth and removal data was obtained from the U.S. Department of Agriculture Forest Service's Forest Inventory and Analysis (FIA) database for the period 2019-2021.[3] While historical data for Idaho is more limited compared to other states, the available information provides valuable insight into standing biomass inventory within the Supply Zone.

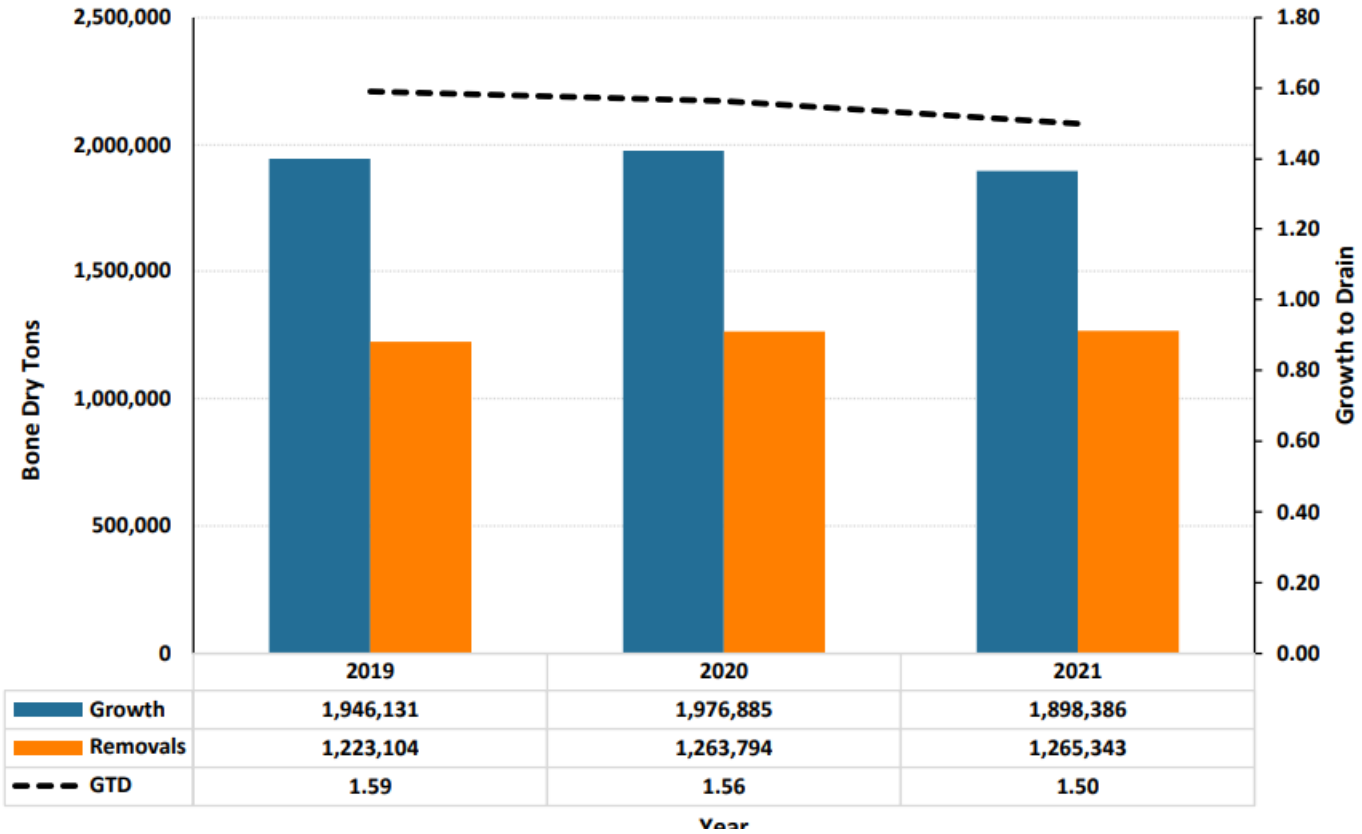
Pulpwood

In the BDO Zone, pulpwood is a by-product of sawtimber harvesting. After tree felling, logs are graded, with sawtimber-grade logs separated and transported to buyers' facilities. Logs failing to meet sawtimber quality standards, approximately 12% of the total harvest,[4] become available as pulpwood.

The Supply Zone's annual timber growth across all diameter classes averages approximately 1.9 million bdt, with about 1.3 million bdt harvested (Figure B-1). The growth-to-drain ratio (GTD), a key sustainability indicator representing the proportion of annual wood growth relative to harvest removals, averages nearly 1.55 across the Supply Zone. This significantly exceeds the 1.2 threshold generally considered sustainable, indicating strong long-term supply potential.

[1] Idaho Forest Products Commission. https://www.idahoforests.org.
[2] Ibid.
[3] Forest Inventory and Analysis. https://www.fs.usda.gov/research/programs/fia.
[4] Average figure based on outreach to industry and Forest Service experts.

Figure B-1. Growth, Removals, and GTD for All Timber Classes



Based on the aforementioned 12% classification rate, approximately 150,000 bdt of pulpwood is generated annually in the BDO Zone.

Forest Residues

Whole-tree logging is the predominant harvesting practice in the BDO Zone. This method involves transporting felled trees to landing sites for processing, where branches and tops are removed prior to log grading. Due to insufficient market demand, these materials are typically left in the forest but could be available to new projects.

The FIA database estimates that approximately 268,000 bdt/yr of forest residues are generated in the BDO Zone during logging operations. However, due to the low density and irregular shape of these materials, processing requires chipping or grinding equipment followed by transport in specialized vehicles. Based on consultation with forestry experts, only approximately one-third of the Supply Zone offers sufficient access to the required equipment.

Consequently, accounting for these logistical constraints, approximately 89,000 bdt of forest residues are realistically available annually in the BDO Zone.

It is notable that the current absence of a market for forest residues corresponds with a lack of processing and transportation equipment. Projects interested in utilizing forest residues must plan for significant logistical scale-up investments.

Sawmill Residues

The Supply Zone contains four operational sawmills (Map B-2) with a collective annual capacity of 635 million board feet (MMBF), requiring approximately one million bdt/yr of sawlogs (Figure B-2). Three of these facilities are located at the outer edge of the Supply Zone, potentially increasing transportation costs.

Sawmill capacity has remained stable since 2017 (Figure B-2). Between 2014 and 2017 the number of facilities decreased while production capacity increased before stabilizing at the current 635 MMBF per year.

Map B-2. Sawmills in the Supply Zone

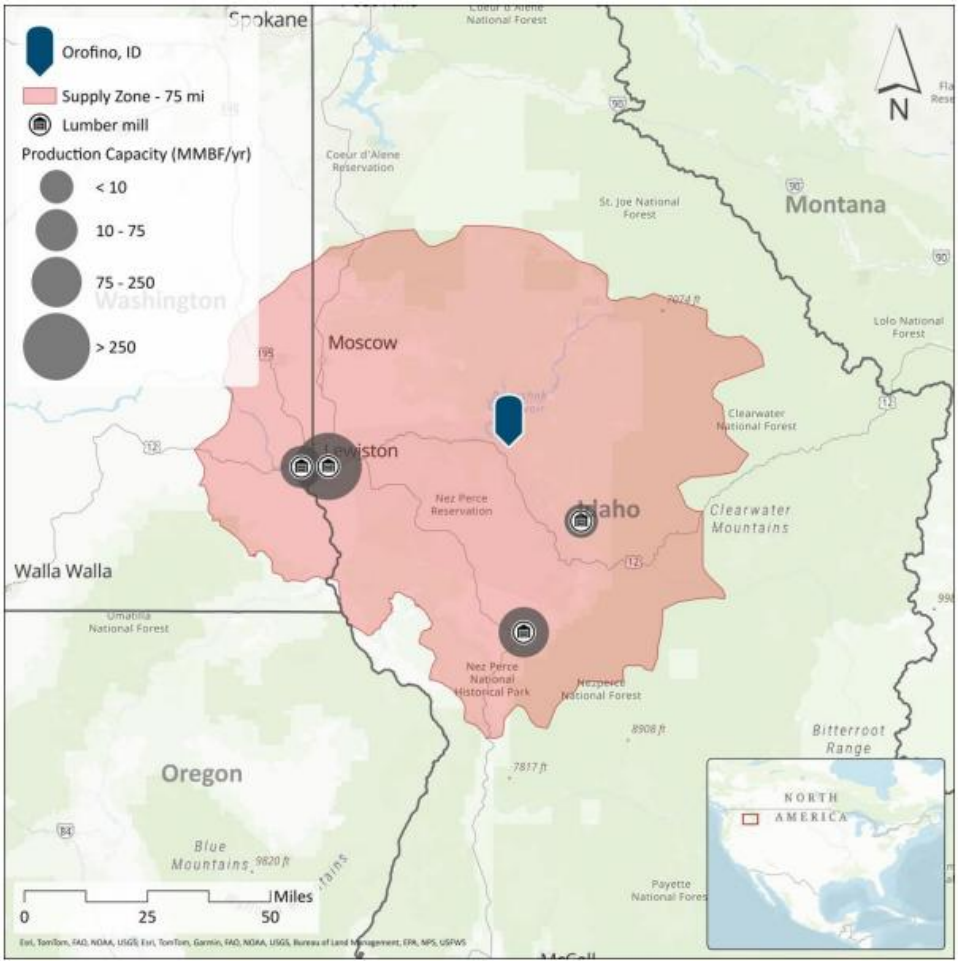
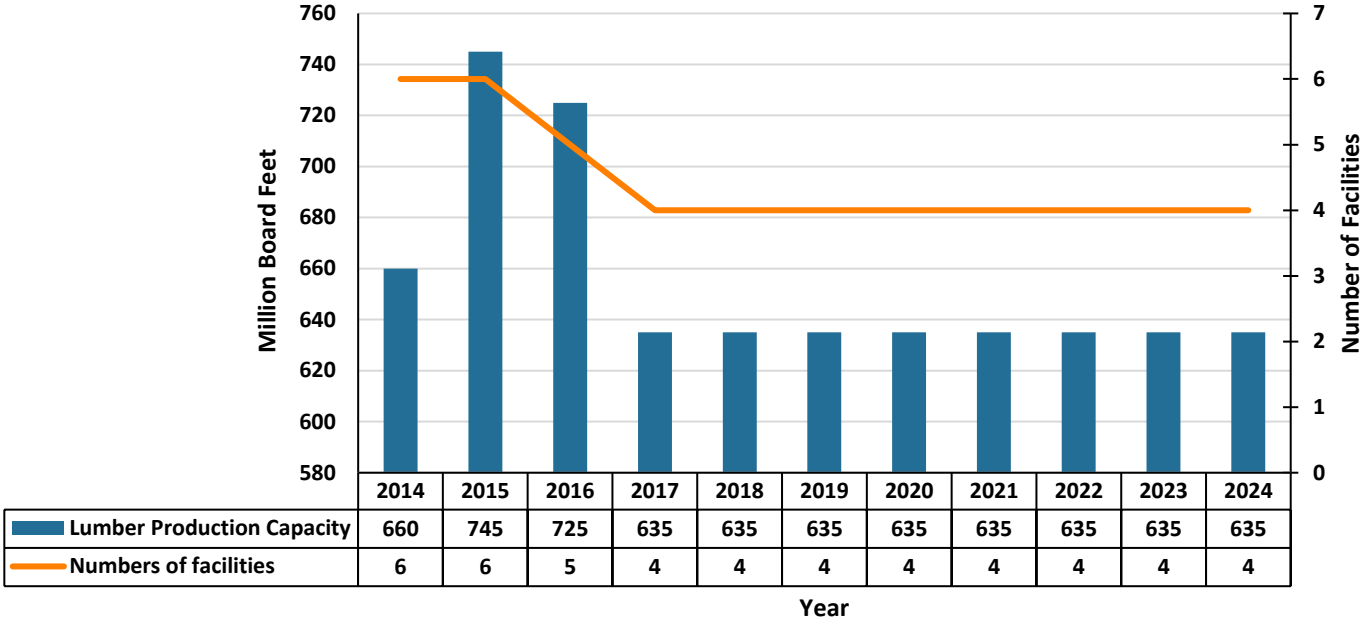


Figure B-2. Sawmill Capacity and Number of Facilities



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Lumber Production Capacity	660	745	725	635	635	635	635	635	635	635	635
Numbers of facilities	6	6	5	4	4	4	4	4	4	4	4

Despite sawmills generating over 600,000 bdt/yr of residues, these materials are fully committed to existing markets.[5,6] The two largest sawmills, accounting for 86% of residue production, supply these materials to the Lewiston pulp and paper mill under long-term contracts. Additionally, bark is utilized on-site for heat or power generation, while wood shavings are sold to animal bedding producers. Pellet mills in the Competition Zone have also secured contracts for sawmill residues. Consultations with local sawmills and forestry experts confirm that sawmill residues are effectively unavailable to new project developers.

COMPETITION ANALYSIS

Five competitors operate within the Competition Zone, utilizing chipped material, sawdust, and bark across multiple sectors:

1. A pulp and paper mill that sources 80-90% of its feedstock from sawmill residues, with pulpwood constituting the remainder
2. Two wood pellet producers utilizing sawmill residues
3. Two facilities generating biomass heat or combined heat and power (CHP), primarily using bark

The biomass heat/power facilities include heating systems at hospitals and schools, as well as process heat/power at sawmills and the pulp and paper mill. Recent reductions in biomass heating have occurred due to challenges in meeting clean air standards.[7] Map B-3 illustrates the geographic distribution of these competitors.

[5] Sawmill residual estimates are based on sawmill annual capacity and calculated using a proprietary Ecostrat model.
[6] Simmons, Eric A., Samuel G. Scott, Todd A. Morgan, Lucas P. Townsend, and John D. Shaw. "Timber basket of the Interior West: Idaho's forest products industry and timber harvest, 2019, with trends through 2021." *Resour. Bull. RMRS-RB-38. Fort Collins, CO: US Department of Agriculture, Forest Service, Rocky Mountain Research Station. 51 p. https://doi. rog/10.2737/RMRS-RB-38.* 38 (2024).
[7] Timber buyer. Personal communication.

Map B-3. Location of Competitors in the Competition Zone

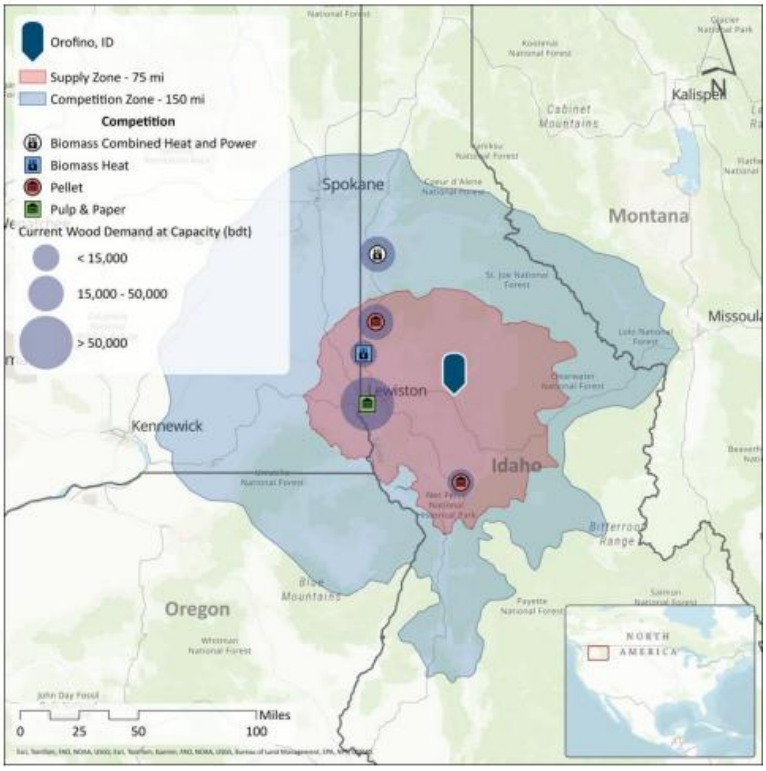


Table B-1 provides a breakdown of competitors, including their wood demand and impact on the Supply Zone.

Table B-1. Summary of Competitors in the Competition Zone

Category	Number of Facilities	Wood Demand at Capacity (bdt)	Pulpwood Demand at Capacity (bdt)	Supply Zone Percent Overlap	Estimated Annual Wood from Supply Zone (bdt)[8]
Pulp & Paper	1	961,000	96,000-192,000	8	8,000-15,000
Wood Pellets	2	53,000	0	26	0
Biomass Heat/Power	2	19,000	0	10	0
Totals	**5**	**1,033,000**	**96,000-192,000**		**8,000-15,000**

These five facilities collectively demand approximately 1,033,000 bdt/yr of woody biomass. Analysis indicates that suppliers in the Supply Zone meet approximately 1% (8,000-15,000 bdt) of this demand, representing approximately 8% of the pulpwood demand.

Current pulpwood demand must be factored in when determining feedstock availability. Subtracting the average pulpwood demand of 12,000 bdt annually from the 150,000 bdt generated yields 138,000 bdt of available pulpwood annually.

[8] Demand in Supply Zone is based on the degree of overlap of each facility supply area with the Supply Zone.

New Projects and Expansions

Our research did not identify any announced new competitors for biomass or capacity expansions for existing competitors.

RATED QUANTITIES AND PRICING

The rated quantity is determined by dividing the availability estimate by a Biomass Availability Multiple (BAM). The BAM accounts for uncertainties in underlying data, models, assumptions, and potential feedstock supply and demand fluctuations due to weather, market dynamics, or other external factors. This approach yields a conservative, low-risk estimate of availability for new projects. Depending on the assessment of these uncertainties, the BAM value ranges from 1.5 to 4.0.

Table B-2 presents the results of applying appropriate BAM factors to estimated feedstock quantities. Pulpwood received a BAM of 1.5, reflecting the minimal competition for this resource. Forest residues received a more conservative BAM of 4.0, acknowledging the higher risk associated with these materials due to the absence of current processing and transportation infrastructure.

Table B-2. Estimate of Average Annual and Low-Risk Quantities of Pulpwood and Forest Residues

Feedstock Type	Availability Quantity (bdt/yr)	BAM Factor	Rated Quantity (bdt/yr)	Rated Price Range ($/bdt)
Pulpwood	138,000	1.5	92,000	60-80
Forest Residues	89,000	4.0	22,000	55-90

The delivered price of pulpwood logs in the Supply Zone is primarily influenced by haul distance, stumpage fees, and logging costs (Figure B-3). These components contribute approximately 28% for stumpage, 25% for logging, and 47% for transportation. Transportation represents the most significant cost factor, making longer haul distances a material price driver (Figure E-2).

In Northern Idaho, average delivered pulpwood costs have decreased from approximately $67/bdt in 2020 to approximately $55/bdt in 2024 (Figure E-3). By comparison, delivered costs to the Lewiston pulp and paper mill have ranged from $80 to $100/bdt over the past year, reflecting deliveries from a significantly larger 200-mile supply basin.

The BDO Zone's 75-mile Supply Zone presents a logistical advantage. Given Orofino's location within highly productive timberlands and shorter haul distances relative to Lewiston, lower delivered prices are achievable. Lewiston's supply area generally extends farther from the mill, resulting in higher transportation costs (Map E-1).

Forest residues currently lack an established market in the BDO Zone, necessitating price estimation. Figure B-4 illustrates the component breakdown of delivered forest residue pricing based on a 75-mile haul. The estimate assumes minimal stumpage fees of $5-10/bdt, reflecting the by-product status of materials typically left in the forest or burned. Chipping costs are estimated at $30-40/bdt, while transportation costs are assumed to be equivalent to pulpwood at $20-40/bdt, based on similar load weights and distances. These figures incorporate profit margins.

Based on the preceding analysis, pulpwood's estimated delivered price range is $60-80/bdt, reflecting the significantly shorter average haul distance compared to Lewiston supply routes. The estimated delivered price range for forest residues is $55-90/bdt.

Figure B-3. Breakdown of Pulpwood Delivery Costs – 75-Mile Haul

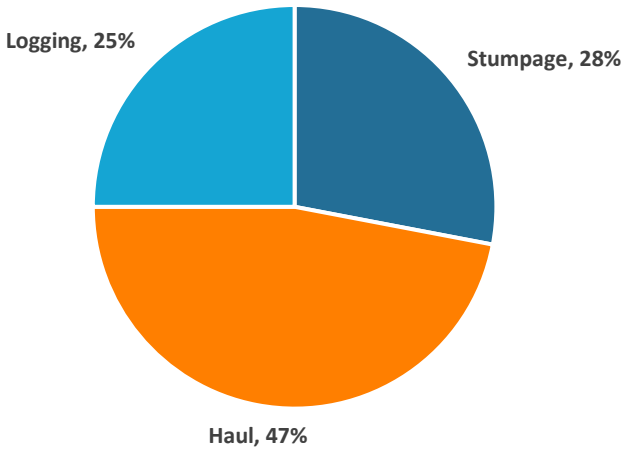
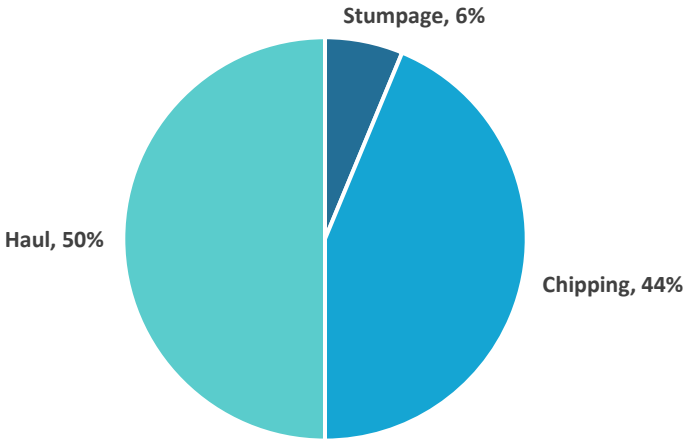


Figure B-4. Breakdown of Forest Residue Delivery Costs – 75-Mile Haul



OPERATIONAL CONSIDERATIONS

Pulpwood harvesting crews in the Supply Zone typically consist of five to seven personnel, producing approximately 45 truckloads weekly, each carrying about 14 bdt of logs.[9] The number of vehicles and drivers required varies with the distance to the mill, with an average haul of 50 miles.[10]

A new biomass facility targeting the rated volume of 92,000 bdt/yr would require approximately three to four additional logging crews (20 personnel) and 13 additional log trucks and drivers to support 30 daily deliveries.

Forest residue processing involves feeding woody material into a chipper that transfers the chips directly into transport vans. A typical chipping crew consists of two or three personnel. Processing 22,000 bdt/yr of forest residues would require one additional crew of two or three people, plus three to four additional trucks and drivers to support six to seven daily hauls.

[9] University of Idaho faculty. Personal communication.
[10] Hayes, Steve, Michael Niccolucci, and Todd Morgan. *Estimated Trucking Costs Idaho and Montana.* Bureau of Business and Economic Research, The University of Montana - Missoula, December 14, 2022.

SECTION C: INFRASTRUCTURE



Orofino Site – Former Lumber Mill

PROPERTY OVERVIEW

Address:	84 Grangemont Rd
City:	Orofino
State:	Idaho
County:	Clearwater
Acres:	+/- 42
Pricing Note:	Negotiable
Lease Available:	Negotiable
Topography:	Graded / level
Zoning:	Industrial, Commercial
Notes:	Owner can build to suit

SITE CONTACTS

Economic Development Contact
Susan Jacobson
Clearwater County Economic Development
217 1st Street, PO Box 1826
Orofino, ID 83544
208-476-8824
sjacobson@clearwatercounty.org

ADDITIONAL NON-RATED SITES

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

PROPERTY PROFILE

Located three miles east of Orofino, Idaho, this 42-acre property offers a viable opportunity for industrial development, particularly for forestry or wood-based enterprises. The site was previously used for lumber milling and retains infrastructure that can support a variety of industrial operations.

The property is fully zoned for industrial use and has access to essential utilities, including water, electricity, and telecommunications. Although natural gas is not currently available, the existing utility connections help to minimize the need for significant initial infrastructure investment.

Text
Text
Text
Text
Text
Text

Transportation

Nearest Highway: ID Hwy 12 (3 miles)
Nearest Interstate: I-90 (175 miles)
Nearest Airport: Orofino Municipal
Nearest Commercial Airport:
Lewiston, ID (44 miles)

Rail Served: Adjacent, but line not active
Rail Accessible: Yes, spur available
Air Infrastructure in Place: Yes
Nearest Water Port:
Lewiston, ID (44 miles)

Electric Service

Supplier: Clearwater Power Co
Ownership: Co-operative
Phone: 208-743-1501

Website: www.clearwaterpower.com
All Utilities Extend to Site: Yes
Nearest Substation: On site

Capability: Three-phase 12.5 kV service to the site. Existing service line.

No Natural Gas/Propane Only

Supplier: AmeriGas
Ownership: Investor Owned
Phone: 800-263-1442

Website: www.amerigas.com
Size of Main: N/A
Pressure: N/A

Water

Supplier: Riverside Water & Sewer
Ownership: Municipal
Phone: 208-476-3613

Website: www.riversidewatersewer.com
Size of Main: 6" (Std Industrial)
Peak Capacity: 43,000 gals/day

Wastewater

Supplier: Riverside Water & Sewer
Ownership: Municipal
Phone: 208-476-3613

Website: www.riversidewatersewer.com
Size of Main: N/A
Capability: 880,000 gals/day

Telecommunications

Supplier: AirBridge Broadband
Ownership: Private
Phone: 208-494-4343

Website: www.airbridgebroadband.com
Platforms: Satellite, wireless
Capability: Primary wireless available

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 forestry industry has a long-standing presence in the region spanning over 175 years. Between 2015 and 2017, the closure of two sawmills removed approximately 110 MMBF (15%) of lumber production capacity from the Supply Zone. Since 2017, the total lumber production capacity of the four remaining sawmills has stabilized at approximately 635 MMBF. There are four sawmills and one pulp and paper mill in the Supply Zone, all with operational histories exceeding a decade, indicating medium supplier stability despite some historical consolidation.

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**

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: Pulpwood availability significantly exceeds current demand in the Supply Zone. The majority of this material, which represents a by-product of sawtimber harvests, remains unutilized and is typically burned at log processing sites rather than transported for commercial use. Similarly, forest residues currently lack commercial utilization channels. This limited market competition results in low risk of suppliers preferring competing markets for these resources.

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: Land ownership within Idaho's forestlands exhibits significant fragmentation: 28% is privately owned, 4% is controlled by the US Bureau of Land Management, 6% by the state of Idaho, and 62% by the Forest Service.[11] Notably, approximately half of Forest Service land is designated as "roadless" and reserved for natural ecosystem preservation. The majority control of land by the government results in medium supply risk risk as access and harvesting policies may change based on government regulations.

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 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**

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 farmer and 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. For example, when harvesting agricultural residues such as corn

[11] Idaho Forest Products Commission. "Timberlands and Forest Lands." Accessed October 7, 2024. https://www.idahoforests.org/content-item/timberlands-and-forest-lands/.

stover, using a third-party company with standard equipment specializing in harvesting, collection, and transportation may decrease quality variations (e.g., ash content) of the final feedstock.
Risk Information: Equipment ownership patterns among logging operations in Idaho vary according to company size and operational requirements. Larger companies typically favor equipment ownership, while newer or smaller operations more commonly utilize leasing arrangements due to capital constraints for purchasing expensive machinery. The mixed ownership versus leasing scenario brings about medium supply risk, as equipment availability could potentially fluctuate during peak demand 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** *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**

1.3.3 Ownership of Transportation/Logistics

Rationale: In most cases, suppliers that own or lease transportation equipment necessary to transport biomass from forests or fields 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: The transportation infrastructure is moderately stable with 61% of log truck drivers owning their vehicles and 39% operating company-owned equipment.[12] Approximately half of the owner-operators possess multiple log trucks, providing some redundancy in transportation capacity. This ownership structure results in relatively low risk for transportation.
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.

[12] Cook, Philip S. *Survey of Idaho Log and Chip Truck Drivers 2019.* Issue Brief No. 22, September 2019. University of Idaho, Policy Analysis Group.

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**

1.3.4 Feedstock as a Secondary Transformation

Rationale: Secondary transformation is dependent upon the production of primary products. Forest residues, corn stover, 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.

In the case of agricultural feedstocks, such as corn stover, the feedstock is a by-product of a primary crop. Since the primary crop is significantly more lucrative than the residue, it will be a priority for the producer. If the production of the primary crop requires resources to be taken away from the production of the secondary crop (e.g., shorter harvesting windows due to weather), the secondary feedstock supply will suffer. In times of stretched resources, suppliers may also perceive the harvest and collection of the feedstock as a nuisance, potentially decreasing production levels.

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

Risk Information: Both pulpwood and forest residues are classified as secondary products, generated as by-products of commercial timber harvesting operations focused on sawtimber production. While limited quantities of pulpwood are utilized in pulp and paper manufacturing, the majority is either burned or abandoned at landing sites. Pulpwood production is directly contingent upon sawtimber harvest volumes driven by lumber manufacturing demand. This dependency on primary product markets leads to high supply risk, as any reduction in sawtimber demand would result in proportional declines in pulpwood and forest residue availability. Uncertainty around trade policy and high interest rates have created uncertainty in the lumber market but it is expected for timber prices to remain constant until the housing sector pick up.[13]

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)	

[13] AgWest Farm Credit. *Forest Product Updates*. Accessed March 31, 2025. https://agwestfc.com/.

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**

1.4 Risk Factor: Supplier Experience

1.4.1 Fundamental Feedstock Production Experience

Rationale: Risk is higher when suppliers have limited experience with planting, growing, harvesting, processing, and/or collecting biomass. Limited experience may be common for stover or forest residue supply chains where farmers or forestry producers may have no previous experience.

Risk Information: The sawmilling industry has operated continuously in the region for over 175 years. Management of small-diameter trees and forest residues has historically been integrated into standard timberland practices for both sawtimber production and wildfire fuel reduction. Consequently, the regional workforce possesses substantial experience in feedstock production, harvesting, and processing, representing low risk related to technical production capabilities.

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**

1.4.2 Production Scale Experience

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

Risk Information: Logging companies have conducted commercial timber harvesting operations throughout the Supply Zone for decades, consistently meeting end-user demand requirements. This established track record indicates low risk for pulpwood production at scale. Conversely, forest residues currently lack commercial harvesting operations, resulting in potential scale-up challenges that may be offset by transferable skills from related logging 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	**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: Suppliers demonstrate considerable expertise in harvesting, handling, and transportation of logs and sawmill residues. Operations typically include both log harvesting and fuel reduction practices involving in-woods chipping, reflecting the region's extensive experience in biomass management. This established operational expertise represents low risk for equipment efficiency concerns.

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**

1.6 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 corn stover (e.g., corn) or forest residues (e.g., pulpwood), supply may not be a top priority for a supplier.

Risk Information: Both pulpwood and forest residue harvesting occur as by-products of sawtimber harvesting operations. While limited quantities of pulpwood enter commercial channels, the majority of these resources are either abandoned in forests or burned on-site. Despite pulpwood abundance, its removal from forestlands remains controlled

by timber buyers. Projects requiring pulpwood access must establish arrangements with timber buyers. The ability to transport this feedstock will be contingent upon available logistics capacity. This secondary priority status results in medium risk for consistent supply availability.

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**

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: Within the 150-mile Competition Zone surrounding Orofino, ID, five competitors operate facilities utilizing woody biomass feedstock. These facilities consume approximately 1,033,000 bone dry tons (bdt) annually. Based on analysis of overlapping supply zones, only approximately 1% (8,000-15,000 bdt) of this total demand is sourced from suppliers within the Supply Zone, representing about 8% of the pulpwood demand. Forest residues currently lack commercial markets, with all material remaining unutilized in forests. The limited competitive pressure represents very low risk for new market entrants.

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.	**NN**

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

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 Supply 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: The processing capacity for pulpwood has increased approximately 8% over the past decade, with the Lewiston mill expanding from 888,000 bdt/yr to 961,000 bdt/yr. This facility represents the largest and only significant consumer of pulpwood in the Supply Zone. Notably, the mill's operational design primarily utilizes sawmill residues, with pulpwood comprising only 10-20% of its feedstock requirements. Forest residues currently lack commercial markets. This limited competitive pressure causes low risk for feedstock 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

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 Supply 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 pulpwood market exhibits minimal demand with negligible competitive pressure on pricing. The single pulp mill in the Competition Zone sources 80-90% of its feedstock requirements from sawmill residues, primarily chips and sawdust, through long-term contracts with Supply Zone sawmills. Local experts confirm limited demand for pulpwood.[14,15] Independent pulpwood sales,[16] when occurring separately from sawlog harvests, typically involve small volumes with stumpage prices ranging from $20 to $40/bdt.[17] Determining the price for forest residues is difficult, as they lack established markets. Estimated material costs for piled residues range from $5 to $10. This limited price competition represents very low risk for new market entrants.

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**

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

Rationale: Feedstock utilization in a Supply 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: No announcements regarding capacity expansions or new facilities have been identified within the Competition Zone. The absence of planned competitive capacity growth represents very low risk for future feedstock availability or price escalation.

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**

[14] Consulting Forester. Personal communication.
[15] Idaho Department of Lands. Personal communication.
[16] These sales are carried out by the Idaho Department of Lands with the timber specifically designated as "pulpwood".
[17] Ibid.

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

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 pulpwood market demonstrates minimal demand as these resources face limited commercial utilization. Pulpwood demand is typically satisfied through the processing of non-sawlog material during sawlog harvests. Remaining non-saw logs and forest residues are commonly burned at logging decks. These resources are also occasionally thinned as part of fuel reduction practices to mitigate wildfire intensity, with resulting material typically burned or occasionally chipped and distributed across the site. This limited commercial utilization leads to medium risk related to establishing new supply chains and procurement relationships.

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

2.1.6 Temporary Market-Driven Markets

Rationale: Alternative, non-traditional, market-driven competitors for feedstock can drive feedstock demand in unusual circumstances. A BDO Zone Rating Issuer based on corn stover as a feedstock, for example, would not typically compete with higher-end animal feed markets due to quality issues. However, in times of significant hay shortage (e.g., during

drought), farmers use corn stover in place of hay, driving the price of feedstock and decreasing availability for bio-projects.[18]

Risk Information: No significant non-traditional or market-driven consumers for wood biomass exist that would threaten long-term availability. In limited instances, loggers make firewood available to the public by stacking non-saw grade material at landing sites or roadsides, but these volumes are not commercially significant. The absence of substantial alternative markets represents very low risk for supply disruptions.

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**

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: Existing biomass consumers maintain inventory storage capacity sufficient for approximately two months of operational requirements. These facilities generally operate at full storage capacity. However, given that the majority of pulpwood remains unutilized in forestlands, high levels of on-site inventory at competing facilities represent very low risk regarding feedstock availability for new market entrants.

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.	**NN**

[18] Bergtold, 2018.

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 4 out of 100. **4**

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: Feedstock delivery logistics at the primary competitor facility demonstrate reasonable efficiency with unloading times under 30 minutes. These standard operating procedures result in medium risk for new market entrants, who would need to establish comparable or superior receiving capabilities to compete effectively for available supply.
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**

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: Competition for pulpwood is low and there is minimal demand for forest residues. This situation presents low risk for new entrants.
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**

2.2.4 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 Supply Zone.
Risk Information: The Pacific Northwest softwood pulp production industry, primarily serving packaging and tissue sectors, faces significant challenges from global market conditions. High interest rates, labor shortages, and supply chain disruptions are expected to impact regional pulp mills, consistent with North American industry trends. Capacity reductions have already occurred in the Pacific Northwest and may continue if economic conditions fail to improve.[19] The pellet industry utilizes limited pulpwood volumes and exhibits relative market stability. This risk is assessed as low due to available displaced pulp and paper feedstock and absence of demand for forest residues.
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**

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: Pulpwood was assigned a BAM score of 1.5, indicating low competition for this feedstock. In contrast, forest residues received a higher BAM score of 4.0. This more conservative assessment reflects the elevated risk

[19] "What's in Store for Global Pulp Markets? | 2024 Preview." *Fastmarkets.* Accessed September 19, 2024. https://www.fastmarkets.com/insights/whats-in-store-for-global-pulp-markets-in-2024/.

associated with these materials, primarily due to the lack of existing infrastructure for processing and transportation. As it is likely that new projects will primarily source pulpwood a low risk was assessed to this risk indicator.

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: Figure E-1 indicates that approximately 50% of the pulpwood and forest residue supply is accessible within 55 to 60 miles from the BDO Zone center point. Transportation costs account for approximately half of the delivered feedstock cost, with increased hauling distances significantly impacting economic viability. The geographic distribution of resources and transportation cost sensitivity bring about low-medium risk for supply chain economics.

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**

3.1.3 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,[20] which can manifest in shortages and higher costs for Issuers.
Risk Information: Seasonal factors lead to minimal limitations on feedstock harvesting operations. While snow accumulation may restrict access to higher elevation areas, and wet conditions may impede operations in poorly drained sites, these constraints are effectively managed by focusing on accessible harvest locations. The ability to shift operations to different sites based on seasonal conditions represents low risk for consistent supply 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) — **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**

3.1.4 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 demonstrates consistent year-to-year feedstock growth patterns and accessibility. The predictable forest productivity results in very low risk related to annual supply fluctuations.
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) — **NN**

[20] Golecha & Gan, 2016.

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 4 out of 100.	**4**

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: The average delivered price of pulpwood has exhibited a consistent downward trend, declining from approximately $76/bdt in 2020 to approximately $55/bdt in the third quarter of 2024 (Figure E-2).[21] Stumpage prices for pulpwood on Idaho Endowed Land have remained stable at approximately $20/bdt since 2018.[22] Given the limited market demand for pulpwood logs, current low prices are expected to persist until demand increases significantly. No pricing data exists for forest residues due to lack of current markets. This price stability represents low risk for cost fluctuations.

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**

3.2.2 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.

[21] Northwest Management Inc. *Quarterly Log Market Report.* Moscow, ID. https://northwestmanagement.com/timber-market/.
[22] Idaho Department of Lands. "Endowed Timber Sales." Accessed October 21, 2024. https://www.idl.idaho.gov/about-forestry/endowment-forestry/.

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: The lumber industry in the BDO Zone has established and maintained sophisticated supply chains for timber and timber by-products over an extended period. Harvest and processing experience for the rated feedstock is well-established in the region, thus low risk related to operational expertise for resource utilization.

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**

3.2.3 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.

For new crop types, inexperience in planting, harvest, collection, and yield data may pose higher levels of risk.

If the feedstock is a secondary transformation (i.e., wheat straw, corn stover, or forest residue), then production can be subject to variables beyond suppliers' control (e.g., changing demand for sawtimber or primary crop prices).

Risk Information: The forest products industry has maintained active operations in the Supply Zone since the early 20th century. Suppliers demonstrate significant experience in harvesting, processing, and transporting pulpwood. The expertise and equipment necessary for chipping forest residues exist and have been implemented at small scales previously. However, current markets for chipped forest residues are absent. The combination of established expertise and undeveloped markets brings about medium risk for supply chain development.

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 The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	**Score** **36**

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: Economic indicators play significant roles in influencing delivered feedstock prices, with the Producer Price Index (PPI) and Consumer Price Index (CPI) serving as critical metrics for monitoring biomass logistics operation costs, including fuel, labor, equipment parts, and administrative expenses.

Figure E-5 illustrates the movement of the CPI over the past four years for the US West Region compared to the US National average. The CPI for the US West Region tracks closely with the national average, albeit at slightly higher values. The relative stability of these indices presents low risk for cost escalation.

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**

3.3.2 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 analysis.

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)	Score
The Gross Risk Indicator (RRL X RRI) is not rated (NR).	NR
Mitigation/Notching	**Notch**
The Total Notch (RRL Notch) X (RRI Notch) is not rated (NR).	NR
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is not rated (NR).	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 analysis.

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).	NR
Mitigation/Notching	**Notch**
The Total Notch (RRL Notch) X (RRI Notch) is not rated (NR).	NR
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is not rated (NR).	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. For example, an Issuer using corn stover as a feedstock would not typically compete with the higher-end animal feed market. However, in times of significant hay shortage (e.g., during drought), farmers may use corn stover as hay replacement, driving the price of stover feedstock and decreasing its availability for bio-projects.[23]

Risk Information: Not relevant to this analysis.

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).	NR
Mitigation/Notching	**Notch**
The Total Notch (RRL Notch) X (RRI Notch) is not rated (NR).	NR
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is not rated (NR).	NR

[23] Bergtold, 2018.

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.

For example, agricultural feedstocks and energy crops have optimal harvesting windows to ensure minimal moisture content. In certain Supply Zones, these harvesting windows may coincide with heightened weather risks, such as frost or rain.

For forestry biomass, unsightly clear-cuts and slash piles (even on plantation forests and especially when located near communities) can provoke unwanted public backlash even when suitable and sustainable replanting regimes are followed.

Risk Information: Pulpwood is generated as a by-product of sawtimber harvest operations. Logs failing to meet sawtimber quality standards are either abandoned in forests, burned, or delivered to buyers such as pulp and paper mills. Standardized harvest practices result in low risk for quality or quantity variations.

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**

3.4.2 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 cultivation, harvesting, and collection can increase feedstock quality risks.

Relevant equipment should be specified for the sake of product consistency and risk reduction.

Risk Information: Harvesting and collection equipment utilized in the Supply Zone conforms to regional standards. Depending on terrain characteristics, operations employ either cable-logging/winch-assisted logging or ground-based methods.[24] Ground-based logging on gentle slopes typically utilizes feller-bunchers and skidders to transport logs to

[24] University of Idaho faculty. Personal communication.

landing sites. Steeper terrain operations employ cable logging with yarders replacing skidders. This standardized equipment utilization causes low risk for operational compatibility.

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 round or square bales, pellets, cubes, chips, or grindings. The size of wood fiber processed in a grinder is less homogenous than if a chipper is used.

Bales of different densities can absorb moisture at different rates. In certain cases, round bales have been viewed as problematic due to their uneven moisture content distribution.[25]

Risk Information: The Supply Zone applies standardized methods for feedstock densification, including pellet production, as well as for the processing of chips, mulch, and roundwood. These operations use equipment that reflects widely accepted practices across North America, which helps to ensure operational compatibility and process efficiency. This uniformity in processing significantly reduces the risk associated with variations in feedstock format. Furthermore, the use of consistent densification methods supports streamlined handling and transportation throughout the supply chain, thereby minimizing the likelihood of compatibility issues between suppliers and end users.

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.	**NN**

[25] Huhnke, 2018.

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 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: A new biomass facility sourcing pulpwood in the Supply Zone at an annual volume of 92,000 bdt would require significant additional resources, including approximately 20 additional logging crew personnel and 13 additional truck drivers. Forest residue operations (22,000 bdt/yr) would require two to three personnel for chipping and three to four truck drivers.

The labor market for logging crews is severely constrained, with the median age of Idaho loggers at approximately 55 years. This aging workforce, combined with technological advancement requirements, produces a critical demand for younger, skilled workers.[26] The University of Idaho has implemented a two-year forest operations degree program and established partnerships with high schools to develop forestry career pathways.[27]

Idaho faces a significant log truck driver shortage, part of a statewide issue driven by an aging workforce and limited recruitment of younger drivers, particularly for specialized positions. Many drivers exceed 50 years of age, with a substantial percentage over 60, raising succession concerns. Recruitment initiatives including training programs and incentives have been implemented but face challenges due to physical demands and regulatory requirements.[28] These workforce limitations represent very high risk for operational scale-up.

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) No adjustment. *RRI Mitigation (Notch)* New project proponents should consider implementing a training program for new log truck drivers. A program started by Idaho Forest Group in which experienced drivers are compensated to train new employees could serve as a model.[29] Notch at 25%. The Total Notch (RRL Notch) X (RRI Notch) is 25%.	**25%**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 75 out of 100.	**75**

[26] Bartholdt, Ralph. "Trees to Framing Timbers." *University of Idaho News*, April 2024. https://www.uidaho.edu/news/feature-stories/ryer-becker.
[27] University of Idaho faculty. Personal communication.
[28] Cook, *Survey of Idaho Log and Chip Truck Drivers 2019*.
[29] Idaho Forest Group. "Log Truck Drivers Needed." Accessed November 2, 2024. https://ifg.com/log-truck-drivers-needed/

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: Hauling costs have experienced significant volatility in recent periods. Table E-2 shows the variables that contribute to the total delivered cost of feedstock.

From 2020 to 2022, the per-load cost for a 70-mile haul increased by 35%. Between 2012 and 2022, regional hauling cost trends closely correlated with the trucking industry's Producer Price Index (PPI). During this period, the Consumer Price Index (CPI) increased by 27%, while both the trucking PPI and estimates from the University of Montana's Forest Industry Research Program indicate hauling costs increased by 51%.[30] The current average feedstock transportation cost is $0.548/bdt-mile.

Diesel prices significantly impact feedstock hauling costs. At an average diesel price of $5.00 per gallon with a 75-mile haul distance, fuel represents 24% of the total hauling cost. If diesel prices increase to $6.00 per gallon, fuel costs rise to 29% of the total. If prices decrease to $4.00 per gallon, the fuel cost component falls to 19%.[31] This cost sensitivity results in high risk for transportation economics.

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**

[30] "S.v. Not Out of the Woods: Log Hauling Costs Have Spiked in Montana and North Idaho." *The Free Library.* Accessed October 21, 2024. https://www.thefreelibrary.com/Not+Out+of+the+Woods%3a+Log+Hauling+Costs+Have+Spiked+in+Montana+and...-a0775446655.
[31] Ibid.

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: Figure E-4 demonstrates that diesel prices have fluctuated significantly over the past decade, ranging from a low of $1.90 in January 2016 to a high of $5.71 in July 2022. Since the initial COVID-19 pandemic period, prices have shown some stabilization. However, ongoing pandemic effects and potential global carbon taxation make future diesel price projections uncertain. This volatility leads to medium risk for transportation 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) 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**

3.5.3 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: Transportation methods for logs are well-established throughout the Supply Zone, utilizing standard equipment without specialized requirements. This standardization brings about low risk for equipment availability or compatibility.

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**

3.5.4 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: Forestry and biomass operations constitute integral components of the local economy, making significant opposition to these activities unlikely. Trucking professionals in the region have received specialized training in identifying and avoiding potential nuisance zones, helping ensure efficient biomass transportation. This community integration results in low risk for transportation restrictions.

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**

3.5.5 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: Idaho permits a gross vehicle weight limit of 80,000 pounds under standard conditions, with permits available for increased weight limits up to 129,000 pounds gross weight.[32] These regulations lead to very low risk for transportation efficiency.

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)*	**NN**

[32] "Size/Weight Limits - Idaho." *J.J. Keller Compliance Network.* Accessed October 16, 2024. https://jjkellercompliancenetwork.com/regsense/sizeweight-limits-idaho.

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 4 out of 100. **4**

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: State and federal highway access is sufficient for biomass transportation. Forestland access roads are designed to accommodate standard log trucks. This infrastructure adequacy results in low risk for transportation logistics.
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**

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: Log truck availability presents low risk in the Supply Zone.[33] Reduced timber demand combined with driver shortages has resulted in significant idle capacity in the log truck fleet. This equipment availability produces low risk for transportation 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 **Notch** *RRL Mitigation (Notch)* **NN** No adjustment.

[33] University of Idaho faculty. Personal communication.

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**

3.6 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 a 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: This risk is assessed as high due to multiple factors. Pulpwood sales occur at small scales, and forest residues currently lack processing and transportation channels. Pulpwood harvest depends on contracts with timber buyers, primarily two sawmills in the Supply Zone. This limited supplier base and market concentration generate high risk for supply chain development.

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)* Project proponents can mitigate the risk of accessing pulpwood by establishing business relationships with the major sawtimber buyers in the Supply Zone. As pulpwood availability is dependent on sawtimber harvest, the buyers of sawtimber have control of how the pulpwood is handled. Arrangements to direct pulpwood to a new facility rather than being burned would increase the security of feedstock supply. Notch at 25%. The Total Notch (RRL Notch) X (RRI Notch) is 25%.	**Notch** **25%**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 48 out of 100.	**Score** **48**

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 has varying impacts on suppliers.

Risk Information: The Supply Zone sawmills, while potential suppliers of feedstock (chips, sawdust, shavings, and bark), are unlikely to provide material due to existing long-term contracts with the Lewiston pulp and paper mill. Pulpwood availability primarily depends on separation during sawtimber harvest operations. Supply Zone sawmill capacity (Figure B-2) does not appear closely correlated with housing starts (Figure E-6), unlike many regions. While this reduces risk levels, sawmills typically face similar external risk factors as they serve comparable markets and source feedstock from the same resource base. This risk concentration yields medium supply vulnerability.

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**

3.6.3 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: Approximately 62% of Supply Zone timberlands are publicly owned, and primarily managed by the U.S. Forest Service (USFS). Private ownership accounts for approximately 28%, with the remaining lands managed by state, tribal, or other federal agencies such as the Bureau of Land Management (BLM).[34] High government ownership levels may lead to project risk through potential harvesting restrictions. However, private landowners provide approximately 60-65% of timber harvest,[35] partially mitigating this risk. The mixed ownership structure results in medium supply risk.

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**

[34] "Idaho Hunt Planner." Idaho Official Government Website. Accessed September 18, 2014. https://idfg.idaho.gov/ifwis/huntplanner/hunt/19726.
[35] Simmons, Eric A., Samuel G. Scott, Todd A. Morgan, Lucas P. Townsend, and John D. Shaw. "Timber basket of the Interior West: Idaho's forest products industry and timber harvest, 2019, with trends through 2021." *Resour. Bull. RMRS-RB-38. Fort Collins, CO: US Department of Agriculture, Forest Service, Rocky Mountain Research Station. 51 p. https://doi. rog/10.2737/RMRS-RB-38.* 38 (2024).

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**

3.7 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: Seasonal variations result in minimal impact on feedstock harvesting operations. While snow accumulation may restrict access to higher elevation areas, and wet conditions may impede operations in poorly drained sites, these constraints are effectively managed by shifting operations to accessible locations. This operational flexibility brings about low risk for seasonal supply disruptions.

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**

3.7.2 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 2024 University of Idaho Climate-Economy Impacts Assessment[36] projects that the state will experience increasing temperatures, precipitation pattern changes, and decreasing snowpack. Spring rainfall is expected to increase while summer precipitation is likely to decrease. Rain falling on snowpack increases flood events and landslide risks. Idaho also faces increased drought and wildfire likelihood. Effects on forests will vary by tree species and location. While some forests may benefit from extended growing seasons, insect outbreak risks will likely increase.[37] These climate trends cause high risk for the likelihood and medium risk for the impact on long-term resource stability.

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) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Dfc4ewasaLoaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 48 out of 100.	**48**

3.7.3 Forest/Crop Fire

Rationale: Forest/crop 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. However, analyses of fire history suggest that the effect of climate variability on precipitation regimes is the primary reason for the decreasing fire activity.

Risk Information: Wildfire risk has increased significantly in recent years due to climate change effects, resulting in extended fire seasons and more intense burns.[38] Drier summers and increased temperatures demonstrate clear correlation with peak wildfire occurrences, particularly evident during severe fire years in 2015 and 2021.[39] This escalating risk give rise to high vulnerability for forest resources.

[36] University of Idaho. *Idaho Climate-Economy Impacts Assessment.* Accessed September 17, 2024. https://www.uidaho.edu/president/direct-reports/mcclure-center/iceia.
[37] Ibid and outreach to local experts.
[38] Ibid.
[39] NASA Earth Sciences Applied Sciences. "Assessing Drought and Fire Conditions, Trends, and Susceptibility to Inform State Mitigation Efforts and Bolster Monitoring Protocol in North Central Idaho." Accessed December 11, 2024. https://appliedsciences.nasa.gov/.

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**

3.7.4 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.

Risk Information: Insect infestations represent significant threats to Supply Zone forests, with climate changes exacerbating these challenges. The most destructive forest pests in the region include bark beetles, spruce budworms, and other species that thrive in warm, dry conditions. These biological threats are a high risk for forest health and productivity.

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**

3.7.5 Risk of Hail

Rationale: Hail has negligible impact on forestry biomass but is one of the principal destroyers of agricultural crops in North America.

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: Hail damage in Idaho is minimal compared to impacts in central United States regions. Effects on forestry operations are negligible,[40] creating very low risk for resource damage.

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**

3.7.6 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: The BDO Zone center point is not located within a US Federal Emergency Management Agency (FEMA) designated flood zone.[41,42] This geographic positioning leads to low risk for flood-related disruptions.

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**

[40] Western Regional Climate Center. "Climate of Idaho." Accessed September 17, 2024. https://wrcc.dri.edu/Climate/narrative_id.php#:~:text=Storms%20of%20this%20type%20may,part%20of%20the%20United%20States.
[41] U.S. Federal Emergency Management Agency. Accessed October 16, 2024. https://www.fema.gov/.
[42] Outreach to local expert regarding the risk to the Center Point.

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**

3.7.7 Risk of Drought

Rationale: Droughts can cause significant disruptions to feedstock supplies across entire BDO Zones for extended periods of time, especially in the case of agricultural residues and energy crops.

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: The Supply Zone has experienced recurring drought conditions over the past two decades, with severity typically fluctuating between moderate and severe levels.[43] These drought periods frequently coincide with below-average precipitation years. While drought intensity varies, extended severe drought episodes represent a recurring challenge in the region, creating high risk for forest productivity and fire vulnerability.

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**

3.7.8 Risk of Hurricanes, Tornadoes, and Strong Winds

Rationale: Hurricanes, tornadoes, and strong winds can destroy timber stands, crops, and feedstock piles. They can also delay forestry and agricultural 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.

[43] "Drought Conditions for Clearwater County." National Integrated Drought Information System. https://www.drought.gov/states/idaho/county/Clearwater.

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: The region is not susceptible to tornadoes or hurricanes. This limited severe weather exposure brings about low risk for catastrophic wind damage.

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**

3.7.9 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: Freezing conditions are common during winter months; however, seasonal operational adjustments effectively accommodate winter weather patterns. These standard and common adaptations result in low risk for cold-related disruptions.

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**

3.8 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: No government subsidies for biomass production or utilization within the Supply Zone were identified. The absence of subsidy-dependent economics gives rise to very low risk for policy-driven market disruptions.

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**

3.8.2 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 or corn stover, allowable cut limits, air emission, storage permits, rights-of-way, overweight permits for trucks, cross-border permitting for shipment of 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: About half of the harvested feedstock comes from private lands. While no permits are required for harvest on private land, timber harvesting is subject to regulations[44] to ensure sustainable forest management and environmental protection. regulatory barriers are much lower than on public land.

Commercial logging operations on state and federal lands require specific permits. Each relevant agency (US Forest Service, US Bureau of Land Management, and Idaho Department of Lands) maintains distinct procedures and guidelines. Permits are often denied if an application fails to meet environmental or legal criteria, such as potential harm to endangered species or sensitive ecosystems. They may also be refused if a project risks harming cultural or historical

[44] Idaho Forest Practices Act.

sites or conflicts with established land management plans. This regulatory complexity leads to medium risk for permitting and compliance.

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 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**

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: No evidence of opposition to biomass utilization was identified during research. This community acceptance results in very low risk for social license challenges.

Raw Risk Likelihood (RRL) The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**Score** **2**
Raw Risk Impact (RRI) The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**Score** **2**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**Score** **4**
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 4 out of 100.	**Score** **4**

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: The Nez Perce Reservation is included within the Supply Zone. The Nez Perce tribe maintains federal recognition status as a Native American tribe. The tribe operates its own economic development entity for reservation-based projects. Local economic development organizations collaborate with the tribe when activities outside tribal authority are considered to avoid potential impacts on tribal lands. This established relationship framework brings about low risk for interruptions to the supply chain.

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**

3.8.5 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 analysis.

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 (NR).	**Score** **NR**
Mitigation/Notching The Total Notch (RRL Notch) X (RRI Notch) is not rated (NR).	**Notch** **NR**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is not rated (NR).	**Score** **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 Idaho Forest Practices Act (IFPA) mandates rule establishment for forest management on federal, state, and private lands to protect, maintain, and enhance Idaho's natural resources.[45] Forest practices must meet or exceed standards in the Idaho Administrative Code (IDAPA 20.02.01), known as IFPA Rules. Compliance inspections in 2019 found 99% conformance with IFPA Rules.[46]

Additionally, BDO Zone forests frequently align with certification standards such as those from the American Tree Farm System (ATFS),[47,48] which certifies family-owned forests meeting rigorous sustainability criteria. Local organizations and consulting firms work with landowners on sustainable forest management, often involving certification programs like ATFS and Forest Stewardship Council (FSC).[49] This regulatory and certification framework results in very low risk for sustainability concerns.

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**

3.9.2 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.

[45] Barkley, Yvonne, Randall Brooks, Robert Keefe, Mark Kimsey, Ashley McFarland, and Chris Schnepf. *Idaho Forestry Best Management Practices Field Guide: Using BMPs to Protect Water Quality.* University of Idaho Extension, 2015. http://www.idahoforestrybmps.org/.

[46] Idaho Department of Lands. *2029 Idaho Forest Practices Year-End Report.* Accessed September 18, 2024. https://idahoforests.wpenginepowered.com/wp-content/uploads/2019-Forest-Practices-Year-End-Report.pdf.

[47] Idaho Forest Products Commission. "Certification Recognizes Landowner's Conservation Ethics." Accessed September 18, 2024. https://www.idahoforests.org/content-item/forest-certification/.

[48] "American Tree Farm System." Accessed September 17, 2024. https://www.treefarmsystem.org/.

[49] "Forest Stewardship Council." Accessed September 17, 2024. https://fsc.org/en/.

Risk Information: Forest practices are carried out according to IFPA rule and compliance inspections show very little risk to soil quality.[50]	
Raw Risk Likelihood (RRL) The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**Score** **2**
Raw Risk Impact (RRI) The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**Score** **2**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**Score** **4**
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 4 out of 100.	**Score** **4**

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: A high level of compliance to IFPA forest practices indicate very little risk to water quality.[51].	
Raw Risk Likelihood (RRL) The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**Score** **2**
Raw Risk Impact (RRI) The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**Score** **2**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**Score** **4**
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 4 out of 100.	**Score** **4**

[50] Idaho Department of Lands. *2029 Idaho Forest Practices Year-End Report.* Accessed September 18, 2024. https://idahoforests.wpenginepowered.com/wp-content/uploads/2019-Forest-Practices-Year-End-Report.pdf.
[51] Ibid.

3.9.4 Water Use

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: The tree species types being grown and harvest in the Supply Zone present a very low risk to water use.

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**
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**

3.9.5 Pesticide Risk to Human and Ecosystem Health

Rationale: Application of pesticides (i.e., herbicides, fungicides, and insecticides) on agricultural and 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 analysis.

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).	**NR**
Mitigation/Notching	**Notch**
The Total Notch (RRL Notch) X (RRI Notch) is not rated (NR).	**NR**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is not rated (NR).	**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: Wildlife and landscape are subject to very low risk as forest practices are carried out according to IFPA rules.[52]

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**

[52] Ibid.

The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**4**
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 4 out of 100.	**Score** **4**

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 analysis.

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 (NR).	**Score** **NR**
Mitigation/Notching The Total Notch (RRL Notch) X (RRI Notch) is not rated (NR).	**Notch** **NR**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is not rated (NR).	**Score** **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: The Supply Zone has established efficient systems for producing, harvesting, transporting, and processing pulpwood. These materials generally meet quality requirements for most biobased applications. These biomass resources have demonstrated reliable utilization by biomass power facilities and the pulp and paper industry within the Competition Zone for extended periods, confirming their supply consistency and viability. While forest residues lack large-scale processing history, their quality requirements are generally less demanding. This established quality performance results in low risk for feedstock specifications.

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	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**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: Labor constraints significantly limit scale-up potential, particularly regarding the availability of loggers and especially log truck drivers. These workforce shortages result in very high risk for operational capacity expansion.

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 *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* Active promotion, support and participation in training programs for loggers and log truck drivers will help to reduce the shortage of labor impact on this risk indicator. Notch at 25%. The Total Notch (RRL Notch) X (RRI Notch) is 25%.	**Notch** **25%**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 75 out of 100.	75

CATEGORY 5.0: INFRASTRUCTURE RISKS

5.1 Risk Factor: Physical Infrastructure

5.1.1 Land Parcel/Industrial District

Risk Information: The 42-acre industrial site is a former lumber mill situated approximately three miles east of Orofino, Idaho. It is zoned for industrial use and contains existing infrastructure. There are currently no identified building restrictions or environmental issues associated with the site. For further information, including maps and detailed site characteristics, refer to Section E.

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**

5.1.2 Ownership of Land

Risk Information: The parcel is under private ownership, and the owner has expressed openness to various transaction structures, including sale, lease, or build-to-suit agreements for all or part of the 42-acre site. This centralized ownership presents notable advantages compared to publicly owned land. These benefits include increased flexibility, more efficient decision-making processes, and reduced administrative complexity.

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: In Clearwater County, ID, permitting processes typically require 30-60 days for non-hazardous site, air, water, and environmental permits. This approval timeline could potentially be expedited by renewing previous permits associated with the former lumber mill. No permitting issues were identified regarding this site. The established permitting framework results in low risk for 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) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **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**

5.1.4 Environmental Issues

Risk Information: The southern portion of the site has recently undergone remediation, addressing its previous location below the floodplain. Following this work, the area now complies with all applicable standards for new construction, including requirements related to elevation and drainage. Additionally, the entire parcel is located within an EPA-designated attainment area, signifying that air quality in the region meets federal standards and does not present significant concerns.

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**

5.2 Risk Factor: Utilities

5.2.1 Natural Gas Availability

Risk Information: Natural gas service is not available at the Orofino industrial site. However, propane is readily accessible through multiple suppliers operating in the surrounding area.

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**

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**

5.2.2 Electric Availability

Risk Information: The Orofino industrial site receives electric service from Clearwater Power Company, a regional electric cooperative that provides both distribution and transmission-level support. The site benefits from multiple voltage options and infrastructure with available excess capacity, making it suitable for a wide range of industrial applications.

The average industrial electricity rate in Clearwater County is approximately 11.16 cents per kilowatt-hour,[53] which is about 32 percent lower than the national average of 16.35 cents. Nearly all of the county's electricity supply is generated from hydroelectric sources, ensuring a reliable and renewable energy supply for the region.

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**

5.2.3 Water Availability

Risk Information: Potable water service in Orofino, Idaho, is reliable and capable of supporting residential, commercial, and light industrial demands. The system is operated by Riverside Water & Sewer, which manages a modern treatment facility located north of the city along the Clearwater River. This facility sources water from the river and utilizes a gravity-fed, membrane filtration plant that was constructed in 2014.[54] It is one of only three such facilities in Idaho.

The plant holds water rights for up to 2.3 million gallons per day and is currently operating well below that capacity. This surplus provides significant potential to accommodate future industrial expansion. The 42-acre industrial site is served by a 6-inch primary water feeder line. Additionally, the city maintains five water storage reservoirs with a combined capacity of 2.3 million gallons, ensuring consistent supply and adequate pressure for users.

[53] Find Energy. "Clearwater County, ID: Electricity Rates, Providers & More." Last modified September 18, 2024. https://findenergy.com/id/clearwater-county-electricity/
[54] City of Orofino. "Water Treatment Plant." Last modified August 2023. https://cityoforofino.org/departments/water-treatmentplant/.

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**

5.2.4 Waste Disposal

Risk Information: Clearwater County, Idaho, manages a decentralized solid waste system consisting of multiple transfer stations. All collected waste is transported to regional landfills located outside the county. The nearest facility, the Orofino transfer station, is situated approximately four miles west of the industrial site. It accepts all waste types except hazardous materials and operates seven days a week. While the system is adequate for residential and light commercial use, it may present logistical and cost challenges for industrial operations that generate large volumes of waste.

Wastewater is managed through a single-cell aerated lagoon system, which features seasonal discharge and routine maintenance, including lift station monitoring and sewer main flushing. The industrial site is already connected to discharge piping and sewer infrastructure. The existing system has adequate capacity to accommodate additional industrial users, suggesting a low level of infrastructure risk with respect to wastewater treatment.

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: AirBridge Broadband is a regional internet service provider serving the Orofino, Idaho area. It offers fixed wireless broadband services with a range of speed tiers designed to meet the needs of residential, commercial, and light industrial users. Fixed wireless technology enables rapid deployment and is particularly effective in locations where traditional wired infrastructure is limited. This connectivity option presents a low risk for new industrial developments in the area, ensuring reliable internet access without significant infrastructure constraints.

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**

5.3 Risk Factor: Transportation/Logistics

5.3.1 Road/Highway Access

Risk Information: The primary access route to the industrial site is Michigan Avenue, which connects directly to State Route 12 in Orofino. The nearest interstate, I-90, is located approximately 125 miles to the northwest and is reached by traveling west through Lewiston and then north to Coeur d'Alene. I-90 serves as a major east-west freight corridor, facilitating long-distance commercial transport across the northern United States.

Local roads within Orofino are well-maintained and kept in good condition throughout the year. Winter maintenance is actively conducted to ensure reliable, snow-free access. Given the connectivity and infrastructure quality, the existing transportation routes serving the industrial site are assessed as presenting a low level of risk.

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)*	**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 16 out of 100. — **16**

5.3.2 Rail Access

Risk Information: The industrial site in Orofino currently lacks active rail service. While there are existing rail lines and a spur that connect to the site, they have not been in use since the Bountiful Grain and Craig Mountain Railroad (BG&CM) ceased operations in 2004. The rail infrastructure is now in a state of disrepair and would require significant rehabilitation to be restored to operational status. At present, there are no formal plans for reactivation. This condition presents a medium level of risk for industries that depend heavily on rail freight for logistics or supply chain operations.

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**
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**

5.3.3 Airport Access

Risk Information: Orofino Municipal Airport is located approximately four miles west of the industrial site and primarily serves general aviation users. It features a 2,500-foot lighted asphalt runway and offers basic services, including Avgas and tie-down storage.

For commercial passenger and air freight requirements, the nearest facility is Lewiston–Nez Perce County Airport, situated 44 miles west of Orofino, or roughly a one-hour drive. This airport provides direct service to major U.S. hubs, with daily non-stop flights to Denver, Salt Lake City, and Seattle operated by Delta and United Airlines.

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.	**NN**

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**

5.3.4 Water Freight Access

Risk Information: The Port of Lewiston, located approximately 44 miles west of the industrial site, serves as Idaho's only seaport and is recognized as the most inland port on the West Coast. It lies 465 miles from the Pacific Ocean and is accessible via the Snake and Columbia Rivers through a system of four locks. The port is equipped with full cargo handling and loading capabilities and can accommodate large ships and barges.

This inland waterway access offers strategic value for industries that require bulk transport or international shipping options, providing an alternative to overland freight routes and enhancing logistical flexibility.

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**

5.4 Risk Factor: Social Infrastructure

5.4.1 Healthcare (Local)

Risk Information: Orofino, Idaho, is served by Clearwater Valley Hospital & Clinics (CVHC), a 23-bed critical access facility that offers general medical and surgical care for inpatient, outpatient, and emergency room patients. The hospital maintains a fully operational emergency department and ambulance service available at all times. Outpatient services, including laboratory and radiology, are provided during weekdays. While the facility is equipped to handle a range of medical needs, patients with life-threatening conditions can be transported by air to major regional hospitals.

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**

5.4.2 Education (Schools)

Risk Information: Orofino, Idaho, is served by the Orofino Joint School District #171, which includes eight schools and provides education for approximately 1,098 students from pre-kindergarten through 12th grade. The district operates a school bus system within the town, with 25 buses transporting an average of 399 students daily.

For post-secondary education, residents have access to several regional institutions. Lewis-Clark State College in Lewiston, located about 44 miles west of Orofino, offers more than 130 degree and certificate programs, including vocational and technical training. North Idaho College, approximately 86 miles to the north in Coeur d'Alene, provides a variety of associate degrees and technical programs. Additionally, the University of Idaho Extension office in Orofino supports the community with educational resources and outreach programs.

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: Local transportation options in the Orofino area are limited. The town does not offer municipal bus service, and ride-sharing platforms such as Uber or Lyft are not currently active in the region. Regional transit is available through the Appaloosa Express, a fixed-route service operated by the Nez Perce Tribe. This service connects Orofino with nearby communities, including Lapwai, Culdesac, Lenore, and Lewiston. It operates Monday through Friday from 5:30 AM to 7:00 PM, with fares ranging from $1 to $2.

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 medium, therefore the RRI is 6 out of 10.	**Score** **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

5.4.4 Public Safety (Local)

Risk Information: Orofino, Idaho, maintains a moderate public safety profile, with an overall crime rate of approximately 8 incidents per 1,000 residents.[55] This figure aligns closely with the national average for communities of comparable size. The Orofino Police Department and the Clearwater County Sheriff's Office provide law enforcement coverage. Emergency medical services are supported by the Clearwater County Ambulance District, which includes 13 advanced emergency medical technicians (EMTs), three basic EMTs, six first responders, and two drivers operating within Orofino.[56] Additionally, Back Country Medics offers air medical transport services for remote or critical care situations. The existing public safety infrastructure is considered adequate for a community of this size and represents a low risk for prospective industries and their employees.

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: As of early 2025, the housing market in Orofino, Idaho, remains comparatively affordable relative to both state and national benchmarks. The average home value is approximately $305,308, representing a modest year-over-year increase of 1.5 percent.[57] This figure is substantially lower than Idaho's median home price of $457,000,

[55] NeighborhoodScout. "Orofino, ID: Crime Rates and Statistics." Last modified January 2025.
[56] Clearwater County Sheriff's Office. "Sheriff." Accessed April 24, 2025. https://www.clearwatercounty.org/departments/sheriff/home/index.php.
[57] Zillow. "Orofino, ID Housing Market: 2025 Home Prices & Trends." Last modified March 31, 2025. https://www.zillow.com/homevalues/137159/woodland-orofino-id

making Orofino an accessible location for prospective homeowners. Rental prices are also competitive; the average monthly rent for a two-bedroom apartment is approximately $910, which is 36.4 percent below the national average and 23.1 percent lower than the state average.[58]

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**

5.5 Risk Factor: Labor

5.5.1 Workforce

Risk Information: As of March 2025, Clearwater County, which includes Orofino, reported an unemployment rate of 6.3 percent. This figure is notably higher than both the Idaho state average of 3.7 percent and the national average of 4.2 percent.[59] The county's civilian labor force totals approximately 3,439 individuals, with 3,223 employed and 216 unemployed.

The workforce in Orofino is predominantly older, with a median age of 52 years, compared to the statewide median age of 37 years.[60] While the area offers a stable and experienced labor pool, particularly in key industries, the higher unemployment rate and older demographic may pose challenges for employers seeking a younger or more diverse workforce.

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)*	**NN**

[58] BestPlaces. "Orofino, ID Cost of Living." Accessed April 24, 2025. https://www.bestplaces.net/cost_of_living/city/idaho/orofino
[59] Idaho Department of Labor. Clearwater County Labor Force and Economic Profile. January 2025. https://lmi.idaho.gov/wpcontent/uploads/2024/12/ClearwaterProfile.pdf
[60] Census Reporter. "Clearwater County, ID." Accessed April 24, 2025. https://censusreporter.org/profiles/05000US16035-clearwater-countyid/

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**

5.5.2 Labor Costs

Risk Information: As of 2025, labor costs in Orofino, Idaho, remain comparatively low in relation to both state and national standards. Idaho's minimum wage is $7.25 per hour, consistent with the federal minimum and unchanged since 2009. This rate is significantly lower than those in neighboring states, such as Washington at $16.66 and Oregon at $14.70 per hour.[61]

In Orofino, the average hourly wage is approximately $25.06, which equates to an annual salary of around $52,123. This figure slightly exceeds Idaho's statewide average hourly wage of $24.69.[62]

Overall, Orofino presents a cost-effective labor market, offering wages that are competitive within the state while maintaining a lower cost of employment compared to nearby regions.

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**

[61] Workstream. "Wages in Idaho 2025." Accessed April 24, 2025. https://www.workstream.us/wageindex/idaho

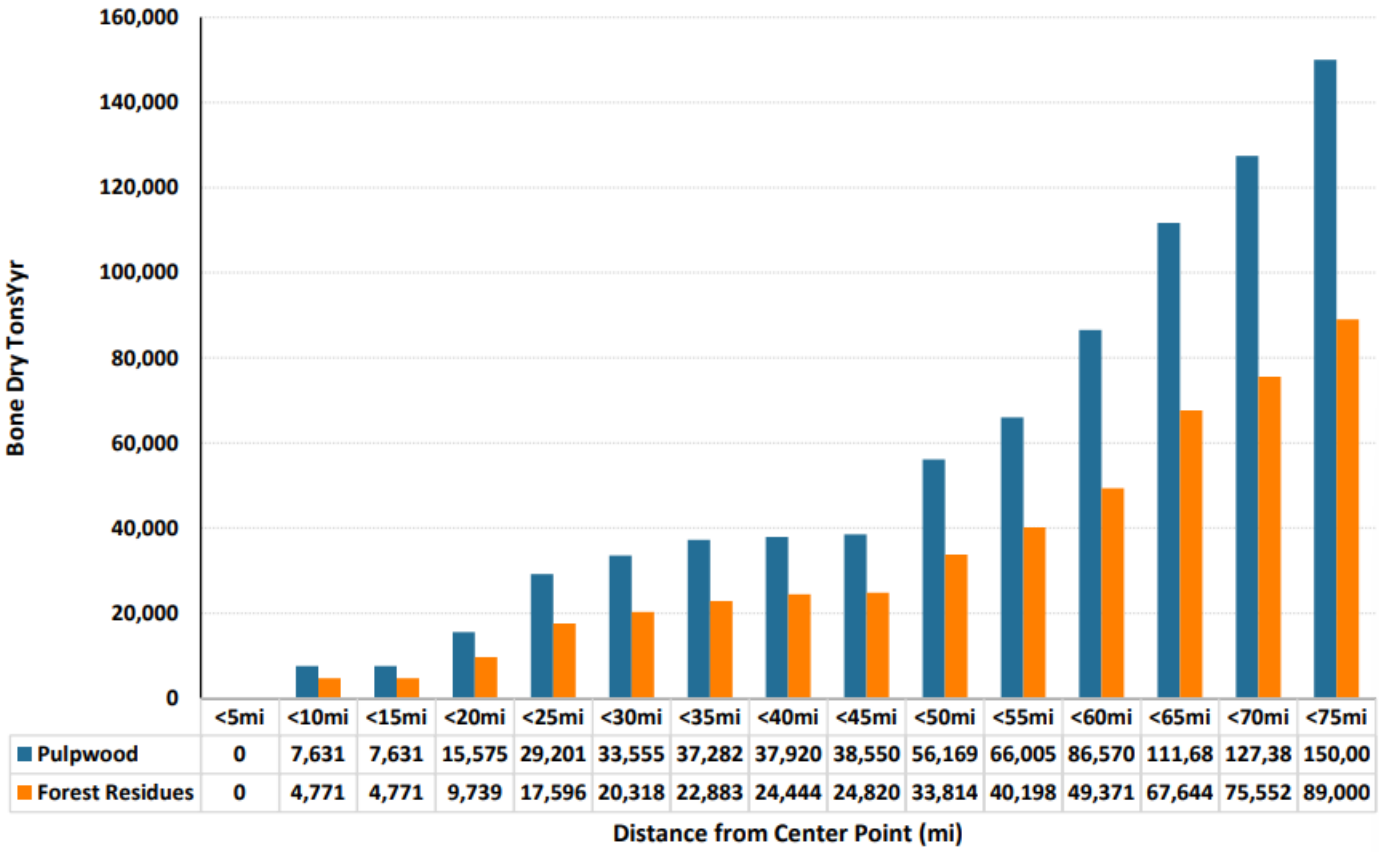
[62] Dutton, Audrey. "Idaho's Average Hourly Wage Is Fast Approaching $25 an Hour." Idaho Capital Sun, June 6, 2023. https://idahocapitalsun.com/briefs/idahos-average-hourly-wage-is-fast-approaching-25-an-hour/.

SECTION E: TABLES AND FIGURES

Table E-1. Counties in Supply Zone with Percent Overlap

County	State	Percent in Supply Zone
Lewis	Idaho	91%
Clearwater	Idaho	66%
Nez Perce	Idaho	59%
Latah	Idaho	39%
Idaho	Idaho	16%
Shoshone	Idaho	7%
Asotin	Washington	<1%

Figure E-1. Pulpwood and Forest Residue Production Curve in the Supply Zone



	<5mi	<10mi	<15mi	<20mi	<25mi	<30mi	<35mi	<40mi	<45mi	<50mi	<55mi	<60mi	<65mi	<70mi	<75mi
Pulpwood	0	7,631	7,631	15,575	29,201	33,555	37,282	37,920	38,550	56,169	66,005	86,570	111,68	127,38	150,00
Forest Residues	0	4,771	4,771	9,739	17,596	20,318	22,883	24,444	24,820	33,814	40,198	49,371	67,644	75,552	89,000

Figure E-2. Transportation Cost by Distance from Orofino, ID ($/bdt)[63]

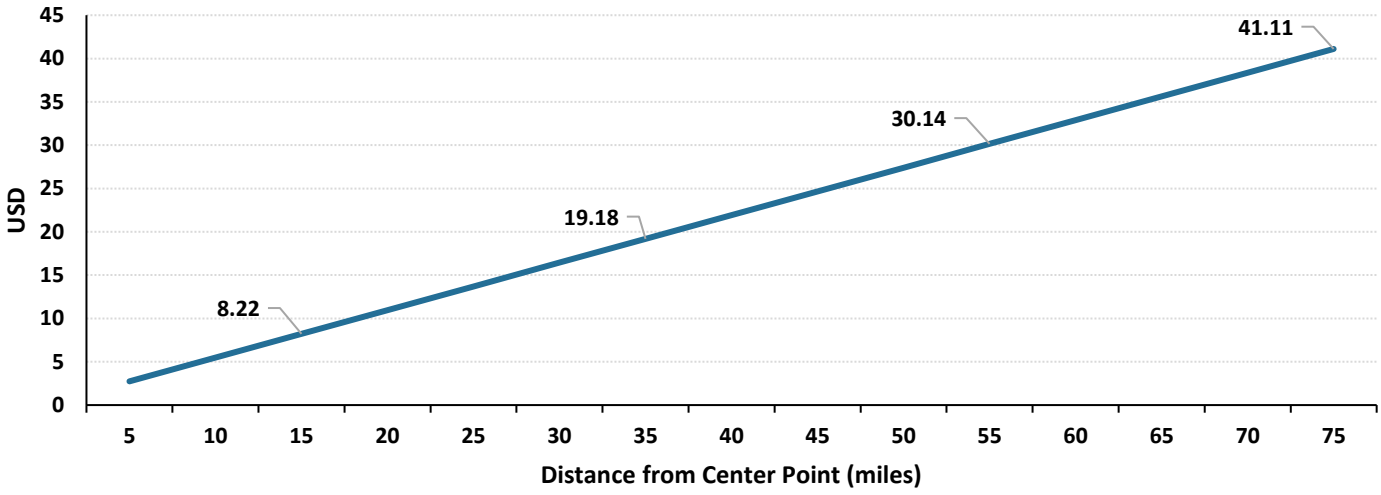
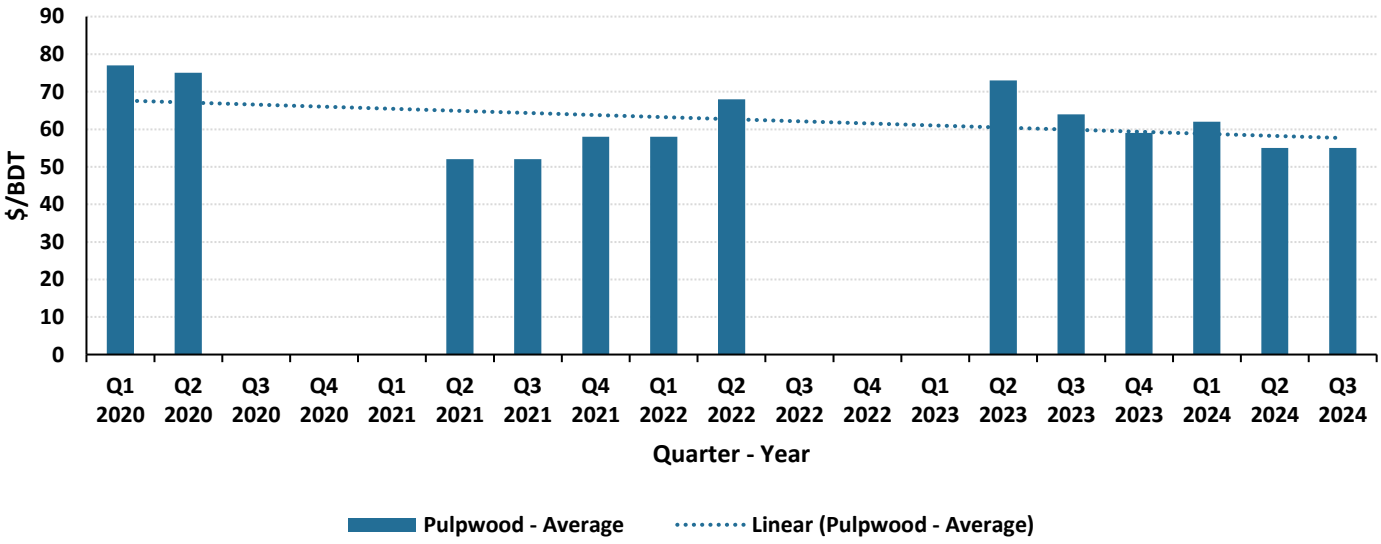


Figure E-3. Average Delivered Price of Pulpwood



[63] Based on an average transportation cost of $0.548/bdt-mile.

Map E-1 Orofino ID, Competitive Advantage for Pulpwood

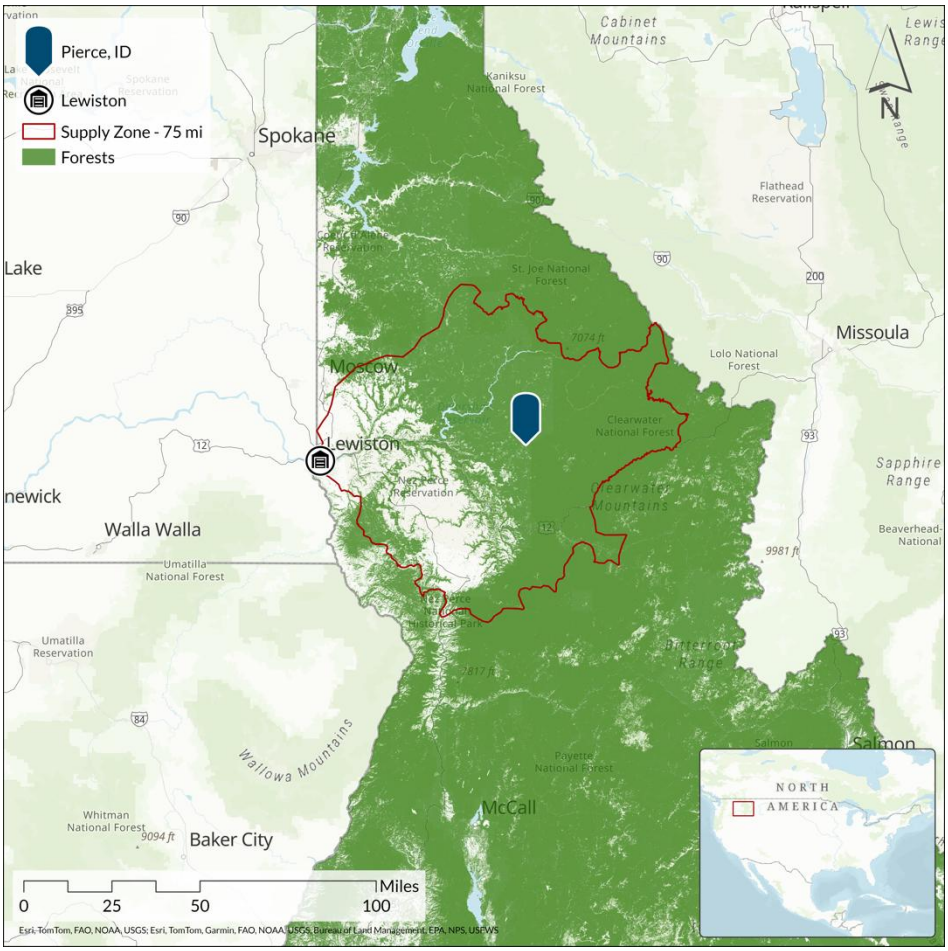
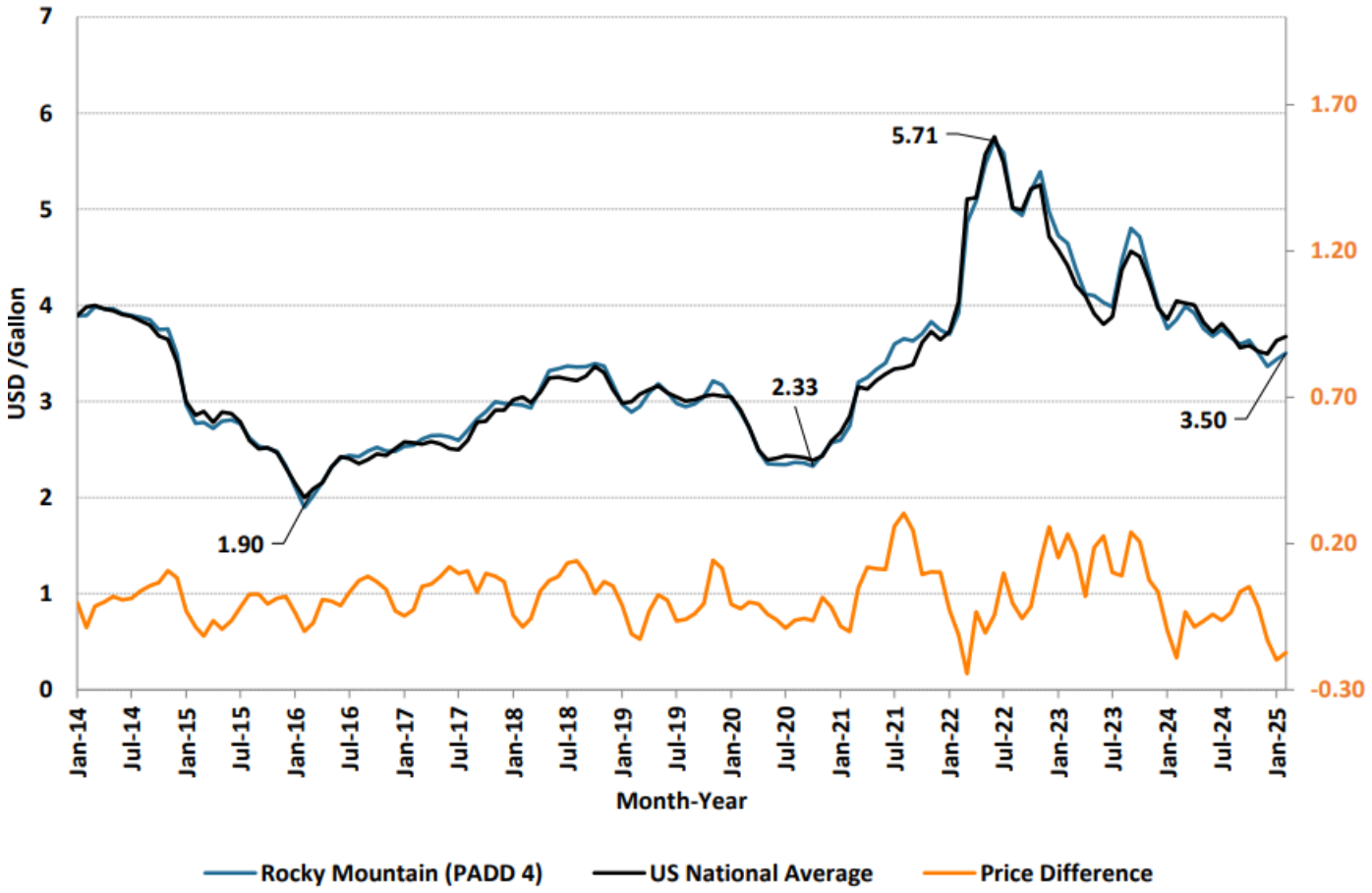


Figure E-4. Monthly No 2 Diesel Retail Price – Rocky Mountain vs US National Average[64]



[64] U.S. Energy Information Administration. "West Coast (PADD 5) Except California No 2 Diesel Retail Prices (Dollars per Gallon)." Accessed September 4, 2024. https://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_r5xca_m.htm.

Figure E-5. Consumer Price Index – US West Region[65] vs US National Average[66]

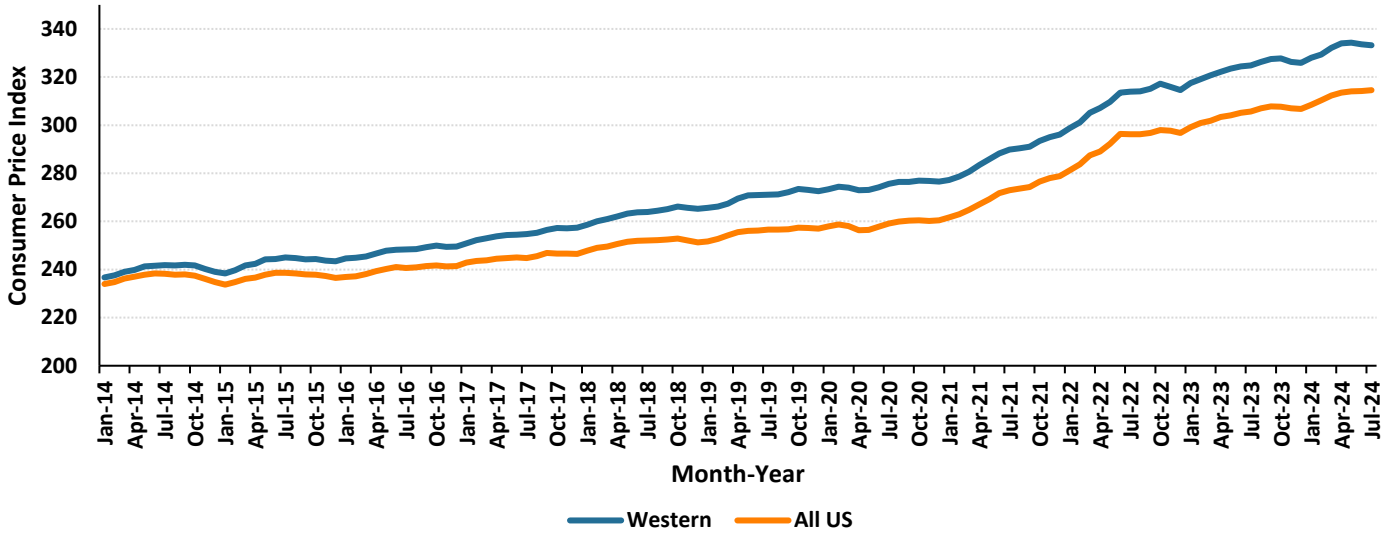
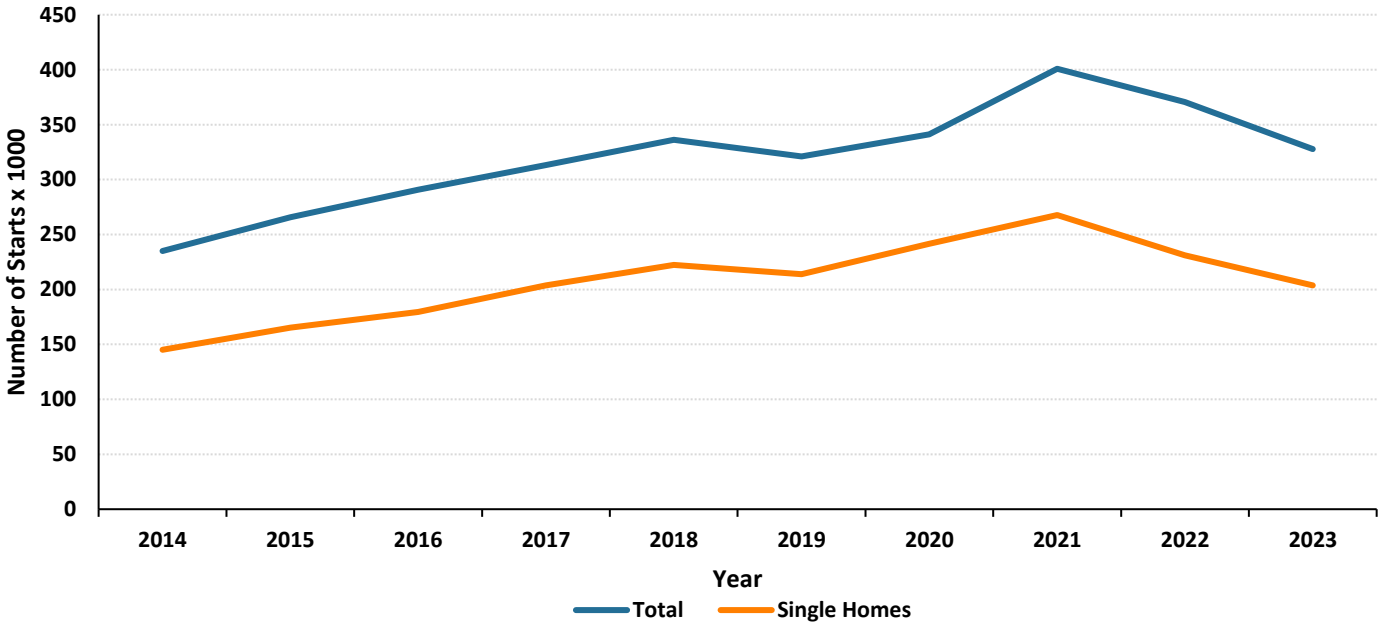


Figure E-6. Privately Owned Housing Starts US West 2014 – 2023[67]



[65] U.S. Bureau of Labor Statistics. "Consumer Price Index CPI-U. All Items in West Urban, Not Seasonally Adjusted." Accessed September 4, 2024. https://data.bls.gov/timeseries/CUUR0400SA0.
[66] U.S. Bureau of Labor Statistics. "Consumer Price Index CPI-U. All Items in All U.S. Urban, Not Seasonally Adjusted." Accessed September 4, 2024. https://data.bls.gov/timeseries/CUUR0400SA0.
[67] United States Census Bureau. "New Residential Construction." Accessed September 4, 2024. https://www.census.gov/construction/nrc/historical_data/index.html.

Figure E-7 Orofino Industrial Site - Clearwater County, ID



Map E-2 Clearwater County, ID



SECTION F: LEGAL DISCLAIMER

This BDO Zone Rating (the "Rating") is prepared for and provided to Clearwater County, ID, and is intended to be read and used in its entirety and not in parts. Separation or alteration of any section or page from the main body of this Rating is expressly forbidden. In preparing this Rating, Ecostrat has used information obtained from third parties or otherwise publicly available. All such information has not been independently validated, verified, or confirmed by Ecostrat (except where otherwise specifically indicated) and Ecostrat makes no representation or warranty as to the accuracy or completeness of any information provided by third parties or otherwise publicly available.

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