



West Fraser | TNFD Methodology and Case Study for Alberta's Forest Products Sector

June 1, 2026

EXECUTIVE SUMMARY

Over half of global economy is dependent on nature and, thus, concurrently exposed to the risks of nature loss. Businesses highly connected to natural resources, such as those in the forest products sector, may be especially impacted by nature-related risks. However, it is not clear as to how many global businesses are measuring or monitoring these risks, or the extent to which they have undertaken a systematic review to achieve comprehensive knowledge of their impacts and dependencies on nature. The Taskforce on Nature-related Financial Disclosures (TNFD) is supporting companies with filling these knowledge gaps by providing guidance and a structured framework for identifying, measuring, managing, and reporting nature-related impacts and dependencies and the associated risks and opportunities that can affect businesses and their long-term value. TNFD is a private-sector-led taskforce comprised of 40 members representing financial institutions, corporates, and market service providers with over US\$20 trillion in assets. It builds on and aligns with other corporate reporting frameworks and methodologies, including the Taskforce on Climate-related Financial Disclosures (TCFD). While TNFD follows the TCFD's structure on recommendations for governance, strategy, risk management, and metrics and targets, TNFD includes an additional, critical element - the Locate, Evaluate, Assess and Prepare ("LEAP") approach - which aims to address the fact that nature-related dependencies and impacts, and resulting risks and opportunities, are location specific.

This document outlines how West Fraser Timber Co. Ltd. (West Fraser, the Company) applied TNFD's LEAP approach across its forest management areas, quota tenures and mill sites in Alberta, Canada, to perform a nature risk and opportunity assessment. Although this document focuses on the case study of West Fraser's experience undertaking the LEAP approach, it aims to provide a clear, replicable, and adaptable methodology for other companies in Alberta's, and Canada's, forest products sector to conduct their own nature risk and opportunity assessments. In doing so, it also serves as a practical reference for organizations across the sector to understand how nature-related risks and opportunities can be examined in a structured way and, ultimately, support knowledge and management of nature-related risks and opportunities that may impact business value. This document outlines the steps taken, the data used, and the structure of West Fraser's first LEAP assessment, offering a tangible case study for how a TNFD-aligned assessment of nature-related risks and opportunities can be undertaken in practice. By providing transparency on how the LEAP process was undertaken by West Fraser, this case study aims to support greater consistency and alignment among companies in the forest products sector on how nature-related risks and opportunities can be evaluated, which also supports planning, risk management, and future reporting as expectations around nature-related disclosures continue to evolve.

The nature risk and opportunity assessment undertaken by West Fraser follows established frameworks and guidance, including TNFD's LEAP guidance and the United Nations Environment Programme's (UNEP) Nature Risk Profile methodology, and draws on globally recognized tools, like the Exploring Natural Capital Opportunities, Risks, and Exposure (ENCORE) tool, and datasets suited to Alberta's landscape. The development of this document was supported by the Forest Resource Improvement Association of Alberta (FRIAA), as part of its broader interest in advancing nature-related understanding across the forest products sector, and technical input from the National Council for Air and Stream Improvement's (NCASI) Canadian Operations to ensure the methodology outlines in this document reflects recognized scientific practice.

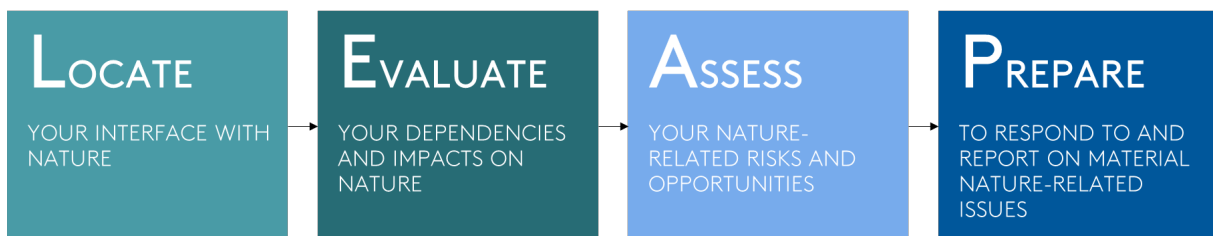
INTRODUCTION

Background

Due to their direct interface with natural ecosystems, companies in the forest products sector¹ both impact and depend on ecosystems and the ecosystem services they provide. These impacts and dependencies make these companies well placed not only to drive and accelerate the conservation of nature through sustainable forest management and planning, but also to invest in solutions that can help support the resilience of ecosystems upon which the broader industry and local communities rely.

An important consideration is that active forest management can generate positive outcomes for nature, including through biodiversity and habitat enhancement, improved forest health, and reduced wildfire and pest risk. The effects of forest management on nature are context-dependent and shift across space and time, and this assessment reflects that reality by considering both positive and negative impacts. For companies, identifying impacts and dependencies on nature is critical for effectively understanding and mitigating business risks, strengthening long-term resilience of their operations and supply chains, and capturing new commercial opportunities that arise from their interface with nature. The Taskforce on Nature-related Financial Disclosures (TNFD) is a private-sector-led taskforce comprised of 40 members representing financial institutions, corporates, and market service providers with over US\$20 trillion in assets. It is a science-based initiative that aims to support businesses across industries, including the forest products sector, in identifying, managing, and disclosing their nature-related risks and opportunities. TNFD's LEAP approach (refer to Figure 1) provides a structured process for organizations to identify where their operations interact with nature (Locate), understand their dependencies and impacts on nature (Evaluate), analyze related risks and opportunities (Assess), and develop strategies and disclosures to respond effectively (Prepare).^{2,3} For businesses in the forest products sector, the TNFD Sector Guidance for Forestry, Pulp, and Paper provides further guidance and sector-specific considerations for how to apply the LEAP approach.⁴

Figure 1: TNFD's LEAP Approach³



Alberta is significant for Canada's forest products sector: 60% of Alberta's land area is forested and it contributes over \$14 billion in economic impact.⁵ Therefore, Alberta's forestry regulations include strict guidelines for forest management plans that emphasize sustainable forest management in order to ensure its forests are used in ways that meet current needs without compromising their health and productivity for future generations, while conserving ecosystems and protecting biodiversity. Sustainable forest management practices in Alberta have historically been explored through numerous industry-led initiatives, emphasizing ecosystem-based forest management principles, reforestation, carbon sequestration, and biodiversity.^{6,7} However, companies' understanding of their nature-related dependencies and impacts, how these manifest into

¹ This document defines the forest products sector as companies in the entire value chain of forest products, from forestry management to the manufacturing of forest-derived goods. This includes companies involved in the management and harvesting of forests, the manufacturing of solid wood and engineered wood products, and the production of pulp, paper, and bio-based wood energy products.

² TNFD (2023) [Guidance on the Identification and Assessment of Nature-related Issues: The LEAP Approach](#).

³ For more information on the TNFD and the LEAP approach, refer to Appendix A.

⁴ TNFD (2024) [Additional Sector Guidance: Forestry, Pulp, and Paper](#).

⁵ Alberta Forest Products Association (2025) [ASLTC Welcomes Federal Investment in Forestry Sector and Workers](#).

⁶ Alberta Wilderness Association (2025) [Forests](#).

⁷ Government of Alberta (2024) [Alberta's Forest Economy 2024](#).

business risks and opportunities, and their residual risks considering mitigation practices already in place, as well as the integration of these risks and opportunities into corporate financial decision making and enterprise risk management, are still maturing. Therefore, companies in the forest products sector and their investors stand to benefit from a holistic and consistent approach to assessing and reporting nature-related risks and opportunities that is aligned with TNFD's framework, leveraging consistent and credible datasets to support comparability and an increasingly shared understanding of nature-related dependencies, impacts, risks, and opportunities relevant for the industry.

Document Objectives

The purpose of this document is to serve as a case study of how West Fraser applied TNFD's LEAP approach across its Forest Management Units (FMU) areas and mills in Alberta, with guidance and input from NCASI's Canadian Operations.⁸ It outlines the steps taken, the data used, and the structure of the assessment, offering a clear reference for organizations seeking to understand how nature-related risks and opportunities can be evaluated in a forest products sector context. Through this work, West Fraser hopes to support companies in Alberta's forest products sector with their ability to evaluate their operations and supply chains for nature-related dependencies and impacts and translate these into business risks and opportunities in line with the TNFD framework, so that risks and opportunities are increasingly comparable between companies in the sector, and stakeholders can better understand the current state of sustainable forest management practices. This work thereby aims to support the contribution of companies in Alberta's forest products sector to their prosperity, competitiveness in the global market, and knowledge upon which to make decisions that increase business resilience while reducing negative impacts on nature. Additionally, while this document is primarily targeted at companies in the forest products sector in Alberta, it may also help guide companies in this industry in other geographies with undertaking a LEAP-aligned nature risk and opportunity assessment.

Methodology Overview

This document lays out six overarching steps to implementing a LEAP-aligned nature risk and opportunity assessment, and aligns with the processes, data sources, and tools recommended by TNFD's LEAP approach guidance and additional guidance for the forestry, pulp, and paper sector.^{4,2,4,9} Complementary technical guidance from other globally-recognized institutions, where appropriate and recommended by the TNFD guidance, were also leveraged to inform the development of this methodology. For example, Step 3 leveraged the UNEP "Nature Risk Profile" methodology, a TNFD-aligned process for identifying and analyzing nature-related dependencies and impacts using a combination of nature data and data on the locations of company activities.¹⁰

This document is structured whereby each step includes overarching context from TNFD and industry guidance that informed the methodology for that step, followed by a case study example with details on how that step was undertaken by West Fraser.¹¹ As each company will have its own unique business context and geographical and operational exposures to nature, users of this document should take into consideration that the methodology and case study laid out in this document are solely illustrative of West Fraser's implementation of its nature risk and opportunity assessment using datasets appropriate for the geographical context of Alberta, Canada. TNFD recommends that application of the LEAP approach should be iterative and tailored to an organization's business context.²

The six overarching steps are as follows:

- Step 1 – Scoping the LEAP assessment: Agree on the scope and parameters of the nature risk and opportunity assessment, with a focus on the company's business activities, value chain, and geographies most likely to be associated with material nature-related dependencies and impacts.

⁸ For more information on West Fraser and NCASI, refer to Appendix B.

⁹ For a glossary of terms, refer to Appendix C.

¹⁰ UNEP (2023) [Nature Risk Profile: A Methodology for Profiling Nature Related Dependencies and Impacts](#).

¹¹ For a statement on the potential limitations of West Fraser's nature risk and opportunity assessment, refer to Appendix D.

- Step 2 – Determining interface with nature and ecologically sensitive locations: Based on the agreed scope from Step 1, identify where and how the company interfaces with areas of ecological importance and sensitivity, leveraging geospatial and ecological data from global, regional, and/or national databases and location data for the company’s operations, where available.
- Step 3 – Identifying and evaluating material dependencies and impact drivers/impacts: Determine dependencies and impact drivers/impacts material to the company’s sector and evaluate them based on the company’s specific operational and geographical contexts using a set of factors underpinned by geospatial and ecological data from global, regional, and/or national databases and location data for the company’s operations, where available.
- Step 4 – Identifying, assessing, and prioritizing risks from priority dependencies and impact drivers: Prioritize the dependencies and impact drivers identified in Step 3 and translate them into potential business risks for the company. Assess the identified risks based on a set of factors, including their likelihood of occurrence and potential magnitude of impact on the company, and prioritize them for mitigation and follow-up action.
- Step 5 – Identifying and assessing opportunities: Based on the company’s sector and the priority dependencies, impact drivers, and risks identified in Step 4, determine potential commercial opportunities for the company.
- Step 6 – Preparing for implementation and reporting: Based on insights from Steps 2-4, determine how the company should respond to its priority nature-related dependencies, impact drivers/impacts, risks, and opportunities and what the company will disclose in line with TNFD’s recommended disclosures for material nature-related issues.

Overarching Steps to Applying the LEAP Approach for Alberta Forestry Sector Companies		Corresponding LEAP Phases	Related LEAP Components
1	Scoping the LEAP assessment	Locate	L1
2	Determining interface with nature and ecologically sensitive locations		L2, L3, L4
3	Identifying and evaluating material dependencies and impact drivers/impacts	Evaluate	E1, E2, E3, E4
4	Identifying, assessing, and prioritizing risks from priority dependencies and impact drivers	Assess	A1, A2, A3, A4
5	Identifying and assessing opportunities		A1, A2, A3, A4
6	Preparing for implementation and reporting	Prepare	P1, P2, P3, P4

STEP 1 – SCOPING the LEAP ASSESSMENT

Relevant LEAP component: L1

Key technical guidance: TNFD LEAP approach guidance²

Undertaking a TNFD-aligned LEAP assessment often requires the support of multiple stakeholders within a company. This may include, but is not limited to, a dedicated project team and ongoing engagement with members of other business units and senior leadership, such as those involved in finance, risk, and procurement. Obtaining internal alignment related to resourcing and capacity for undertaking the LEAP assessment will ensure that the company can effectively manage the process to meet key objectives, deliverable timeline, stakeholder expectations, and resources needed for the assessment.

The company may consider the following factors when scoping a LEAP assessment:

- The objective(s) and timeline for undertaking a nature risk and opportunity assessment;

- Areas of the business for inclusion in the assessment based on, where available, results of materiality¹² or double materiality assessments;
- The available data, budget, staff time, expertise and capacity needed to support the assessment;
- Engagement with relevant internal stakeholders, external stakeholders and Rightsholders relating to the business activities and regions of the assessment; and
- The company’s core business activities and the initial hypothesis on where nature-related dependencies and impacts may be material

CASE STUDY: SCOPE OF WEST FRASER’S NATURE RISK AND OPPORTUNITY ASSESSMENT

Objectives

West Fraser conducted a LEAP-aligned nature risk and opportunity assessment with the primary goals of demonstrating its commitment to understanding its nature-related risks and opportunities; strengthening its nature-related voluntary disclosures; and sharing its learnings to elevate the performance of its industry in these areas. By documenting the assessment West Fraser also aimed to share its experience with the broader forest sector in Alberta, aligning to the intent of FRIAA’s forest resource improvement program.

Scope

The scope of West Fraser’s pilot assessment spanned its mill sites, as well as Forest Management Unit (FMU) areas that supply the mills, which include both Forest Management Agreement Areas and Forest Management Units from which West Fraser receives fibre in the form of quota. All tenures are within Alberta, Canada. For the purpose of this report only, where ‘FMU’ is used, this includes both areas with forest management agreements and forest management units with quota allocated to West Fraser.

This operational scope was selected as West Fraser is a global and diversified wood products company and its operational footprint in Alberta is large, with primary business activities centered around wood products manufacturing and forest management that includes harvesting and silviculture. This geographic scope, which encompasses publicly-held lands managed by West Fraser, was selected due to West Fraser’s direct role in forest management and planning in those areas and based on the expected potential of those areas for undertaking a TNFD-aligned LEAP assessment.¹³ Throughout the assessment, West Fraser’s FMU areas and mill sites were evaluated separately as FMU operations and mill operations fall under different parts of the wood products value chain and may have different dependencies and impact drivers that may give rise to different business risks and opportunities.

The scoping process was led by a dedicated project lead and core project team, including representatives from NCASI, and was guided by West Fraser’s internal Biodiversity Community of Excellence, a group made up of Chief Foresters, technical specialists, environmental leaders and members from Operations and Sustainability to guide biodiversity-related practices and share best management practices. Following this pilot assessment, West Fraser is planning to expand the geographic scope, while monitoring maturing methodologies, data, and tools for nature risk and opportunity assessments.

STEP 2 – DETERMINING INTERFACE WITH NATURE AND ECOLOGICALLY SENSITIVE LOCATIONS

Relevant LEAP components: L2, L3, L4

Key technical guidance: TNFD LEAP approach guidance²

Once alignment has been reached on the assessment’s scope, the company can identify where and how it interfaces with ecosystems and other environmental assets at the global, regional, national, or provincial/local

¹² For the definitions of “materiality”, refer to Appendix C.

¹³ For more information on Alberta’s forest tenure system, refer to Appendix E.

levels within the area in scope for assessment. Given the location-specific characteristic of nature, understanding how and where the company's business activities interface with different elements of nature is crucial for identifying its dependencies and impact drivers/impacts, and translating these into business risks and opportunities.

A sub-set of locations where the company interfaces with nature may include ecologically sensitive locations. These sensitive locations may expose the company to elevated risks and opportunities that may not yet be captured by standard risk management processes. Therefore, it is critical that companies pay particular attention to any ecologically sensitive locations where their business model or value chain may have an impact or dependency on nature.

TNFD defines sensitive locations as meeting one or more of five criteria:²

- Areas important for biodiversity;
- Areas of high ecosystem integrity;
- Areas of rapid decline in ecosystem integrity;
- Areas of high physical water risks; and
- Areas of importance for ecosystem service provision, including benefits to Indigenous Peoples, Local Communities, and stakeholders.

TNFD's LEAP approach guidance provides greater detail on the underlying components that make up the five criteria defining sensitive locations and a non-exhaustive list of recommended reference datasets that can be used by companies to get started with their identification of any sensitive locations meeting one or more of these criteria. However, TNFD recommends that companies consider datasets based on the specific nature of their business models and value chains.²

Once company sites/assets that overlap with ecologically sensitive locations have been identified, the company may consider comparing and prioritizing them for further assessment, monitoring, and/or actions. This may include setting a defined threshold for meeting TNFD's criteria for ecologically sensitive locations and comparing and prioritizing sites/assets based on the number of thresholds met across the five criteria. TNFD does not provide explicit recommendations on approaches to define thresholds as it recognizes that different organizations may analyze and interpret ecological sensitivity differently based on their specific business contexts, capacities, and available resources.² Companies may consider different approaches to defining thresholds, which may include, but are not limited to, setting a score-based threshold (e.g., prioritizing sites/assets based on whether any criteria defining sensitive locations for each site/asset exceeds a pre-defined threshold) or a portfolio-based threshold (e.g., prioritizing sites/assets based on a pre-defined number or percentage of sites/assets, such as the top 10% of sites/assets based on their ecological sensitivity scores).

CASE STUDY: WEST FRASER'S INTERFACE WITH NATURE AND ECOLOGICALLY SENSITIVE LOCATIONS

Interface With Nature

To prepare for the Locate and Evaluate phases of the LEAP assessment, NCASI and West Fraser reviewed the TNFD criteria to understand how the Company interacts with nature, identify sensitive locations, and assess impacts and dependencies. For each TNFD category and sensitivity criterion, NCASI and West Fraser reviewed available global, national (Canada), and provincial (Alberta) data sources to determine what information was objectively of the highest quality, most spatially and temporally relevant, up to date, and practical to use. West Fraser drew upon NCASI's long-standing forest sector research and scientific expertise, as well as NCASI's familiarity with environmental monitoring datasets, to help determine which sources would provide the most credible and decision-useful basis for analysis, while ensuring the selected datasets could be interpreted appropriately for forested landscapes and operations. Where TNFD-recommended global datasets were found to be less suitable, due to limitations in relevance, resolution, or interpretability for managed forest areas in Alberta, NCASI and West Fraser selected alternative datasets that better met the assessment's needs while maintaining alignment with the intent of the TNFD criteria. The rationale for dataset selection, including reasons for not using specific TNFD-recommended datasets, is summarized in the Appendix J

Using geospatial mapping, West Fraser identified where its FMU areas and mill sites overlap with the following four categories of nationally and/or provincially recognized areas in Alberta, Canada:

- Ecoprovinces and ecoregions;
- Land cover types, including wetland types;
- Indigenous territories, including areas occupied/used by Indigenous and local communities and areas where these groups have natural resource rights; and
- Areas of biodiversity and conservation value, including national and provincial protected areas, Key Biodiversity Areas, ecological corridors, and critical habitats for at-risk species.

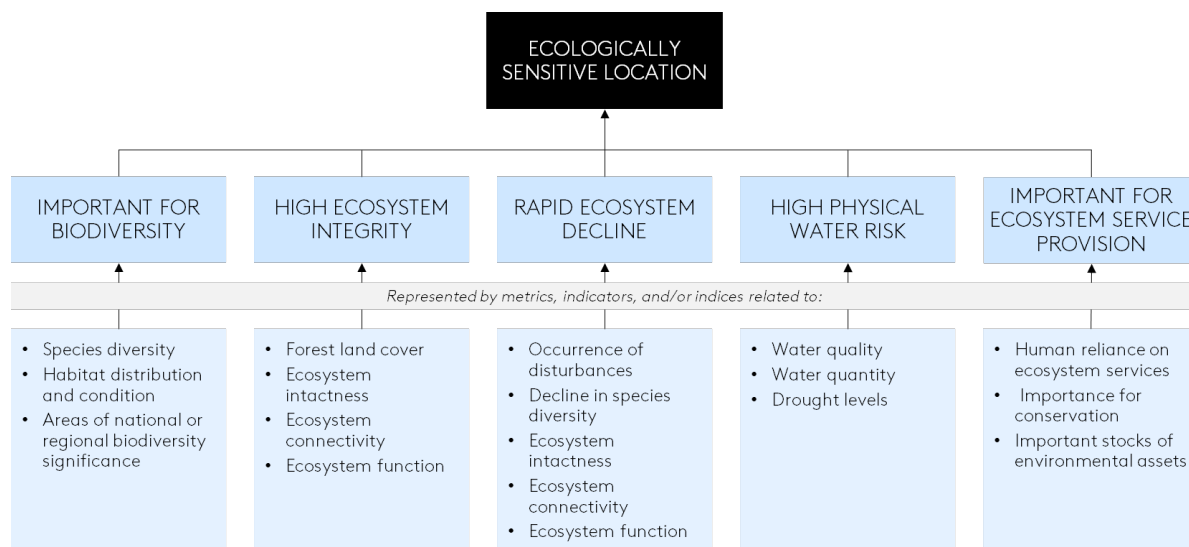
Output(s): Information sheet that includes the ecoprovinces, ecoregions, land cover types, Indigenous territories, and areas of biodiversity and conservation value that intersect with West Fraser’s FMU areas and mill sites in Alberta; geospatial map of where West Fraser’s FMU areas and mill sites overlap with these areas in Alberta.

Data sources used: Continental (North America), national (Canada), and provincial (Alberta) databases of areas of ecological importance; geospatial data of West Fraser’s FMU areas and mill sites in Alberta.¹⁴

Interface With Ecologically Sensitive Locations

West Fraser considered its FMU areas and mill sites to intersect with an ecologically sensitive area if the area or site meets at least one of the five criteria recommended by TNFD. Each criterion (displayed in Figure 2) is underpinned by a set of metrics, indicators, and/or indices, which are supported by geospatial and ecological datasets obtained from the Government of Canada, Government of Alberta, or other recognized international organizations.¹⁵

Figure 2: Metrics, indicators, and/or indices underpinning TNFD’s five criteria for ecologically sensitive locations used by West Fraser



Scores across the five criteria were calculated, as mean composite scores from their underlying metrics, indicators, and/or indices, for each FMU area and mill site and normalized to a 0-1 scale representing ecological sensitivity. Across all five criteria, a value closer to 0 indicates lower ecological sensitivity and a value closer to 1 indicates higher ecological sensitivity. This framing is applied consistently: an area is considered more ecologically sensitive if it is important for biodiversity, has high ecosystem integrity, faces rapid ecosystem decline, has high physical water risk, and/or is important for ecosystem service provision.

¹⁴ For the full list of data sources used, refer to Appendix F.

¹⁵ For the definitions of “metrics”, “indicators”, and “indices”, refer to Appendix C.

Importantly, all five criteria are oriented in the same direction on this scale, so that a higher score always indicates greater ecological sensitivity regardless of whether the underlying criterion measures a positive ecological state (such as ecosystem integrity) or a pressure or risk (such as ecosystem decline). Scores are therefore directly comparable and can be interpreted consistently across criteria.

For example, a normalized score for the ecosystem function indicator (one component of the ecosystem integrity criterion) was calculated as the ratio between observed net primary productivity (“NPP”) and potential NPP. No difference between observed and potential NPP results in a score of 1, indicating a highly functional and ecologically sensitive ecosystem, whereas a significant difference results in a score closer to 0, indicating a more degraded and less ecologically sensitive ecosystem. While a score of 1 represents the theoretical maximum of each criterion, such as fully intact ecosystem integrity, it is acknowledged that this may represent an aspirational benchmark rather than a practically achievable condition in multi-use landscapes. This score, averaged with the normalized scores for the integrity of forested land (assessed using the Canada Annual Forest Land Cover and Forest Landscape Integrity Index datasets), ecosystem intactness (assessed using the Ecosystem Intactness Index, Native Cover Indicator for Alberta, and Interior Habitat indicator for Alberta), and ecosystem connectivity (assessed using the Landscape Connectivity Indicator for Alberta and the Stream Connectivity indicator for Alberta), produced a mean composite score for the ecosystem integrity criterion.

Once calculated, the mean composite scores across the five criteria were used to compare West Fraser’s sites for their interface with ecologically sensitive locations.

Output(s): For each of West Fraser’s FMU areas and mill sites in Alberta, mean composite scores across the five criteria, normalized to a 0-1 scale; geospatial map of where West Fraser’s FMU areas and mill sites in Alberta overlap with ecologically sensitive locations. Examples for an anonymized FMU are provided in Figure 3-5.

Figure 3: Mean composite scores across the five criteria of ecological sensitivity of an anonymized West Fraser FMU area

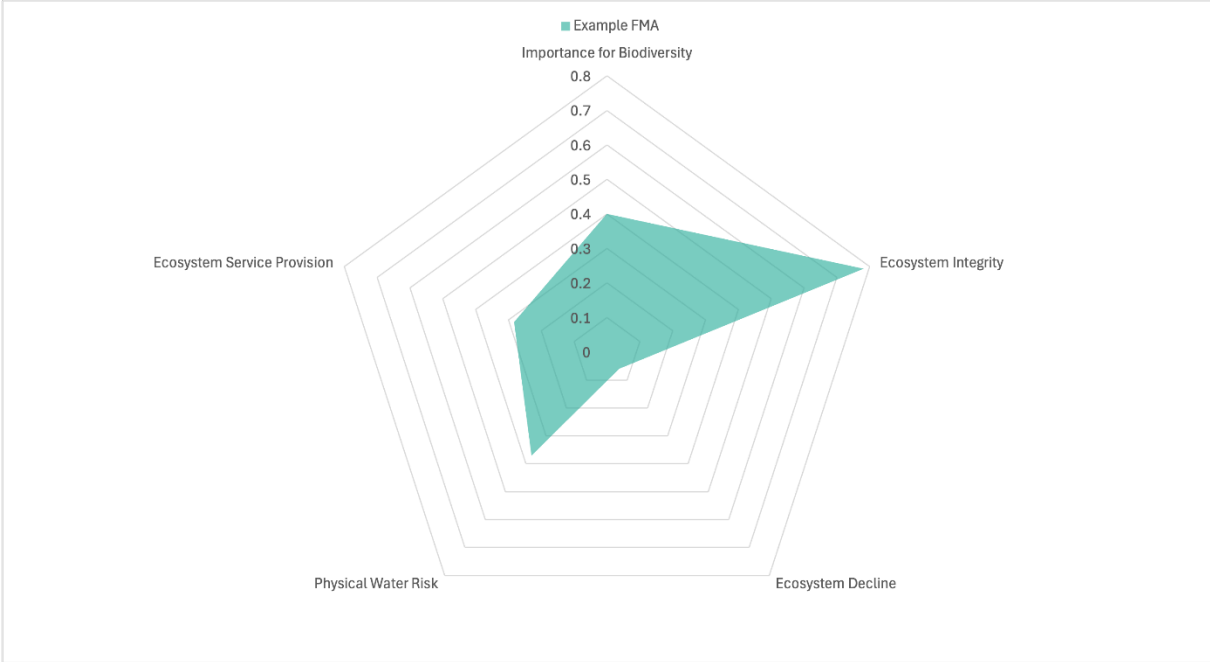


Figure 4: Variation in ecosystem integrity (one of TNFD’s five criteria for ecologically sensitive locations) within an anonymized West Fraser FMU area, whereby a higher score (a darker green color) indicates a higher level of ecosystem sensitivity for that criteria.

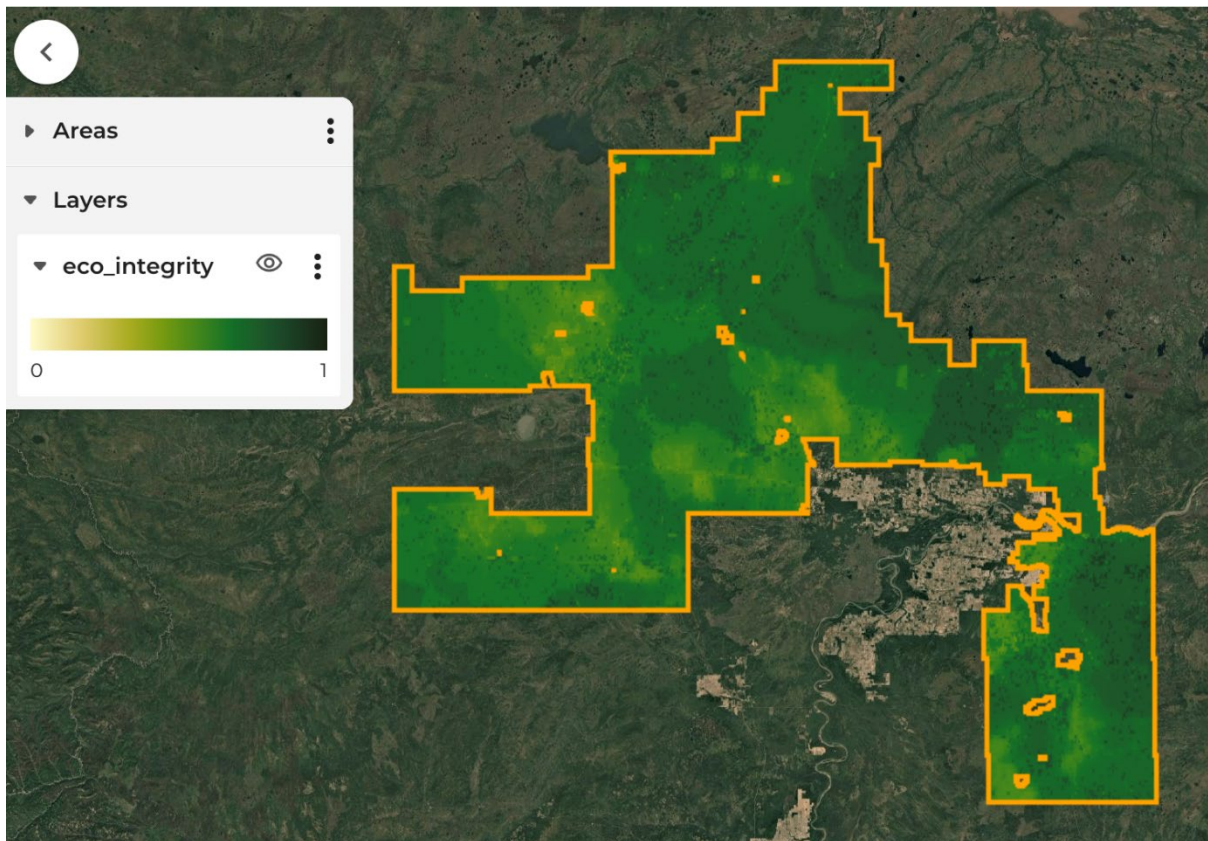
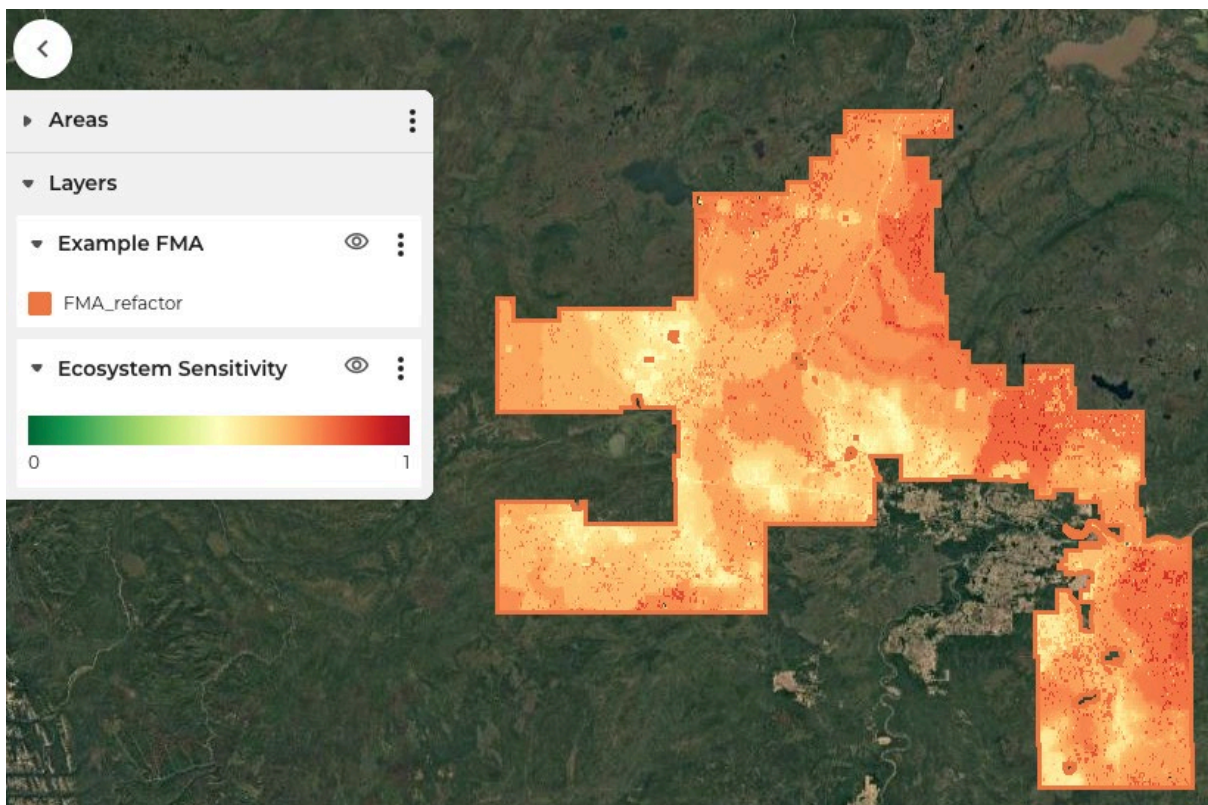


Figure 5: Variation in ecological sensitivity within an anonymized West Fraser FMU area, incorporating all five criteria of ecological sensitivity



Data sources used: Global, continental (North America), national (Canada), and provincial (Alberta) databases of areas of high biodiversity importance, high ecosystem integrity, rapid ecosystem decline, high physical

water risk, and high ecosystem service provision; geospatial data for West Fraser's FMU areas and mill sites in Alberta.¹⁶

STEP 3 – IDENTIFYING AND EVALUATING MATERIAL DEPENDENCIES AND IMPACT DRIVERS/IMPACTS

Relevant LEAP components: E1, E2, E3, E4

Key technical guidance: TNFD LEAP approach guidance²; UNEP Nature Risk Profile methodology¹⁰¹¹, ENCORE Explore tool¹⁷

After determining where the company geographically intersects with nature and ecologically sensitive areas, the company can determine and analyze its dependencies and impact drivers/impacts on nature. This involves identifying a longlist of dependencies and impact drivers material to its sector, and then refining the list based on its business activities and assets and the ecological conditions of the areas in scope for assessment.

One way in which companies can generate an initial longlist of dependencies and impact drivers is through the use of ENCORE's Explore tool¹⁷, which serves as a high-level screening tool that provides generalized, global-level qualitative links between economic activities and nature. However, it does not capture all value chain links and does not account for company-specific nuances. The ENCORE Explore tool serves as a helpful mechanism to identify an initial longlist of sector-relevant dependencies and impact drivers but should be further assessed and validated by companies to ensure relevance to their specific business contexts and supplemented by more granular geospatial data, where possible. TNFD has published several sector-specific guidance materials, including the TNFD Additional Guidance for Forestry, Pulp, and Paper Sector, which can support companies with further knowledge and/or validation of their impacts and dependencies on nature.

To build on sector-level materiality ratings from ENCORE, [UNEP's Nature Risk Profile methodology](#) integrates and outlines a process for companies and investors to develop a more specific profile of their dependencies and impacts on nature. UNEP's Nature Risk Profile methodology provides guidance on combining nature data with data on the locations of the companies' activities.¹⁰¹¹ Materiality is a key consideration for companies in developing a more specific profile of nature-related dependencies and impacts in the context of TNFD and, hence, outputs from ENCORE's Explore tool can be leveraged for this process, as recommended by the UNEP's Nature Risk Profile methodology.

A key strength of UNEP's Nature Risk Profile methodology is that it allows for flexibility in how companies evaluate their dependencies and impacts based on the granularity of spatial detail used. Where geolocated asset-level data are available (e.g., location data for a company's forestry assets), more accurate and spatially precise profiles of dependencies and impacts can be estimated, in line with TNFD's focus on understanding location-specific nature-related risks. Where asset-level data are not readily available, global or national data sets can be used to determine estimates of metrics at a broader sectoral and spatial resolution can be used to estimate potential dependencies and impacts.

Companies can identify and evaluate their nature-related dependencies and categorize them as ecosystem services. This approach directly links companies' business activities to the benefits they receive from nature, making it easier to understand and manage the resulting risks that arise from these dependencies. On the other hand, companies can evaluate their potential effects on nature in two ways. First, as impact drivers, which are the business processes or direct pressures that a company or its value chain exerts on the environment that may cause changes in nature. Secondly, as broader impacts, which are the changes in the state of nature that result from those impact drivers.² For example, one impact driver of a forestry company may be logging within managed forestlands which could alter distribution of stand age and patch configuration over the long term and

¹⁶ For the full list of data sources used, refer to Appendix G.

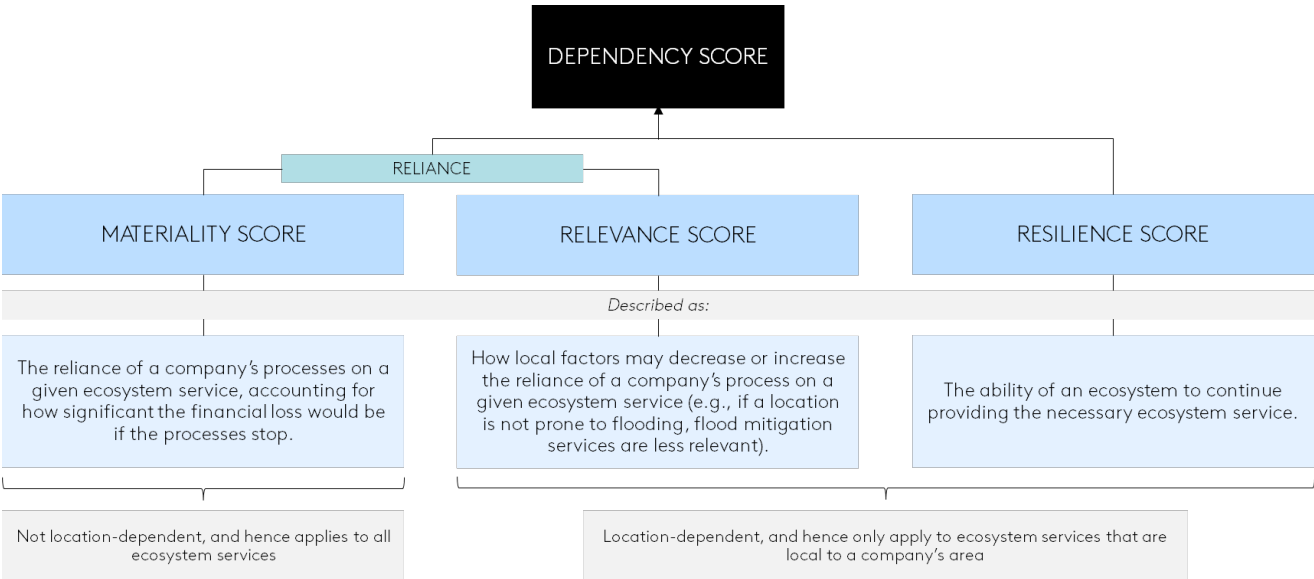
¹⁷ Global Canopy, UNEP FI, UNEP-WCMC (2025) [ENCORE: Exploring Natural Capital Opportunities, Risks, and Exposure](#). ENCORE's Explore tool only captures potential direct dependencies and impact drivers of economic activities. It excludes supply chain (both upstream and downstream) effects of the economic activities to avoid double counting.

result in an outcome/impact of a decline in the population size of certain at-risk species. As such, companies can leverage UNEP’s Nature Risk Profile methodology and supporting geospatial analyses to map and measure where pressures occur (i.e., impact drivers) while also monitoring and quantifying ecosystem condition and change over time (i.e., impacts).

Dependency score

Once an initial longlist of dependencies (i.e., ecosystem services) is generated, the company can estimate the extent of its dependency on each of the identified ecosystem services by calculating a composite dependency score based on scores associated with three underlying factors: materiality, relevance, and resilience (shown in Figure 6).¹¹¹⁰ Under UNEP’s Nature Risk Profile methodology, relevance and resilience are location-dependent factors, meaning that they only apply to ecosystem services that are local to the company’s area in scope for assessment. Therefore, the overall dependency score for those ecosystem services will make use of geospatial data to characterize that location. Those ecosystem services that are not location-dependent are calculated at the business level rather than at the asset/site level.

Figure 6: The UNEP Nature Risk Profile methodology’s approach to dependency scoring¹⁸

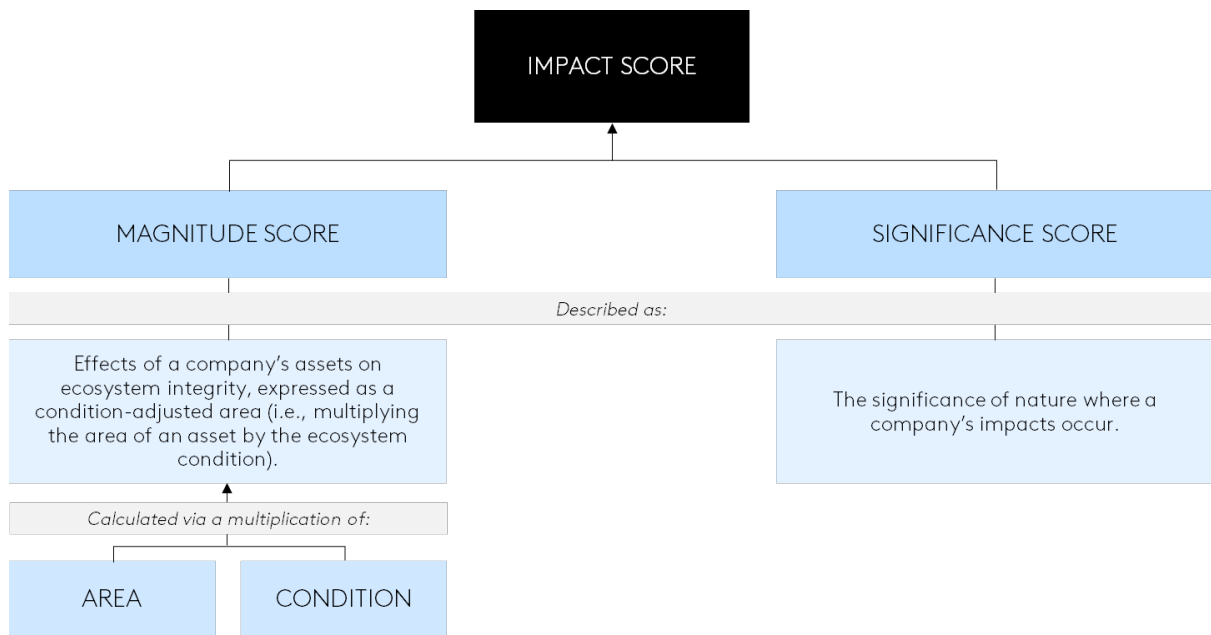


Impact score

The company can estimate the extent of its potential impact on nature by calculating an impact score for each of its sites/assets based on two underlying factors which can also be scored: magnitude and significance (shown in Figure 7).¹¹¹⁰ The magnitude of the company’s impact on nature can be estimated via a concept of condition-adjusted area. Significance, on the other hand, considers the importance of environmental assets in the area, how integral the continued supply of ecosystem services is to the company, and the potential knock-on effects of impacts on nature in the area. Given that the impact scores are specific to the company’s sites/assets, they can be used by the company to compare and prioritize locations for further assessment, monitoring, and/or action.

¹⁸ ENCORE’s ratings of dependencies and impact drivers are based on a set of quantitative, and/or qualitative indicators. Where there are suitable quantitative data available, use of quantitative indicators is prioritized, and the quantitative indicators are taken from global databases and studies. Materiality ratings that draw on quantitative indicators, due to varying sizes of economic activities, are analyzed based on the distribution of per 1 EUR of output values. For more information on ENCORE’s methodology to materiality ratings, refer to ENCORE’s [materiality ratings webpage](#).

Figure 7: The UNEP Nature Risk Profile methodology's approach to potential impact scoring



For both dependencies and impacts, the company can choose to perform its evaluation across all its sites/assets (i.e., portfolio-wide) or on a number of individual sites/assets (i.e., asset level). This decision should be made based on the company's available resources and subsequent intended use of the evaluation results. For example, the latter may be more applicable for companies looking to prioritize sites/assets for mitigation or follow-up actions in the context of limited budget and other resources. One way to prioritize sites/assets for dependency and impact/impact driver evaluation is based on the results of Step 2 (LEAP's L4), whereby sites/assets that overlap with ecologically sensitive locations are prioritized. Conversely, companies undertaking a nature risk and opportunity assessment for the first time, or those with sufficient resources or a small portfolio of sites/assets, may opt to perform dependency and impact/impact driver evaluation for all their sites/assets.

CASE STUDY: IDENTIFICATION AND EVALUATION OF WEST FRASER'S DEPENDENCIES, IMPACTS, AND IMPACT DRIVERS

West Fraser leveraged UNEP's Nature Risk Profile methodology to identify and evaluate its nature-related dependencies, impact drivers, and impacts. West Fraser also evaluated dependencies and impacts/impact drivers for all its FMU areas and mill sites in scope for its assessment. Therefore, it did not use the results of its analysis on its interface with ecologically sensitive locations (from Step 2) to prioritize specific FMU areas and mill sites for dependency and impact/impact driver evaluation. Instead, West Fraser chose to perform the evaluation for all assets in the scope of the assessment. Nonetheless, the results of West Fraser's Step 2 analysis are important for its continued monitoring of its interface with nature and ecologically sensitive locations and may be used to prioritize specific assets for ongoing dependency and impact driver/impact evaluation, as well as risk identification, prioritization, and mitigation actions as part of future iterations of the assessment. A summary of the process is laid out below, and more details can be found in UNEP's guidance document, including a full breakdown of the methodology's steps.¹¹¹⁰

Identification of Dependencies and Impact Drivers

West Fraser generated an initial longlist of its dependencies and impact drivers by applying a sector-level filter, using ENCORE's Explore tool to identify dependencies and impact drivers material to the International

Standard Industrial Classification of All Economic Activities' ("ISIC") industry groups of silviculture and logging (for FMU areas), and sawmilling and wood planning (for mills).¹⁹

For each dependency and impact driver, ENCORE's Explore tool provides a materiality rating for the sector, which ranged from "very low" to "very high". Normalized scores, ranging from 0 to 1, as described in the previous section, were then assigned to each dependency and impact driver based on their qualitative ENCORE rating, this is demonstrated in the following table. As West Fraser's dependencies and impact drivers may differ between FMU areas and mill sites, some were considered "not applicable" by ENCORE and hence were assigned a score of 0 (e.g., West Fraser's FMU areas are very highly dependent on soil quality regulation services, whereas its mills are not dependent on this ecosystem service; hence, this ecosystem service was assigned a score of 1 for FMUs and 0 for mills). These scores were subsequently used in the evaluation of the dependencies and impact drivers.

ENCORE's Materiality Ratings	Corresponding Score Assigned
Very high	1.0
High	0.8
Medium	0.6
Low	0.4
Very low	0.2
Not applicable	0.0

Output(s): A list of dependencies and impact drivers material to West Fraser based on its business activities, ENCORE materiality ratings for dependencies and impact drivers ranging from "very low" to "very high", and their corresponding assigned scores ranging from 0 to 1.

Data sources used: West Fraser's business activity categories in line with the ISIC economic activity classification system.

Evaluation of Dependencies

For each ecosystem service identified as a West Fraser dependency via the ENCORE Explore tool, a composite dependency score was calculated for each FMU area and mill site following the UNEP Nature Risk Profile methodology approach to dependency scoring. Each composite dependency score was calculated using a logarithmic function of the scores of the underlying materiality, relevance, and resilience factors.

- **Materiality** – Scores, ranging from 0 to 1, for each ecosystem service were assigned based on their qualitative ratings from the ENCORE Explore tool;
- **Relevance** – Relevance is a location-dependent factor, which means that the potential benefits gained from certain ecosystem services are highly location specific, for example the benefit of flood mitigation is only relevant to locations at risk of flooding. Therefore, for select ecosystem services relevance was calculated from data overlapping with West Fraser's FMU areas or within 10 km of their mill sites (i.e., the overall dependency of West Fraser on these ecosystem services was calculated using location specific data). For example, the provision of genetic materials, like seeds, could come from areas outside of West Fraser's FMU areas and hence relevance scores were not calculated for genetic material services. Relevance is assessed using one or more geospatial datasets that best describe the relative exposure at a given location. Relevance scores are normalized to a 0-1 scale for easier aggregation and integration into the overall, composite dependency score for each FMU area and mill site.²⁰ For example, to assess the relative exposure of an FMU to biomass provisioning services, the European Space Agency's aboveground biomass

¹⁹ Exploring Natural Capital Opportunities, Risks, and Exposure ("ENCORE") is a free, online tool that aims to help organizations explore their exposure to nature-related risk by setting out how economic sectors, subsectors, and activities depend on and impact nature. It follows the economic activity classification system of the International Standard Industrial Classification of All Economic Activities ("ISIC") developed by the United Nations' Statistics Division.

²⁰ Where possible, West Fraser utilized datasets with the most localized scales and finest spatial resolutions possible to use data that are most relevant to West Fraser's business activities and Alberta's ecological landscape. These were largely at either the national (i.e., Canada) or global scales, and at spatial resolutions of 300 m or less, apart from one dataset with a 1 km spatial resolution and another with a 11 km spatial resolution. For more information on considerations and potential limitations related to West Fraser's approach, including datasets and metrics/indicators/indices used, refer to Appendix D.

dataset was used. An area of low aboveground biomass is considered to have a higher exposure as West Fraser will be more reliant on biomass provisioning services for the trees in these locations to regrow and replace the biomass stock required for their activities. A location with a high level of aboveground biomass is considered lower exposure because the biomass has already been provisioned. When normalized, the presence of aboveground biomass was scaled between 0 and 1, based on the Alberta regional maximum value of 374 tonnes/hectare, hereby 1 represents no biomass present (highest exposure), and hence a high dependency on the ecosystem service to provide timber via tree growth for harvesting, and 0 represents the densest level of biomass, and hence minimal dependency on the ecosystem service given the already abundant presence of timber for harvesting. To compare sites based on their overall relevance scores with respect to all local ecosystem services, West Fraser employed a two-stage process whereby (1) the input datasets were processed and combined into a single composite data layer using either their mean or maximum values (depending on the specific approach required to assess relevance for a given ecosystem service), and (2) the mean or maximum score for each FMU or mill site was calculated, using zonal statistics²¹; and

- Resilience – Only ecosystem services that are provided at a local level had resilience scores generated (i.e., the overall dependency of West Fraser on these ecosystem services was calculated using location-specific data). Resilience scores were estimated using the Ecosystem Integrity Index, which uses geospatial data, and are calculated on a 0-1 scale, which ensures they can be aggregated and integrated into the overall, composite dependency score for each FMU area and mill site.²² For West Fraser’s water-supply-related and soil-quality-related ecosystem service dependencies, the Ecosystem Integrity Index was not used as more appropriate geospatial datasets are available for these ecosystem services.

As all the underlying scores for Materiality, Relevance, and Resilience are normalized to a 0-1 scale, the composite dependency scores are also on the same scale, with 0 indicating no dependency, and 1 indicating very high dependency. This means that they can be combined to give overall scores while also enabling comparisons between locations and/or ecosystem services. Qualitative ratings ranging from “very low” to “very high” were assigned to each dependency based on their mean composite scores across all FMU areas and mill sites, using the same approach ENCORE uses for grouping qualitative materiality ratings with corresponding quantitative scores. The qualitative ratings supported the subsequent prioritization of dependencies for translation into risks and opportunities (Steps 4 and 5).

Output(s): For each of West Fraser’s FMU areas and mill sites in Alberta* and across each of the ecosystem service dependencies identified from the ENCORE Explore tool, a composite dependency score and the underlying materiality, relevance, and resilience scores, normalized to a 0-1 scale (see Figures 8-10 for an example of one FMU); for each of West Fraser’s dependencies identified from the ENCORE Explore tool, a mean composite score across all FMU areas and mill sites, normalized to a 0-1 scale, and the corresponding qualitative rating.

*West Fraser’s FMU areas and mill sites were evaluated separately as FMU operations and mill operations fall under different parts of the wood products value chain and may have different dependencies and impact drivers which may give rise to different business risks and opportunities.

²¹ Alternative statistics may be used at either stage in this process depending on the specific approach being followed, e.g. the maximum may be used to create the composite data layer when you are looking at extreme temperatures.

²² Ecosystem Integrity Index provides an estimation of the condition and capacity of the ecosystems where business operations are taking place at any geographical scale. It is a combination of geospatial layers representing the three components of ecosystem integrity—ecosystem structure, ecosystem composition, and ecosystem functioning. Ecosystem structure reflects the effect of habitat area, intactness, and fragmentation. Ecosystem composition refers to the species present and the overall species diversity. Ecosystem function refers to the core processes that occur within the ecosystem as a result of interactions between living and non-living components. For more information on considerations and potential limitations related to West Fraser’s approach, including datasets and metrics/indicators/indices used, refer to Appendix D.

Figure 8: Composite dependency scores across ecosystem services for an anonymized West Fraser FMU area

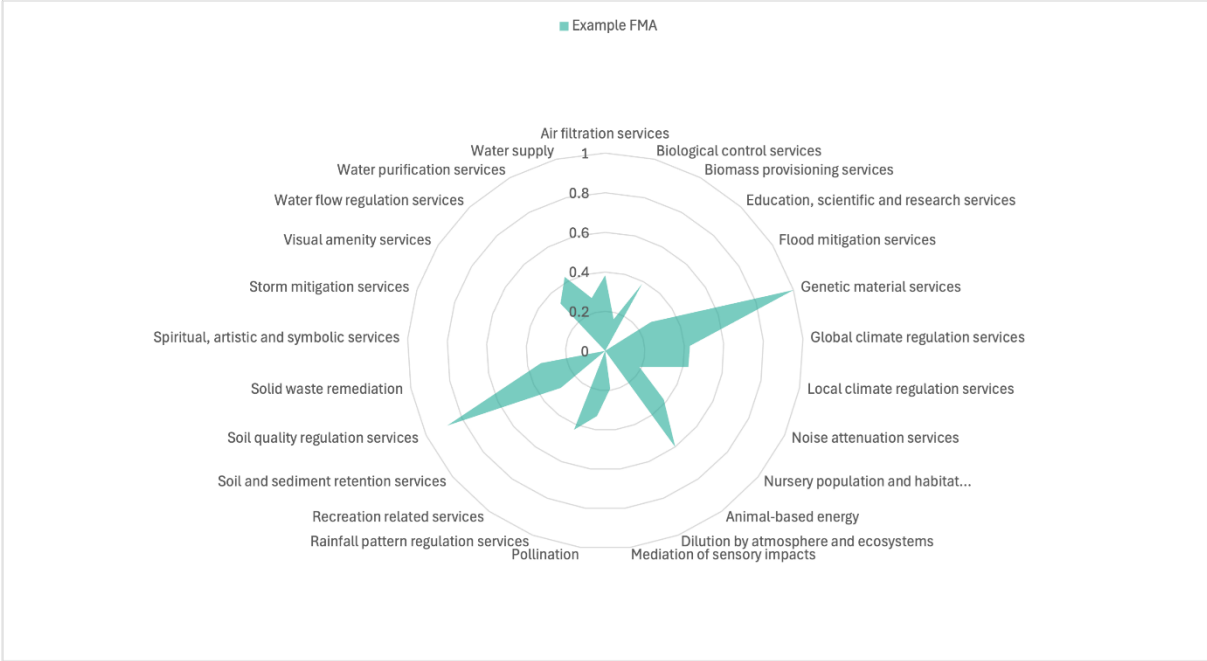


Figure 9: Dependency scoring for an anonymized West Fraser FMU area

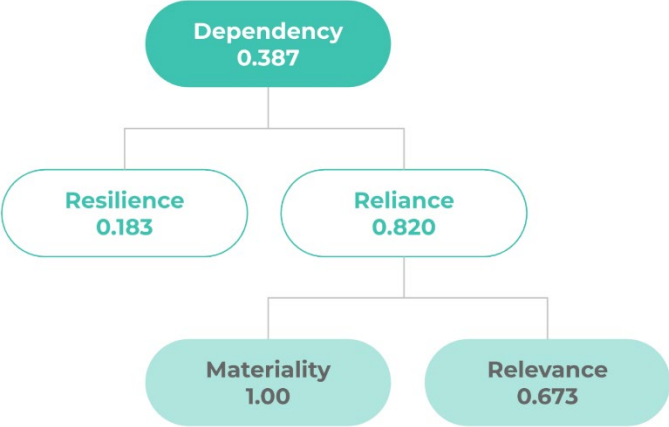
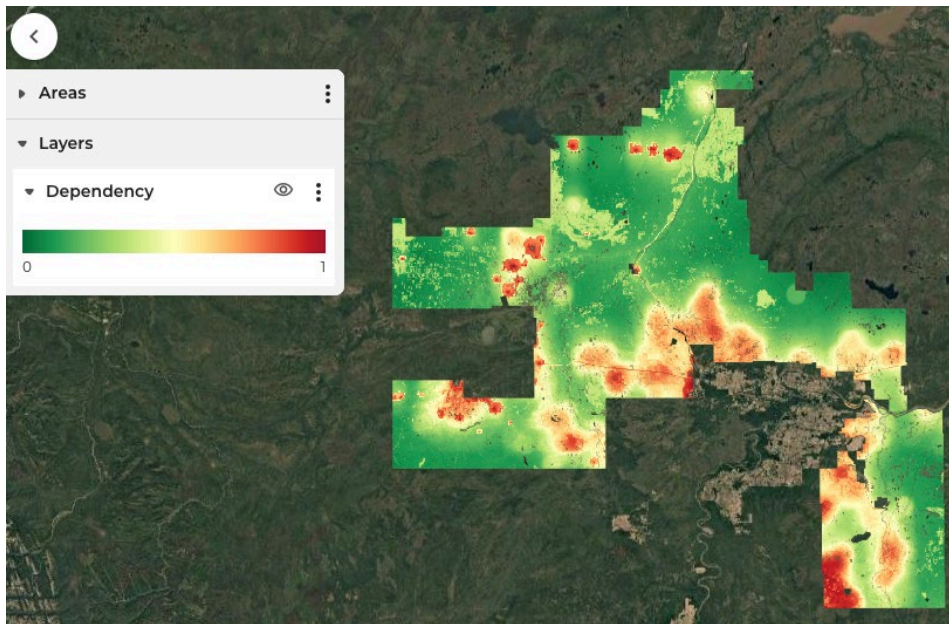


Figure 10: Variation in composite dependency scores within an anonymized West Fraser FMU area, incorporating all ecosystem service dependencies



Data sources used: Global, continental (North America), national (Canada), and provincial (Alberta) databases; geospatial data of West Fraser’s FMU areas and mill sites in Alberta.²³

Evaluation of Impacts and Impact Drivers

West Fraser estimated and evaluated both its impacts and impact drivers on nature, though impact drivers were the predominant focus of Steps 4 and 5 (LEAP’s ‘Assess’ phase) for West Fraser. Analyzing and quantifying impacts at the FMU and mill level can support considerations around geographic distribution and magnitude of asset-level impacts and guide West Fraser’s risk management actions specific to these assets as well as considerations of how nature-related impacts may translate into financial impacts. However, analyzing impact drivers can also provide West Fraser with a broader understanding of how its different activities may affect nature (i.e., how these drivers lead to impacts) and how changes in its activities may give rise to various business risks and opportunities. Furthermore, given the variation in asset-level impacts across companies, investors and other external stakeholders who undertake nature-related due diligence may look to evaluate companies and make decisions based on their sustainability performance at the impact driver level, given easier comparability of impact drivers across companies. As such, in its initial assessment, West Fraser focused on impact drivers for the identification, evaluation, and prioritization of risks and opportunities as part of the LEAP’s ‘Assess’ phase.

Impacts

A composite impact score was calculated for each FMU area and mill site following the UNEP Nature Risk Profile methodology’s approach to impact scoring. Each composite impact score was calculated as a product of the scores of the underlying magnitude and significance factors. These scores were normalized to a 0-1 scale whereby 0 indicates no impact and 1 indicates the highest level of impact.

- Magnitude – Condition-adjusted area was calculated by multiplying the area of West Fraser’s FMU area or mill site by the area’s ecosystem condition. Ecosystem condition was estimated using the Ecosystem Integrity Index, similar to the resilience factor under the dependency scoring approach;²²²² and
- Significance – Scores, ranging from 0 to 1, were estimated using an approach similar to the ecological sensitivity scoring approach in Step 2 but with physical water risk excluded. Given significant overlap between TNFD’s definition of a sensitive ecosystem and what might constitute ecosystem

²³ For the full list of data sources used, refer to Appendix H.

significance, a subset of the datasets used to estimate ecological sensitivity in Step 2 were selected and used to calculate this step's significance scores.

Output(s): For each of West Fraser's FMU areas and mill sites in Alberta*, a composite impact score and the underlying magnitude and significance scores, normalized to a 0-1 scale. (see Figures 11 – 12 for an example of one FMU).

Figure 11: Impact scoring for an anonymized West Fraser FMU area

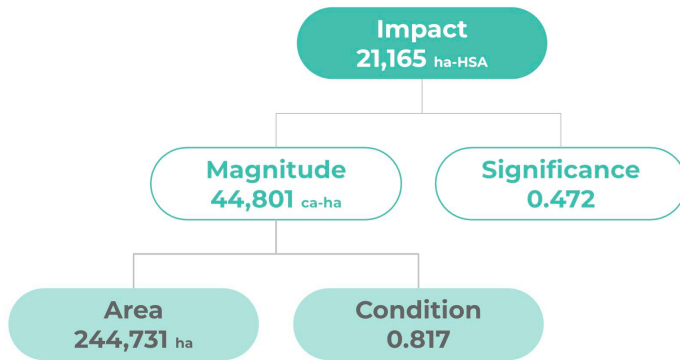
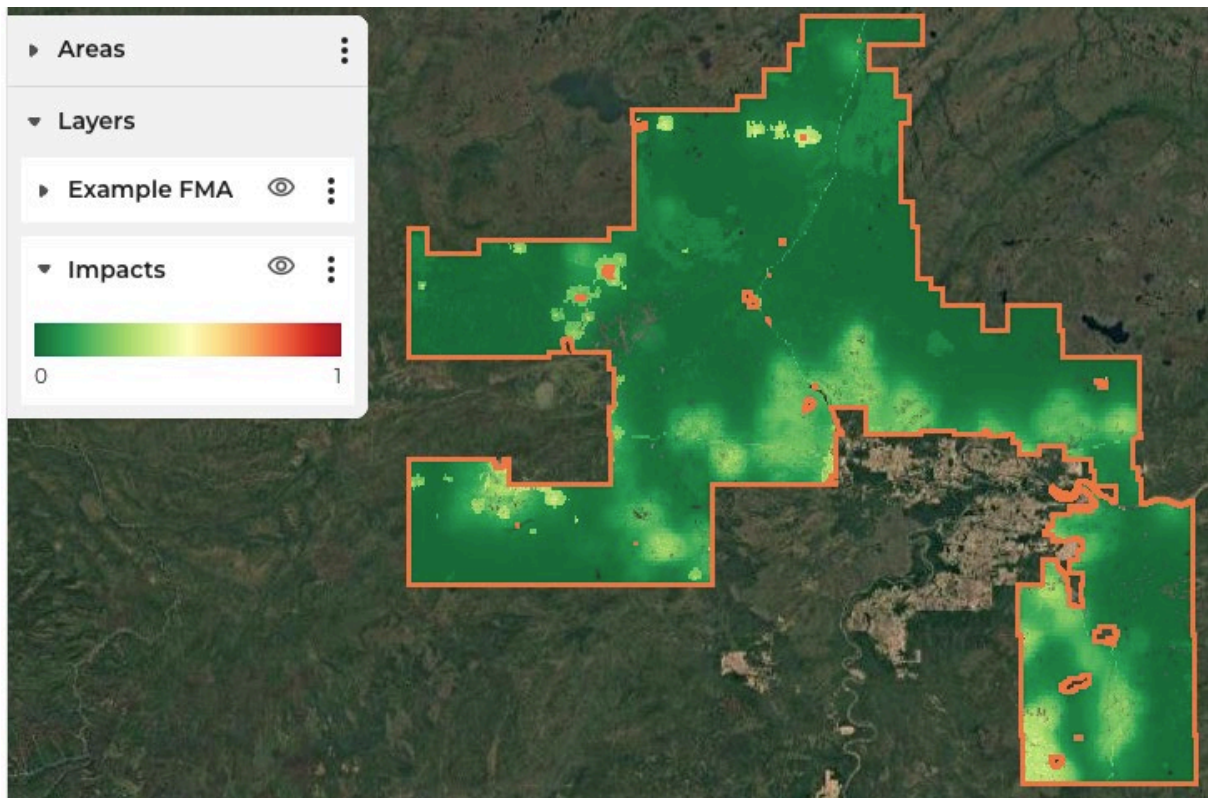


Figure 12: Variation in composite impact scores within an anonymized West Fraser FMU area. Magnitude is measured in condition-adjusted hectares (ca-Ha), and Impact is measured in hectares-equivalent of highest significant area (Ha-HSA).



Data sources used: Global, continental (North America), national (Canada), and provincial (Alberta) databases; geospatial data of West Fraser's FMU areas and mill sites in Alberta.²⁴

²⁴ For the full list of data sources used, refer to Appendix I.

Impact drivers

For West Fraser's impact drivers, scores were calculated for each FMU area and mill site across a subset of the impact drivers identified via the ENCORE Explore tool.²⁵ To assess the degree of impact, a 0-1 score was calculated using geospatial data to estimate the level of impact, whereby 0 indicates no impact and 1 indicates the highest level of impact. For example, using the land cover of North America's dataset to estimate land use change from natural to unnatural land cover, the mean conversion score for each of West Fraser's FMU areas was scaled between 0 and 1 whereby 1 indicates that all natural land had been converted into an unnatural land cover type from a base year and 0 indicates no change or an increase in natural land cover types.

Qualitative ratings ranging from "very low" to "very high" were then assigned to each impact driver based on their mean composite scores across all FMU areas and mill sites, similar to the approach used for grouping ENCORE's qualitative materiality ratings with their corresponding quantitative scores. The qualitative ratings supported the subsequent prioritization of impact drivers for translation into nature-related risks and opportunities (Steps 4 and 5).

Output(s): For each of West Fraser's impact drivers identified from the ENCORE Explore tool, a mean composite score across all FMU areas and mill sites, normalized to a 0-1 scale, and the corresponding qualitative rating.

Data sources used: Global, continental (North America), national (Canada), and provincial (Alberta) databases; geospatial data of West Fraser's FMU areas and mill sites in Alberta.²⁴²⁴

STEP 4 – IDENTIFYING, ASSESSING, AND PRIORITIZING RISKS FROM PRIORITY DEPENDENCIES AND IMPACT DRIVERS/IMPACTS

Relevant LEAP component: A1, A2, A3, A4

Key technical guidance: TNFD LEAP approach guidance²; TNFD additional guidance for forestry, pulp, and paper sector⁴; TNFD risk and opportunity registers²⁶

Translating dependencies and impact drivers/impacts into risks and opportunities enables companies to determine how their interactions with nature may have implications for their businesses, across their operations and supply chains, and for society. Dependencies and impact drivers alone may not result in material commercial consequences to a company. However, business risks may arise from these dependencies and impact drivers when there are (i) changes to the state of nature (i.e., impacts) caused by the company's impact drivers or other external factors, (ii) changes to the stocks and/or flows of ecosystem services which the company depends on, associated with the changes to the state of nature, and/or (iii) impacts to society resulting from the company's impacts on nature, which in turn may affect the company.² Additionally, strong dependencies on nature (e.g., use of freshwater) may sometimes contribute to potential impacts on nature (e.g., declines in freshwater available for other users), which can then manifest into risks for the business and/or for society (e.g., water scarcity).

Companies can focus their assessment of potential risks based on dependencies and impact drivers/impacts identified as material in Step 3. For example, TNFD notes that a company may use its longlist of dependencies and impact drivers/impacts identified in Step 3 to then narrow these into a shortlist of priority dependencies and impact drivers/impacts. Companies can apply prioritization criteria or thresholds most suitable for their specific business contexts. After developing a shortlist of priority dependencies and impact drivers/impacts, the company can identify corresponding risks, leveraging TNFD's risk categories, including physical risks (acute, chronic), transition risks (policy, market, technology, reputational, liability), and systemic risks

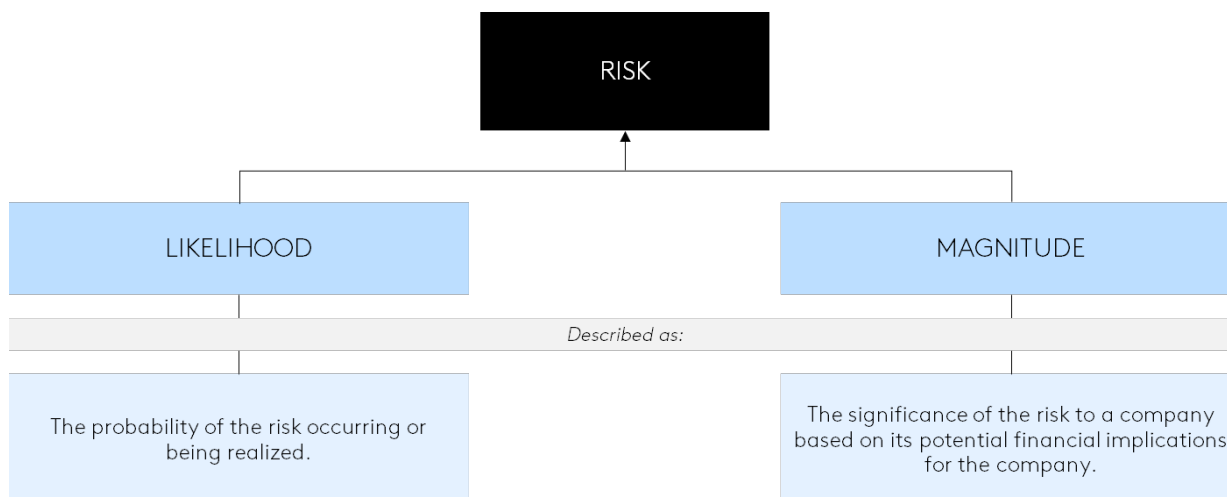
²⁵ Due to several limitations, including limited data availability, time constraints, and analysis complexity, certain impact drivers identified via the ENCORE Explore tool were excluded from West Fraser's assessment. They may be included in future iterations as data availability, existing methodologies, and West Fraser's experience with LEAP-aligned nature risk and opportunity assessments develop.

²⁶ TNFD (2023) [Nature-related Risk and Opportunity Registers](#).

(ecosystem stability, financial stability).²⁷ TNFD’s risk and opportunity registers and additional guidance for the forestry, pulp and paper sector provide examples of dependency-driven and impact-driver-driven risks.

Once business risks have been identified from the company’s priority dependencies and impact drivers, the company can begin to assess and prioritize the risks. TNFD recommends that companies assess and prioritize their nature-related risks based on several criteria, and link their risk assessments back to their broader enterprise risk management frameworks and approaches, where possible.²² TNFD notes, though, that many companies use a traditional likelihood-magnitude approach to gauge the severity or materiality of their risks and then assess the severity of their risks relative to their risk appetite and risk tolerance. The two criteria underpinning this approach are shown in Figure 13.

Figure 13: TNFD’s approach to risk assessment and prioritization



CASE STUDY: IDENTIFICATION, ASSESSMENT, AND PRIORITIZATION OF WEST FRASER’S RISKS

Prioritization of Dependencies and Impact Drivers for Translation into Risks

Dependencies with at least one "high" or "very high" FMU or mill rating or those with "medium" for both of their FMU and mill ratings from Step 3 were prioritized for identification and assessment of corresponding risks for West Fraser. For West Fraser’s assessment, all impact drivers identified were prioritized for translation into risks, primarily given: (i) all impact drivers were rated similarly in Step 3; and (ii) due to their direct link with West Fraser’s business activities, West Fraser’s greater control over them, and their importance for investor due diligence and decision making.²⁸ In future iterations of West Fraser’s nature risk and opportunity assessment, additional impact drivers may be evaluated.

Output(s): A shortlist of priority dependencies and impact drivers for translation into risks.

Data sources used: Qualitative ratings of each dependency and impact driver identified in Step 3 for West Fraser’s FMU and mill portfolios.

Identification of Risks/Translation of Dependencies and Impact Drivers into Risks

West Fraser’s priority dependencies and impact drivers were then used to identify potential corresponding nature-related business risks, leveraging TNFD’s risk and opportunity registers and additional guidance for the forestry, pulp, and paper sector. These risks were further categorized based on TNFD’s physical, transition, and systemic risk categories.

²⁷ For descriptions of the TNFD’s nature-related risk categories, refer to Appendix K.

²⁸ West Fraser estimated and evaluated both its impacts and impact drivers on nature. For the purposes of risk identification in Step 4, West Fraser initially focused on identifying and prioritizing risks at the impact driver level, given a more direct ability to influence and measure impact drivers, compared to impacts (i.e., changes to the state of nature and ecosystem services), which vary across its FMU areas and mill sites. As part of ongoing evaluation of its risk management practices and potential future iterations of the LEAP assessment, West Fraser may integrate more granular impact data to expand its evaluation and prioritization of impact drivers and consideration of how these translate into additional risks and opportunities.

In West Fraser's assessment, its dependencies largely drove physical risks. However, in some cases, dependencies also gave rise to potential transition risks (e.g., liability risk) related to the role ecosystem services (upon which West Fraser depends) can play in reducing or mitigating the frequency or severity of acute environmental events, which may, in turn, impact West Fraser's sites, operations, or employees. Additionally, West-Fraser-driven impact drivers may influence certain ecosystem services that West Fraser is also dependent upon, giving rise to additional physical risks. Lastly, West Fraser's impact drivers largely gave rise to potential transition risks associated with regulatory requirements, reputation, liabilities, and market shifts.

Output(s): A list of business risks for West Fraser, including their descriptions and categorizations according to TNFD's risk categories.

Data sources used: West Fraser's priority dependencies and impact drivers.

Analysis and Rating of Identified Risks

West Fraser analyzed its identified risks following TNFD's recommended primary criteria for assessing and prioritizing risks through evaluating the likelihood of occurrence and magnitude of impact. "Low", "medium", or "high" ratings were then assigned to each risk across the two criteria. The ratings were informed by the following considerations:

- Likelihood of occurrence defined as:
 - Ratings for priority dependencies and/or impact drivers identified in Step 3 that underpin each risk; and
 - West Fraser's plans, policies, certifications, regulatory compliance obligations, governance structures/processes, and/or other initiatives that address the corresponding nature-related business risk. Examples include, but are not limited to, West Fraser's Sustainable Forest and Wood Procurement Policy, Biodiversity Policy, Environmental Policy, Alberta Forest Management Plans, fiber sourcing and chain-of-custody certifications, and enterprise risk management framework.
- Magnitude of impact defined as:
 - The materiality and type of commercial implications on West Fraser's business related to potential nature-related business risk (e.g., financial, operational, reputational, legal, market); and
 - Expected timescale of the potential commercial implications on West Fraser's business related to the nature-related business risk (i.e., near, medium, long terms).

In certain cases, risk ratings were adjusted from the generally applied rating approach. This occurred on a case-by-case basis and was driven by the unique context of the specific risk. For example, in certain cases, West Fraser's alignment with Alberta's rigorous regulatory requirements for forestry sector companies and resulting obligations for forestry management and planning was considered to be an important factor that reduced the likelihood or magnitude of certain policy-related transition risks.

In addition to the likelihood and magnitude ratings, West Fraser developed a heatmap based on the likelihood-magnitude ratings to enable deeper-dive comparison across its risks.

Output(s): For each risk identified, a likelihood rating and a magnitude rating; a heatmap of the likelihood-magnitude ratings.

Data sources used: West Fraser's priority dependencies and impact driver ratings from Step 3; West Fraser's resources and own understanding of their business.

Prioritization of Risks

Likelihood ratings and magnitude ratings were combined to produce a composite overall rating for each risk, ranging from "high", to "moderate", to "low", upon which the risks were prioritized. Prioritized risks from this assessment will help inform potential next steps for West Fraser with respect to enhancing its risk mitigation actions and measuring and monitoring progress in these areas.

Output(s): For each risk identified, an overall rating.

Data sources used: Qualitative likelihood and magnitude ratings of each risk identified.

STEP 5 – IDENTIFYING AND ASSESSING OPPORTUNITIES

Relevant LEAP components: A1, A2, A3, A4

Key technical guidance: TNFD LEAP approach guidance²; TNFD additional guidance for forestry, pulp, and paper sector⁴; TNFD risk and opportunity registers²⁶²⁶

In addition to business risks, a company's interface/interactions with nature may also present new commercial opportunities that, if actioned, can drive revenue generating opportunities linked to sustainable outcomes and strengthen long-term business viability while improving impacts on nature. Nature-related opportunities, as defined by TNFD, are activities that create positive outcomes for companies and nature through positive impacts or the mitigation of negative impacts on nature.²

Companies in the forest products sector may have a wide range of potential commercial opportunities that are informed by their dependencies and impact drivers/impacts on nature. For example, these can occur when they avoid, reduce, mitigate, or manage their nature-related risks, or through the strategic transformation of their business models, products, services, markets, and investments that actively work to reduce their negative effects on nature while reducing costs and improving efficiencies, strengthening alignment with consumer preferences, gaining access to lower costs of capital, and/or generating additional revenue. These may include the implementation of climate-smart forestry practices, the restoration of natural forest dynamics and regeneration cycles and the implementation of nature-based solutions.

It is important to recognize that active forest management can itself be a direct source of positive outcomes for nature, independent of any associated commercial opportunity. Well-designed harvesting, silviculture, and stand management practices can enhance biodiversity by creating structural diversity and early successional habitat, improve forest health and resilience by reducing fuel loads and pest pressure, and support the recovery of natural regeneration cycles that might otherwise be suppressed by overcrowding or disease. These benefits are not incidental: they reflect the reality that managed forests exist on a continuum of human and ecological interactions, and that intervention in the natural world is not universally negative. The positive and negative effects of forest management on nature shift across space and time, and a comprehensive assessment of nature-related opportunities for forestry companies should explicitly account for the ecological value that active, science-based forest stewardship can generate in its own right.

Companies that are still in the early stages of understanding their interface/interactions with nature can start identifying opportunities by focusing on those relevant to their broader sector. For forestry companies and wood manufacturers, this may include referencing TNFD's additional guidance for the forestry, pulp, and paper sector, TNFD's [risk and opportunity registers](#), their own double materiality assessments, and opportunities already in motion in their local markets. However, since nature-related opportunities and prioritization of these opportunities should be informed by a company's business context, companies should refine this initial suite of potentially relevant opportunities based on their priority dependencies, impact drivers, and risks, as well as their specific strategic, operational, capacity, geographical, market, and stakeholder contexts. Companies can define and categorize opportunities leveraging TNFD's opportunity categories, including markets, products and services, capital flow and financing, resource efficiency, and reputational capital opportunities.²⁹

While business opportunities can arise from restoring nature and mitigating existing damage through reconstructive or compensatory measures, TNFD recommends that business actions that avoid or minimize negative impacts on nature should be prioritized, following mitigation hierarchy principles and SBTN's Avoid, Reduce, Regenerate, Restore, and Transform ("AR3T") framework.^{2,30,31} Subsequently, companies can look to gradually expand beyond risk reduction to influencing the threats and pressures that drive nature loss and

²⁹ For descriptions of the TNFD's nature-related opportunity categories, refer to Appendix L.

³⁰ Developed by the Science Based Targets Network ("SBTN"), the AR3T framework—Avoid, Reduce, Regenerate, Restore, Transform—lays out four types of actions that companies should follow sequentially to apply the mitigation hierarchy for avoiding or minimizing negative impacts on nature.

³¹ SBTN (2020) [Initial Guidance for Business](#).

degradation, and investing in activities that conserve and restore nature. Therefore, strategic transformation is likely to be more impactful than the mitigation or management of nature-related risks in isolation.

CASE STUDY: IDENTIFICATION AND ASSESSMENT OF WEST FRASER'S OPPORTUNITIES

West Fraser initially identified a longlist of forestry sector opportunities potentially relevant to its business and aligned to TNFD's opportunity categories. The initial suite of opportunities will continue to be refined based on the following considerations:

- West Fraser's priority dependencies, impact drivers, and risks;
- West Fraser's existing initiatives that may influence or act upon any of the identified opportunities;
- West Fraser's strategic priorities and available budget and other resources; and
- Existing market conditions and future market outlook, and their resulting potential impact on the feasibility of investing in the identified opportunities.

Over time, as West Fraser continues to build its understanding of its nature-related dependencies, impact drivers/impacts, risks, and opportunities, and as available industry guidance continues to develop, it will continue to reassess and prioritize its opportunities for potential investment/action to ensure that they align with supporting its overall business performance while reducing its negative impacts on nature.

Output(s): A list of business opportunities for West Fraser, including their descriptions and categorized according to TNFD's opportunity categories.

Data sources used: West Fraser's priority dependencies, impact drivers, and risks.

STEP 6 – PREPARING FOR IMPLEMENTATION AND REPORTING

Relevant LEAP components: P1, P2, P3, P4

Key technical guidance: TNFD LEAP approach guidance²; TNFD disclosure recommendations³²; TNFD additional guidance for forestry, pulp, and paper sector⁴

After a company has determined its nature-related dependencies, impacts, risks, and opportunities from Steps 2-5, it can use the insights gained from its assessment to inform discussions with internal stakeholders (e.g., senior management, board of directors) on how it should respond to the material nature-related issues identified. This may include making updates to business strategy, risk management, capital allocation decisions, and resource deployment, as well as consideration of potential disclosures for material nature-related issues in line with TNFD's recommended disclosures.

Post-assessment actions may include, but are not limited to:

- Presentation of assessment results to senior management teams from across the organization and discussion of the implications for strategy, risk management, and capital/resource allocation at the business unit and enterprise levels;
- Development of an action plan to respond to the priority nature-related dependencies, impacts, risks, and opportunities;
- Performing a gap assessment of the company's current state of nature-related disclosures and actions across governance, strategy, risk management, metrics, and targets, against the broader TNFD framework and disclosure requirements;
- Identification of metrics to set targets, measure progress, and report performance; and

³² TNFD (2023) [Recommendations of the Taskforce on Nature-related Financial Disclosures](#).

- Disclosure of material nature-related issues in line with TNFD’s recommended disclosures, subject to time, cost, and data constraints.

TNFD recommends that any decisions made should be framed within the broader corporate strategy and consider short-, medium-, and long-term considerations.²

CASE STUDY: WEST FRASER’S VALIDATION OF RISKS AND RISK RANKINGS

Ratings for each of the risks were taken to subject matter experts within West Fraser for validation. Meetings were held with the West Fraser Biodiversity Community of Excellence and these subject matter experts performed independent desktop reviews of the approach, ratings and risk mitigations considered. Subject matter experts were able to apply their knowledge of the efficacy of risk mitigation practices in Alberta to provide a more accurate likelihood of each of the risks. Risk mitigation activities were evaluated qualitatively and over the region generally, which is why including regional subject matter experts into the process was essential. Input from these individuals supported West Fraser in finalizing ratings for each of the risks. Final ratings were presented to senior leadership including the Chief Environment Sustainability Officer. Definitions of priority risks were reviewed with General Counsel and the CFO as part of the TNFD report Disclosure Committee review. As these risks were identified relating to a single geography, they will not be rolled into West Fraser’s enterprise risk management process without understanding the global corporate relevance.

Output(s): For each risk identified, a validated overall rating.

Data sources used: Meetings and desktop reviews with BCOE members.

In addition to this methodology and case study document, West Fraser plans to publish its first TNFD report that will contain its assessment’s approach, insights, and results as well as its broader governance, strategy, risk management, metrics, and targets relevant to its approach for managing nature-related risks and opportunities. Senior executives within the organization and members of West Fraser’s Biodiversity Community of Excellence will be engaged in a similar manner for the review process of its upcoming first TNFD report.

NEXT STEPS

As companies in the forest products sector explore the possibility of implementing TNFD’s recommendations, this methodology and West Fraser’s experience in implementing the LEAP approach within Alberta may provide a helpful example and guidance for other companies wanting to explore this process. This methodology and case study document aims to support the forest products sector in advancing a more standardized and comparable approach to assessing nature-related risks and opportunities through implementation of the TNFD framework. These findings can inform a company’s broader risk management approaches and can also generate business opportunities, which collectively may enhance and preserve long-term value for the company. However, it is important to recognize that datasets, tools, and methodologies to support LEAP-aligned assessments are expected to continue developing in response to corporates’ and financial institutions’ information needs related to nature, alongside the evolution of global and national regulatory frameworks and policies and investor expectations related to nature disclosures and actions. As these developments continue to unfold, companies may want to regularly review and refine their nature risk and opportunity assessments and their corresponding actions to ensure they align with regulatory, investor, and broader stakeholder expectations.

APPENDIX

A. Overview of the TNFD and the LEAP Approach

The Taskforce on Nature-related Financial Disclosures (“TNFD”), launched in June 2021, is a market-led and science-based initiative that aims to provide organizations in business and capital markets with the tools to act on evolving nature-related issues and with better quality information through corporate reporting on nature

that improves enterprise and portfolio risk management.³³ It is supported by national governments, businesses, and financial institutions worldwide and, as of July 2025, over 600 organizations from over 50 jurisdictions and with US\$20 trillion in assets have publicly committed to getting started with nature-related reporting aligned to the TNFD recommendations.³⁴ TNFD builds on and aligns with other corporate reporting frameworks and methodologies, including the Taskforce on Climate-related Financial Disclosures³⁵ (TCFD), following the structure on recommendations for governance, strategy, risk management, and metrics and targets.

TNFD’s recommendations and additional guidance materials are designed to help organizations report and act on evolving nature-related issues with the ultimate aim of supporting a shift in global financial flows away from nature-negative outcomes and toward nature-positive outcomes. They have been developed in close collaboration with TNFD’s knowledge partners, including standards bodies such as the International Sustainability Standards Board (“ISSB”) and the Global Reporting Initiative (“GRI”), scientific and conservation organizations such as the International Union for Conservation of Nature (“IUCN”) and the United Nations Environment Programme World Conservation Monitoring Centre (“UNEP-WCMC”), and framework providers including the Capitals Coalition and the Science Based Targets Network (“SBTN”). The LEAP approach (Locate, Evaluate, Assess, and Prepare, displayed in Figure 14) is an integrated approach that TNFD has developed for the identification and assessment of nature-related issues, designed for use by organizations of all sizes and across all sectors and geographies. The approach aims to help organizations conduct the due diligence necessary to inform disclosure statements aligned with the TNFD recommendations, but it is also useful for other organizations looking to identify and assess their nature-related issues, regardless of their formal disclosure requirements.

The four phases of the LEAP approach are:

- Locate your interface with nature;
- Evaluate your dependencies and impacts on nature;
- Assess your nature-related risks and opportunities; and
- Prepare to respond to nature-related risks and opportunities and to report on your material nature-related issues.

Figure 14: TNFD’s LEAP approach and its underlying components

L	LOCATE Interface with nature	E	EVALUATE Dependencies and impacts	A	ASSESS Material risks and opportunities	P	PREPARE To respond and report
L1	Business model and value chain	E1	Identification of environmental assets, ecosystem services, and impact drivers	A1	Risk and opportunity identification	P1	Strategy and resource allocation plans
L2	Dependency and impact screening	E2	Identification of dependencies and impacts	A2	Risk mitigation and risk and opportunity management	P2	Target setting and performance management
L3	Interface with nature	E3	Dependency and impact measurement	A3	Risk and opportunity measurement and prioritization	P3	Reporting
L4	Interface with sensitive locations	E4	Impact materiality assessment	A4	Risk and opportunity materiality assessment	P4	Presentation

³³ TNFD (2025) [About Us](#).

³⁴ TNFD (2025) [TNFD 2025 Status Report](#).

³⁵ In 2023, the TCFD officially disbanded, with the ISSB’s standards marking the culmination of the work of the TCFD. In a similar effort to simplify and align sustainability reporting frameworks, the TNFD is following a similar path to the TCFD’s transition and is working with the ISSB to create a global standard for nature disclosures that builds upon the TNFD recommendations. The TNFD plans to finalize its technical work by Q3 2026, then pause to support the ISSB, which is aiming to release a draft standard on nature-related disclosures for public consultation by October 2026.

B. About West Fraser and NCASI

West Fraser

West Fraser Ltd. is one of the world's largest producers of renewable wood building products, with over 50 facilities in Canada, the United States, the United Kingdom, and Europe.³⁶ Based in Vancouver, British Columbia, West Fraser produces lumber, engineered wood products (oriented strand board, laminated veneer lumber, medium-density fibreboard, plywood, and particleboard), pulp, newsprint, wood chips, and other residuals, while promoting sustainable practices across its operations. Its products are used in home construction, repair and remodelling, industrial applications, papers, and tissue.

NCASI

The National Council for Air and Stream Improvement, Inc. ("NCASI") is a 501 (c)(6) tax-exempt association organized to serve the forest products industry as a center of excellence providing unbiased, scientific research, and technical information necessary to achieve the industry's environmental and sustainability goals.³⁷ Since being established in 1943 by a consortium of pulp and paper companies committed to lowering the ecological impact of pulping and papermaking operations, NCASI has developed technical expertise that encompasses the full spectrum of environmental topics of interest to the broad forest products industry, including wood products manufacturing and forest management, in the United States, Canada, and beyond.

Despite the similar environmental characteristics of forest harvesting and manufacturing facilities operated by NCASI Member Companies in Canada to those operated by its U.S. Member Companies, the different land ownership pattern and regulatory platform create unique needs for science and data to help Canadian companies cost effectively meet their environment and sustainability goals. NCASI's Canadian Program is grounded in a research program to address the specific needs of its Canadian Member Companies, and it is undertaken by a staff team located in Montreal, Quebec that is well-versed in the nuances of operating in the Canadian landscape.³⁸

C. Glossary of Terms³⁹

Dependencies (on nature):	Aspects of environmental assets and ecosystem services that a person or an organization relies on to function.
Ecosystem services:	The contributions of ecosystems to the benefits that are used in economic and other human activity.
Forest products sector:	Companies in the entire value chain of forestry management to the manufacturing of forest-derived goods. This includes companies involved in the management and harvesting of forests, the manufacturing of solid wood and engineered wood products, and the production of pulp, paper, and bio-based wood energy products.
Impacts (on nature):	Changes in the state of nature (quality or quantity) which may result in changes to the capacity of nature to provide social and economic functions. Impacts can be positive or negative. They can be the result of an organization's or another party's actions and can be direct, indirect, or cumulative. A single impact driver may be associated with multiple impacts.
Impact drivers:	A measurable quantity of a natural resource that is used as a natural input to production or a measurable non-product output of a business activity.

³⁶ West Fraser (2025) [West Fraser 2024 Annual Report](#).

³⁷ NCASI (2025) [About NCASI](#).

³⁸ NCASI (2025) [Canadian Program](#).

³⁹ This glossary of terms is adapted from the TNFD's [glossary of terms](#).

Index:	A composite or aggregate measure, formed by combining multiple metrics or indicators into a single numerical value, usually through normalization and weighting.
Indicator:	A qualitative or quantitative factor or variable that provides a simple and reliable means to estimate or reflect the status of a condition, the achievement of a result, or changes linked to an intervention, especially when the desired outcome is difficult to measure directly.
Materiality assessment:	A materiality assessment identifies environmental, social, and governance issues that significantly affect a company's performance. Traditional approaches to materiality assessments focus solely on impacts to the company. A double materiality assessment expands this scope by considering both environmental, social, and governance issues that significantly affect a company's financial performance as well as the effects the company has on people and the environment.
Metric:	A standardized and repeatable quantitative measurement of a specific attribute, according to a well-defined scale or standard.
Nature-related opportunities:	Activities that create positive outcomes for organizations and nature by creating positive impacts on nature or mitigating negative impacts on nature.
Nature-related risks:	Risks resulting from the degradation of nature and consequential loss of ecosystem services that economic activity depends upon.
Zonal statistics	<p>A spatial analysis method that summarizes the values of a raster dataset (such as land cover, elevation, or biodiversity indices) within defined geographic zones or boundaries, producing aggregate metrics such as mean, sum, or majority class for each zone.</p> <p>A raster data set is a spatial data format that represents geographic information as a grid of cells (pixels), where each cell contains a value corresponding to a feature or measurement at that location, such as land cover type, elevation, or vegetation density.</p>

D. Statement on the Potential Limitations of West Fraser's Nature Risk and Opportunity Assessment

It is important to recognize that there may be several limitations to the case study examples outlined in this methodology document, which are based on West Fraser's initial nature risk and opportunity assessment. Companies seeking to perform their own assessments should consider the strengths and weaknesses of the various calculation methods, datasets, metrics/indicators/indices, assumptions, and resources used by West Fraser, and ultimately consider what is most suitable for their own business contexts. Several examples of potential limitations for consideration related to West Fraser's approach for its initial assessment are outlined below.

Where possible, West Fraser utilized datasets with the most localized scales and finest spatial resolutions possible to use data that are most relevant to its business activities and Alberta's ecological landscape. For example, national datasets (i.e., Canada scale) were only used when no provincial datasets (i.e., Alberta scale) were publicly available, and global datasets were only used when no datasets that were more localized (e.g., continental, national, provincial) were publicly available. Finer spatial resolutions (e.g., 30 m) were prioritized over larger spatial resolutions (e.g., 1 km). Using more localized datasets with finer spatial resolutions helps ensure that West Fraser's assessment is more tailored to its specific operational and geographic contexts and relationship with nature. However, it is important to also recognize that global datasets may be useful for

comparing assets across very different regions and where localized datasets may not be comparable and/or available.

Ecosystem Integrity Index (“EII”), which is used to estimate the resilience of West Fraser’s ecosystem service dependencies, is identified by the UNEP Nature Risk Profile methodology as a best practice measure for estimating the condition and capacity of the ecosystems where business operations are taking place at any geographical scale.¹¹¹⁰ However, EII has several limitations, including but not limited to difficulty in distinguishing managed lands and possibly degraded lands outside of forest management areas, the fact that it is an aggregated set of indicators representing the ecosystem integrity of an area rather than a full ecosystem assessment of the area, and one of the input datasets for ecosystem function (one of the three components of EII) is static (i.e., without a time series).⁴⁰ Although the methodology for calculating EII is detailed and transparent, it is important to recognize that it is not calibrated to national forest inventories or forest management data. Therefore, EII scores should ideally be validated with local forest monitoring data.

E. Overview of Alberta’s Forest Tenure System

The Government of Alberta manages all timber located on provincial public lands. The province’s forest management system is a legislated framework that ensures sustainable use of public forest lands by balancing ecological, economic, and social goals. It uses long-term planning through Forest Management Agreements and includes operational rules, adaptive management, and public and Indigenous consultations to address biodiversity, water, and forest health values for future generations.

A Forest Management Agreement (“FMA”) is a long-term (20 years), renewable, area-based form of forest tenure.⁴¹ Guided by standards like the Alberta Forest Management Planning Standard (“AFMPS”) and Canada’s national standard for sustainable forest management (CAN/CSA-Z809), it is the most secure type of tenure in Alberta. Through the FMA, a company is given certain rights, including the right to establish, grow, harvest, and remove timber, in exchange for various responsibilities such as forest management planning, reforestation, and maintenance of the forest inventory. FMA holders are required to have an approved Forest Management Plan (“FMP”) and an approved annual operating plan in place before any timber can be harvested.

Forest Management Units (“FMUs”) are geographic zones that divide Alberta’s forested public lands into manageable areas for planning and oversight. Each FMU serves as the foundation for allocating timber through various tenure types, such as FMAs, quotas, and other types of timber harvesting permits, and ensures that forest activities are tailored to the specific ecological, economic, and social characteristics of the region. FMAs help organize sustainable forest management by enabling localized planning, monitoring, and stakeholder engagement. FMAs in Alberta are managed through a combination of government oversight and tenure holders. FMA holders are responsible for managing the FMUs where they hold rights, including preparing FMPs, whereas the Government of Alberta oversees forest planning and harvest allocation through permits and/or quotas for FMUs not allocated through FMAs.

F. Data Sources Used for West Fraser’s Analysis of Interface with Nature (Step 2/LEAP’s L3)⁴²

Category & Underlying Components	Publisher	Dataset	Spatial Resolution	Last Update	Update Frequency	Description
National Ecological Framework for Canada						
Ecoprovinces	Government of Canada	Terrestrial Ecoprovinces of Canada	NA	1999	Irregular	This dataset provides representations of ecoprovinces in Canada. It is one of three levels from the National Ecological Framework for Canada.

⁴⁰ Grantham et al. (2020) [Anthropogenic Modification of Forests Means Only 40% of Remaining Forests Have High Ecosystem Integrity](#).

⁴¹ Government of Alberta (2025) [Forest Management Agreements](#).

⁴² The West Fraser project team worked closely with NCASI to identify datasets to use in West Fraser’s nature risk and opportunity assessment. Using the TNFD’s recommended sources and types of data as a starting point for consideration, West Fraser and NCASI ultimately decided on and used datasets that were most relevant to West Fraser’s business activities and Alberta’s ecological landscape. This process helped to ensure the assessment used the most locally relevant datasets and was highly tailored to West Fraser’s specific operational and geographic contexts and relationship with nature.

Category & Underlying Components	Publisher	Dataset	Spatial Resolution	Last Update	Update Frequency	Description
Ecoregions	Government of Canada	Terrestrial Ecoregions of Canada	NA	1999	Irregular	This dataset provides representations of ecoregions in Canada. It is one of three levels from the National Ecological Framework for Canada.
Land Cover Types						
Land cover types	North American Land Change Monitoring System	Land Cover of North America	30m	2020	Irregular	This dataset reflects land cover information for 2020 from Mexico and Canada, 2019 over the conterminous United States, and 2021 over Alaska. Each country developed its own classification method to identify land cover and provided an input layer to produce a continental map across North America.
Wetland types	Alberta Biodiversity Monitoring Institute	Alberta Wetland Inventory	1km	2021	"As needed"	Province-wide wetland inventory classification according to the Alberta Wetland Classification System - fen, bog, swamp, marsh. Open water class includes both shallow and deep open water features.
Indigenous Territories						
Indigenous territories	LandMark	Indigenous and Local Community Lands	NA	2024	Regular updates	Locally defined boundaries of the lands that are held or used by Indigenous Peoples and Local Communities.
	LandMark	Indigenous and Community Natural Resource Rights	NA	2024	Regular updates	Locations where community groups have rights to harvesting, hunting, fishing, herding, or grazing.
Areas of Biodiversity and Conservation Value						
Protected areas	Government of Canada	Canadian Protected and Conserved Areas Database	NA	2024	Regular (annual review)	This dataset contains the most up-to-date spatial and attribute data on marine and terrestrial protected areas and other effective area-based conservation measures in Canada. CPCAD is compiled and managed by Environment and Climate Change Canada, in collaboration with federal, provincial, territorial jurisdictions, and other data providers.
	Government of Alberta	Alberta Parks and Protected Areas	NA	2025	Irregular	This dataset contains parks and protected area boundaries for sites administered by the Government of Alberta. National parks, because of their similar intent, are also included.
Key Biodiversity Areas	KBA Canada	Canada Key Biodiversity Areas	NA	2024	Every 8-12 years	This dataset is a comprehensive database of sites that are scientifically identified as critical for the long-term persistence of biodiversity in Canada. This dataset, developed by a coalition of conservation groups, provides information on areas that are essential for various species and ecosystems, guiding conservation decisions and planning.
Ecological corridors	Parks Canada	National Priority Areas for Ecological Corridors (Canada)	NA	2022	Not planned	This dataset was developed using a scientific framework for national-scale prioritization of where ecological corridors are most urgently needed. They are derived from the internationally recognized International Union for Conservation of Nature's Guidelines on Connectivity and adapted to the Canadian context.
Critical habitats of at-risk species	Government of Canada	Critical Habitat for Species at Risk - Canada	NA	2025	"As needed"	This dataset maps the critical habitat for terrestrial species at risk in Canada. It is based on the federal Species at Risk Act and identifies the areas necessary for a species' survival or recovery. It includes information from recovery strategies and action plans, and for sensitive species, the data may be generalized to a coarser resolution to protect the species' locations.
	Government of Canada	Critical Habitat of Aquatic Species at Risk	NA	2025	"As needed"	This dataset describes the critical habitat for endangered or threatened aquatic species in Canada, as identified under the federal Species at Risk Act. The data outlines the geographic areas necessary for the survival or recovery of these species, serving to inform users about the proximity of critical habitat and the legal prohibition against its destruction.

G. Data Sources Used for West Fraser’s Analysis of Interface with Ecologically Sensitive Locations (Step 2/LEAP’s L4)⁴²⁴²

Criteria & Underlying Components	Publisher	Dataset	Spatial Resolution	Latest Update	Update Frequency	Description
Importance for Biodiversity						
Species diversity	Natural History Museum	Species Richness – All Species	1km	2016	Irregular	A relative measure of the number of common native species within each 1-km ² grid cell across the province.
	ImpactObservatory	Biodiversity Intactness Index	100m	2020	Yearly (2017-2020)	A metric combining the abundance and composition of biodiversity to represent how much of an ecosystem’s natural biodiversity remains.
	Natural Resources Canada	Canada Long Term Tree Species	30m	2022	Annual to 2022	Annual maps of dominant tree species (37 in total) across Canada’s 650 million hectares of forested land from 1984 to 2022. Regional Random Forest models were trained on Canada’s National Forest Inventory data and used Landsat time-series imagery at 30 m resolution.
Habitat distribution and condition	Government of Canada	Critical Habitat for Species at Risk National Dataset – Canada	NA	2025	“As needed”	This dataset maps the critical habitat for terrestrial species at risk in Canada. It is based on the federal Species at Risk Act and identifies the areas necessary for a species’ survival or recovery. It includes information from recovery strategies and action plans, and for sensitive species, the data may be generalized to a coarser resolution to protect the species’ locations.
	Government of Canada	Critical Habitat of Aquatic Species at Risk	NA	2025	“As needed”	This dataset describes the critical habitat for endangered or threatened aquatic species in Canada, as identified under the federal Species at Risk Act. The data outlines the geographic areas necessary for the survival or recovery of these species, serving to inform users about the proximity of critical habitat and the legal prohibition against its destruction.
Areas of national or regional biodiversity significance	Government of Alberta	Alberta Parks and Protected Areas	NA	2025	Irregular	This dataset contains parks and protected area boundaries for sites administered by the Government of Alberta. National parks, because of their similar intent, are also included.
	Government of Canada	Canadian Protected and Conserved Areas Database	NA	2024	Regular (annual review)	This dataset contains the most up-to-date spatial and attribute data on marine and terrestrial protected areas and other effective area-based conservation measures in Canada. CPCAD is compiled and managed by Environment and Climate Change Canada, in collaboration with federal, provincial, territorial jurisdictions, and other data providers.
	Government of Alberta	Key Wildlife & Biodiversity Zones	NA	2015	Irregular	This dataset provides information for land management to help minimize human impact on wildlife. It identifies specific areas that are crucial for maintaining regional biodiversity. It is intended to guide industry and government departments in land-use planning.
	KBA Canada	Canada Key Biodiversity Areas	NA	2024	Every 8-12 years	This dataset is a comprehensive database of sites that are scientifically identified as critical for the long-term persistence of biodiversity in Canada. This dataset, developed by a coalition of conservation groups, provides information on areas that are essential for various species and ecosystems, guiding conservation decisions and planning.

Criteria & Underlying Components	Publisher	Dataset	Spatial Resolution	Latest Update	Update Frequency	Description
	Parks Canada	National Priority Areas for Ecological Corridors (Canada)	NA	2022	Not planned	This dataset was developed using a scientific framework for national-scale prioritization of where ecological corridors are most urgently needed. They are derived from the internationally recognized International Union for Conservation of Nature's Guidelines on Connectivity and adapted to the Canadian context.
Ecosystem Integrity						
Forest land cover	Natural Resources Canada	Canada Annual Forest Land Cover Maps	30m	2022	Annual	This dataset offers annual forest land cover maps across Canada's entire 650 million hectares of forested ecosystems, spanning 1984–2022. These wall-to-wall maps were generated using annual Landsat image composites, forest change data, and ancillary topographic and hydrologic layers.
	Wildlife Conservation Society	Forest Landscape Integrity Index	300m	2019	Static layer	A global index of forest integrity based on anthropogenic forest pressures and connectivity loss.
Ecosystem intactness	Beyer et al. 2019	Ecosystem Intactness Index	~0.3km	2017	Irregular	A measure of ecosystem structure based on cumulative human pressures. Uses inverted map of global human modification to represent habitat quality and then further processed to account for fragmentation.
	Government of Alberta	Native Cover	NA	2021	Annual 2018-2021	This indicator measures the percentage of natural land in each pixel that is free of visible human footprint. It includes both aquatic (e.g., lakes, swamps) and terrestrial (e.g., forests, grasslands) native cover.
	Government of Alberta	Interior Habitat	NA	2018	Bi-annual for 2014-2018	This dataset quantifies the remaining habitat in Alberta by calculating the percentage of remaining habitat outside of human footprints and their associated buffer zones. It measures both the direct loss of habitat and the additional negative impact of edge effects.
Ecosystem connectivity	Government of Alberta	Landscape Connectivity Indicator for Alberta (Canada)	NA	2021	Irregular	This indicator tracks connectivity changes over time using an Equivalent Connected Area index. Connectivity values for these types, and an aggregated value, were calculated for all HUC 8 watersheds in Alberta for 2010, 2018, 2019, 2020, and 2021.
	Government of Alberta	Stream Connectivity	NA	2018	Bi-annual for 2014-2018	This dataset assesses the health of stream systems by measuring how human-made barriers impact the movement of aquatic species. It calculates the probability that a barrier is "hanging" and obstructing the flow of the network.
Ecosystem function	NASA	NASA MODIS Net Primary Productivity	500m	2023	Annual	This dataset provides global estimates of carbon captured by vegetation, calculated by subtracting respiration from gross primary productivity.
	EnviDat	CHELSA-BIOCLIM+ Potential Net Primary Productivity	1km	2022	Static layer	This dataset represents the NPP which could be expected if climate was the only limiting factor. This is useful for establishing a baseline for maximum ecosystem potential.
Ecosystem Decline						
Disturbance	Government of Canada	Canada Landsat Disturbance (CanLad)	30m	2024	Annual	Forest disturbance types include wildfire, harvesting, pest outbreaks, windthrow, and new water bodies. The method is based on the summer composite Landsat time series. Only pest outbreaks and defoliation are used in this assessment.
Species diversity	ImpactObservatory	Biodiversity Intactness Index	100m	2020	Annual (2017-2020)	A metric combining the abundance and composition of biodiversity to represent how much of an ecosystem's natural biodiversity remains.

Criteria & Underlying Components	Publisher	Dataset	Spatial Resolution	Latest Update	Update Frequency	Description
	Natural Resources Canada	Canada Long Term Tree Species	30m	2022	Annual	Annual maps of dominant tree species (37 in total) across Canada's 650 million hectares of forested land from 1984 to 2022. Regional Random Forest models were trained on Canada's National Forest Inventory data and used Landsat time-series imagery at 30 m resolution.
Ecosystem intactness	Government of Alberta	Native Cover	NA	2021	Annual (2018-2021)	This indicator measures the percentage of natural land in each pixel that is free of visible human footprint. It includes both aquatic (e.g., lakes, swamps) and terrestrial (e.g., forests, grasslands) native cover.
	Government of Alberta	Interior Habitat	NA	2018	Bi-annual (2014-2018)	This dataset quantifies the remaining habitat in Alberta by calculating the percentage of remaining habitat outside of human footprints and their associated buffer zones. It measures both the direct loss of habitat and the additional negative impact of edge effects.
Ecosystem connectivity	Government of Alberta	Landscape Connectivity Indicator for Alberta (Canada)	NA	2021	Irregular	This indicator tracks connectivity changes over time using an Equivalent Connected Area index. Connectivity values for these types, and an aggregated value, were calculated for all HUC 8 watersheds in Alberta for 2010, 2018, 2019, 2020, and 2021.
	Government of Alberta	Stream Connectivity	NA	2018	Bi-annual (2014-2018)	This dataset assesses the health of stream systems by measuring how human-made barriers impact the movement of aquatic species. It calculates the probability that a barrier is "hanging" and obstructing the flow of the network.
Ecosystem function	NASA	NASA MODIS Net Primary Productivity	500m	2023	Annual	This dataset provides global estimates of carbon captured by vegetation, calculated by subtracting respiration from gross primary productivity.
	EnviDat	CHELSA-BIOCLIM+ Potential Net Primary Productivity	1km	2022	Static layer	This dataset represents the NPP which could be expected if climate was the only limiting factor. This is useful for establishing a baseline for maximum ecosystem potential.
Physical Water Risk						
Water risk	World Resources Institute	Aqueduct WRI Water Risk	NA	2023	Every 4-5 years	A collection of 13 water quality, quantity, and risk scores. Scores are available individually or aggregated into grouped risk scores with different weightings for sectors. Here, the default aggregated risk score is used to include all 13 water quality scores in a composite.
	National Oceanic and Atmospheric Administration	North American Drought Monitor	2.5km	2025	Monthly	A gridded version of the North American Drought Monitor ("NADM") produced by Canadian, Mexican, and US authors, where the value given by the current NADM drought classification for that region is either "wet" or a value between 1 and 4 categorizing the drought level.
Importance for Ecosystem Service Provision						
Human reliance on ecosystem services	Conservation International	Critical Natural Assets	~2km	2020	Static layer	Related to nature's contribution to people ("NCP"), maps of critical natural assets on both land and in oceans for the year 2020.
Importance for conservation	International Institute for Applied Systems Analysis	Areas of Global Conservation Value	10km	2019	Static layer	Areas of global importance for conserving terrestrial biodiversity, carbon, and water.
Important stocks of environmental assets	Conservation International	Irrecoverable Carbon	300m	2018	2010 and 2018	Maps of global irrecoverable carbon in ecosystems, highlighting carbon stocks that, if lost, cannot be recovered by mid-century.
	Alberta Biodiversity Monitoring Institute	Alberta Wetland Inventory	1km	2021	"As needed"	Province-wide wetland inventory classification according to the Alberta Wetland Classification System - fen, bog, swamp, marsh. Open water class includes both shallow and deep open water features.

Criteria & Underlying Components	Publisher	Dataset	Spatial Resolution	Latest Update	Update Frequency	Description
	NERC EDS Centre for Environmental Data Analysis	ESA Aboveground Biomass	100m	2021	Irregular	Global aboveground biomass estimates for years between 2010 and 2021 (intermittent).
	McMaster University	Canada Soil Carbon Stock	250m	2020	Static image	Soil carbon stock map of Canada, produced in 2020 and involving five years of data collection.

H. Data Sources Used for West Fraser's Evaluation of Dependencies (Step 3/LEAP's E2-E3)⁴²⁴²

Factor & Underlying Components	Publisher	Dataset	Spatial Resolution	Latest Update	Update Frequency	Description
Materiality						
Materiality	Global Canopy, UNEP FI, UNEP-WCMC	ENCORE	NA	2024	Irregular	ENCORE sets out how economic activity depends and impacts on nature by providing normalised (0-1) scores on how material these relationships are to different ecosystem services.
Relevance						
Biological control	Government of Canada	Canada Landsat Disturbance (CanLad)	30m	2024	Annual	Forest disturbance types include wildfire, harvesting, pest outbreaks, windthrow, and new water bodies. The method is based on the summer composite Landsat time series. Only pest outbreaks and defoliation are used in this assessment.
	Natural Resources Canada	Canada Annual Forest Land Cover Maps	30m	2022	Annual	This dataset offers annual forest land cover maps across Canada's entire 650 million hectares of forested ecosystems, spanning 1984–2022. These wall-to-wall maps were generated using annual Landsat image composites, forest change data, and ancillary topographic and hydrologic layers.
Biomass provisioning	NERC EDS Centre for Environmental Data Analysis	ESA Aboveground Biomass	100m	2021	Irregular	Global aboveground biomass estimates for years between 2010 and 2021 (intermittent).
Flood mitigation	World Resources Institute	Aqueduct WRI Water Risk	NA	2023	Every 4-5 years	A collection of 13 water quality, quantity, and risk scores. Scores are available individually or aggregated into grouped risk scores with different weightings for sectors. Here, the default aggregated risk score is used to include all 13 water quality scores in a composite.
Soil and sediment retention	NASA	NASA Landslide Susceptibility Map	1km	2017	Static layer	This dataset evaluates landslide potential, incorporating data on key factors such as slope, forest loss, roads, bedrock and soil strength, and fault lines to produce a map of landslide susceptibility.
	European Soil Data Centre	GLOSEM (Soil Erosion)	100m	2022	Static layer	This dataset provides a baseline (2019) global soil erosion map, primarily soil displacement caused by water erosion in arable lands. The calculation of model parameters was based on the integration of diverse spatial datasets related to climate, land use/cover, soils, and topography.
Storm mitigation	Copernicus Climate Change Service	ERA5-Land Daily Aggregated Data	~11km	2025	Daily	A comprehensive dataset combining model data with observations for a range of climate and land variables over several decades. Used here for wind speed data.
	Government of Canada	Canada Landsat Disturbance (CanLad)	30m	2024	Annual	Forest disturbance types include wildfire, harvesting, pest outbreaks, windthrow, and new water bodies. The method is based on the summer composite Landsat time series. Only pest outbreaks and defoliation are used in this assessment.
Resilience						

Factor & Underlying Components	Publisher	Dataset	Spatial Resolution	Latest Update	Update Frequency	Description
Ecosystem structure	Beyer et al. 2019	Ecosystem Intactness Index	~0.3km	2017	Irregular	A measure of ecosystem structure based on cumulative human pressures. Uses inverted map of global human modification to represent habitat quality and then further processed to account for fragmentation.
Ecosystem composition	ImpactObservatory	Biodiversity Intactness Index	100m	2020	Annual (2017-2020)	A metric combining the abundance and composition of biodiversity to represent how much of an ecosystem's natural biodiversity remains.
Ecosystem functioning	NASA	NASA MODIS Net Primary Productivity	500m	2023	Annual	This dataset provides global estimates of carbon captured by vegetation, calculated by subtracting respiration from gross primary productivity.
	EnviDat	CHELSA-BIOCLIM+ Potential Net Primary Productivity	1km	2022	Static layer	This dataset represents the NPP which could be expected if climate was the only limiting factor. This is useful for establishing a baseline for maximum ecosystem potential.
Water supply	World Resources Institute	Aqueduct WRI Water Risk	NA	2023	Every 4-5 years	A collection of 13 water quality, quantity, and risk scores. Scores are available individually or aggregated into grouped risk scores with different weightings for sectors. Here, the default aggregated risk score is used to include all 13 water quality scores in a composite.
	National Oceanic and Atmospheric Administration	North American Drought Monitor	2.5km	2023	Every 4-5 years	A gridded version of the North American Drought Monitor ("NADM") produced by Canadian, Mexican, and US authors, where the value given by the current NADM drought classification for that region is either "wet" or a value between 1 and 4 categorizing the drought level.
Soil quality	McMaster University	Canada Soil Carbon Stock	250m	2020	Irregular	Soil carbon stock map of Canada, produced in 2020 and involving five years of data collection.
	ISRIC — World Soil Information	Global Soil Salinity	250m	2019	Irregular, roughly every 5-8 years	Global soil salinity maps (1986-2016) created using seven soil property layers, thermal satellite data, and field data measurements to identify soils affected by salinity over time.

I. Data Sources Used for West Fraser's Evaluation of Impacts/Impact Drivers (Step 3/LEAP's E3-E4)^{42,42}

Factor & Underlying Components	Publisher	Dataset	Spatial Resolution	Latest Update	Update Frequency	Description
Area						
The area, in hectares, of each of West Fraser's FMU areas in scope for its nature risk and opportunity assessment. This factor does not include West Fraser's mill sites.						
Condition						
Ecosystem structure	Beyer et al. 2019	Ecosystem Intactness Index	~0.3km	2017	Irregular	A measure of ecosystem structure based on cumulative human pressures. Uses inverted map of global human modification to represent habitat quality and then further processed to account for fragmentation.
Ecosystem composition	ImpactObservatory	Biodiversity Intactness Index	100m	2020	Annual (2017-2020)	A metric combining the abundance and composition of biodiversity to represent how much of an ecosystem's natural biodiversity remains.
Ecosystem functioning	NASA	NASA MODIS Net Primary Productivity	500m	2023	Annual	This dataset provides global estimates of carbon captured by vegetation, calculated by subtracting respiration from gross primary productivity.
	EnviDat	CHELSA-BIOCLIM+ Potential Net Primary Productivity	1km	2022	Static layer	This dataset represents the NPP which could be expected if climate was the only limiting factor. This is useful for establishing a baseline for maximum ecosystem potential.

Significance						
Areas of national or regional biodiversity significance	Government of Alberta	Alberta Parks and Protected Areas	NA	2025	Irregular	This dataset contains parks and protected area boundaries for sites administered by the Government of Alberta. National parks, because of their similar intent, are also included.
	Government of Canada	Canadian Protected and Conserved Areas Database	NA	2024	Annual	This dataset contains the most up-to-date spatial and attribute data on marine and terrestrial protected areas and other effective area-based conservation measures in Canada. CPCAD is compiled and managed by Environment and Climate Change Canada, in collaboration with federal, provincial, territorial jurisdictions, and other data providers.
	Government of Alberta	Key Wildlife & Biodiversity Zones	NA	2015	Irregular	This dataset provides information for land management to help minimize human impact on wildlife. It identifies specific areas that are crucial for maintaining regional biodiversity. It is intended to guide industry and government departments in land-use planning.
	KBA Canada	Canada Key Biodiversity Areas	NA	2024	Every 8-12 years	This dataset is a comprehensive database of sites that are scientifically identified as critical for the long-term persistence of biodiversity in Canada. This dataset, developed by a coalition of conservation groups, provides information on areas that are essential for various species and ecosystems, guiding conservation decisions and planning.
	Parks Canada	National Priority Areas for Ecological Corridors (Canada)	NA	2022	Not planned	This dataset was developed using a scientific framework for national-scale prioritization of where ecological corridors are most urgently needed. They are derived from the internationally recognized International Union for Conservation of Nature's Guidelines on Connectivity and adapted to the Canadian context.
Ecosystem intactness and connectivity	Government of Alberta	Native Cover	NA	2021	Annual 2018-2021	This indicator measures the percentage of natural land in each pixel that is free of visible human footprint. It includes both aquatic (e.g., lakes, swamps) and terrestrial (e.g., forests, grasslands) native cover.
	Government of Alberta	Interior Habitat	NA	2018	Bi-annual (2014-2018)	This dataset quantifies the remaining habitat in Alberta by calculating the percentage of remaining habitat outside of human footprints and their associated buffer zones. It measures both the direct loss of habitat and the additional negative impact of edge effects.
	Government of Alberta	Landscape Connectivity Indicator for Alberta (Canada)	NA	2021	Irregular	This indicator tracks connectivity changes over time using an Equivalent Connected Area index. Connectivity values for these types, and an aggregated value, were calculated for all HUC 8 watersheds in Alberta for 2010, 2018, 2019, 2020, and 2021.
	Government of Alberta	Stream Connectivity	NA	2018	Bi-annual (2014-2018)	This dataset assesses the health of stream systems by measuring how human-made barriers impact the movement of aquatic species. It calculates the probability that a barrier is "hanging" and obstructing the flow of the network.
Importance in relation to species	Natural History Museum	Species Richness – All Species	1km	2016	Irregular	A relative measure of the number of common native species within each 1-km ² grid cell across the province.
	Government of Canada	Critical Habitat for Species at Risk National Dataset – Canada	NA	2025	"As needed"	This dataset maps the critical habitat for terrestrial species at risk in Canada. It is based on the federal Species at Risk Act and identifies the areas necessary for a species' survival or recovery. It includes information from recovery strategies and action plans, and for sensitive species, the data may be generalized to a coarser resolution to protect the species' locations.

	Government of Canada	Critical Habitat of Aquatic Species at Risk	NA	2025	"As needed"	This dataset describes the critical habitat for endangered or threatened aquatic species in Canada, as identified under the federal Species at Risk Act. The data outlines the geographic areas necessary for the survival or recovery of these species, serving to inform users about the proximity of critical habitat and the legal prohibition against its destruction.
	International Institute for Applied Systems Analysis	Areas of Global Conservation Value	10km	2019	Static layer	Areas of global importance for conserving terrestrial biodiversity, carbon, and water.
Human reliance on ecosystem services	Conservation International	Critical Natural Assets	~2km	2020	Single image	Related to nature's contribution to people ("NCP"), maps of critical natural assets on both land and in oceans for the year 2020.
Important stocks of environmental assets	Conservation International	Irrecoverable Carbon	300m	2018	2010 and 2018	Maps of global irrecoverable carbon in ecosystems, highlighting carbon stocks that, if lost, cannot be recovered by mid-century.
	Alberta Biodiversity Monitoring Institute	Alberta Wetland Inventory	1km	2021	"As needed"	Province-wide wetland inventory classification according to the Alberta Wetland Classification System - fen, bog, swamp, marsh. Open water class includes both shallow and deep open water features.
	NERC EDS Centre for Environmental Data Analysis	ESA Aboveground Biomass	100m	2021	Irregular	Global aboveground biomass estimates for years between 2010 and 2021 (intermittent).
	McMaster University	Canada Soil Carbon Stock	250m	2020	Static image	Soil carbon stock map of Canada, produced in 2020 and involving five years of data collection.
Impact Drivers						
Impact Drivers	Natural Resources Canada	Land Cover of North America	30m	2020	Irregular	This dataset reflects land cover information for 2020 from Mexico and Canada, 2019 over the conterminous United States, and 2021 over Alaska. Each country developed its own classification method to identify land cover and provided an input layer to produce a continental map across North America. The main inputs for image classification were 30-meter Landsat 8 data.
	Earth Observation Group	VIIRS Night Light	500m	2025	Monthly	A dataset of monthly global nighttime images that measures the intensity of light on Earth. This version is not filtered to remove non-urban lights like those from fires or the aurora.
	NERC EDS Centre for Environmental Data Analysis	ESA Aboveground Biomass	100m	2021	Irregular	Global aboveground biomass estimates for years between 2010 and 2021 (intermittent).

J. TNFD recommended list of datasets and tools relevant to the forestry, pulp and paper sector

Tool name	Description (relevance to sector)	LEAP phase	Included in WF Pilot?	Rationale for use of alternative tools/datasets
FSC Verified Impact	FSC Verified Impact helps forest managers and owners to quantify the intangible value of their forest with third-party validation.	Locate	No	This is a certification framework, part of which includes a 3 rd party audit. This project applied the Nature Risk Profile methodology.
Global Forest Watch	Geospatial data for monitoring companies and portfolios in forest-risk commodity supply chains. Can be used to build understanding of the extent of deforestation in forest-risk commodities and financing, focusing on the state of forests and the pressures.	Locate	No	Not useful within a forestry context of harvest and replanting cycles as forest loss is only identified once. Known uncertainties within the data, and more geographically relevant data used to understand areas of forest conversion. Land Cover of North America was used instead.

Common Guidance for the Identification of High Conservation Values	A good practice guide for identifying High Conservation Values (HCVs) across different ecosystems and production systems developed by the HCV Network.	Locate; Evaluate	No	More relevant data set identified: Landscape Connectivity Indicator for Alberta (Canada)
MapBiomass (Brazil)	Historical land cover and land use data, covering Brazil, the Amazon and the Gran Chaco. Allows visibility of deforestation over time.	Locate; Evaluate	No	Not geographically relevant. Land cover of North America was used instead.
FSC Search	A database that provides FSC certification and licensing information.	Locate; Evaluate; Assess	No	100% of West Fraser's Forest Management Areas piloted are Sustainable Forestry Initiative® (SFI) Forest Management certified. No alternative data needed.
FSC Risk Assessment Platform	This platform provides a simplified, easy-to-use overview of the contents of all 60 FSC risk assessments for use when applying FSC-STD-40-005 <i>Requirements for Sourcing FSC Controlled Wood</i> , with summaries of the risk descriptions and the precise control measures that are contained in the original risk assessments.	Locate; Evaluate; Assess	No	This platform was designed to support and simplify due diligence work for ensuring wood or paper products within your supply chain come from acceptable sources. Spatial data is available at a country level. This project applied the Nature Risk Profile methodology.
Programme for the Endorsement of Forest Certification (PEFC) Certificate Holder Database	This database helps users find PEFC-certified companies and provides information on them.	Locate; Assess	No	100% of West Fraser's Forest Management Areas piloted are SFI Forest Management certified. No alternative data needed.
Sustainable Forestry Initiative (SFI) Fiber Sourcing Standard and Certificate Holder locations	The SFI Fibre Sourcing Standard is for organizations that do not own or manage land but procure wood directly from forests. SFI-certified organizations must show that the raw material in their supply chain comes from legal and responsible sources, whether the forests are certified or not. Primary producers must be third-party audited and certified to the SFI 2022 Fiber Sourcing Standard. The SFI 2022 Fiber Sourcing Standard promotes responsible forestry practices through 13 Principles, 11 Objectives, 29 Performance Measures and 59 Indicators. These fiber sourcing requirements include measures to broaden the practice of biodiversity, use forestry best management practices to protect water quality, provide outreach to landowners and use the services of forest management and harvesting professionals. The Fiber Sourcing Standard applies to organizations in the United States and Canada that procure wood domestically or globally.	Locate; Evaluate; Assess; Prepare	No	100% of West Fraser's Forest Management Areas piloted are SFI Forest Management certified. No alternative data needed.
SFI Water Benefits Tool	This online tool provides access to summaries of some of the benefits of certified lands in the US. The data presented are based on geographic analysis of private and public land ownership boundaries, publicly available spatial data on lakes and streams, and state guidelines for protection of water quality.	Locate; Evaluate; Assess	No	Not geographically relevant. WRI Aqueduct data was used instead.
United States Department of Agriculture (USDA) Forest Service Climate Change Tree Atlas	A tool that enables exploration of current tree species and suitable habitats in the Eastern United States and how they are likely to be affected by changing climate. Models developed, which form the basis of Tree Atlas, bring together information about potential suitable habitat, migration potential and tree species traits for 125 tree species in the East, with an additional 23 species.	Locate; Evaluate	No	Not geographically relevant. Response of specific species to a changing climate was not assessed as part of this project.
Biostar	Biostar is designed to help stakeholders quantify and visualize the potential sustainability benefits and trade-offs of cellulosic biomass production systems.	Evaluate	No	Alternative selected: ESA Aboveground Biomass

Natural Capital Protocol Forest Products Sector Guide	The guide offers a standardized decision-making framework to help businesses along the forest products value chain to identify, measure and value their impacts and dependencies on natural capital. It is aimed primarily at managers from sustainability, environmental and operations departments from companies along the forest products value chain.	Evaluate	Yes	The framework broadly follows a similar approach to the LEAP framework used within the project. Does not have explicit guidance on how to make use of geospatial data and instead relies primarily on internal data and qualitative analysis. This project applied the Nature Risk Profile methodology.
FSC Document Centre	A core document repository that provides an overview of normative documents to help certificate holders understand the requirements they have to comply with.	Assess	No	Certification was used as an input for risk likelihood and severity ranking. West Fraser holds SFI Forest Management certification and Fibre Sourcing certification in the region piloted. No alternative data needed.
Global Illegal Logging and Associated Trade Risk Assessment Tool (ILAT Risk)	The tool is designed to give a better understanding of global trade in timber, pulp and paper products, revealing the main producers and processors of timber commodities as well as the trade routes associated with an elevated risk that the timber was illegally harvested or traded. Users can access global timber trade data and the ILAT Risk Data Tool can help raise flags related to the risk of illegal timber entering a supply chain. ILAT Risk provides publicly available global trade data as well as key proxies/indicators of risk for 211 countries.	Assess	No	In Alberta, West Fraser are the land managers and wood-product manufacturers. West Fraser's fibre for the piloted region is sourced within Canada only. No alternative data needed.
CostingNature	Web-based spatial policy support system for natural capital, accounting and analyzing the ecosystem services provided by natural environments (i.e., nature's benefits), identifying beneficiaries of these services and assessing impacts of human interventions.	Locate; Evaluate	No	Provides access to similar datasets. Globally applicable and typically coarser resolution. Where possible, this project preferred to use more local datasets with a higher resolution over global datasets.
Copernicus	Synthetic Aperture Radar (SAR) Analysis Ready Data (ARD) on land-use mapping, including hot spotting of environmentally stressed areas.	Locate; Evaluate	No	Datasets from the Copernicus program were used where relevant as part of this project.
Crowther Lab interactive maps	Provides interactive maps with key data about the Earth's ecosystems.	Locate; Evaluate		Have previously published some datasets similar to those used in this project, typically on a global scale. Where possible, this project preferred to use more local datasets with a higher resolution over global datasets.
ESG Signals Biodiversity	ESGSignals@ biodiversity metrics applied in financial analysis or due diligence to help estimate potential influence on the surrounding environment at asset and corporate level.	Locate; Evaluate		Alternative commercial data provider Earth Blox were the technical partners on this project.
Global Assessment of Ecoregion Intactness	Intactness metric including habitat loss, quality, fragmentation; calculated using continuous habitat quality measures. Uses 1 km ² resolution globally across 16-year period.	Locate; Evaluate		An updated version of this dataset was used, applying the same methodology but with more recent data at a higher resolution.
Google Earth Engine	Planetary-scale platform for Earth science data and analysis.	Locate; Evaluate		Earth Blox are Google partners and Google Earth Engine is one of the technologies underlying their product.
NatureServe Explorer	Information on rare and endangered species and ecosystems in the Americas, including data on 100,000+ species and ecosystems.	Locate	No	Not geographically available for Alberta. Data published by the Government of Alberta was used where these data may have been used.
RepRisk ESG Data	Third-party controversy data on a range of ESG topics to support materiality assessments, due diligence and monitoring.	Locate; Evaluate; Assess	No	ENCORE was used for materiality
TOOLS				
AWARE	Water use midpoint indicator representing Available Water REmaining per area in a watershed after human and ecosystem demand is met. Assesses potential water deprivation.	Evaluate	No	Typically, water related risks were assessed using the WRI Aqueduct datasets.
Environmental Justice Atlas	Maps conflicts across categories including nuclear, mining, waste, fossil fuels, energy, climate justice, infrastructure, tourism, recreation, biodiversity conservation and utilities.	Evaluate	No	Not relevant to this project.

Rezatec Geospatial AI	Geospatial AI for monitoring water infrastructure, water catchment areas, water quality, pipeline risk, etc. Includes forestry, agriculture and energy datasets.	Evaluate		Alternative commercial data provider. Earth Blox were the technical partners on this project.
Universal Human Rights Index	Allows exploration of 230,000+ human rights observations and recommendations made by the international human rights protection system.	Evaluate		Not relevant to this project.
EXIOBASE	Multi-regional environmentally-extended input-output database for estimating environmental impacts by sector and geography. Supports supply chain breakdown and relative impacts.	Evaluate		Not relevant to this project.
FAO Aquastat	Collects, analyses and provides free access to 180+ water variables and indicators by country since 1960.	Evaluate; Assess		Typically, water related risks were assessed using the WRI Aqueduct datasets.
GEMI Local Water Tool	Tool for organizations evaluating water-related impacts, business risks, and management plan sufficiency at specific sites.	Evaluate; Assess	No	Typically, water related risks were assessed using the WRI Aqueduct datasets.
Global Impact Database	Estimates impacts for organizations, countries and sectors.	Evaluate; As		Alternative commercial data provider. Earth Blox were the technical partners on this project.

K. TNFD's Nature-related Risk Categories⁴³

TNFD Risk Type / Category	Description
Physical risks	Risks to an organization, typically location specific, that arise from changes to the biotic and abiotic conditions of nature and the consequential loss of ecosystem services.
Acute	Occurrence of short-term, specific events that change the state of nature. ⁴⁴
Chronic	Gradual changes to the state of nature.
Transition risks	Risks to an organization that result from a misalignment of economic actors with actions aimed at protecting, restoring, and/or reducing negative impacts on nature.
Policy	Changes in the policy context due to new (or enforcement of existing) policies to create positive impacts on nature or mitigate negative impacts on nature.
Market	Changing dynamics in overall markets, including changes in consumer preferences, which arise from changing physical, regulatory, technological and reputational conditions and stakeholder dynamics.
Technology	Substitution of products or services with a reduced impact on nature and/or reduced dependency on nature.
Reputational Liability	Changes in perception concerning an organisation's actual or perceived nature impacts. Liability risks that arise directly or indirectly from legal claims as laws, regulations, and case law related to an organization's preparedness for nature action evolves.
Systemic risks	Risks to an organization that arise from the breakdown of the entire system, rather than the failure of individual parts. These risks are characterised by modest tipping points combining indirectly to produce large failures, where one loss triggers a chain of others, and prevents the system from reverting to its prior equilibrium.
Ecosystem stability	Risk of the destabilization of a critical natural system, so it can no longer provide ecosystem services in the same manner as before.
Financial stability	Risk that a materialization and compounding of physical and/or transition risks leads to the destabilization of an entire financial system.

L. TNFD's Nature-related Opportunity Categories^{43,43}

TNFD Opportunity Type / Category	Description
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⁴³ The descriptions of the nature-related risk and opportunity categories are adapted from the TNFD's [recommendations](#).

⁴⁴ The TNFD recognizes that time horizons may vary significantly across organizations. Therefore, it recommends that organizations should describe what they consider to be relevant short-term time horizons, as well as medium- and long-term time horizons, based on their specific business contexts. These may include the useful life of their assets, their business-cycle lengths, investment cycles, planning horizons, cash flow dynamics, and/or how users of financial reports view their time horizons.

Business performance	
Markets	Changing dynamics in overall markets that arise from other opportunity categories due to changing conditions, including consumer demands, consumer and investor sentiment, and stakeholder dynamics.
Products and services	Value proposition related to the creation or delivery of products and services that protect, manage, or restore nature, including technological innovations.
Capital flow and financing	Access to capital markets, improved financing terms, or financial products connected to positive nature impacts or the mitigation of negative impacts.
Resource efficiency	Actions an organization can take within its own operations or value chain to avoid or reduce dependencies and impacts on nature while achieving co-benefits like improved operational efficiency or reduced costs.
Reputational capital	Changes in perception concerning an organization's actual or perceived nature impacts, including the consequent impacts on society and engagement of stakeholders.
Sustainability performance	
Sustainable use of nature resources	Substitution of natural resources by recycled, regenerative, renewable, and/or ethically responsibly sourced organic inputs.
Ecosystem protection, restoration, and regeneration	Activities that support the protection, regeneration, or restoration of habitats and ecosystems, including areas both within and outside the organization's direct control.

M. Resources Referenced According to Footnote Number

- 2 TNFD (2023) [Guidance on the Identification and Assessment of Nature-related Issues: The LEAP Approach.](#)
- 4 TNFD (2024) [Additional Sector Guidance: Forestry, Pulp, and Paper.](#)
- 5 Alberta Forest Products Association (2025) [ASLTC Welcomes Federal Investment in Forestry Sector and Workers.](#)
- 6 Alberta Wilderness Association (2025) [Forests.](#)
- 7 Government of Alberta (2024) [Alberta's Forest Economy 2024.](#)
- 11 UNEP (2023) [Nature Risk Profile: A Methodology for Profiling Nature Related Dependencies and Impacts.](#)
- 17 Global Canopy, UNEP FI, UNEP-WCMC (2025) [ENCORE: Exploring Natural Capital Opportunities, Risks, and Exposure.](#)
- 18 ENCORE (2025) [Materiality Ratings.](#)
- 26 TNFD (2023) [Nature-related Risk and Opportunity Registers.](#)
- 31 SBTN (2020) [Initial Guidance for Business.](#)
- 32 TNFD (2023) [Recommendations of the Taskforce on Nature-related Financial Disclosures.](#)
- 33 TNFD (2025) [About Us.](#)
- 34 TNFD (2025) [TNFD 2025 Status Report.](#)
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- 37 NCASI (2025) [About NCASI.](#)
- 38 NCASI (2025) [Canadian Program.](#)
- 39 TNFD (2025) [Glossary of Terms.](#)
- 40 Grantham et al. (2020) [Anthropogenic Modification of Forests Means Only 40% of Remaining Forests Have High Ecosystem Integrity.](#)
- 41 Government of Alberta (2025) [Forest Management Agreements.](#)

N. Forward Looking Statements and Cautionary Statements for West Fraser

This TNFD Methodology and Case Study For Alberta's Forest Products Sector ("TNFD Methodology") has been prepared by a third party for West Fraser to support its application of the TNFD LEAP approach across West Fraser's forest management areas, quota tenures and mill sites in Alberta, Canada and forms the basis for information included in [West Fraser's 2025 TNFD Report](#). West Fraser engaged in this process to demonstrate our commitment to learning and strengthening how we assess and manage nature-related risks, dependencies, impacts and opportunities, as part of our commitment to transparency. The TNFD Methodology is provided for information purposes only and is not intended for reliance by third parties. West Fraser makes no representations or warranties as to the suitability, accuracy or completeness of the information contained therein. Any use of, or reliance on, the TNFD Methodology is at the user's sole risk, and West Fraser disclaims all liability arising from such use or reliance.