

World Wildlife Fund Canada

PRIMARY FORESTS IN CANADA: REGIONAL WORKSHOPS AND DIALOGUE

ENGAGEMENT SUMMARY

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EXECUTIVE SUMMARY

In January 2025, over the course of two weeks, WWF-Canada hosted two in-person workshops that brought together Indigenous organizations, researchers, representatives from the forest sector, government agencies, and environmental non-governmental organizations. The workshops focused on discussing the definition, extent, and importance of primary forests in Canada.

Through a two-day event, WWF-Canada aimed to gauge participants' understanding of primary forests—how they are defined, perceived, and the value of identifying and mapping primary forests at a national scale. Participants identified various anthropogenic, ecological, structural, and sociocultural characteristics that define primary forests and their associated value. Mapping primary forests was recognized as offering several benefits, such as establishing a benchmark for healthy and functioning ecosystems. It was also identified as supporting research and monitoring efforts, which are crucial for informing forest management and practices in other resource sectors.

However, there were concerns that designating areas as primary forests could restrict Indigenous communities' access to and control over lands within their traditional territories. Some participants argued that primary forests are subjective and poorly defined, casting doubt on their value and utility for guiding policy development and management.

Presentations by Habitat and the University of Maryland's Global Land Analysis and Discovery (GLAD) laboratory highlighted their respective work on characterizing primary forests and developing a prototype map of 'Structurally Stable Natural Forests' as a proxy for primary forests. Key points from the following discussion included:

- **Clarification of Data Inputs and Sources:** Participants sought further explanation on the data inputs and sources used in the creation of the prototype map.
- **Methodological Rationale:** The rationale behind key methodological decisions, such as buffer distance, patch size, and tree age, was discussed in detail to ensure transparency in the mapping process.
- **Additional Considerations for Defining Primary Forests:** There were calls for incorporating different metrics for various forest types (e.g., boreal vs. temperate forests), considering fire dynamics and forest regeneration, and recognizing the influence of Indigenous use and management of primary forest areas.
- **Incorporating Localized Data:** The need to incorporate localized data to verify or "ground-truth" the map was emphasized, as it would improve the accuracy and relevance of the map at the regional level.
- **Intended Use and Audience:** There were discussions about the intended use of the prototype map and clarifying who the target audience would be to ensure appropriate application.
- **Implications of Publicizing the Map:** Participants expressed concerns about the potential consequences of publicizing a primary forest map without providing the necessary context or clearly describing its limitations, which could lead to misinterpretation or misuse of the data.

Most participants agreed that a crucial next step is reaching consensus on the definition of primary forest. To promote the credibility of a primary forest map and support its adoption by users, several key actions were identified:

- **Agreement on Data Inputs and Methodology:** Reaching a consensus on the data inputs and methodology used to create the map is vital for its accuracy and reliability.
- **Clear Communication:** It's important to clearly articulate what the map does and does not represent. A user guide should be provided alongside the map to help users understand its capabilities and limitations.
- **Map Ownership and Governance:** Addressing the ownership and governance of the map will be essential to ensure accountability and long-term maintenance.
- **Incorporating Localized Data and Expertise:** Integrating more localized data sources and expert knowledge will improve the map's relevance and accuracy, particularly at regional levels.
- **System for Updates and Feedback:** Establishing a system to address user questions and incorporate updates will enhance the map's accuracy and utility over time.
- **Opportunities for Coordination and Co-Ownership:** Identifying opportunities to further coordinate or co-own aspects of the map will help support local applications and foster collaboration with users, stakeholders and rightsholders.

1. INTRODUCTION

1.1. PROJECT UNDERSTANDING

WWF-Canada recognizes the importance of the concept of primary forests and the value in seeking clarity in defining and mapping them. An enhanced understanding of primary forest presence and extent can help inform decision-making processes around forest conservation and management, fibre sourcing and land use planning, including Indigenous Protected and Conserved Areas (IPCAs).

WWF-Canada has identified three main project activities to support this work:

1. Conduct a literature review of the current state of knowledge for defining, identifying and classifying primary forests in Canada;
2. Support the University of Maryland's Global Land Analysis and Discovery (GLAD) laboratory to develop and implement a methodology to create a prototype map¹ of 'long-lived structurally mature tree cover that has not been completely cleared or regrown' as a proxy for primary forests; and
3. Dialogue with stakeholders, policy makers and technical experts to discuss potential uses and limitations of a primary forest map in a Canadian context, and to collect feedback on the prototype map and methods.

As part of the third project activity, WWF hosted two in-person workshops to present key findings from the literature review, share progress on a prototype map of 'Structurally Stable Natural Forests' in Canada, and to hear from participants how a primary forest map could be used as a tool to inform forest management, stewardship, and land use planning.

1.2. ENGAGEMENT OBJECTIVES

The objectives of the workshop series were:

1. **Technical knowledge sharing:**
 - a. To introduce the concept of a primary forest map;
 - b. To share the state of knowledge on definitions of primary forest and their characteristics/criteria (literature review findings);
 - c. To share the methodology and criteria used for the prototype map.
2. **Gathering feedback:**
 - a. To hear the perspectives of participants on their range of preferred definitions and criteria;
 - b. To discuss the potential use and utility of a primary forest map as a tool to support conservation planning, land and resource management;
 - c. To identify assumptions and limitations of the prototype map;
 - d. To discuss useful next steps and potential future projects to carry forward work done to date.
3. **Reporting out:**

¹ Prototype map is the preferred language to be used when referring to the UMD GLAD-Lab Primary Forests Prototype Map.

- a. To document perspectives and learnings obtained during the workshop series with an engagement summary.

1.3. WORKSHOP OVERVIEW

The two workshops were held over a two-week period, with the Ontario regional workshop taking place on January 21-22, 2025, in Thunder Bay, ON, and the BC regional workshop on January 28-29, 2025, in Vancouver, BC. WWF-Canada contracted The Firelight Group (Firelight) to provide facilitation services to lead the preparation and execution of a technical two-part workshop series in support of the third project activity identified above in Section 1.1.

The workshop consisted of ten sessions designed to inform participants about the work done to define and map primary forests, while also gaining insight into participants' perspectives on these initiatives. Day One was dedicated to context-setting and information sharing, while Day Two focused on the application and utility of these initiatives at the user level. In total, 45 participants consented to participate in the workshops, with 20 attendees at the Ontario regional workshop and 25 at the BC regional workshop.

The workshop agenda can be found in Appendix A, and the full list of participants attending each workshop can be found in Appendix B.

2. WHAT WE HEARD

This engagement report summarizes the perspectives shared during the workshop series. It outlines key themes and insights gathered from each of the workshop sessions, with all participant feedback anonymized across both workshops. Section 2.5 of the report provides a summary of the regional considerations highlighted at each workshop.

2.1. UNDERSTANDING VALUES

The first facilitated session, **Understanding Values**, gave participants the opportunity to articulate and share their current perspectives and values related to the concept of primary forests in Canada. Three questions were posed, and participant responses are summarized below.

2.1.1. *What is a primary forest?*

Participants defined primary forests based on a combination of anthropogenic, ecological, structural, and sociocultural characteristics. The details of these characteristics are outlined below:

- **Anthropogenic Characteristics:** These include both historic and current human land use. Some participants explicitly noted that Indigenous activities and land use should be considered part of a primary forest, while others argued that any significant history of human land use should disqualify an area from being considered a primary forest. Additionally, some participants believed that any industrial activity, such as clear-cutting or logging, should exclude an area from being classified as a primary forest. Others felt that the presence of any anthropogenic disturbance, regardless of its scale, should lead to an area being excluded as a primary forest.

- **Ecological Characteristics:** Participants identified several ecological features that define primary forests. These include forests that support natural processes and functions, provide ecosystem services, or are representative of the natural range of variation for a given forest type. Primary forests were also described as being biodiverse, resilient, and having healthy soils. Additionally, some participants highlighted the ability of primary forests to store high amounts of carbon as a key feature, emphasizing their importance in climate regulation.
- **Structural Characteristics:** Participants discussed various structural elements that define primary forests, including forest or tree age-class, as well as stand and landscape-level features. In the BC context, one participant suggested that a potential primary forest should be at least 300 years old, while another proposed a threshold of 250 years. Others suggested that a primary forest could be of any age-class, similar to a naturally disturbed forest. Some participants emphasized that primary forests should have a diversity of mixed-age mature trees rather than a uniform tree stand age. Additionally, some participants noted that any planting or silvicultural activities within a forest area would disqualify it from being considered a primary forest. Intactness or non-fragmentation of landscapes was also highlighted as an important structural characteristic, particularly landscapes with limited or no road access.
- **Sociocultural Characteristics:** Sociocultural characteristics of primary forests refer to the intangible values and human connections associated with these forests. Participants identified values such as "connections," "identity," and "relations" to reflect a deeper, non-extractive human-forest relationship. Some participants expressed the view that the concept of primary forests could be a "settler" or sociopolitical construct, with some even arguing that the primary forest concept is problematic, idealistic, without utility, or entirely unachievable.

The diversity of responses highlights the varying perspectives on the need to define primary forests, illustrating the complexity and different cultural understandings surrounding them.

2.1.2. *What are some values associated with primary forests?*

Many responses to the question of the value of primary forests mirrored those provided in the previous question regarding their definition. However, this question prompted further discussion on the interaction between primary forests, people, and the broader environment.

Some participants highlighted the deep connection between Indigenous peoples and their use of forests, associating primary forests with cultural, spiritual, and identity-based values. These values also encompassed the transmission of traditional knowledge and practices.

Ecological values were widely discussed with many participants emphasizing the ecological integrity and intactness of primary forests. These forests play a critical role in preserving natural systems and cycles, supporting healthy, naturally functioning ecosystems. Other values related to primary forests include their connection to biodiversity, complex ecosystems, and their ability to contribute to climate resiliency, mitigation, and carbon storage. Participants also noted the inherent "natural" and "native" aspects of primary forests as central to their value.

However, some participants questioned the importance of exploring values tied to primary forests, with a few continuing to challenge the concept of primary forests altogether. Some expressed the view that primary forests themselves are subjective or even eco-colonialist in nature. Others mentioned that since the definition of primary forests remains unclear,

understanding or exploring their values is not feasible. Ultimately, the lack of a shared understanding of what constitutes a primary forest made it difficult for some participants to answer this question effectively.

Participants continued to explore intangible values and the relationship between people and forests. Many participants shared that Indigenous forest usage and management, as well as local community uses, are integral to the value of a primary forest. Additionally, some participants pointed out the recreational value of primary forests, noting how these forests provide spaces for peaceful enjoyment, relaxation, and connection with nature. These values reflect the broader social and cultural importance of primary forests beyond their ecological and economic roles.

2.1.3. *Why is it important to understand where the primary forests are on the landscape?*

Core responses regarding the importance of delineating primary forests focused on several key areas, including the ability to measure and manage primary forests, raise public awareness, prevent forest loss, and support conservation efforts. However, there was a range of perspectives, with some participants questioning the fundamental importance or premise of primary forests.

Many participants emphasized that delineating primary forests is crucial for establishing a benchmark of healthy and functioning ecosystems. This would support research, monitoring initiatives, and ultimately inform forest management practices, as well as strategies for managing other resource sectors. Identifying primary forests helps to better understand their status and condition, which is essential for making informed decisions about conservation and resource management.

Other responses related specifically to the benefits and drawbacks of raising public awareness of primary forests. Several participants highlighted the potential of primary forest delineation to increase public knowledge and awareness, contributing to the development of policies that address environmental concerns. By identifying and mapping primary forests, these areas can be brought to the forefront of discussions around climate change, an issue some participants feel has been neglected by governments and industries. At the same time, others expressed concern that such identification could lead to the restriction of local community access to these areas, thus exerting control over the land. This concern was particularly related to how primary forest mapping might be used to limit access and control over the landscape and communities.

Additionally, some participants noted that delineating primary forests could enhance the recognition of broader, intangible values such as culture, traditions, rights, and history. For Indigenous communities, primary forests may hold significant cultural and spiritual value, and their identification can help affirm these connections to the land.

2.2. PRIMARY FOREST DEFINITION, PROTOTYPE MAP, AND LITERATURE REVIEW FEEDBACK

A key component of the workshop was to share with participants some of the recent work related to defining and mapping primary forests. A literature review of primary forest definitions and characteristics was presented by Sylvia Wood (Habitat), followed by the presentation of a Structurally Stable Natural Forests (SSNF) prototype map and methodology by Peter Potapov

and Svetlana Turubanova (University of Maryland (UMD) Global Land Analysis & Discovery (GLAD) Lab).

2.2.1 High-level overview of presentations

Habitat Presentation: Current State of Knowledge for Defining, Identifying and Classifying Primary Forest in Canada

As a part of project activity 1, WWF-Canada mandated Habitat to conduct a literature review assessing academic research, grey literature, and existing definitions developed by international bodies to build a more comprehensive definition of primary forests. Habitat reviewed 19 sources to develop their proposed definition, shared below.

Proposed operational definition of primary forest for Canada: Forests of any age class, composed of naturally regenerated native species, undergoing natural ecological processes and subjected to natural forest disturbance dynamics, that have not been impacted by recent or major anthropogenic disturbances or usage other than traditional land use (Habitat, 2024).

Habitat identified several limitations associated with their proposed definition, such as understanding that some criteria are inherently unmappable, incomplete datasets that limit national use, and the lack of a mandate to include Indigenous engagement in the development of the proposed definition. Habitat identified that engagement with Indigenous people is necessary for addressing data collection gaps and to refine a shared understanding of primary forests. Habitat also called for the development of “unified” datasets across provinces and territories to advance national scale mapping.

UMD GLAD Lab Presentation: Structurally Stable Natural Forests (SSNF) Mapping in Canada

As a part of project activity 2, WWF-Canada mandated the UMD GLAD Lab to develop a prototype map of primary forests in Canada, resulting in the creation of the Structurally Stable Natural Forests (SSNF) Map. UMD GLAD Lab led the development of the mapping approach and the mapping itself based on the following three criteria of a structurally stable natural forest:

1. **Tall and dense tree stands** were identified using a dataset from 2020 with tree canopy cover $\geq 50\%$ and tree height ≥ 5 m;
2. **No disturbance in the last 35 years** was achieved by excluding 1985-2020 tree canopy loss and gain; and
3. **No modifications from past land use and stand-replacement disturbances (50-70 years old)**. This was done using a two-step approach: first by completing expert-driven classification to identify modified and disturbed areas, then completing a visual image analysis to identify areas of historical logging.

UMD presented the SSNF prototype map for Ontario and shared the link to the map with participants. UMD GLAD Lab acknowledged several limitations of their map, primarily related to national level data availability and the difficulty in mapping historic anthropogenic impacts at the landscape level. UMD GLAD Lab was unable to include any Indigenous data in the development of their map, citing challenges in the availability and accessibility of national level datasets.

It was acknowledged that the UMD GLAD Lab mapping approach and resulting map was not based on the Habitat proposed definition of primary forests.

2.2.2 Discussion and participant feedback

Generally, participants were able to distinguish between the Habitat proposed definition of primary forests, and the methodology used to identify primary forests in the UMD map. A significant portion of the discussion centered around the use of the term "primary forest" to describe the mapping work undertaken. The UMD GLAD Lab acknowledged that the term "primary forest" is "loaded" with complex meanings and sensitivities, which is why their map did not use this term in its labeling. This issue of terminology reflects the broader challenges surrounding the definition of primary forests, as there has been no formal agreement on what the term should encompass.

Several participants expressed uncertainty about the overall objectives of both the Habitat and UMD initiatives, as well as the motivations driving these mapping efforts. There were concerns about ensuring that the research behind the maps is evidence-based, emphasizing the importance of a clear and objective approach. Participants indicated that these efforts should be grounded in solid scientific evidence, ensuring credibility and accuracy to support the potential use of the maps in policy and decision-making processes.

Presenters and participants across both workshops identified the lack of Indigenous knowledge and perspectives incorporated in the literature review and prototype map as a significant gap in understanding and defining primary forests. The prototype map, in particular, raised concerns from participants who suggested various ways that Indigenous knowledge and land usage could be integrated, such as through the inclusion of territory boundaries, trapline boundaries, and traditional use study information. Participants noted that the challenges in incorporating Indigenous data—especially traditional use study datasets—should not be mistaken for a lack of data.

Another commonality identified across both presentations was the importance of scale and buffer distances in the mapping methodology, and the need for a clear explanation of how decisions regarding these aspects are made. The choice of buffer distances (e.g., 100 meters vs. 250 meters), the scale of the map and minimum patch size choices (e.g., 100 m² vs. 1000 m²), can lead to drastically different outcomes. Many participants questioned the rationale behind the buffer values applied to various features in the map, such as anthropogenically disturbed areas, waterways, and fragmented forests. They also sought clarification on why certain minimum patch sizes were incorporated into the map, expressing concerns about how these decisions might impact the accuracy and relevance of the map for different uses.

> Habitat Presentation Feedback

Discussion following the Habitat presentation largely focused on topics related to clarification, additional considerations that should be applied, and the potential implications resulting from this work being carried out without further changes. Each of these is explained with greater detail below.

- **Clarification:** Some participants requested further clarification regarding the terminology used in the proposed definition of primary forests, seeking to understand what specific terms encompass and how they apply in various contexts. Other participants identified a need to understand how the proposed Habitat definition of primary forests will be used and its intended role in supporting further primary forest-related work. Participants also questioned the rationale behind the selected buffer distances used in Habitat's proposed primary forest criteria.

- **Definition:** Additional considerations for what should be included in the definition of primary forest were discussed. This includes additional ecological aspects (e.g., representation of ecosystem or biome types, fire-related considerations such as fuel build-up, ignition source, fire regime). Other participants identified that Indigenous uses and the related biocultural impacts are integral to understanding and therefore defining primary forests. Some participants shared that Indigenous forest uses have been transformational to the landscape, and practices such as cultural burning have greatly shaped the forest ecosystem as we now know it. It was identified that when the impacts of Indigenous forest use on the landscape are not fully recognized, this can contribute to the further perpetuation of historically inaccurate narratives that do not acknowledge how our forests today have been shaped by these historic and ongoing uses; and
- **Implications:** Potential implications of the primary forest definition was another topic of discussion. Some participants highlighted that policies could be impacted by this work in many ways, including impacts to procurement policy, potential conserved area identification, or by reducing the amount of logging in certain areas. Some participants believed that recognising primary forests as an area that can only be lost and never gained (e.g. anthropogenic disturbance cannot be reversed), would negatively affect organizations' future conservation efforts. For example, if new primary forests are not able to 'come online', this could cause non-primary forests to be further exploited because of their limited future conservation value. Viewing areas as either primary forest or non-primary forest does not consider the complexity of ecosystems or their ability to regenerate. Instead, some participants advocated for definitions and models that applied a gradient approach for classification, allowing for areas with minimal amounts of primary forest to be considered as having high conservation value along with areas that were solely primary forest.

> UMD GLAD Lab Presentation Feedback

The prototype map and its associated definition generated interest and subsequent discussion amongst participants. Like the previous presentation, general themes were related to areas requiring further clarification, additional considerations, and implications stemming from the release of the prototype map at this stage in its development. Though the participant feedback was primarily related to the technical aspects of the methodology and development of the prototype map, questions addressing historic use and potential opportunities for the primary forest map to support other work were also key aspects of discussion.

- **Data Inputs and Rationale:** Participants wanted a comprehensive understanding of the rationale behind most methodological decisions made for the prototype map. These questions were primarily related to why some data input layers were chosen over others, the basis for the buffer and patch size values selected, and how the age of trees factored into the analysis. The data input layers prompted discussion around the exact dataset used, and participants proposed additional data for consideration. The response to nearly all this feedback was that the prototype map could only use datasets that offered national coverage, while many of the recommended data sources only offered regional coverage.
 - **Buffer distance and patch size:** Like the Habitat research, participants discussed the rationale for why certain values were chosen for the buffer distance and patch size. In the context of the UMD GLAD Lab research, these choices were based on minimum thresholds identified in academic literature to show proof of concept.

- **Tree age:** Some participants were interested in understanding how ages of trees and tree stands factored into the methodology, since the mapping criteria did not directly use an age dataset (rather, the datasets used density and tree height, due to limitations in assessing age using remote sensing). This was an issue of concern for some participants because some areas had trees that should be considered primary forests but since they had the characteristics of small trees, they were not identified as such. These conversations prompted discussion on how to balance fine scale needs in a national analysis and how to proceed with analysis in lieu of historical data older than Landsat imagery.

Some participants expressed support in being able to have different classifications of primary forests rather than the binary approach of primary forest and non-primary forest areas.

- **Intended Audience:** Another area of feedback questioned the intended audience of the prototype map. UMD GLAD Lab clarified their role in developing the map; defining its utility and how it is to be used is beyond the scope of their role.
- **Validation and Verification:** Other responses focused on questions related to the validation or 'ground-truthing' process for the map, and how to deal with loss when scaling up to a national landscape level approach. Loss in this context refers to the information that is lost when going from local scales to national scales, for example when using patch sizes of 30 metres, there will be areas that lose the fine detail. Some participants, particularly from the Ontario workshop, also questioned specific geographic areas of the prototype map, sharing feedback that some of these areas identified as 'SSNF' were actually areas of artificial second stage regrowth, or conversely areas that should have been identified as SSNF were not identified on the map, prompting further questions about the map methodology. Another point of consideration was that shifting baselines and assumptions on the history of forests must be made, as the ability to assess the history of disturbance on the landscape using Landsat satellite imagery only goes back to 1972.
- **Implications:** Participants of all backgrounds identified concerns with the public release of the map without the necessary context and background knowledge to understand its limitations. These concerns escalate further if a map is used to create areas restricting or controlling access (e.g., protected areas), especially to local First Nations. Feedback was also shared that the map will be inherently political, but the 'governing' organisation (i.e. owners of the map) should be neutral in this space to prevent the perception of underlying motivations clouding the accuracy of any produced work. It was acknowledged by participants that previous attempts at mapping intact forest landscapes had created an unfortunate legacy and threat of external control over the management of lands and territories that may overshadow future attempts at national-scale mapping initiatives.
- **Indigenous Data Inclusion:** Participants identified the lack of Indigenous data as a gap but many struggled to identify national-level data sets that could help fill this gap. The ability for the prototype map to allow users to incorporate their own data (e.g., local or Indigenous traditional knowledge) was acknowledged by participants as a way to address some of the gaps stemming from the lack of localised knowledge and data inputs. The ability to use the prototype map as a baseline tool would also support alignment with Indigenous data sovereignty principles.

2.3. UNDERSTANDING USER GROUPS

Workshop participants engaged in a scenario-based activity focused on understanding the utility of a primary forest map from the perspective of specific 'user' groups: forest industry, First Nation, ENGO and provincial government. The purpose of this activity was to test assumptions about the needs of each group and identify gaps that would need to be addressed to improve a primary forest map's effectiveness as a land management or conservation tool. Facilitators made best attempts to align participants with the user group that best fit the participant's background and expertise.

A consistent theme from all user groups identified the ability for maps to be 'weaponised' against each user group in varying ways. Others shared that having a clear primary forest definition rather than a map could be more useful because it could allow for a consistent methodology that could be applied across different jurisdictions using the best available regional data. There was also recognition that other national values-mapping initiatives such as intact forest landscape mapping have contributed to disengagement and mistrust among local communities and rights-holders, with concerns that these sentiments may also carry over to this initiative.

Insights from each of the four groups have been summarised in further detail below.

2.3.1. *Industry*

In the industry scenario, participants were asked to discuss the utility of a primary forest map from the viewpoint of a Forest Manager.

The industry perspective highlighted that industry has access to detailed technical data related to forest features and biophysical characteristics, and that any primary forest map produced would be reviewed and validated against their datasets to assess its viability as a potential tool. Some responses identified the potential for poor uptake and utilization of a map without this type of verification. Other participants noted that they would prefer to see the UMD GLAD Lab prototype map criteria made available so they could develop their own maps. Industry group participants expressed an interest in primary forest identification within forest license areas as it could offer benefits such as being a tool to mitigate risk in harvesting primary forests, or in supply chain sourcing and procurement. Participants also shared that identifying primary forests could lead to land use zoning changes (e.g., commercial harvesting area to protected area) or changes to how fires could be managed on the landscape (e.g., assessing fuel loading risks in dense areas). An area of concern to the industry group is that primary forest identification could lead to a reduction in commercial harvesting areas. Instead, some responses advocated for having different classes of primary forest to better reflect the diversity of forest landscapes. Overall, there were concerns that a primary forest map would work against industry interests and that further engagement would be necessary for industry to support primary forest mapping efforts.

2.3.2. *Environmental non-governmental organisation*

In the environmental non-governmental organisation (ENGO) scenario, participants were asked to discuss the utility of a primary forest map from the perspective of a Forest Conservation Program Lead.

The ENGO scenario discussion highlighted the need for additional baseline data as well as ground truthing prior to finalisation of the map. Participants acknowledged that the scale of the map is important, and that a map can have different impacts at the local scale than a national scale. This is seen especially with northern Indigenous and local communities who rely on the forest for economic purposes as well as ecosystem goods and services. This user group also highlighted considerations for free, prior, and informed consent (FPIC) surrounding the potential for land use conversion to protected areas, and that this cannot occur without the consideration and participation of the surrounding Indigenous Nations and communities. Additionally, it was flagged that Indigenous use of the primary forest area could be jeopardised by a map, depending on its application. Concerns were also shared over the need to understand the extent of current logging activities in primary forest areas, and the potential for a primary forest map to be used to encourage further logging in these areas. This is part of the broader concern raised regarding the unintended consequences or negative ramifications that could result from the release of a primary forest map.

2.3.3. First Nation

In the First Nation scenario, participants were asked to take the viewpoint of a First Nation Lands Manager.

In this user group, participants shared a high degree of concern over potential restrictions to access, management and control of their territories. Other responses highlighted the need to protect the ability of First Nations to pursue their own economic interests over their territories, such as through First Nation owned and operated forest tenures. Overall, this group identified that the primary forest map or subsequent related work must support Indigenous rights, and further map development should not proceed without localised knowledge. Others supported the development of the map in a way that supports additive use, meaning that the map could function more as a data layer which could have additional layers added to provide more context and control over what the final map displays. This would allow for sensitive data that is private to the Nation to stay within the control of the Nation itself, in alignment with principles of Indigenous data sovereignty. Potential positive applications of a primary forest map could be to support landscape level planning initiatives undertaken by the Nation. Participants acknowledge that using the map for this purpose would also require time, capacity, and potential funding to support capacity-building in this manner. There were suggestions for a capacity-building resource to be developed that could include provisions related to potential work flows for incorporating Indigenous data into the map, to support use of the map in a Nation's referrals process, and to support decision-making.

2.3.4. Provincial government

In the provincial government scenario, participants were asked to discuss the utility of a primary forest map from the perspective of a provincial Policy Maker.

Feedback was shared by this user group regarding the implications of the primary forest map to First Nations, including concerns regarding access restrictions. This concern around impacts also extended beyond First Nations to other local communities, and highlighted the broader need to include other values to understand how the area is being used. For a primary forest map, a dataset such as a comprehensive road layer could be included to see how impacted a given area is. Another area of feedback was that as a policy maker, any data used to support decision-making should be reviewed and validated to ensure it is evidence-based. In this case, all aspects of a primary forest map would be reviewed to ensure it is accurate and unbiased,

including a review of the motivations for its development and any related objectives from the publishing organisation. Maps are representations of values and these can be subjective, both positive and negative. For example, on the positive side, this map could be helpful in assisting in the identification of important ecological values such as habitat connectivity corridors. On the negative side, it could be used to prohibit access for Indigenous people in the name of conservation. Overall, this user group called for a need to ground-truth and validate the map and methodology, but that it could be a good starting point to advance discussions about old growth regions, supply chain sourcing, and understanding trends over time.

2.4. LOOKING FORWARD

2.4.1. *What makes a primary forest map credible?*

Participants emphasized several factors that will influence the credibility of a primary forest map:

- **Primary forest definition:** There was a call for a better understanding of the thresholds for tree and stand age, how fire is treated, and whether regeneration capacity is considered in the definition of primary forests. While some participants advocated for reaching a consensus on these criteria, others emphasized specific attributes for inclusion, such as those relevant to boreal versus temperate forests. Some participants also suggested aligning the definition with internationally recognized standards, such as the FAO definition. A common agreement was that Indigenous usage should be considered in the primary forest definition.
- **Transparency:** Participants stressed the importance of clearly articulating what the map does and does not do. A user guide should be provided alongside the map, along with a system to address questions, concerns, or feedback. Additionally, a mechanism for maintaining ongoing updates should be established to ensure the map remains useful over time.
- **Clarity:** The methodology, data input layers, and the definition of primary forests should be clearly outlined. It is essential to communicate the map's limitations, including providing rationale for decisions made during the analysis (e.g., buffer distance, scale value).
- **Validation:** The map should be validated and endorsed by different rights holders and stakeholders. Cross-referencing with other primary forest or similar map products was seen as an important step to further validate the map's accuracy and credibility.

2.4.2. *What are the priority actions to address prior to the release of a primary forest map?*

Participants shared the following actions that should be completed prior to the release of a primary forest map.

- **Ownership and Governance:** Participants emphasized the need for a plan to maintain and update the map, as well as clearly defining ownership and the associated responsibilities.
- **Additional Engagement:** There was a call for further engagement opportunities, particularly on key topics such as Indigenous involvement and engagement in the mapping process.

- **Methodology:** Reaching agreement on data inputs and methodology was considered essential by many participants, though the structure of this process remained unclear.
- **Limitations:** Participants stressed the importance of clearly articulating the strengths and weaknesses of the primary forest map, including addressing any data-related limitations, such as availability and quality.
- **Validation:** A consistent theme in discussions was the need for verification of the mapping methodology, with participants emphasizing the importance of identifying who should be involved in the verification process to ensure that the output of a primary forest map accurately reflect values relevant to the Canadian context.

2.4.3. *What is the role for users (First Nation/Industry/ENGOS/gov't) in the future development and use of a primary forest map? How could users be involved?*

Participants identified several ways in which map users could be involved:

- **Validation:** Users at various levels could assist in validating and ground-truthing the accuracy of the map outputs. They could also help develop a shared understanding of the map's capabilities and limitations.
- **Providing Indigenous and local knowledge and context:** Feedback emphasized the importance of localized knowledge, which is crucial for operationalizing the map and improving its effectiveness.
- **Risk assessment:** Users with on-the-ground knowledge could offer valuable insights into risks that may not have been anticipated during the map development process.
- **Collaboration and coordination:** Participants suggested that future opportunities for further coordination or co-ownership of aspects of the map should be considered, fostering greater collaboration among rightsholders and stakeholders.

2.4.4. *Once a primary forest map is available, what else is important to have, understand, and consider about primary forests?*

Beyond the delineation of primary forests through mapping, participants highlighted several areas for additional research and investment:

- **Rate of Change:** Understanding the cumulative impacts of various land management decisions could be enhanced once primary forests are clearly delineated. This would allow for the detection and monitoring of their condition and rate of change over time.
- **Tools to support land management:** Gaining a deeper understanding of primary forests and their related mapping outputs could support other land management objectives, such as informing procurement policies, managing species at risk, guiding land use planning, forest management planning, forest certification, and more.
- **Use considerations:** Indigenous land uses, forest tenures and other types of land use may be further understood on the landscape by understanding their relationship with primary forests; and
- **Clarify understanding of values:** Primary forest mapping may offer greater clarity regarding the inputs and drivers of forest loss. Participants noted that this mapping could

also help identify additional or competing values on the landscape, aiding in more comprehensive decision-making.

2.5. REGIONAL CONSIDERATIONS

2.5.1. Similarities

Both the Thunder Bay and Vancouver workshops identified several broad similarities across various topics. Participants highlighted the importance of addressing data gaps in the prototype map, particularly regarding how fire and tree age are factored as inputs. Another key area of feedback was related to forest types, with some participants suggesting that the prototype map should not treat all forest types in the same way. There was agreement that incorporating local knowledge is essential to making the map as useful as possible for practitioners. Both workshop groups acknowledged that this could be achieved either at the user level or by allowing users to contribute data to the map development team for incorporation. However, both groups also recognized the challenge of managing fine-scale data at a national level, especially in terms of technical feasibility. This led to similar discussions in both workshops about the potential for a primary forest map to serve as a complementary tool alongside other available resources.

Additionally, as emphasized throughout this report, participants from all backgrounds expressed concern over the potential use of the map and related work to restrict access or management approaches. Another common piece of feedback was directed toward WWF-Canada, with participants expressing interest in understanding their position and objectives within the primary forest conversation.

2.5.2. Differences

Although the majority of feedback shared during the two workshops was similar in perspective, areas of divergence focused mainly on regional considerations. The representation of participants' backgrounds and interests also varied between the Ontario and BC workshops. Despite significant efforts to have equal representation in both workshops, the BC regional workshop was attended by more ENGO representatives, while the Ontario regional workshop saw greater industry representation.

> Ontario Workshop

Given that the prototype map presented by UMD focused on Ontario, workshop participants had the opportunity to more closely critique the application of the methodology used to identify NSSF, based on their familiarity with the forest area. There was also resistance by several participants regarding the use of the term "primary forest" to accurately represent the values it is intended to convey.

Discussion at the Ontario workshop highlighted the challenges in applying a set methodology to various forest types, given the differences in natural disturbance dynamics, tree height characteristics and harvest methods used. For example, it can be more challenging to identify disturbance in areas that have been selectively logged vs. clearcut. UMD presenters acknowledged that temperate forests were more difficult to map than tropical forests. As a result, participants emphasized that each forest type should have its own tailored methodology that accounts for its unique characteristics when developing primary forest mapping approaches.

Discussions also touched on the inclusion of younger forests, with participants suggesting that "future primary forests" should be considered in the identification process.

> BC Workshop

At the BC regional workshop, discussions were dominated by fire and old growth considerations throughout the two-day event. Fire was a central theme in nearly every conversation, particularly in terms of how areas impacted by fire should be treated when defining a primary forest. Participants debated whether burned or post-fire regenerated areas should still be classified as primary forests. There was also interest in understanding how primary forest areas could influence fire management strategies, particularly in identifying fuel-loaded areas, guiding fire suppression practices, and considering how fire-related loss could be treated differently from loss caused by logging.

The discussion on old growth focused on the relevance of primary forest identification and mapping, as old growth is a key focus of most policy and advocacy efforts within the province. The treaty context concerning First Nations in BC was also acknowledged, noting that much of the province is situated on unceded land not covered by treaty. This creates unique implications for land and forest management in BC compared to other regions of the country. Additionally, participants recognized that the primary forest prototype map shared by the UMD GLAD Lab heavily focused on boreal forests, which only represent a portion of BC's applicable forest types.

2.6. CLOSING REMARKS

In conclusion, many participants from both workshops expressed appreciation for the opportunity to come together, exchange ideas, and engage in meaningful discussions about the definition and mapping of primary forests. Several highlighted the value of the diverse range of interests represented at the workshops and expressed a desire for more opportunities to engage in direct dialogue and share information on this topic.

APPENDIX A: WORKSHOP AGENDA

DAY 1 AGENDA

| Time | Activity |
|---------------|---|
| 8:30 - 9:00 | Breakfast and Sign In |
| 9:00 - 10:00 | Session 1: Introduction and Building Understanding [WWF-Canada/Firelight] <ul style="list-style-type: none"> - <i>Workshop welcome;</i> - <i>Setting the stage for workshop and terms of engagement;</i> - <i>Participant introduction roundtable.</i> |
| 10:00 - 10:30 | Session 2: Understanding Values [Firelight] <ul style="list-style-type: none"> - <i>Interactive exercise identifying participant values related to primary forests.</i> |
| 10:30 - 10.45 | Break |
| 10:45 - 11:15 | Session 3: Understanding Values: Summary [Firelight] <ul style="list-style-type: none"> - <i>Review and discussion of feedback shared during the previous session.</i> |
| 11:15 - 12:15 | Session 4: Defining Primary Forests [Habitat] <ul style="list-style-type: none"> - <i>Presentation from Habitat sharing literature review results on defining primary forests.</i> |
| 12:15 - 1:15 | Lunch |
| 1:15 - 2:15 | Session 5: Primary Forest Prototype Map [UMaryland GLAD Lab] <ul style="list-style-type: none"> - <i>Presentation from GLAD Lab reviewing prototype map, methodology, input layers, and limitations.</i> |
| 2:15 - 2:30 | Break |
| 2:30 - 3:30 | Session 6: Group Feedback Session [Firelight] <ul style="list-style-type: none"> - <i>Focus group discussion regarding information presented today, including reactions to primary forest definitions and prototype map;</i> - <i>Plenary discussion reporting back on focus group findings.</i> |
| 3:30 - 4:00 | Day Wrap Up [WWF/Firelight] |

DAY 2 AGENDA

| Time | Activity |
|-----------------------------------|--|
| 8:30 - 9:00 | Breakfast |
| 9:00 - 9:15 | Arrival and Setting the Stage [WWF-Canada/Firelight] <ul style="list-style-type: none"> - <i>Session opening;</i> - <i>The focus of Day 2 is on the utility of a primary forest map and understanding gaps and limitations.</i> |
| Morning (specific time TBD) | Session 7: Primary Forest Map As a Tool [Firelight, Participants] <ul style="list-style-type: none"> - <i>Opportunity for participants to share what they are doing in this space, and how their efforts at mapping primary forests (or similar) are supporting their organizational goals;</i> - <i>Identification of additional documents or data sets to support primary forest mapping.</i> |
| Morning (specific time TBD) | Session 8: Scenario Part 1 - Understanding User Groups [Firelight] <ul style="list-style-type: none"> - <i>Overview of selected scenarios that will be used to understand how a primary forest map may be utilized by different users;</i> - <i>Breakout groups will each take one of the introduced scenarios and assess the utility of the primary forest map at a user level, and where it may fall short;</i> - <i>Groups will share back their findings to the broader plenary.</i> |
| 10:45 - 11:00 | Break |
| 11:00 - 12:00 | Session 9: Scenario Part 2 - Roundtable Collaboration [Firelight] <ul style="list-style-type: none"> - <i>Participants will be assigned a breakout group and will discuss and document how a primary forest map could be used to facilitate collaborative discussion between user groups;</i> - <i>Groups will share back their findings to the broader plenary.</i> |
| 12:00 - 1:00 | Lunch |
| 1:00 - 2:00 | Session 10: Looking Forward [Firelight] <ul style="list-style-type: none"> - <i>A world cafe-style session focusing on identifying priority actions, next steps and opportunities to improve the feasibility of a primary forest map for Canada;</i> - <i>Findings will be shared back to the broader plenary.</i> |
| 2:00 - 3:00 | Parking Lot/Overflow [WWF/Firelight] <ul style="list-style-type: none"> - <i>An opportunity to address overflow or placeholder topics.</i> |
| 3:00 - 3:30 | Workshop Closing [WWF] |

APPENDIX B: PARTICIPANT LIST

British Columbia

Celina Starnes

Cam Beck

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Mel Chanona

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Lisa Matthaus

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Jason Northcott

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Adrian Walton

Keith Atkinson

Evan Muise

Peter Wood

Orrin Quinn

Lauren Cooper

Andrea Lyall

Darcy Riddell

Todd Bailey

Dave Daust

Peter Potapov

Ontario

Lynn Palmer

Cole Wear

Tom Ratz

Chris McDonell

Etienne Belanger

Richard Donovan

Lauren Chisholm

Alex Bilyk

Craig Crosson

Mike Briennesse

Laura Scott

Moses Elleason

Derek Tesser

Peggy Smith

Mariah Nodin

Scot Rubin

Laird Van Damme

Mirabai Alexander

Sylvia Wood

Peter Potapov

Svetlana Turubanova

APPENDIX C: REFERENCE LIST

The following reports and articles were shared with WWF-Canada by participants during the engagement sessions.

- Bernier, P. Y., Paré, D., Stinson, G., Bridge, S. R. J., Kishchuk, B. E., Lemprière, T. C., Thiffault, E., Titus, B. D., & Vasbinder, W. (2016). Moving beyond the concept of “primary forest” as a metric of forest environment quality. *Ecological Applications*, 27(2), 349–354. <https://doi.org/10.1002/eap.1477>
- Burton, P. J., Parisien, M.-A., Hicke, J. A., Hall, R. J., & Freeburn, J. T. (2008). Large fires as agents of ecological diversity in the North American boreal forest. *International Journal of Wildland Fire*, 17(6), 754–767. <https://doi.org/10.1071/WF07149>
- Eisenberg, C., Prichard, S., Nelson, M. P., & Hessburg, P. (2024). *Braiding Indigenous and western knowledge for climate-adapted forests: An ecocultural state of forests report*. https://depts.washington.edu/flame/mature_forests/pdfs/BraidingSweetgrassReport.pdf
- Food and Agriculture Organization of the United Nations. (2020). *Global forest resource assessment 2020 terms and definitions* (Working Paper No. 188; Global Forest Resources Assessment). <https://openknowledge.fao.org/server/api/core/bitstreams/531a9e1b-596d-4b07-b9fd-3103fb4d0e72/content>
- Food and Agriculture Organization of the United Nations. (2020, November 23-27). *International expert workshop on “improving reporting on boreal primary forests”*. [Summary report]. Canada.
- Mackey, B., DellaSala, D. A., Kormos, C., Lindenmayer, D., Kumpel, N., Zimmerman, B., Hugh, S., Young, V., Foley, S., Arsenis, K., & Watson, J. E. M. (2014). Policy Options for the World’s Primary Forests in Multilateral Environmental Agreements. *Conservation Letters*, 8(2), 139–147. <https://doi.org/10.1111/conl.12120>
- McRoberts, R. E., Winter, S., Chirici, G., & LaPoint, E. (2012). Assessing Forest Naturalness. *Forest Science*, 58(3), 294–309. <https://doi.org/10.5849/forsci.10-075>
- Pesklevits, A., Duinker, P. N., & Bush, P. G. (2011). Old-growth Forests: Anatomy of a Wicked Problem. *Forests*, 2(1), 343–356. <https://doi.org/10.3390/f2010343>
- Potapov, P., Hansen, M. C., Laestadius, L., Turubanova, S., Yaroshenko, A., Thies, C., Smith, W., Zhuravleva, I., Komarova, A., Minnemeyer, S., & Esipova, E. (2017). The last frontiers of wilderness: Tracking loss of intact forest landscapes from 2000 to 2013. *Science Advances*, 3(1), e1600821. <https://doi.org/10.1126/sciadv.1600821>
- Potapov, P., Yaroshenko, A., Turubanova, S., Dubinin, M., Laestadius, L., Thies, C., Aksenov, D., Egorov, A., Yesipova, Y., Glushkov, I., Karpachevskiy, M., Kostikova, A., Manisha, A., Tsybikova, E., & Zhuravleva, I. (2008). Mapping the World’s Intact Forest Landscapes by Remote Sensing. *Ecology and Society*, 13(2), 51. <https://www.jstor.org/stable/26267984>

Old Growth Technical Advisory Panel. (2021). *Priority deferrals: An ecological approach*. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/stewardship/old-growth-forests/summary_for_g2g_package.pdf

Sierra Club BC. (2017). *The future is here: An urgent call to defend nature, stabilize the climate and transition to post-carbon prosperity*. https://sierraclub.bc.ca/wp-content/uploads/SierraClubBC_Future_Is_Here.pdf

Venier, L. A., Walton, R., Thompson, I. D., Arsenault, A., & Titus, B. D. (2018). A review of the intact forest landscape concept in the Canadian boreal forest: Its history, value, and measurement. *Environmental Reviews*, 26(4), 369–377. <https://doi.org/10.1139/er-2018-0041>

Venter, O., Sanderson, E. W., Magrath, A., Allan, J. R., Beher, J., Jones, K. R., Possingham, H. P., Laurance, W. F., Wood, P., Fekete, B. M., Levy, M. A., & Watson, J. E. M. (2016). Sixteen years of change in the global terrestrial human footprint and implications for biodiversity conservation. *Nature Communications*, 7(1), 12558. <https://doi.org/10.1038/ncomms12558>

Wood, P. (2021). *Intact forests, safe communities: Reducing community climate risks through forest protection and a paradigm shift in forest management*. Sierra Club BC. <https://sierraclub.bc.ca/wp-content/uploads/2021-Forest-Climate-Risk-Assessment-Report-final-February.pdf>

Wulder, M. A., Hermosilla, T., Stinson, G., Gougeon, F. A., White, J. C., Hill, D. A., & Smiley, B. P. (2020). Satellite-based time series land cover and change information to map forest area consistent with national and international reporting requirements. *Forestry: An International Journal of Forest Research*, 93(3), 331–343. <https://doi.org/10.1093/forestry/cpaa006>