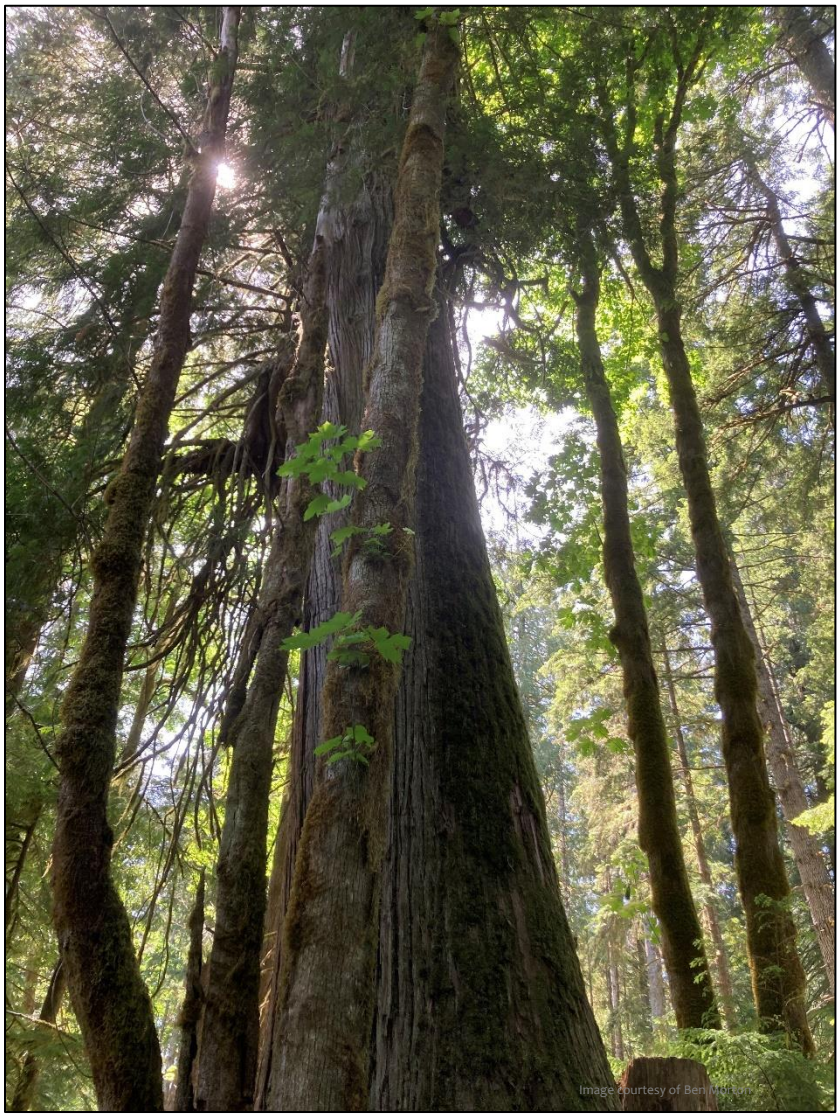
Implementing the 2023 Great Bear Rainforest Land Use Order

Ecosystem-Based Management Planning and Practice Guidance

Version 1.0



1.0 About this Document

1.1 Overview

This planning and practice guidance has been developed to support implementation of the 2023 Great Bear Rainforest Land Use Objectives Order (GBRO). The GBRO establishes legal objectives for the Great Bear Rainforest (GBR) plan area pursuant to section 93.4 of the *Land Act*. The objectives provide direction on the preparation of forest stewardship plans and the planning and practice of forest management in the GBR.

The GBR Joint Ecosystem-Based Management Forum (GBR Joint EBM Forum), a collaborative government-to-government group of staff and technical representatives from the Ministry of Forests, Ministry of Water, Land and Resource Stewardship, Coastal First Nations, and Nanwakolas Council contributed to and coordinated the preparation of this guidance. Staff from forest licensees (Western Forest Products, Interfor Corporation, Mosaic, and BC Timber Sales) and environmental organizations (Sierra Club, Stand.Earth, and Greenpeace) also contributed to its development, as did professionals with experience in coastal forestry planning and related areas of professional practice.

Section 1

This section provides an overview of the background and purpose of the GBRO, the planning history and supporting information, and the legal and policy context in which the GBRO is situated. This section also explains the role of this guidance in that context, identifies available related guidance and technical information, and outlines the arrangements for supporting and monitoring implementation of the GBRO. Monitoring information will be used to evaluate the effectiveness of the GBRO and this guidance, and to identify issues, viability in forestry practices across the GBR, and unintended consequences associated with implementation of the GBRO.

Section 2

Section 2 is the core of this document. For each objective in the GBRO, the intent, definitions, and related information are summarized, followed by a description of required and recommended planning activities and practices. The overview and guidance will be useful to forest stewardship planners and other people who are interested in how ecosystem-based management is being implemented in the GBR. The subsections are organized to address the major themes in the GBRO.

Section 2 is written to be accessible to the general reader. More detailed technical guidance for forestry planners and practitioners is provided in the EBM Supplemental Technical Guidance.

Supplemental Technical Guidance

The Supplemental Technical Guidance, organized to parallel subsections in Section 2, provides more detailed information and guidance on the planning activities and operational practices that should be

followed to implement key elements of the GBRO. Supplemental information is included to assist practitioners working in the office and in the field.

1.2 Context

Land Use Planning Context

The GBRO and this guidance build upon many years of land use planning that has involved the British Columbia government, First Nations, and stakeholders, and many years of government-to-government (G2G) discussions and work among First Nations and successive British Columbia governments.

Land use recommendations for the GBR were developed through the interest-based, multi-stakeholder planning that took place during the Central Coast Land and Resource Management Plan (CCLRMP) and North Coast Land and Resource Management Plan (NCLRMP) processes in the late 1990s and early 2000s.

The *CCLRMP Consensus Recommendations Report* (2003) outlines the recommendations of the Central Coast table.[1] The *North Coast Land Resource Management Plan: Final Recommendations* (January 2005) presents recommendations of the North Coast planning table.[2]

LRMP discussions were informed by a wide range of scientific and technical information, including information and reports prepared by the Coast Information Team. The *Ecosystem-Based Management Planning Handbook* was developed in March 2004 to guide implementation of ecosystem-based management in the GBR. The *Scientific Basis of Ecosystem-Based Management* summarizes the science and technical information that supports the EBM handbook. These and other Coast Information Team reports, such as the *Hydroriparian Planning Guide,* are available at https://www.for.gov.bc.ca/tasb/slrp/citbc/abo.html

Additional scientific and technical work was undertaken during the GBR Land Use Decision Implementation phase in 2006–2009, primarily under the direction and coordination of the Ecosystem-Based Management Working Group, a multi-stakeholder technical committee established by the British Columbia government and First Nations to oversee research and data management related to implementation of ecosystem-based management in the GBR[3].

[1] www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/land-use-plans-and-objectives/westcoast-region/centralcoast-lrmp/central_coast_lrmp_completion_table_recommendations.pdf

[2] www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/land-use-plans-and-objectives/skeena-region/northcoast-lrmp/lrmp_final_recommendations.pdf

[3] EBM Working Group project summaries and reports are provided in the "Decision Support Reports" section at www.for.gov.bc.ca/tasb/SLRP/plan17.html

Government-to-Government Context

The CCLRMP and NCLRMP processes were the first land use planning processes in British Columbia that were carried out in the context of strategic government-to-government agreements between the British Columbia government and First Nations. The General Protocol on Land Use Planning between the British Columbia government and the Coastal First Nations indicated that the LRMP processes would be co-managed, and in the case of the NCLRMP, co-chaired, and that recommendations from the LRMP tables would inform subsequent government-to-government discussions between the British Columbia government and First Nations.[4]

With the CCLRMP and NCLRMP recommendations in hand, after nearly a year of discussions, First Nations and the British Columbia government reached agreement on a land use decision for the GBR in 2006. The agreement was recorded in strategic land use planning agreements and protocols between the First Nations and the British Columbia government.[5] In two circumstances, broader agreements were entered into by the British Columbia government and First Nations political coalitions, including the Coastal First Nations[6] and Nanwakolas Council.[7]

The strategic land use planning agreements and the related agreements established a unique government-to-government collaborative arrangement for implementation of GBR land use decisions. Amendments to the *Park Act* and a new Order in Council under the *Environment and Land Use Act* were developed to support the designation of new protected areas. A government-to-government technical team composed of senior First Nations and British Columbia government representatives was established to work with stakeholder organizations to develop recommendations on the first GBR Land Use Order. The first land use orders for the GBR were promulgated in 2007. Amendments to the GBR land use orders in 2009, 2016, and 2023 were developed through similar government-to-government processes.

In 2009, the Coastal First Nations and the British Columbia government entered into a Reconciliation Protocol.[8] Nanwakolas Council and the British Columbia government entered into a similar reconciliation protocol in 2011.[9] The two reconciliation protocols created a stronger government-to-government arrangement for implementation of ecosystem-based management in the GBR,

---

[4] https://www.for.gov.bc.ca/tasb/slrp/citbc/finalprotocol.pdf

[5] See, for example, the Gitga'at Strategic Land Use Planning Agreement: https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/land-use-plans-and-objectives/westcoast-region/great-bear-rainforest/great-bear-rainforest-first-nations-agreements/gitgaat_fn_signed_slupa.pdf

[6] https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/land-use-plans-and-objectives/westcoast-region/great-bear-rainforest/great-bear-rainforest-first-nations-agreements/turning_point_protocol_agreement_signed_optimized.pdf

[7] https://nanwakolas.com/wp-content/uploads/2020/08/AIP-FInal-Signed-Version-compressed.pdf

[8] coastal_first_nationas_reconciliation_protocol_amending_agreement_mar_16_17_signed.pdf (gov.bc.ca)

[9] https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/consulting-with-first-nations/agreements/nanwakolas_framework_agreement_2019_amending_agreement.pdf

including creation of a joint government-to-government EBM Forum that coordinates, monitors, and provides ongoing policy support for EBM implementation. The protocols also created new frameworks for collaborative land and resource decision-making on matters related to EBM implementation. Decisions about forest stewardship plans and cutting permits, for example, are now made as an outcome of consensus-seeking government-to-government engagement processes between First Nations and the British Columbia government.

1.3 Provincial Legal Context for the GBRO

Requirements under the Land Use Objectives Regulation

To establish land use objectives under the Land Use Objectives Regulation, the minister responsible for the *Land Act* must be satisfied that the objectives do not duplicate direction already in place under the Land Use Objectives Regulation or another enactment. The objectives must also provide an appropriate balance of social, economic, and environmental benefits. The objectives in the GBRO should, therefore, be considered complementary and supplemental to direction provided by other enactments unless otherwise specified.

Relationship to the *Forest and Range Practices Act*

The *Forest and Range Practices Act* (FRPA) relies on the establishment of objectives to provide the overarching direction for forest management in British Columbia. Three types of objectives may be established or enabled under FRPA:

1) land use objectives established under section 93.4 of the *Land Act* (such as the GBRO) or grand parented under section 93.8 of the *Land Act* for objectives that were previously established under sections 3-5 of the Forest Practices Code;

2) objectives set by government pursuant to section 149(1) of FRPA (e.g., Forest Planning and Practices Regulation section 5-10); and

3) objectives enabled by regulation pursuant to section 149(1) – 150.5 of FRPA and sections 5 to 10 of the Government Actions Regulation.

Forest licensees are required to identify strategies and/or results in a forest stewardship plan that are consistent with all the objectives that are in effect for any given area. Tenures that are not required to have a forest stewardship plan are not subject to the objectives in the GBRO. Woodlot licences and specified community forest agreements may be exempted in the GBRO.

Relationship to the *Heritage Conservation Act*

The *Heritage Conservation Act* addresses protection of archaeological sites that contain evidence of use or habitation that predates 1846, and burial sites and Indigenous rock art. The Act prohibits the destruction, excavation, or alteration of archaeological sites without a permit. Section 6 of the Act

states that if there is a conflict between the *Heritage Conservation Act* and another enactment, the *Heritage Conservation Act* prevails over the other legislation:

> If, with respect to any matter affecting the conservation of a heritage site or heritage object referred to in section 13 (2), there is a conflict between this Act and any other Act, this Act prevails.

The GBRO provides for the identification, protection, and stewardship of Indigenous heritage features and forest resources in a manner that is intended to complement, not supersede or replace, the requirements of the *Heritage Conservation Act*. The GBRO includes management direction that is specific to First Nations cultural heritage values, sites, and features, and includes a requirement to manage for Indigenous heritage features dated before or after 1846.

In the GBR, the provisions of the *Heritage Conservation Act* and the GBRO are complementary. Procurement of a site alteration permit under the *Heritage Conservation Act* does not override the provisions and requirements of the objectives for Indigenous heritage features in the GBRO. This means that alteration of a feature, site, or area that is covered by the *Heritage Conservation Act* and the GBRO requires both a site alteration permit and planning and management practices consistent with the GBRO.

Relationship to the *Declaration on the Rights of Indigenous Peoples Act*

The *Declaration on the Rights of Indigenous Peoples Act* (DRIPA) establishes the United Nations Declaration on the Rights of Indigenous Peoples (UN Declaration) as the Province's framework for reconciliation. Section 4 of DRIPA requires the Province to develop and implement an action plan, in consultation and cooperation with Indigenous peoples, to meet the objectives of the UN Declaration.

The GBRO, developed through a collaborative process between the Province and several First Nations, represents progress on the DRIPA Action Plan, in particular, the "co-development and enhancement of strategic-level policies, programs and initiatives reflecting collaboration and cooperation on stewardship of the environment, land and resources" (Action 2.7). Provincial and First Nations government representatives continue to work collaboratively to oversee and coordinate activities related to the GBR via the GBR Joint EBM Forum.

GBRO and Guidance Implementation

The GBRO came into effect in July 27, 2023. This guidance has been developed to support implementation of the GBRO, including preparation and submission of forest stewardship plans. It is expected that licensees with tenure in the GBR will commit in their forest stewardship plans to make reasonable efforts to follow the guidance in this document.

If a forest stewardship plan holder wishes to propose results and strategies that differ from this guidance, they should develop alternative forest stewardship plan results and strategies in collaboration with applicable First Nations.

Under the GBR Joint EBM Forum, a multi-party GBR EBM Implementation Working Group has been established, in which Forum members and representatives from forest licensees and environmental non-governmental organizations share information, discuss issues, and develop recommendations related to EBM implementation.

Monitoring and Evaluation

Under the GBR EBM Implementation Working Group, a Monitoring and Evaluation Subcommittee has been established. It will seek to:

- observe and reach common understanding of changes in forestry planning and operating practices resulting from implementation of the GBRO, this guidance, and other technical guidance, including the *Indigenous Heritage Features Handbook*, *A Framework for Landscape Reserve Design in the Great Bear Rainforest*, and *Ecosystem Based Management Implementation in the Great Bear Rainforest: Landscape Reserve Design Methodology*;
- identify effects and outcomes, including unintended consequences, on ecological values, Indigenous harvest activities/opportunities and cultural heritage, and forestry management and commercial timber harvesting operations; and
- develop recommendations to modify the guidance as may be necessary to address issues and opportunities that have been identified.

The Monitoring and Evaluation Subcommittee will meet at regular intervals to assess and discuss information gathered, and report key findings and recommendations to the GBR Joint EBM Forum. The Subcommittee may, as needed, seek input from others, including but not limited to, relevant independent professionals, researchers, and Indigenous knowledge-holders.

Other Supporting Policy and Technical Guidance

A number of other documents have been developed to support implementation of the GBRO, including:

- the *Indigenous Heritage Features Handbook*, which provides detailed guidance to support implementation of the Indigenous heritage features objectives;
- the landscape reserve design methodology, which provides detailed technical guidance for development of landscape reserve designs;
- *A Framework for Landscape Reserve Design*, which provides policy guidance for developing and amending landscape reserve designs; and
- Land Management Handbook 72: *Guidelines to Support Implementation of the Great Bear Rainforest Order with Respect to Old Forest and Listed Plant Communities*.

These documents can be reviewed on, and downloaded from, the GBR EBM Data Centre and Ministry of Forest websites.[10]

Additional policy direction documents, data, and supporting technical information are provided on the GBR EBM Data Centre website, including:

- reports and GIS data associated with completed landscape reserve designs;
- GIS data and documents related to schedules in the GBRO; and
- spreadsheets that identify managed forest and old forest targets for each site series group in the landscape units in the GBR.

Future Amendments to the GBRO

The preamble to the GBRO states that "the implementation of ecosystem-based management will be monitored and, if monitoring results determine that ecosystem integrity is not being maintained or human well-being improved, this Order may be reviewed and amended." Information gathered by strategic and operational committees, government-to-government tables, and effectiveness monitoring programs or other processes will be considered in future periodic reviews (March 31, 2026, and subsequently every 10 years) or if necessary, ad hoc reviews. Amendments to the GBRO and this guidance arising from periodic reviews and ad hoc reviews may result in an update of this document.

2.0 Planning and Practice Guidance

2.1 General Concepts

This section provides general guidance for key terms and concepts used throughout the GBRO. Where there are inconsistencies between the language and definitions in the GBRO and this guide, the GBRO prevails.

Reserve Zones and Management Zones

Intent

Many objectives in the GBRO require the establishment of reserve zones or management zones. They are an essential component of the GBRO, serving to:

- maintain forest that adds a protective buffer next to important cultural heritage features, aquatic habitats, and other important ecological features and habitats; and

[10] https://ebmdata.ca/?token=bde12c88b73a098c5891829114449b070 Additional resource documents can be found on the Great Bear Rainforest Land Use Direction Resource site under the "Implementation and Monitoring Information" tab: https://www2.gov.bc.ca/gov/content/industry/crown-land-water/land-use-planning/regions/west-coast/great-bear-rainforest

- sustain important habitats and key hydroriparian and ecological processes by ensuring healthy, functional riparian forests are maintained at key locations in the landscape.

Definitions

From the GBRO:

management zone: an area for the protection of a feature and that specifies direction on the alteration, removal, recruitment, or management of trees

reserve zone: an area where commercial timber harvesting and road building are not permitted unless otherwise specified in the Order

Guidance

There are three key considerations when designing reserve zones and management zones in the GBR:

1) the identification of the feature or features being protected, a process that will likely involve a variety of office and field inventory and assessment procedures, including, in some circumstances, involvement of qualified professionals;

2) the development of a preliminary design for the reserve zone or management zone, a process that involves consideration of the GBRO requirements associated with a particular feature and the reason why the reserve or management zone is being established next to the feature or features (e.g., is it being established to protect the feature from altered microclimate, windthrow, or slope failure; to protect riparian forest habitats, etc.);

3) the adjustment of the reserve zone or management zone design to address site and local circumstances, a process that involves clarifying the type of flexibility that can be used to design the reserve or management zone in that particular circumstance, predicting whether the functionality of the reserve or management zone may be adversely affected by endemic processes such as windthrow or slope failure, and typically, seeking support from the applicable First Nation(s) for the proposed alternative approach.

More detailed guidance related to these considerations is provided in the following sections of this guide and in the EBM Supplemental Technical Guidance.

Planning and Operational Flexibility

The GBRO identifies specific planning and practice requirements for each objective, some of which are quite prescriptive. However, each objective also contains one or more provisions that create flexibility in implementation. For example:

- Some objectives—e.g., the objectives for old forest maintenance and recovery—identify specific targets that must be achieved overall in the GBR. To ensure these regional targets are effectively distributed across the GBR, technical guidance in the form of landscape-level

targets for each type of old forest ecosystem have also been developed. The GBRO states that old forest targets are to be met in each landscape unit "to the extent practicable".

- Many objectives require the design of reserve zones or management zones adjacent to important cultural and ecological features. However, those objectives also allow practitioners to adjust the width of the zone as needed to address local site characteristics and conditions, as long as the net area of the zone is maintained.
- Some objectives—e.g., the objectives for active fluvial units and red-listed plant communities—allow for alteration of reserve zones and management zones and the feature itself in circumstances where local access challenges result in no practicable alternative.

Overall, the intent of this approach is to let the GBRO identify the outcomes that should be achieved, while recognizing that flexibility will be required to address local site characteristics and conditions and uncertainty. Use of flexibility should be limited in circumstances with high consequences. For example, if one of the purposes of a reserve zone is to maintain the microclimate of a feature, the full width of the zone should be maintained.

Qualified professionals such as biologists, archaeologists, and forestry engineers will need to be engaged to help design reserve zones and management zones in high-stakes circumstances. At times, more than one qualified professional may need to be involved.

More detailed guidance related to the flexibility associated with each objective is provided in the following sections of this guide and in the EBM Supplemental Technical Guidance.

2.2 First Nations Objectives

Overview

Intent

The objectives for First Nations engagement and Indigenous forest values indicate that forest licensees are to pursue information sharing and engagement with First Nations in relation to all the objectives in the GBRO, and to ensure protection and stewardship of Indigenous forest values (which include Indigenous cultural heritage sites and features). Specific measures are identified for important resources and features at a landscape and site level.

Background

Forestry is a key activity in coastal First Nations cultures. Over millennia, First Nations in the GBR adapted to the coastal forest environment by developing practices to manage and harvest trees, plants, and wildlife. Individuals had the role and responsibility of providing cedar and other forest resources for their tribe, clan, or house. Specific rules existed for when and how to harvest forest resources (e.g., most cedar trees that were used remained alive and standing), and included strict protocols regarding permission and access. Stewardship and harvesting were based on extensive knowledge and careful evaluation of the characteristics and condition of the resource.

Today, forest values and resources continue to be used by coastal First Nations for many traditional and cultural purposes, including crafting of tools and clothing, construction, and art. The value of Indigenous forest resources extends beyond their consumptive utility. Different forested areas and locations often contain vital and irreplaceable habitation, harvesting, and spiritual sites, and the persistence of these sites and values on the landscape directly contribute to a Nation's sense of place and cultural well-being.

Managing Indigenous Forest Values

The First Nations objectives in the GBRO provide direction for the protection and stewardship of forest values in a manner that:

- establishes processes and procedures for meaningfully engaging with First Nations and for working collaboratively with First Nations stewardship staff to identify, inventory, and prepare plans to protected and steward Indigenous forest values; and
- ensures Indigenous cultural heritage and forest values are protected or enhanced, including ensuring there is sufficient quality and quantity of cedar and other forest values and resources today and for future generations.

Objective for First Nations Information Sharing and Engagement

Intent

The *Forest and Range Practices Act* directs forest licensees to share information with First Nations in relation to development and implementation of forest stewardship plans. If effectively pursued, such Information-sharing processes can create opportunities to identify and resolve issues. Meaningful discussions can lead to the development of cooperative and mutually beneficial working relationships and streamlined planning and decision making.

The purpose of the objective for First Nations information sharing and engagement is to establish direction that, before submitting any cutting authorities, forest stewardship plan holders are to pursue meaningful information sharing and collaborative engagement with applicable First Nations in relation to all the GBRO objectives.

Objective

From the GBRO:

(1) For the purpose of implementing and achieving the intent of the objectives in this land use order, conduct engagement with applicable First Nations.

Definitions

From the GBRO:

applicable First Nation: any First Nation with an asserted or established Indigenous right, Indigenous title, or treaty right to the area under consideration

First Nations engagement: reasonable efforts to communicate, share information, engage in dialogue, and identify and work to resolve issues and concerns brought forward by applicable First Nations

Supporting Information

For the purposes of this guidance, the following supplemental information applies:

- A Ministerial Direction letter dated January 29, 2016, provides additional clarity that forest stewardship plans must "specify intended results and strategies that describe in detail how the license holder's operations will be consistent with the objectives for First Nations Information Sharing and Engagement in the GBR LUO".[11]

[11] Memorandum, Ref: 219914, "RE: Direction on approval of Forest Stewardship Plan (FSPs) in the Great Bear Rainforest plan area", signed by Honourable Steve Thomson, Minister of Forests, Lands and Natural Resources on January 29, 2016.

Guidance

In practice, the steps and actions that can and should be taken to implement the objective for First Nations information sharing and engagement include the following:

- reviewing applicable land use plans and agreements, ethnographic studies, outcomes of previous consultation in the area, etc., to identify the values and interests of applicable First Nations that may be affected by proposed forestry activities;
- before initiating operational planning activities, meeting with designated representatives of applicable First Nations to discuss best approaches, protocols, and processes for engagement in relation to implementation of the objectives in the GBRO. Information related to some values and interests may be considered by First Nations to be too sensitive to be shared in writing;
- providing the First Nation with all relevant information that is required for the assessment and consideration of the issues and concerns raised by their representatives, including potential effects on their Nation's forest values and interests;
- prior to submitting applications for operational permits, meeting with designated representatives of applicable First Nations to discuss and seek to identify solutions to issues, and then adjusting planned harvesting, road building, and forest management activities to address the concerns and issues raised by the Nations' representatives; and
- providing provincial decision-makers and First Nation representatives with a record of efforts made to meet, develop processes for engagement, share relevant information, identify and discuss issues, and resolve concerns and issues.

A best practice that should be pursued is the development of a formal protocol or agreement with applicable First Nations that defines and clarifies the working relationship and the processes and procedures that will be followed to share information and address issues.

Objective for Identification of Indigenous Forest Values

Intent

Section 10 of the Forest Planning and Practices Regulation provides general direction for the identification and management of cultural heritage resources that are of "continuing importance to Aboriginal peoples". The purpose of the objectives for the identification of Indigenous forest resources and Indigenous heritage features is to provide more detailed direction regarding the identification and assessment of the Indigenous forest values in the GBR.

Objective

From the GBRO:

(1) Prior to undertaking road construction or timber harvesting, through field reconnaissance or field assessments and First Nations engagement as appropriate, identify Indigenous forest values that may be altered or adversely impacted by road construction, timber harvesting, or other site development activity.

Definitions

From the GBRO:

contemporary culturally modified tree: a tree that was modified less than 80 years ago by First Nations people as part of their cultural use of the tree

cultural cedar stand: three or more monumental cedars or contemporary culturally modified trees where each tree is within 30 m of another monumental cedar or contemporary culturally modified tree

historical culturally modified tree: a tree that was modified 80 or more years ago by First Nations people as part of their cultural use of the tree

Indigenous forest resource: a forest plant resource listed in Schedule J, or other forest plant resources identified by First Nations during First Nations engagement that is used for food, social, medicinal, or ceremonial purposes

Indigenous forest values: an Indigenous forest resource, Indigenous heritage feature, historical culturally modified trees, contemporary culturally modified trees, monumental cedar, cultural cedar stands, western yew trees, and other forest features that are of importance to First Nations

Indigenous heritage feature: an artefact, feature, or site of the general types listed in Schedule I, other than a contemporary culturally modified tree or a historical culturally modified tree, that is known, is identified during First Nations engagement, or is found during field inventories and assessments, and is important to the cultural practices, knowledge, or heritage of the applicable First Nation

monumental cedar: a large, old, western redcedar tree or a large, old, yellow cedar tree that has the attributes necessary to fulfill the Indigenous tree use needs of the applicable First Nation, primarily for totem poles, canoes, or long beams and poles to build longhouses, community halls, or similar community structures

Supporting Information

To address this objective, forest stewardship plan holders are to undertake the necessary proactive steps to identify Indigenous forest values that may be directly or indirectly affected by forest development activities. As described below, this can be achieved through a combination of review of available documents and reports, First Nations information sharing and engagement, field reconnaissance activities, and field inventories and assessments.

The objective and the definitions in the GBRO, and the guidance provided in this document do not replace the requirements of *the Heritage Conservation Act*. Rather, they complement and extend beyond the scope of the Act to require consideration of a more detailed and varied number of Indigenous heritage features dated before or after 1846.

Guidance

In practice, the steps that forest stewardship plan holders should take to achieve the intent of the objective for Indigenous forest values include the following:

- undertaking literature reviews and other research to obtain information about the characteristics and location of Indigenous forest values;
- meeting with designated representatives of applicable First Nations to discuss and seek to obtain additional local knowledge and information about the characteristics and location of Indigenous forest values in proposed development areas;
- making all reasonable efforts to collaborate with applicable First Nations to design and implement a mutually agreed upon approach to performing field inventories and assessments of Indigenous forest values; or
- in circumstances where collaboration with applicable First Nations is not possible, engaging qualified professionals to design and perform field inventories and assessments of Indigenous forest values.

Field inventories and assessments designed to identify the characteristics and location of Indigenous forest values that may be affected by forest development activities should extend sufficiently beyond the boundaries of proposed cutblocks and roads so as to include consideration and assessment of potential windthrow and other processes that may affect reserve zones and management zones that are established adjacent to the identified Indigenous forest value. For example, field inventories need to extend at least 200 m beyond the boundaries of the proposed cutblocks and roads if there is potential to identify a Type 1 Indigenous heritage feature in the applicable area.

Objectives for Indigenous Forest Resources

Intent

The purpose of these objectives is to provide direction for the maintenance and stewardship of the Indigenous forest resources listed in Schedule J, or other Indigenous forest resources identified through First Nations information sharing and engagement, in quantities and in locations such that First Nations are able to continue their customs and traditions related to the stewardship, management, cultivation, harvesting, and use of those resources.

Objectives

From the GBRO:

1) Avoid road construction, timber harvesting, or other site development activities in areas and sites that contain Indigenous forest resources, to the extent practicable.
2) Despite subsection (1), areas or sites containing Indigenous forest resources may be harvested or altered, provided measures to identify and manage or provide access to Indigenous forest resources have been developed through a process of engagement with applicable First Nations.

Definition

From the GBRO:

Indigenous forest resource: a forest plant resource listed in Schedule J, or another forest plant resource identified by First Nations during engagement that is used for food, social, medicinal, or ceremonial purposes

Supporting Information

For the purposes of this guidance, the following supplemental information applies:

- Many trees and forest plants in the GBR are important to First Nations. The list in Schedule J identifies the common tree and plant resources that have been and still are stewarded, cultivated, harvested, and used by many First Nations who have territories in the GBR. However, Schedule J is not exhaustive. Other trees and plants not listed in Schedule J may be stewarded, cultivated, harvested, and used by particular First Nations in accordance with their unique customs and traditions.

Guidance

In practice, the steps that forest stewardship plan holders should take to achieve the intent of the objectives for Indigenous forest resources include the following:

- gathering information about the management, cultivation, harvesting, and use of Indigenous forest resources by applicable First Nations through review of relevant First Nations land use plans, supporting documents, and relevant literature.[12] Most First Nations have developed Indigenous forest resource-related literature that is specific to their unique culture and customs;[13]

[12] General information is provided in *Food Plants of Coastal Peoples* by Nancy J. Turner, Royal BC Museum (2006). *"Where Our Women Used to Get the Food": Cumulative Effects and Loss of Ethnobotanical Knowledge and Practice; Case Study from Coastal British Columbia* by Nancy J. Turner and Katherine L. Turner, School of Environmental Studies, University of Victoria (2008) provides an overview of First Nations historical uses of many of the plants in the GBR area.

[13] See, for example, *'Nwana'a Lax Yuup: Plants of the Gitga'at People*, edited by: Nancy J. Turner and Judith Thomson, School of Environmental Studies, University of Victoria (2006).

- sharing information and engaging with applicable First Nations regarding the known or potential characteristics and locations of Indigenous forest resources and any applicable Indigenous customs or practices regarding their protection, stewardship, cultivation, harvesting, and use;
- collaborating with designated representatives and stewardship staff of applicable First Nations to design and perform field inventories and assessments of Indigenous forest resources; or
- in circumstances where collaboration with First Nations is not possible, engaging qualified professionals to conduct field inventories and assessments of Indigenous forest resources that are within or near proposed roads and cutblocks; and
- adjusting, if required, planned harvesting, road building, and forest management activities to support the current and future stewardship, cultivation, harvesting, and use of Indigenous forest resources by applicable First Nations.

Adjustments may include avoiding areas that contain Indigenous forest resources, establishing stand-level retention to maintain Indigenous forest resources, or adapting silvicultural, harvesting, and road development plans to promote Indigenous forest resource regeneration and access.

Objectives for Indigenous Heritage Features

Intent

Section 10 of the Forest Planning and Practices Regulation establishes general direction for the conservation and protection of cultural heritage resources that are of continuing importance to Indigenous peoples. The *Heritage Conservation Act* provides complementary and more specific direction regarding the identification, recording, and protection of archaeological features and sites dated before 1846.

Experience has shown, however, that the Forest Planning and Practices Regulation, *Heritage Conservation Act*, and related policy and technical guidance do not address the specific direction that is needed in the identification, protection, and maintenance of the distinct and wide range of Indigenous heritage features that exist in the coastal forests of the GBR.

The purpose of the Indigenous heritage feature objectives is to provide a detailed definition of these features and direction regarding the identification, protection, and maintenance of Indigenous heritage features and sites in the GBR.

Objectives

From the GBRO:

(1) Protect Type 1 Indigenous heritage features.

(2) Adjacent to Type 1 Indigenous heritage features, maintain a reserve zone with an outer edge

designed to minimize risk of windthrow, and with a minimum width of 200 m to protect the Type 1 Indigenous heritage feature.

(3) Despite subsections (1) and (2), the Type 1 Indigenous heritage feature and the reserve zone may be modified with the support of, or lack of objection from, the applicable First Nations.

(4) Despite subsections (2) and (3), the reserve zone may be modified when:

  (a) the modification is required for road access or other infrastructure, or to address a safety concern, and no practicable alternative exists;

  (b) alternative measures are implemented to avoid, mitigate, or otherwise address impacts on the Type 1 Indigenous heritage feature; and

  (c) the alternative measures have been developed through a process of engagement with applicable First Nations.

(5) Protect all Type 2 Indigenous heritage features.

(6) Adjacent to Type 2 Indigenous heritage features, maintain a reserve zone with an outer edge designed to minimize risk of windthrow, and with a minimum width of 1.5 tree lengths measured from the edge of the feature to protect the Type 2 Indigenous heritage feature.

(7) Despite subsections (5) and (6), the Type 2 Indigenous heritage feature and its reserve zone may be modified with the support of, or lack of objection from, the applicable First Nation.

(8) Despite subsections (5), (6), and (7), the reserve zone may be modified when:

  (a) the alteration or removal is required for road access or other infrastructure, or to address a safety concern, and there is no practicable alternative;

  (b) alternative measures are implemented to avoid, mitigate, or otherwise address impacts on the Type 2 Indigenous heritage feature; and

  (c) the alternative measures have been developed through a process of engagement with applicable First Nations.

Definition

From the GBRO**:**

Indigenous heritage feature: an artefact, feature, or site of the general types listed in Schedule I, other than a contemporary culturally modified tree or a historical culturally modified tree, that is known, is identified during First Nations engagement, or is found during field inventories and assessments, and is important to the cultural practices, knowledge, or heritage of a First Nation

Supporting Information

The *Indigenous Heritage Features Handbook* provides technical guidance regarding the types and characteristics of Indigenous heritage features that exist in the GBR**,** and the appropriate methods for identifying them**.**

General guidance regarding appropriate field inventory and assessment methods is provided in archaeological inventory standards manuals**,** including the *British Columbia Archaeological Site Inventory Form Guide***.**

In addition, many First Nations in the GBR have developed policy direction and technical guidance on identifying and protecting Indigenous heritage features in their particular territory.

Guidance

In practice, the steps that forest stewardship plan holders should take to achieve the intent of the objectives for Indigenous heritage features include the following:

- reviewing First Nations land use plans, supporting documents, scientific literature, general application standards manuals, and Nation-specific policy and technical guidance regarding the identification, protection, and management of Indigenous heritage features, and Indigenous heritage feature records and information;
- meeting with designated representatives of applicable First Nations to share information about known or potential locations of Indigenous heritage features, and to discuss any applicable Indigenous customs, policies, or practices regarding their identification, protection, and management;
- collaborating with designated representatives and stewardship staff of applicable First Nations to design and perform field inventories and assessments of Indigenous heritage features, focusing on those features and associated management zones and reserve zones that may be affected by proposed roads and cutblocks; or
- in circumstances where collaboration with applicable First Nations is not possible, engaging qualified professionals to conduct field inventories and assessments of Indigenous heritage features within proposed development areas, focusing on those features and associated management zones and reserve zones that may be affected by proposed roads and cutblocks; and
- adjusting planned harvesting, road building, and forest management activities to protect known or newly identified Indigenous heritage features.

Objectives for Historical Culturally Modified Trees

Intent

Section 10 of the Forest Planning and Practices Regulation provides general direction regarding the conservation and protection of cultural heritage resources that are of continuing importance to Indigenous peoples. The *Heritage Conservation Act* provides complementary and more specific direction regarding the identification, recording, and protection of archaeological features and sites dated before 1846. However, experience has shown that the Forest Planning and Practices Regulation, *Heritage Conservation Act*, and related technical guidance do not provide the necessary direction regarding the identification, protection, and maintenance of culturally modified trees dated later than 1846.

The intent of these objectives is to provide additional, more detailed direction regarding the identification, protection, and management of culturally modified trees that are greater than 80 years old. These objectives, along with the overarching objective for First Nations information sharing and engagement, direct licensees to share information and work with First Nations to identify and protect historical culturally modified trees within areas proposed to be altered or harvested.

Objectives

From the GBRO:

(1) Protect historical culturally modified trees.

(2) Adjacent to historical culturally modified trees, maintain a management zone of sufficient width and design to protect the historical culturally modified trees from site-specific local hazards and windthrow.

(3) Despite subsections (1) and (2), a historical culturally modified tree and the adjacent management zone may be altered or harvested if,

(a) alteration or harvesting is required for road access or other infrastructure, or to address a safety concern, and there is no practicable alternative; or

(b) protection of all of the historical culturally modified trees in the cutblock area would make harvesting economically unviable;

provided that the plans to alter or harvest the historical culturally modified trees have been developed through a process of engagement with applicable First Nations.

Definition

From the GBRO:

historical culturally modified tree: a tree that was modified 80 or more years ago by First Nations people as part of their cultural use of the tree

Supporting Information

Culturally Modified Trees of British Columbia: A Handbook for the Identification and Recording of Culturally Modified Trees provides technical guidance for field inventory and data recording of culturally modified trees.[14]

The Significance and Management of Culturally Modified Trees provides a general overview of approaches to assessing the importance and value of culturally modified trees.[15]

[14] https://www.for.gov.bc.ca/hfd/pubs/docs/mr/mr091/cmthandbook.pdf

[15] https://www.for.gov.bc.ca/ftp/archaeology/external/!publish/web/culturally_modified_trees_significance_management.pdf

In addition, many First Nations with territories in the GBR have developed policy direction and technical guidance for the identification and protection of historical culturally modified trees, which are applicable to a particular Nation's territory.

Guidance

In practice, the steps that forest stewardship plan holders should take to achieve the intent of the objectives for historical culturally modified trees include the following:

- reviewing First Nations land use plans, supporting documents, scientific literature, general application standards manuals, and Nation-specific policy and technical guidance regarding the identification, protection, and management of historical culturally modified trees;
- meeting with designated representatives of applicable First Nations to share information on the known or potential location of historical culturally modified trees, and to discuss any applicable Indigenous laws or customs regarding their identification, protection, and management;
- collaborating with applicable First Nations to perform reconnaissance and/or detailed field surveys of historical culturally modified trees within or adjacent to proposed development areas, roads, and cutblocks; or
- in circumstances where collaboration with applicable First Nations is not possible, engaging qualified professionals to conduct field inventories and assessments of historical culturally modified trees within or adjacent to proposed development areas, roads, and cutblocks; and
- engaging with applicable First Nations to identify measures for, and adjustments to, planned harvesting, road building, and forest management activities to protect known or newly identified historical culturally modified trees.

Objectives for Indigenous Tree Use

Intent

First Nations with territories in the GBR have an Indigenous right to manage, harvest, and use cedar and other tree species to fulfill their food, social, and ceremonial needs, including the use of trees for such things as shelter, transportation, tools, fuel, and art.

The intent of this objective is to ensure that sufficient quantities of western redcedar, yellow cedar, and other tree species are maintained to support present and future harvesting and use of trees by applicable First Nations.

Objectives

From the GBRO:

(1) Maintain a sufficient volume and quality of western redcedar, yellow cedar, and other tree

species to support the applicable First Nations' present and future Indigenous tree use.

(2) In Cedar Stewardship Areas, maintain, and recruit as necessary, monumental cedar, western redcedar, and yellow cedar in a quantity sufficient to support the applicable First Nations' present and future Indigenous tree use.

(3) Within development areas, retain monumental cedar with windfirm buffers, and cultural cedar stands in a quantity sufficient to support the applicable First Nations' present and future Indigenous tree use.

(4) Despite subsection (3), a monumental cedar and its windfirm buffer, or a cultural cedar stand, may be altered or harvested if:

(a) the harvesting is required for road access or other infrastructure, or to address a safety concern, and there is no practicable alternative; or

(b) it has been determined that the monumental cedar or cultural cedar stand is not suitable or is not required for a cultural cedar use; or

(c) the monumental cedar or cedar from the cultural cedar stand will be provided to the applicable First Nation;

provided that:

(a) retention of all monumental cedar and cultural cedar stands in the cutblock area would make harvesting economically unviable; and

(b) the plans to alter or harvest the monumental cedar and cultural cedar stands have been developed through a process of engagement with applicable First Nations.

(5) Within a cutblock, for the first 15% of the pre-harvest stand retained in stand retention as specified in section 17(1), design stand retention to maintain mature and old western redcedar and yellow cedar representative of the pre-harvest stand.

Definitions

From the GBRO:

cedar stewardship area: an area identified in Schedule Q or a similar area that is identified by First Nations through engagement that is for the purpose of maintaining, enhancing, and providing access to cedar for cultural use

contemporary culturally modified tree: a tree that was modified less than 80 years ago by First Nations people as part of their cultural use of the tree

cultural cedar stand: three or more monumental cedars or contemporary culturally modified trees, where each tree is within 30 m of another monumental cedar or contemporary culturally modified tree

Indigenous tree use: the present and future use of monumental cedar, other cedar, or other tree species to fulfill the food, social, medicinal, spiritual, and ceremonial needs of the applicable First Nation, including the use of trees for such things as shelter, transportation, tools, fuel, and art

monumental cedar: a large, old western redcedar tree or a large, old yellow cedar tree that has the attributes necessary to fulfill the Indigenous tree use needs of the applicable First Nation, primarily for totem poles, canoes, or long beams and poles to build longhouses, community halls, or similar community structures

Supporting Information

For the purposes of inventorying cultural cedar stands, the 30-m distance is measured from bark to bark to determine if the group of trees constitutes a cultural cedar stand.

As new historical culturally modified trees are added to the landscape, the boundaries of cultural cedar stands will be altered, and new stands may be created.

Guidance

In practice, the steps that forest stewardship plan holders should take to achieve the intent of the objectives for Indigenous tree use include the following:

- reviewing First Nations land use plans, supporting documents, scientific literature, general application standards manuals, and Nation-specific policy and technical guidance regarding the identification, protection, and management of historical culturally modified trees;
- meeting with designated representatives of applicable First Nations to share and discuss information related to the First Nations' stewardship, harvesting, and use of trees, and to discuss any applicable Indigenous customs or policies regarding their identification, protection, and management;
- engaging with designated representatives of applicable First Nations to develop and implement a cedar strategy for each territory. Such strategies may include:
    - considering standards identified by the First Nation regarding what constitutes a monumental cedar (e.g., tree defect tolerances, size, amount of clear wood);
    - developing a protocol for establishing reserves for monumental cedar use; and
    - developing a protocol to work collaboratively as part of operational planning to identify monumental cedar;
- collaborating with applicable First Nations to perform reconnaissance and/or detailed field surveys of contemporary culturally modified trees and cultural cedar stands within or adjacent to proposed development areas, roads, and cutblocks; or
- in circumstances where collaboration with applicable First Nations is not possible, engage qualified professionals to conduct field inventories and assessments of Indigenous heritage features within or adjacent to proposed development areas, roads, and cutblocks; and
- the amount of monumental cedar required by First Nations will vary; therefore, First Nations engagement is required. Some cedar strategies, which address the uses and grade profiles

required by First Nations, have been completed. For example, see the Nanwakolas Operational Protocol for Large Cultural Cedar,[16] or the *Guidelines for Managing Cedar for Cultural Purposes*.[17]

Where cedar strategies have identified specific locations that will provide a sufficient amount of monumental cedar over time, individual cutblock assessments may not be required. However, if monumental cedars are located during reconnaissance, engagement regarding their locations and potential retention or use may occur depending upon agreements with the First Nation(s).

When a monumental cedar is harvested under subsection (4) of the objective or for the purpose of providing monumental cedar to an applicable First Nation, the associated windfirm buffer can also be harvested.

Objectives for Retention of Western Yew

Intent

The intent of these objectives is to support the inventory and retention of western yew trees for First Nations harvesting and use.

Objectives

From the GBRO:

(1) Retain western yew trees.

(2) Despite subsection (1), western yew trees may be altered or harvested if:

(a) alteration or harvesting is required to accommodate operational requirements for road and bridge construction, and there is no practicable alternative; or

(b) the retention of all western yew trees in a cutblock would make harvesting economically unviable;

provided that:

(a) measures are implemented to provide for the use of the altered or harvested western yew trees by applicable First Nations; and

(b) the plans to alter or harvest the western yew trees have been developed through a process of engagement with applicable First Nations.

(3) Where practicable, include western yew trees in stand retention.

(4) All areas retained or managed in accordance with subsections (1), (2), and (3) must be

[16] https://nanwakolas.com/news/nanwakolas-operational-protocol-for-large-cultural-cedar/#:~:text=Specifically%2C%20this%20LCC%20Protocol%20provides,economic%20benefits%2C%20including%20carbon%20values

[17] https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/consulting-with-first-nations/agreements/forestry-agreements/policies-reports/guidelines_for_managing_cedar_for_cultural_purposes.pdf

documented and submitted as digital spatial data to the applicable First Nation and the Province of British Columbia at the end of each calendar year.

Definition

For the purposes of implementing this objective, field assessments and management should focus on inventorying and retaining western yew trees that are greater than 2 m tall, unless other approaches are adopted following engagement with applicable First Nations.

Guidance

In practice, the steps that forest stewardship plan holders should take to achieve the intent of the objectives for the retention of western yew include the following:

- meeting with designated representatives of applicable First Nations to share and discuss information related to the First Nations' stewardship, harvesting, and use of western yew, and to discuss any applicable Indigenous customs or policies regarding their identification, protection, and management;
- taking necessary steps to inventory western yew that are greater than 2 m tall when conducting preliminary field reconnaissance activities and field assessments independently or in collaboration with applicable First Nations;
- engaging with designated representatives of applicable First Nations to reach agreement on site plans which ensure sufficient western yew are retained and can be accessed for present and future use by First Nations; and
- compiling and submitting new western yew inventory information in appropriate digital spatial data format to the applicable First Nation and the Province of British Columbia at the end of each calendar year.

2.3 Land Allocation and Biodiversity Objectives

Overview

A core goal of ecosystem-based management in the GBR is to maintain ecosystem health in the region while also improving human well-being in local communities. When ecosystem health is being maintained, harmful effects on ecological values and processes are limited or unlikely to occur. Human well-being is maintained when the quality of life in communities in the region is equal to or better than the Canadian average.

Work to achieve this goal has many facets that go well beyond what can be delivered with land use objectives. However, the GBRO can play a foundational role by establishing direction to:

- sustain ecosystem health in the GBR plan area by protecting or reserving an amount, type, and distribution of forests that will maintain biodiversity in the plan area; and

- support a viable forest sector by identifying and designating an amount of forested land in the GBR that will be managed for commercial forestry and can support an annual allowable cut of 2.5 million cubic metres.

The amount, type, and distribution of old forest needed to maintain a low level of risk to biodiversity in the GBR was determined by analysis of the characteristics and natural disturbance rates of forest ecosystems on the coast, and by review of scientific research on how loss of habitats in forest ecosystems will affect the abundance and distribution of tree, plant, and wildlife species.[18] Outcomes of this work are integrated into the objectives for old forest maintenance and recruitment, protection of red- and blue-listed plant communities, landscape reserve design, and stand-level retention.

Identification of the type and amount of productive forest needed to sustain a viable commercial forest sector in the region is informed by analysis of timber supply, domestic and export forest products markets, and current and future industry resource requirements. In the GBRO, the outcomes of research and discussions on this topic are addressed by the objective for managed forest.

Objective for Managed Forest, and Protected and Reserved Forest

Intent

The objective for managed forest, and protected and reserved forest establishes plan area targets for designating forested lands in the GBR as managed forest for commercial forestry activity, or as protected and reserved forests to support conservation objectives and sequestration of forest carbon.

The managed forest target is intended to ensure that sufficient productive forested lands are available for commercial forestry to support a viable forest sector. To that end, timber supply analyses conducted for the northern GBR and southern GBR indicate that 550,032 ha of productive forest are sufficient to maintain an allowable annual cut in the GBR plan area of 2.5 million cubic metres.

The target for protected and reserved forest is intended to ensure that enough forested lands are set aside to support implementation of GBRO biodiversity, aquatic, wildlife, and Indigenous forest values objectives. Strategic analysis of the GBRO requirements and current inventory indicates that 3,108,876 ha of forested lands are sufficient to achieve this goal.[19]

[18] Coast Information Team. *The Scientific Basis of Ecosystem-Based Management*. Section 4.1.5: Risk. https://www.for.gov.bc.ca/tasb/slrp/citbc/c-ebm-scibas-fin-04May04.pdf

[19] The amounts of managed forest, and protected and reserved forest do not equal the total forest management land base in the GBRO; there is an additional forest area (27,875 ha) outside of managed forest and landscape reserve targets that will be unmanaged forest and thus reserved at either landscape or stand

Objective

From the GBRO:

(1) Identify and maintain in the Order area:

(a) a managed forest area of 550,032 ha, and

(b) a protected and reserved forest area that

continues to grow older over time subject to natural disturbance and non-forest tenure activity, and has an area of (at least) 3,108,876 ha.

Definitions

From the GBRO:

managed forest: the area of productive forest that is available for commercial timber harvest planning

protected and reserved forest: the area of productive forest that is included in protected areas and landscape reserves designs

Supporting Information

The managed forest, and protected and reserved forest objective establishes strategic targets for managed forest, and protected and reserved forest at the broad GBR plan area. In practice, that direction is achieved by implementing other GBRO objectives, in particular, the landscape reserve design objective. Managed forest, and protected and reserved forest must be identified in each landscape unit during development of landscape reserve designs; the goal is to ensure that when all landscape reserve designs in the GBR have been completed, the total amount of managed forest, and protected and reserved forest will equal the plan area targets.

Guidance for the landscape reserve design process outlines approaches to achieving managed forest targets and protected and reserved forest targets that have been apportioned to each landscape unit. Two methods have been used to allocate plan-area targets to each landscape unit. The first was developed in 2016 based on analyses conducted by a Joint Solutions Project technical working group. Over the next 6 years, the landscape-level managed forest targets and protected and reserved forest targets were refined and updated by provincial staff as new inventory and harvest data were developed and updated. The second method translates outputs from the GBR spatial timber supply model into recommended managed forest targets and protected and reserved forest targets for each landscape unit. The underlying assumption is that because the model has been calibrated to address the GBRO (i.e., it has been designed to address all the objectives while maintaining 2.5 million cubic metres of allowable annual cut), the spatial outputs provide a reasonable estimate of

levels. The amounts of managed forest, and protected and reserved forest (previously referred to as natural forest) have not changed from those in the 2016 GBRO.

the managed forest target and protected and reserved forest target that should be achieved in each landscape unit.

Within the spatial timber supply model, a new analytical framework has been developed to identify the managed forest target and protected and reserved forest target for each subregion (northern GBR and southern GBR) and landscape unit in the GBR over time. The model is used to assess the current condition of each site series group (overall in the plan area, by each plan area subregion, and by landscape unit) relative to long-term managed forest targets and protected and reserved forest targets. The model is then used to calculate recommended targets for managed forest, and protected and reserved forest for each site series group, by subregion and landscape unit, based on optimization and fairness rules.[20]

Guidance

Guidance on addressing the landscape-level targets for managed forest, and protected and reserved forest in the landscape reserve design process is provided in the landscape reserve design guidance section of this guide and the landscape reserve design methodology.

Objectives for Old Forest Maintenance and Recovery

Intent

The goal of the objectives for maintenance and recovery of old forest is to maintain forests in the GBR in a state that mimics natural age distributions and spatial patterns. The basic concept is that if forests in the GBR are maintained in a state that is close to their "natural range of variability", the native plant communities and wildlife and Indigenous peoples that have adapted to and evolved under those conditions will be sustained.

Objectives

(1) Maintain landscape-level biodiversity as follows:

(a) for each site series group in the Order area, maintain a distribution of forest stand ages that will achieve the old forest representation targets listed in Column "A" in Schedule G by no later than 2264;

(b) for each site series group in the Order area, retain an amount of old forest equal to or greater than the Order area minimum old forest retention levels listed in Column "B" in Schedule G; and

(c) for the purposes of subsections (1)(a) and (1)(b), for each site series group in a landscape

[20] Fairness rules within the spatial timber supply model help ensure that the effects of new land use decisions, changes in forest land status, or adoption of new inventory are not localized but instead are distributed reasonably across the surrounding plan area. The basic premise is to allow protected forest for a site series group in one subregion to adjust downward targets in the other subregion but to avoid shifting requirements to reserve additional timber harvesting land base between subregions (i.e., a need to reserve timber harvesting land base in one area will not be reduced by increasing timber harvesting land base reserves in the other area).

unit, retain a minimum of 30% of the total forest area of the site series group as old forest.

(2) Despite subsection (1)(c), alteration or harvesting of old forest in a site series group in a landscape unit may occur where less than 30% of the total forest area of the site series group in the landscape unit is old forest, provided that

  (a) within the landscape unit area

    (i) the alteration or harvesting is required for road access or other infrastructure, or to address a safety concern, where there is no practicable alternative; or

    (ii) the lesser of 20% of the total forest area or the minimum old forest retention level specified in Schedule F is maintained as old forest; and

  (b) the aggregate area of old forest in the Order area harvested under subsection (2)(a) after January 28, 2016 does not exceed 18,650 ha; and

  (c) the plans to alter or harvest old forest in a site series group in a landscape unit have been developed through a process of engagement with applicable First Nations.

(3) Where there is not enough old forest available to meet the targets in subsections (1)(b) and (1)(c), or as a result of subsection (2), recruit forest to meet the old forest requirements by no later than 2264.

Additional ecological representation objectives for the southern GBR include the following:

(1) Pursuant to Part 1, section 4, subsections (1) and (2), for each site series group in the South-Central Coast area, up to 10% of the area required to meet the old forest representation targets specified in Part 1, section 4, subsection (1)(a) can be met:

  (a) in forest in a higher-level site series group in the same biogeoclimatic variant specified in Schedule L [and in the same landscape unit]; or

  (b) in forest in an equal or higher-level site series group in a different biogeoclimatic variant [specified in Schedule L], in any of the four landscape units specified in Schedule M;

  where this results in an improved outcome for ecological integrity and Indigenous cultural values.

(2) Pursuant to Part 1, section 4, subsections (1) and (2), for each site series group in the South-Central Coast area shown in Schedule C, up to 10% of the area required to meet the minimum old forest retention level specified in Part 1, section 4, subsections (1)(c) or (2)(a) can be met:

  (a) in forest that is not old forest:

    i. in the same site series group; or

    ii. in a higher-level site series group specified in Schedule L; or

  (b) in old forest in a higher-level site series group specified in Schedule L;

  where this results in an improved outcome for ecological integrity and Indigenous forest values.

(3) Pursuant to Part 1, section 4, subsections (1)(c) and (2)(a), for each site series group in the South Central Coast area where less than 30% of the site series group in a landscape unit is old forest, promote the restoration of landscape-level biodiversity by reserving a minimum of 30% of the

forest area in the site series group in a landscape reserve design.

(4) Despite subsection (3), the minimum amount of forest area of a site series group retained in a landscape reserve design may be reduced to enable flexibilities in subsections (1)(a), (1)(b), and (2)(b), where this results in an improved outcome for ecological integrity and Indigenous forest values.

(5) For the purposes of Part 1, sections 4 and 5, where because of harvest history or landscape characteristics, or where it is not practicable to meet minimum old forest retention levels in a landscape reserve design:

(a) forest that is not old forest may be included in the landscape reserve design; and

(b) temporary old forest reserves may be established outside of the landscape reserve design, with an area sufficient to meet the landscape unit minimum old forest retention levels.

Definitions

From the GBRO:

minimum old forest retention level: the minimum percentage of the total forest area in a site series group to be retained as old forest for the Order area shown in Column "B" of Schedule G

old forest: means any of the following:

(a) a stand of trees 250 years or older;

(b) a structurally complex stand composed mainly of late successional or climax species where older seral remnants may still be present in the upper canopy, and that typically includes:

i. standing snags;

ii. rotting logs on the ground; and

iii. a patchy to well-developed understorey;

(c) a stand of trees younger than 250 years, of an ecosystem that has reached the late successional or climax stage for the ecosystem

old forest representation target: a long-term old forest representation target for a site series group for the Order area shown in Column "A" in Schedule G

In addition to the objectives above:

- Schedule G of the GBRO provides two sets of old forest targets. The old forest representation target identifies the amount of natural forest to be maintained or recruited over the long term in each site series group in the Order area.[21] The minimum old forest retention level sets the minimum amount of old forest that must be reserved in each site series group in the short term.

[21] In circumstances where there is insufficient old forest to meet a target, the Order directs managers to recruit forest to meet the target by 2264.

- Part 1, Division 3, section 4 (1) (c) of the GBRO sets a general rule that a minimum of 30% of the area occupied by a site series group in each landscape unit must be maintained as old forest. This reduces risk to biodiversity at the landscape level and ensures that a reasonable distribution of old forest is sustained across the plan area.
- Sections 4(2) and 4(3) and Schedule F of the GBRO identify an alternative set of targets for specific landscape units that can be adopted in circumstances where strict application of the above old forest targets would severely limit forestry operations in the short term. In these areas, the minimum of 30% old forest can be reduced to 20% or to the levels identified in Schedule F if there is currently 30% or less old forest in the landscape unit.
- The South Coast portion of the GBRO contains additional short-term allowances. Amounts of old forest can be further reduced in the short term in some areas, but the cumulative decrease in old forest below the 30% (drawdown) for all site series groups over time must not exceed 18,650 ha.[22]

Supporting Information

The approach to old forest management in the GBR relies on the biogeoclimatic classification system (BEC). In the BEC system, the site series is the finest resolution of terrestrial ecosystem identification. Each site series reflects a unique combination of site characteristics and growing conditions (geography and climate) and plant assemblages.

Given that many site series occur in the GBR and many of them have similar characteristics, they have been amalgamated into a smaller set of site series groups in order to support efficient GBRO implementation.

The objectives for old forest maintenance and recovery establish targets for the protection and stewardship of old forest in each site series group. The goal is to maintain and, where needed, recruit enough old forest in each forest ecosystem type so that there is a low level of risk to plan area and landscape-level biodiversity (i.e., 70% of the range of natural variation).[23] Although targets have been

[22] A limit of 18,650 ha was set on the cumulative harvest of old forest in any site series group below 30% within any landscape unit, pursuant to section 4(2)(a). Each hectare of old forest in a site series group below 30% in a landscape unit harvested under section 4(2)(a) counts as a hectare against the 18,650 ha drawdown limit for the entire GBR plan area. Furthermore, plan area minimum old forest retention levels for each site series group must still be met. Harvest of a site series group below 30% in a landscape unit may need to be offset by retention (reallocation) of a similar area of that site series group in another landscape unit, particularly where the old forest level of a site series group in a landscape unit is below the guidance minimum old forest retention levels. Drawdown is factored into the minimum old forest retention levels in the guidance table. If the 18,650 ha drawdown limit is exhausted, no further harvest below 30% may occur. Drawdown limits must be considered during the landscape reserve design development process.

[23] See the Coast Information Team report *The Scientific Basis of Ecosystem-Based Management*. Extensive scientific literature on ranges of natural variation and the effects of habitat loss in coastal forest ecosystems was gathered and reviewed before old forest maintenance and recruitment targets were adopted for the GBR. The review indicated that, in general, wildlife populations begin to show behavioural stress and population

set at less than 70% of the range of natural variation for a small number of ecosystems in the GBR (primarily the CWHxm, CWHdm, and CWHmm), the total area with these targets is less than 1% of the plan area.

In some areas of the GBR that have a long history of commercial timber harvest and reduced levels of old forest, reserving productive younger forest and allowing it to grow old is a priority. This is especially true in the southern GBR.

In addition to maintaining the ecosystem processes and structures that sustain native plant communities and wildlife and Indigenous people, maintenance and recovery of forest ecosystems to close to natural conditions and patterns will also:

- create habitat refugia and connections that will buffer native plant communities and wildlife from the effects of climate changes;
- sustain Indigenous peoples forest values;
- enhance forest land carbon sequestration, thus mitigating climate change; and
- enable establishment of benchmark areas to support comparative research on the effects of different forest management approaches.

In recognition that a strict approach may significantly reduce harvesting opportunities in the short term, and that this will affect human well-being, the GBRO provides planning and operational flexibility, such as:

- the ability to substitute specified amounts of site series groups with equal or higher-level matrix site series groups;
- the use of productive younger forest to contribute to meeting old forest targets in particular landscape units; and
- the allowance of local site planning adjustments to address access and safety requirements.

This flexibility is also intended to enable development of landscape-level and operational plans that contribute to recruitment of old forest such that the amount and distribution of old forest in a landscape regains natural patterns and variation over time. For example, in many areas of the southern GBR (and some areas in the north) where the remaining old forest is located on higher ground and poorer sites, flexibility should be used to reserve younger forests on more productive areas.

decline when 30% of habitat has been altered or removed, and that risk increases as additional habitat is lost; eventually, high levels of risk are reached when greater than 70% of habitat has been altered or removed.

Guidance

Implementing the objectives for old forest maintenance and recovery will primarily involve addressing the old forest targets identified in the GBRO through the landscape reserve design process. This will involve developing landscape reserve designs for landscape units that, to the extent practicable, address the recommended old forest representation target and minimum old forest retention-level targets for each site series group in that landscape unit.

Detailed guidance on addressing the old forest representation target and minimum old forest retention level landscape-level targets in the landscape reserve design process is provided in the landscape reserve design methodology.

Objectives for Red-Listed and Blue-Listed Plant Communities

Intent

The intent of the objectives for red-listed and blue-listed plant communities is to ensure primary forest activities:

- have no or, at most, minimal adverse effects on endangered or threatened forest plant communities in the GBR; and
- present no more than a low level of risk to the viability of plant communities that are of concern because they are rare and particularly sensitive to primary forest activity and natural disturbance.

Objectives

From the GBRO:

(1) Protect each occurrence of a red-listed plant community during a primary forest activity as per Schedule N.

(2) Despite subsection (1), up to 5% of each occurrence of a red-listed plant community may be disturbed if:

  (a) there is no practicable alternative for road access or other infrastructure, or to address a safety concern; and

  (b) the plans to disturb the red-listed plant community have been developed through a process of engagement with applicable First Nations.

(3) Despite subsections (1) and (2), greater than 5% of a red-listed plant community occurrence that is less than 1 ha may be disturbed if it is necessary for critical road access, provided that:

  (c) the total disturbance of that red-listed plant community in a landscape unit does not exceed 5%; and

  (d) the plans to further disturb the red-listed plant community have been developed through a process of engagement with applicable First Nations.

(4) Reserve a minimum of 70% of each occurrence of a blue-listed plant community during a primary

forest activity, or reserve a minimum of 70% of the total area of each blue-listed plant community within a landscape unit as per Schedule O.

Definitions

From the GBRO:

blue-listed plant community: a plant community listed in Schedule O that is sufficiently established

red-listed plant community: a plant community listed in Schedule N that is sufficiently established

sufficiently established: means either of the following:

(a) a plant community occurrence within an old forest stand;

(b) a low-bench floodplain ecosystem, a mid-bench floodplain ecosystem, or a high-bench floodplain ecosystem;

(c) a mature forest that has structures and understorey approaching those of an old forest.

And for the purposes of this guidance:

occurrence (i.e., of a listed community): a single patch (or polygon) within which a listed community has been mapped. A "discrete occurrence" is a polygon of only one plant community (i.e., the mapped area is entirely or very nearly entirely one community). A "complex occurrence" is a polygon of more than one plant community (i.e., the mapped area is composed of two or more communities that cannot be separated into discrete occurrences due to the spatial complexity of site conditions and/or the scale of mapping).

Supporting Information

Plant communities are classed as red-listed if they are Endangered or Threatened and are at risk of being lost or extirpated. Other plant communities are classed as blue-listed if they are of Special Concern because they are rare and sensitive to disturbance.

Schedules N and O draw upon the Red and Blue Lists from the British Columbia Conservation Data Centre, although some changes and additions have been made to address the specific circumstances of the GBR. For example, several plant communities in the GBR have been defined in the GBRO as red-listed or blue-listed, either because they are rare, or they were once common but typically occur in late seral forests that have been extensively affected by forest development activities.

The GBRO protects listed ecosystems that are "sufficiently established"; i.e., that have late mature or old forest structure or structures that are relatively similar to old forest. Criteria required to be sufficiently established are outlined in Land Management Handbook 72. Specific direction is required to ensure that primary forest activities such as timber harvesting, and road construction and maintenance have little or no effect on these plant communities.

Guidance

Implementing the objectives for red-listed plant communities and blue-listed plant communities will involve the following:

- ensuring trained and qualified personnel (competent in site series identification and criteria in LMH 72) field check all proposed harvest cutblocks. Regardless of whether or not red- or blue-listed plant communities are identified on maps, field personnel should always look for the presence of red-listed and blue-listed plant communities;
- increasing sampling intensity in areas that have a moderate to high potential of containing red-listed and blue-listed plant communities;
- during fieldwork, when a red-listed plant community is identified, increasing sampling intensity to ensure that red-listed plant sites are identified and delineated. The minimum stratification size for managing red-listed plant communities will depend on whether the site is a distinct unit or a mosaic, but will generally be 0.25 ha (see LMH 72 for details);
- ensuring that proposals to disturb up to 5% of a red-listed plant community are justified—i.e., the disturbance is required for critical road access or to address a safety concern; that proposals to modify more than 5% of a single occurrence are pursued only when the red-listed polygon is quite small (i.e., less than 1 ha) and creates a critical access constraint; and that no more than 5% of the total area known to be occupied by the red-listed plant community in the landscape unit is disturbed;
- use the best inventory available to ensure that a minimum of 70% of each occurrence of a blue-listed plant community is protected or reserved, or that 70% of the area that is known or estimated to be occupied by blue-listed plant communities in a landscape unit is protected or reserved; Work to improve inventories over time (see below);
- documenting and recording justification for boundary changes in circumstances where boundaries between red-listed plant communities and cutblocks or road rights-of-way are established in the field;
- establishing buffers and using wind-firming treatments within the buffer to limit windthrow in red-listed plant community polygons to 10% over 3 years of endemic winds;
- considering and addressing the sensitivity/resiliency of red-listed and blue-listed plant communities in relation to harvesting and road building activities (e.g., considering and addressing the implications on those communities if drainage patterns, the water table, or canopy closure are altered);
- when multiple operators are planning operations in the same landscape unit, tracking the area of blue-listed plant communities that is being managed in each site series to ensure that less than 30% is being altered overall in the landscape unit; and

- considering windthrow so that where harvest is planned next to a blue-listed plant community, the potential for blowdown will be limited to 20% of that community's polygon over 3 years of endemic winds.

In addition, the following recommended steps and actions should be pursued:

- The status of the landscape unit in relation to old forest representation targets should be reviewed to assess whether the red- or blue-listed site series in the landscape unit are encompassed in the landscape reserve design. Meeting old forest representation targets for each site series group will provide protection for red- and blue-listed site series that may not yet be sufficiently established. The intent is that implementation of the red- and blue-list objective in combination with protection of red- and blue-listed site series through landscape reserve design will eventually enable de-listing of the red-listed and blue-listed ecosystems as old forest conditions are attained over time.

- The full extent of known or previously inventoried occurrences of the plant communities listed in Schedules N and O should be incorporated into landscape reserve designs as per objective 5 (1) (c) of the GBRO, along with buffers designed to reduce risk of windthrow. If this is not practicable because of the size, shape, or location of the occurrences, the location of the unprotected listed communities should be noted in the landscape reserve design report, along with a recommendation that their protection be addressed during operational planning.

Note that in inventory data, some site series groups may contain a mosaic of red- or blue-listed site series along with non-listed site series. When analyzing the potential abundance and location of red- and blue-listed plant communities, each site series, not the site series group, must be examined for its age and condition.

- The inventory of red- and blue-listed plant communities should be improved. The extent of red-listed and blue-listed plant communities in the landscape unit should be confirmed and adjusted as better field and inventory data become available. Estimates of the abundance and distribution of red- and blue-listed plant communities in a landscape unit can be improved by using Light Detection and Ranging (LiDAR). LiDAR could also be used to check if polygons mapped as red-listed and blue-listed plant communities appear to have old forest structures (which will make them likely to be red- or blue-listed plant communities).

- Red- and blue-listed ecosystems in landscape reserve designs should be monitored and windthrow in red- and blue-listed ecosystems adjacent to harvested cutblocks should be recorded to support adaptive management.

Objectives for Landscape Reserve Designs

Intent

In the GBR, many higher-level land use issues have been addressed through the establishment of larger protected areas (parks; conservancies; biodiversity, mining, and tourism areas; ecological

reserves; etc.), and at the local level, many GBRO objectives provide protection and stewardship of site-level values. The larger protected areas provide about half of the GBRO targets and need to be augmented with landscape reserves to meet low-risk targets over time. The purpose of the landscape reserve design objective is to support creation of a mid-level planning product. Done well, landscape reserve designs help address landscape scale planning issues and create a less complex and more stable environment for operational planning and management activity.

The landscape reserve design process is intended to result in a plan for each landscape unit that, to the extent practicable, best addresses GBRO objectives for protection and stewardship of Indigenous heritage features and forest values, old forest retention, red- and blue-listed plant communities, habitats for species at risk, ungulate winter range, and habitat for regionally important wildlife. Landscape reserve designs are also intended to address the objective for managed forest by identifying, to the extent practicable in each landscape unit, an area of productive forest that will be available for commercial forestry activities.

Objectives

From the GBRO:

(1) For each landscape unit in the Order area, a landscape reserve design must be prepared by a qualified professional that addresses the minimum old forest retention levels specified in section 4(1)(c) and (2), and, to the extent practicable, contributes to:

  (a) the old forest representation targets specified in section 4(1)(a) and (b);

  (b) the protection and stewardship of Indigenous forest values;

  (c) the protection, connectivity, and stewardship of red-listed plant communities, blue-listed plant communities, rare and at-risk ecosystems, habitat that is important for species at risk, ungulate winter range, and habitat for regionally important wildlife, including, but not limited to, mountain goats, grizzly bears, black bears, Northern Goshawks, tailed frogs, and Marbled Murrelets; and

  (d) the protected and reserved forest area and the managed forest area specified in section 6(1).

(2) For the purposes of subsection (1)(a), the provisions of section 16 (1) and (2) of Part 3 apply.

(3) No commercial timber harvesting is permitted in a landscape reserve design.

(4) For the purposes of subsection (1):

  (a) complete landscape reserve designs prior to declaring areas or applying for a cutting authority; and

  (b) to the extent practicable, complete landscape reserve designs in all landscape units by December 31, 2026.

(5) Despite subsection (3), thinning and silvicultural treatments are permitted in landscape reserve designs to expedite recovery to old forest structural characteristics, provided that the proposed treatments are developed through a process of engagement with applicable First Nations.

(6) A landscape reserve design may be altered or modified to address new information, provided that the alteration or modification

(a) is developed by a qualified professional;

(b) maintains or improves outcomes pursuant to subsection (1); and

(c) is developed through a process of engagement with applicable First Nations.

Definitions

From the GBRO:

landscape reserve: an area in a landscape unit where commercial harvesting is not permitted

landscape reserve design: a system of landscape reserves in a landscape unit which is designed to meet requirements for old forest representation and simultaneously contribute to protection of Indigenous heritage features, Indigenous forest resources, and other land use objectives

landscape unit: a landscape unit within the Order area shown in Schedule A

Supporting Information

The landscape reserve design methodology provides detailed guidance for developing landscape reserve designs.[24] Additional guidance related to the preparation and submission of landscape reserve design spatial data and reports is provided in *A Framework for Landscape Reserve Design*.[25]

The approach used to develop landscape reserve designs can vary depending on landscape unit characteristics and circumstances. A more comprehensive approach involving establishment of Technical Teams may be used in landscape units with relatively high amounts of operable forest, more extensive harvest history, and heightened levels of First Nation, stakeholder, and public interest. A more streamlined approach developed by the GBR Joint EBM Forum may be used to prepare landscape reserve designs in more remote landscape units with relatively limited operable forest and harvest history.

[24] https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/land-use-plans-and-objectives/westcoast-region/great-bear-rainforest/great_bear_rainforest_landscape_reserve_design_methodology.pdf

[25] https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/land-use-plans-and-objectives/westcoast-region/great-bear-rainforest/gbr_framework_landscape_reserve_design_great_bear_rainforest.pdf

The GBRO requires that knowledgeable qualified professionals (i.e., professional biologists and foresters with landscape-level conservation planning experience, training in conservation biology, and the ability to identify land suitable for timber harvest) are involved in the preparation of landscape reserve designs. Landscape reserve designs submitted for review and acceptance as per *A Framework for Landscape Reserve Design in the Great Bear Rainforest* (previously "G2G Bulletin 2") Appendix 2, must be formally endorsed by a qualified professional.

Guidance

In practice, implementing the objectives for landscape reserve designs will involve making all practicable efforts to ensure the design:

- protects areas identified by First Nations as containing important Indigenous forest values and heritage sites and features;
- reserves a minimum of 30% of the area occupied by each site series group as old forest, or, if old forest is not available, as mature forest with complex structure;
- contains other reserves that will protect or recruit sufficient old forest to address the recommended amount of old forest representation target for each site series group;
- protects known occurrences of red-listed and at least 70% of blue-listed plant communities;
- protects grizzly bear Class 1 habitat and no less than 50% of Class 2 habitat (see also GBR wildlife objectives);
- protects Northern Goshawk habitat and Marbled Murrelet habitat;
- follows guidance in the landscape reserve design methodology for identifying best recruitment areas for biodiversity and climate change resilience (e.g., productive mature forest with old structures);
- follows design principles outlined in the landscape reserve design methodology;
- uses local knowledge to add to or refine protection of areas of Indigenous values; and
- identifies an amount of managed forest equivalent to the recommended amount for that landscape unit.

The landscape reserve design objective states that plan area managed forest, protected and reserved forest, and old forest representation targets should be addressed to the extent practicable in each landscape unit. As outlined above, landscape-level guidance has been developed to support the achievement of this goal, but it should be recognized that the guidance was developed using strategic-level inventory and a strategic-level model; therefore, it will contain some uncertainty. In addition, Indigenous and local knowledge and other sources of more specific information should play an equally important role in the landscape reserve design process.

In landscape units with extensive harvest history, it may be necessary to recruit old forest by establishing reserves that contain mature or younger forest. Landscape reserve design planners should focus first on reserving remaining old and mature forest, and should include younger stands only if they overlap important values or address key design elements (e.g., they provide riparian linkages where past harvesting has removed old forest adjacent to aquatic habitats). Landscape reserve designs should include representation of rich and poor growing sites and tree species in proportions expected in the landscape unit prior to harvest.

The GBRO provides direction regarding how the "to the extent practicable" goal should be achieved with each landscape unit, particularly in the southern GBR, where due to past harvest history, old forest recruitment is a greater concern. For example:

- Incorporating mature rather than old forest in reserves is allowed in landscape units that have 30% or less old forest in a site series group, and the good growing sites in that site series group have been heavily harvested. This approach should be used only in circumstances where the available old forest is not a sufficiently established red- or blue-listed ecosystem or it falls short in relation to old forest criteria in Land Management Handbook 72 (e.g., the old forest does not have many large trees, snags, and downed wood).
- Mature forest can also be swapped for old forest where the old forest is on less productive lower-than-average growing sites in the landscape unit. If that area of old forest is accessible and practical for forest harvest, it can be added to the managed forest, which will allow higher-quality mature forest to be added to the landscape reserve. That higher-quality mature forest must have large trees (greater than 70 cm dbh on mesic and moist sites, and greater than 50 cm dbh on dry sites), be on richer-than-average growing sites for the landscape unit, and be in areas that contribute to useful landscape reserve design.
- Areas of higher-productivity site series groups can be traded into landscape reserve and less productive areas put into managed forest (and these changes do not need to be balanced at the plan area).
- Where a BEC variant occurs in only one landscape unit, flexibility allows trading to other BEC variants in that landscape unit or nearby landscape units. Because the landscape targets are implementation guidance, there is some flexibility to move landscape reserve among landscape units that have the same BEC variants to eventually sum to the legal plan area targets. In landscape units that contain the only example of a BEC variant, the legal targets do not enable trading among landscape units; thus, there is added explicit flexibility in Schedules L and M to allow some potential trading among site series groups in different variants (for example, landscape reserve design could be added to the CWHxm2 and managed forest could be added to the CWHvm1 in the same or different landscape units).

Individual completed landscape reserve designs may vary in some respects from landscape-level guidance. In this context, ensuring plan area managed forest, protected and reserved forest, and old forest representation target guidance and other landscape reserve design priorities are achieved will

necessitate a high level of cooperation and coordination. First Nations and forest licensees that are leading or involved in preparing and submitting information to landscape reserve designs will, as appropriate, need to work cooperatively to prepare individual landscape reserve designs in landscape units in which multiple First Nations and forest licensees have interests. They will also need to track whether multiple landscape reserve designs in a particular portion of the GBR or all landscape reserve designs in the GBR are delivering an outcome that addresses plan area targets.

Overall coordination of landscape reserve design development, tracking, and monitoring is provided by the GBR Joint EBM Forum, which is supported by the GBR EBM Implementation Working Group. The Forum will track, review, and assess whether landscape reserve designs attain plan area targets for managed forest, and protected and reserved forest. If review of multiple complete landscape reserve designs in a particular portion of the GBR reveals a failure to reasonably align with plan area targets, the Forum may recommend that particular landscape reserve designs or groups of designs be revised to address managed forest, protected and reserved forest, or old forest representation target surpluses and deficits.

More guidance on preparing and submitting landscape reserve designs is provided in the landscape reserve design methodology and framework documents.

Objectives for Stand-Level Retention

Intent

The intent of the objectives for stand-level retention is to ensure:

- a sufficient amount, quality, and distribution of stand-level retention is maintained in the managed forest to address site-level biodiversity conservation goals; and
- stand-level retention is designed to:
    - protect or sustain local occurrences of important Indigenous forest values;
    - protect or sustain sites that contain important wildlife habitat elements and old forest characteristics; and
    - minimize the risk that retention will be affected by windthrow.

Objectives

From the GBRO:

(1) Maintain forest structure and diversity at the stand level by:

(a) maintaining a minimum of 15% of the cutblock area as stand retention;

(b) distributing stand retention throughout the cutblock;

(c) maintaining greater than 15% retention as necessary, considering cutblock size, landscape unit context, and immediate landscape context; and

(d) managing windthrow.

(2) To the extent practicable, include the following within stand retention:

(a) Indigenous features and values;

(b) habitat elements important for restoration of old forest; and

(c) habitat elements important for wildlife.

Definitions

From the GBRO:

cutblock: an area within which a tenure holder is authorized to harvest timber, as identified in a cutting permit, timber sale licence, or other cutting authority

stand retention: small patches of trees and understorey vegetation that are located in a cutblock or are contiguous to a cutblock

Guidance

The intent of the objectives for stand-level retention can be achieved by adopting a variable retention approach when designing harvest and site plans that uses a mix of the retention silvicultural system, clearcut with reserves, and other silvicultural systems with long-term retention. Use of the retention system will be especially critical in managed forest areas that have high cultural and wildlife values and reduced levels of old-growth forest in the surrounding landscape.

In practice, the following steps should be followed to assess the requirements for stand-level retention in each development area or proposed cutblock:

1) Assess the character and condition of the surrounding landscape unit in relation to GBRO objectives; i.e., site plans should include more stand-level retention in landscape units or portions of landscape units that have heavily harvested.

2) Assess the locations of the proposed cutblocks and the nature of the forested area around them; i.e., stand-level retention should be designed to help sustain or support recovery of local habitat features and elements.

3) Assess and to the extent possible design retention to encompass important Indigenous forest values and wildlife habitat elements that are within or near the proposed cutblocks.

4) Assess the general biophysical hazard for windthrow with the goal of minimizing the risk of retention blowdown.

More detailed guidance on completing these steps is provided in the EBM Supplemental Technical Guidance.

2.4 Objectives for Aquatic Habitat and Riparian Forest

Overview

Intent

The intent of the objectives for aquatic habitat and riparian forest is to maintain the ecological and hydroriparian structure and functions of those landscape elements. Some objectives are intended to protect important aquatic habitats and features; others are intended to maintain hydroriparian functions at broader scales. The goal is to sustain the habitats and ecological processes in those systems that fish and other wildlife species depend upon.

Background

Aquatic habitats and their associated riparian forests form a hydroriparian system of interconnected terrestrial, freshwater, and marine ecosystems. They provide short- and long-term storage and transport of energy, nutrients, organic material, and organisms that underpin ecosystem productivity and diversity. Depending on the character of a watershed, this system can extend from steep alpine headwaters through hillslope streams, lakes, wetlands, and floodplains to intertidal, estuarine, and marine environments at ocean shorelines. Management over the entire extent of a watershed has implications for all habitats in these areas.

Hydroriparian systems, particularly those associated with streams and floodplains, typically contain the most energetic, diverse, and productive ecosystems and habitats in the forested landscape. Maintaining the physical condition and ecological function of these systems is critical to sustaining the diverse species, particularly culturally and economically important fish species, that occur in the GBR.

Natural hillslope, hydraulic, and fluvial disturbance regimes contribute to the character of these habitats. Maintaining functioning riparian and upland forest in key areas helps mitigate the effect of new disturbance, the goal being to maintain processes within the natural range of variation.

Managing at Multiple Scales

At the watershed scale, developing knowledge and understanding of the watershed's character and physical processes is a key first step in preparing plans and management activities that achieve EBM goals.

At the site level, reserve zone and management zone boundaries need to be designed to maintain local hydrogeomorphic functions and riparian habitats, and to manage the risk of windthrow, slope failure, and other disturbances that could compromise the integrity and function of the local hydroriparian ecosystems.

Objectives for Important Fisheries Watersheds

Intent

Important fisheries watersheds have been identified based on the contribution they make to the health and maintenance of salmon and other valued fish and wildlife species. Salmon and other fish species have been a vital part of coastal Indigenous peoples' diet, economy, and mythology for centuries. Salmon were and are an important Indigenous trade item. Salmon, in particular, feature prominently in a wide variety of Indigenous people's legends, art, and spiritual ceremonies. In some stories, salmon are considered returning relatives.

Due to the importance of these watersheds, development and management activities should be planned and conducted in a manner that creates a low level of risk to hydroriparian habitats and structures, and natural hydrological and fluvial processes. The goal is to maintain hydrological and fluvial processes within the natural range of variation such that watershed health, including the quality and quantity of streamflow through important freshwater habitats and the characteristics and function of adjacent riparian forests, is sustained over time.

Objectives

From the GBRO:

(1) Within each of the important fisheries watersheds shown in Schedule E, prior to declaring areas or applying for a cutting authority, ensure:

  (a) a watershed assessment or similar assessment of watershed sensitivity to forest development disturbance is completed by a qualified professional;

  (b) an amount, type, and distribution of forest cover sufficient to sustain natural hydrological and fluvial processes within the watershed is maintained;

  (c) the effectiveness of the management strategies implemented pursuant to subsection (1)(b) are monitored; and

  (d) the watershed assessment and monitoring strategies have been developed through a process of First Nations engagement.

(2) Despite subsection (1), forest stewardship plan holders may apply for a cutting authority in an important fisheries watershed if:

  (a) a preliminary watershed assessment indicates no adverse impact on fish habitat, stream flow quality and quantity, and other watershed health indicators, and

  (b) First Nations support, or do not object to, the application.

Definition

From the GBRO:

important fisheries watershed: a watershed area identified in Schedule E, but not including watersheds composed entirely of S5 or S6 streams flowing directly to the ocean

Supporting Information

Schedule E of the GBRO identifies the watersheds in the GBR to which the objectives for important fisheries watersheds apply. More detailed GIS data that support implementation of this objective can be downloaded from the GBR EBM Data Centre.[26]

Guidance

In practice, implementing the objectives for important fisheries watersheds will involve the following:

- conducting watershed assessments in important fisheries watersheds with emphasis on understanding and managing key risks within the watershed using the concept of risk tolerance;[27]
- ensuring effective watershed management by involving qualified professionals who conduct overview and more detailed watershed assessments, starting with GIS-based overview assessments and progressing, if required, to more detailed assessments and field evaluations;
- ensuring that qualified professionals who are conducting watershed assessments conduct planning based on the goal of low risk tolerance. Proposed management activities should present a low risk of adverse effects on aquatic–riparian values, or a low likelihood that adverse effects will occur, with at worst, a low severity of consequence;
- adopting risk-averse or precautionary strategies relative to likely effects or risks for watershed health, in general, including key hydroriparian habitats and structures, and natural hydrological and fluvial processes that are important to the health and maintenance of salmon and other valued fish species and populations; and
- updating watershed assessments every 10 years, or as needed if there is:
    - a significant change in watershed condition;
    - new site and watershed information that has not been previously addressed;
    - new information that affects existing estimation of risk; or
    - other reasons specified by a qualified professional or applicable First Nation.

[26] https://ebmdata.ca/?token=bde12c88b73a098c5891829114449b070

[27] Risk tolerance: references against which the significance of a risk is evaluated. Generally, these are associated with defined qualitative or quantitative risk levels (*Watershed Assessment and Management of Hydrologic and Geomorphic Risk in the Forest Industry* [ABCFP and EGBC 2020]).

Objectives for Type 1 Aquatic Habitat

Intent

The purpose of the objectives for Type 1 aquatic habitats is to ensure their protection and provide direction on establishing forest buffers that maintain functional riparian forest and have the width and integrity to protect the characteristics, attributes, and function of these habitats. Although natural windthrow can be beneficial because it can create small habitat openings and contribute large woody debris to stream channels, a key goal is to limit adverse effects associated with increased windthrow due to harvesting and exposure of edges.

Objectives

From the GBRO:

(1) Protect and maintain Type 1 aquatic habitats by, within or adjacent to cutblocks and roads but excluding stream crossings, maintaining an adjacent reserve zone with a minimum width of 1.5 tree lengths and an outer edge designed to minimize risk of windthrow.

(2) Despite subsection (1), the width of the reserve zone may be decreased at specific locations to address site characteristics and values, provided that:

  (a) a decrease is no more than 0.5 tree lengths; and

  (b) there is no net loss of reserve zone area required in subsection (1) within or adjacent to the cutblock.

(3) Despite subsections (1) and (2), the width of the reserve zone may be decreased, at specific locations to address site characteristics and values, by more than 0.5 tree lengths provided that:

  (a) there is no net loss of reserve zone area required in subsection (1);

  (b) assessments have been prepared by a qualified professional that specify measures:

    (i) to maintain the geomorphic and hydroriparian characteristics of the stream channel;

    (ii) to maintain the life cycle needs of fish in affected stream reaches;

    (iii) to maintain local terrestrial habitat needs and linkages to other reserves; and

    (iv) to minimize loss of trees in the reserve zone from windthrow.

  (c) the measures in subsection (b) are implemented; and

  (d) the plans to decrease the width of the reserve zone have been developed through a process of engagement with applicable First Nations.

(4) Where some or all of the forest required by subsections (1), (2), and (3) has been previously altered or harvested, to the extent practicable, recruit or create functional riparian forest in the reserve zone in the shortest time practicable.

For the southern GBR only:

(4) Despite subsections (1), (2), and (3) for Type 1 aquatic habitat that is not on an active fluvial unit, a forest stewardship plan may comply with the provisions for riparian reserve zones and riparian management zones in accordance with Schedule K, provided that:

(a) there has been engagement with applicable First Nations that has resulted in the support of, or lack of objection from, the applicable First Nations;

(b) indicators to be tracked have been identified, and strategies are in place to evaluate the effectiveness of the recommended riparian strategies; and

(c) the indicators and strategies in paragraph (d) have been developed through a process of engagement with applicable First Nations.

(5) Despite subsections (1), (2), and (3), for the lower portion of the Klinaklini River and its tributaries identified in Schedule P, and for the lower portion of Viner Creek identified in Schedule P, maintain a reserve zone with a width of 100 m on each side of the natural boundary, unless there is no practicable alternative for future road access or other infrastructure, or to address a safety concern. Existing road access and infrastructure is exempt from this reserve provision.

(6) Where some or all of the forest required in subsections (1) and (2) has been previously altered or harvested, to the extent practicable, recruit or create functional riparian forest in the reserve zone in the shortest time practicable.

Definition

From the GBRO:

Type 1 aquatic habitat means any of the following:

(a) a reach of a watercourse and, if present, its active fluvial unit, with a continuous channel bed that is greater than 1.5 m in width, with an average gradient ≤ 5%, and is known to be, or has potential to be, inhabited by fish;

(b) a lake greater than 0.25 ha, or a marsh or fen wetland greater than 0.25 ha, that is known to be inhabited by fish or connected within 500 m by a perennial or seasonal stream to fish habitat described in (a);

(c) an estuary or marine interface zone connected by a perennial or seasonal stream to fish habitat described in (a) or (b), or associated with a shellfish bed; or

(d) herring spawn areas, kelp beds, eel grass beds, and other highly productive nearshore habitat used by valued marine invertebrates for reproduction and rearing.

Supporting Information

For the purposes of this guidance, the following supplemental information applies:

- Type 1 aquatic habitats are identified based on the higher-quality habitat they provide for a range of important species, including salmon, trout, shellfish, and other wildlife that rely on freshwater, estuarine, and intertidal habitats for spawning, rearing, and living. They are places where the flows of nutrients and energy converge in the biophysical environment to create productive and diverse aquatic and terrestrial habitats.
- Planning and operational flexibility is provided by allowing the width of the riparian reserve zones and management zones to be adjusted within a limited range over a development area, using the no net loss principle. Additional flexibility is provided by allowing limited harvesting in management zones.

- Where riparian forests next to Type 1 aquatic habitats have been altered or harvested in the past or have lost natural structure and function due to harvest-related windthrow, recovery of functional riparian forest should be a priority to the extent practicable.
- In some cases, Type 1 streams may have an active floodplain or may be a more confined stream that is seasonally flooded (without an active floodplain). The following are possible situations:
    - The stream has a non-alluvial or semi-alluvial channel with banks in non-alluvial deposits, and no floodplain beyond the seasonally flooded channel. In this case, the reserve zone for Type 1 aquatic habitat extends from the active channel banks.
    - The stream is on an active fluvial unit with one or both banks in erodible alluvial deposits, and has the potential to erode its banks or change the channel position within the floodplain or on the fan. In this case, the reserve zone extends from the outer edges of the active fluvial unit.

Guidance

In practice, implementing the objectives for Type 1 aquatic habitat will involve the following:

- identifying potential Type 1 aquatic habitat features in the office using all available data and tools;
- verifying Type 1 aquatic habitat features in the field, focusing on areas where development is planned to occur;
- designing the boundaries of reserve zones and management zones to address site-specific conditions and provide best possible net ecological benefits, taking into consideration additional hydrogeomorphic and ecological information provided by qualified professionals where it is available;
- designing reserve zones and management zones to address windthrow risk and specific levels of acceptable windthrow (i.e., the recommended risk tolerances in the EBM Supplemental Technical Guidance);
- recruiting functional riparian forest where practicable by actively applying silvicultural or other treatments to speed recovery of desired riparian forest attributes, according to subsection 4 (6 in the southern GBR);
- pursuing the alternative approach for Type 1 aquatic habitats in the southern GBR that are not on active fluvial units, where appropriate and practicable, allowing for the use of reserves described in Schedule K, provided the criteria in the GBRO are met; and
- engaging a qualified professional to assess opportunities to enhance riparian forest recovery with silvicultural or other treatments, given that recruiting functional riparian forest for

streams with active floodplains can be challenging. The size of the trees required to be functional will vary depending on the erosive power on the active portion of the floodplain.

For more detailed information and guidance, see the EBM Supplemental Technical Guidance.

Objectives for Type 2 Aquatic Habitat

Intent

The intent of the objectives for Type 2 aquatic habitat is to ensure that the hydrogeomorphic processes and ecological structure and function of these ecosystems are sustained.

Objectives

From the GBRO:

(1) Maintain the natural ecological function of Type 2 aquatic habitat by, within or adjacent to cutblocks and roads but not stream crossings, retaining 90% of the forest in an adjacent management zone with a minimum width of 1.5 tree lengths and an outer edge designed to minimize risk of windthrow.

(2) Despite subsection (1), the width of the management zone in any cutblock may be decreased by up to 0.5 tree lengths to address site characteristics, provided there is no net loss of management zone area within the cutblock.

(3) Despite subsections (1) and (2), the width of the management zone may be increased or decreased by more than 0.5 tree lengths, and alteration or harvesting within the management zone may occur provided that:

(a) there is no net loss of management zone area required in subsection (1) in the cutblock;

(b) an assessment has been prepared by a qualified professional that specifies measures:

(i) to maintain the geomorphic and hydroriparian characteristics of the stream channel;

to maintain the life cycle needs of fish in affected stream reaches;

to maintain local terrestrial habitat needs and linkages to other reserves; and

to minimize loss of trees in the management zone from windthrow;

(c) measures in subsection (3)(b) are implemented; and

(d) the plans to increase or decrease the width of the management zone by more than 0.5 tree lengths and have alteration or harvesting within the management zone have been developed through a process of engagement with applicable First Nations.

For the southern GBR only:

(4) Despite subsections (1), (2), and (3) for Type 2 aquatic habitat that is not on an active fluvial unit, a forest stewardship plan may comply with the provisions for riparian management zones in accordance with Schedule K, provided that:

(a) there has been engagement with applicable First Nations resulting in the support of, or lack of objection from, the applicable First Nations;

(b) indicators to be tracked have been identified, and strategies are in place to evaluate the effectiveness of the recommended riparian strategies; and

(c) the indicators and strategies pursuant to subsection (4)(d) have been developed through a process of engagement with applicable First Nations.

(5) Where some or all of the forest required in subsections (1) or (4) has been previously altered or harvested, to the extent practicable, recruit or create functional riparian forest in the management zone or riparian management area in the shortest time practicable.

Definition

From the GBRO:

Type 2 aquatic habitat refers to any of the following:

(a) S1 to S3 streams that are not Type 1 aquatic habitat;

(b) S4 stream reaches that are known to be, or have the potential to be, inhabited by fish and are directly connected to Type 1 aquatic habitat or to S1 to S3 streams that are Type 2 aquatic habitat;

(c) lakes greater than 0.25 ha that are not Type 1 aquatic habitat; or

(d) marsh and fen wetlands greater than 0.25 ha that are not Type 1 aquatic habitat.

Supporting Information

For the purposes of this guidance, the following supplemental information applies:

- Though the specifics will vary with circumstance, Type 2 stream channels are generally less sensitive to disturbance than are Type 1 stream channels.
- Three levels of planning and operating flexibility are provided in the objectives for Type 2 aquatic habitat:
    - up to 10% of the basal area in the outer portion of a management zone may be harvested (where it contributes to the economic viability of a project and risks to ecological values or of increased windthrow are minimal);
    - management zone boundaries may be adjusted in width to address site conditions or provide greater net ecological benefits; or
    - management zone designs may be adjusted based on information provided by qualified professionals as long as they are accompanied by sound rationale.
- The GBRO provides an alternative option in the southern GBR that allows Schedule K management zones to be used for Type 2 aquatic habitats that are not on active fluvial units, provided they meet certain criteria in the GBRO, including retention of functional riparian habitat. See the EBM Supplemental Technical Guidance Section 2.4 for more details, including a definition for high value fish habitat.

For more detailed information and guidance, see the EBM Supplemental Technical Guidance.

Guidance

In practice, implementing the objectives for Type 2 aquatic habitat will involve the following:

- identifying potential Type 2 aquatic habitat features in the office using all available data and tools;
- verifying Type 2 aquatic habitat features in the field, focusing on areas where development is planned within the next 5 years;
- designing the boundaries of reserve zones and management zones to address site-specific conditions, taking into consideration more precise hydrogeomorphic and ecological information provided by qualified professionals;
- designing reserve zones and management zones to address windthrow risk and specific levels of acceptable windthrow (i.e., the recommended risk tolerance levels in the EBM Supplemental Technical Guidance Section 1.2);
- conducting overview assessments to determine where the forest next to Type 2 aquatic habitat has been removed by past harvesting or has lost function due to harvest-related windthrow, and where practicable, planning recruitment of functional riparian forest, including applying silvicultural or other treatments to speed recovery of desired riparian forest attributes;
- pursuing the alternative approach for Type 2 aquatic habitats in the southern GBR that are not on active fluvial units, where appropriate and practicable, allowing for the use of reserves described in Schedule K, provided the criteria in the GBRO are met. See EBM Supplemental Technical Guidance section 2.4 for more details;
- possibly requiring management activities within management zones and retention and other management activities outside of management zones to ensure the structural goals for the management zones are met and windthrow is kept within desired tolerance limits, as specified in the EBM Supplemental Technical Guidance Section 2.4; and
- recruiting functional riparian forest, possibly by reserving younger forest from harvesting or actively applying silvicultural treatments to speed the recruitment of desired riparian forest attributes (i.e., restoration), according to subsection (5).

For more detailed information and guidance, see the EBM Supplemental Technical Guidance.

Objectives for Forested Swamps

Intent

Forested swamps provide a diverse range of ecological niches, and their associated riparian forests provide important landscape attributes and habitat for a variety of species.

The intent of these objectives is to maintain the natural ecological function of forested swamps. The objectives direct licensees to manage riparian forests adjacent to those ecosystems in a manner that sustains hydrological processes and the ecological composition, structure, and function of those forests.

Objectives

From the GBRO:

(1) Maintain the ecological characteristics and function of forested swamps.

(2) Adjacent to forested swamps that are greater than 0.25 ha, retain 70% of the functional riparian forest in a management zone with an outer edge designed to minimize risk of windthrow and a minimum width of 1.5 tree lengths.

(3) Despite subsection (2), the width of the management zone adjacent to a forested swamp may be decreased by up to 0.5 tree lengths to address site-specific values.

(4) Despite subsections (2) and (3), the width of the management zone may be decreased by more than 0.5 tree lengths, and additional harvesting within the management zone may occur provided that:

  (a) a qualified professional has prepared a forested swamp assessment that specifies measures:

    (i) to maintain local terrestrial habitat needs and linkages to other reserves; and

    (ii) to minimize loss of trees in the management zone from windthrow;

  (b) measures in subsection (4)(a) are implemented; and

  (c) the plans to decrease the width of the management zone by more than 0.5 tree lengths and have additional harvesting within the management zone have been developed through a process of engagement with applicable First Nations.

(5) Where some or all of the forest within the management zone required in subsections (2), (3), and (4) has been previously altered or harvested, to the extent practicable, recruit or create functional riparian forest in the management zone in the shortest time practicable.

Definition

From the GBRO:

forested swamp: a forested mineral wetland or a forested peatland with standing or gently flowing nutrient-rich water in pools or channels where the water table is usually at or near the surface of the wetland or peatland, not including poorly drained areas that are transitional to uplands where folisolic growing substrate (i.e., folic material derived from the litter of trees and lesser

vegetation of upland sites) occupies ≥ 50% of the site, or hydromorphic organic matter (organic material accumulated under saturated conditions) and wetland hydrophyte species occupy less than 50% of the site area.

Guidance

In practice, implementing the objectives for forested swamps will involve the following:

- identifying potential forested swamps in the office using all available data and tools;
- verifying the presence of forested swamps in the field, focusing on areas where development is planned in the next 5 years. To identify ecosystems as forested swamps, and to delineate their extent and a preliminary management zone boundary, refer to the criteria provided in the GBRO definition. More detailed criteria and interpretations are provided in the EBM Supplemental Technical Guidance;
- engaging a qualified professional to assess the site and prepare a plan if local site characteristics indicate that site planning can be improved by modifying the boundary of the management zone or by conducting some harvesting in the zone;
- preparing and implementing plans to reserve younger forest from harvesting or apply silvicultural treatments to speed the recruitment of desired riparian forest attributes and functions if site assessments indicate the need to recruit functional riparian forest in the management zone;
- prioritizing forested swamps less than 0.25 ha as biological anchors for stand-level retention, given that there is no requirement to establish a management zone for these small, forested swamps; and
- considering the effects of roads on the water table, avoiding and managing sediment effects, and minimizing the effects of windthrow in order to meet the requirement of retaining the amount of functional riparian forest sufficient to maintain the integrity of the forested swamp.

For more information on acceptable levels of windthrow and other criteria, see the EBM Supplemental Technical Guidance.

Objectives for Upland Streams

Intent

The intent of the objectives for upland streams is to maintain the hydrologic, geomorphic, and ecological functions in upland stream areas. The focus of management should be on:

- maintaining sufficient functional riparian forest in the upland portion of watersheds;

- establishing functional riparian forest buffers as appropriate to protecting larger, steeper, and more sensitive upland stream reaches; and
- using best management practices to minimize adverse effects on upland streams in harvested areas.

Objectives

From the GBRO:

(1) Maintain the hydrologic and hydrogeomorphic processes in watershed planning units within the range of natural variation by maintaining a minimum of 70% of the forest in the upland stream area as functional riparian forest.

(2) For the purposes of subsection (1), to the extent practicable, preferentially retain the functional riparian forest to create windfirm reserve zones and management zones adjacent to streams in the upland stream area that:

  (a) are located upstream from Type 1 aquatic habitat and Type 2 aquatic habitat;

  (b) have sensitive hydrogeomorphic attributes;

  (c) are stream reaches with known tailed frog habitat; or

  (d) have unique microclimate or other rare ecological characteristics.

(3) Despite subsections (1) and (2), an alternative plan to maintain hydrologic and hydrogeomorphic processes in a watershed planning unit that are within the range of natural variability may be prepared as a result of a watershed assessment that is conducted by a qualified professional and is consistent with professional practice guidelines, provided that:

  (a) the effectiveness of the strategy implemented pursuant to subsection (3) is monitored according to a monitoring strategy designed by the qualified professional;

  (b) the watershed assessment and plan are updated to reflect the results of such monitoring; and

  (c) the strategies have been developed through a process of engagement with applicable First Nations.

Definitions

From the GBRO:

functional riparian forest: forest adjacent to streams and other aquatic features that provides hydrologic, hydrogeomorphic, and ecological hydroriparian functions and has trees of adequate size to resist channel bank erosion, supply functional large wood, and contribute to slope stability

upland stream area: the forested portion of a watershed planning unit that does not contain Type 1 aquatic habitat or Type 2 aquatic habitat

watershed planning unit: a watershed or watershed subunit used as a unit of analysis for watershed assessments and planning forest retention in upland stream areas

For the purposes of this guidance, the following supplemental descriptions also apply:

upland stream: any stream that is not Type 1 or Type 2 aquatic habitat

watershed planning units: are typically defined as a surface catchment area, determined by the height of land to a point of interest such as a lake or ocean shoreline, a stream confluence, or the downstream limit of aquatic habitat of special interest. Watershed planning units can also include face units that drain directly to an ocean or lake shoreline. For the purposes of managing upland streams, the Province has delineated boundaries for watershed units in the GBR, and may update this information from time to time.

Supporting Information

For the purposes of this guidance, the following supplemental information applies:

- Upland streams, also known as hillslope or headwater streams, can range from small (less than 3 m width) ephemeral streams to large (greater than 3 m width) perennial streams. Upland streams are crucial for sustaining the structure, function, and productivity of downstream ecosystems, especially those upland streams that are larger and steeper and have more power to move material and elements downstream.
- Upland riparian forest maintains sidewall stability of gullies, escarpments, and gully-like features; provides erosion resistance in erodible channel banks; and supplies large wood to the stream. Management of upland streams is particularly important in watersheds that have a large extent of potentially unstable terrain, a large proportion of previous harvesting or other disturbance, and significant fish populations.

Guidance

In practice, implementing the objectives for upland streams will involve the following:

- identifying potential upland streams and the upland stream area in the office using all available data and tools;
- verifying upland streams in the field, focusing on areas where development is planned within the next 5 years;
- preparing development plans that maintain 70% functional riparian forest in the entire upland stream portion of the watershed, while preferentially allocating retention on the ground and appropriately managing windthrow;
- using the productive forest land base as the basis for calculating the amount of functional riparian forest in the upland stream area (i.e., do not include non-forested and unproductive land in the calculation);[28]

[28] Non-forested and unproductive land includes lakes, alpine, rock, ice, roads, low-productivity or non-productive forests, and unclassified areas under the inventory.

- ensuring during harvest planning and layout that retention for upland streams is prioritized on streams and stream features that are most important for habitat and riparian function. These include sensitive hydrogeomorphic streams, upland streams with known tailed frog habitat or unique microclimates, and a hierarchy of streams based on size and proximity to fish habitat and temporal continuity of streamflow. All in-block retention for these streams and stream features will contribute to the maintenance of 70% functional riparian forest;
- designing reserve zones and management zones and retention in the upland stream area to help maintain hydroriparian structures and functionality, taking into consideration the different types of streams and stream features; and
- using qualified professionals to develop alternative management strategies for an upland stream area, if needed, based on comprehensive watershed assessments. Principles and more detailed guidance for using this option are provided in EBM Supplemental Technical Guidance Section 2.6. The general risk tolerance for such watershed assessments, assuming the watersheds are not important fisheries watersheds, is low–moderate.

For more detailed information and guidance, see the EBM Supplemental Technical Guidance.

Objectives for Active Fluvial Units

Intent

Active fluvial units are dynamic ecosystems with diverse aquatic and terrestrial habitats. They are often biological hot spots because they sustain important fish habitat, rare ecosystems, specialized habitats for critical species, and high levels of biodiversity.

The intent of these objectives is to maintain the integrity and natural ecological function of active fluvial units. Because they are hydrologically and hydrogeomorphically active, the stream channels within these units can become unstable if associated forest cover is removed or damaged by windthrow. The measures for this objective are intended to maintain the stabilizing and other functions of the forest on these units.

Objectives

From the GBRO:

(1) Reserve all forest on active fluvial units.

(2) Adjacent to active fluvial units, retain a minimum of 90% of the forest in a management zone with an average width of 1.5 tree lengths.

(3) Despite subsections (1) and (2), forest on an active fluvial unit may be altered or harvested, and less than 90% of the forest in the management zone may be retained, to allow for road access or to address a safety concern, provided that:

(a) no practicable alternative to access a development area is available;

(b) an active fluvial unit assessment has been prepared by a qualified professional that:

(i) specifies measures to maintain stream flow patterns and flow capacity and geomorphic stability of the active fluvial unit for roads or other infrastructure; or

where the removal of four or more live trees is proposed for safety reasons, provides an assessment of the potential impact on geomorphic stability;

(c) the measures in subsection (3)(b) are implemented in a manner that will maintain the flow patterns, flow capacity, and geomorphic stability of the active fluvial unit; and

(d) the plans to alter or harvest an active fluvial unit or to retain less than 90% of the forest in the management zone have been developed through a process of engagement with applicable First Nations.

(4) Where some or all of the forest required to be retained in subsections (1) and (2) has been previously altered or harvested, to the extent practicable, recruit or create functional riparian forest on the active fluvial unit in the shortest time practicable.

Definitions

From the GBRO:

active fluvial unit: an active floodplain, where water flows over land in a normal flood event, and includes both low and medium benches or the hydrogeomorphic zone of an active fan

functional riparian forest: forest adjacent to streams and other aquatic features that provides hydrologic, hydrogeomorphic, and ecological hydroriparian functions and has trees of adequate size to resist channel bank erosion, supply functional large wood, and contribute to slope stability

Supporting Information

For the purposes of this guidance, the following supplemental information applies:

- Because alluvial streams within active fluvial units are often associated with important fish habitat, fish-bearing alluvial stream reaches should be assumed to be important for fish unless an assessment by a qualified professional has confirmed otherwise.
- The Forest and Range Practices Act includes specific requirements to avoid destabilization of alluvial fans, and more specifically to avoid a material adverse effect.
- The size and composition of functional riparian forests that need to be included in reserve zones and management zones adjacent to functional riparian forests will vary depending on the size of the stream, its gradient, its consistency of flow, and the volume of water it transports during peak flows.

Guidance

In practice, implementing the objectives for active fluvial units will involve the following:

- identifying potential active fluvial units in the office using all available data and tools;

- verifying active fluvial units in the field, focusing on areas where development is planned within the next 5 years. Determination of whether a fluvial unit is active usually needs to be conducted on the ground at the site level;
- ensuring road designs take the shortest practicable distance to address safety and access considerations, even though planning and operating flexibility is provided for active fluvial units, depending on their size. Qualified professional should be involved;
- ensuring that if an active fluvial unit reserve zone or management zone must be reduced below the requirement in the GBRO, it is based on assessments completed by qualified professionals. The qualified professionals must investigate the hydrogeomorphic and aquatic ecological implications, consistent with accepted procedures and practice standards;
- ensuring that where active fluvial units overlap other important habitat features (e.g., Type 1 habitat, forested swamps, red-listed plant communities), the feature with the greatest requirements for protection prevails, which may satisfy requirements for multiple features;
- ensuring that designs of reserve zones or management zones for active fluvial units do not create potential for windthrow or other disturbance that will affect the active fluvial unit. Qualified professionals should assess active fluvial units when considering windthrow risk. Recommended risk tolerances for management of windthrow are provided in EBM Supplemental Technical Guidance Section 1.2; they should be used unless alternative options are provided by a qualified professional;
- recruiting functional riparian forest (subsection [4], may involve reserving younger forest from harvesting or actively applying silvicultural treatments to speed the recruitment of desired riparian forest attributes (i.e., restoration). For active fluvial units, recruitment of functional riparian forest can be challenging and may require the advice of a qualified professional.

For more detailed information and guidance, see the EBM Supplemental Technical Guidance.

2.5 Objectives for Wildlife Habitat

Overview

Much of the wildlife habitat guidance in the GBR has focused on five focal species (grizzly bear, Marbled Murrelet, mountain goat, Northern Goshawk, and tailed frog) as well regionally important wildlife such as deer, moose, elk, and black bears (see Horn et al 2009a). Only grizzly bear and black bear (primarily Kermode bears) are addressed specifically in Order. It is assumed that protection and stewardship of key habitats for most of these species will be reasonably addressed by implementing the biodiversity and other objectives in the GBRO which create various anchors for landscape reserves and stand-level retention.[29] Landscape reserves also provide for considering other species at risk or species of local interest. This guidance document only discusses the two species noted specifically in the Order.

Grizzly bears are a top carnivore, and the status of their populations can be a key indicator of ecosystem health. Protection and stewardship of their habitats is addressed in the GBRO because they are blue-listed (Special Concern) in British Columbia by the Conservation Data Centre.

Protection and stewardship of habitat for Kermode bears is addressed in the GBRO because they are provincially and regionally significant and have cultural and economic significance to First Nations. The Kermode black bear subspecies (*Ursus americanus kermodei Hornady*) can have fur that is either black or white; however, it is the white phase that is referred to as Kermode bear in the GBRO objectives. The Kermode bear is also called the "Spirit bear", and was named as British Columbia's official mammal in 2006.

The intent of the GBRO objectives for both grizzly bears and black bears is to maintain sufficient forage and cover habitat, protect den sites, and reduce human disturbance to key areas. Grizzly bear and black bear denning objectives apply across the entire GBR; objectives for Kermode bears apply only in areas of the GBR where Kermode bears are common.

Objectives for Grizzly Bear Habitat

Intent

The intent of the objectives for grizzly bear habitat is to support the long-term viability of grizzly bear populations in the GBR. To achieve this, Class 1 and Class 2 grizzly bear habitat polygons have been inventoried and mapped. All instances of Class 1 habitat and 50% of Class 2 habitats are protected or reserved from harvesting. Where strict application of the objectives may adversely affect timber harvest opportunity, alteration of Class 1 and Class 2 habitats is allowed if a qualified professional

[29] Marbled Murrelet and Northern Goshawk have their own species recovery plans and guiding legislation. Mountain Goats have identified winter ranges in the GBR. Tailed frog locations are not well inventoried, but where locations are known, they are considered in landscape reserve designs.

confirms that the proposed disturbance will maintain or enhance the conditions and structures necessary to ensure the habitat remains suitable for use by grizzly bears.

Objectives

From the GBRO:

(1) Maintain 100% of Class 1 grizzly bear habitat:
    (a) shown in Schedule D; or
    (b) identified in the field by a qualified professional.

(2) Maintain a minimum of 50% of Class 2 grizzly bear habitat:
    (a) shown in Schedule D; or
    (b) identified in the field by a qualified professional; and
    (c) that provides a mix of habitat types, seasonal value, and distribution within a watershed or landscape unit.

(3) Despite subsection (1), Class 1 grizzly bear habitat may be altered or harvested, provided that:
    (a) a qualified professional:
        (i) completes an assessment that identifies the characteristics of the habitat; and
        (ii) confirms that the alteration or harvesting will result in no net loss of Class 1 grizzly bear habitat and connectivity, and no functional loss of habitat connectivity;
    (b) measures are implemented that will ensure the alteration or harvesting will not cause a material adverse impact to the suitability of the Class 1 grizzly bear habitat; and
    (c) the plans to alter or harvest Class 1 grizzly bear habitat have been developed through a process of engagement with applicable First Nations.

(4) Despite subsection (1), Class 1 grizzly bear habitat may be altered or harvested for road access or to address a safety concern, provided that:
    (a) there is no other practicable alternative for road access or other infrastructure, or the alteration or harvesting is required to address a safety concern;
    (b) the road right-of-way clearing width is the minimum safe width necessary to accommodate the road;
    (c) measures are implemented that, to the extent practicable, will ensure the alteration or harvesting will not cause a material adverse impact to the suitability of the Class 1 grizzly bear habitat; and
    (d) the plans to alter or harvest Class 1 grizzly bear habitat have been developed through a process of engagement with applicable First Nations.

(5) All identified grizzly bear habitat polygons must be documented, and this documentation must be submitted to the applicable First Nations and the Province of British Columbia at the end of each calendar year.

Definitions

For the purposes of this guidance, the following supplemental descriptions also apply:

Class 1 habitat: high suitability habitat (75–100% of the best) distinguished using the Resources Inventory Committee[30] method for rating the suitability of habitat for a particular target species.[31] It defines suitability as the ability of a habitat in its current condition to provide the life requisites of a species. There are six potential classes for rating the seasonal suitability of a particular habitat polygon for grizzly bears. The ranges within classes are in comparison to what is considered to be the benchmark (highest quality) habitats for grizzly bears in coastal British Columbia. The GBRO focuses on Class 1 (high) and 2 (moderately high) habitat.

Class 2 habitat: moderately high suitability (50–75% of the best; see notes for Class 1).

Qualified professional: for assessing grizzly bear habitat, a qualified professional is a biologist (RPBio) with at least 5 years of experience in coastal British Columbia in both remote and field-based habitat research, classification, and mapping, or assessment for grizzly bears.

Grizzly bear habitat polygon: All identified grizzly bear habitat polygons must be documented and the documentation submitted to the applicable First Nations and the Province of British Columbia at the end of each calendar year.

Supporting Information

For the purposes of this guidance, the following supplemental information applies:

- Current Class 1 and Class 2 grizzly habitat mapping and associated data files for the GBRO area are available at the following websites:
    - GBR EBM Data Centre: https://ebmdata.ca/?token=9a07beb5cb7be1a7e828f1228baf23ab
    - GBR legal directions and agreements, including Schedule D grizzly bear habitat map: https://www2.gov.bc.ca/gov/content/industry/crown-land-water/land-use-planning/regions/west-coast/great-bear-rainforest/great-bear-rainforest-legal-direction-agreements
- The current inventory of grizzly bear habitat for the GBR includes inventory from eight separate projects. The data underwent extensive review during 2009 and 2010, at which time many inconsistencies and errors were resolved.[32] However, not all polygons were reviewed,

[30] www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/laws-policies-standards-guidance/inventory-standards#:~:text=The%20Resources%20Information%20Standards%20Committee%20%28RISC%29%20is%20responsible,storage%2C%20analysis%2C%20interpretation%20and%20reporting%20of%20inventory%20data

[31] Resources Inventory Committee. 1999. https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/nr-laws-policy/risc/whrs.pdf

[32] MacHutchon (2010)

and not all issues were resolved. Given this uncertainty, the GBRO requires a qualified professional to identify additional habitat polygons or features in the field, determine if mapped habitat is indeed Class 1 or Class 2 grizzly bear habitat, and reclassify or declassify polygons if appropriate.

- Guidance on how a qualified professional could evaluate whether there was "material adverse impact" to Class 1 grizzly bear habitat is provided in MacHutchon et al. (2010).

Guidance

In practice, implementing the objectives for grizzly bear habitat will involve the following:

- reviewing Class 1 and Class 2 habitat inventories;
- ensuring that all known Class 1 habitat polygons and 50% of the Class 2 habitat in each landscape unit is protected. Ensuring that the most beneficial Class 2 habitats are included will involve considering: [33]
    - the amount and distribution of Class 1 and Class 2 habitats in the landscape unit. Class 2 habitat may be critically important in landscape units in which there is little Class 1 habitat;
    - the amount and distribution of Class 1 and Class 2 habitats in the subregion[34]. Class 2 habitat may be critically important in subregions in which Class 1 habitat is not abundant;
    - the seasonal type of Class 1 and Class 2 habitats available. Class 2 habitat provides important forage if the rest of the habitat (i.e., Class 1 habitat and seral stage distribution) does not. Class 2 habitat fills a gap in seasonal habitat availability where other available habitats are used in different seasons; and
    - the value of Class 1 and 2 habitats for security cover in situations where human–bear conflict is likely. Class 2 habitat provides important security cover if the rest of the habitat does not, particularly in landscape units where human–bear interaction is a concern;
- if Class 1 habitat is abundant, retention of Class 2 habitat is less important. If Class 2 habitat is rare, it may be very valuable or hardly used depending on context. Sometimes, retaining concentrations of habitat will be relatively beneficial; other times, dispersed habitat retention will be better. Knowledge from local biologists or holders of Local Ecological Knowledge or Traditional Ecological Knowledge should be sought in addition to engagement with Applicable Nations;

[33] Daust et al. (2010); MacHutchon et al. (2010)

[34] See Horn et al 2009a,b for discussion of grizzly bear biology including discussion of habitats in south, mid and north coast subregions of the GBR.

- planning for retention of Class 2 habitat polygons also involves consideration of the following:
    - it is more important to protect the less common, lower-elevation Class 2 habitats. These include Class 2 early and late spring habitats, which are the least common of the seasonal habitats, and provide bears with nutrient-rich forage post-denning; Class 2 habitats along streams that are used during fall for fishing; and Class 2 habitats in the CWHvh, which are particularly important (i.e., where bears are known to occur in landscapes that contain this subzone);
    - where possible, connectivity between foraging habitats should be maintained at the landscape scale. This allows bears to move between feeding locations by providing security and thermal cover. Connectivity can be achieved through forested hydroriparian corridors and other forest areas that have been maintained for other values (e.g., ecosystem representation, habitat for other focal species);
- ensuring that designation of managed forest and operational planning does not overly affect higher-quality Class 2 habitat (i.e., maintain a representative amount and distribution of low- and high-elevation Class 2 habitats in landscape reserve designs and the managed forest); and
- if considering removing 50% of a Class 2 polygon, ensuring that forest that would affect the core function area of the habitat is not removed. For example, removing forest around an open feeding area would reduce the value of that area by eliminating travel routes and security and thermal cover.

Objectives for Grizzly Bear Dens

Intent

The intent of the objectives for grizzly bear dens is to support the long-term viability of grizzly bears in the GBR by protecting their denning habitats.

Objectives

From the GBRO:

(1) Protect grizzly bear dens.

(2) Adjacent to grizzly bear dens, maintain a reserve zone with a minimum width of 50 m.

(3) Despite subsections (1) and (2), alteration or removal of a grizzly bear den or its reserve zone, or both, may occur, provided that:

(a) alteration or removal is required for road access or to address a safety concern, and there is no practicable alternative;

(b) the alteration or removal does not occur during the winter hibernation season; and

(c) the plans to alter or remove a grizzly bear den or reserve zone have been developed

through a process of engagement with applicable First Nations.

(4) In addition to subsections (1) and (2), adjacent to any reserve zone required in subsection (2), maintain a management zone with an average width equal to 1.0 tree length, measured from the outer edge of the reserve zone, to protect the integrity of the reserve zone.

(5) Within the management zone required under subsection (4), alteration or removal of trees may occur outside of the winter hibernation season to:

(a) accommodate operational requirements for road and bridge construction, where no practicable alternative exists;

(b) accommodate road maintenance and deactivation, removal of danger trees, and brushing and clearing within the right-of-way, for safety purposes, on any existing road under active tenure; or

(c) mitigate the impact of windthrow;

(d) provided that the plans to alter or remove trees in a management zone have been developed through a process of engagement with applicable First Nations.

(6) All grizzly bear dens that are found must be documented, and the documentation must be submitted to the applicable First Nations and the Province of British Columbia at the end of each calendar year.

Definitions

From the GBRO:

bear den: a den identified by a qualified professional that is suitable for winter hibernation or maternity.

For the purposes of this guidance, the following supplemental descriptions also apply:

qualified professional: biologist: an applied scientist or technologist, acting alone or together with another professional, if:

(e) the individual is registered and in good standing with an appropriate professional association constituted under an Act in British Columbia, is acting under that association's code of ethics, and is subject to disciplinary action by that association; and

(f) the individual is acting within their area of expertise

Supporting Information

For the purposes of this guidance, the following supplemental information applies:

- Coastal grizzly bears typically dig dens at higher elevations in old forests or sparsely treed areas with good drainage in the upper Cedar Western Hemlock or Mountain Hemlock zones, which are unlikely to be affected by timber harvest activity.
- However, grizzly bears do den at lower elevations, and forest management activity is occurring more frequently at higher elevations. A reserve zone is required for any identified den.

Guidance

Denning grizzly bears are highly vulnerable to disturbance and related physiological stress. These effects are particularly acute when disturbance occurs less than 200 m from the den but may extend up to 1000 m from the den site.[35] Therefore, it is important that managers be aware of where bear dens are located or likely to be located and of the ecological and management concerns associated with them.

In practice, implementing the objectives for grizzly bear dens will involve the following:

- ensuring that Grizzly bear dens be identified by a qualified professional (RPBio or RBTech) or by holders of relevant technical, Indigenous, and local knowledge, and should have at least 5 years' experience in grizzly bear habitat research and identifying grizzly bear dens in coastal British Columbia. If a non-qualified professional finds an active den, it should be reported, and appropriate management should be directed by a qualified professional;
- ensuring that grizzly bear deans are accurately identified by engaging qualified professionals who begin by conducting GIS and air photo-based overview assessments, and progressing if required, to more detailed field assessments and evaluations;
- protecting identified dens and establishing a 50-m forested reserve zone and an additional tree-length management zone. Windthrow risk should be minimized. If a large buffer is needed in particular areas to mitigate windthrow risk, the management zone boundaries should be adjusted as necessary to reduce the risk;
- ensuring that no harvesting occurs in management zones that have been established next to grizzly bear dens unless it is needed for the construction of roads or bridges or to implement treatments for windthrow. Such incursions should not occur near active dens during the denning season (generally early October to mid-May); and
- ensuring that no forest management activity occurs within 1 km of an active grizzly bear den during fall, winter, and spring.

Objectives for Black Bear Dens

Intent

The intent of the objectives for black bear dens is to support the long-term viability of black bear populations in the GBR, in particular, the Kermode subspecies, by protecting their denning habitats.

The goal of management is to ensure that:

- the den feature remains usable by black bears into the future;
- bears that attempt to use the den are not disturbed or displaced by forestry activities; and

[35] Linnell et al. (2000); Roever et al. (2008)

- female bears that reproduce in dens have access, with their cubs, to secure escape cover after emerging from their dens.[36]

Objectives

From the GBRO:

(1) Protect black bear dens.

(2) Adjacent to black bear dens, maintain a reserve zone with a minimum width of 30 m.

(3) Despite subsections (1) and (2), alteration or removal of a black bear den or its reserve zone, or both, may occur, provided that:

  (a) alteration or removal is required for road access or to address a safety concern, and there is no practicable alternative;

  (b) the alteration or removal does not occur during the winter hibernation season; and

  (c) the plans to alter or remove a black bear den or reserve zone have been developed through a process of engagement with applicable First Nations.

(4) In addition to subsections (1) and (2), adjacent to any reserve zone required in subsection (2), maintain a management zone of sufficient width and design to protect the integrity of the bear den and reserve zone.

(5) Within the management zone required under subsection (4), alteration or removal of trees may occur outside of the winter hibernation season to:

  (a) accommodate operational requirements for road and bridge construction, where no practicable alternative exists;

  (b) accommodate road maintenance and deactivation, removal of danger trees, and brushing and clearing within the right-of-way, for safety purposes, on any existing road under active tenure; or

  (c) mitigate the impact of windthrow,

  provided that the plans to alter or remove trees in a management zone have been developed through a process of engagement with applicable First Nations.

(6) Where practicable, include suitable future and additional black bear denning habitat in management zones and stand-level retention.

(7) All black bear dens that are found must be documented, and the documentation must be submitted to the applicable First Nations and the Province of British Columbia at the end of each calendar year.

Definitions

From the GBRO:

qualified professional: an applied scientist or technologist, acting alone or together with another

[36] Davis (2021a, b)

professional, if:

(a) the individual is registered and in good standing with an appropriate professional association constituted under an Act in British Columbia, is acting under that association's code of ethics, and is subject to disciplinary action by that association; and

(b) the individual is acting within their area of expertise.

For the purposes of this guidance, the following supplemental descriptions also apply:

black bear den: a den identified by a qualified professional that is suitable for winter hibernation or maternity by black bears. The GBRO requires protection of black bear dens, but identification in the field is left to the qualified professional. If a non- qualified professional finds an active den, a qualified professional should determine the appropriate management.

Supporting Information

For the purposes of this guidance, the following supplementation information applies:

- Coastal black bears usually den in productive forests. Dens are usually in large conifer trees of all species, although large deciduous trees such as cottonwoods, often with above-ground entrances, are also used sometimes. Dens can also be under logs, in old stumps, or sometimes in debris piles. Denning occurs from sea level to higher elevations.
- Denning black bears are vulnerable to disturbance, which leads to physiological stress. The effects can be acute when disturbance occurs less than 200 m from the den, but activity as far as 1000 m from a den site can still have an effect. Identifying bear dens in and adjacent to proposed forest operations is critical so that they can be protected and buffered from disturbance.[37]
- Protecting only the den tree may be adequate for some male bears but not for female bears, who use nearby forest for escape routes with their cubs. Therefore, protection of bear dens in the GBR will include not only protection of the tree but also a reserve zone and flexible management zone to create a resilient habitat patch.
- Information on identifying bear dens is provided in the *Coastal Bear Den Identification Manual*.[38]
- Detailed information on the protection of black bear dens, with examples of preferred, acceptable, and inadequate protection measures, is provided in *Stand-Level Retention Guidelines for Bear Dens*.[39]

[37] Linnell et al. 2000

[38] http://artemiswildlife.com/AWC_Bear_Den_ID_manual_v2.pdf

[39] www.artemiswildlife.com/AWC%20stand%20level%20bear%20den%20retention%20guidelines.pdf

Guidance

In practice, implementing the objectives for black bear dens will involve the following:

- ensuring Black bear dens be identified by a qualified professional (RPBio or RBTech) or a First Nations holder of Traditional Ecological Knowledge/Local Ecological Knowledge who has at least 5 years' experience in black bear habitat research and identifying black bear dens;
- engaging a qualified professional to identify black bear dens by assessing if the potential den shows evidence of use, such as introduced bedding, scratch and bite marks around the entrance, and bear hair around the entrance and in the bed.[40] If active dens are encountered during planning or operations, they also should be assessed by a qualified professional.
- protecting known or newly identified dens that show signs of previous or active use. Potential den sites that are not actively being used should also be considered for protection in stand-level retention. It is particularly important to protect dens that are used for hibernation and maternity, including dens that have a high likelihood of being used for more than one denning season. If the qualified professional cannot determine if the den is used by grizzly bears or black bears, the more restrictive grizzly bear objectives and guidance apply;
- establishing 30-m diameter reserves zones around a den feature to provide cover and escape routes for female bears and cubs. The reserve zone can be incorporated into the landscape reserve or retained as stand retention;
- establishing a management zone next to the reserve zone so that the total buffer around the den is at least 1 ha. The management zone should be shaped to minimize risk of windthrow in the reserve zone and provide additional cover and escape structures for female bears and cubs. Where practicable, suitable spruce, western redcedar, and yellow cedar should be included in management zones for long-term den recruitment;
- placing roads as far from a den as practicable (at least 75 m away, and as best practice, greater than 200 m away). Activity near active dens during denning seasons should be limited to required travel only. Harvest activity within 1 km of active den sites should be limited to late spring through early fall;
- as best practice, designing site plans to create and protect potential future den sites. Potential den sites can be anchors for stand-level retention or can be included in areas of landscape reserve. To identify potential den trees, the qualified professional should assess the size and characteristics of the entrance. The entrance should be large enough to allow females to enter prior to hibernation, yet small enough to prevent males from gaining entrance (i.e., 30- to 40- cm diameter). Cavity entrances should be sheltered from rain so that

[40] http://artemiswildlife.com/AWC_Bear_Den_ID_manual_v2.pdf

the internal cavity provides dry shelter and enough room for a female to be at arm's length from the entrance; and

- where practicable, retaining potential den sites and other trees, snags, stumps, and logs that are greater than 0.80 m in diameter within stand-level retention for the recruitment of future denning habitat.[41]

Objectives for Kermode Bear Habitat

Intent

The intent of the objectives for Kermode bear habitat is to support the long-term viability of the Kermode subspecies in key areas of the GBR by protecting its critical habitats and, where practicable, undertaking stand treatments in second-growth stands to maintain foraging habitats.

Objectives

From the GBRO:

(1) To maintain Kermode (Spirit) bear habitat within managed forest in the Kermode Stewardship Areas shown in Schedule R:

  (a) where practicable, thin or harvest mid-seral forest stands to create patchy openings and less canopy closure to encourage shrub and forb growth; and

  (b) do not alter critical black bear habitat.

(2) Despite subsection (1)(b), up to 5% of a critical black bear habitat occurrence may be altered if there is no practicable alternative for road access or other infrastructure, or to address a safety concern, provided the plans to alter critical black bear habitat have been developed through a process of engagement with applicable First Nations.

Definitions

For the purposes of this guidance, the following supplemental descriptions also apply:

critical black bear habitat: includes salmon spawning habitats and adjacent forests, intertidal habitats, travel corridors, and spring foraging habitats (e.g., avalanche chutes, swamps, wetlands, estuaries). There is a reasonably high degree of overlap of critical black bear habitat with grizzly bear Class 1 and Class 2 habitats, but in some cases, Kermode bear ranges extend beyond where grizzly bear habitat has been mapped.

Kermode Stewardship Area: the areas shown in Schedule R of the GBRO, which are areas with a higher frequency of the white-phased Kermode bear allele

mid-seral forest: forests that are 40–80 years old. Closed canopy mid-seral forest refers to mid-seral forest with greater than 60% crown closure and sparse understorey.

[41] Davis (2021a, b)

Supporting Information

Kermode bears are a white-coated colour phase of a unique subspecies of coastal black bear and currently occupy several islands and mainland watersheds in the GBR. The Kermode's white coat is the result of two copies of a rare, recessive "Kermode" allele at the mc1r gene. On the islands in the GBR with the highest prevalence of Kermode bears, approximately 10% of black bears have white-coloured fur; within 70 km of these islands, the percentage is close to zero.[42]

To support the long-term viability of this colour phase, the GBRO identifies Kermode Stewardship Areas in Schedule R; they are the areas with the highest concentration of Kermode alleles. Within those areas, the GBRO requires maintenance of a suitable mix of open and forested habitats (Objective 1a) and protection of critical habitats (Objective 1b).

High-value bear habitats have variously been described as "important", "sensitive", or "critical" in land use guidelines or orders for coastal British Columbia.[43]

Creating suitable mixes of open and forested habitat can be achieved by having a mix of seral stages on the landscape, including early, mid, mature, and old forest. The objectives address the concern of having too much closed canopy mid-seral forest in a landscape because wildlife foraging values are greatly diminished. The creation of closed canopy mid-seral forests can be avoided by capping the amount of mid-seral forest or by creating openings in existing closed canopy mid-seral forests.

Because grizzly bears are expanding their range to islands previously occupied solely by black bears with high frequencies of the Kermode allele, providing escape habitat for black bears is becoming more important, particularly near important salmon streams where both species are using the same food. Recent research has shown that grizzly bear presence reduces black bear salmon consumption by ~40%.[44]

Guidance

In practice, implementing the objectives for Kermode bear habitat will involve the following:

General:

- Prior to harvest planning in Kermode Stewardship Areas, forest licensees should meet with applicable First Nations and local wildlife biologists to share information regarding Kermode bear abundance, distribution, key habitat types, travel routes, and areas where grizzly bear range overlaps.

Objective 1a (Closed canopy mid-seral forest):

[42] Service et al. (2020)

[43] Machutchon (2007)

[44] Service et al. (2014, 2019)

- Assessing the extent and characteristics of mid-seral forests in the landscape unit or development area, and where appropriate and practicable, planning and undertaking silvicultural treatments (pre-commercial or commercial thinning) to create canopy gaps of 0.25–1 ha to allow forage to grow close to security cover and other critical habitats.

  An open canopy forest is more likely than a closed-canopy forest to be productive for shrub fruit and a variety of forbs that are eaten by bears during their active seasons. Thus, where mid-seral forest exceeds 30%[45] in landscape units in the Kermode Stewardship Areas, it is important to assess these forests to determine if they are in a closed-canopy state with a sparse understorey. The focus of these assessments should be on more sensitive areas for Kermode bears in the landscape unit.

Objective 1b (Critical habitats):

- Protecting and establishing forested buffers next to important salmon-bearing streams (Figure 1). Best practice would be to establish a 200m buffer around salmon bearing streams in areas with grizzly bears, and a 50-100m buffer (dependent on habitat quality) in landscape units and development areas where there are no grizzly bears.
- Protecting and establishing forest buffers next to intertidal foraging and shoreline travel habitat. Best practice would involve a 50- to 100-m shoreline buffer, taking into consideration adjacent habitat quality, slope, and grizzly bear presence.
- Reserving vegetation foraging habitat. Best practice would involve inventorying and protecting high-value forage locations (e.g., estuaries, riparian habitats, wetlands, floodplains, avalanche chutes). These habitats have been mapped for grizzly bears, and the same areas are important to black bears. Both Class 1 and Class 2 grizzly bear habitats should receive 100% protection in the Kermode Stewardship Areas.

[45] The 30% limit of mid-seral forest follows from recommendations for seral stage distributions under a high biodiversity emphasis option (FPC 1995). The total percentage suggested for a high biodiversity emphasis in the CWH (most of the Kermode bear range) is 54% mature and old forest, and 23% early forest, which leaves approximately 23% within mid-seral forest. Those numbers are more precise than our knowledge supports, and it is likely that some percentage of mid-seral forest will have either a moderate or high forage suitability potential. The PGBTWG (2020) suggested that the CWH zone generally has a high capacity to provide forage in the mid-seral state. As a result, allowing 30% mid-seral forest is good general guidance.

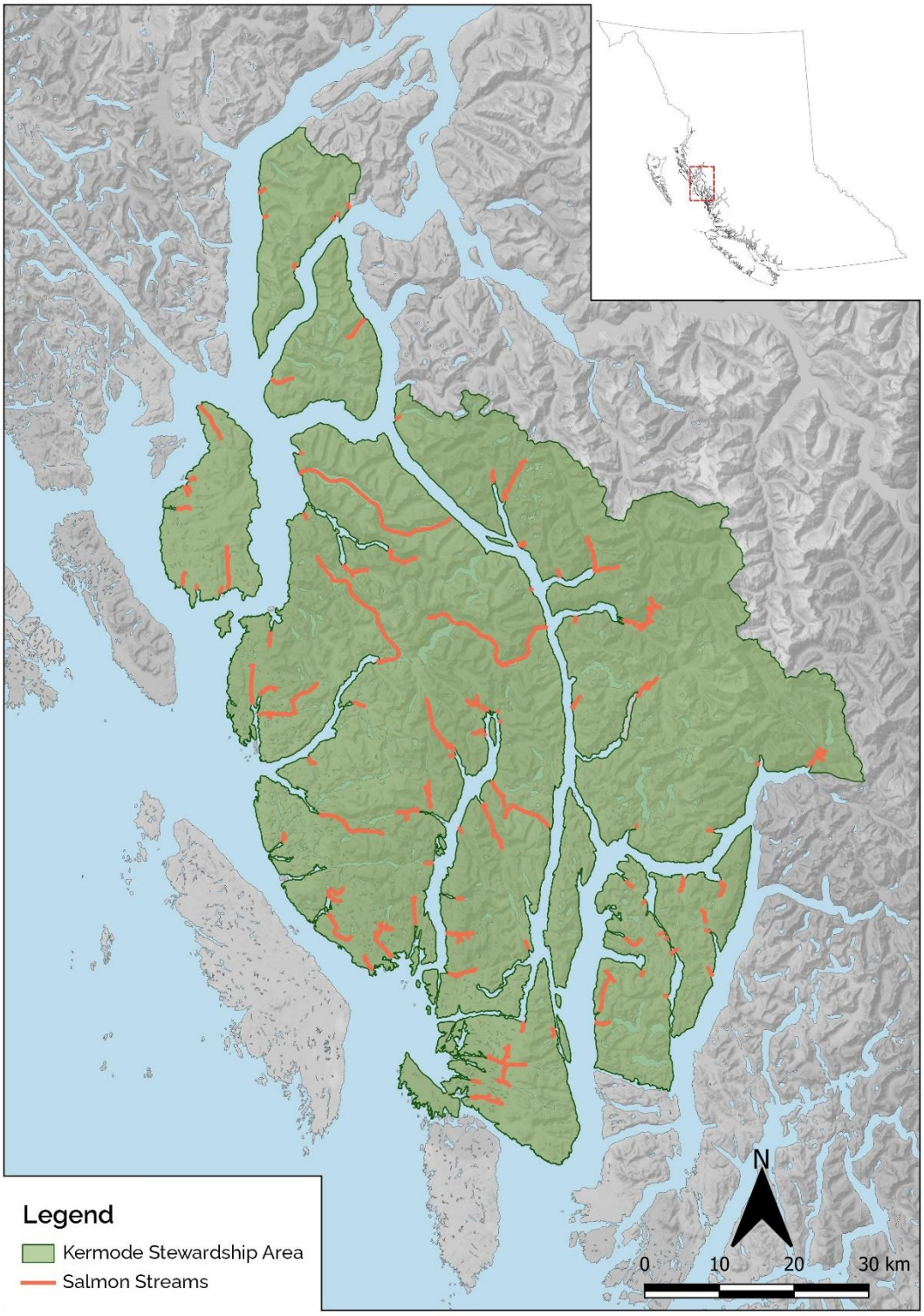


FIGURE 1. Important salmon-bearing streams for Kermode bears.

References

Daust, D., L. Kremsater, C. Apps, K. Brunt, A.E. Burger, K. Dunsworth, L. Dupuis, F. Doyle, P. Friele, G. MacHutchon, T. Mahon, E. McClaren, V. Michelfelder, B. Pollard, D. Seip, J.D. Steventon, and F.L. Waterhouse. 2010. Focal species risk thresholds for BC's North and Central Coast; workshop proceedings. Joint Coastal Land Resourc. Forum Tech. Liaison Committee, Nanaimo, B.C.

Davis, H. 2021a. Coastal bear den identification manual (version 2). Artemis Wildlife Consultants, Victoria, BC. http://artemiswildlife.com/AWC_Bear_Den_ID_manual_v2.pdf

_____. 2021b. Stand-level retention guidelines for bear dens. Artemis Wildlife Consultants, Victoria, B.C. www.artemiswildlife.com/AWC%20stand%20level%20bear%20den%20retention%20guidelines.pdf

Forest Practices Code (FPC). 1995. Biodiversity guidebook. For. Pract. Code B.C., Victoria, B.C.

Fortin, J. K., S.D. Farley, K.D. Rode, and C.T. Robbins. 2007. Dietary and spatial overlap between sympatric ursids relative to salmon use. Ursus 18:19–29.

Hilderbrand, G.V., C.C. Schwartz, C.T. Robbins, M.E. Jacoby, T.A. Hanley, S.M. Arthur, and C. Servheen. 1999. The importance of meat, particularly salmon, to body size, population productivity, and conservation of North American brown bears. Can. J. Zool. 77:132–138.

Horn, H.L., P. Arcese, K. Brunt, A.E. Burger, H. Davis, F. Doyle, K. Dunsworth, P. Friele, S. Gordon, S.L. Hazlitt, A.N. Hamilton, S. Leigh-Spencer, G. MacHutchon, T. Mahon, E. McClaren, V. Michelfelder, B. Pollard, S. Taylor, and F.L. Waterhouse. 2009a. Part 1: Assessment of co-location outcomes and implications for focal species management under EBM. Integrated Land Management, Nanaimo, British Columbia. 127 pp.

Horn, H.L., P. Arcese, K. Brunt, A. Burger, H. Davis, F. Doyle, K. Dunsworth, P. Friele, S. Gordon, Hamilton, G. MacHutchon, T. Mahon, E. McClaren, V. Michelfelder, B. Pollard, G. Sutherland, S. Taylor, L. Waterhouse. 2009b. Part 3: Knowledge Base for Focal Species and their Habitats in Coastal B.C. Report 3 of the EBM Working Group Focal Species Project. Integrated Land Management Bureau, Nanaimo, B.C.

Linnel, J.D.C., J.E. Swenson and R. Anderson. 2001. Predators and people: conservation of large carnivores is possible at high human densities if management policy is favourable. Animal Conservation forum 4 (4):345-349.

MacHutchon, A.G. 2007. Mapping methods for important coastal grizzly bear habitat. B.C. Min. Environ., Black Creek and Victoria, B.C.

_____. 2010. Coastal grizzly bear habitat mapping and review methods. Grizzly Bear Habitat Mapp. Tech. Rev. Team, B.C. Min. Environ. and B.C. Min. For. Range, Victoria and Nanaimo, B.C.

_____. 2020. Grizzly bear habitat mapping on Princess Royal, Swindle, and Sarah Islands of the British Columbia Central Coast. Kitasoo/ Xai'xais First Nation and B.C. Min. For., Lands, Nat. Resourc. Ops. Rural Dev., Klemtu and Nanaimo, B.C.

MacHutchon, A.G., S. Himmer, H. Davis, M. Gallagher. 1998. Temporal and spatial activity patterns among coastal bear populations. Ursus 10:539–546.

MacHutchon, A.G., T. Manning, and A.N. Hamilton. 2010. Assessing material adverse impact to coastal grizzly bear habitat. Grizzly Bear Habitat Mapp. Tech. Rev. Team, B.C. Min. Environ. and B.C. Min. For. Range, Victoria and Nanaimo, B.C.

MacKenzie, W.H. and J.R. Moran. 2004. Wetlands of British Columbia: a guide to identification. B.C. Min. For., Res. Br., Victoria, B.C. Land Manag. Handb. 52.

MacKenzie, W.H., D. Remington, and J. Shaw. 2000. Estuaries on the north coast of British Columbia: a reconnaissance survey of selected sites (draft). B.C. Min. Environ., Lands, Parks and B.C. Min. For., Victoria, B.C.

Mattson, D.J., S. Herrero, and T. Merrill. 2005. Are black bears a factor in the restoration of North American grizzly bear populations? Ursus 16:11–30.

Provincial Grizzly Bear Technical Working Group (PGBTWG). 2020. Interim assessment protocol for grizzly bear in British Columbia – standards for assessing the condition of grizzly bear populations and habitat under British Columbia's cumulative effects framework. B.C. Min. Environ. Clim. Change Strateg. and B.C. Min. For., Lands, Nat. Resourc. Ops. Rural Dev., Victoria, B.C.

Reimchen, T.E. 1994. Further studies of predator and scavenger use of chum salmon in stream and estuarine habitat in Bag Harbour, Gwaii Haanas. Prepared for Can. Park Serv.

Resources Inventory Committee. 1999. British Columbia wildlife habitat rating standards. Version 2.0. Terrestrial Ecosys. Task Force, Resourc. Inventory Committee, Victoria, B.C.

Roever, C.L., M.S. Boyce, and G.B. Stenhouse. 2008. Grizzly bears and forestry: II: Grizzly bear habitat selection and conflicts with road placement. For. Ecol. Manag. 256: 1262–1269.

Schwartz, C.C., S.L. Cain, S. Podruzny, S. Cherry, and L. Frattaroli. 2010. Contrasting activity patterns of sympatric and allopatric black and grizzly bears. J. Wildl. Manag. 74:1628–1638.

Service, C.N., M.S. Adams, K.A. Artelle, P. Paquet, L.V. Grant, and C.T. Darimont. 2014. Indigenous knowledge and science unite to reveal spatial and temporal dimensions of distributional shift in wildlife of conservation concern. PLoS One 9:e101595.

Service, C.N., A.W. Bateman, M.S. Adams, K.A. Artelle, T.E. Reimchen, P.C. Paquet, and C.T. Darimont. 2019. Salmonid species diversity predicts salmon consumption by terrestrial wildlife. J. Anim. Ecol. 88:392 –404.

Service, C.N., M. Bourbonnais, M.S. Adams, L. Henson, D. Neasloss, C. Picard, P.C. Paquet, and C.T. Darimont. 2020. Spatial patterns and rarity of the white-phased 'Spirit bear' allele reveal gaps in habitat protection. Ecol. Solutions Evid. 1:e12014.