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INDIAN RIVER WATERSHED

INTEGRATED STEWARDSHIP PLAN

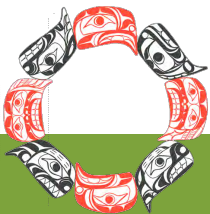
Prepared by Tsleil-Waututh Nation
Spring 2014





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Section 1: Plan Introduction

Introduction

The Tsleil-Waututh are the “People of the Inlet” having lived and prospered in the vicinity of Burrard Inlet, the Fraser River, and adjacent valleys and waters since time out of mind. Today, the Consultation Area (see Map 1) incorporates urban areas in the south, as well as wilderness watersheds northwards to the vicinity of Mount Garibaldi, west to Gibsons and east to Coquitlam Lake.

The area at the head of the Indian Arm of Burrard Inlet, the Indian River Watershed is extremely important in the history, culture and economy of the Tsleil-Waututh people. Inlailawatash is the name of the historic Tsleil-Waututh village located near the mouth of the Indian River. According to Tsleil-Waututh oral history, it is the site of first contact with Spanish explorers in 1792. Inlailawatash is also the name attached to two Indian Reserves there, and a large area of fee-simple land owned by the Tsleil-Waututh Nation.

Tsleil-Waututh oral history teaches that the Tsleil-Waututh people have always belonged to and have accepted responsibility for the care of the lands and waters within their traditional territory. More recent management by Crown governments has been fragmented and diminished environmental and cultural values. To reverse this course in the Indian River Watershed, Tsleil-Waututh convened a restoration conference in 1999. The purpose was to bring representatives of various levels and branches of government together to work with Tsleil-Waututh to bring environmental and cultural health back to a core of the traditional territory.

Seizing the opportunity presented by the Province of British Columbia through the Sea-to-Sky Land and Resource Management planning process, Tsleil-Waututh proposed a watershed-level planning process for the Indian River Watershed. In December 2005, Tsleil-Waututh and the Province signed a Partnership Agreement for the collaborative development of an Integrated Stewardship Plan. This process was led by Tsleil-Waututh and it was the first collaboration of its kind in the Province.

The Integrated Stewardship Plan (the Plan) is based on the Provincial Landscape Unit Planning Framework and sets future management direction for the watershed. The specific purposes of the Plan are to:

- Harmonize the interests of Tsleil-Waututh and the Province;
- Identify strategic goals for the watershed;
- Develop management objectives that are a showcase for sustainability;
- Provide tangible resource management strategies for operational planning and day-to-day resource management decisions; and,

- Address cumulative effects of previous development actions in the watershed.

The joint planning process included:

- Terms of Reference adopted in 2007 defining the planning process and guiding principles;
- A steering committee with equal Tsleil-Waututh and Provincial representation supported by a joint technical team;
- Consultation with the Tsleil-Waututh community and other First Nations, and communication with major stakeholders and the general public; and,
- A shared vision for a new government-to-government relationship based on respect, recognition and accommodation of Aboriginal rights, title and interests.

The Plan is structured into five sections:

- Section 1 introduces the Plan and highlights plan goals;
- Section 2 provides the regional context for the Indian River Watershed and highlights access management, safety, monitoring and enforcement issues;
- Section 3 provides management objectives and strategies for the protection of key environmental and cultural values; these values are combined and used to develop the Indian River Watershed Reserve Network, a three-tier system of land use designations;
- Section 4 provides management direction for the main economic development opportunities in the watershed; and,
- Section 5 outlines implementation mechanisms and strategies.

Once the Plan is approved by Tsleil-Waututh and the Province, plan management objectives and strategies can be legally established or incorporated into Tsleil-Waututh and Provincial policy. As highlighted in the implementation strategy, this will occur on a chapter-by-chapter basis.

An additional product associated with this Plan is the Bioregional Atlas for the Indian River Watershed. It has been produced as a supplementary, stand alone document.



Plan Goals

The Indian River Watershed Integrated Stewardship Plan goals are based on the project Terms of Reference, identified planning issues and by joint technical team discussions. The goals serve as a reference point for the Plan and will be expanded with specific management direction (Objectives and Strategies) for key watershed values and activities.

The six identified Plan goals include:

Cultural Expression: ensure the Indian River Watershed remains a core area for Tsleil-Waututh cultural expression by protecting past cultural landscapes, celebrating present connections and nurturing wide-spread future Tsleil-Waututh use and occupancy for generations to come;

Watershed Integrity and Restoration: restore the ecological and hydrological integrity of the Indian River Watershed;

Biodiversity Protection: ensure biodiversity values are carefully considered in all planning activities, and sensitive ecosystems and wildlife habitats are protected;

Economic Opportunity Creation: ensure a diversity of viable economic opportunities are available for Tsleil-Waututh and others in the Indian River Watershed that protect, respect and support environmental and cultural values;

Safety and Access Facilitation: ensure the Indian River Watershed provides a safe and secure working and recreational environment; a key safety feature will be to ensure access infrastructure is environmentally sound, culturally sensitive and supportive of economic opportunities; and,

Jurisdictional Collaboration: through integrated stewardship, create an example of jurisdictional collaboration that supports the above goals and provides a showcase for new relationships between First Nation and Crown governments.



Section 2: Regional Context

Watershed Description

The Indian River Watershed is located approximately 30 kilometres northeast of Vancouver and is the southernmost fjord on the west coast of North America. It is surrounded by the Seymour, Stawamus, Mamquam, Pitt and Coquitlam Watersheds.

The watershed is approximately 218 square kilometres in area and lies at the head of Indian Arm, a northerly extension of Burrard Inlet. The highest elevation is Meslilloet Mountain, at 2001 metres above sea level. The topography is typical of Coast Range watersheds with the headwaters located in steep, alpine terrain and a main U-shaped valley of glacial origin bisecting the approximate centre of the watershed.

The principal stream is the Indian River, which flows over 36 kilometres and discharges into an estuary with the largest remaining intertidal area in Burrard Inlet. The watershed hosts over 750 kilometres of stream channels including major tributaries like Meslilloet, Hixon, Brandt and Forestry Creeks. The watershed also has several hundred kilometres of unimproved forest roads.

Two Provincial parks have lands in the watershed: Say-Nuth-Khaw-Yum Provincial Park boundaries include lands immediately adjacent to the river estuary and Pinecone-Burke Provincial Park covers the higher elevations of the northeasterly portion of the watershed.

The watershed falls in the temperate rainforest zone along the west coast of British Columbia, including Coastal Western Hemlock and Mountain Hemlock biogeoclimatic zones, and at higher elevations, the Coastal Mountain-Heather Alpine zone. Dominant tree species include hemlock, cedar and fir, with red alder and bigleaf maple at lower elevations along the river.

The Indian River Watershed is central to Tsleil-Waututh's traditional use and occupancy and therefore, forms a core area of their interest. Tsleil-Waututh people have occupied the watershed since time out of mind.

The area at the head of Indian Arm and the Indian River are important areas in the history, culture and economy of the Tsleil-Waututh people. As part of a yearly round of activity, the watershed was and continues to be harvested for renewable resources including salmon, deer, elk, cedar, berries and medicinal plants.

Inlailawatash is the name of the historic Tsleil-Waututh village site located near the mouth of the Indian River, as well as the present name of the two nearby Tsleil-Waututh reserves (I.R. #4 and I.R. #4a) and Tsleil-Waututh owned fee-simple land. It is interpreted as a Halkomelem phrase for “go inside place.”





TSLEIL-WAUTUTH NATION INDIAN RIVER WATERSHED PLAN SERIES

MAP 1 REGIONAL CONTEXT

LEGEND

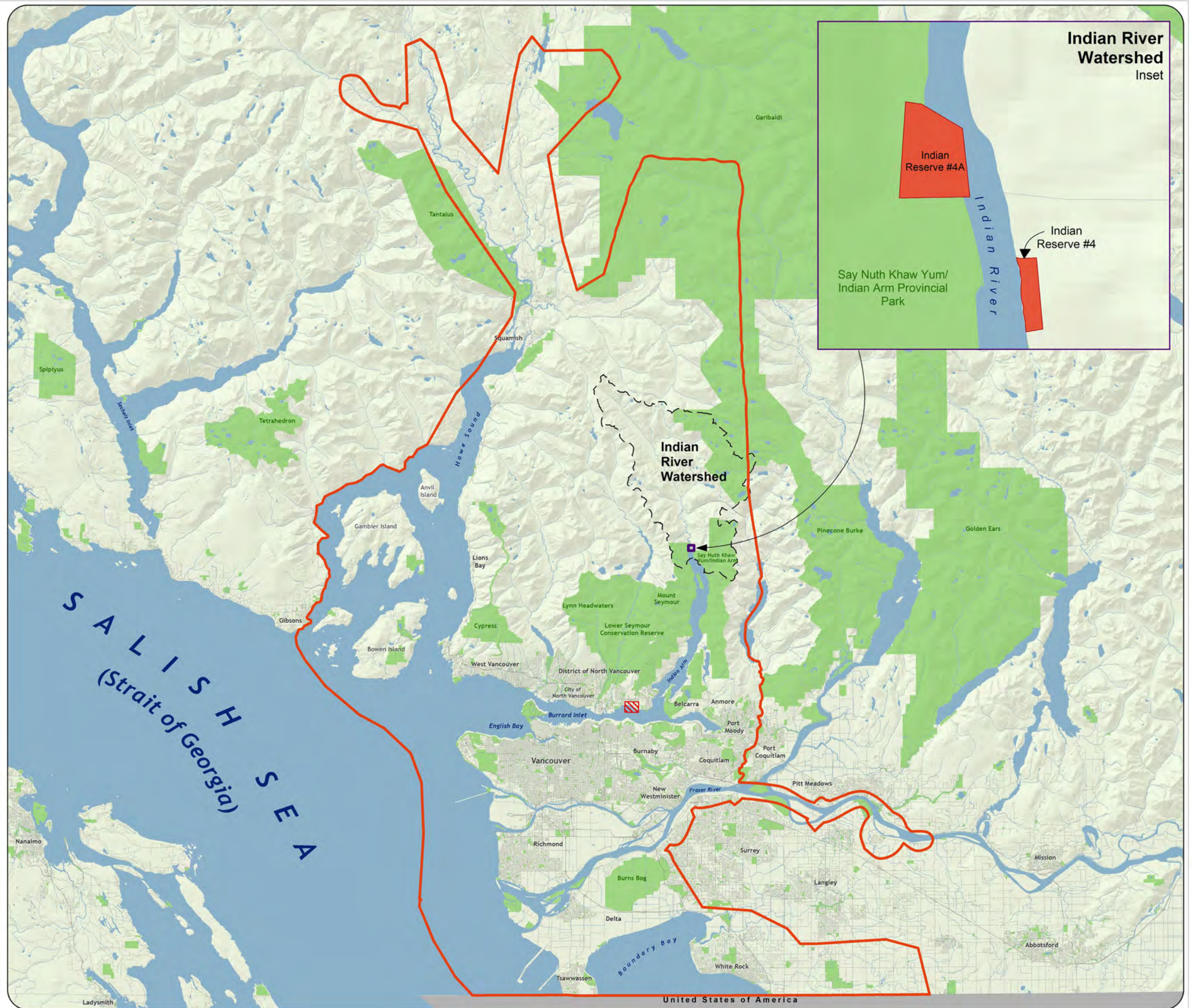
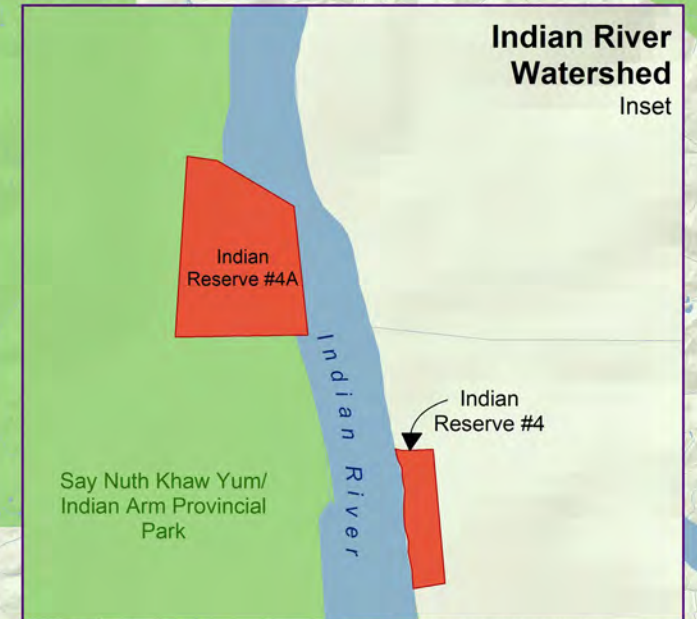
- Road
- Park Land
- Tsleil-Waututh Nation Consultation Boundary
- ▨ Tsleil-Waututh Nation Indian Reserve #3
- Tsleil Waututh Nation Indian Reserve #4 and #4A
- - - Indian River Watershed Boundary



0 5 10 20 Kilometers

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Map produced February 2014 by Tsleil-Waututh Nation
Projection: UTM, NAD83, Zone 10
Map Scale: 1:215,000; Inset Scale: 1:3,50;
Overview map Scale: 1:9,000,000.



Access Management

The Indian River Watershed has a unique access system that attracts and supports a variety of different users. There are two main access points into the watershed, one from the south via a marine dock, and one (now closed) from the north via the Stawamus-Indian Forest Service Road (FSR). There is also a third, restricted access point that enters from the east (Coquitlam Watershed) via the Hixon Creek Road.

The southern access point is a marine dock located in the Indian River estuary at the southern terminus of the Stawamus-Indian FSR. The dock currently provides access for Tsleil-Waututh members to utilize Indian Reserve #4 and #4A, and the Inlailawatash land (~800 acres of riverfront and forest). The dock also provides a launching point for activities such as forest stewardship, fisheries management, tourism and recreation. The dock is a private, Tsleil-Waututh-managed facility and requires authorization from the Nation for its use.

Adjacent to the dock is a log dump also managed by Tsleil-Waututh in partnership with the Ministry of Forests, Lands and Natural Resource Operations. The log dump is the main departure point for forest products and an entry point for heavy equipment and supplies arriving by barge.

The northern access point formerly provided entry into the Indian River Watershed from the District of Squamish via the Stawamus Watershed. The Stawamus-Indian FSR was built to support forestry operations in both watersheds. While the FSR on the Stawamus side is classified as a wilderness road and is open to the public, the road is deactivated and closed at the pass between the two watersheds. Motorized entry from the pass into the Indian River Watershed is currently prohibited.

On the Indian River side of the pass, the road is designated as a Wilderness FSR and is not maintained north of the 10 kilometre mark from the Indian River dock. The lower sections of the Indian FSR are maintained for authorized users and permit holders that access the road via the southern or eastern access points.

The eastern access point provides entry from the Coquitlam Watershed. It is a Community Watershed that supplies drinking water to Metro Vancouver. The watershed is closed to the public and road use is restricted. Entry into the Coquitlam Watershed is controlled by a manned gate at the lower end and a gate at the entry to the Indian River Watershed. The Coquitlam Watershed road is well maintained by Metro Vancouver.

As a result of the Indian River Watershed's unique access system, a number of management issues have been identified. The issues highlighted below serve to inform access management scenarios and guide specific management direction.

Illegal Activity

Despite the road closure at the pass, the Indian FSR continues to be used by off-road vehicles during the non-snow months (spring to fall). Unfortunately, some of the users are engaged in illegal activities such as theft, vandalism, wildlife poaching and environmental damage to sensitive salmon habitat.

Public Safety

The unauthorized access highlighted above raises significant public safety and liability issues. The poor condition of some sections of the Indian FSR poses safety risks and the isolated nature of the watershed hinders effective communication and emergency response.

Environmental Impact

Due to the steep and unstable nature of the watershed, the risk of environmental impacts such as landslides and mass movement of soil and debris is high. Unauthorized access can exacerbate the risks and have a variety of downstream effects.

Economic Productivity

Present and future economic developments require reliable access. Current parties with a primary economic interest in the access system include BC Hydro, Fortis BC and Inlailawatash Forestry Limited Partnership.

Coordinated Management

Considering the issues and interests highlighted above, access management planning in the Indian River Watershed represents a key theme that this Plan will address. In doing so, the following Objectives and Strategies were developed for access management:



Access Management Direction

Objectives	Strategies
1. Minimize impact to Tsleil-Waututh cultural values associated with public access.	<p>1.1 Maintain an adequate compliance and enforcement presence in accordance with the Safety, Monitoring and Enforcement chapter.</p> <p>1.2 Use communications tools (e.g., signage, brochures) to increase awareness of Tsleil-Waututh cultural values, in accordance with the Tsleil-Waututh Cultural Communications Strategy and Provincial guidelines.</p> <p>1.3 Ensure compliance with and enforcement of the Provincial Heritage Conservation Act and the Tsleil-Waututh Stewardship Policy's requirement for Cultural Heritage Investigation Permits.</p>
2. Ensure access infrastructures (i.e., roads and bridges) meet or exceed Provincial construction and maintenance standards.	<p>2.1 Update road inventories that describe the condition of the Indian River Watershed access infrastructure.</p> <p>2.2 Subject to 2.1, develop an annual maintenance schedule and funding sources.</p>
3. Minimize impact of access infrastructure on wildlife.	<p>3.1 Limit road construction in areas identified as high value habitat for wildlife species of concern.</p> <p>3.2 Locate roads on the south side of valleys.</p> <p>3.3 Complete an appropriate degree of deactivation for access infrastructure not in use.</p>
4. Restrict motorized recreational activities, except where specifically approved.	<p>4.1 Actively enforce motorized recreational use in the watershed per the Safety, Monitoring and Enforcement chapter.</p>
5. Maintain opportunities for non-motorized access.	<p>5.1 Allow for non-motorized access when designing access control infrastructure, subject to Community Watershed restrictions.</p> <p>5.2 Address non-motorized access needs when implementing restoration and deactivation plans.</p>
6. Coordinate existing and future access infrastructure development and maintenance.	<p>6.1 Establish and maintain an Access Management Working Group to coordinate activities.</p>
7. Coordinate access management plans with access requirements and restrictions of adjacent watersheds.	<p>7.1 Provide management direction to inform the implementation of the Sea-to-Sky Land and Resource Management Plan.</p> <p>7.2 Provide opportunities for major stakeholders in adjacent watersheds to participate in the Access Management Working Group.</p>





TSLEIL-WAUTUTH NATION INDIAN RIVER WATERSHED PLAN SERIES

MAP 2 ACCESS CONTEXT

LEGEND

- Park Land
- Tsleil-Waututh Nation Indian Reserve #3
- Community Drinking Watershed

Access Context

- Access Road
- Indian River Watershed Forest Service Roads
- Maintained Road
- Semi-Permanent Deactivated Road

0 2.5 5 10 Kilometers

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Projection: UTM, NAD83, Zone 10

Map Scale: 1:120,000





TSLEIL-WAUTUTH NATION INDIAN RIVER WATERSHED PLAN SERIES

MAP 3 ACCESS MANAGEMENT

LEGEND

Forest Service Roads

- Maintained Road
- Semi-Permanent Deactivated Road

Secondary Road Status

- Semi Deactivated
- Deactivated
- Provincial Park Land

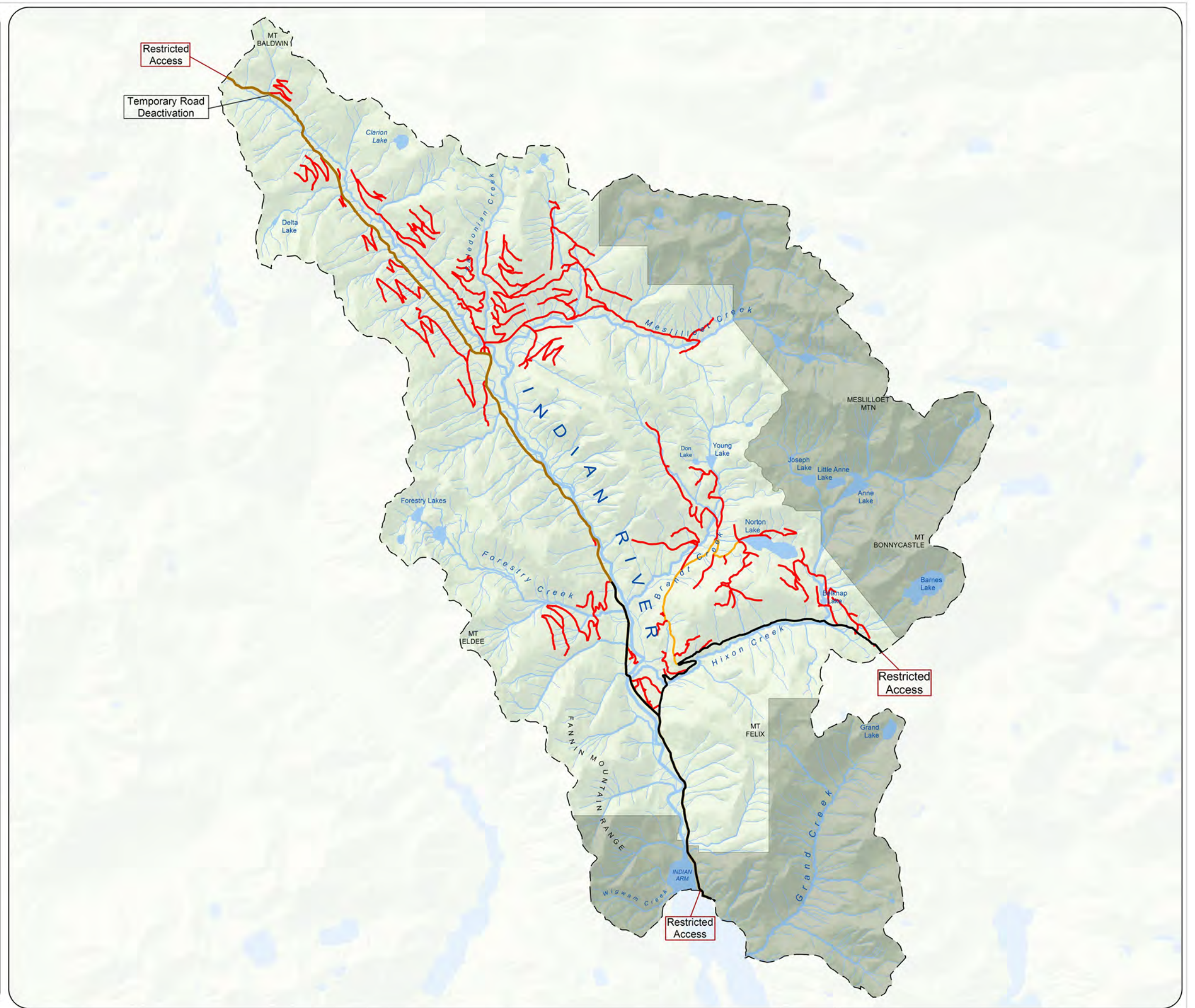


Overview Map

0 1.25 2.5 5 Kilometers

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Map Scale: 1:45,000; Overview Map Scale: 1:600,000



Safety, Monitoring and Enforcement

Despite the close proximity to Metro Vancouver and the District of Squamish, the Indian River Watershed is an isolated wilderness environment. As highlighted in the Access Management chapter, the roads leading into the watershed are closed to motorized traffic because of community watershed restrictions or road safety issues.

Notwithstanding the road closures, the Stawamus-Indian Forest Service Road (FSR) continues to be heavily utilized by off-road vehicles seasonally (spring to fall). In addition to off-road vehicles utilizing the road via Squamish, members of the public also travel by boat and offload all-terrain vehicles and motorbikes at the marine dock. Use of the marine dock by boaters is significant during the summer months, despite the signage highlighting that the dock is a private facility for “Authorized Use Only.”

The unauthorized access of the Indian FSR and dock facilities raises public safety and liability concerns. The unmaintained sections of the FSR pose substantial safety risks and have resulted in a number of accidents and significant injury. Emergency responders have limited access and communication systems hinder effective response.

In addition to public safety concerns, some members of the public are engaged in illegal activities such as theft, vandalism, wildlife poaching and environmental damage to sensitive salmon habitat. As with emergency responders, agencies responsible for conducting monitoring and enforcement of private property/infrastructure protection, fish and wildlife harvest regulations, and environmental damage are challenged by access to the watershed. There is currently a very low monitoring and enforcement presence.

The Tsleil-Waututh Nation is very concerned about the frequency of illegal activity occurring in the watershed, and is working with agencies to improve safety, monitoring and enforcement efforts. In doing so, the following Objectives and Strategies were developed to address issues with safety, monitoring and enforcement:

Safety, Monitoring and Enforcement Management Direction

Objectives	Strategies
1. Maintain an adequate compliance and enforcement presence.	<p>1.1 Establish a Safety, Monitoring and Enforcement Working Group to coordinate activities. The working group will develop strategies that include, but are not limited to:</p> <p>1.1.1 Improving monitoring and enforcement presence;</p> <p>1.1.2 Preventing illegal and dangerous activities such as theft, vandalism, poaching of fish and wildlife, tenure infractions and the illegal harvest of forest products;</p> <p>1.1.3 Enhancing safety measures and procedures; and,</p> <p>1.1.4 Improving access for monitoring, enforcement and emergen-</p>
2. Improve communication systems.	<p>2.1 Establish clear and accurate kilometre signs on all FSR.</p> <p>2.2 Designate a radio frequency for communications within the watershed.</p>
3. Demonstrate that all stewardship activities place a priority on safety.	<p>3.1 Companies, organizations and contractors operating in the watershed will strive to achieve standards equivalent to the British Columbia Forest Safety Council.</p>
4. Reduce risks of wildfire initiation and spread.	<p>4.1 Develop a wildfire management and response strategy.</p> <p>4.2 Subject to Strategy 4.1, ensure wildfire protection plans are in place for designated activities.</p> <p>4.3 Coordinate wildfire management strategies with the Forest Protection branch of the Squamish Forest District.</p>



Section 3: Value Articulation

Tsleil-Waututh Cultural Values

The Tsleil-Waututh people have lived and prospered in the Indian River Watershed since time out of mind. The watershed represents a core area of the Tsleil-Waututh traditional territory, and holds immense cultural and archaeological value.

Although historic industrial activities may have permanently altered or destroyed many archaeological sites, Tsleil-Waututh cultural heritage remains in the form of a village site, trail networks and culturally modified trees (1). The watershed also has high potential for pictographs, rock shelters and quarries, wet sites, middens, lithic scatters and burial sites. Recent archaeological research undertaken at high altitudes has revealed additional, previously unknown traditional land use patterns.

The Indian River Watershed has not been subject to any comprehensive archaeological surveys. Consequently, only one archaeological site has been formally documented. This extremely low number of recorded archaeological sites makes it very difficult to quantify the extent of Tsleil-Waututh land use and occupancy. Until such time when an Archaeological Inventory Assessment can be completed, the Tsleil-Waututh Nation considers the entire watershed an area of high archaeological potential.

Archaeology aside, the Indian River Watershed is rich with a variety of cultural resources such as prime fishing and hunting sites, productive berry and medicinal plants patches, and areas of great spiritual significance. In 1999, Tsleil-Waututh undertook a Traditional Use Study where more than 80 community members shared information regarding their land use and occupancy activities. They identified over 4,000 locations within the watershed.

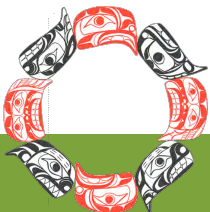
Tsleil-Waututh members continue to use the watershed for many types of cultural activities. A key objective of Tsleil-Waututh is to ensure that community members maintain undisturbed access to cultural activities, specifically access to healthy, wild foods and medicines.

The following Objectives and Strategies were developed to provide management direction for protecting and respecting Tsleil-Waututh cultural values:

(1) The Province defines Culturally Modified Tree as a tree that has been altered by Aboriginal people as part of their traditional use of the forest.

Tsleil-Waututh Cultural Values Management Direction

Objectives	Strategies
1. Identify and protect Tsleil-Waututh cultural and archaeological heritage resources.	1.1 All tenure and permit applications for maintenance (roads, power lines, gas lines) or development activities including forestry, mining and energy, and commercial tourism, are subject to a Tsleil-Waututh Cultural Heritage Review. Tsleil-Waututh will administer this review in accordance with its regulations, policies and procedures. 1.2 Complete an Archaeological Potential Model and an Archaeological Inventory Assessment for the entire watershed to inform cultural heritage review and development planning processes.
2. Preserve and safeguard Tsleil-Waututh cultural and archaeological resources in their natural condition and setting.	2.1 Restrict public access to protect all archaeological sites and areas identified as culturally sensitive, unless otherwise specified by Tsleil-Waututh. 2.2 Protect intangible cultural sites used for seclusion, transformation or other spiritual activities.
3. Identify and protect culturally modified trees.	3.1 Culturally modified trees are cultural heritage features subject to the Tsleil-Waututh Cultural Heritage Review process. 3.2 Create a management zone of sufficient size to protect the integrity of culturally modified trees. 3.3 If areas are identified as having a high concentration of culturally modified trees, consider the creation of Culturally Modified Tree Areas that will be reserved from development.
4. Respect and promote Tsleil-Waututh contemporary cultural expression.	4.1 Encourage Tsleil-Waututh community members to visit the watershed, and promote activities such as hunting or gathering of wild foods and medicines.





TSLEIL-WAUTUTH NATION INDIAN RIVER WATERSHED PLAN SERIES

MAP 4 TWN CULTURAL VALUES

LEGEND

Forest Service Roads

- Maintained Road
- Semi-Permanent Deactivated Road
- - - Secondary Road
- Provincial Park Land

Tsleil-Waututh Nation Cultural Values

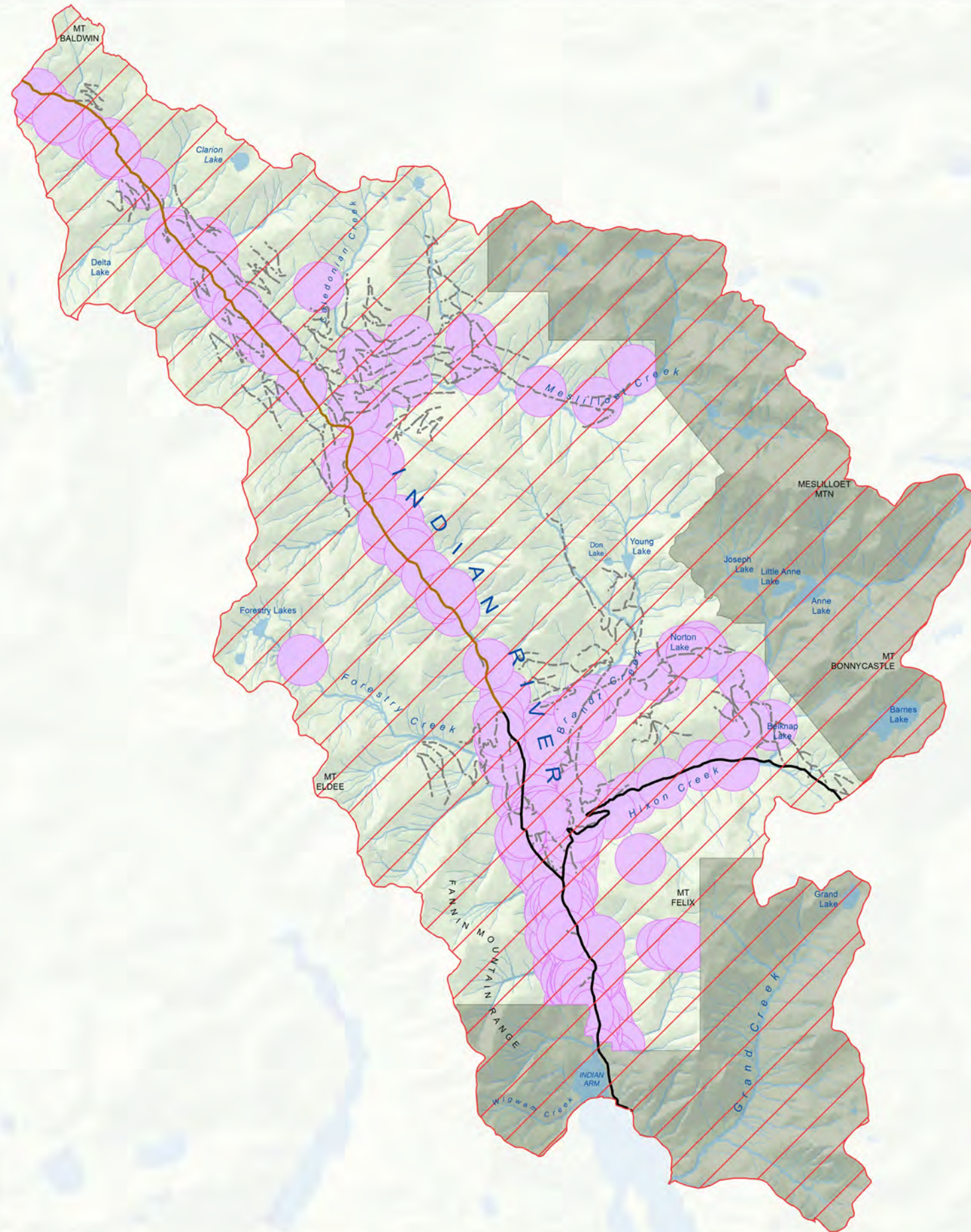
- ▨ Tsleil-Waututh Cultural Management Area
- Tsleil-Waututh Traditional Use Site*

*Randomized and buffered to a maximum of 500 meters

0 1.25 2.5 5 Kilometers

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Map Scale: 1:45,000



Visual Landscape Quality

The visual quality of the Indian River landscape is extremely important to Tsleil-Waututh members. In its role as steward of traditional lands and waters, the Tsleil-Waututh Nation takes immense pride in the careful management of the Indian River Watershed including its viewscapes.

In British Columbia, visually sensitive areas are identified through a Visual Landscape Inventory. Management of visual resources in sensitive areas requires the designation of Scenic Areas and establishment of Visual Quality Objectives (VQO). The following categories of VQO are prescribed, each according to the extent of alteration resulting from land development activity:

Visual Quality Objective	Description
Preservation	No visible human caused alterations
Retention	Human-caused alterations are visible but not evident
Partial Retention	Human-caused alterations are evident but subordinate and not dominant.
Modification	Human-caused alterations are dominant but have natural-appearing characteristics.
Maximum Modification	Human-caused alterations are dominant and out of scale.

Once VQO have been established, development activities such as timber harvest require the skillful application of visual landscape design principles. Use of Visual Impact Assessments informs the project planning necessary to ensure that VQO designations are implemented appropriately.

A Visual Landscape Inventory conforming to Provincial standards and procedures has not been conducted for the Indian River Watershed. As a result, the watershed is not currently designated as a Scenic Area and does not have established VQO designations.

To acquire an understanding of the watershed's visual resources, Tsleil-Waututh conducted a preliminary, broad-scale visual landscape review in 2007. The analysis was based on a limited field survey and GIS viewshed analyses of important viewing sites or areas identified by Tsleil-Waututh members.

The findings suggest that the entire Indian River Watershed is visually sensitive and should be designated as a Scenic Area. Recommended Visual Quality Classes (RVQC) have been developed suggesting the level of management that may be appropriate given the area's visual sensitivity. The RVQC are identified on Map 5. These designations are interim only and will be refined upon completion of a formal Visual Landscape Inventory.

Until a Visual Landscape Inventory is completed, the RVQC will provide interim management direction for visual quality in the watershed. In addition, the following Objectives and Strategies were developed to protect and manage the visually sensitive areas identified by Tsleil-Waututh:

Visual Landscape Quality Management Direction

Objectives	Strategies
1. Protect visual quality values.	<p>1.1 Utilize the Recommended Visual Quality Classes as interim management direction, until a formal Visual Landscape Inventory is completed.</p> <p>1.2 Carry out a Visual Landscape Inventory to Provincial standards to identify and classify the watershed's visually sensitive areas.</p> <p>1.3 Designate the watershed's visually important areas as Scenic Areas pursuant to Section 7(1) of the Government Actions Regulation.</p> <p>1.4 Establish Visual Quality Objectives per the categories of altered forest landscape prescribed under section 1.1 of the British Columbia Forest Planning and Practices Regulation; these objectives will also apply to other non-forestry development activities.</p>
2. Manage development activities to achieve the categories of altered forest landscape as prescribed by the VQO.	<p>2.1 Conduct Visual Impact Assessments from significant or relevant viewpoints as part of the operational planning process to demonstrate that development activities are consistent with established VQO.</p> <p>2.2 Apply visual landscape design concepts and principles to all operational harvest or developmental plans within designated Scenic Areas.</p> <p>2.3 Employ forest harvest methods that will achieve the level of altered forest landscape prescribed by VQO (e.g. partial cutting).</p>





TSLEIL-WAUTUTH NATION INDIAN RIVER WATERSHED PLAN SERIES

MAP 5 VISUAL LANDSCAPE QUALITY

LEGEND

Forest Service Roads

- Maintained Road
- Semi-Permanent Deactivated Road
- - - Secondary Road
- Provincial Park Land

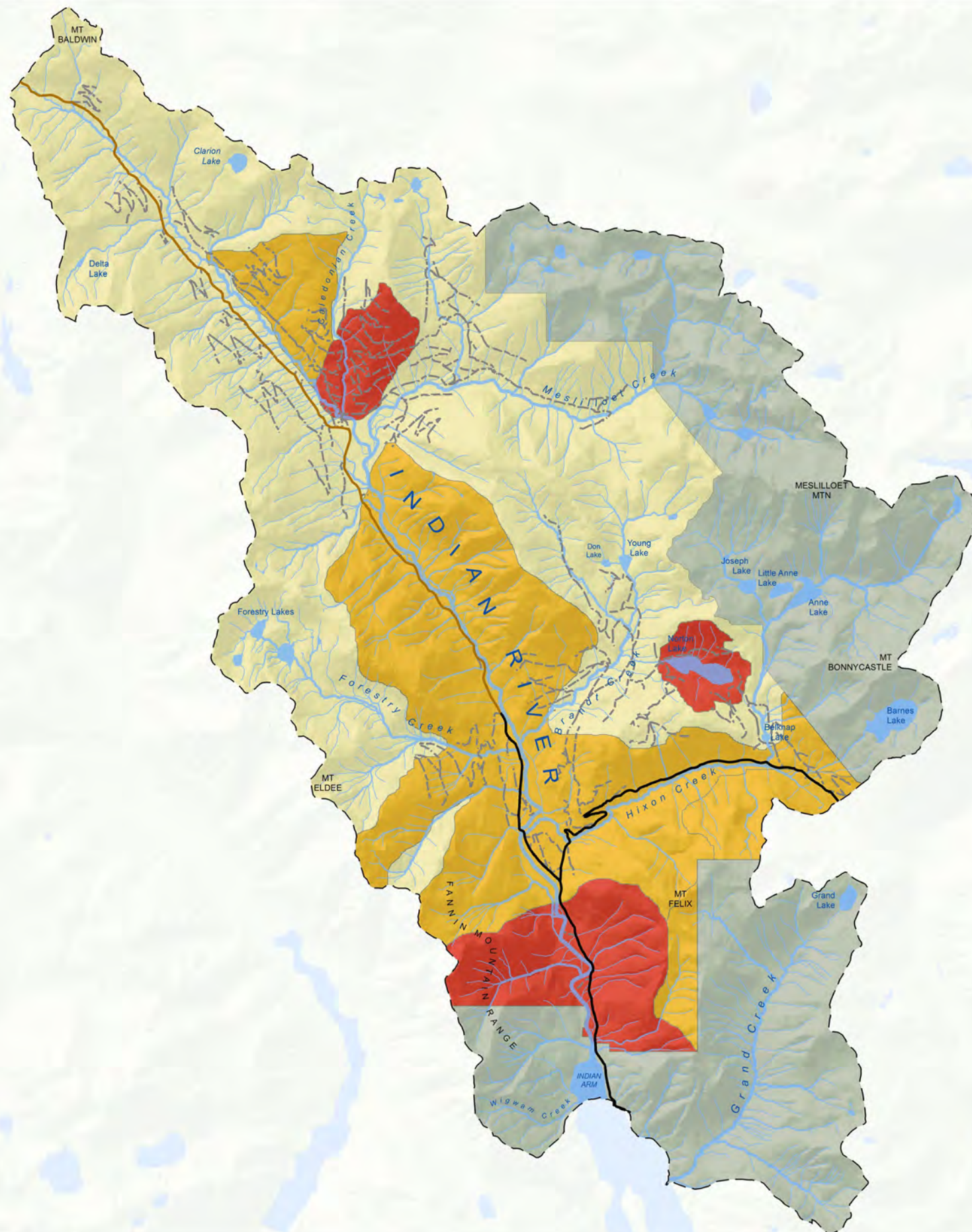
Recommended Visual Quality Classes

- Preservation
- Retention
- Partial Retention

0 1.25 2.5 5 Kilometers

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Salmon Stewardship

Salmon is a keystone species for Tsleil-Waututh culture, the Indian River Watershed, and the entire Salish Sea. Since time out of mind, Tsleil-Waututh people have been stewards of Indian River salmon and have lived and prospered in part as a result of this resource.

The river hosts five different salmon species, predominantly pink and chum, some coho, and small numbers of chinook and occasional sockeye. The river is accessible to salmon up to the cascades, which creates an impassable barrier approximately 10 kilometres upstream from Indian Arm. Salmon also access Hixon Creek, about 6 kilometres upstream of the outlet of Indian River.

Indian River pink salmon arrive in odd years as early as July. They spawn from early September to October with a peak in late September. Every year chum arrive in early October and remain in the system through December with peak spawning in mid-November. Coho are similar to chum, but may spawn until January. The limited sockeye and chinook spawn September to October.

Different salmon species require different freshwater habitats. Pink salmon dominate the low gradient mainstem and big pools downstream of the Hixon Creek confluence. Chum salmon utilize the whole river and side channel systems, focusing on areas of upwelling groundwater. Coho rely on side channel habitats for overwintering, especially pools with low water velocities and significant amounts of large woody cover.

Salmon habitat in the Indian River Watershed has been degraded by extensive logging, the placement of a high-voltage hydroelectric transmission line in the floodplain in 1968, and the construction of a natural gas pipeline in 1991. These activities increased the sediment load in the river through accelerated streambank erosion, road failures and landslides, creating a highly unstable system. These impacts, in combination with factors external to the watershed, significantly diminished populations of all salmon species.

Beginning in the 1980s, salmon stocks in the Indian River began to slowly recover primarily due to the completion of a number of habitat improvement projects, improved forest management practices and modest hydrologic recovery. Recent monitoring and enhancement efforts spearheaded by the Tsleil-Waututh Nation and Fisheries and Oceans Canada have demonstrated continued recovery, but have not achieved historic abundance.

To build on this success, the following Objectives and Strategies were developed for the stewardship of salmon:

Salmon Stewardship Management Direction

Objectives	Strategies
1. Protect salmon habitat and Tsleil-Waututh culturally significant fishing sites and trails.	<p>1.1 Create a Salmon Stewardship Area that encompasses the entire lower Indian River floodplain and estuary as defined on Map 6.</p> <p>1.2 Conduct a hydriparian assessment for the Salmon Stewardship Area as highlighted in the Hydriparian chapter.</p> <p>1.3 In the absence of a hydriparian assessment, establish a Riparian Reserve Zone of 70 metres on each side of the Indian River in the Salmon Stewardship Area; on named tributaries in the Salmon Stewardship Area, establish a Riparian Reserve Zone of 50 metres up to the first anadromous fish barrier.. (2)</p> <p>1.4 In the absence of a hydriparian assessment, establish a Riparian Management Zone of 230 metres on each side of the Indian River in the Salmon Stewardship Area. It will lie just outside and adjacent to the Riparian Reserve Zone along the mainstem only.</p>
2. Restore and enhance critical habitats in the Salmon Stewardship Area.	<p>2.1 Undertake salmon restoration and enhancement projects including, but not limited to:</p> <p>2.1.1 Creation of side channel habitat for coho;</p> <p>2.1.2 Reintroduction of steelhead and other resident trout species;</p> <p>2.1.3 Assessment of native chinook populations;</p> <p>2.1.4 Reestablishment of conifers in the riparian forest and floodplain;</p> <p>2.1.5 Enhancement of Large woody debris concentration</p> <p>2.1.6 Restoration of river and floodplain geomorphic stability and resilience; and,</p> <p>2.1.7 Assessment and restoration of estuary ecological functions.</p>





TSLEIL-WAUTUTH NATION INDIAN RIVER WATERSHED PLAN SERIES

MAP 6 SALMON STEWARDSHIP AND STREAM ENHANCEMENT

LEGEND

Forest Service Roads

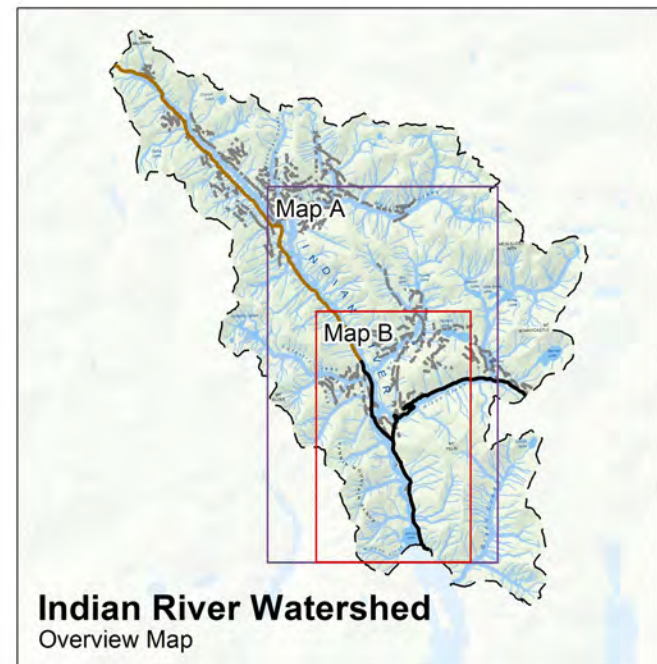
- Maintained Road
- Semi-Permanent Deactivated Road
- Provincial Park Land
- Secondary Road

Stream Enhancement

- Erosion Area
- Anadromous Stream Barrier
- Treatment Area
- Gravel Bar
- Avulsion Site
- Off-Channel Habitat

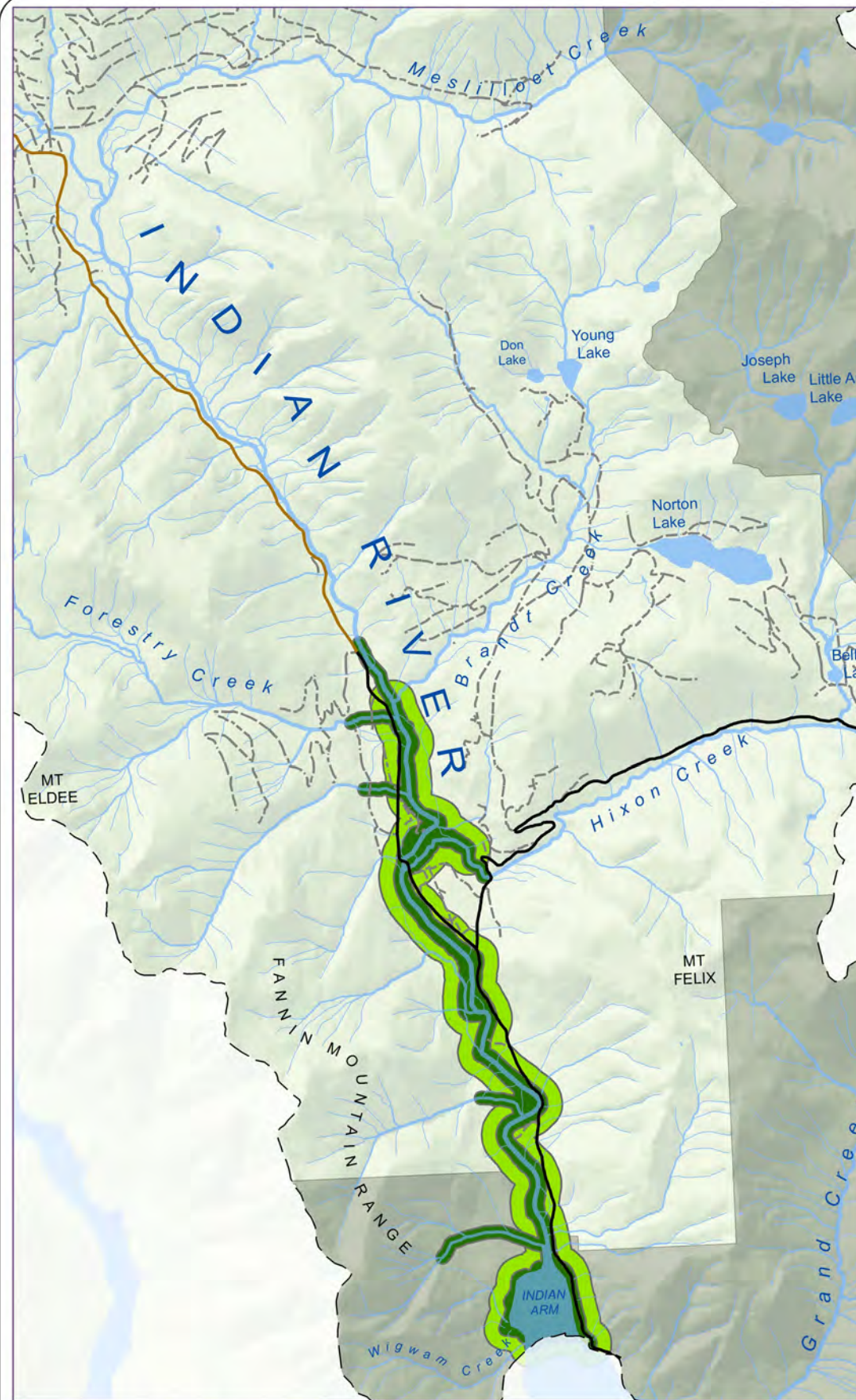
Salmon Stewardship

- Salmon Stewardship Reserve Zone
- Salmon Stewardship Management Zone



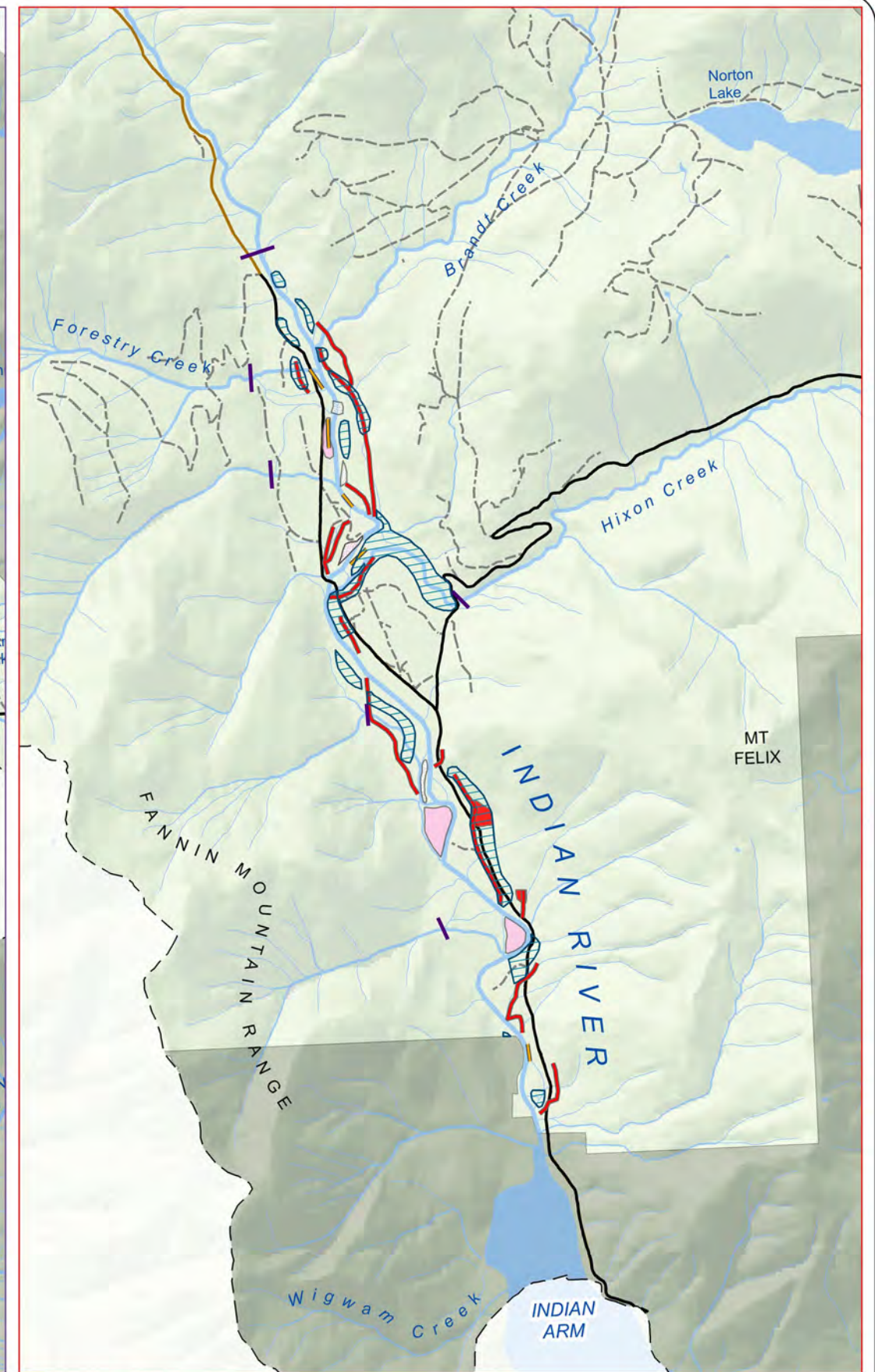
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Projection: UTM, NAD83, Zone 10
Map A Scale: 1:30,000
Map B Scale: 1:20,000



Map A: Salmon Stewardship

0 0.5 1 2 3 Kilometers



Map B: Stream Enhancement

0 0.5 1 2 Kilometers

Cedar Stewardship

From the Tsleil-Waututh perspective, the most important tree species for cultural and practical use is cedar. In the Indian River Watershed, the use of Western red and yellow cedar are inherently linked to Tsleil-Waututh culture. Western red cedar is usually found in moist, shaded sites at lower elevations; yellow cedar is usually found in moist, rocky sites at higher elevations.

According to practices passed down through generations, virtually every part of the cedar tree was traditionally used by the Tsleil-Waututh people. The bark was used for clothing and matting, roots for rope, pitch for medicinal preparations, and boughs for insulation and spiritual purposes. Cedar wood was used for building homes, carving artwork, and a variety of household implements. Very large logs were used to create the dominant symbol of Tsleil-Waututh culture: the canoe.

Due to the variety of modern cultural uses for cedar, Tsleil-Waututh requires a diversity of tree ages in cedar stands—from saplings to large monumental cedars greater than two metres in diameter. Unfortunately, past intensive timber harvesting activities focused extraction on cedar species, resulting in fewer cedar leading stands and potential destruction of culturally modified trees (3).

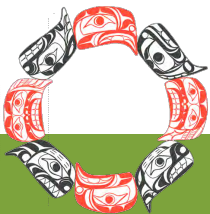
Given the limited extent of cedar forests, especially low elevation old growth forests, Tsleil-Waututh requires measures to ensure cedar species are given special consideration.

In doing so, the following Objectives and Strategies were developed to conserve and protect cedar forests for Tsleil-Waututh cultural use:

Cedar Stewardship Management Direction

Objectives	Strategies
1. Maintain cedar for Tsleil-Waututh cultural uses.	<div>1.1 Old-growth forest stands with leading species compositions of Western red or yellow cedar will be reserved from resource development. Single-tree selection harvesting of cedar trees from these stands will be permitted for Tsleil-Waututh cultural use.</div> <div>1.2 Restrict resource development in second-growth forest stands with leading species compositions of Western red or yellow cedar. The primary management objective for these stands is to maintain or increase the cedar component and to promote the development of old-growth characteristics. Single-tree selection harvesting of cedar trees from these stands will be permitted for Tsleil-Waututh cultural use.</div>
2. Promote cedar in all silviculture and restoration strategies.	<div>2.1 Consider cedar establishment in all silviculture and restoration plans.</div> <div>2.2 Consider old growth cedar recruitment for harvest block retention.</div>

(3) See Tsleil-Waututh Cultural Values chapter for management direction for culturally modified trees.





**TSLEIL-WAUTUTH NATION
INDIAN RIVER
WATERSHED PLAN SERIES**

**MAP 7
CEDAR STEWARDSHIP**

LEGEND

Forest Service Roads

- Maintained Road
- Semi-Permanent Deactivated Road
- - - Secondary Road
- Provincial Park Land

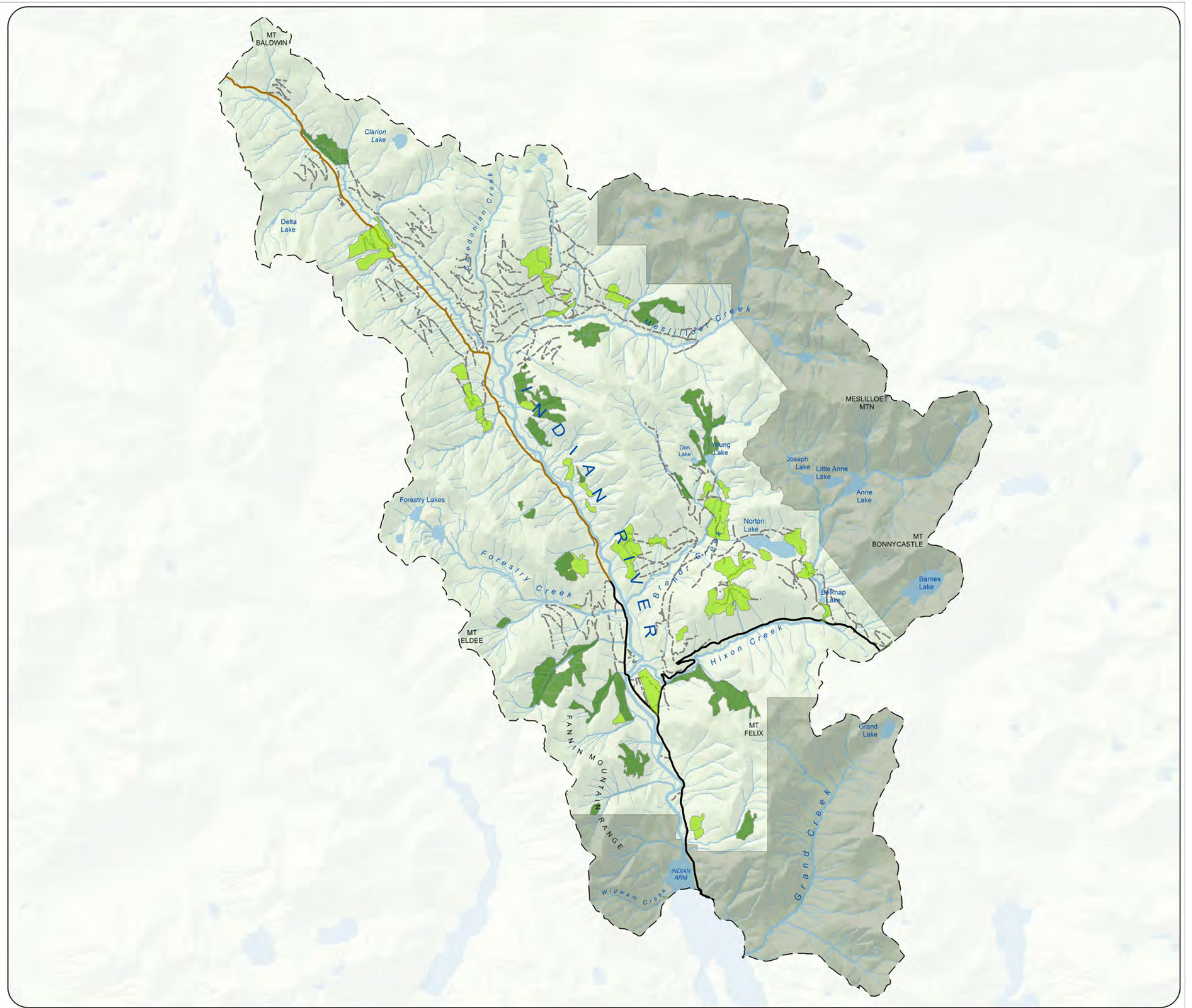
Cedar Stewardship

- Cedar Stewardship Reserve Zone
- Cedar Stewardship Management Zone

0 1.25 2.5 5 Kilometers

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Map Scale: 1:45,000



Watershed Integrity Values

Hydroriparian Ecosystems

The Tsleil-Waututh people believe water is the life blood of their traditional territory. A core of that territory, the Indian River Watershed, hosts numerous steep streams flowing from alpine headwaters like capillaries. They combine to form a very productive river in the valley bottom.

The entire watershed system is a key foundation for Tsleil-Waututh culture. It provides prime habitat and ample populations of numerous fish, wildlife and plant species. At its lower end, the river system flows out through a shellfish-rich estuary to feed Indian Arm, Burrard Inlet and the rest of the Salish Sea.

Hydroriparian ecosystems represent a combination of aquatic features (streams, lakes or wetlands) and the adjacent land influenced by those features. In the Indian River Watershed, the main type of hydroriparian ecosystem is found along stream courses and river floodplains. This system supports vital ecological functions by flushing water, sediment, large woody debris, organisms and nutrients through the watershed.

The forested portions of hydroriparian ecosystems serve to stabilize streambanks and meter sediments moving toward the water bodies. These riparian forests are essential to maintaining critical instream habitat for fish and other aquatic life. They provide shade to regulate temperature and dissolved oxygen, and supply food through litter and insect fall. They also contribute to stream channel complexity because the forests are the source of large woody debris. Once in the river, the debris gives lower gradient streams and rivers a characteristic pool and riffle structure that fish and other aquatic organisms favor.

Hydroriparian ecosystems extend vertically into the hyporheic zone. It is a zone just under the river bottom where water is exchanged freely with surface flow. This zone also provides a conduit to and from deeper aquifers. The deeper groundwater can upwell to maintain flow of cool water into the streams and river. This ecological function is especially critical during late summer and fall months after snowmelt has ceased to provide a source of streamflow.

The full range in variability of the natural flow regime is necessary to maintain the connections between all the disparate elements of the hydroriparian ecosystem. Surface water from the river must flood at least occasionally in order to sustain both the river and the adjacent riparian forest. Frequently, water must barely top the streambanks, but occasionally, it must make it all the way to the farthest edges of the floodplain. This flooding cycle maintains riparian health and creates a natural progression of channel movement back and forth across the floodplain.

Channel migration is a natural process driven by the flow regime. However, it is often accelerated by anthropogenic activity driving change beyond the ability of the hydroriparian ecosystem to make incremental adjustments. Large-scale, geomorphic change driven by human activity can disrupt ecological integrity and threaten the survival of fish, wildlife and plant species.

Tsleil-Waututh and the Province recognize that hydroriparian ecosystems are a critical component to restoring and maintaining the ecological integrity of the Indian River Watershed. To further watershed protection, the following standards (4) will be applied to protect hydroriparian values:

Salmon Stewardship Area	Riparian Reserve Zone	Riparian Management Zone
Indian River below cascades (river type S1 or S2)	≥ 30 metres each side	≥ 40 metres each side
Named tributaries below fish barriers (type S3 or S4)	≥ 30 metres each side	≥ 20 metres each side

In recognizing the importance of hydroriparian ecosystems, the following Objectives and Strategies were developed:

(4) Standards utilized are consistent with the Forest Stewardship Council BC Regional Standards—Appendix B: Requirements for Riparian Management (2005).



Hydroriparian Ecosystem Management Direction

Objectives	Strategies
1. Maintain the integrity of hydroriparian ecosystems.	<p>1.1 Apply Hydroriparian Management Standards to all water bodies.</p> <p>1.2 Map preliminary fixed-location <i>Hydroriparian Reserve and Management Zones</i> (modifying Salmon Stewardship Area designations as appropriate).</p> <p>1.3 Conduct a hydroriparian Site Specific Assessment as part of operational planning for all maintenance or development activities.</p> <p>1.4 Following any assessments, revise hydroriparian zone designations utilizing the budget approach per standards guidance.</p>
2. Maintain the hydrological regime of the watershed.	<p>2.1 Ensure Forest Stewardship Plans develop Rate of Cut levels for all sub-drainage basins in the watershed.</p>
3. Increase knowledge of hydrological features and processes.	<p>3.1 Undertake hydroriparian and water use studies in the watershed. Studies should include but not be limited to:</p> <p>3.1.1 Inventorying and classifying all hydrological features;</p> <p>3.1.2 Understanding natural flow regimes;</p> <p>3.1.3 Establishing hydroriparian assessment and management priorities; and,</p> <p>3.1.4 Developing detailed hydroriparian zone designations, monitoring effectiveness and employing adaptive management.</p>





**TSLEIL-WAUTUTH NATION
INDIAN RIVER
WATERSHED PLAN SERIES**

**MAP 8
HYDRORIPARIAN**

LEGEND

Forest Service Roads

- Maintained Road
- Semi-Permanent Deactivated Road
- Secondary Road
- Provincial Park Land

Hydroriparian (Fixed - Location)

- Riparian Reserve Zone
- Riparian Management Zone

Stream Enhancement

- Anadromous Stream Barrier

0 1.25 2.5 5 Kilometers

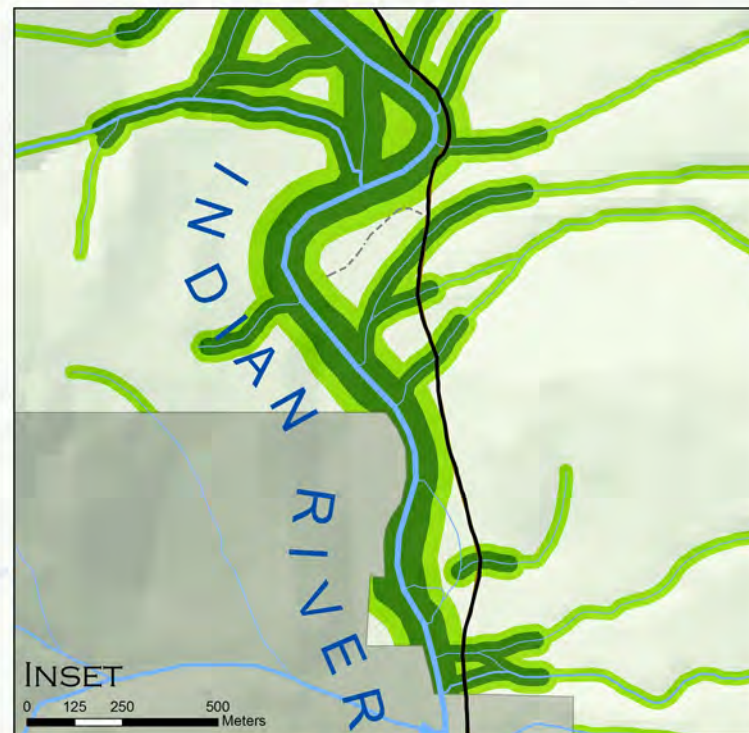
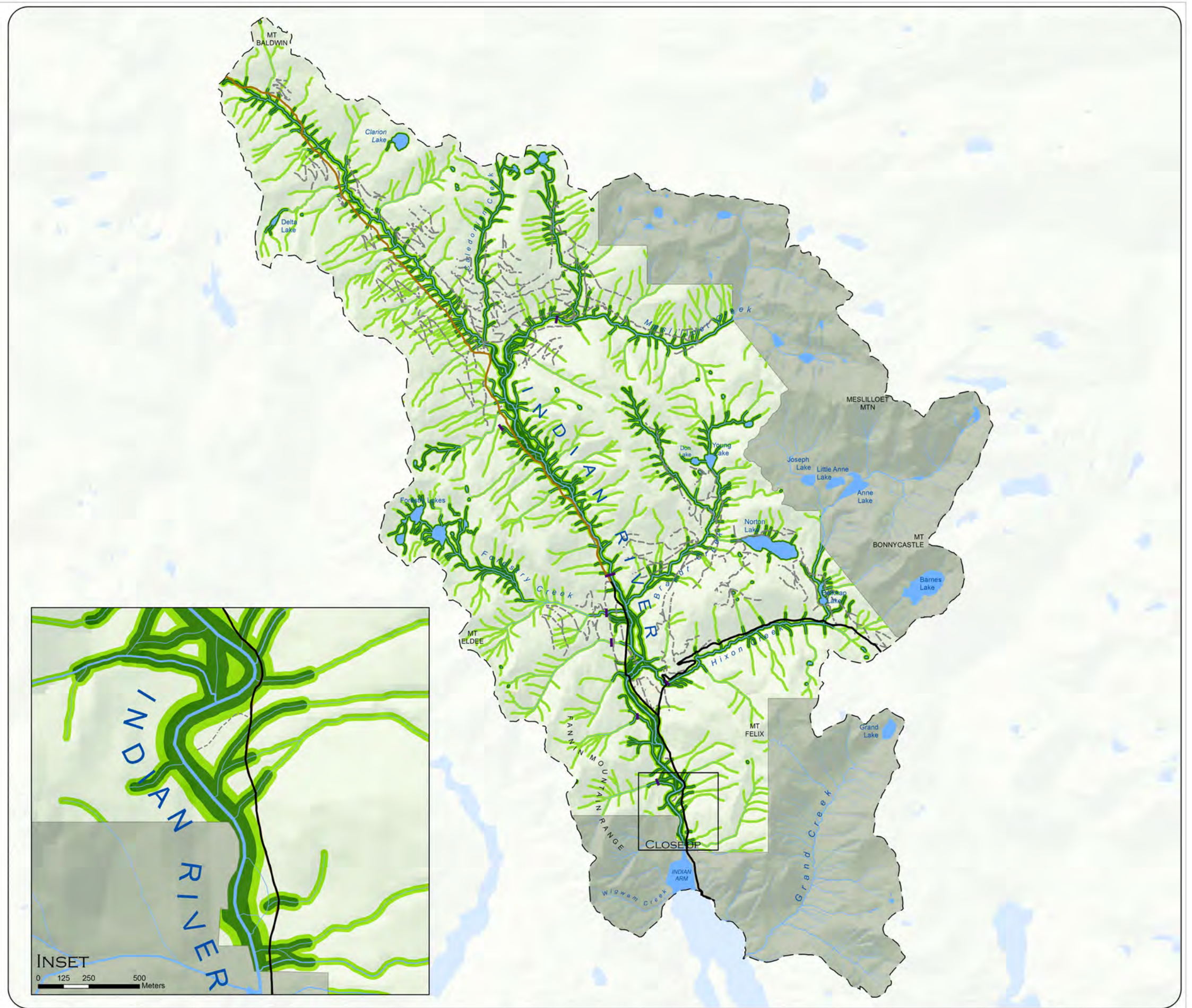
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Map Scale: 1:45,000; Inset Map Scale 1:9,000



Terrain Stability

The Indian River Watershed is representative of typical coastal watersheds: steep, wet and prone to terrain instability. A Tsleil-Waututh elder who spent his childhood in the watershed remembers listening to the rocks fall at night. Tsleil-Waututh uses of the watershed were adapted to this instability. Homes, cabins and other structures were built away from the cliffs while being mindful of the potential for river flooding and debris torrents.

The naturally unstable character of the watershed has been aggravated by intensive timber harvest and associated road development. A comprehensive study completed in the late 1990s determined that the watershed is prone to landslides due to the nature of the bedrock, soils and steepness of the terrain. The study also predicted that the majority of future landslides would originate from logging roads. It recommended development of a detailed deactivation and stabilization plan. Despite some progress on plan implementation, extreme winter storms continue to impact the watershed with multiple landslides occurring every year.

The Tsleil-Waututh Nation commissioned a reconnaissance study in 2005 to assess terrain stability using the following classification system:

Stability Class	Management Implications
I	No specific stability problems
II	Very low likelihood of landslides following timber harvesting or road construction.
III	Low likelihood of landslides following timber harvesting or road construction.
IV	Contains areas with a moderate likelihood of landslide initiation following timber harvesting or road construction.
V	Contains areas with a high likelihood of landslide initiation following timber harvesting or road construction.

Based on this preliminary analysis, approximately 15% of the watershed is mapped as unstable (Class V) and 25% of the watershed is mapped as potentially unstable (Class IV). A future comprehensive landslide inventory is necessary to fully evaluate and manage the Indian River Watershed.

The following Objectives and Strategies were developed for terrain stability management:

Terrain Stability Management Direction

Objectives	Strategies
1. Enrich Tsleil-Waututh knowledge with improved scientific understanding of terrain stability and soil erosion potential.	<p>1.1 Develop and implement a landslide monitoring program including a review of the role of forest roads as the origin of landslides.</p> <p>1.2 Undertake detailed terrain stability and soil erosion potential mapping.</p> <p>1.3 Carry out a complete geomorphic study of the watershed documenting glacial history, landslide counts, river channel evolution, floodplain development and estuary progression.</p>
2. Limit the risk of landslides and soil erosion.	<p>2.1 Reserve from resource development unstable terrain (Class V) and areas of very high soil erosion potential. Boundaries of unstable terrain or high erosion reserves may be amended based on detailed Site Specific Terrain Assessments.</p> <p>2.2 Complete a Site Specific Terrain Assessment during resource development planning in potentially unstable terrain (Class IV). The prevention of landslides or soil erosion must be addressed prior to the initiation of development activities.</p> <p>2.3 On stability classes I-III, operational planning will assess potential terrain stability or soil erosion issues.</p>
3. Revise and implement restoration plans.	<p>3.1 Complete deactivation and restoration activities as prescribed by completed reports (5) and revise as required.</p>

(5) Forsite Engineering and Geoscience Ltd. 2009. Indian River Forest Service Roads Upgrades and Deactivation Prescriptions. Also SNC Lavalin. 1997. Indian River Watershed Restoration Project: detailed condition assessment and deactivation prescriptions.





**TSLEIL-WAUTUTH NATION
INDIAN RIVER
WATERSHED PLAN SERIES**

**MAP 9
TERRAIN STABILITY**

LEGEND

Forest Service Roads

- Maintained Road
- Semi-Permanent Deactivated Road
- - - Secondary Road
- Provincial Park Land

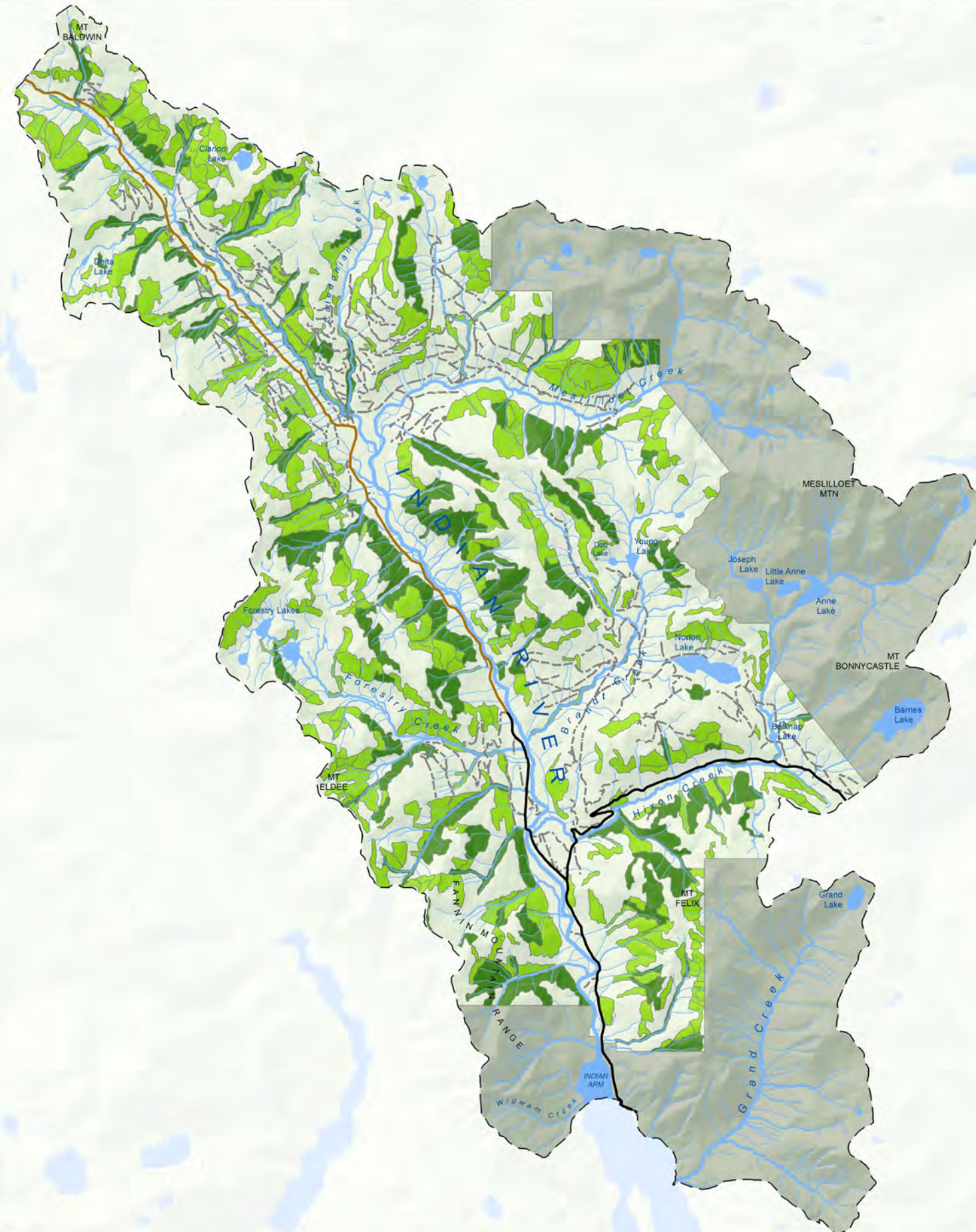
Terrain Stability

- Unstable Terrain Class V Reserve Zone
- Partially Unstable Terrain Class VI Management Zone

0 1.25 2.5 5 Kilometers

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Biodiversity Values

Plant Communities at Risk

It is a strong Tsleil-Waututh belief that humans must live in harmony with all beings in the web of life. Tsleil-Waututh people feel that the only way to protect all life is to plan and execute activities with a holistic perspective. In essence, everything is connected to everything else and to lose even one connection, threatens the well-being or survival of the whole. In this regard, all species including shrubs, herbs and mosses hold immense value.

Similarly in British Columbia, a key strategy for maintaining biological diversity is the protection of plant communities at risk. Typically, a focus on animal species is favored, but increasingly, rare and threatened plant communities are highlighted for protection. A plant community has a characteristic variety in species composition, specific diagnostic species, and a defined range in habitat conditions.

In the Province, the status of plant communities has been colour-coded. There are red, blue and yellow listings:

Colour	Classification
Red-listed	Legally designated as endangered, threatened, extirpated, or are candidates for such designation
Blue-listed	Sensitive to human activities or natural disturbances
Yellow-listed	A small range or low abundance, have shown Provincial declines, or are facing long-term threats

In the Indian River Watershed, the following plant communities are listed:

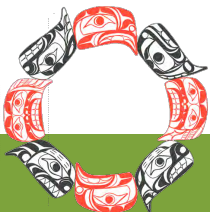
Species	Common Name	Conservation Designation
<i>Anaphalis margaritacea</i> – <i>Aster foliaceus</i>	pearly everlasting – leafy aster	Red
<i>Calamagrostis purpurascens</i>	purple reedgrass	Red
<i>Carex sitchensis</i> / <i>Sphagnum</i> spp.	Sitka sedge / peat-mosses	Red
<i>Phlox diffusa</i> – <i>Selaginella wallacei</i>	spreading phlox – Wallace’s selaginella	Red
<i>Picea sitchensis</i> / <i>Rubus spectabilis</i> Very Wet Maritime	Sitka spruce / salmonberry Very Wet Maritime	Red
<i>Abies amabilis</i> – <i>Picea sitchensis</i> / <i>Oplopanax horridus</i>	amabilis fir – Sitka spruce / devil’s club	Blue
<i>Ledum groenlandicum</i> / <i>Kalmia microphylla</i> / <i>Sphagnum</i> spp.	Labrador tea / western bog-laurel / peat-mosses	Blue
<i>Populus balsamifera</i> ssp. <i>Trichocarpa</i> – <i>Alnus rubra</i> / <i>Rubus spectabilis</i>	black cottonwood – red alder / salmonberry	Blue
<i>Salix sitchensis</i> / <i>Carex sitchensis</i>	Sitka willow / Sitka sedge	Blue
<i>Thuja plicata</i> – <i>Picea sitchensis</i> / <i>Lysichiton americanus</i>	western red cedar – Sitka spruce / skunk cabbage	Blue
<i>Thuja plicata</i> – <i>Tsuga heterophylla</i> / <i>Polystichum munitum</i>	western red cedar – western hemlock / sword fern	Blue
<i>Tsuga heterophylla</i> – <i>Thuja plicata</i> / <i>Gaultheria shallon</i> Very Wet Maritime	western hemlock – western red cedar / salal Very Wet Maritime	Blue



The following Objectives and Strategies were developed to protect plant communities at risk:

Plant Communities at Risk Management Direction

Objectives	Strategies
1. Protect rare and threatened plant communities.	<div>1.1 Areas identified as supporting red-listed plant communities will be reserved from resource development. Reserve boundaries may be amended based on operational site-level planning.</div> <div>1.2 Areas identified as supporting blue-listed plant communities will be subject to resource development constraints with the target of preserving 50% of the total area. Boundaries of blue-listed plant communities may be amended based on operational site-level planning.</div>





**TSLEIL-WAUTUTH NATION
INDIAN RIVER
WATERSHED PLAN SERIES**

**MAP 10
PLANT COMMUNITIES
AT RISK**

LEGEND

Forest Service Roads

- Maintained Road
- Semi-Permanent Deactivated Road
- Secondary Road
- Provincial Park Land

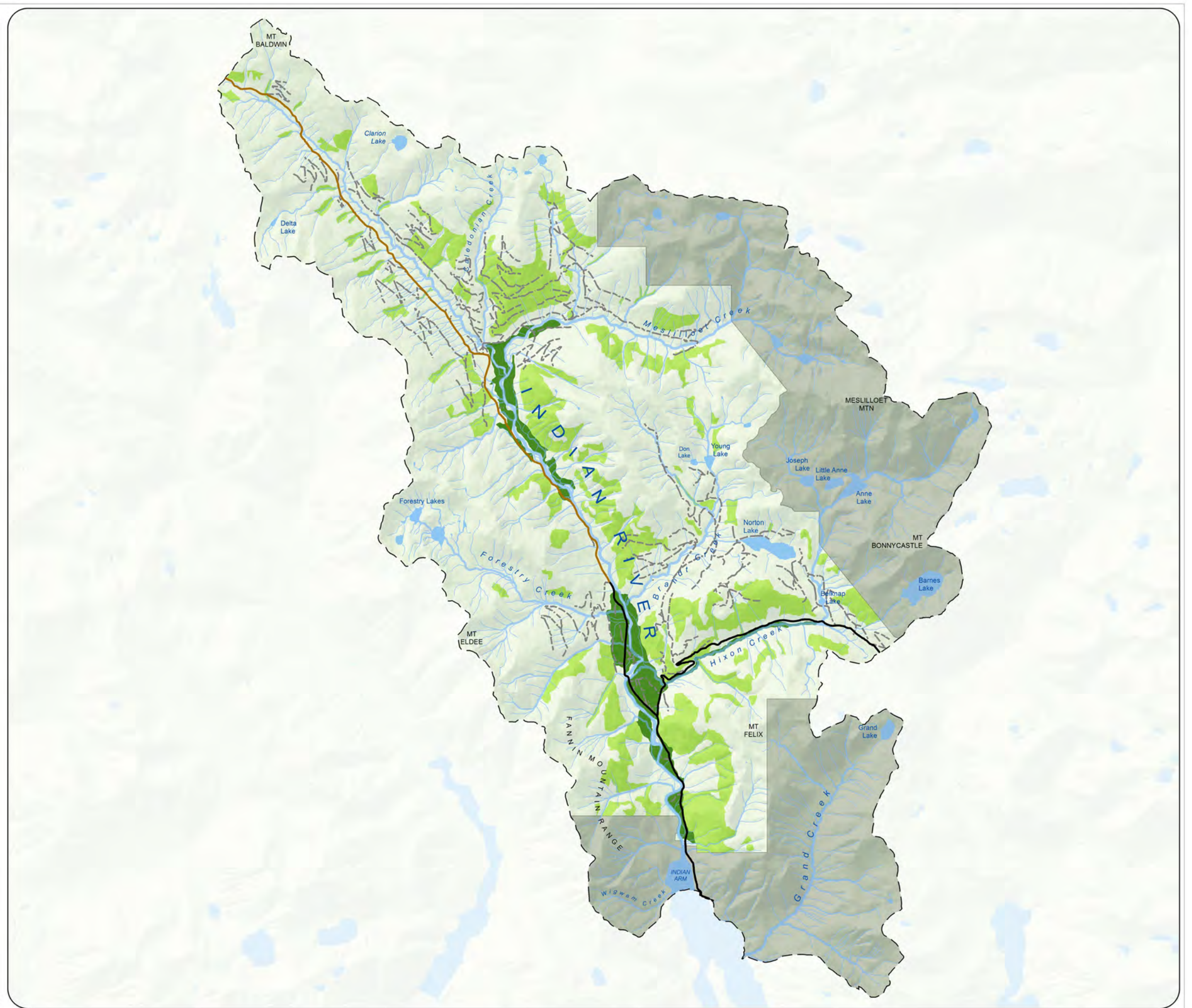
Plant Communities at Risk

- Red Listed Plant Communities Reserve Zone
- Blue Listed Plant Communities Management Zone

0 1.25 2.5 5 Kilometers

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Old Growth Forests

Old growth forests represent a powerful record of history in the Indian River Watershed, with some trees such as yellow cedar living up to 1,500 years. Due to the past intensity of timber harvest, the Tsleil-Waututh Nation places an extremely high value on preserving remaining old growth forests. From the Tsleil-Waututh perspective, these are the forests of their ancestors and are sacred.

Similarly, the Province recognizes the value of protecting old growth forests as a strategy for conserving biological diversity. Old Growth Management Areas (OGMA) have been established to protect biodiversity values across a range of landscapes, and to provide natural seed sources for surrounding areas. Except in clearly defined circumstances, timber harvest is not permitted in OGMA, although exploration and development for gravel, minerals and gas is allowed. In 2003, the Province established forty-nine (49) OGMA in the Indian River Watershed totaling 1,250 hectares, or 5.6% of the forested area.

The process used to establish OGMA was designed to have minimal impact on timber supply. Consequently, the OGMA established are largely located in areas that would otherwise be inoperable due to steep slopes or other harvesting challenges. Additionally, to meet minimum Provincial biodiversity requirements without impacting timber supply, OGMA “contributions” were made in areas already protected in Provincial parks.

The park contributions to overall OGMA targets for the watershed are over-represented lessening the requirements in the non-park portions of the watershed. This has led to a situation where the non-park portions fall short of minimum biodiversity requirements.

Tsleil-Waututh supports the concept of old growth protection, but is concerned with the methodology and consultation process adopted during OGMA establishment. It is important to highlight that Tsleil-Waututh representatives did not support the timber supply priority focus in OGMA establishment, nor the over-representation of OGMA in the Provincial parks.

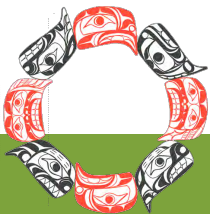
To better integrate old growth forest values with other cultural, biophysical and economic values in the watershed, the following Objectives and Strategies were developed:

Old Growth Management Direction

Objectives	Strategies
1. Conserve remaining old growth forest.	<div>1.1 Ensure a minimum of 40% of the forested area is in old growth forest condition (6) and:<div>1.1.1 The old growth forest is within a designated, set-aside watershed reserve; or,</div><div>1.1.2 The old growth forest is retained within the operable or inoperable watershed land base.</div></div> <div>1.2 Ensure that the representation of protected old growth forest is proportional to the amount of forested ecosystem types in the wa-</div>
2. Recruit old growth forest in select second growth areas.	<div>2.1 Identify gaps in old growth forest representation.</div> <div>2.2 Identify gaps in old growth forest linkages.</div> <div>2.3 Quantify the extent of second growth forest.</div> <div>2.4 Designate key second growth areas for old growth recruitment based on 2.1, 2.2 and 2.3.</div> <div>2.5 Identify second growth forest areas in the watershed that would benefit from silviculture or stand tending.</div>

(6) Old growth forest condition is considered to be greater than age class 8 (>140 years old).

(7) Forest ecosystem type to be assessed at the Biogeoclimatic Variant level.





**TSLEIL-WAUTUTH NATION
INDIAN RIVER
WATERSHED PLAN SERIES**

**MAP 11
OLD GROWTH FORESTS**

LEGEND

Forest Service Roads

- Maintained Road
- Semi-Permanent Deactivated Road
- - - Secondary Road
- Provincial Park Land

Old Growth Forests

- Old Growth Management Area Reserve Zone (pre-2011)
- Old Growth Management Area* (after 2011)

*Not included in the analysis of the Reserve Management Zone

0 1.25 2.5 5 Kilometers

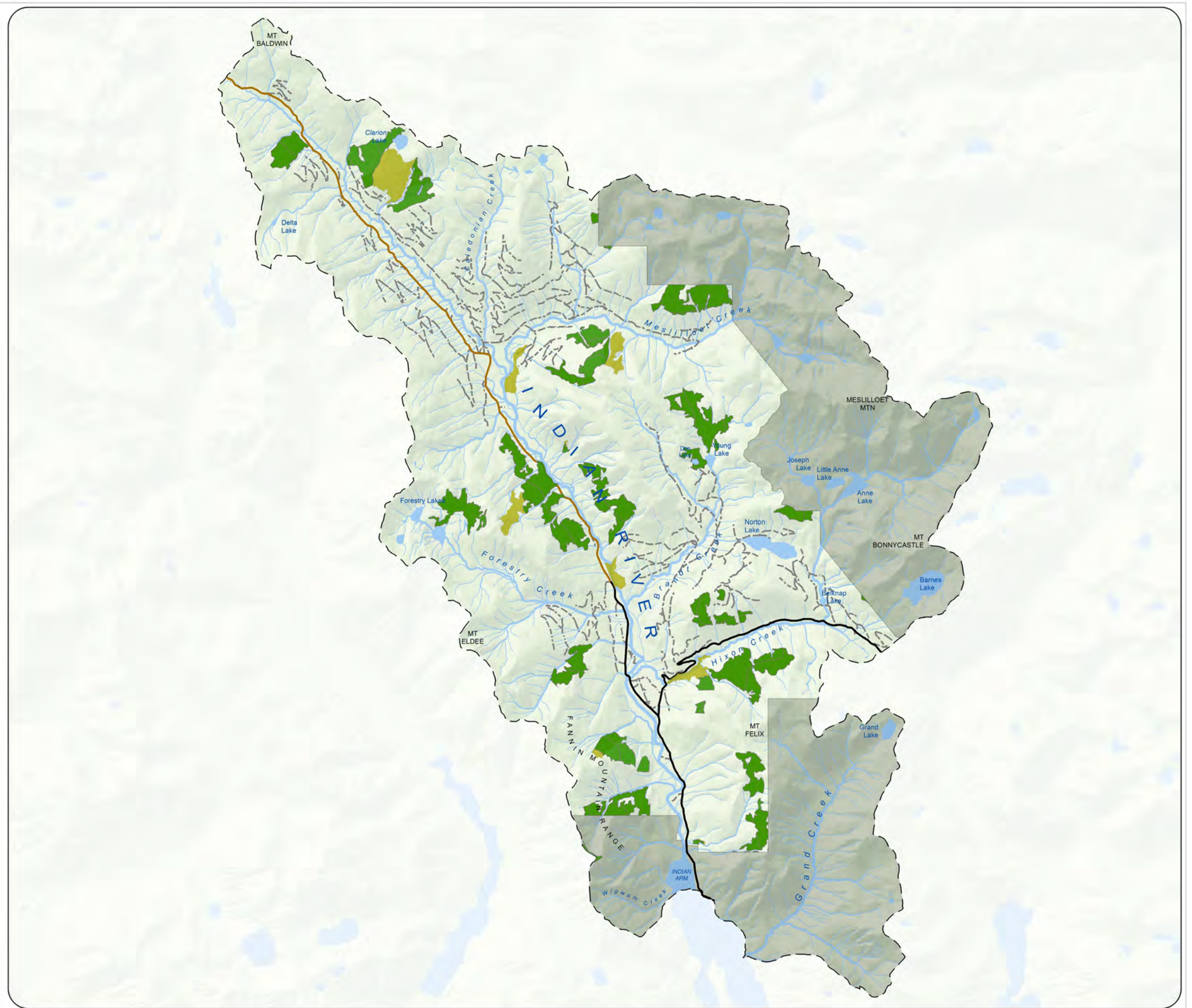
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Projection: UTM, NAD83, Zone 10

Map Scale: 1:45,000



Wildlife Species of Concern

The protection and stewardship of wildlife is an important value to the Tsleil-Waututh Nation and the Province. The Indian River Watershed has always hosted a rich array of wildlife that utilize forest, alpine, aquatic and marine ecosystems. Along with salmon, cedar and medicinal plants, this high wildlife and habitat diversity makes the area an extraordinary place. It provides Tsleil-Waututh community members with sustenance, as well as nurturing their cultural and spiritual well-being.

The Nation has always held all wildlife and their intricate web of interactions with the environment in high esteem. From time out of mind, community members have actively hunted deer, bear, goat and elk; they also hunted or trapped furbearing species such as hare, porcupine, mink, raccoon, beaver, squirrel, muskrat, marten, weasel, coyote, fox, marmot, otter and wolverine, all without disrupting the natural order of things. Grizzly bear, cougars and wolves were generally avoided.

The Tsleil-Waututh people have a long, close association with wolves. In their oral history, the Creator transformed the Wolf into the first Tsleil-Waututh, and made him responsible for this land.

Developing sound management direction for wildlife takes a two-step strategy geared towards maintaining ecological integrity, overall biodiversity, and healthy populations. The first step is to apply a landscape management approach to the whole watershed that focuses on general terrestrial and aquatic ecosystem representation. This involves achieving and maintaining the natural range and variability in habitats, successional processes, and disturbance regimes.

The second step is a fine-scale management approach to wildlife protection that addresses the site specific, habitat-management needs of species of concern (i.e., those considered at risk by the Crown or of special significance to Tsleil-Waututh). Included are keystone species that have a fundamental or disproportionate influence on ecosystem functions. Their management can aid in the overall protection and maintenance of ecological health and biodiversity; their habitat needs bridge the landscape and fine-scale approaches.

This Wildlife chapter is organized into three sections: the first focuses on general wildlife management for the entire watershed; the second describes site-specific management measures for “Identified Wildlife” per the British Columbia Forest and Range Practices Act; and the third outlines the habitat requirements of keystone species and species of special significance to Tsleil-Waututh.

General Wildlife

The general approach to wildlife management includes initiatives that will conserve the greatest diversity of species. The strategies include: 1) providing a natural distribution of forest seral stages across the watershed and 2) protection of critical or high value habitat types and features. Some examples of the latter include: low elevation old growth forests; mature, second growth forests; wildlife trees; cliffs and cave structures; and, aquatic systems, associated riparian areas and large woody debris recruitment processes.

Another conservation approach requires the retention of larger, more resilient habitat patches (smaller patches do not sustain as many species) linked by forested migration corridors. This approach supports wildlife species that thrive only in the interior of large patches and species that disperse across the landscape under forest cover.



Identified Wildlife

In British Columbia, Identified Wildlife are species at risk or of regional concern, requiring special management attention. These species are designated as “red-listed” if they are extirpated (no longer present in an area), endangered due to imminent extirpation or extinction, or threatened with becoming endangered if environmental limiting factors are not reversed.

Species are “blue-listed” if they are of concern because certain characteristics make them sensitive to human or natural disturbances. “Yellow-listed” species are not currently of concern, but are of interest because they may become at risk, or have been of concern in the recent past.

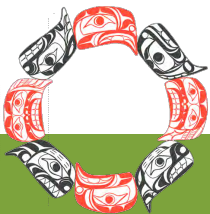
Management guidelines are provided in the Identified Wildlife Management Strategy which is an initiative of the Ministry of Environment in partnership with the Ministry of Forests, Lands and Natural Resource Operations. It is carried out in consultation with other Provincial ministries, First Nation governments and the interested public.

A great concern for creating and implementing an effective wildlife management strategy is the lack of knowledge. Wildlife management is only effective if there is a comprehensive understanding of species populations, their habitat requirements, and the ecological characteristics of the watershed.

The Objectives and Strategies outlined in this Chapter are intended to set direction for future initiatives and should be considered a “working policy” that will be continually updated based on the latest research or experience. Wildlife management will be coordinated with other management strategies in the region to achieve regional wildlife and biodiversity goals.

Identified Wildlife in the Indian River Watershed are listed in the following table. Many species rely on habitat features and characteristics that will be adequately protected through general wildlife management strategies. Other species require additional or more specific management measures.

Common Name	Species	Conservation Designation
<i>Herpetofauna and Small Mammals</i>		
Coastal Tailed Frog	<i>Ascaphus truei</i>	Blue
Townsend’s Big-eared Bat	<i>Corynorhinus townsendii</i>	Blue
Keen’s Long-eared Myotis	<i>Myotis keenii</i>	Red
Pacific Water Shrew	<i>Sorex bendirii</i>	Red
<i>Birds</i>		
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Yellow
Marbled Murrelet	<i>Brachyramphus marmoratus</i>	Blue
Northern Spotted Owl	<i>Strix occidentalis</i>	Red
Peregrine Falcon subspecies	<i>Falco peregrinus anatum</i>	Red
Northern Goshawk	<i>Accipiter gentilis laingi</i>	Red
Green Heron	<i>Butorides virescens</i>	Blue
Great Blue Heron subspecies	<i>Ardea herodias fannini</i>	Blue
<i>Ungulates</i>		
Roosevelt Elk	<i>Cervus elaphus roosevelti</i>	Blue
Mountain Goat	<i>Oreamnos americanus</i>	Yellow
Mule (blacktail) Deer	<i>Odocoileus hemionus</i>	Yellow
<i>Large Predators</i>		
Grizzly Bear	<i>Ursus arctos</i>	Blue
Wolverine subspecies	<i>Gulo gulo luscus</i>	Blue
Grey Wolf	<i>Canis lupus</i>	Yellow



Identified Wildlife Management Prescriptions

The Townsend's Big-eared Bat and Keen's Long-eared Myotis are two bats at risk that rely on tree cavities, caves and rock crevices as roost sites and nurseries. The retention and adequate buffering of wildlife trees and cave structures will protect these species and their habitats. Similarly, the Peregrine Falcon tends to nest on rock cliff ledges above river valleys or lakes. It can be protected during the breeding season with suitable buffering and constraints on work activity.

Marbled Murrelets are seabirds that require low elevation old growth forest with large trees for nesting. The trees must have wide, mossy limbs for murrelets to land on with their webbed feet. The retention of old growth forest and mature second-growth stands for Marbled Murrelets will be guided by the most recent information available on optimal habitat suitability.

Northern Spotted Owls and Northern Goshawks require large tracts of old growth forest or mature second-growth stands for their survival. Inside the tracts, there must be core, undisturbed breeding areas at a distance from forest edges. Tracts need to be connected by forested corridors for the owls and goshawks to forage and rear fledglings. Management efforts will be guided by the most recent research on habitat suitability for these species and by their existing recovery strategies.

Mountain Goat habitat includes alpine and subalpine zones, most often on steep slopes at or above tree line. This includes steep cliff faces, grassy ledges, talus slopes and alpine meadows. These habitats are unlikely to be disturbed by human activities. However, mountains goats inhabiting coastal regions will often use forested, lower elevation areas in winter to avoid deep accumulations of snow. Winter ranges including steep, southerly slopes with coniferous forest greater than 100 years old should be protected. This will provide critical habitat for foraging, kidding, and escaping predators.

Roosevelt Elk are a recently re-introduced species to the Indian River Watershed. The management of winter and cover habitat as well as forage areas will adhere to the Provincial Elk Recovery Strategy. Managing for elk will also benefit Mule Deer.

Large wildlife predators including the Grizzly Bear, Wolverine and Grey Wolf are opportunistic and require extremely large home ranges with a variety of habitat features to meet their life history requirements. These predators are generally sensitive to human activity and thus, require large tracts of relatively undisturbed wilderness for long-term survival. Strategies for protecting them include limiting road access, hunting and trapping, and ensuring that there are wilderness areas in the watershed where human recreation is restricted. Also important are protecting critical migration corridors between denning sites and foraging areas, and maintaining healthy prey populations.

Several listed wildlife species rely on functioning aquatic ecosystems and their associated riparian areas. These include the Pacific Water Shrew, Coastal Tailed Frog, Great Blue Heron, Green Heron and Bald Eagle. These species are best managed by protecting water bodies (streams, wetlands, lakes, and estuaries) and their associated riparian zones.

The Pacific Water Shrew is largely a riparian inhabitant though it forages in all types of low-gradient freshwater systems. Suitable habitat is in moist, low-elevation riparian forest with dense understories and an abundance of woody debris. The Pacific Water Shrew requires very wide buffers to protect the long-term viability of its few remaining populations.

The Coastal Tailed Frog breeds in fast-flowing mountain streams that are highly susceptible to disturbance from upstream events. This species requires wide buffers along the length of breeding reaches and narrower buffers along upstream channels. To prevent acceleration of upstream disturbance, very strict road construction and maintenance practices are required in headwaters.

For herons and eagles, human activity is discouraged during the breeding season and when eagles are feeding on salmon. Nesting and roosting trees are to be retained for herons and eagles, and vegetation disturbance in nesting and roosting habitats minimized.

The following are Objectives and Strategies that were developed with the goal of protecting the greatest diversity of wildlife populations in the watershed:



Wildlife Management Direction

Objectives	Strategies
1. Conserve ecological integrity and biological diversity of terrestrial and aquatic ecosystems.	<p>1.1 Establish and maintain a natural and balanced diversity of habitat types, seral stages, stand structures and species richness across the landscape.</p> <p>1.2 Ensure coordination occurs with relevant regional, Provincial and Federal initiatives to promote biodiversity.</p> <p>1.3 Manage the landscape to mimic natural disturbance patterns.</p> <p>1.4 During forestry site-level planning, ensure adequate protection of critical and high value habitat types and features that are known to support a diversity of species such as: wildlife trees, large woody debris, cliffs, cave structures, aquatic ecosystems and associated riparian areas.</p> <p>1.5 During forestry site-level planning, establish, maintain and enhance habitat connectivity within the watershed and with adjacent watersheds.</p> <p>1.6 Identify opportunities to increase biodiversity on a site level such as restoration of degraded ecosystems and enhancement of forest stand structure.</p> <p>1.7 Minimize the number of roads and industrial or commercial structures to limit habitat fragmentation.</p>

Objectives	Strategies
2. Improve knowledge of existing wildlife population levels and their habitat requirements.	<p>2.1 Assess wildlife habitat needs. Studies should include, but not be limited to:</p> <p>2.1.1 Inventorying Identified Wildlife species and species of special significance to Tsleil-Waututh;</p> <p>2.1.2 Assessing populations, trends, habitat associations and survival requirements of species of concern;</p> <p>2.1.3 Incorporating regional habitat suitability models that were created for wildlife species included in the Ecosystem Based Management Initiative;</p> <p>2.1.4 Identifying degraded areas within critical habitat areas for species of concern;</p> <p>2.1.5 Monitoring keystone species as measures of watershed health; and,</p> <p>2.1.6 Evaluating the feasibility of monitoring genetic diversity of species with disjunct populations such as Roosevelt Elk.</p> <p>2.2 Create partnerships and coordinate research activities with relevant Provincial agencies, institutions, industry and individuals.</p> <p>2.3 Identify collaborative funding and research opportunities to fill knowledge gaps.</p>
3. Identify, maintain and enhance water systems and riparian habitat.	<p>3.1 Protect sensitive riparian and aquatic habitats. See Objectives and Strategies highlighted in the Hydoriparian chapter.</p> <p>3.2 Prevent erosion and sedimentation into water courses. See Objectives and Strategies highlighted in the Hydoriparian and Terrain Stability chapters.</p> <p>3.3 Minimize number of stream crossings (use stable, temporary crossing structures where possible).</p> <p>3.4 Determine species presence or habitat suitability for Identified Wildlife prior to development activities.</p>



Objectives	Strategies
4. Prevent large scale anthropogenic disturbances.	4.1 See management direction highlighted in the Forest Stewardship chapter.
5. Reduce conflicts between wildlife and human activity.	<p>5.1 Determine location and intensity of roads and development activities to limit human encroachment and disturbance in critical or sensitive habitat areas.</p> <p>5.2 Implement guidelines and seasonal windows to limit or prohibit intrusive activities during critical periods such as breeding seasons.</p> <p>5.3 Establish buffer zones to protect or limit disturbance to known raptor nests, heron rookeries, other roosting areas, calving/kidding grounds, Tailed Frog breeding reaches, or other sensitive wildlife areas.</p> <p>5.4 Minimize habitat fragmentation caused by human structures and disturbances.</p> <p>5.5 Integrate habitat and migration corridors within operational resource and forest management plans.</p> <p>5.6 Develop guidelines specific to the watershed for setting species-specific hunting limits.</p> <p>5.7 Develop and implement guidelines for recreational vehicle use.</p> <p>5.8 Promote public education programs to foster appreciation of wildlife and their habitat.</p> <p>5.9 Promote law enforcement initiatives that protect wildlife and their habitat.</p>



Keystone Species

Healthy populations of keystone species require explicit conservation planning for habitat patch size and landscape connectivity, both of which contribute to ecosystem integrity and biodiversity.

Keystone species in the Indian River Watershed include:

Ungulates

- Mountain Goat
- Roosevelt Elk

Birds

- Marbled Murrelet
- Northern Goshawk
- Northern Spotted Owl

Riparian & Aquatic Species

- Coastal Tailed Frog

The Tailed Frog is a symbol of stream health and hydroriparian connectivity; the goat is an emblem of high elevation habitat and elevational connectivity; the goshawk is an icon of mature second and old growth forest health and connectivity; the Spotted Owl is a symbol of large patch size in old growth forest; the murrelet is an emblem of productive, valley bottom old growth forest; and the elk is an icon of the edges between healthy ecosystems.

With the exception of the Spotted Owl and Roosevelt elk, these species were used in Provincial Ecosystem Based Management (EBM) Initiatives. For this reason, regional habitat suitability models have already been developed and can directly be employed by the Tsleil-Waututh Nation to guide wildlife habitat management. Their use will enable the Nation to be an active participant in Provincial wildlife stewardship efforts.



Mountain Goat (*Oreamnos americanus*)

Mountain Goats in coastal areas are found on steep slopes 300 to 1200 metres in elevation where exposure to full sunlight exists. Goats move up and down with the seasons. In the spring, they live in the lower end of their home ranges to take advantage of the earliest flush of deciduous vegetation. They migrate up to timberline during the summer and fall to feed in avalanche chutes, alpine meadows, grassy boulder patches, and on vegetated cliff ledges.

In winter, goats migrate back to low elevation to find thermal refuge, security and food. Although Mountain Goats avoid heavy snow, they will venture into clearcuts and second growth stands near their winter ranges during low snowpack years to forage.

Escape terrain is vital to healthy goat populations. It includes steep, rocky cliffs where goats can tread, but predators cannot access. Proximity to escape terrain is an important feature of goat habitat in all seasons.

Based on recent radio-telemetry, mountain goats tend to occupy annual home ranges of 300 to 550 hectares, mostly on southerly aspects. Site fidelity (returning to the same site in consecutive years) is very high, and individuals rarely move more than 400 metres from escape terrain.

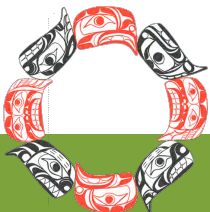
Most mountain goat habitat occurs in inoperable forest areas and is naturally maintained. Conservation at high elevation mainly needs to restrict human disturbance around steep cliffs used during kidding season (May 1 to July 15). This is particularly true for helicopter activity; aerial disturbance can cause goats to spend an inordinate amount of time in escape terrain rather than foraging.

Precautions are necessary in areas where timber harvest overlaps with goat winter ranges. Although clearcuts and young forests are used for forage, a relatively high proportion of mature and old forest needs to be maintained as cover, especially for harsh winters. Timber harvest should never occur in portions of goat winter ranges that serve as nurseries; nor should it occur in goat winter range areas with low snow interception.

Provincially designated goat winter ranges have been identified in the watershed, and a model was developed as part of an Ecosystem-based Management Initiative to predict other areas highly suitable for goats. Based on this information, the following Objectives and Strategies were developed:

Mountain Goat Management Direction

Objectives	Strategies
7. Manage the Mountain Goat population and habitat to ensure long term viability of the herd.	<div>7.1 Develop a long-term population monitoring program.</div> <div>7.2 Establish low-risk windows of operation (July 16 to October 31) and suitable buffers for any human activity—for helicopter activity, maintain separation of at least 2 horizontal kilometres and 400 vertical metres.</div> <div>7.3 Incorporate goat winter ranges, as defined by the province, into the Watershed Reserve Network (see Map 12).</div> <div>7.4 Where additional goat winter ranges are identified and overlap with operable forests, as part of site-level planning conduct timber harvests through group selection or variable-density tree removal to provide summer forage and winter forage in low snow years and avoid timber harvest where there is insufficient snow interception.</div> <div>7.5 Outside of established goat winter ranges identified on Map 12 and subject to 7.1, monitor goat distribution and abundance in harvested and non-harvested areas, to understand the affects of canopy removal on the local population and allow for adaptive management.</div>



Roosevelt Elk (*Cervus elaphus roosevelti*)

Roosevelt Elk are considered vulnerable to extirpation in British Columbia without special habitat and species management. They are distributed on Vancouver Island and in small, isolated areas of the southwest mainland coast. Current mainland populations are the result of several reintroductions, first in the Sechelt Peninsula from 1987 to 1989 and subsequently to other locations, including the Indian River Watershed.

Elk vary in their use of habitats depending on seasons and related life requisites. They require thermal cover, security, breeding and calving grounds, and good forage quality and quantity. In the winter, elk seek either floodplains with cover from snow, or gentle to moderate south-facing forests with small, scattered openings such as wetlands, rock outcrops, or forest clearings where they can forage. Usually forests greater than 10 metres in height suffice for thermal cover in low snowpack areas; old growth is necessary in high snowpack areas.

During the growing season, the elk feed largely on forbs, herbs and shrubs and can be found in coniferous and deciduous-dominated forests, riparian zones, and in more open habitats such as wetlands, estuaries and vegetated landslides. Roosevelt Elk are generally considered an edge species, preferring to stay within relatively easy access to forage in open areas, and to cover in dense tree stands. They will feed in clearcuts but generally stay within 200 metres of the forest edge.

Habitat quality is the primary limiting factor for the successful establishment of elk populations. Other threats to elk include loss and fragmentation of adequate habitat, predation (primarily cougars and wolves), as well as hunting and poaching by humans. Management of this species requires a combination of strategies including the addition of critical elk habitat to Watershed Reserve Network, and the dynamic management of natural resources to ensure that there is spatial and temporal distribution of forage and cover habitats at all times.

High suitability habitat has been identified for winter, spring and summer in areas where recent terrestrial and vegetation inventories were available. Park areas within the watershed were excluded because these lands are already protected. Based on the ungulate habitat suitability map and a review of the Watershed Reserve Network, the following Objectives and Strategies were developed:

Roosevelt Elk Management Direction

Objectives	Strategies
8. Manage the Roosevelt Elk population and habitat to ensure long term viability of the herd.	8.1 Develop a long-term population monitoring program.
	8.2 Develop hunting guidelines, and establish an annual allowable harvest quota based on population size.
	8.3 Develop an Elk Summer and Winter Range Management Zone (see Map 12). This will include Watershed Reserve Areas as well as managed forests to provide for forage, winter and security cover. The distribution of the Management Zone extends throughout the watershed and be managed dynamically through forest operations.
	8.4 During site-level forest harvest planning:
	8.4.1 Identify high quality winter elk habitat and ensure that thermal capabilities of the stand are maintained and that small clearings with irregular shapes are promoted to increase the quantity of secure, winter forage;
	8.4.2 Identify, enhance or protect seasonal migration corridors between winter and summer habitat; and,
	8.4.3 Identify low passes that represent potential migration corridors between the Indian River and adjacent watershed and consider adoption of restrictive management strategies.
	8.5 In heavily used areas, expect browse of planted seedlings by elk. Use protective measures around seedlings during planting.
	8.6 Reduce the distribution of slash cover in clear cuts to promote elk access.
	8.7 Where operationally feasible, preserve visual buffers from cut blocks and forage areas to adjacent roads to reduce the risk of poaching.
	8.8 Monitor and report any elk poaching or associated illegal activities.





**TSLEIL-WAUTUTH NATION
INDIAN RIVER
WATERSHED PLAN SERIES**

**MAP 12
WILDLIFE SPECIES AT RISK:
UNGULATE HABITAT SUITABILITY**

LEGEND

Forest Service Roads

- Maintained Road
- Semi-Permanent Deactivated Road
- Secondary Road
- Provincial Park Land

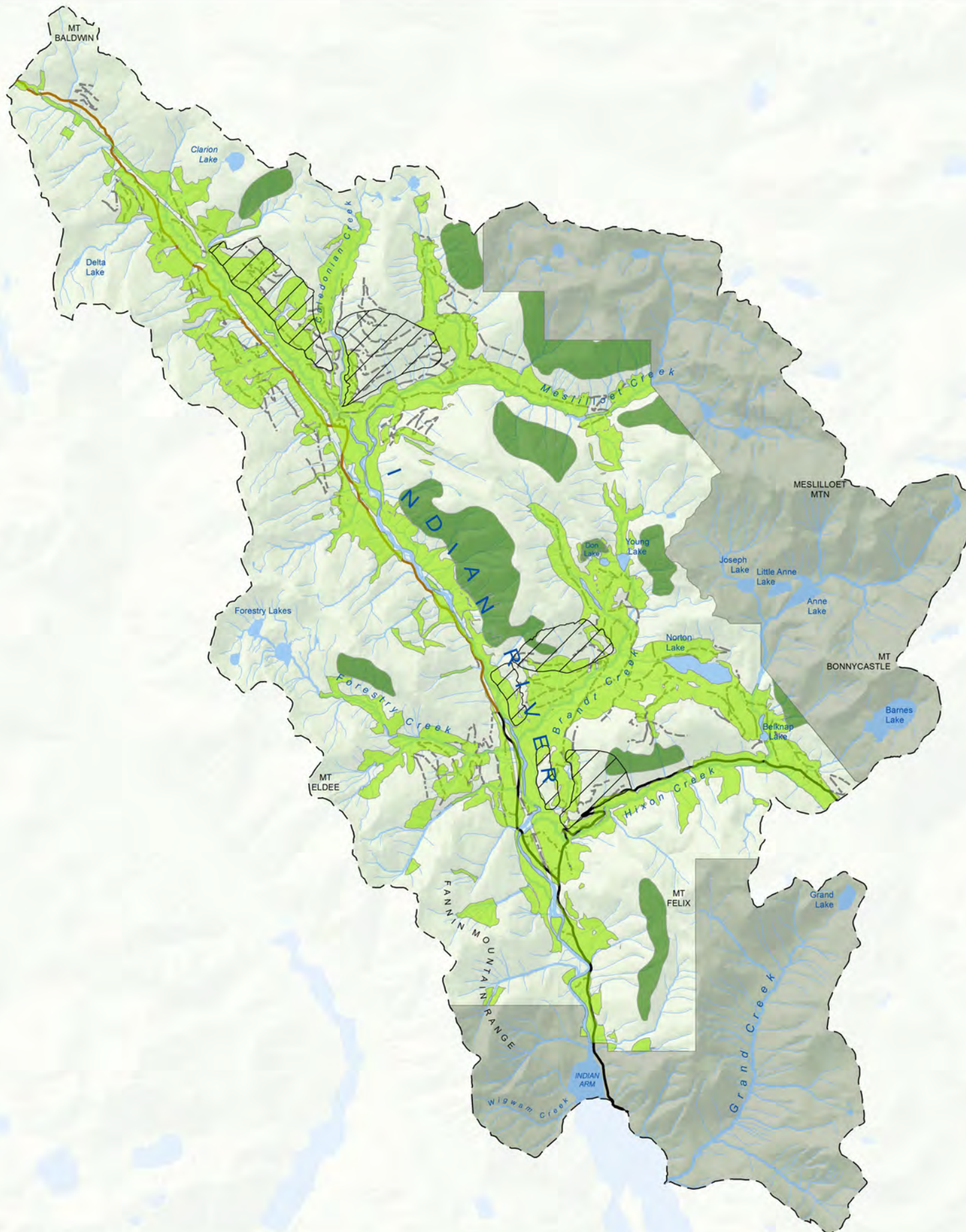
Habitat Suitability

- Goat Winter Range Reserve Zone
- Elk Summer & Winter Range Management Zone
- ▨ Deer Winter Range Management Zone

0 1.25 2.5 5 Kilometers

This map is a living document and is intended to be amended and refined over time. It is not an expression of the location of Tsleil-Waututh aboriginal title. The data used to produce this map originate from many sources and are presented without prejudice. This map is the property of the Tsleil-Waututh Nation and may not be reproduced without written permission.

Data Sources: Tsleil-Waututh Nation, Province of British Columbia, Government of Canada, Timberline, Land and Resource Data Warehouse.
Map produced February 2014 by Tsleil-Waututh Nation
Projection: UTM, NAD83, Zone 10
Map Scale: 1:45,000



Marbled Murrelet (*Brachyramphus marmoratus*)

Marbled Murrelets are small diving seabirds that inhabit inland waters of the northeastern Pacific Ocean. They feed on fish, crustaceans and mollusks in the marine environment, but nest in coastal forests up to 30 kilometres away from productive foraging areas. Nests are usually in the large, mossy limbs of big trees in old growth forests. The forests must have canopies with high vertical complexity. Topographic variability (e.g., rock outcrops, gullies) is thought to contribute to habitat suitability as it breaks up canopy uniformity. Most nests are below 1000 metres in elevation; occupancy decreases within increasing elevation. Nests are generally away from hard edges such as roads and young forest boundaries.

Marbled Murrelets nest between March and September, with most breeding activity occurring from May to August. The incubation period is 30 days long and young fledge in 27 to 40 days.

The Marbled Murrelet is thought to be imperiled and very susceptible to extirpation primarily because of old growth forest habitat loss, but also due to the combined and cumulative effects of climate-related changes in the marine ecosystem and human maritime disturbances.

Habitat suitability mapping was completed for the south coast of British Columbia as part of the Provincial recovery strategy and Ecosystem-based Management Initiatives, combining air photo interpretation with low-level aerial habitat surveys. Based on this mapping and review of the Watershed Reserve Network, the following Objectives and Strategies were developed:

Marbled Murrelet Management Direction

Objectives	Strategies
9. Manage the Marbled Murrelet population and habitat.	9.1 Conduct a Marbled Murrelet survey to determine their distribution and ground-truth existing habitat suitability ratings. 9.2 Create reserve zones (200 metres) around any active nests. 9.3 During site-level forest harvest planning and if operationally feasible, identify and protect forests >140 years old within 5 kilometres from the ocean that contain trees of significant size and with features such as brooms suitable for nesting platforms. 9.4 Through the Watershed Reserve Network, maintain a mix of large (>200 hectares), medium (50–200 hectares), and small (<50 hectares) tree patches as recommended by the Marbled Murrelet Re-



Northern Goshawk (*Accipiter gentilis laingi*)

The Northern Goshawk is a raven-sized hawk found in temperate forests. It feeds in most of the forested land base around coastal British Columbia. Pairs mate for life and occupy large home ranges that overlap with the home ranges of other pairs. However, during the nesting season space use contracts and breeding territories are roughly 7 kilometres apart. Courtship and breeding take place in February and March, and the nesting season extends from April to August. Fledglings and juveniles remain with their parents until fall.

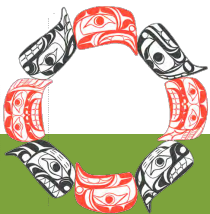
Breeding territories are comprised of mature and old growth forest dominated or co-dominated by Western hemlock or Douglas fir; all but the subalpine and extreme coastal variants can be inhabited. The territories include the core nesting area, which has three to nine nests that the pair will alternate between, the adjoining post-fledgling area, and the surrounding adult foraging area. The core and post-fledgling areas range in size from 100 to 200 hectares.

Northern Goshawks show a preference for large forest patches with natural rather than hard, artificial edges. Late seral coniferous forests are preferred because their open understories and high canopy cover are easier for the large birds to maneuver through. The presence of large woody debris, snags, stumps, and large, low, thick-limbed trees are important structural features as they support many prey species.

Northern Goshawks populations are threatened by forest fragmentation, the loss of mature or old growth forest nesting habitat, and the loss of habitat and structural diversity, all of which ultimately reduces their prey base. Based on habitat suitability models for the south coast of British Columbia and information on the species survival requirements, the following Objectives and Strategies were developed:

Northern Goshawk Management Direction

Objectives	Strategies
10. Manage for Northern Goshawk habitat.	<div>10.1 Conduct a multiple year Northern Goshawk inventory to determine if there are any pairs inhabiting the watershed.</div> <div>10.2 Create reserve zones (200 metres) around any active nests.</div> <div>10.3 Develop management strategies for breeding territories beyond core nesting or post-fledgling areas that aim to create old growth features and structures, and that soften forest edges next to harvest blocks. This includes initiatives such as biodiversity thinning and wildlife tree creation.</div> <div>10.4 Limit disturbance next to nest site and post-fledgling areas to low-risk windows (September to March).</div> <div>10.5 During site-level forest harvest planning, consider the interconnection of mature and old forest patches from valley bottoms to mid-elevation levels.</div> <div>10.6 In the absence of actively breeding goshawks, establish a Goshawk Nesting Management Zone (see Map 13) in high potential breeding areas. Within the Management Zone, retain and create old growth features and other appropriate stand structures during site-level forest harvest planning.</div>



Northern Spotted Owl (*Strix occidentali*)

The Northern Spotted Owl is a resident species in southwestern British Columbia. It is considered critically imperiled and extremely susceptible to extirpation because of its small population size and the loss of large, low elevation old growth forests upon which it relies for survival. The population is predicted to continue to decline over the next 20-30 years.

Home ranges are estimated at 3300 hectares and breeding ranges at 1600 hectares. Suitable coniferous stands are more than 140 years old with closed canopies comprised of multiple species and layers. The stands must be dominated by large, overstory trees with at least 20% being Douglas firs. Large trees and snags with various deformities must be abundant and serve as below-canopy nest and roost sites.

Spotted Owls form a life-long pair bond and have high site fidelity. Pairs begin roosting together in late winter. Breeding occurs in March and the female lays her eggs in April, incubating them for 30 days. Young owls fledge in June and leave natal areas in September.

Spotted Owls are preyed upon by larger owls and Northern Goshawks. The Barred Owl is a major competitor for habitat and prey species.

Due to overlap between habitat needs and high productivity timber areas, an Inter-agency Northern Spotted Owl Steering Committee (INSOSC) was formed to address recovery strategies, including captive breeding and Barred Owl management plans. The INSOSC along with its habitat and population management teams has taken responsibility for all Spotted Owl management and research.

Based on INSOSC intentions and preliminary habitat suitability mapping for the watershed, and a review of the Watershed Reserve Network, the following Objectives and Strategies were developed:

Northern Spotted Owl Management Direction

Objectives	Strategies
11. Manage the Northern Spotted Owl population and habitat.	11.1 Support INSOSC research and management initiatives in and next to the Indian River Watershed. 11.2 Contribute to management efforts by incorporating 80 hectares around any identified active nest sites into the Watershed Reserve Network. 11.3 Establish a Spotted Owl Management Zone (see Map 13) in high capability habitat areas (older forests with >20% Douglas fir). Within this Management Zone, retain and create old growth features and stand structures during site-level forest harvest planning. This includes initiatives such as biodiversity thinning and wildlife tree creation.





**TSLEIL-WAUTUTH NATION
INDIAN RIVER
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**MAP 13
WILDLIFE SPECIES AT RISK:
BIRD HABITAT SUITABILITY**

LEGEND

Forest Service Roads

- Maintained Road
- Semi-Permanent Deactivated Road
- - - Secondary Road
- Provincial Park Land

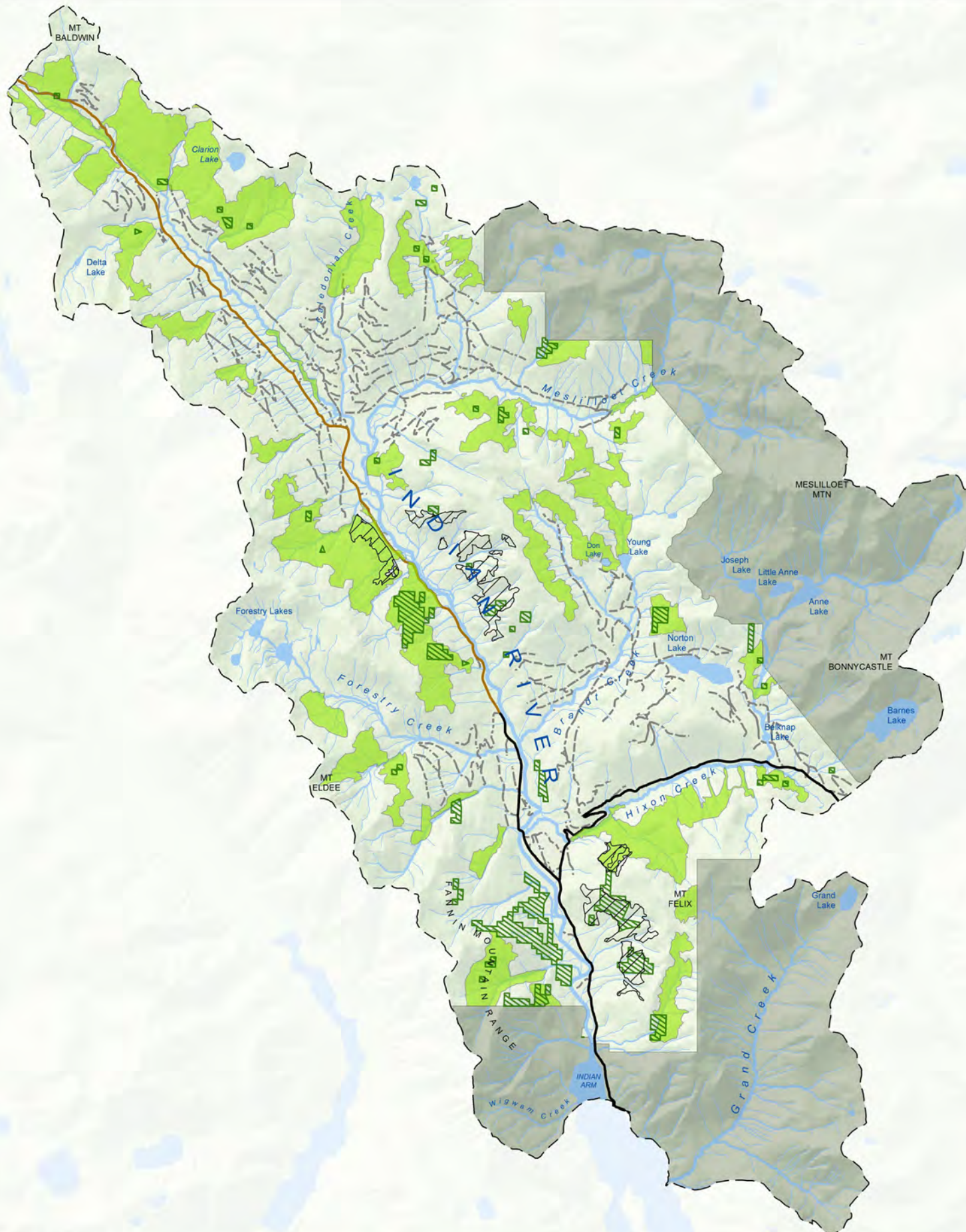
Habitat Suitability

- Marbled Murrelet Management Zone
- ▨ Spotted Owl Management Zone
- ▤ Goshawk Nesting Habitat Management Zone

0 1.25 2.5 5 Kilometers

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Data Sources: Tsleil-Waututh Nation, Province of British Columbia,
Government of Canada.
Map produced February 2014 by Tsleil-Waututh Nation
Projection: UTM, NAD83, Zone 10
Map Scale: 1:45,000



Coastal Tailed Frog (*Ascaphus truei*)

The Coastal Tailed Frog inhabits perennial mountain streams, though it generally breeds in tributaries. Creeks draining smaller catchments have more suitable discharge rates and typically display the step-pool stream channel morphology preferred by this species. Step-pool morphology provides stability against large disturbance events such as sediment floods and debris flows. It also provides ample foraging substrates and refuge sites.

Tadpoles thrive best in moderately steep catchments. Very steep channels are unstable; low gradient streams are more prone to sediment accumulation. The level of fine sediment in a channel bed is a particularly strong influence on tadpole survival.

Tailed Frog juveniles and adults are terrestrial. They live and feed in riparian zones but are known to wander well away from streams when conditions are moist. They are strongly tied to moist, stable forests with high wood, herb and fern cover, and thrive in old forests.

Management of Tailed Frog streams is generally geared towards minimizing sediment influx: 1) by retaining bank-stabilizing riparian buffers and 2) by adopting strict erosion and sediment control measures along and upstream of breeding reaches.

Retaining riparian buffers along breeding streams protects all life stages. Riparian connectivity between headwaters and valley bottoms is equally important to terrestrial life stages. Such a forest network provides potential dispersal routes and is an important aspect of population dynamics of the Coastal Tailed Frog.

Based on all this information, the following Objectives and Strategies were developed:

Coastal Tailed Frog Management Direction

Objectives	Strategies
12. Manage streams and riparian zones for Coastal Tailed Frog viability.	<div>12.1 During site-level forest harvest planning, conduct surveys for Coastal Tailed Frogs.</div> <div>12.2 For confirmed breeding reaches and upstream of them, extend the Riparian Reserve Zone to at least 30 metres and apply a Riparian Management Zone of at least 20 metres per general guidelines in the Hydriparian chapter.</div> <div>12.3 Near confirmed breeding reaches, maximize connectivity of terrestrial habitats by retaining a forest connection between Tailed Frog Riparian Reserve Zones and other nearby streams, wetlands and seeps.</div> <div>12.4 Maintain the hydrological regime of the watershed to limit the frequency of extreme discharge events and mortality of Tailed Frogs during floods.</div> <div>12.5 Minimize roads and stream crossings in or upstream of Tailed Frog Riparian Reserve Zones.</div> <div>12.6 Minimize site disturbance during harvesting in terrain with a high sediment transfer potential to Tailed Frog Riparian Reserve Zones.</div> <div>12.7 Avoid cross-stream yarding and slash loading of channels upstream of Tailed Frog Riparian Reserve Zones.</div> <div>12.8 During site-level forest harvest planning, retain additional forest cover in low divides between the Indian River and adjacent watersheds to facilitate dispersal of Coastal Tailed Frogs.</div>



Ecosystem Representation

The Indian River Watershed hosts a variety of ecosystem types: coniferous forests, deciduous forests, mountain alpine, lakes, wetlands, riparian areas and a major estuary. Ecosystems are functional units consisting of all the living factors (plants, animals, microbes), all the nonliving factors (air, water, soil), and their interactions. All these factors and interactions are linked together through nutrient cycling and energy flow.

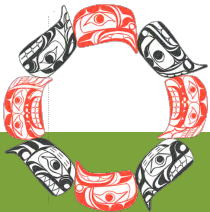
The Tsleil-Waututh believe that the only way to protect all life is to plan and execute activities in a holistic manner. From this perspective, planning in the Indian River Watershed must ensure that the entire range of ecosystems present before contact with Europeans is conserved to provide plants, animals and other organisms with their specific habitat requirements. Ensuring adequate representation of all ecosystems is an essential strategy for conserving biological diversity.

The following Objectives and Strategies were developed to ensure there is adequate representation of all ecosystems in the watershed:

Ecosystem Representation Management Direction

Objectives	Strategies
1. Ensure that the natural range and variability of ecosystems is conserved to protect biological diversity.	1.1 Assess the Watershed Reserve Network and as necessary, incorporate additional areas into the Rare Site Series presented in Map 14 to meet ecosystem representation requirements. (8)

(8) As defined in Watershed Planning in Clayoquot Sound: Volume 1—Principles and Process (2006).





**TSLEIL-WAUTUTH NATION
INDIAN RIVER
WATERSHED PLAN SERIES**

**MAP 14
ECOSYSTEM
REPRESENTATION**

LEGEND

Forest Service Roads

- Maintained Road
- Semi-Permanent Deactivated Road
- Secondary Road
- Provincial Park Land

Ecosystem Representation

- Rare Site Series (each site represents <2% of forested area)

Biogeoclimatic Classification

- Coastal Western Hemlock
Submontane Very Wet Maritime
- Coastal Western Hemlock
Montane Very Wet Maritime
- Mountain Hemlock
Windward Moist Maritime
- Coastal Mountain Weather Alpine
Undifferentiated and Parkland

0 1.25 2.5 5 Kilometers

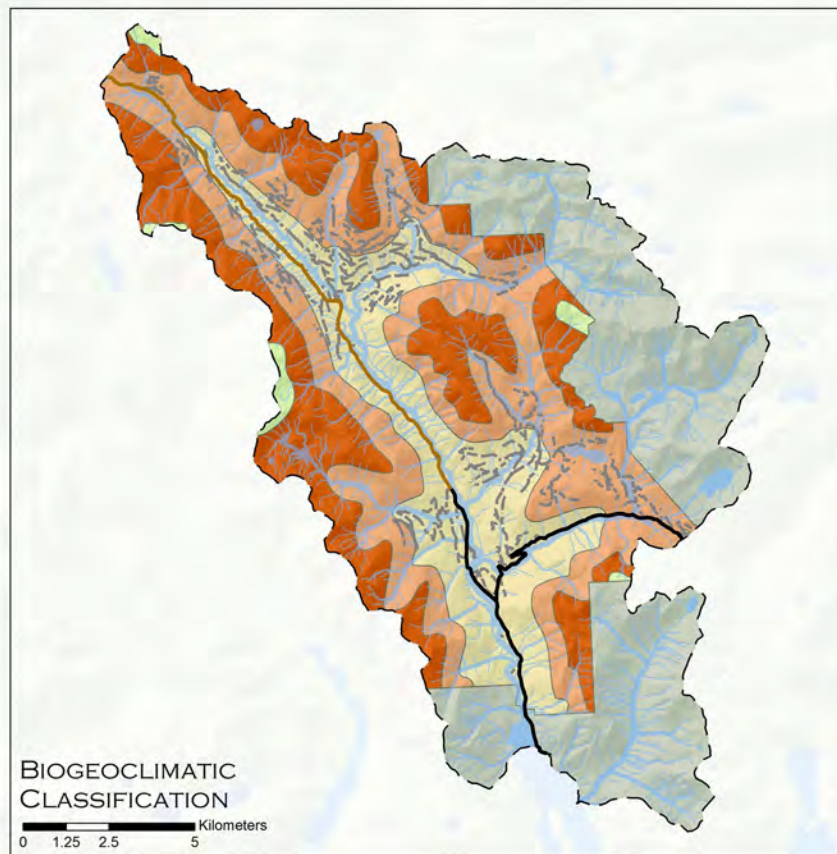
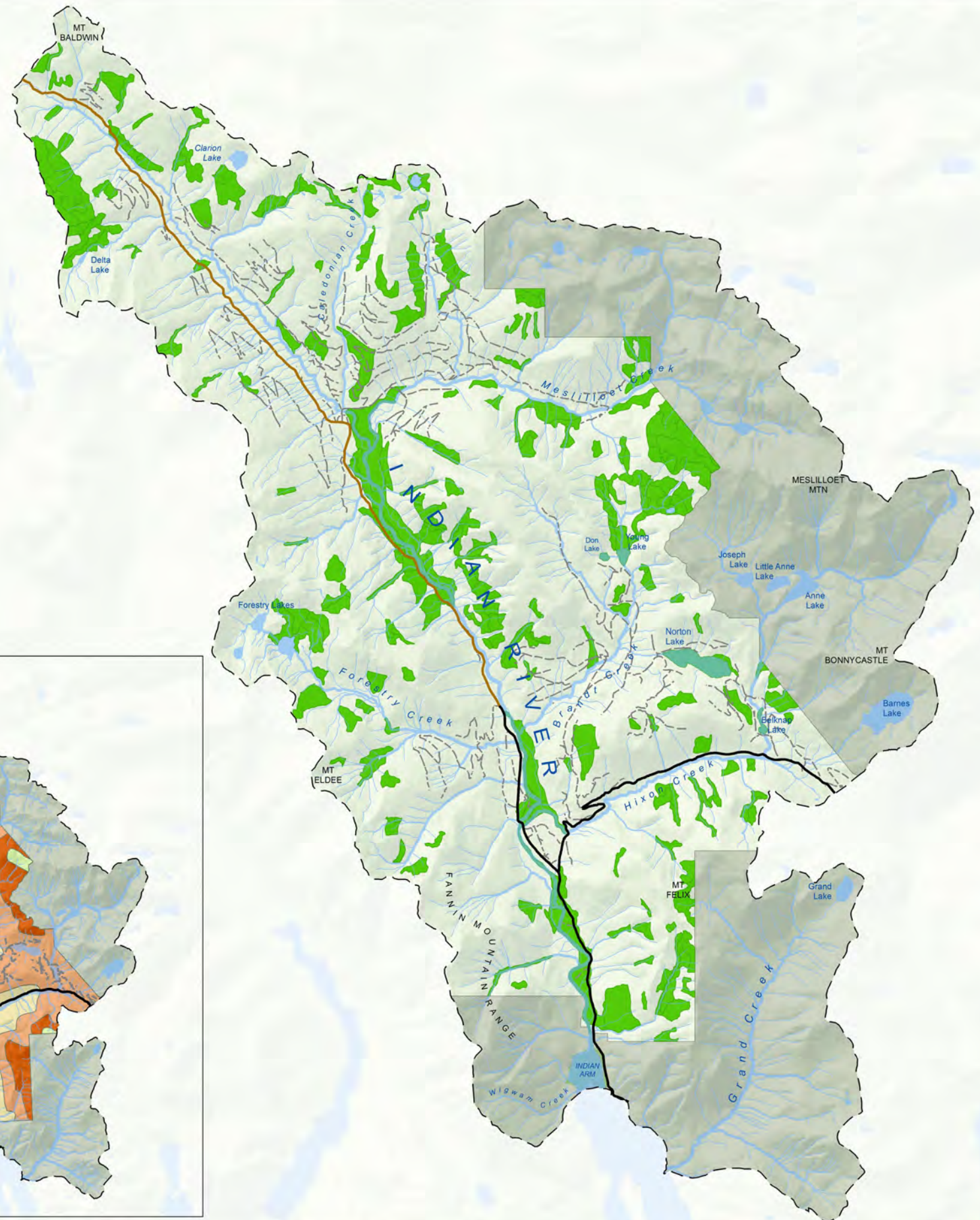
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Data Sources: Tsleil-Waututh Nation, Province of British Columbia, Government of Canada, BC Conservation Data Center, Timberline.
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Projection: UTM, NAD83, Zone 10
Map Scale: 1:45,000; Biogeoclimatic Classification Map Scale: 1:100,000



**BIOGEOCLIMATIC
CLASSIFICATION**

0 1.25 2.5 5 Kilometers



Watershed Reserve Network

The blending of cultural, environmental and biodiversity values articulated in this Section results in a Watershed Reserve Network for the Indian River Watershed. The reserve network is an overall management prescription describing permitted land uses by zone. It was created based upon cultural values, terrain stability, and the reserve and management zone designations for hydriparian areas, plant communities, cedar, old growth, salmon and wildlife. The network as presented in Map 15 designates three distinct zones: Reserve Zone, Value Management Zone and Integrated Zone.

Reserve Zone

The reserve zone encompasses ~12,500 hectares (58%) of the total area in the watershed. This zone represents protected areas and sites of significant environmental and cultural value where some types of economic development activities are not permitted. Prohibitions generally include timber harvesting and energy generation infrastructure (including dams/weirs, penstocks, powerhouses, turbines, new roads and transmission lines). As many of the existing developed areas in the watershed, such as transmission and pipeline right-of-ways and roads are located within reserve zone areas, site-specific plans will be developed for future maintenance activities.

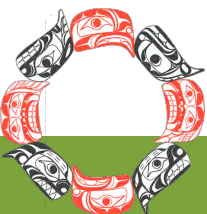
Activities permitted in the reserve zone include Tsleil-Waututh cultural harvesting of forest products, commercial recreation or tourism, and mineral development. Although mineral development is permitted in this zone, mining-related activities will be restricted per the management direction provided in this Plan.

Value Management Zone

The value management zone encompasses ~4,000 hectares (19%) of the total area in the watershed. This zone represents sites of environmental or cultural value where a range of economic development activities are permitted. Economic development is subject to the management direction provided in this Plan and relevant Provincial and federal legislation.

Integrated Zone

The integrated zone encompasses ~5,000 hectares (23%) of the total area of the watershed. This zone represents areas that have not been identified as reserve or a value management zones and is open to economic development, subject to relevant legislation. Development permitted in this zone includes but is not limited to timber harvesting, mineral and energy development, and commercial recreation or tourism. Activities in this zone will be undertaken in a manner that provides for the long-term sustainability of cultural, environmental, recreational, and economic values, consistent with relevant legislation and management direction provided in this Plan.





TSLEIL-WAUTUTH NATION INDIAN RIVER WATERSHED PLAN SERIES

MAP 15 WATERSHED RESERVE NETWORK

LEGEND

Forest Service Roads

- Maintained Road
- Semi-Permanent Deactivated Road
- Secondary Road
- Provincial Park Land

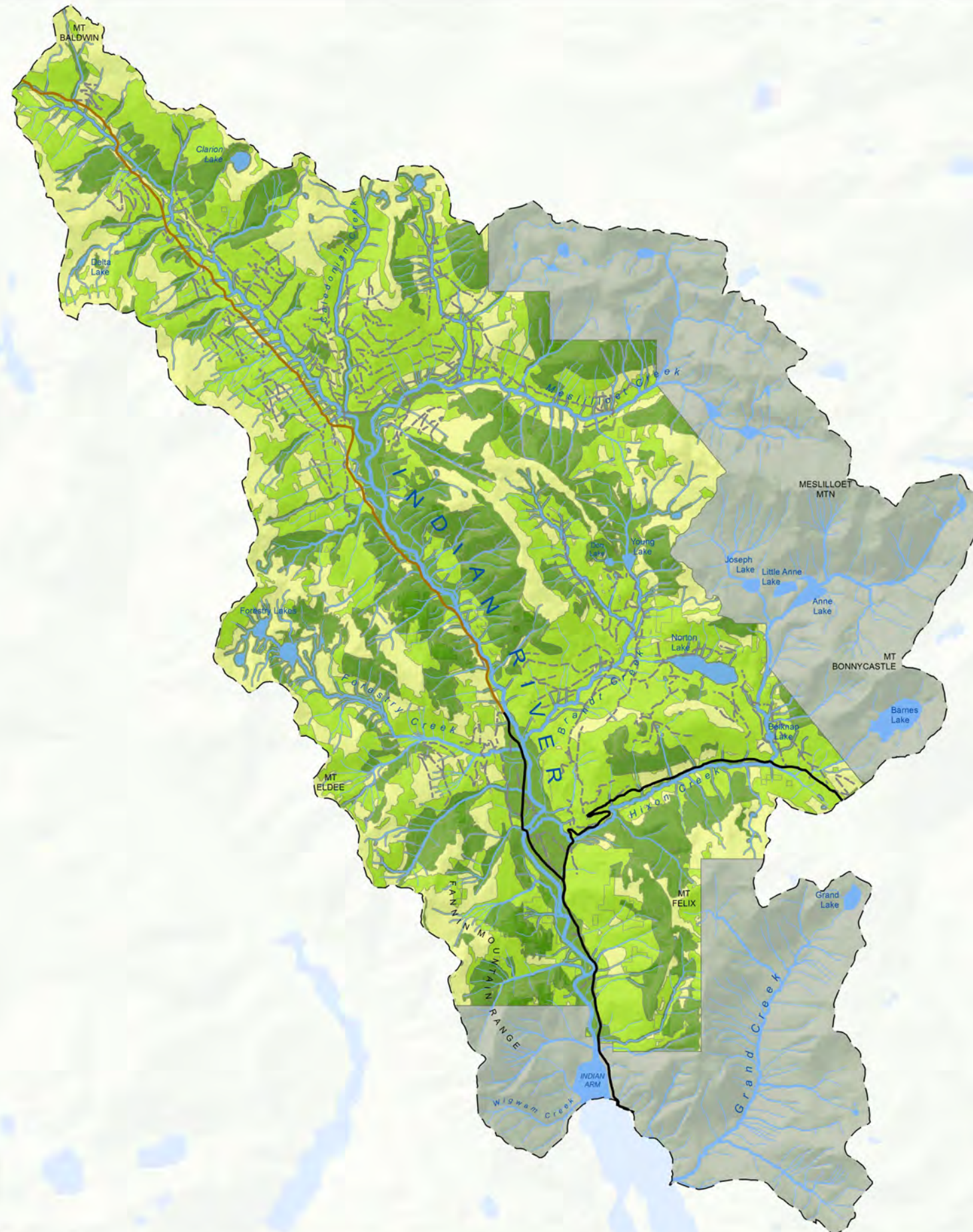
Zonation

- Watershed Reserve Zone
The Watershed Reserve Zone is comprised of the following:
 - Salmon Stewardship Reserve Zone
 - Cedar Stewardship Reserve Zone
 - Riparian Reserve Zone
 - Unstable Terrain Class V Reserve Zone
 - Red Listed Plant Communities Reserve Zone
 - Old Growth Reserve Zone
 - Goat Winter Range Reserve Zone
 - Provincial Park Land
- Value Management Zone
The Value Management Zone is comprised of the following:
 - Salmon Stewardship Management Zone
 - Cedar Stewardship Management Zone
 - Riparian Management Zone
 - Partially Unstable Terrain Class VI Management Zone
 - Blue Listed Plant Communities Management Zone
 - Old Growth Management Area
 - Deer Winter Range Management Zone
 - Elk Summer and Winter Range Management Zone
 - Marbled Murrelet Management Zone
 - Spotted Owl Management Zone
 - Goshawk Nesting Habitat Management Zone
- Integrated Zone
The Integrated Zone comprises of any other zone that is not a Watershed Reserve Zone or a Value Management Zone.

0 1.25 2.5 5 Kilometers

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Map Scale: 1:45,000



Restoration Areas

The Indian River Watershed has suffered significant environmental harm due to past industrial operations. Canadian Collieries Resources (later Weldwood of Canada) built a network of forest roads and intensively logged the watershed from 1969 to 1989. This activity, in combination with the 1968 construction of a high-voltage power transmission line and a 1991 natural gas pipeline, has resulted in significant environmental degradation.

There has been and continues to be a pressing need to restore the health of the watershed. A number of early action projects have already been completed. These include the deactivation of logging roads, replanting of riparian areas and salmon habitat enhancements. However, these projects represent only an initial investment in restoration.

With its history, the watershed has a pressing need for additional actions. Legacy soil contamination and industrial waste remains for clean-up. More effort is needed to address hydroriparian habitat degradation. Anthropogenic sources of sediment continue to enter the river system. In particular, critical salmon spawning habitat has been smothered with fine sediment, and deep pools where fish have historically sought refuge have filled with coarse sediment.

To assist in prioritizing restoration projects in the watershed, the following Objectives and Strategies were developed:

Restoration Area Management Direction

Objectives	Strategies
1. Restore negative impacts of past development through future development activities.	1.1 Work to conduct Restoration Assessments for the identified Restoration Areas displayed on Map 16. 1.2 Within Restoration Areas, restoration options must be evaluated for all future developments. 1.3 Ensure future developments do not compound environmental impacts.
2. Ensure all past industrial waste and equipment is removed from the watershed.	2.1 Inventory locations of industrial waste. 2.2 Identify responsible parties and require them to develop and implement clean-up plans for removing past industrial waste and equipment.
3. Ensure that environmental impacts resulting from landslides are addressed.	3.1 Work to conduct Restoration Assessments and, if required, propose restoration measures for sites impacted by landslides and mass wasting events.





**TSLEIL-WAUTUTH NATION
INDIAN RIVER
WATERSHED PLAN SERIES**

**MAP 16
RESTORATION AREAS**

LEGEND

Forest Service Roads

- Maintained Road
- Semi-Permanent Deactivated Road
- Secondary Road
- 1920's Era Shake Bolt Flume

Restoration Areas

- Industrial Waste Clean-up Site

Salmon Stewardship

- Salmon Stewardship Reserve Zone
- Salmon Stewardship Management Zone

Areas of Concern

- Invasive Species (Partial Survey - Lower Half of the Indian River Watershed)
- Contamination Site, Garbage and Old Structures
- Soil Erosion
- Logging Debris
- Excess Sediment Deposits

0 1.25 2.5 5 Kilometers

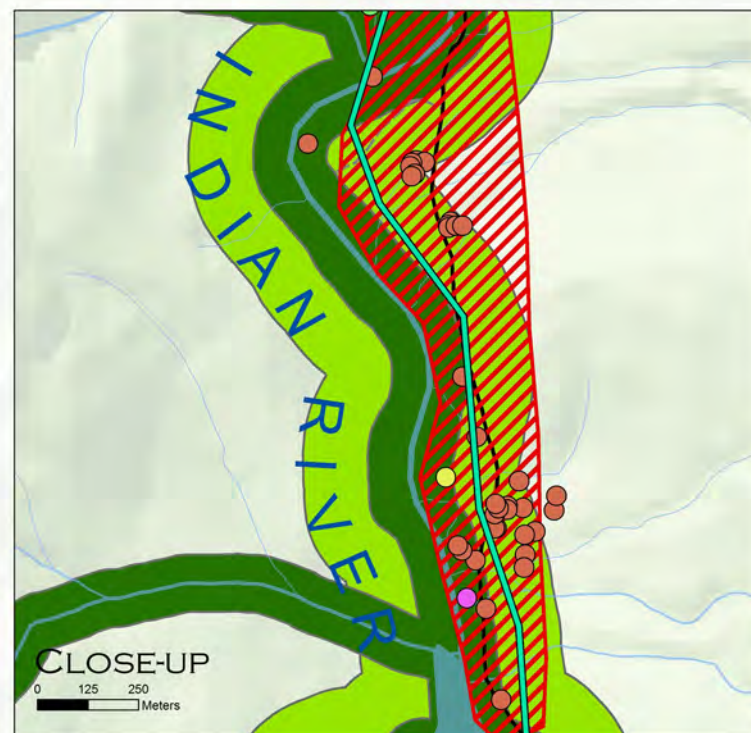
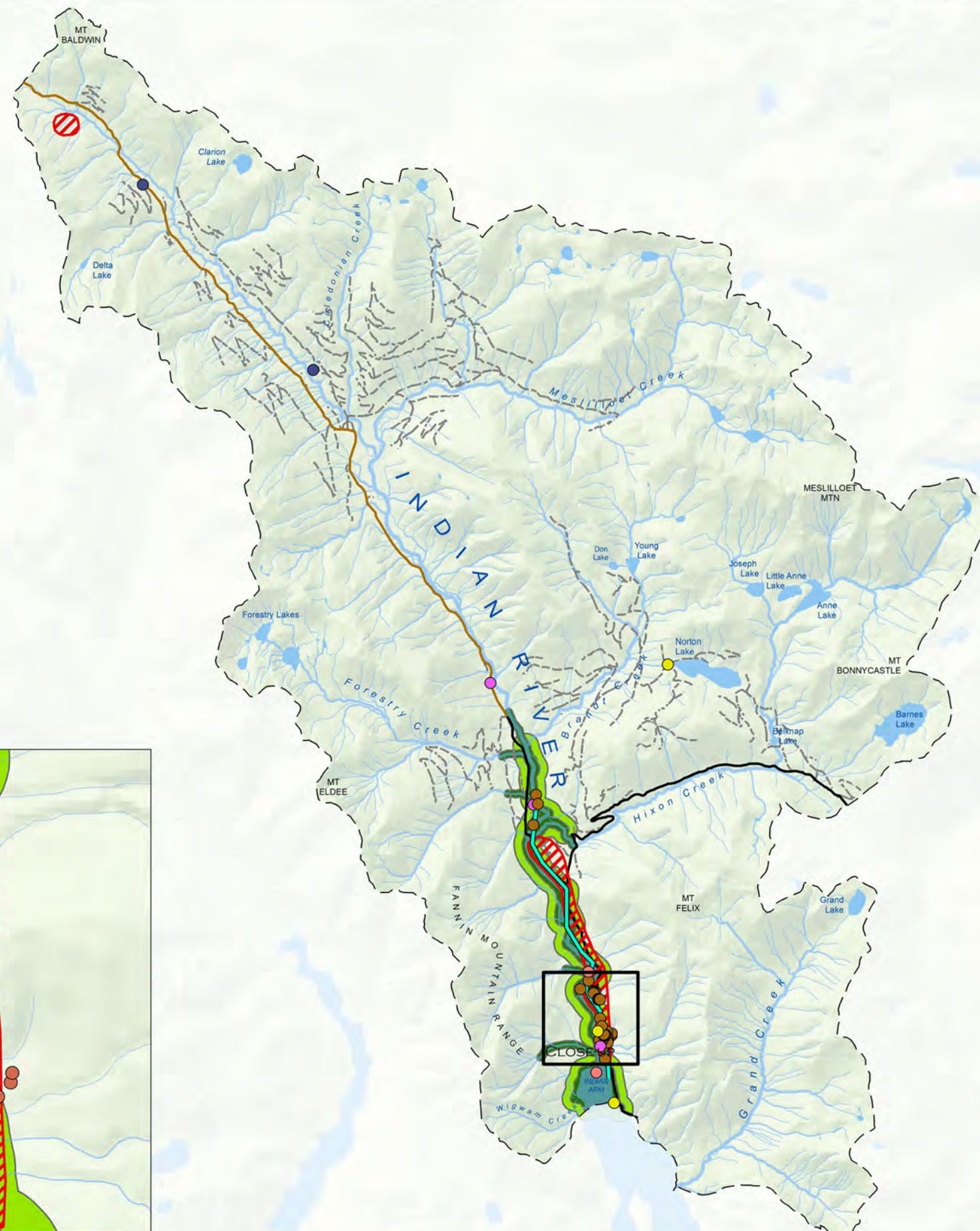
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Projection: UTM, NAD83, Zone 10

Map Scale: 1:45,000; Close-Up Map Scale 1:8,500





**TSLEIL-WAUTUTH NATION
INDIAN RIVER
WATERSHED PLAN SERIES**

**MAP 17
LANDSLIDES AND
ROAD STATUS**

LEGEND

Forest Service Roads

- Maintained Road
- Semi-Permanent Deactivated Road
- Secondary Road Status
 - Active
 - Semi Deactivated
 - Deactivated

Restoration Areas

- Landslide Event/Rehabilitation

Landslides

- Landslide

Year Landslide First Became Visible

- 1936
- 1969
- 2004

0 1.25 2.5 5 Kilometers

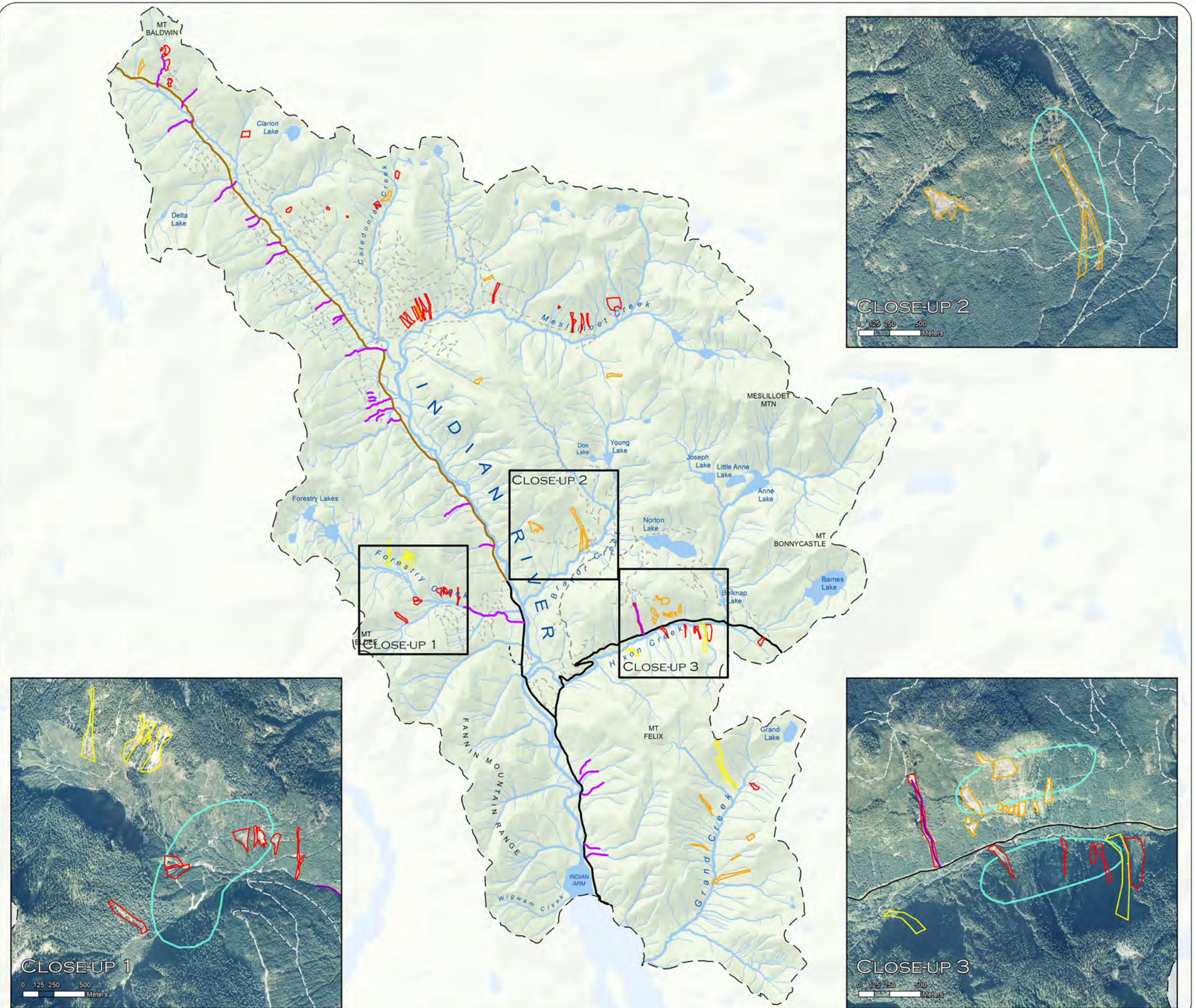
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Data Sources: Tsleil-Waututh Nation, Province of British Columbia, Government of Canada.
Imagery: Tsleil-Waututh Nation, 2004.

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Projection: UTM, NAD83, Zone 10

Map Scale: 1:45,000; Map Scale of Close-Ups 1, 2, & 3: Map Scale 1:15,000



Section 4: Economic Development Opportunities

Tourism and Recreation

In addition to Tsleil-Waututh land use and occupancy, the Indian River Watershed has also served as an important spiritual and recreational place for Tsleil-Waututh people. The clean and healthy rivers, lakes and forests are shared with a variety of wilderness recreation enthusiasts. In the summer months, recreational fishers are attracted to the runs of wild salmon that return annually, and to the lakes that have been stocked with rainbow trout. Recreational hunters arrive in the fall, seeking predominately bear and deer. During all seasons, backcountry hikers and campers use forested and alpine areas.

To support all of these activities, forest recreation campsites have been established at Norton and Young Lakes, but are currently not maintained. Unfortunately, some of the individuals and groups that access the watershed behave in a highly irresponsible manner. Vandalism and theft is rampant, unsafe and illegal use of firearms is evident, salmon habitat is routinely damaged by all-terrain-vehicles, and trash is liberally scattered. Tsleil-Waututh community members often feel threatened in the heart of their own territory.

To remedy this situation, the Tsleil-Waututh Nation articulated a vision for tourism and recreation that focuses on the watershed's environmental and cultural wonders. In the past decade alone, Tsleil-Waututh has commissioned several ecotourism-related studies in addition to launching their own ecotourism company, Takaya Tours in 2001. Tsleil-Waututh also co-manages Say-Nuth-Khaw-Yum Provincial Park and Whey-Ah-Wichen District Park farther down Indian Arm.

Similarly, the Province is a strong advocate for safe and enjoyable recreational experiences on Crown land and in Provincial parks. The rugged and spectacular landscape of the Indian River Watershed provides ample opportunities for visitors to enjoy wilderness experiences. Combined with the wealth of Tsleil-Waututh cultural knowledge, the watershed has tremendous potential for a variety of tourism and recreational opportunities. These opportunities are especially heightened because of the close proximity to Say-Nuth-Khaw-Yam Provincial Park, Vancouver and the rest of the Lower Mainland.

The following Objectives and Strategies serve to plot a path forward for tourism and recreational activities:



Tourism and Recreation Management Direction

Objectives	Strategies
1. Increase visibility and respect for, Tsleil-Waututh culture and heritage through tourism and recreational programming.	<p>1.1 Tsleil-Waututh will complete and implement a Cultural Communications Strategy.</p> <p>1.2 In accordance with the Cultural Communication Strategy and Provincial guidelines:</p> <p>1.2.1 Incorporate Tsleil-Waututh designs, motifs and relevant cultural information into tourism and recreational programming, facilities and signage; and,</p> <p>1.2.2 During permitting for commercial tourism, the Province will consult the Tsleil-Waututh Nation on incorporation of Tsleil-Waututh designs, motifs and relevant cultural information.</p>
2. Improve awareness and understanding of Tsleil-Waututh stewardship values through tourism development and programming.	<p>2.1 Identify and pursue opportunities to develop tourism or recreational programming that highlights environmental stewardship projects.</p>
3. Limit impacts of tourism, recreational activities and infrastructure on environmental and cultural values.	<p>3.1 Use appropriate communication tools (e.g., pamphlets, signage) to provide information on environmentally and culturally sensitive areas in the watershed.</p> <p>3.2 Consistent with Provincial guidelines, address wildlife issues for proposed tourism and recreational activities.</p> <p>3.3 Strive to construct tourism-related infrastructure and facilities utilizing "green" building standards.</p>
4. Improve knowledge of and appreciation for nature and environmental values through tourism programming.	<p>4.1 Consider any applicant's ability to support environmental values and nature interpretation programs as a criteria in evaluating tourism or recreational permit applications.</p>

Objectives	Strategies
5. Expand public recreational opportunities.	<p>5.1 Reestablish access and improve infrastructure at the Norton Lake Recreation Site.</p> <p>5.2 Establish new Recreation Sites in the watershed that include, but are not limited to, the Cascades and Forestry Lakes as identified in Map 18.</p> <p>5.3 Establish new trails in the watershed that include, but are not limited to: Norton-Young-Anne Lake Loop Trail, Forestry Lakes Trail, and Grand Lake to Norton Lake Trail as identified in Map 18.</p>
6. Enhance Tsleil-Waututh economic opportunities for tourism and recreational developments.	<p>6.1 Provided wildlife populations permit a sustainable harvest, Tsleil-Waututh will be given the right of first refusal to enter into an area-based guide outfitter licence.</p> <p>6.2 Provide the Tsleil-Waututh Nation with the exclusive authority to deliver cultural interpretation programs.</p> <p>6.3 Ensure tourism and recreation economic opportunities give priority consideration to training and employing Tsleil-Waututh community members.</p> <p>6.4 Seek opportunities to develop appropriate infrastructure and facilities to support tourism and recreational programs and activities.</p>
7. Ensure all tourism and recreational development projects involve the Tsleil-Waututh Nation.	<p>7.1 Tourism and recreational project proposals will adhere to provisions outlined in the Tsleil-Waututh Nation Stewardship Policy.</p>
8. Ensure the recreational harvesting of fish, wildlife or botanical forest products is lawful.	<p>8.1 Regulate and strictly enforce the recreational harvest of fish, wildlife and botanical forest products by visitors, tenure and permit holders per the Safety, Monitoring and Enforcement chapter.</p>
9. Integrate tourism and recreational activities with other stewardship initiatives occurring within the watershed and surrounding areas.	<p>9.1 If activity warrants, establish a Tourism and Recreation Working Group to coordinate activities and report annually to the Watershed Stewardship Council.</p>





**TSLEIL-WAUTUTH NATION
INDIAN RIVER
WATERSHED PLAN SERIES**

**MAP 18
RECREATION AND
TOURISM**

LEGEND

Forest Service Roads

- Maintained Road
- Semi-Permanent Deactivated Road
- - - Secondary Road

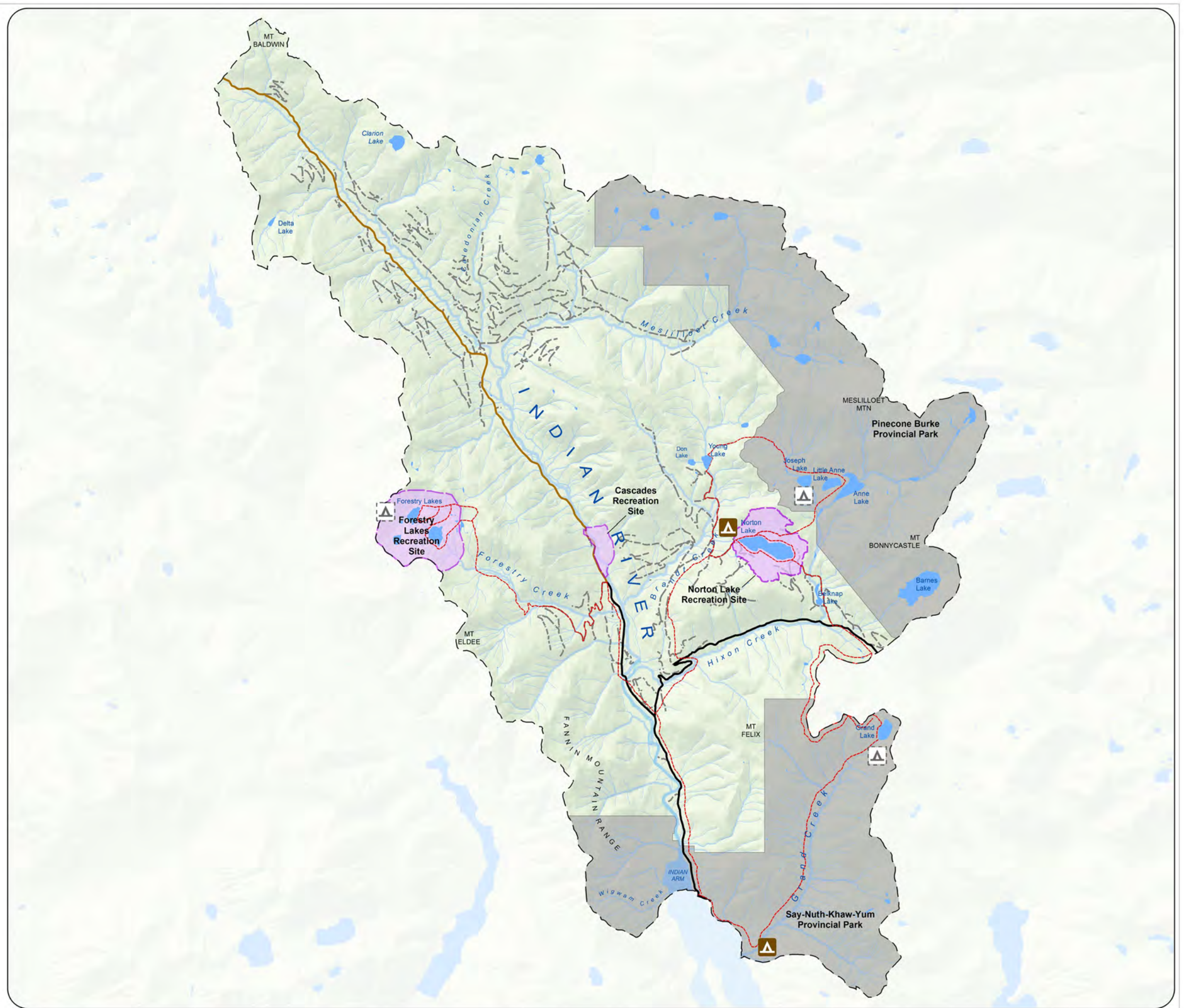
Recreation and Tourism

- - - Proposed Trail
- ▲ Existing Campsite
- ▲ Proposed Campsite
- Provincial Park Land
- Proposed Recreation Site

0 1.25 2.5 5 Kilometers

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Mineral Aggregate Development

Given the inherent geology, proximity to rich mineral seams and active gravel recruitment to the floodplain, the Indian River Watershed contains high potential for mineral and aggregate resources. This potential is especially relevant due to the close proximity of the port of Squamish and navigable waters of Indian Arm. Detailed accounts of geology, mineral potential and current tenures are highlighted in the *Bioregional Atlas for the Indian River Watershed*.

Mineral Development

British Columbia recognizes the mining industry as a vital component of the regional and national economy. In 2003, the Province made a commitment to aggressively revitalize mineral exploration and development. It introduced an online mineral claims system and implemented new policies to increase investor confidence. One such policy is the “two-zone” land use system for mineral exploration and development. Under the system, lands are classified as *Protected Zone* (crown lands closed to mineral development) or *Mineral Zone* (land open to mineral claims, exploration or development). The two-zone policy clearly states that most land use planning designations not resulting in formal protected area status fall into the mineral zone classification.

To date, mineral development in the Indian River Watershed has consisted mostly of claim staking. Mineral claims increased two-fold following the introduction of the online system and claims continue to fluctuate on a regular basis. Two sites in the watershed have undergone limited exploration and one site underwent intensive exploration in the 1980’s.

Aggregate Development

Aggregates refer to all types of quarry material such as sand, gravel and rock used to construct and maintain physical infrastructure. Aggregate development is regulated under the British Columbia Land Act. In evaluating applications and monitoring tenures, the Province considers safety standards, land use compatibility and environmental sensitivities.

Currently no aggregate tenures exist in the Indian River Watershed. In 2000, a large (over 2,500 hectare) permit was rejected by the Province due to concerns raised by the Tsleil-Waututh Nation and Fisheries and Oceans Canada. Tsleil-Waututh expressed concerns from both environmental and Aboriginal rights and title perspectives. The Nation questions whether aggregate or mineral extraction activities are consistent with their stewardship goals and in particular, the health of wild fish populations. They also questioned the process by which mineral claims have been and continue to be allocated without any form of consultation.

Notwithstanding these issues, the Nation is committed to working with the Province to establish management direction for mineral and aggregate resource development. In doing so, the following Objectives and Strategies were developed:



Mineral and Aggregate Management Direction

Objectives	Strategies
1. Protect Tsleil-Waututh cultural values and interests in all phases of mineral or aggregate development.	<p>1.1 Mineral and aggregate exploration or development projects will adhere to management direction highlighted in the Tsleil-Waututh Cultural Values chapter.</p> <p>1.2 Establish a Conditional Registration Reserve under the British Columbia Mineral Tenure Act for the non-park portions of the watershed to require consultation with the Tsleil-Waututh Nation before registering any claim.</p> <p>1.3 Subject to 1.1 and 1.2, prevent disturbance to cultural values and resources from subsurface resource exploration by utilizing low impact methods.</p>
2. Ensure mineral and aggregate development activities preserve watershed integrity.	<p>2.1 Mineral and aggregate exploration and development activities will meet or exceed British Columbia Mineral Tenure Act requirements by addressing the following issues during an environmental review process:</p> <p>2.1.1 Ecological and hydrological integrity of the watershed;</p> <p>2.1.2 Terrain stability and floodplain management;</p> <p>2.1.3 Acid rock drainage;</p> <p>2.1.4 Groundwater quantity and quality;</p> <p>2.1.5 Fish and wildlife habitat;</p> <p>2.1.6 Wildlife sensitivities;</p> <p>2.1.7 Road access requirements;</p> <p>2.1.8 Air quality; and,</p> <p>2.1.9 Noise.</p>

Objectives	Strategies
3. Address mitigation and restoration requirements for mineral and aggregate exploration and development during the tenuring or permitting process.	<p>3.1 Complete a Restoration Assessment that meets or exceeds British Columbia Mineral Tenure Act standards.</p> <p>3.2 Subject to 3.1, restoration activities will be carried out by the responsible mineral tenure holder.</p> <p>3.3 Where the responsible mineral tenure holder does not exist, the Province and Tsleil-Waututh will seek resources to complete restoration activities.</p>
4. Limit mineral and aggregate exploration and development to prevent damage to environmentally sensitive areas.	<p>4.1 Address protection and mitigation measures for environmental values identified in the Watershed Reserve Network during the tenuring or permitting process.</p>
5. Ensure mineral or aggregate development projects accommodate the Tsleil-Waututh Nation.	<p>5.1 Mineral and aggregate project proposals will adhere to the Tsleil-Waututh Nation Stewardship Policy.</p>
6. Maximize Tsleil-Waututh training and employment opportunities in all mining and aggregate development projects.	<p>6.1 Mineral or aggregate project proposals will demonstrate how projects will provide training and employment opportunities to Tsleil-Waututh community members and business partners.</p>
7. Integrate mining and aggregate development activities with other stewardship initiatives occurring within the watershed and surrounding areas.	<p>7.1 If activity warrants, establish a Mineral and Aggregate Working Group to coordinate activities and report annually to the Watershed Stewardship Council.</p>





**TSLEIL-WAUTUTH NATION
INDIAN RIVER
WATERSHED PLAN SERIES**

**MAP 19
MINERAL AND
AGGREGATE DEVELOPMENT**

LEGEND

Forest Service Roads

- Maintained Road
- Semi-Permanent Deactivation Road
- Secondary Road

 Inlailawatash Private Lands

 Provincial Park Land

Mineral and Aggregate Development

-  BC Mineral Tenure Act Conditional Registration Reserve

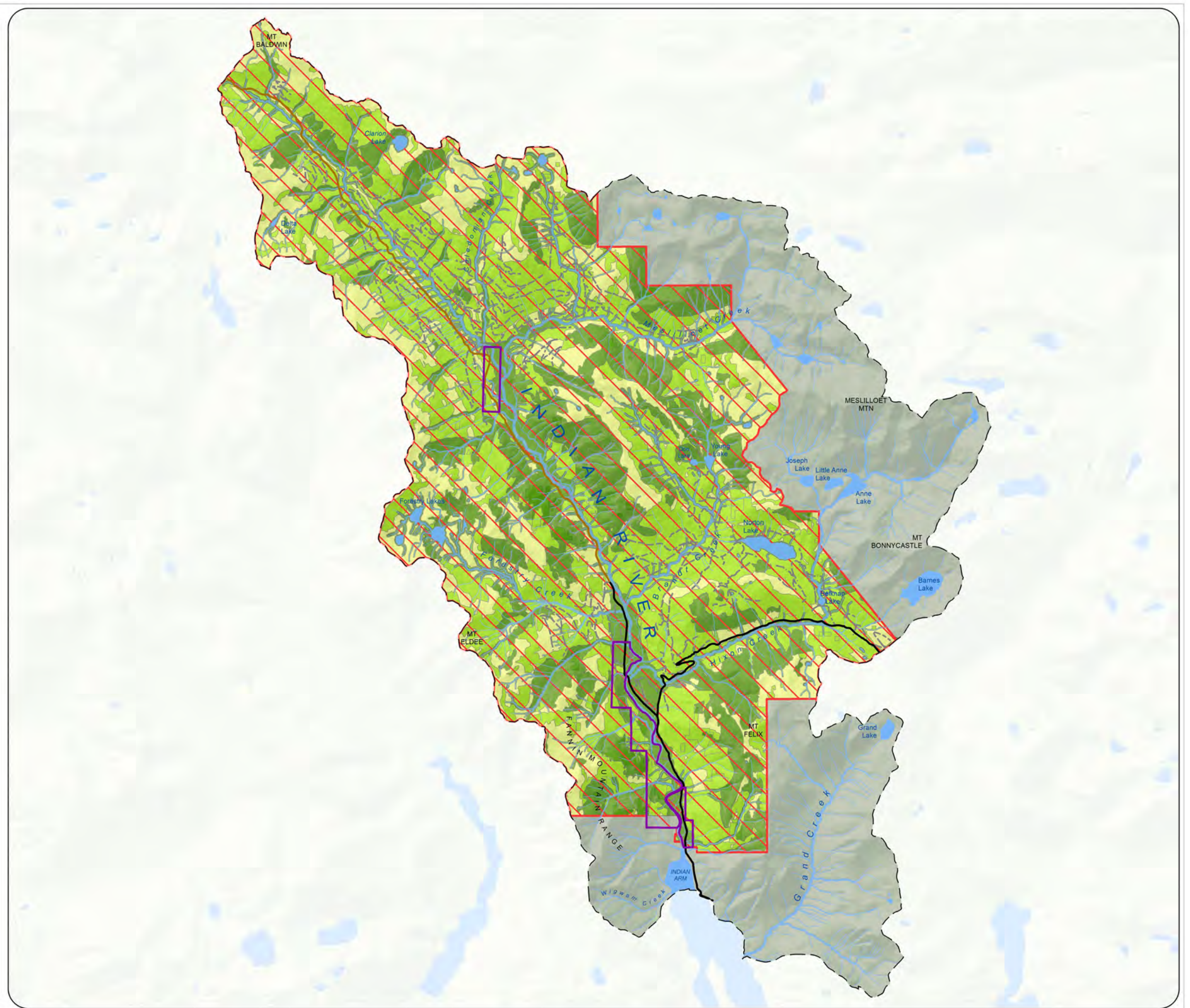
Watershed Zonation

-  Watershed Reserve Zone
-  Value Management Zone
-  Integrated Zone

0 1.25 2.5 5 Kilometers

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Projection: UTM, NAD83, Zone 10
Map Scale: 1:45,000



Fisheries Marine Resources

Fisheries and marine resources have always been an integral part of the Tsleil-Waututh way of life. Tsleil-Waututh members actively fish for pink, chum, and coho salmon, as well as traditionally fishing steelhead and other trout species. Shellfish like butter and littleneck clams were regularly dug at beaches throughout the traditional territory including the Indian River estuary. Other marine resources such as kelp, seaweed, sea onion (*squalnuth*) and sea urchin (*squadzi*) were gathered for sustenance and trade. These resources have been managed in a sustainable way according to the laws and customs of the Tsleil-Waututh for thousands of years.

This form of traditional resource management conserves and protects fish and aquatic resources while at the same time enhancing Tsleil-Waututh culture. The location of villages and the overall prosperity of communities is closely linked to the abundance and quality of fish, shellfish and other marine resources. For example, smokehouses were established at the mouth of the Indian River in the village of Inlailawatash for preparing fish for the winter months.

Not only are these resources an important source of food, but they have always formed an important part of the Tsleil-Waututh economic base. It remains a priority of the Nation to continue to be an active participant in fisheries management and in the commercial fishing and aquaculture industries. These activities are seen as both a legitimate expression of ongoing sovereignty within Tsleil-Waututh territory, and an important component of sustainable economic development.

The Tsleil-Waututh Nation, in partnership with Fisheries and Oceans Canada and the British Columbia Ministry of Environment, is committed to restoring and enhancing fishery and aquatic resources in the Indian River Watershed.

The Objectives and Strategies highlighted below will guide future use and ensure a healthy and viable Indian River fishery:

Fisheries and Marine Resources Management Direction

Objectives	Strategies
1. Seek opportunities to improve knowledge about the quantity and quality of salmon, shellfish and other Tsleil-Waututh ma-	1.1 Conduct stock assessments for salmonids in the Indian River and tributaries. 1.2 Sample shellfish tissue quality and conduct intertidal population assessments in Indian River estuary.
2. Promote awareness of Tsleil-Waututh cultural connection to salmon and other marine species.	2.1 Incorporate Tsleil-Waututh cultural content into Nation and Provincial communications materials (e.g., signs, literature) on marine stewardship, in accordance with the Cultural Communications Strategy and Provincial guidelines.
3. Enhance Tsleil-Waututh economic opportunities for fishery and aquaculture developments.	3.1 Investigate the potential for a Tsleil-Waututh commercial Indian River fishery. 3.2 Investigate the feasibility of establishing fisheries enhancement or commercial aquaculture facilities. 3.3 Provide priority consideration to employing Tsleil-Waututh community members for fishery and aquaculture enterprises.
4. Integrate fisheries and marine resources development with other stewardship initiatives.	4.1 If activity warrants, establish a Fisheries and Marine Resources Working Group to coordinate activities and report annually to the Watershed Stewardship Council.



Energy Infrastructure

Due to the close proximity to highly developed regions of the Lower Mainland, the Indian River Watershed is ideally suited as a transmission corridor for energy infrastructure. In addition, the watershed's steep topography and wet climate makes it a good candidate for water power production.

Transmission Infrastructure

The two major energy transmission infrastructures in the watershed include a BC Hydro electric transmission line (5L45) and a Fortis BC natural gas pipeline.

The electric transmission line connects the Cheekeye Substation near Squamish with the Meridian Substation in Port Moody. The line segment is about 26 kilometres in length and represents BC Hydro's highest operating voltage at 500 kilovolts. From a Provincial perspective, the line is very important as it serves to transport hydroelectricity generated in the Peace River region to the Lower Mainland.

The line enters the watershed at the Stawamus-Indian Divide and exits along the eastern shoreline of Indian Arm. Clearing the line's right-of-way began in 1968 and by 1971 it was energized and brought into operation. Seventy-five towers are present with several of them constructed directly in the river bed or adjacent the streambanks.

The Fortis BC natural gas pipeline connects natural gas storage facilities in the Lower Mainland with Squamish, the Sunshine Coast and Vancouver Island. The pipeline segment that transects the Indian River Watershed is about 25 kilometres in length and 25 centimetres in diameter. The pipeline enters via the Coquitlam Watershed and exits via the Stawamus-Indian Divide. The pipeline is subsurface and generally follows the mainline road, crossing the Indian River just north of Forestry Creek.

Tsleil-Waututh has always had significant concerns regarding the placement of energy infrastructure in the watershed. The projects were built without the Nation's consent and the concerns were never accommodated in any planning or permitting processes. The result has been that the cultural and environmental harm of those projects has continued unabated.

As a direct result of the construction of the electric transmission line, the lower four kilometres of the Indian River channel changed course in 1972. That caused significant river bank erosion, increased sedimentation and damage to culturally significant sites. The harm from the transmission line, in combination with other factors, greatly reduced populations of all salmon species and continues to affect sensitive habitats.

The transmission line also creates a safety risk, particularly when the lines sag, getting too close to water, trees and other features.

Power Generation

Several streams in the Indian River Watershed have potential for water power production. This generally refers to small hydroelectric developments with a production capacity of less than 15 megawatts (1 megawatt is enough to power 500 households per year). These developments are designed as "run-of-the-river" systems because the facilities divert a portion of the streamflow for electricity generation and then return the water downstream.

For over a decade, Tsleil-Waututh has expressed an interest in Nation-driven water power and been an advocate for independent power production in the Indian River Watershed. In 2003 and 2013, Tsleil-Waututh commissioned water power feasibility studies. They highlighted options for energy supplies and included an initial investigation into potential small water power projects.

To facilitate energy and infrastructure opportunities and resolve outstanding issues and concerns, the following Objectives and Strategies were developed:



Energy Infrastructure Management Direction

Objectives	Strategies
1. Protect Tsleil-Waututh cultural values and interests in energy generation or infrastructure development.	1.1 Energy and infrastructure projects will adhere to management direction highlighted in the Tsleil-Waututh Cultural Values chapter.
2. Mitigate and restore impacts of energy infrastructure on riparian habitats.	2.1 The Province and Tsleil-Waututh will study the feasibility of relocation of existing transmission towers from areas identified in the Watershed Reserve Network (Map 20).
3. Identify opportunities for water power production and increase the scientific understanding of impacts on stream systems.	3.1 During the project assessment process, Tsleil-Waututh will, or require proponents to, meet or exceed Provincial requirements for describing location, size, and in-stream impacts of the proposed development.
4. Limit impacts of energy generation and infrastructure development on environmentally sensitive areas, and plant, fish and wildlife species.	<p>4.1 Limit the development footprint of new energy generation projects and related infrastructure within the Watershed Reserve Network to less than 2% of the total area.</p> <p>4.2 Study the effects of energy infrastructure on plants, wildlife, fisheries and other aquatic life.</p> <p>4.3 Develop energy generation projects and infrastructure in a way to achieve more than a “no net loss” for important fish and wildlife habitat. Strive for a “net gain” in habitat.</p> <p>4.4 Evaluate proposed energy generation developments from a watershed or landscape perspective to assess cumulative impacts.</p>
5. Limit the impact of maintaining energy infrastructure right-of-ways on plants, fish, wildlife and other values identified in Section 2 of this Plan.	<p>5.1 Use principles of Integrated Pest Management for vegetation control associated with energy infrastructure right-of-ways; herbicide use should be a last resort management option, but should never be used near any water bodies.</p> <p>5.2 Assess the environmental impact of any future energy infrastructure developments in the mainstem floodplain and implement a plan to mitigate all adverse effects.</p>

Objectives	Strategies
6. Enhance Tsleil-Waututh economic opportunities for energy and infrastructure developments .	<p>6.1 Establish a Tsleil-Waututh water reservation that supports all Tsleil-Waututh domestic, commercial and industrial uses of water, including the generation of hydroelectricity.</p> <p>6.2 Develop a Tsleil-Waututh right of first refusal policy for all Water Act and associated Land Act tenures.</p> <p>6.3 Energy or related infrastructure project proposals must demonstrate how projects will provide significant training and employment opportunities to Tsleil-Waututh community members and business partners.</p>
7. Ensure energy and infrastructure development projects accommodate Tsleil-Waututh.	7.1 Energy and infrastructure project proposals must adhere to provisions outlined in the Tsleil-Waututh Nation Stewardship Policy.
8. New energy projects will supply clean energy for Tsleil-Waututh community expansion and development.	8.1 During the project assessment process, new energy proponents must demonstrate how projects will provide a portion of the energy required for the Tsleil-Waututh community.
9. Integrate energy and infrastructure activities with other stewardship initiatives.	<p>9.1 If activity warrants, establish an Energy and Infrastructure Working Group to coordinate activities and report annually to the Watershed Stewardship Council. The Working Group will consider, but not be limited to, issues such as:</p> <p>9.1.1 Safety associated with working and recreating under or near transmission infrastructure;</p> <p>9.1.2 Potential health risks for people working under or near transmission infrastructure;</p> <p>9.1.3 Coordination of vegetation management and related right-of-way maintenance activities and access requirements; and,</p> <p>9.1.4 Planning for emergency response to energy infrastructure failure, accidents or vandalism.</p>





**TSLEIL-WAUTUTH NATION
INDIAN RIVER
WATERSHED PLAN SERIES**

**MAP 20
ENERGY
INFRASTRUCTURE**

LEGEND

Forest Service Roads

- Maintained Road
- Semi-Permanent Deactivated Road
- Secondary Road
- Provincial Park Land

Energy Infrastructure

- BC Hydro Transmission Tower
- Fortis BC Gas Pipeline
- BC Hydro Transmission Line

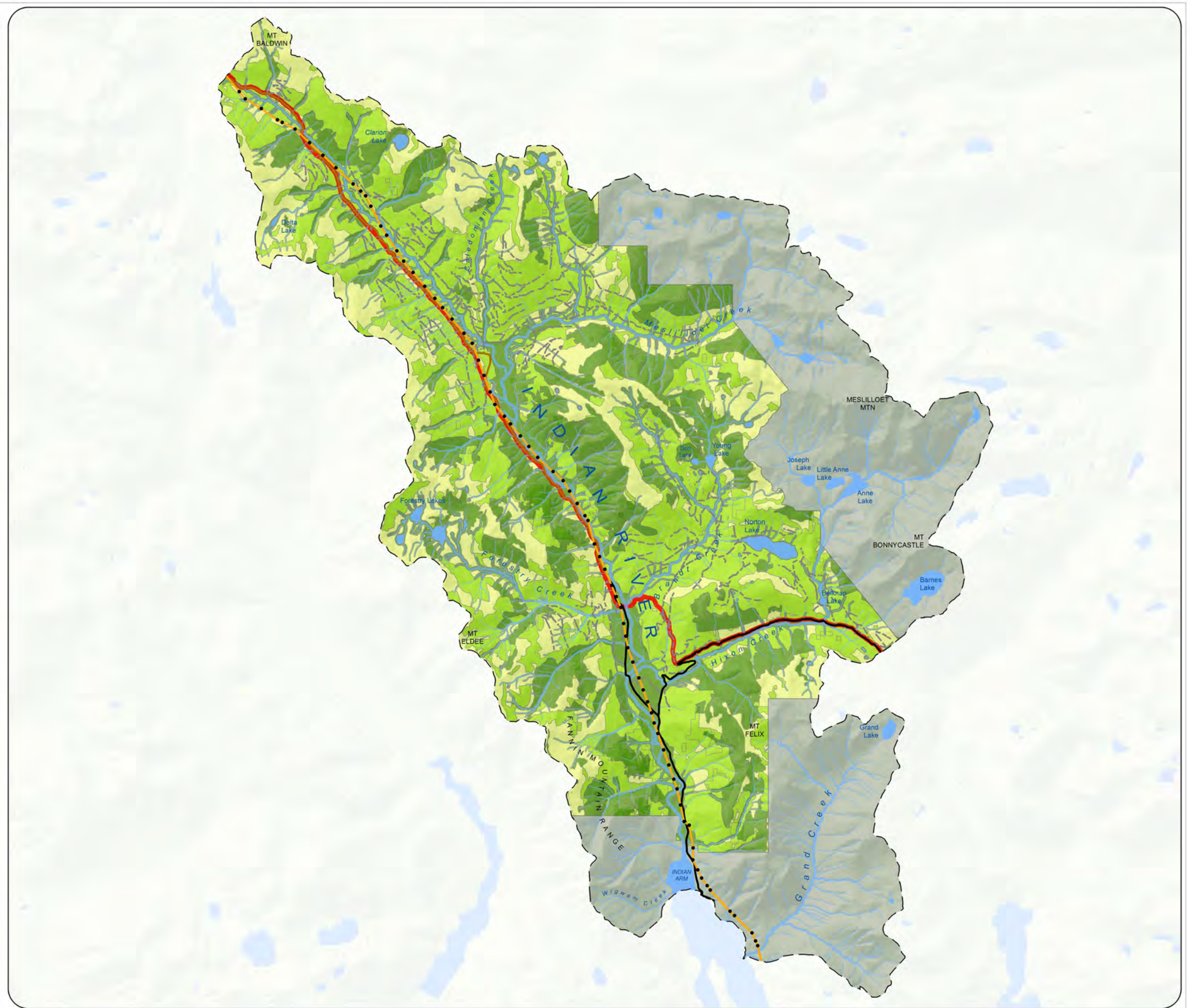
Watershed Zonation

- Watershed Reserve Zone
- Value Management Zone
- Integrated Zone

0 1.25 2.5 5 Kilometers

This map is a living document and is intended to be amended and refined over time. It is not an expression of the location of Tsleil-Waututh aboriginal title. The data used to produce this map originate from many sources and are presented without prejudice. This map is the property of the Tsleil-Waututh Nation and may not be reproduced without written permission.

Data Sources: Tsleil-Waututh Nation, Province of British Columbia, Government of Canada, FortisBC.
Map produced February 2014 by Tsleil-Waututh Nation
Projection: UTM, NAD83, Zone 10
Map Scale: 1:45,000



Forest Stewardship

Forest stewardship refers to the culturally, environmentally and socially responsible use and management of forest resources in order to maintain and enhance forest values for present and future generations. As stewards of the forest, the Tsleil-Waututh Nation and the Province collectively manage the forest resources in the Indian River Watershed on behalf of the Tsleil-Waututh people and the citizens of the Province.

For the purposes of this plan, forest stewardship activities include carbon sequestration projects, botanical forest product harvesting, as well as the many facets of forestry including: management planning, research and inventory, engineering, timber harvest, silviculture and stand tending. Tsleil-Waututh and the Province recognize that the watershed has good economic potential for ongoing forest stewardship activities, despite the challenges from previous timber harvesting practices.

The Indian River Watershed has experienced an intensive timber harvest in the last 50 years. The most accessible tracks of old growth and mature forests have been converted to young, immature forests. Consequently, over 80% of the potential forestland available for timber harvest is less than 80 years old. In the words of a Tsleil-Waututh elder, “the valley was logged stem to stern.”

For over a decade, Tsleil-Waututh has advocated for the Indian River Watershed to be managed as a holistic management unit. However, the present young condition of the forests raises significant concerns for short to mid-term timber supplies.

The intensive timber harvest activity has also had impacts on wildlife habitat, natural flow regimes, slope stability, fisheries, visual quality and availability of culturally important trees such as cedar. These concerns are compounded by the extensive road network that was developed to facilitate timber harvest.

Despite the present condition of forests, Tsleil-Waututh and Province are committed to developing forest restoration strategies that will protect important environmental and cultural values, while providing opportunities to improve forest productivity and economic viability over the long term.

In doing so, the following Objectives and Strategies were developed to guide forest stewardship:



Forest Stewardship Management Direction

Objectives	Strategies
1. Protect Tsleil-Waututh cultural values and interests from all types of forest stewardship activities.	1.1 Forest stewardship activities, including carbon sequestration, and timber or botanical forest product harvesting will adhere to management direction highlighted in the Tsleil-Waututh Cultural Values chapter.
2. Maintain and restore opportunities for forest-based Tsleil-Waututh cultural activities.	2.1 Preserve access to all forest land, including the Watershed Reserve Network, for Tsleil-Waututh cultural purposes.
3. Maintain and restore forest conditions to reflect the natural range of variability.	3.1 Design timber harvesting areas and restoration plans to be consistent with the natural disturbance regime for the watershed (NDT1 – ecosystems with rare stand-initiating events per the British Columbia Forest Practices Code Biodiversity Guidebook). 3.2 Where feasible and environmentally appropriate, restore forest stands to tree species compositions favored at the Biogeoclimatic Ecosystem Classification (BEC) site series level.
4. Maintain healthy and resilient forest ecosystems.	4.1 Monitor forest health conditions and where forest health issues exist (e.g., damaging disease, insects or abiotic disturbances) implement appropriate remediation actions. 4.2 Restrict the establishment of monocultures and prevent introduction of new invasive species. 4.3 Monitor and limit existing invasive wildlife and plant species. 4.4 Monitor the effects of climate change on forest ecosystems.
5. Enhance biodiversity and wildlife habitat values during forest stewardship activities.	5.1 Maintain or enhance a diversity of interior, edge, clearing and riparian habitats. 5.2 Retain a minimum of 25% of total stand volume per harvest block in all BEC Subzones. (9) 5.3 Promote a diversity of native species and stand structures in reforestation and silviculture plans. 5.4 Use principles of integrated pest management in forest stewardship activities.

Objectives	Strategies
6. Enhance forest productivity.	6.1 Maintain a comprehensive forest resources inventory, including accurate data on site and stand productivity. 6.2 Maintain and improve the value and productivity of the timber resource and growing stocks through silviculture practices.
7. Conduct forest stewardship operations in an economically viable manner.	7.1 Utilize economic operability analysis results to assist in defining the Timber Harvesting Land Base as depicted on Map 21. 7.2 Consider creating an Allowable Annual Cut (AAC) partition for areas that are not classified as economically operable. (10)
8. Enhance forest stewardship economic opportunities for the Tsleil-Waututh Nation.	8.1 Provide Tsleil-Waututh with the opportunity to apply for an area-based forest tenure. 8.2 Seek opportunities to pursue forestry-related carbon offset projects. 8.3 Maximize Tsleil-Waututh training and employment opportunities during forest stewardship activities.
9. Increase utilization and the value of timber resources.	9.1 Seek opportunities to assess the feasibility of utilization and value added projects such as: 9.1.1 Operating a portable sawmill in the watershed and seeking opportunities for value-added manufacturing of forest products; 9.1.2 Conducting timber salvage activities; 9.1.3 Conducting commercial thinning activities; and, 9.1.4 Establishing Christmas tree plantations under sections of
10. Provide a positive example of sustainable forest stewardship.	10.1 Promote forest stewardship activities in a diversity of public forums.
11. Integrate forest stewardship activities with other initiatives occurring in the watershed and surrounding areas.	11.1 If activity warrants, establish a Forest Stewardship Working Group to coordinate activities and report annually to the Watershed Stewardship Council.

(9) Total stand level retention per harvest block is equal to the sum of all reserve and management areas (e.g., riparian, wildlife, terrain, etc.).

(10) The ACC partitions would be based on the economic operability mapping and would divide the timber harvesting land base into independent economic harvest quotas. See Coast Forest Region Operability Review (2006) for more detail.





**TSLEIL-WAUTUTH NATION
INDIAN RIVER
WATERSHED PLAN SERIES**

**MAP 21
FOREST STEWARDSHIP**

LEGEND

Forest Service Roads

- Maintained Road
- Semi-Permanent Deactivated Road
- Secondary Road

Operability (as of March 2009)

- Timber Harvesting Landbase
- Inoperable

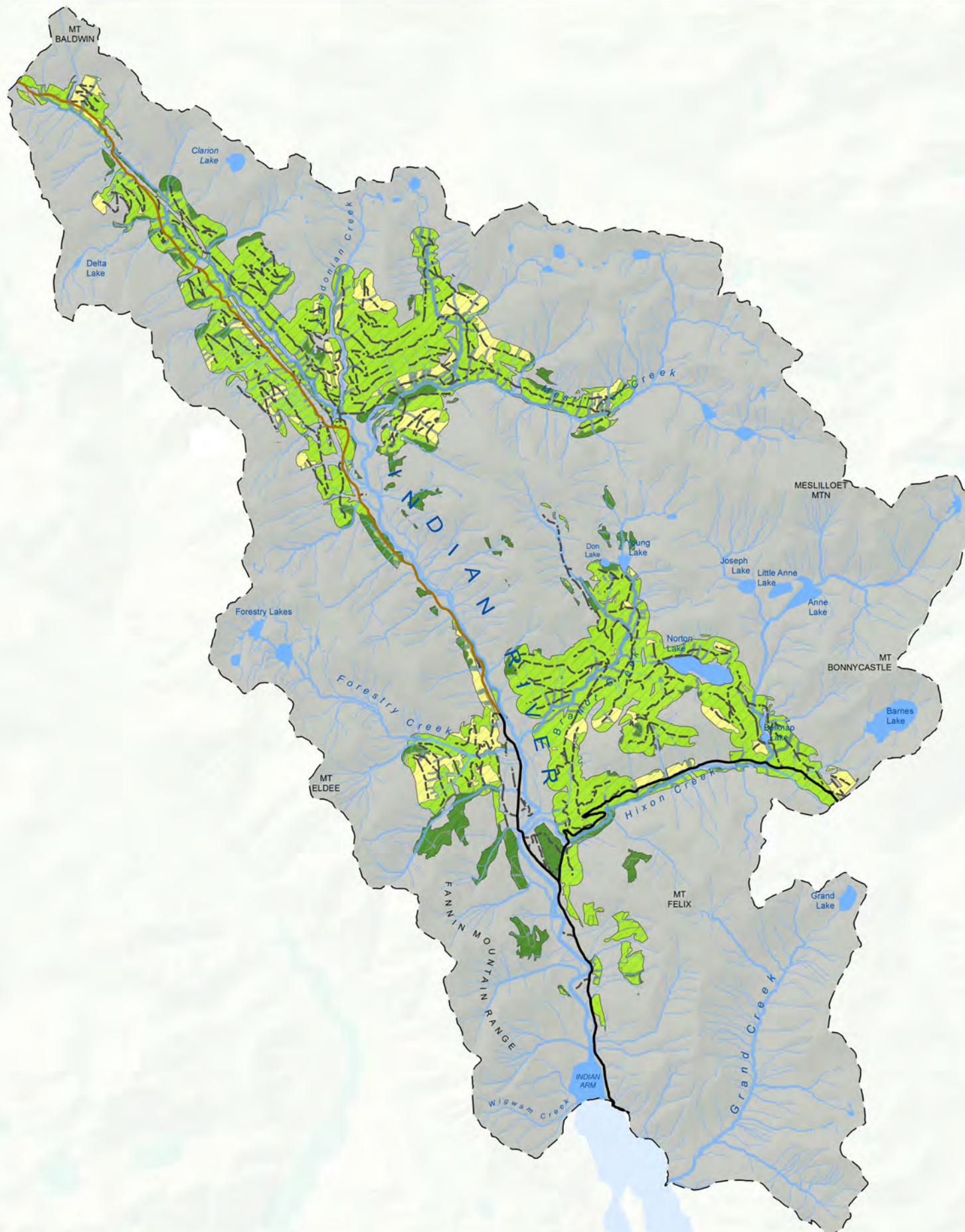
**Watershed Zonation
(within Timber Harvesting Landbase)**

- Watershed Reserve Zone
- Value Management Zone
- Integrated Zone

0 1.25 2.5 5 Kilometers

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Map produced February 2014 by Tsleil-Waututh Nation
Projection: UTM, NAD83, Zone 10
Map Scale: 1:45,000



Section 5: Implementation

Implementation Strategy

Mutual Interests

The Tsleil-Waututh Nation and the Province share a number of interests in terms of the implementation of the Indian River Watershed Plan. In general, the parties wish to:

- Ensure the provisions of an approved Plan are reflected as priority guidelines for the jurisdiction holders;
- Establish a process to monitor the effectiveness of the Plan and the degree to which it is achieving its goals, objectives and strategies;
- Develop effective processes to review and decide on proposed land uses that are consistent with the Plan;
- Develop collaborative mechanisms to deal with proposed land uses that are inconsistent with the Plan;
- Develop the objective and process criteria by which successful Plan implementation will be judged; and,
- Identify the post-approval implementation priorities in terms of further studies and other undertakings that have been identified in the Plan and develop mechanisms for resourcing those activities.

Plan Implementation Structure

To achieve these interests the following institutional structures will be developed to guide effective implementation of the Plan:

Watershed Stewardship Council

Representation on the Stewardship Council will parallel the former Steering Committee with three representatives from Tsleil-Waututh and three from the Province.

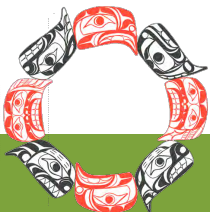
The Stewardship Council will meet annually to review Plan implementation, provide strategic direction for implementation priorities and consider proposals for land use that may be inconsistent with the Plan’s direction, but which may offer benefits in a larger land and resource use context.

Resourcing for the Stewardship Council would be provided by participating organizations on an in-kind basis.

Stewardship Working Groups

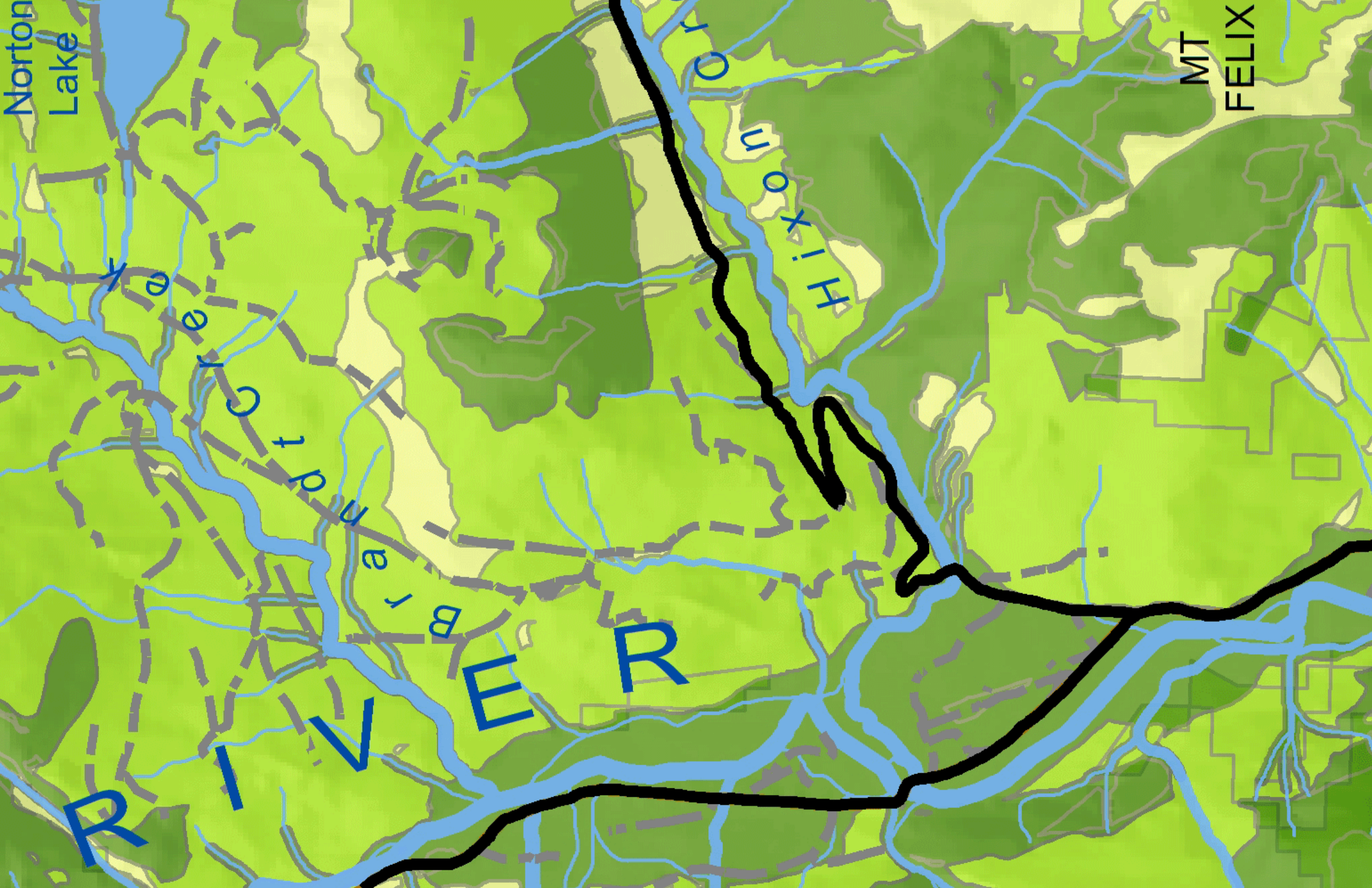
The Stewardship Council will be supported by the more informal and flexible Stewardship Working Groups. Stewardship Working Groups will engage other First Nations, government agencies, private sector and non-government organizations as required. Table 1 describes the identified Stewardship Working Groups and highlights possible members for each group.

The Stewardship Working Groups will meet as directed to undertake specific implementation initiatives and to review, consider and make recommendations to the appropriate decision makers. Resourcing for Stewardship Working Groups would be provided by participating organizations on an in-kind basis. Specific projects undertaken by the working group will require member organizations to raise funds.



Stewardship Working Group	Member Organizations
Access Management	<p>Tsleil-Waututh Nation</p> <p>Ministry of Forests, Lands and Natural Resource Operations</p> <p>Fortis BC</p> <p>BC Hydro</p> <p>Inlailawatash Forestry Limited Partnership</p>
Safety, Monitoring and Enforcement	<p>Tsleil-Waututh Nation</p> <p>Ministry of Environment</p> <p>Ministry of Forests, Lands and Natural Resource Operations</p> <p>Fisheries and Oceans Canada</p> <p>Royal Canadian Mounted Police</p> <p>Northshore Search and Rescue</p>
Tourism and Recreation	<p>Tsleil-Waututh Nation</p> <p>Ministry of Community, Sport and Cultural Development</p> <p>Ministry of Environment – BC Parks</p> <p>Fisheries and Oceans Canada</p> <p>Takaya Tours</p> <p>Inlailawatash Forestry Limited Partnership</p>
Mineral and Aggregate Development	<p>Tsleil-Waututh Nation</p> <p>Ministry of Energy, Mines and Natural Gas</p> <p>Ministry of Agriculture</p>
Fisheries and Marine Resources	<p>Tsleil-Waututh Nation</p> <p>Fisheries and Oceans Canada</p> <p>Ministry of Environment</p>
Energy Infrastructure	<p>Tsleil-Waututh Nation</p> <p>Ministry of Energy, Mines and Natural Gas</p> <p>Ministry of Forests, Lands and Natural Resource Operations</p> <p>Fortis BC</p> <p>BC Hydro</p>
Forest Stewardship	<p>Tsleil-Waututh Nation</p> <p>Ministry of Forests, Lands and Natural Resource Operations</p> <p>Inlailawatash Forestry Limited Partnership</p>







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