

Current Condition Summary for PNG Sector - Moose and Old Forest

The Regional Strategic Environmental Assessment (RSEA) was a partnership between seven Treaty 8 First Nations (Blueberry River, Doig River, Halfway River, Prophet River, Saulteau, West Moberly and McLeod Lake) and the Province of BC, under the Environmental Stewardship Initiative (ESI). ESI partnerships between BC and Indigenous Nations are designed to produce high-quality, accessible and trusted environmental information to inform planning and management. The RSEA completed current condition assessments for five values in northeastern BC between 2016 and 2022 (Peaceful Enjoyment, Environmental Livelihoods, Water, Forest Biodiversity, Moose).

Summary purpose: Share highlights from the 2018 RSEA current condition assessments for Moose and Old Forest, to support proponent conformance with the Blueberry River First Nation Implementation Agreement rules with the BC Energy Regulator.

MOOSE

Moose populations are affected by the condition of the land and the capacity of moose habitat to provide adequate food and shelter. For the purposes of RSEA moose assessment, it was assumed that better habitats are better for moose populations. The main factors believed to influence habitat effectiveness are the amount of mature and old forests for winter shelter, having adequate forage near winter shelter and security cover, and distance from human disturbances such as roads.

RSEA developed a moose risk rating that combines population trends with information on land-based disturbance. This risk rating, therefore, captures a broader view of the condition of moose and their habitats for the northeast (NE) than just looking at habitat alone. The rating assigns several flags to each Wildlife Management Unit (WMU) depending on the population trend (decreasing, stable, increasing) and the condition of key habitat indicators such as road density, area of effective seasonal shelter and forage habitat. The more moose population flags, the higher the overall risk rating (Low, Moderate or High Risk).

A habitat effectiveness assessment, focused on four factors (outlined below), informed the overall moose risk rating results

1. Winter Shelter

Winter shelter habitat suitability is estimated from Biogeoclimatic Zone (BEC) unit, leading tree species, structure (age), and stand composition (i.e., coniferous was rated higher than mixed stands which was rated higher than broadleaf leading stands).

To receive the highest rating, stands need to be mature or old forests with mixed to coniferous crown cover.

2. *Winter Forage*

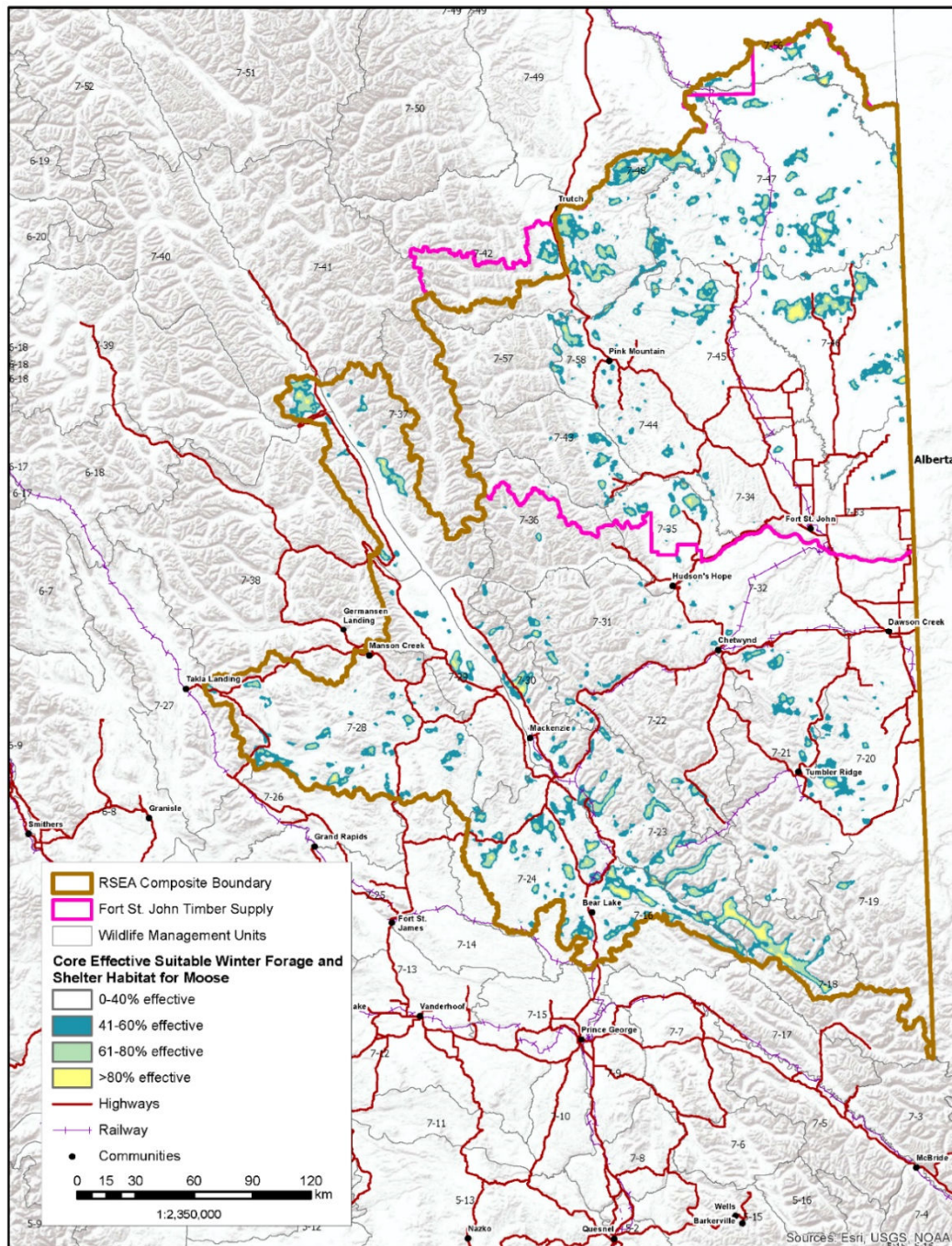
Winter forage habitat suitability for moose is based on BEC unit, ecosystem type (e.g., wetland, forest, riparian, meadow, cultivated fields, etc.), structural stage (e.g., shrub vs. dense young forest), and stand composition (i.e., deciduous is rated highest). Winter forage habitat is further stratified into: (a) static habitat that does not progress through significant seral succession and includes wetlands, riparian areas, self-sustaining deciduous forests and floodplains; and (b) dynamic habitat that is created by disturbances such as fire or forest harvesting which put forested sites back to an earlier, shrubby successional stage that lasts for a relatively short period of time at a specific location.

To be considered effective, winter forage habitat must be located outside disturbance buffers and close to suitable winter shelter.

3. *Core Effective Areas for Winter Shelter and Forage*

Areas where winter shelter and forage are in proximity to each other are considered of higher value to moose compared to large areas of just shelter or just food. This indicator measures moose winter range potential containing effective shelter AND static and dynamic forage within a 10km² search area. (Figure 1)

Figure 1: Potential core effective areas – winter shelter and forage



4. Population Trend

The provincial population dynamics model results show declining moose populations in most of the RSEA Game Management Zones (GMZ) from 1996-2015 except for one GMZ which maintained a stable population in this same period. This same analysis showed that 1996-2005 was generally a period of stable or increasing populations, with only one GMZ showing a

The overall results of the moose assessment are illustrated in Figure 2 and Figure 3 below.

Figure 2: RSEA Moose - Overall Risk Rating within the study area

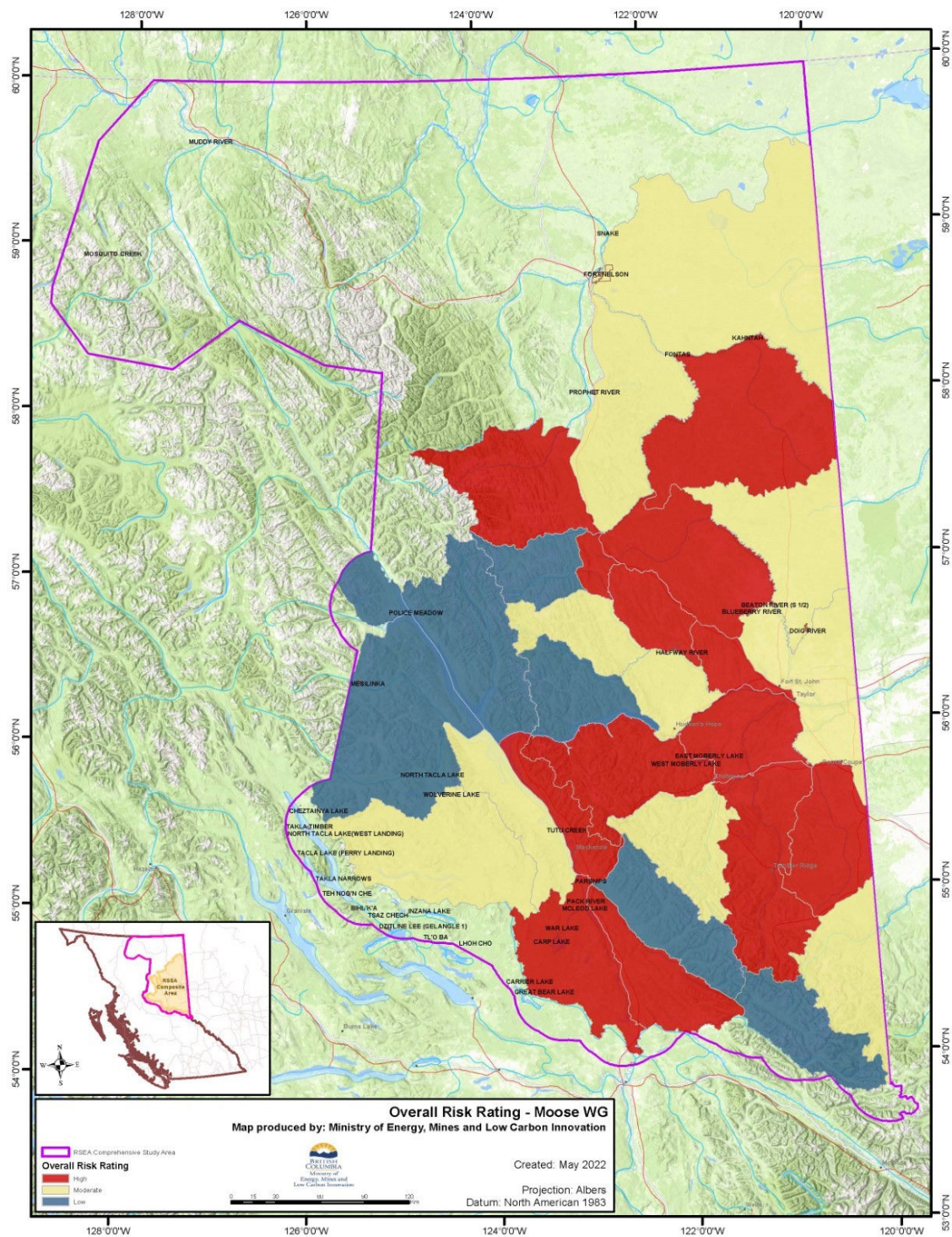


Figure 3: Overall Risk Rating by WMU

WMU ID	Overall Risk – Rating ¹	Total Area of WMU in project area (ha)	WHR for Winter Shelter	WHR for Winter Forage	Population		Disturbance		HEM Patch Size Analysis	HEM Proximity Analysis	HEM Proximity Analysis	Focal Statistics (10km ²)	Primary Indicator Population Flags ^{5,9}	Secondary Indicator Disturbance Flags	Secondary Indicator Habitat Flags
			% Area of Suitable Class 1-3 Winter Shelter ²	% Area of Suitable Class 1-3 Winter Forage	Provincial CEF Assess. Population Trend 2013-2018	Regional SRB Data Population Trend – Short- and Long-Term Trends ¹	Km of road per km ² ^{4,5}	Area of Identified Disturbance (buffers) (%)	% Potential Effective Winter Shelter (Step 2)*	% Potential Effective Dynamic Forage (Step 2)*	% Potential Effective Static Forage (Step 2)**	% Potential Core Effective Winter Habitat ⁷			
7-16	High	250,557	40%	18%	Decreasing	Not available	1.58	21%	32%	7%	5%	11%	3	2	3
7-18	Low	186,745	27%	14%	Increasing	Not available	0.56	5%	29%	3%	1%	26%	0	0	4
7-19	Moderate	436,630	19%	9%	Stable	Not available	0.87	10%	3%	2%	2%	1%	0	1	6
7-20	High	436,447	54%	57%	Decreasing	Up 53% from 1998-2016/17	1.97	33%	10%	6%	7%	1%	3	3	2
7-21	High	673,121	29%	30%	Decreasing	Not available	1.68	22%	5%	4%	5%	0%	3	2	2
7-22	Moderate	415,946	28%	16%	Stable	Not available	0.98	20%	4%	2%	1%	1%	0	1	4
7-23	Low	434,653	28%	11%	Increasing	Not available	0.45	6%	22%	2%	2%	12%	0	0	4
7-24	High	364,842	44%	37%	Decreasing	Not available	1.90	32%	20%	15%	6%	4%	3	3	2
7-28	Moderate	765,010	33%	11%	Stable	Not available	0.69	16%	13%	7%	2%	2%	0	1	4
7-29	Moderate	360,781	30%	13%	Stable	Not available	1.11	24%	12%	8%	5%	1%	0	1	4
7-30	High	241,121	23%	9%	Decreasing	Not available	0.77	14%	17%	5%	5%	5%	3	1	5
7-31	High	539,759	20%	13%	Decreasing	Down 12% from 2013-2017/18	0.90	15%	9%	3%	3%	1%	5	1	5
7-32	High	368,356	29%	70%	Decreasing	Up 30% from 2012-2017/18	1.84	37%	2%	6%	4%	0%	3	3	2
7-33	Moderate	577,709	10%	19%	Stable	Up 24% from 2006-2019	2.17	57%	1%	2%	3%	0%	0	3	5
7-34	High	150,932	22%	58%	Decreasing	Down 51% from 1997-2019	2.46	43%	2%	5%	10%	0%	5	3	3
7-35	Moderate	237,550	45%	48%	Stable	Up 64% from 2011-2013/14	1.53	31%	9%	6%	10%	1%	0	2	2
7-36	Low	338,483	20%	6%	Increasing	Not available	0.36	5%	4%	1%	2%	0%	0	0	5
7-37	Low	345,189	20%	6%	Increasing	Not available	0.24	6%	8%	2%	4%	4%	0	0	5
7-38	Low	134,584	19%	14%	Stable	Not available	0.47	13%	13%	6%	4%	1%	0	0	5
7-40	Low	42,425	39%	11%	Increasing	Not available	0.25	15%	40%	7%	5%	35%	0	0	4
7-42	High	108,035	20%	22%	Increasing	Down 68% from 2001-2014/15	0.32	12%	2%	0%	13%	0%	3	0	4
7-43	Moderate	303,293	28%	11%	Increasing	Not available	0.66	10%	7%	2%	8%	1%	0	1	4
7-44	High	236,902	40%	38%	Decreasing	Down 22% from 1996-2012/13	2.23	41%	6%	5%	19%	0%	5	3	2
7-45	High	621,410	51%	28%	Stable	Down 65% from 1998-2019	1.90	43%	9%	6%	12%	0%	3	3	2
7-46	Moderate	614,369	19%	47%	Stable	Not available	1.35	40%	12%	1%	20%	3%	0	2	3
7-47	High	988,492	19%	63%	Decreasing	Not available	0.87	23%	6%	1%	21%	0%	3	1	3
7-48	Moderate	355,393	60%	37%	Increasing	Not available	0.70	18%	18%	1%	22%	5%	0	1	2
7-56	Moderate	169,686	6%	78%	Increasing	Not available	0.67	11%	3%	0%	15%	0%	0	1	4
7-57	Low	251,587	7%	20%	Increasing	Not available	0.21	2%	3%	0%	5%	1%	0	0	5
7-58	High	78,849	53%	32%	Decreasing	Not available	1.52	30%	21%	1%	20%	7%	3	2	2

Find the core effective winter forage and shelter habitat for moose in the BCER Data Catalogue here: [Data Centre | BC Energy Regulator \(BCER\) \(bc-er.ca\)](https://data.bcer.ca/)

OLD FOREST

Old forests or “old growth” forests are generally described as forests late in the successional cycle of an ecosystem. A hallmark of old forests is that they contain old trees, but so much more is important about them. These forests provide ecologically valuable or critical habitats for animal and plant species as well as unique conditions and processes that are important for the conservation of biodiversity. Functional old forests deliver ecosystem services valued by people, including food, water, fuel, medicines, timber, recreation and tourism opportunities. Old forests provide cultural and spiritual values important to First Nations.

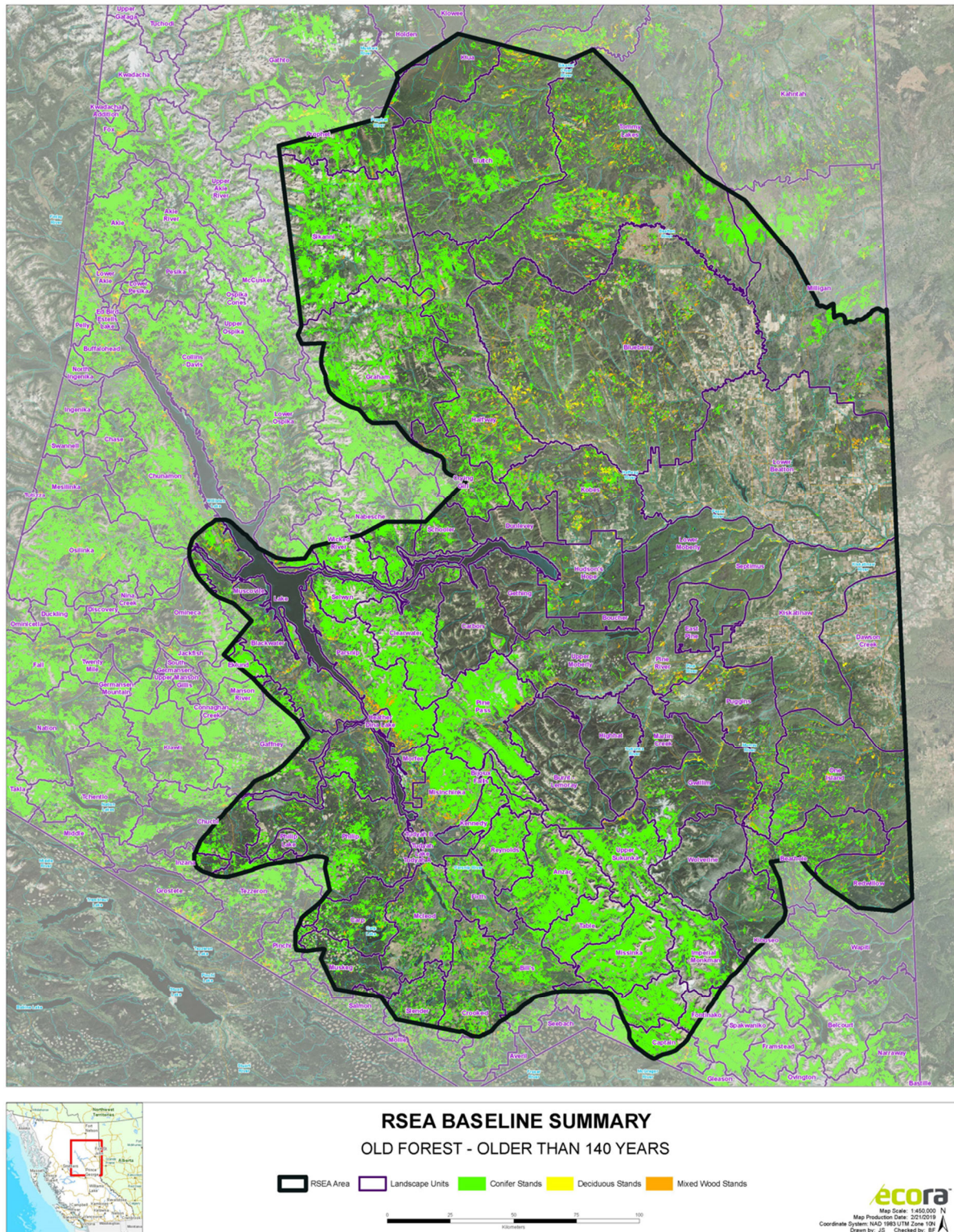
Provincial policy for managing old forest has been based on the concept that the further from the natural distribution of old forest the higher the risk to biodiversity and ecological health. In the RSEA context, risk also relates to the ability of First Nations to exercise treaty rights on the landscape. Note that the RSEA Old Forest assessment reports on current condition based only on the amount of forest, not at the condition of forested ecosystems.

The RSEA Old Forest Assessment applied two age thresholds (> 140 years and > 250 years) to assess the amount and distribution of all old forests. The range of natural variability (RNV) provided a baseline for coarse filter assessment of biodiversity risk and ability to exercise treaty rights. Risk increases as available old forests decrease relative to RNV.

- Where the amount of old forest lies within RNV (between the upper and lower ends of the range), risk is assumed to be Low to Very Low. (Figure 5)
- Where amounts of old forest are below RNV, the RSEA further assessed risk by comparing to the midpoint of RNV, i.e., which is the average amount expected naturally. BC research of habitat supply in different ecosystems suggests that risk is Moderate when more than 70% of the midpoint of natural forest remains; conversely that the risk is Very High when less than 30% of the total amount of an ecosystem remains. The RSEA assessment conservatively assigned a Very High rating when the amount of old forest is less than 50% of RNV.

For the purpose of implementation and this RSEA assessment, old forest and contiguous old forest can be considered everything that is 140 years and older, that is contiguous, defined as touching or adjacent polygons.

Figure 4: Map of old forest > 140 years old in RSEA study area



Additional information around RNV and risk ratings in different geographic areas or NDUs is summarized below.

Figure 5: Defining RNV categories for old forest

Risk	Definition
Very Low	Midpoint to upper end of RNV (and above)
Low	Midpoint to lower end of RNV
Moderate	Below RNV; >70% of RNV midpoint
High	Below RNV; 50 - 70% of RNV midpoint
Very High	Below RNV; <50% of RNV midpoint

Amount of Old Forest by Natural Disturbance Unit

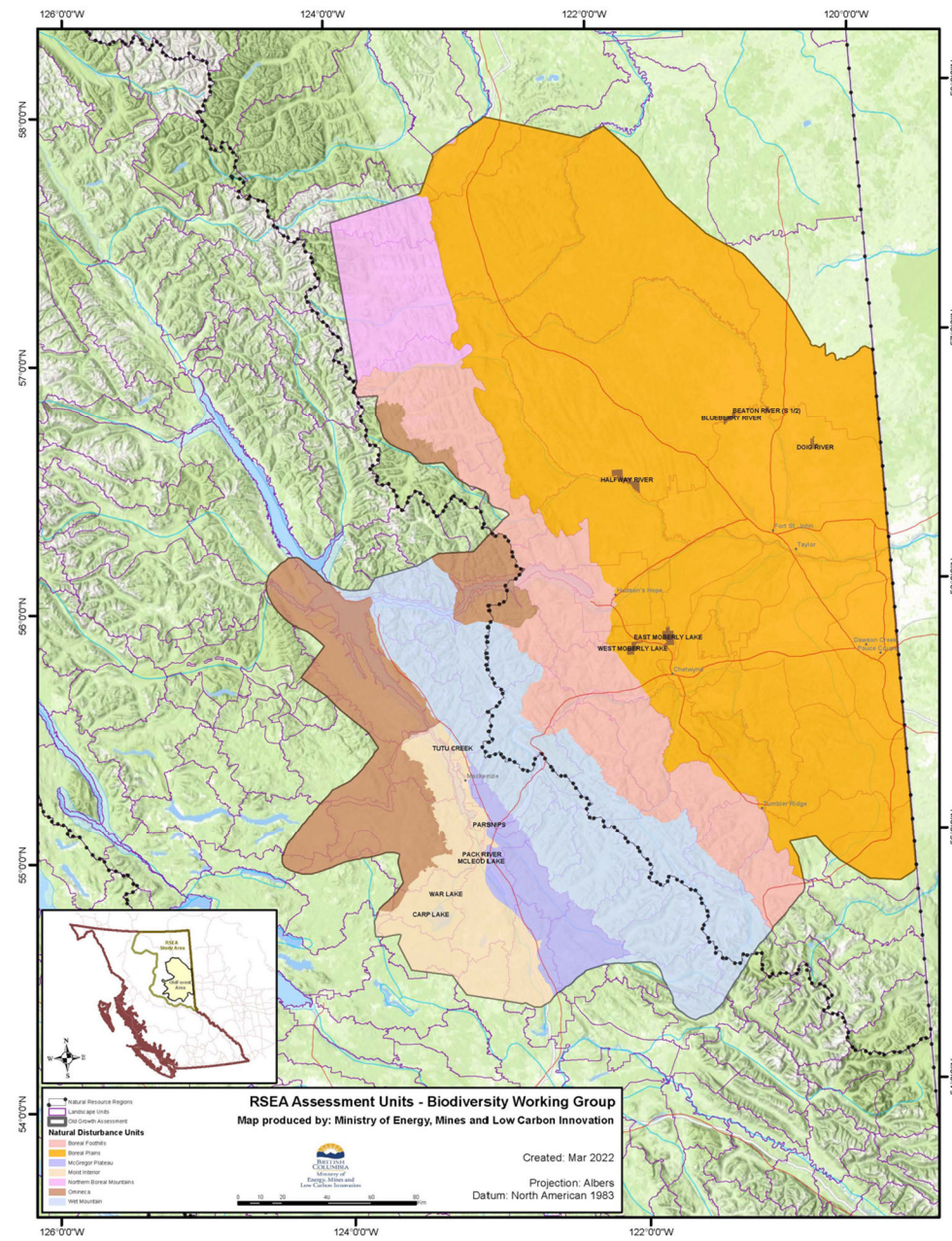
Natural Disturbance Units (NDU) are large areas in northeastern BC that can be delineated based on differences in disturbance processes, stand development, and temporal and spatial landscape pattern. There are nine NDUs within the RSEA study area. Figure 7 illustrates the NDUs for general reference.

The RSEA assessment determined that two NDUs, the North Boreal Mountains and Boreal Foothills-Mountain NDUs, have amounts of old forest >140 years within RNV, so at Low to Very Low Risk. All other NDUs have less old forest >140 years than RNV, and thus were found to be between Moderate to Very High risk with respect to ecological integrity, and likely, functioning of the natural landscape. (Figure 6)

Figure 6: Amount of old forest (>140 years, >0 m, 100 m, and 250 m from disturbance) in each natural disturbance unit (NDU) compared with the expected amount >140 years.

Natural Disturbance Unit	Expected % >140 years mid (low-high)	Total forest (ha)	Forest >140 years (ha) 0 m buffer	Forest >140 years (%)	Forest >140 years (ha) 100 m buffer	Forest >140 years (%)	Forest >140 years (ha) 250 m buffer	Forest >140 years (%)
Boreal Foothills-Mountain	41 (33 - 49)	326,331	118,825	36	109,858	34	99,838	31
Boreal Foothills-Valley	31.5 (23 - 40)	157,070	17,509	11	12,742	8	8,566	5
Boreal Plains-Upland	25 (17 - 33)	3,657,355	392,426	11	293,538	8	195,952	5
McGregor Plateau	52 (43 - 61)	202,374	25,643	13	16,073	8	8,858	4
Moist Interior-Plateau	25 (17 - 33)	364,085	28,530	8	17,240	5	10,258	3
Northern Boreal Mountains	48.5 (37 - 60)	251,199	144,741	58	142,516	57	139,512	56
Omineca-Mountain	63.5 (58 - 69)	250,202	108,837	43	102,449	41	93,844	38
Omineca-Valley	31.5 (23 - 40)	242,875	27,955	12	17,337	7	9,514	4
Wet Mountain	86.5 (84 - 89)	834,730	579,520	69	545,999	64	509,182	61

Figure 7: Map of NDUs, for general reference



Additional related data:

- **RSEA disturbance layer.** BC Data Catalogue [Regional Strategic Environmental Assessment - Disturbance Layer - Northeast BC - Datasets - Data Catalogue \(gov.bc.ca\)](https://data.gov.bc.ca/dataset/regional-strategic-environmental-assessment-disturbance-layer-northeast-bc-datasets)
 - The RSEA disturbance dataset for northeast British Columbia (2018) brings together landscape disturbance data into a consistent format for use in land and environmental management decisions. In this context, the word disturbance includes characterization of anthropogenic developments and a set of natural impacts that have changed the landscape in Northeastern British Columbia.

Contacts:

Angela White, Section Head, Resource Stewardship Operations, Northeast Region.

Email: Angela.White@gov.bc.ca

Jennifer Brooks, NE Geospatial Services Team Lead.

Email: Jennifer.Brooks@gov.bc.ca

BCER Inquiries:

Email: systems@bc-er.ca