WSP Indicator Analysis for the Babine Lake Watershed:

Total Land Cover Alteration

Freshwater Atlas (FWA) Assessment Watersheds

Prepared for:

Lake Babine Nation
225 Sus Ave
Burns Lake, BC V0J 1E0

Prepared by:

Eclipse Geomatics Ltd.
3423 Fulton Avenue Unit 102
Smithers BC V0J 2N0

May 2024

Note to reader:

These Wild Salmon Policy (WSP) habitat indicator assessment reports are intended as a coarse filter approach to identify watersheds that are potentially at risk of exceeding thresholds for the four WSP habitat indicators (Road Density, Stream Crossing Density, Total Land Cover Alteration, and Riparian Disturbance). These reports present the results of GIS-based (Tier 1) methods for assessing the status of a particular freshwater aquatic habitat pressure indicator and determining the watershed indicator "risk" status by comparing the measured values to indicator benchmarks. Pressure indicators are identified by Canada's WSP as proactive measures of identifying potential impacts to salmon habitat within a watershed. Additional information on the WSP is available at https://www.pac.dfo-mpo.gc.ca/fm-gp/salmon-saumon/wsp-pss/ip-pmo/ip-smm-pmo-eng.html#assessment.

The analysis presented in this report was carried out using standardized provincial datasets and did not integrate field-based (Tier 2) information or industry datasets. The results are presented for informational purposes and are not intended to replace operational watershed assessments.

Acknowledgments

[Acknowledgements]

WSP Indicator Analysis for the Babine Lake Watershed

Pressure Indicator: Total Land Cover Alteration

Assessment Units: FWA Assessment Watersheds

Description of Pressure Indicator

Total Land Cover Alteration (TLCA) refers to the change in land surface cover following human development or natural disturbance events, resulting in a suite of potential changes to hydrological processes and sediment generation, with potential impacts to downstream salmon habitat as well as changes in biodiversity (Stalberg et al., 2009). Land cover alteration categories include agriculture, urban development, mining activity, road and utility development, forestry, and fire disturbance. TLCA is reported as a percentage of the total area assessed. The Wild Salmon Policy (WSP) Habitat Working Group has ranked TLCA as a high value pressure indicator (Stalberg et al., 2009).

Study Area

The Babine Lake Watershed is situated in the interior of northwest BC and covers an area of 6,555 km^2 (Figure 1). Babine Lake is one of the largest natural lakes in BC and hosts important salmon spawning and rearing habitat.

This report presents results for BC Freshwater Atlas (FWA) assessment watersheds within the Babine Lake Watershed. FWA assessment watersheds are mesoscale groupings of fundamental watersheds with a target size of between 2,000 ha and 10,000 ha (Province of BC, 2020). A reference map of the study area with FWA assessment watersheds identified is included as Appendix A.

Figure 1: The study area is indicated in red. The grey polygon indicates the outline of the Skeena River watershed.

Methodology

Data layers used to perform the spatial analysis include:

- Digital Road Atlas (BC Ministry of Land, Water & Resource Stewardship [MLWRS], 2024a)
- Forest Tenure Road Section Lines (BC Ministry of Forests, 2024b)
- Harvested Areas of BC (Consolidated Cutblocks) (BC Ministry of Forests, 2024c)
- Vegetation Resources Inventory (VRI) (BC Ministry of Forests, 2024d)
- BC Transmission Lines (BC MLWRS, 2024b)
- TANTALIS – Crown Tenures (BC MLWRS, 2024c)
- Railway Track Line (BC MLWRS, 2024d)
- Fire Perimeters - Historical (BC MLWRS, 2024e)
- TANTALIS - Surveyed Right-of-way Parcels (BC MLWRS, 2024f)
- TANTALIS - Crown Land Right-of-way Parcels (BC MLWRS, 2024g)
- Oil and Gas Commission Pipeline Segment Permits (BC Oil and Gas Commission, 2024)
- Permitted Mine Areas - Major Mine (BC Ministry of Energy, Mines and Low Carbon Innovation, 2024)
- Baseline Thematic Mapping (BTM) (BC MFLNRORD, 2019b)
- Freshwater Atlas (FWA) Assessment Watersheds (BC MFLNRORD, 2019c)
- FWA Lakes (BC MFLNRORD, 2019d)
- FWA Atlas Manmade Waterbodies (BC MFLNRORD, 2019e)
- FWA Rivers (BC MFLNRORD, 2019f)

For the purposes of this study, anthropogenic alterations to the land base were calculated as well as natural disturbance from wildfires. Principal sources of human disturbance identified within the study area include forest harvesting (cutblocks) and access road corridors.

Linear Disturbance Characterization

An updated roads layer was developed for the purposes of this analysis. Overlapping roads within the DRA and FTEN subsets were removed by applying a 30 m buffer to the DRA subset and selecting FTEN roads outside of the buffer. The extracted DRA and FTEN roads were then merged to produce the input roads dataset.

Calculated road, railway, and transmission line right-of-way buffer widths were applied to the respective disturbance layers as set out below, where buffer width refers to the total width of each right-of-way:

Description	Modelled Buffer Width (m)
Trail	0
Overgrown Road	5
Unimproved Road	10
Resource Road	15
Main Resource Road	20
Local Road	25
Highways Road	50
Railway	15
Transmission Line	30

Modelled buffer widths were derived for DRA, and FTEN road features with characterization estimated based on available attributes for each dataset. Refer to Appendix B for details on the method applied.

Land cover alteration along pipeline rights-of-way and other utility corridors was estimated from the TANTALIS – Crown Tenures dataset selected for utility and transportation with a tenure stage of "tenure" (i.e. active tenures), from the TANTALIS - Surveyed Right-of-way Parcels, the TANTALIS - Crown Land Rights of way with a tenure stage of "tenure", and the Oil and Gas Commission Pipeline Segment Permits with a construction description of "constructed" and a buffer width of 18m. The utility category does not include the Prince Rupert Gas Transmission Project, which has been permitted but to our knowledge not constructed.

Forestry Disturbance Characterization

The Consolidated Cutblocks layer was used to identify disturbance from forest harvesting within the last 60 years (i.e. harvested since 1961). This is consistent with the approach used by the Pacific Salmon Foundation (2020).

Other Anthropogenic Disturbance Characterization

Additional sources of land cover alteration were estimated from the TANTALIS – Crown Tenures dataset selected for agriculture, industrial, commercial, quarrying, residential, and community tenure purposes with a tenure stage of "tenure" (i.e. active tenures).

Urban and developed areas were identified using the BTM filtered for land use of "Urban", and the VRI filtered for land classifications of "urban" and "airport".

Areas disturbed by agriculture or rural residential use were identified using the BTM dataset filtered for land uses of "Agricultural" and "Residential Agricultural Mixtures", and the VRI dataset filtered for non-productive descriptors of "clearing" and "hayfield".

Mine footprints were estimated from the Permitted Mine Areas - Major Mine layer, the BTM filtered for land use of "Mining", and the VRI filtered for land classifications of "mine spoils", "gravel pit", "open pit mining", and "tailings".

For the purposes of this analysis, 'other' disturbance includes disturbance from settlements, agriculture, industrial and commercial areas, mines, pipelines, transmission lines, and railways.

Natural Disturbance Characterization

The Fire Perimeters layer was used to estimate fire disturbance within the last 25 years (i.e. fires post 1997), consistent with the approach used by the Pacific Salmon Foundation (2020).

Land Base Calculation

In order to generate TLCA based on the available land area within each assessment unit, the areas covered by freshwater were removed from the assessment unit prior to the intersection with the disturbance layer. This approach was used to improve TLCA reporting for assessment units containing large water bodies (e.g. Babine Lake), where using the total watershed area in the calculation would under-report TLCA impacts on the land base. This

approach is consistent with the BC Cumulative Effects Framework methodology (Provincial Aquatic Ecosystems Technical Working Group [PAETWG], 2020) but represents a change from previous analyses (Eclipse Geomatics Ltd., 2020). The FWA Lakes, Rivers, and Manmade Waterbody datasets were used to identify areas covered by freshwater.

TLCA Calculation

A hierarchy based on the predicted degree of disturbance was applied in order to report estimated total disturbed areas by disturbance type without overlaps: overlapping 'other' disturbances (railways, transmission lines, mines, settlements, agriculture, and tenures) were removed from harvested areas, 'other' disturbances and harvested areas were removed from road areas, and 'other' disturbances, harvested areas, and road areas were removed from fire disturbance areas.

TLCA was calculated by merging all the disturbance layers into a total disturbance layer for each assessment unit and dividing the total disturbed area by each assessment unit using the land area of FWA assessment watersheds as assessment units. Figure 2 shows the location and types of land cover alteration with respect to the assessment units.

This analysis follows the methodology set out by the Pacific Salmon Foundation (2020) for Total Land Cover Alteration with the following adaptions:

- Application of the buffer widths provided by G. Buhr as they were considered more accurate for roads and more conservative for rail and transmission line disturbance; and
- Use of the assessment unit land area not covered by freshwater features in order to improve reporting of TLCA for assessment units containing large waterbodies.

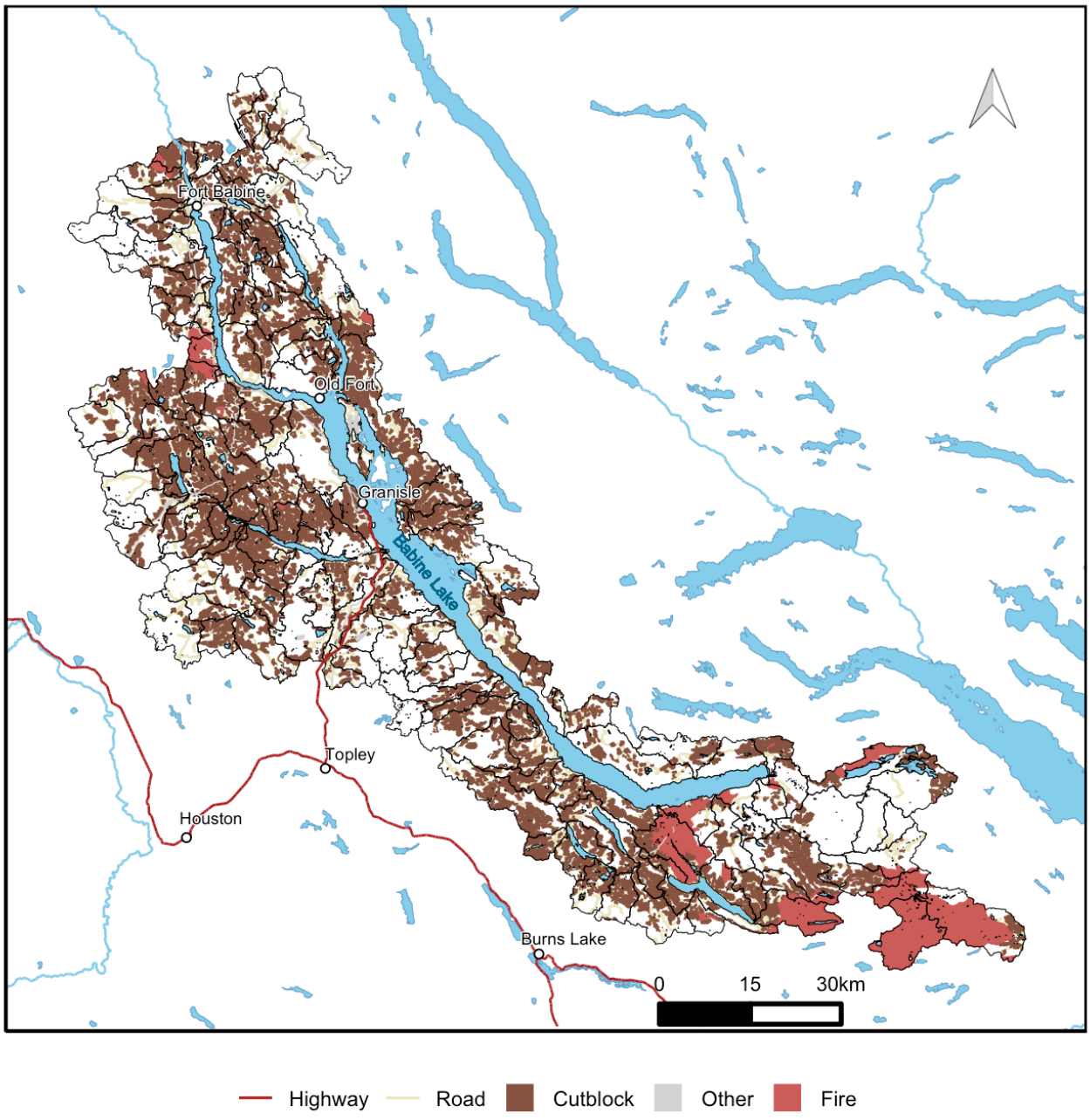

Figure 2: Assessment units and land cover alteration in the study area, including alteration by roads; forest harvesting; wildfire; and agricultural, industrial, utility, transportation, commercial, quarrying, residential and community land tenures, railways, powerlines, and settlements, shown collectively as other disturbance.

Risk Threshold

Categorical risk thresholds applied were generated by the Pacific Salmon Foundation based on the relative distribution of values across all Skeena River watersheds (Porter et al., 2014) and are tabulated below:

Threshold Rating	Percent of Total Land Cover Altered (%)
Low	< 6.4%
Moderate	≥ 6.4% and < 22%
High	≥ 22%

Results of Analysis

A summary of the results of the TLCA analysis with categorical risk thresholds for each assessment unit are shown as Figure 3; Figure 4 provides an overview of the results distribution. Detailed results for each assessment unit are tabulated in Appendix C, and the distribution of the assessment results are shown as a series of figures in Appendix D.

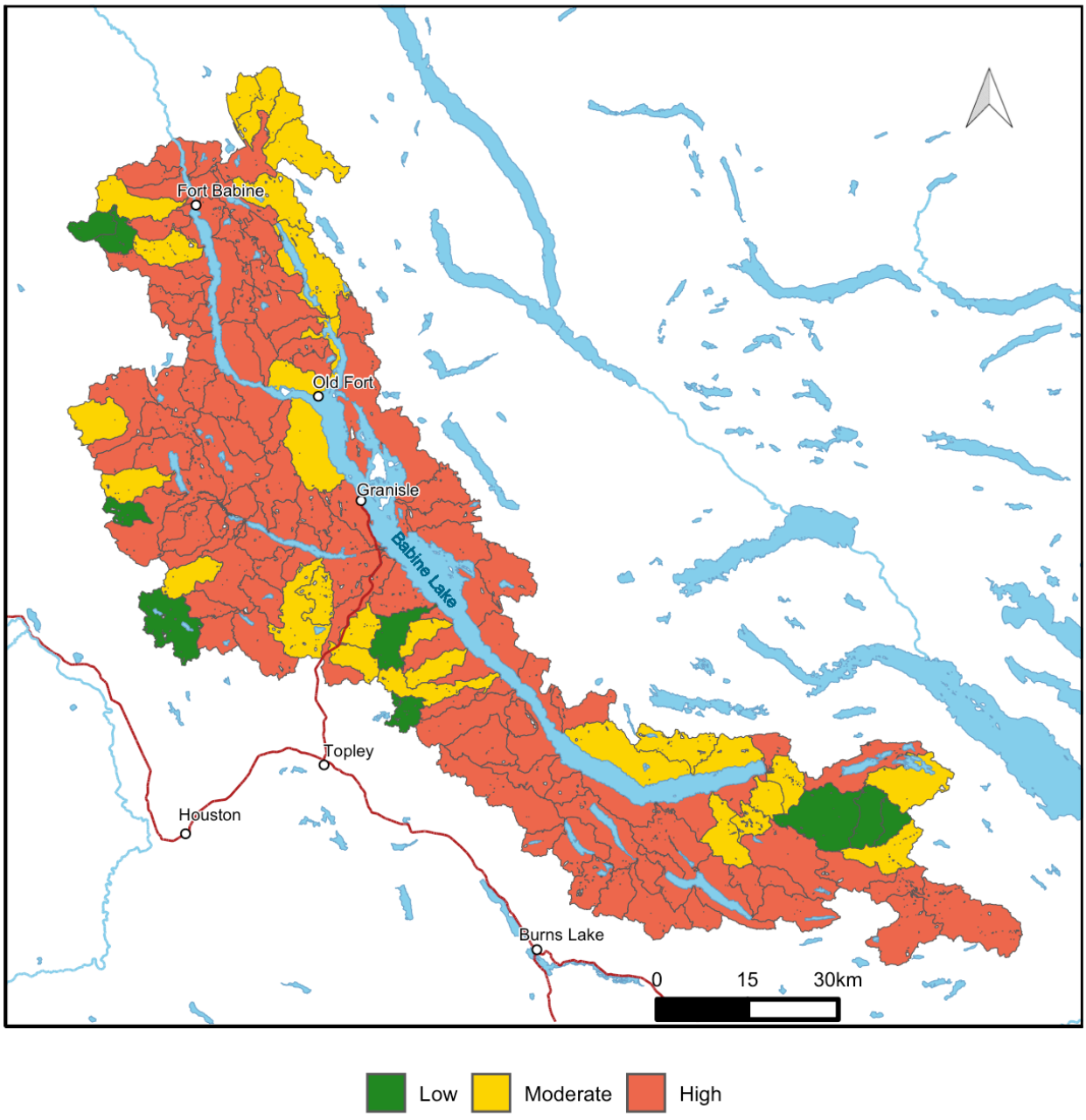

Figure 3: Total land cover alteration for each boundary in the study area is shown on a study area map. The results are colourized by risk threshold (low risk < 6.4% of land area altered, moderate risk ≥ 6.4 and < 22% of land area altered, high risk ≥ 22% of land area altered).

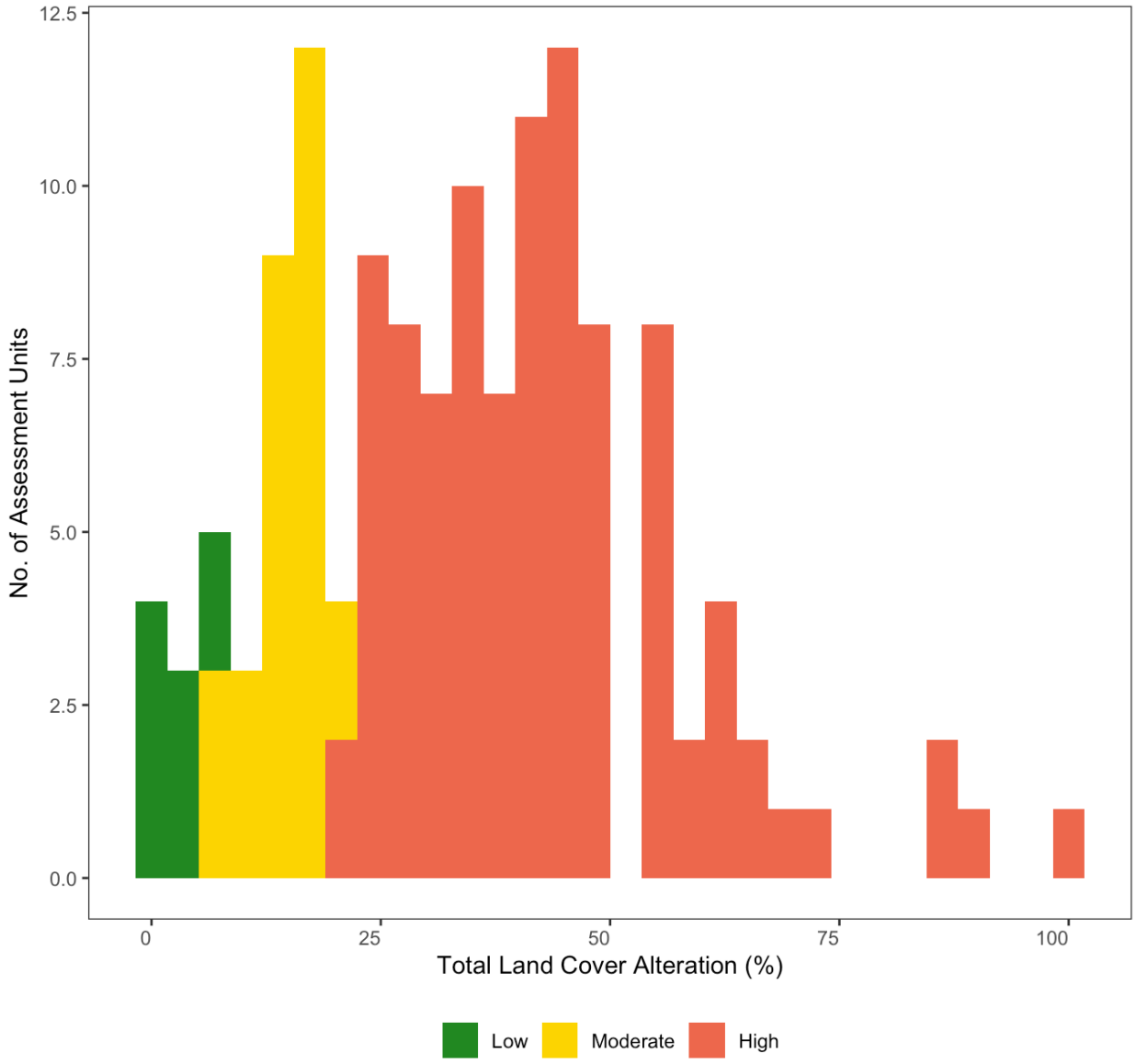

Figure 4: Distribution of results showing the number (count) of assessment units by total land cover alteration. The results are colorized by risk threshold (low risk < 6.4% of land area altered, moderate risk ≥ 6.4% and < 22% of land area altered, high risk ≥ 22% of land area altered).

Total land cover alteration was calculated for a total of 134 assessment units. Values ranged from 0 to a maximum of 100% within the Duncan Creek (394) sub-watershed in an area impacted by wildfire in the southeast portion of the study area (Figure 4; Appendix C and Appendix D). A majority of 96 assessment units had TLCA values above the threshold for high risk and an additional 29 assessment units had TLCA values in the moderate risk threshold range (Figure 3). Assessment units at high and moderate risk of impacts from principally forestry cutblocks, road development and wildfire disturbance are situated throughout the watershed (Figures 2 and 3).

Summary of Results

Total land cover alteration estimations from forestry activities, transportation and utility corridors, agriculture, settlements, and other industrial activities were calculated for 134 FWA watersheds within the Babine Lake Watershed using datasets sourced from the Province of BC. Risk categories derived by the Pacific Salmon Foundation were used to assess risk to freshwater habitat from TLCA.

Results of the analysis indicated TLCA within the study area ranged from 0 to 100% of the total assessment unit area, with 96 assessment units at high risk and 29 assessment units at moderate risk from TLCA-related impacts throughout the study area.

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Appendix A: Reference Maps

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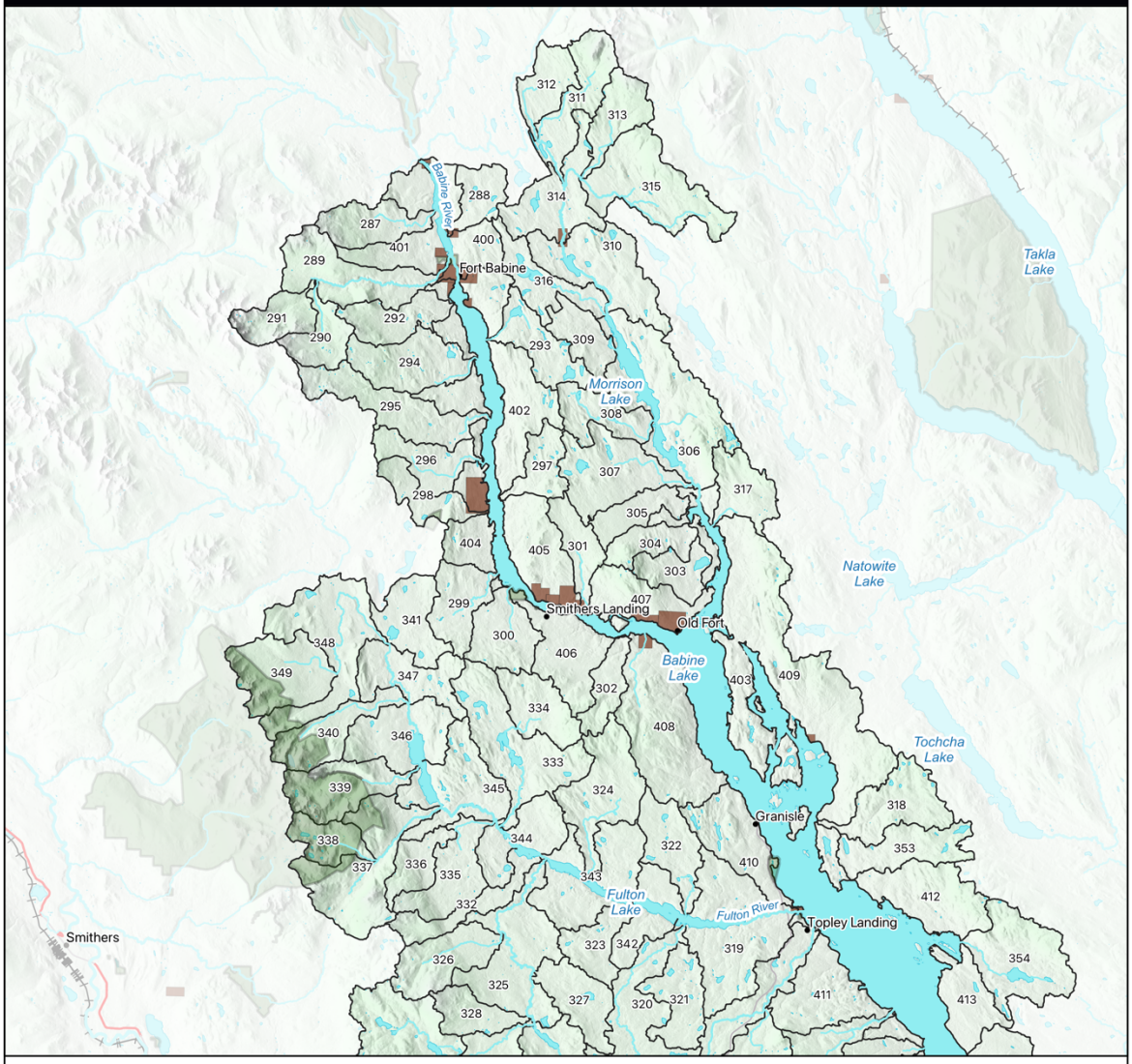
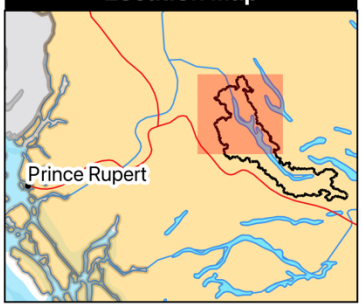
Babine Lake Reference Map - Northwest



Location Map



Legend

- FWA Assessment Watershed
- Park
- Reserve

0 10 20 km

N
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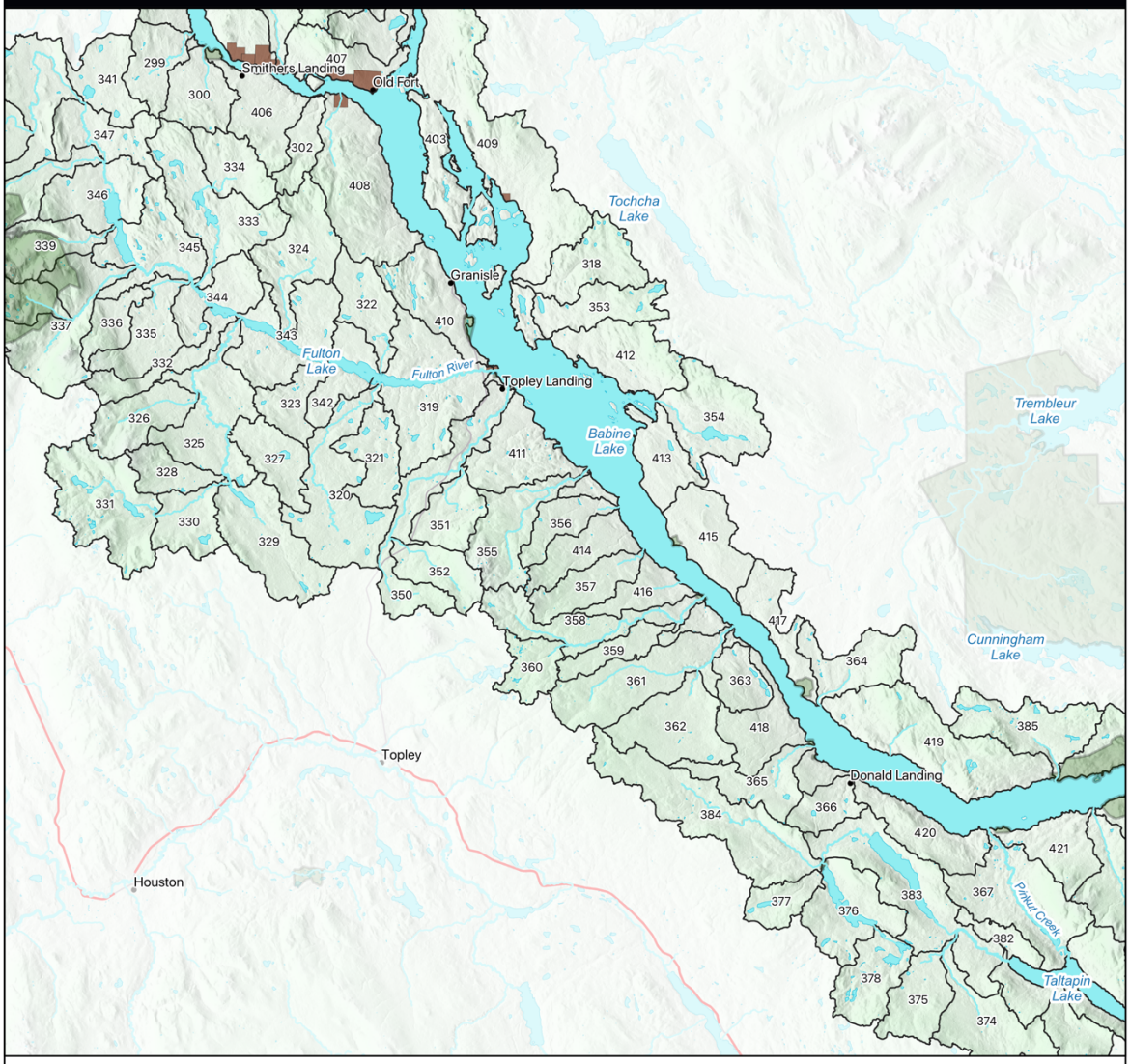
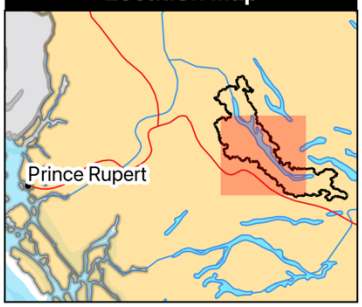
Babine Lake Reference Map - Centre



Location Map



Legend

- FWA Assessment Watershed
- Reserve
- Park

0 10 20 km

N W E S

Prepared by Eclipse Geomatics Ltd., May 2024

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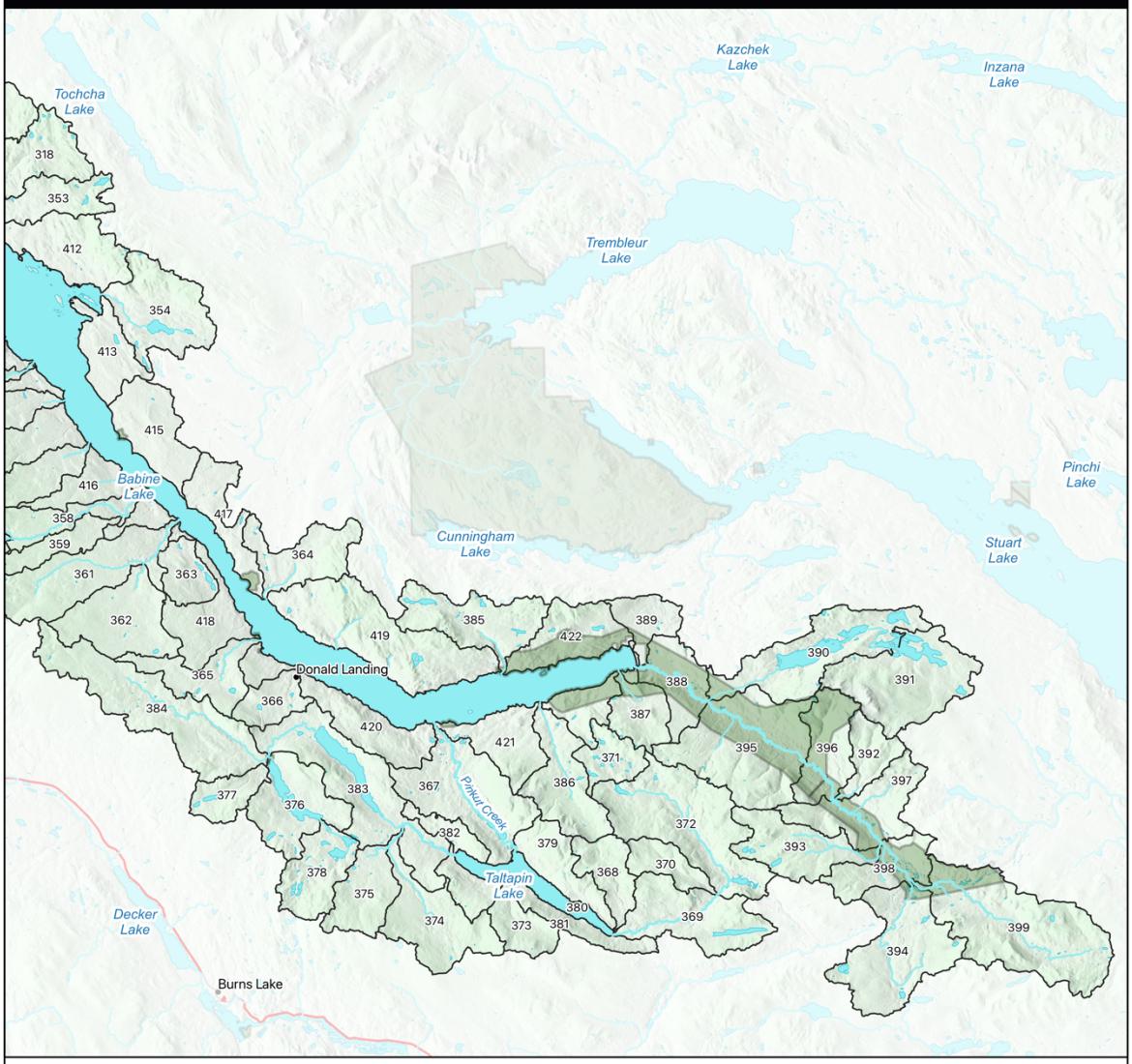
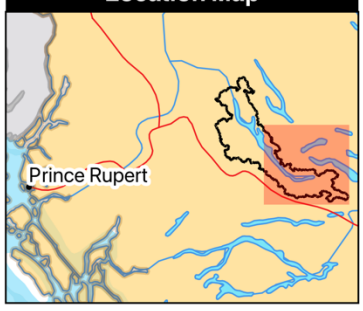
Babine Lake Reference Map - Southeast



Location Map



Legend

- FWA Assessment Watershed
- Reserve
- Park

0 10 20 km

N W E S

Prepared by Eclipse Geomatics Ltd., May 2024

Appendix B: Modelled Road Buffer Width Methodology

Description	Modelled Buffer Width (m)	FTEN Attributes	DRA Attributes	BCTS Attributes
Trail	0	-	ROAD_CLASS = trail, driveway or proposed	LICRDCLASS = TRAIL and BUF_DIST = 5
Overgrown Road	5	-	RDSURFACE = overgrown or seasonal	-
Unimproved Road	10	-	ROAD_CLASS = resource or unclassified, RDSURFACE ≠ paved or overgrown, AND NUMLANES = 1	LICRDCLASS ≠ TRAIL and BUF_DIST = 4 or 5
Resource Road	15	FIL_TP_DSC = Road Permit	ROAD_CLASS = resource, recreation or unclassified, RDSURFACE ≠ rough, paved, overgrown or seasonal, AND NUMLANES = 2	BUF_DIST = 8, 9 or 10
Main Resource Road	20	FIL_TP_DSC = Forest Service Road	ROAD_CLASS = resource or unclassified, AND RDSURFACE = rough, AND NUMLANES = 2	BUF_DIST = 14 or 15 and LICRDCLASS ≠ HWY
MOT/Local Road	25	-	ROAD_CLASS = local, arterial, service, or strata, OR RDSURFACE = paved, AND ROAD_CLASS ≠ trail or highway	BUF_DIST = 20
Highways	50	-	ROAD_CLASS = highway	BUF_DIST = 15 or 30 and LICRDCLASS = HWY

Notes:

FIL_TP_DSC = file type description

RDSURFACE = road surface

NUMLANE = number of lanes

STLG = short-term low-grade

LTAW = long-term all-weather

LICRDCLASS = license road class;

BUF_DIST = buffer distance

Appendix C: Results Tables

Reference AU	Sub-Watershed Name	Net Area (km²)	Disturbed Area (km²)				Total Disturbed Area (km²)	Percent Disturbed (%)	Risk
			Roads	Harvested (Post 1961)	Other Disturbance	Fire Disturbance (Post 1996)			
287		30.04	0.20	7.56	0.41	2.49	10.65	35.45	High
288		20.13	0.11	5.68	0.00	0.00	5.79	28.77	High
289	Tsezakwa Creek	53.00	0.11	10.39	0.02	0.00	10.52	19.86	Moderate
290		24.23	0.00	0.00	0.00	0.00	0.00	0.00	Low
291		25.05	0.00	0.02	0.00	0.00	0.02	0.07	Low
292	Heal Creek	28.83	0.22	8.47	0.13	0.00	8.82	30.61	High
293		30.19	0.13	12.26	0.00	0.00	12.40	41.06	High
294	Five Mile Creek	42.94	0.49	5.27	0.22	0.00	5.98	13.93	Moderate
295		48.66	0.31	12.79	0.16	0.00	13.27	27.26	High
296		28.82	0.32	8.13	0.17	0.00	8.62	29.92	High
297		22.13	0.24	9.12	0.00	0.00	9.36	42.31	High
298		21.37	0.25	4.70	0.20	2.82	7.98	37.33	High
299		31.61	0.23	17.36	0.04	2.49	20.11	63.62	High
300		34.14	0.26	13.97	0.29	0.68	15.19	44.50	High
301		23.16	0.15	9.21	0.00	0.00	9.36	40.42	High
302		20.47	0.25	6.47	0.07	0.00	6.80	33.19	High
303		21.12	0.05	7.41	0.00	0.00	7.45	35.30	High
304		20.65	0.13	5.69	0.00	0.00	5.82	28.17	High
305		22.07	0.27	8.29	0.00	0.00	8.56	38.81	High
306	Morrison Creek	80.05	0.40	9.86	0.00	0.00	10.26	12.82	Moderate
307		51.35	0.29	22.20	0.00	0.00	22.48	43.78	High

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Reference AU	Sub-Watershed Name	Net Area (km²)	Disturbed Area (km²)				Total Disturbed Area (km²)	Percent Disturbed (%)	Risk
			Roads	Harvested (Post 1961)	Other Disturbance	Fire Disturbance (Post 1996)			
308		29.06	0.09	8.82	0.00	0.00	8.91	30.66	High
309		25.13	0.08	15.23	0.10	0.00	15.41	61.32	High
310	Tahlo Creek	56.78	0.13	9.20	0.43	0.00	9.76	17.18	Moderate
311		39.28	0.14	5.18	0.00	0.00	5.31	13.52	Moderate
312		25.63	0.15	3.41	0.00	0.00	3.56	13.90	Moderate
313		28.06	0.10	2.82	0.00	0.00	2.92	10.42	Moderate
314	Tahlo Creek	43.95	0.26	12.60	0.00	0.00	12.86	29.25	High
315	Tahlo Creek	65.28	0.51	3.68	0.72	0.00	4.91	7.53	Moderate
316	Haul Creek	28.17	0.07	9.25	0.31	0.01	9.64	34.22	High
317		29.18	0.48	11.95	0.00	2.01	14.44	49.51	High
318		42.52	0.21	22.55	0.00	0.00	22.76	53.53	High
319	Fulton River	79.23	0.76	19.60	1.23	0.00	21.58	27.24	High
320		77.97	0.28	8.32	0.78	0.00	9.38	12.03	Moderate
321		33.28	0.32	4.14	0.00	0.00	4.46	13.41	Moderate
322		33.92	0.14	16.42	0.00	0.00	16.56	48.82	High
323	Nicholson Creek	23.97	0.16	13.22	0.00	0.00	13.37	55.79	High
324	Broughton Creek	53.96	0.31	18.48	0.00	0.12	18.91	35.05	High
325	Guess Creek	66.89	0.34	25.69	0.00	0.00	26.03	38.92	High
326	Doray Creek	38.63	0.22	2.40	0.00	0.00	2.62	6.79	Moderate
327		32.22	0.15	12.42	0.00	0.00	12.57	39.01	High
328	Betty Creek	22.65	0.32	5.06	0.29	0.00	5.67	25.04	High
329		63.09	0.35	19.66	0.00	0.00	20.01	31.72	High
330	Guess Creek	31.17	0.19	14.39	0.00	0.00	14.58	46.77	High

eclipse GEOMATICS

Reference AU	Sub-Watershed Name	Net Area (km²)	Disturbed Area (km²)				Total Disturbed Area (km²)	Percent Disturbed (%)	Risk
			Roads	Harvested (Post 1961)	Other Disturbance	Fire Disturbance (Post 1996)			
331	Guess Creek	72.85	0.54	3.92	0.00	0.00	4.46	6.12	Low
332	Byron Creek	25.13	0.05	10.50	0.00	0.00	10.56	42.00	High
333	Tanglechain Creek	67.05	0.88	28.58	0.17	0.00	29.63	44.19	High
334	Tanglechain Creek	31.98	0.27	13.97	0.13	0.00	14.38	44.97	High
335	Bristow Creek	38.24	0.27	17.42	0.00	0.00	17.69	46.26	High
336	Fink Creek	21.27	0.09	8.60	0.00	0.00	8.69	40.87	High
337	McKendrick Creek	69.39	0.32	15.15	1.28	0.00	16.74	24.13	High
338	Little Joe Creek	21.33	0.00	0.64	0.01	0.00	0.65	3.06	Low
339	Cronin Creek	41.40	0.42	3.80	0.00	0.01	4.24	10.23	Moderate
340	Nata Creek	34.44	0.07	7.81	0.00	0.00	7.88	22.89	High
341	Bristol Creek	33.02	0.26	20.23	0.00	0.14	20.63	62.48	High
342	Fulton River	27.22	0.13	9.39	0.00	0.00	9.52	34.97	High
343	Fulton River	56.93	0.16	37.60	0.00	0.35	38.10	66.92	High
344	Fulton River	34.08	0.13	21.09	0.00	0.00	21.22	62.25	High
345	Fulton River	50.82	0.45	27.18	0.20	0.00	27.83	54.76	High
346	Fulton River	42.58	0.18	29.65	0.00	0.02	29.85	70.10	High
347	Fulton River	37.52	0.17	16.61	0.00	0.00	16.77	44.70	High
348	Fulton River	70.07	0.22	26.62	0.00	1.67	28.50	40.67	High
349	Fulton River	49.98	0.22	6.82	0.00	0.00	7.04	14.09	Moderate
350	Tachek Creek	63.74	1.36	11.94	0.93	0.02	14.25	22.36	High
351		29.86	0.36	3.20	1.20	0.00	4.76	15.94	Moderate
352	Strimboldh Creek	30.04	0.33	4.26	0.09	0.00	4.67	15.56	Moderate

Reference AU	Sub-Watershed Name	Net Area (km²)	Disturbed Area (km²)				Total Disturbed Area (km²)	Percent Disturbed (%)	Risk
			Roads	Harvested (Post 1961)	Other Disturbance	Fire Disturbance (Post 1996)			
353		35.73	0.35	21.10	0.03	0.00	21.49	60.13	High
354	Big Loon Creek	57.83	0.30	12.45	0.00	0.00	12.76	22.06	High
355		49.02	0.16	2.30	0.00	0.00	2.46	5.01	Low
356		24.09	0.21	4.94	0.00	0.00	5.15	21.36	Moderate
357		31.53	0.05	3.86	0.00	0.00	3.91	12.39	Moderate
358	Pierre Creek	47.85	0.05	8.96	0.00	0.00	9.01	18.83	Moderate
359		21.00	0.04	10.40	0.00	0.00	10.44	49.73	High
360		24.10	0.00	0.52	0.00	0.00	0.52	2.14	Low
361	Twain Creek	68.21	0.23	21.00	0.00	0.00	21.23	31.13	High
362		55.40	0.15	13.04	0.00	0.00	13.20	23.82	High
363		21.37	0.12	9.31	0.00	0.00	9.43	44.13	High
364		39.74	0.31	10.89	0.00	0.00	11.20	28.18	High
365	Cross Creek	34.79	0.27	19.38	0.09	0.00	19.73	56.71	High
366	Donalds Creek	21.76	0.45	8.55	0.00	0.00	9.00	41.38	High
367	Pinkut Creek	73.58	0.78	29.67	0.06	32.42	62.94	85.53	High
368	Marlin Creek	27.05	0.21	14.36	0.00	0.03	14.60	53.99	High
369	Henrietta Creek	57.38	0.72	28.08	0.00	20.12	48.92	85.25	High
370	Coldwater Creek	20.53	0.13	8.21	0.00	0.58	8.92	43.47	High
371		21.69	0.01	1.76	0.00	0.03	1.80	8.30	Moderate
372	Henrietta Creek	96.04	0.28	39.25	0.00	4.22	43.75	45.56	High
373		23.82	0.23	6.99	0.00	0.79	8.01	33.64	High

eclipse GEOMATICS

Reference AU	Sub-Watershed Name	Net Area (km²)	Disturbed Area (km²)				Total Disturbed Area (km²)	Percent Disturbed (%)	Risk
			Roads	Harvested (Post 1961)	Other Disturbance	Fire Disturbance (Post 1996)			
374		56.66	0.44	13.92	0.00	0.00	14.37	25.35	High
375		35.44	0.33	12.15	0.00	0.00	12.48	35.22	High
376		45.67	0.66	21.65	0.19	0.00	22.51	49.28	High
377		20.27	0.35	11.28	0.05	0.00	11.68	57.63	High
378	Ling Creek	36.09	0.68	11.20	0.00	0.00	11.88	32.92	High
379	Pinkut Creek	32.84	0.42	12.47	0.00	3.32	16.20	49.34	High
381		37.59	0.44	15.77	0.00	0.41	16.62	44.21	High
382	Pinkut Creek	13.71	0.24	5.81	0.02	2.87	8.93	65.15	High
383	Pinkut Creek	81.31	0.81	32.07	0.02	0.00	32.90	40.47	High
384	Pinkut Creek	95.74	0.43	37.87	0.02	0.00	38.33	40.04	High
385	Gullwing Creek	51.70	0.14	9.31	0.00	0.02	9.47	18.32	Moderate
386	Four Mile Creek	49.04	0.24	8.33	0.00	0.53	9.10	18.56	Moderate
387		26.85	0.08	2.35	0.00	1.04	3.47	12.92	Moderate
388	Sutherland River	33.96	0.07	4.08	0.00	1.17	5.33	15.69	Moderate
389		21.95	0.11	11.80	0.00	0.01	11.92	54.31	High
390	Shass Creek	62.52	0.22	10.67	0.00	14.85	25.74	41.17	High
391	Shass Creek	71.58	0.08	12.18	0.00	0.03	12.29	17.18	Moderate
392		22.59	0.14	0.05	0.00	0.00	0.19	0.83	Low
393		46.03	0.23	17.24	0.00	2.47	19.94	43.32	High
394	Duncan Creek	76.12	0.98	24.94	0.00	50.20	76.12	100.00	High
395	Sutherland River	96.46	0.04	5.43	0.00	0.00	5.47	5.67	Low

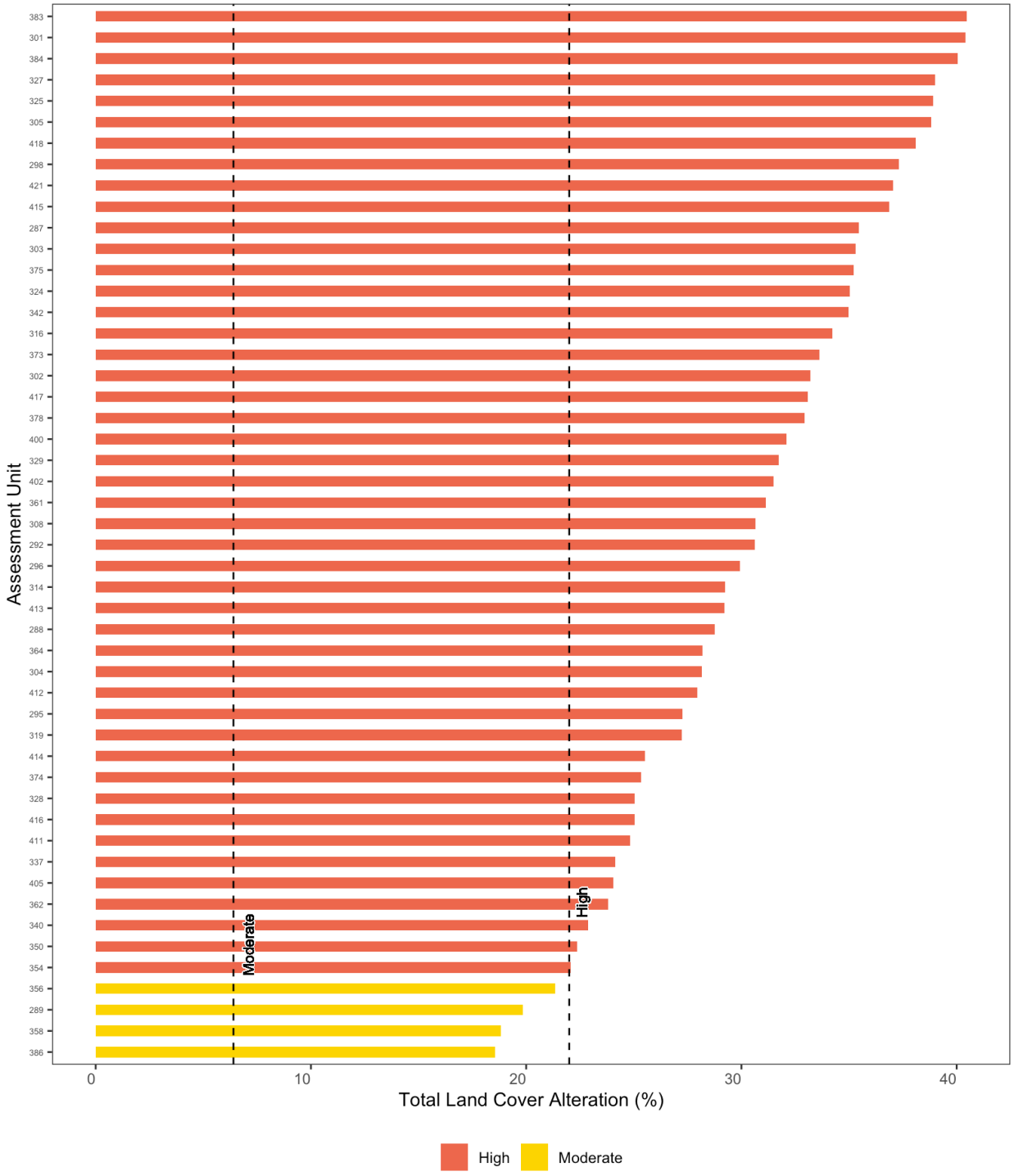
Reference AU	Sub-Watershed Name	Net Area (km²)	Disturbed Area (km²)				Total Disturbed Area (km²)	Percent Disturbed (%)	Risk
			Roads	Harvested (Post 1961)	Other Disturbance	Fire Disturbance (Post 1996)			
396	Sutherland River	39.99	0.05	0.00	0.00	0.00	0.05	0.13	Low
397	Sutherland River	50.52	0.44	2.92	0.00	4.97	8.32	16.47	Moderate
398	Sutherland River	32.46	0.23	9.82	0.00	18.61	28.66	88.32	High
399	Sutherland River	113.13	0.79	34.91	0.00	46.74	82.44	72.87	High
400	Babine River	27.58	0.46	8.21	0.17	0.00	8.85	32.09	High
401	Babine River	41.04	0.41	18.16	0.20	1.28	20.04	48.83	High
402		63.41	0.27	19.27	0.43	0.00	19.97	31.49	High
404		58.85	1.04	13.48	1.20	8.86	24.59	41.78	High
405		44.71	0.60	10.14	0.02	0.00	10.75	24.04	High
406		44.13	0.46	22.94	0.86	0.00	24.26	54.97	High
407		52.56	0.20	8.56	0.47	0.02	9.24	17.57	Moderate
408		86.50	0.60	14.01	1.27	0.00	15.88	18.35	Moderate
409		176.57	1.68	81.39	4.99	0.00	88.06	49.87	High
410		43.54	0.50	20.50	2.86	0.00	23.86	54.80	High
411		53.23	0.40	12.81	0.00	0.00	13.21	24.83	High
412		50.77	0.28	13.89	0.02	0.00	14.19	27.96	High
413		32.90	0.37	9.25	0.00	0.00	9.61	29.22	High
414		32.73	0.13	8.22	0.00	0.00	8.35	25.51	High
415		44.17	0.69	15.60	0.00	0.00	16.28	36.86	High
416		35.92	0.14	8.86	0.00	0.00	8.99	25.04	High
417		32.53	0.19	10.57	0.00	0.00	10.76	33.07	High

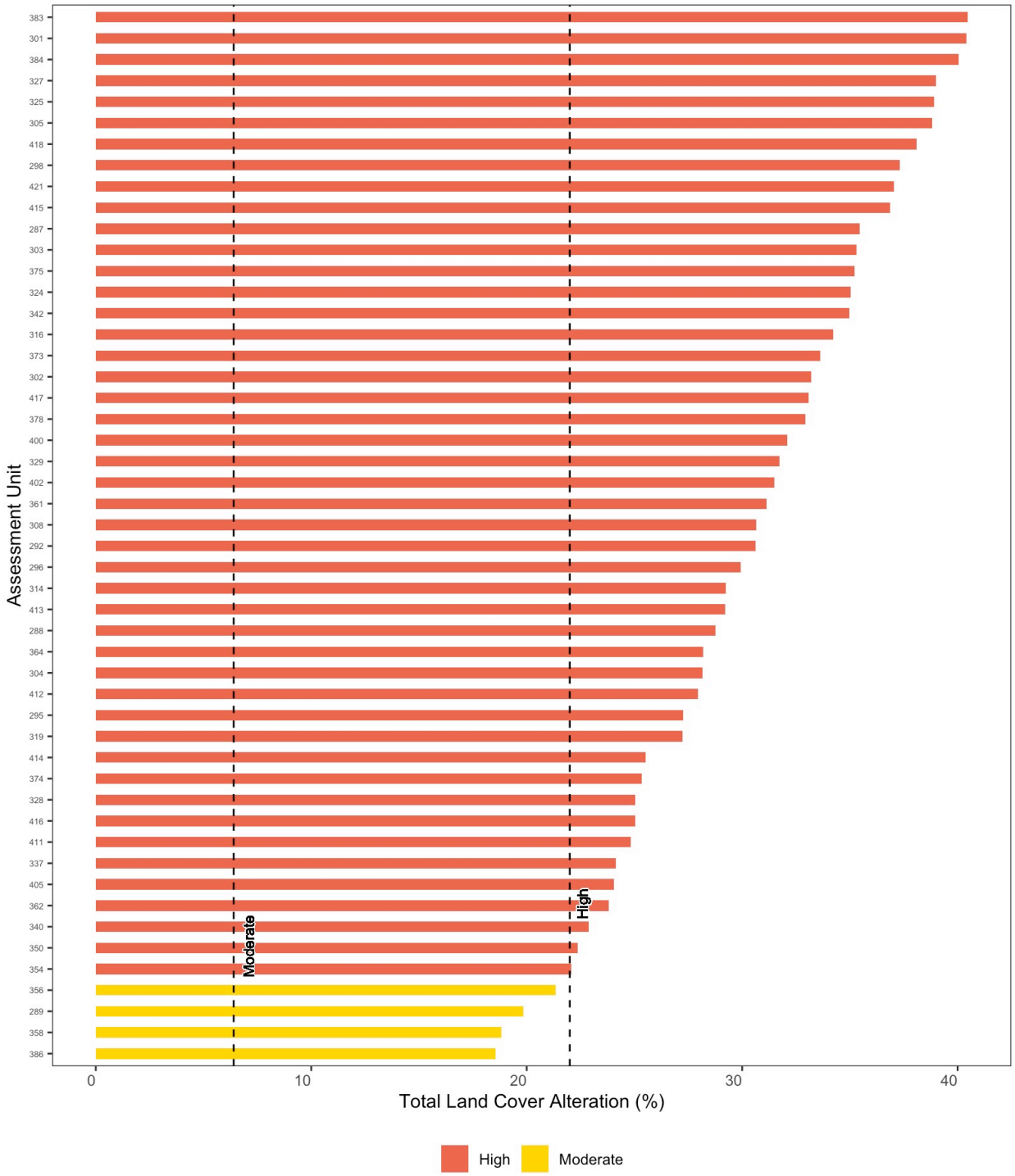
Reference AU	Sub-Watershed Name	Net Area (km²)	Disturbed Area (km²)				Total Disturbed Area (km²)	Percent Disturbed (%)	Risk
			Roads	Harvested (Post 1961)	Other Disturbance	Fire Disturbance (Post 1996)			
418		47.72	0.51	16.95	0.73	0.00	18.19	38.11	High
419		95.16	0.35	14.04	0.00	0.00	14.39	15.13	Moderate
420		40.37	0.22	17.48	0.00	0.03	17.72	43.90	High
421		59.10	0.48	6.85	0.16	14.42	21.90	37.06	High
422		40.96	0.10	6.38	0.00	0.18	6.67	16.28	Moderate

Note: Values were rounded to two decimal places following risk characterization.

Appendix D: Results Distribution

The results are colorized by risk threshold (low risk < 6.4% of land area altered, moderate risk ≥ 6.4% and < 22% of land area altered, high risk ≥ 22% of land area altered).




Assessment Unit
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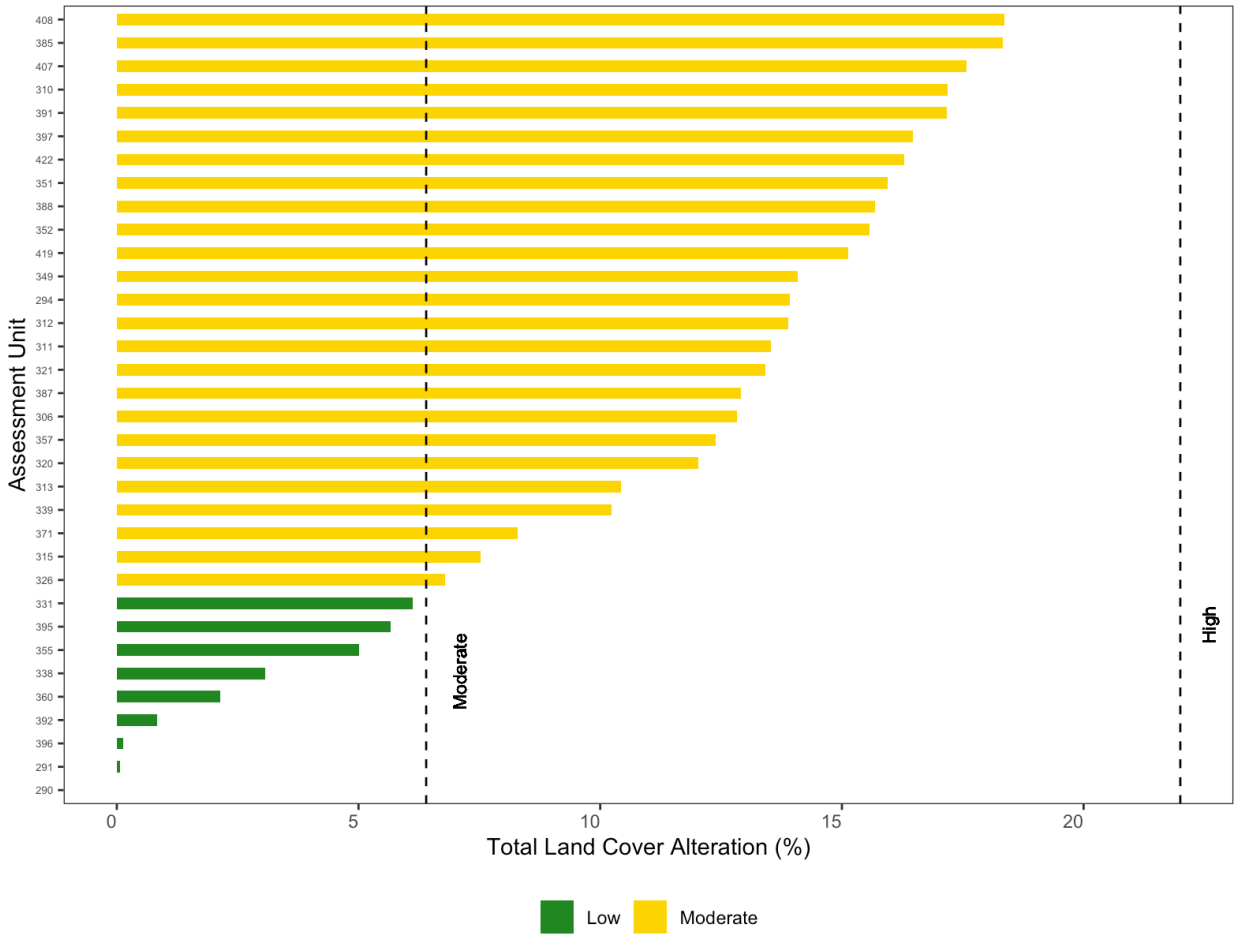
301
384
327
325
305
418
298
421
415
287
303
375
324
342
316
373
302
417
378
400
329
402
361
308
292
296
314
413
288
364
304
412
295
319
414
374
328
416
411
337
405
362
340
350
354
356
289
358
386
Moderate
High
0
10
20
30
40
Total Land Cover Alteration (%)
High
Moderate


Assessment Unit
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385
407
310
391
397
422
351
388
352
419
349
294
312
311
321
387
306
357
320
313
339
371
315
326
331
395
355
338
360
392
396
291
290
Moderate
High
0
5
10
15
20
Total Land Cover Alteration (%)
Low
Moderate