WSP Indicator Analysis for the Kispiox TSA:

Riparian Disturbance

Freshwater Atlas (FWA) Assessment Watersheds

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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. Some inaccuracy is expected due to the inherent limitations and uncertainties that exist in the base input datasets, and no representation of current condition is made.

Acknowledgements

We would like to thank Sarah Railton, Greg Knox, and Julia Hill Sorochan for their contributions and feedback, and to Glen Buhr for his assistance and guidance.

WSP Indicator Analysis for the Kispiox TSA

Pressure Indicator: Riparian Disturbance

Assessment Units: FWA Assessment Watersheds

Description of Pressure Indicator

Riparian disturbance is used to describe streamside changes which may affect stream shade and water temperature, wood and organic matter inputs, bank stability, and many other riparian processes, and is considered an important pressure indicator by the Wild Salmon Policy (WSP) Habitat Working Group (Stalberg et al., 2009). Riparian disturbance is defined as the percentage of the riparian zone that has been altered by land use activities (Porter et al., 2014; Stalberg et al., 2009). Riparian disturbance is related to total land cover alteration and road development.

Study Area

The Kispiox timber supply area (TSA) is situated in the interior of northwest BC and encompasses the District of New Hazelton and the communities of Hazelton, South Hazelton, Kitwanga, Cedarvale, Kispiox, Gitsegukla, Gitwangak, Gitanyow, Hagwilget, Glen Vowell and Gitanmaax (Figure 1). The Kispiox TSR is part of the Skeena Natural Resource Region and is administered by the Skeena Stikine Natural Resource District office in Smithers.

The Kispiox TSA is comprised of seven TSA supply blocks (12A to 12G), with the Cranberry TSA consolidated with the Kispiox TSA on March 31, 2009 as Block 12G. The current allowable annual cut for the Kispiox TSA is 1,087,000 cubic metres (Province of BC, 2019).

This report presents results for BC Freshwater Atlas (FWA) assessment watersheds within the Kispiox TSA and the neighbouring upper Kispiox River and Swan Lake watersheds. The 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 key for the identification of assessment units was developed based on groupings by major watershed, and reference maps of the study area with Kispiox TSA and FWA assessment watersheds are included as Appendix A.

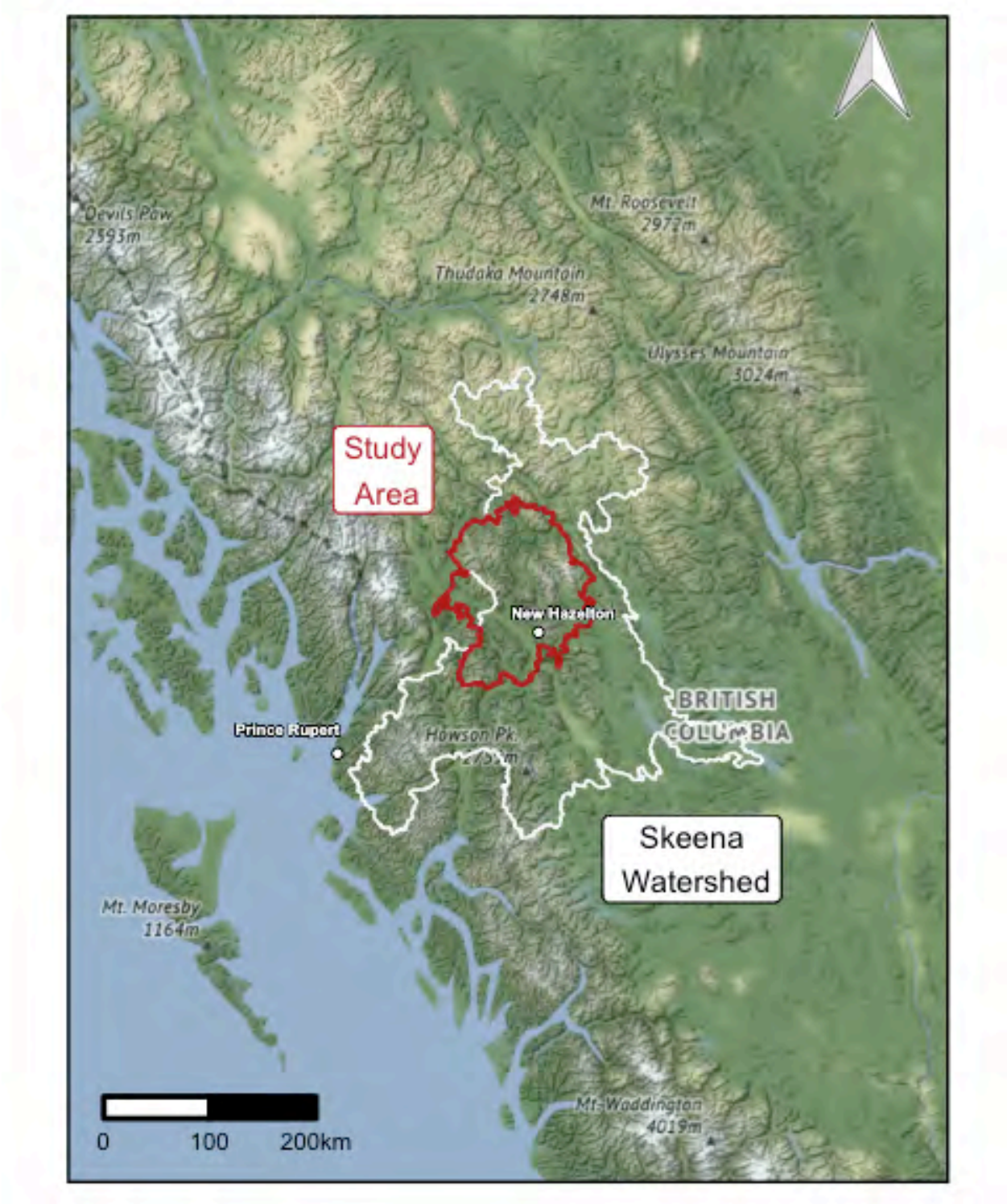

Figure 1: The study area is indicated in red. The grey polygon indicates the outline of the Skeena River watershed.

Methodology

Data layers used to perform the spatial analysis include:

- Kispiox Road Inventory (BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development [BC MFLNRORD], 2017)
- BC Transmission Lines (BC MFLNRORD, 2020a)
- Harvested Areas of BC (Consolidated Cutblocks) (BC MFLNRORD, 2020b)
- TANTALIS – Crown Tenures (BC MFLNRORD, 2020c)
- Railway Track Line (BC MFLNRORD, 2019a)
- Municipalities - Legally Defined Administrative Areas of BC (BC Ministry of Municipal Affairs and Housing, 2019)
- Reserves & Band Names - Administrative Boundaries (BC MFLNRORD, 2019b)
- Fish Habitat and Road Crossings Model (BC MECCS, 2019)
- Freshwater Atlas Rivers (BC MFLNRORD, 2019c)
- FWA Assessment Watersheds (BC MFLNRORD, 2019d)

Fish Habitat Characterization

The fish habitat and road crossings model (version 2.3.1) developed by Mount et al. (2011) and revised by Norris and Mount (2016) was used to identify and characterize riparian habitat. The model uses input data extracted from the BC Geographic Data Warehouse including the Freshwater Atlas Stream Network and Known Fish Observations among others. Output from the fish habitat model classifies fish habitat as fish presence observed, fish presence inferred, or no fish presence inferred. For the purpose of this assessment, inferred fish presence includes habitat up to a 15% grade, the threshold for salmon habitat.

Fish habitat characterization is provided for context only and is not used to qualify riparian habitat disturbance in this analysis.

Riparian Area Identification

Riparian habitat was estimated using a buffer of 30 m (60 m corridor width) applied to all stream features and double line rivers with river area removed. The riparian habitat was characterized based on the fish habitat and road crossings model. The 30 m buffer width is consistent with the methodology set out by the Wild Salmon Policy Habitat Working Group (Stalberg et al., 2009).

Disturbance Characterization

Principal sources of human riparian disturbance identified within the study area include settlements, forest harvesting (cutblocks), and road, railway, electric powerline, and oil and gas pipeline corridors. Natural riparian disturbance such as from insect infestations or wildfires were not included as part of this analysis.

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

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	30
Transmission Line	60

Oil and gas pipeline disturbance areas were obtained from the TANTALIS – Crown Tenures selected for "gas and oil pipeline" sub-purpose and "tenure" stage. The "gas and oil pipeline" category does not include the Prince Rupert Gas Transmission Project, which has been permitted but to our knowledge not constructed.

The Consolidated Cutblocks layer was used to identify disturbance from forest harvesting within the last 20 years (i.e. harvested since 1999). A 20-year time frame for achieving hydrologically effective green-up in disturbed riparian areas has been selected as a reasonable benchmark based on the provincial reforestation requirements for achieving Free Growing status (trees of sufficient height, health, and vigour) in cutblocks under the Forest and Range Practices Act. For the purposes of office-based analysis such as these WSP Habitat Indicator Assessment Reports, selecting the 20-year time frame in line with Provincial green-up standards allows for an administrative benchmark consistent with current government and industry practice. More detailed ground-based WSP habitat indicator assessments may reveal a need to use a longer or shorter time frame for benchmarking hydrologically effective green-up in disturbed riparian areas, however this level of detail falls outside the scope of the initial office-based assessment reports.

Municipal and reserve boundaries were used to estimate riparian disturbance from settlements in the study area.

For the purpose of this analysis, riparian disturbance is characterized and calculated for forestry harvesting (cutblocks), roads, and other disturbance, where other disturbance includes riparian disturbance from settlements, transmission lines, pipelines, and railways. Roads overlapping cutblock and other areas were removed from the road disturbance layer.

Riparian Disturbance Calculation

Riparian disturbance areas were calculated by overlapping riparian habitat and disturbed areas for each disturbance type using FWA assessment watersheds as assessment units.

Total riparian disturbance as a percentage of total riparian area within each assessment unit was calculated by summing the riparian disturbance areas for each disturbance type and dividing by the total riparian area. Figure 2 provides an overview of human disturbance within the study area.

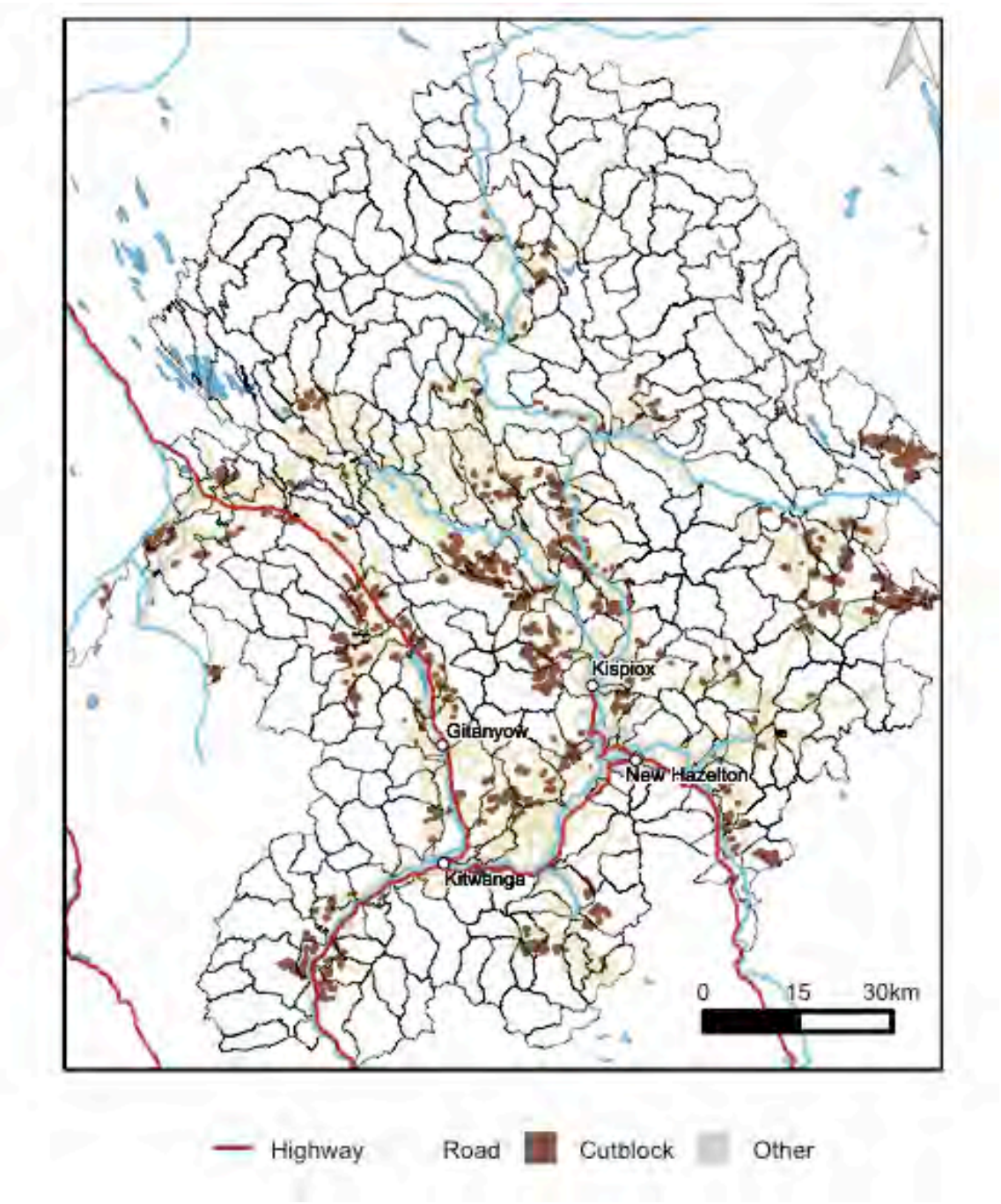

Figure 2: Assessment units and human disturbance located in the study area, including forest harvesting cutblocks, road development, and other disturbance (settlements, railways, transmission lines, and oil and gas pipelines).

Risk Thresholds

Categorical risk thresholds applied were generated by the Pacific Salmon Foundation based on recommendations from the Wild Salmon Policy Habitat Working Group (Porter et al., 2014; Stalberg et al., 2009) and are tabulated below:

Threshold Rating	Percent of Riparian Area Disturbed (%)
Low	< 5 %
Moderate	5 - 15 %
High	> 15 %

Results of Analysis

A summary of the results of the riparian disturbance 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 B, and the distribution of the assessment results are shown as a series of figures in Appendix C. Riparian habitat characterization for each assessment unit is included as Appendix D.

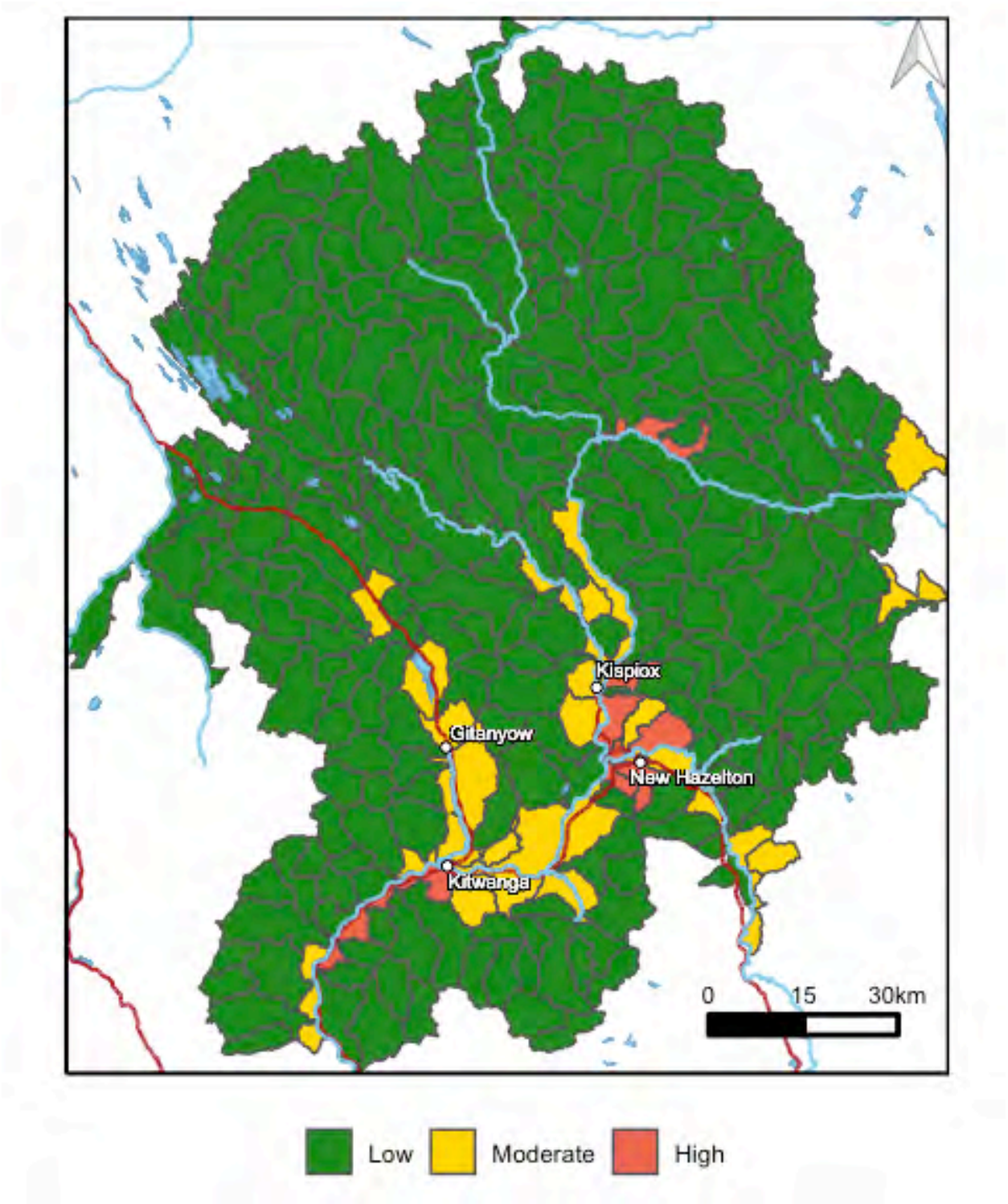

Figure 3: Riparian disturbance for each boundary in the study area is shown on a study area map. The results are colorized by risk threshold (low risk <5% disturbed, moderate risk 5-15% disturbed, and high risk >15% disturbed).

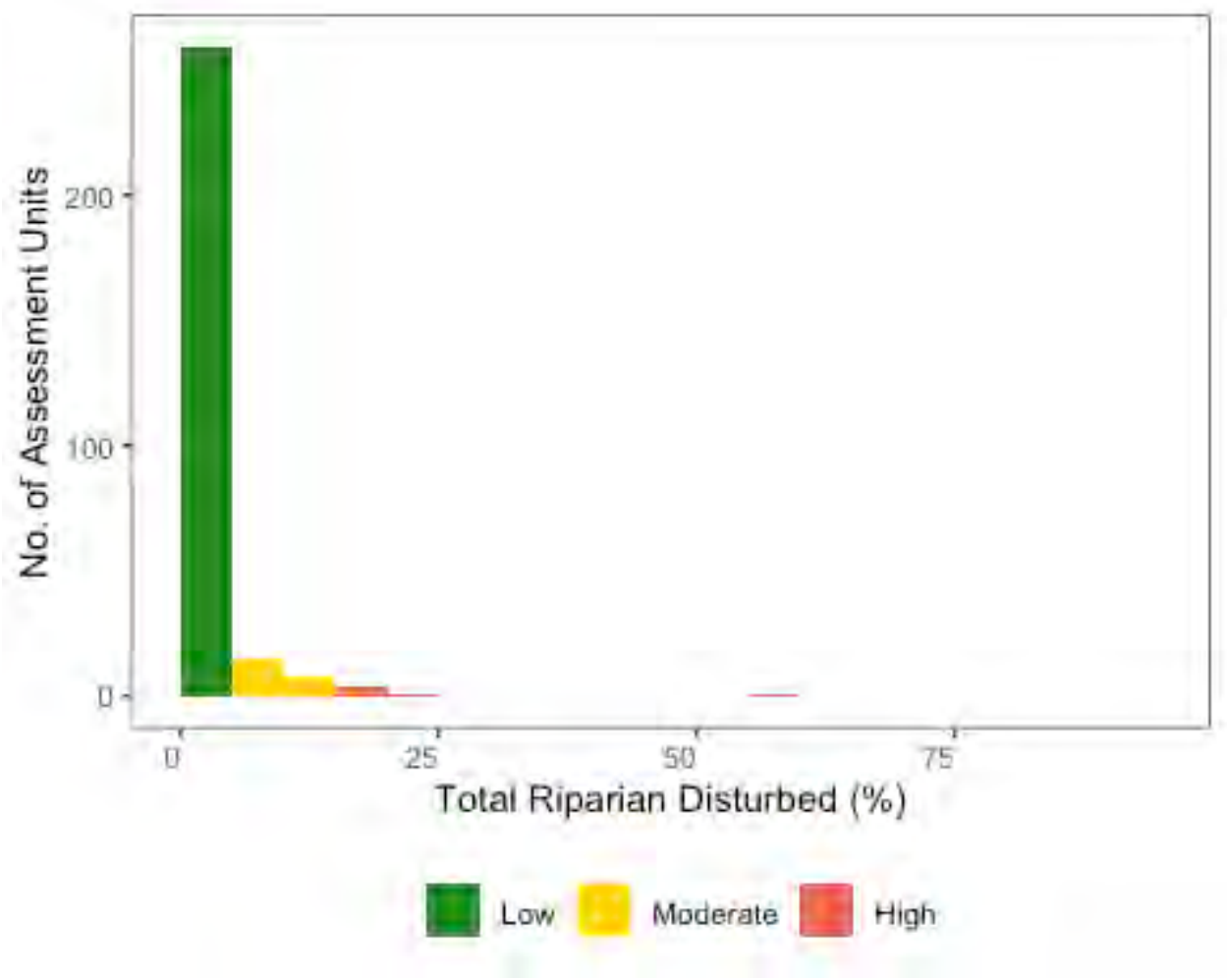

Figure 4: Distribution of results showing the number (count) of assessment units by riparian disturbance. The results are colorized by risk threshold (low risk <5% disturbed, moderate risk 5-15% disturbed, and high risk >15% disturbed).

Riparian disturbance was calculated for a total of 288 FWA assessment watersheds. Values ranged from 0 to a maximum of 55.96% within the Station Creek (BULK-09) sub-watershed, with riparian disturbance values within the majority of the assessment units below the lower threshold of 5% (Figure 4; Appendix B and Appendix C). Six assessment units had riparian disturbance values above the threshold for high risk, all of which were associated with settlements in the central portion of the study area with the exception of the BABR-07 assessment unit, which is associated with the Gitanmaax Kisgegas reserve and may not reflect the level of disturbance on the ground (Figure 3; Appendix A).

Twenty-three assessment units with riparian disturbance values within the moderate risk threshold range were largely situated within the central portion of the study area, with some units in the northeast likely associated with higher densities of cutblock locations (Figures 2 and 3).

Total riparian habitat for each assessment unit was characterized by modelled fish presence and is provided as Appendix D. Characterized habitat type is provided for context only and is not related to riparian disturbance in this analysis.

Interactive visualizations of the indicator analysis results calculated as part of the Kispiox TSA WSP Indicator Analysis are available at https://data.skeenasalmon.info/dataset/wild-salmon-policy-indicator-analysis-for-the-kispiox-tsa.

Summary of Results

Riparian habitat was characterized and riparian disturbance estimations from forestry activities, roads, utility and railway corridors, and settlements were calculated for 288 FWA assessment watersheds within the Kispiox TSA and adjacent Swan Lake and upper Kispiox River sub-watersheds using datasets sourced from the Province of BC. Risk categories derived by the Pacific Salmon Foundation based on recommendations from the Wild Salmon Policy Habitat Working Group were used to assess risk to freshwater habitat as a result of riparian disturbance.

Results of the analysis indicated riparian disturbance ranged from 0 to 55.96 % of riparian area disturbed, with FWA assessment watersheds within the central portion of the study area at moderate and high risk from riparian disturbance-related impacts to fish habitat.

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Appendix A: Reference Maps

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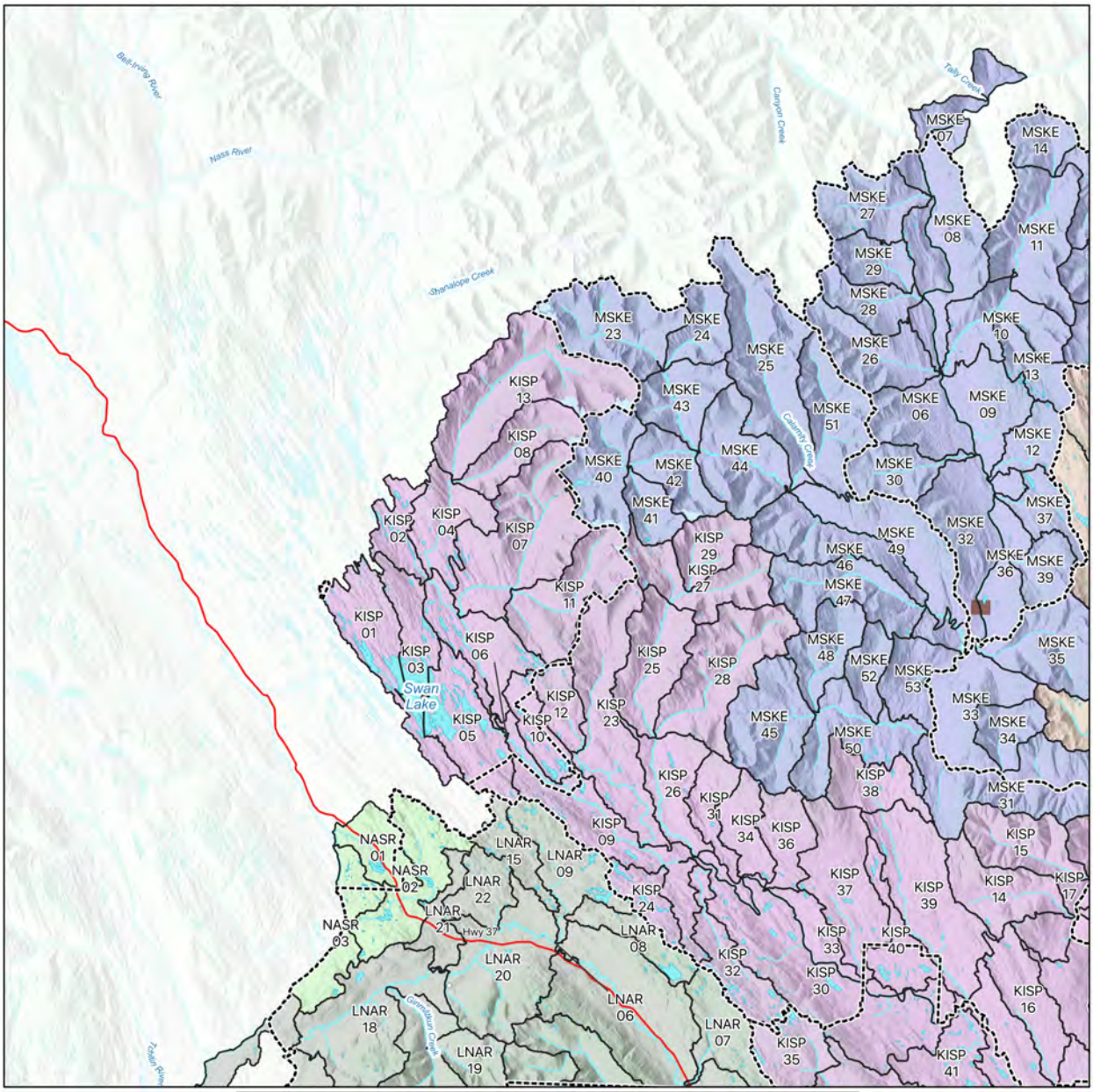
Kispiox Study Area Reference Map - Northwest



Location Map

Legend

Boundary

- Fresh Water Atlas Assessment Watershed
- Kispiox TSA Block
- Reserve Boundary

Major Watershed Group

- BABR
- BULK
- KISP
- KLUM
- LNAR
- MSKE
- NASR

0 5 10 km

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Prepared for SkeenaWild
by Eclipse Geomatics Ltd.,
June 2020

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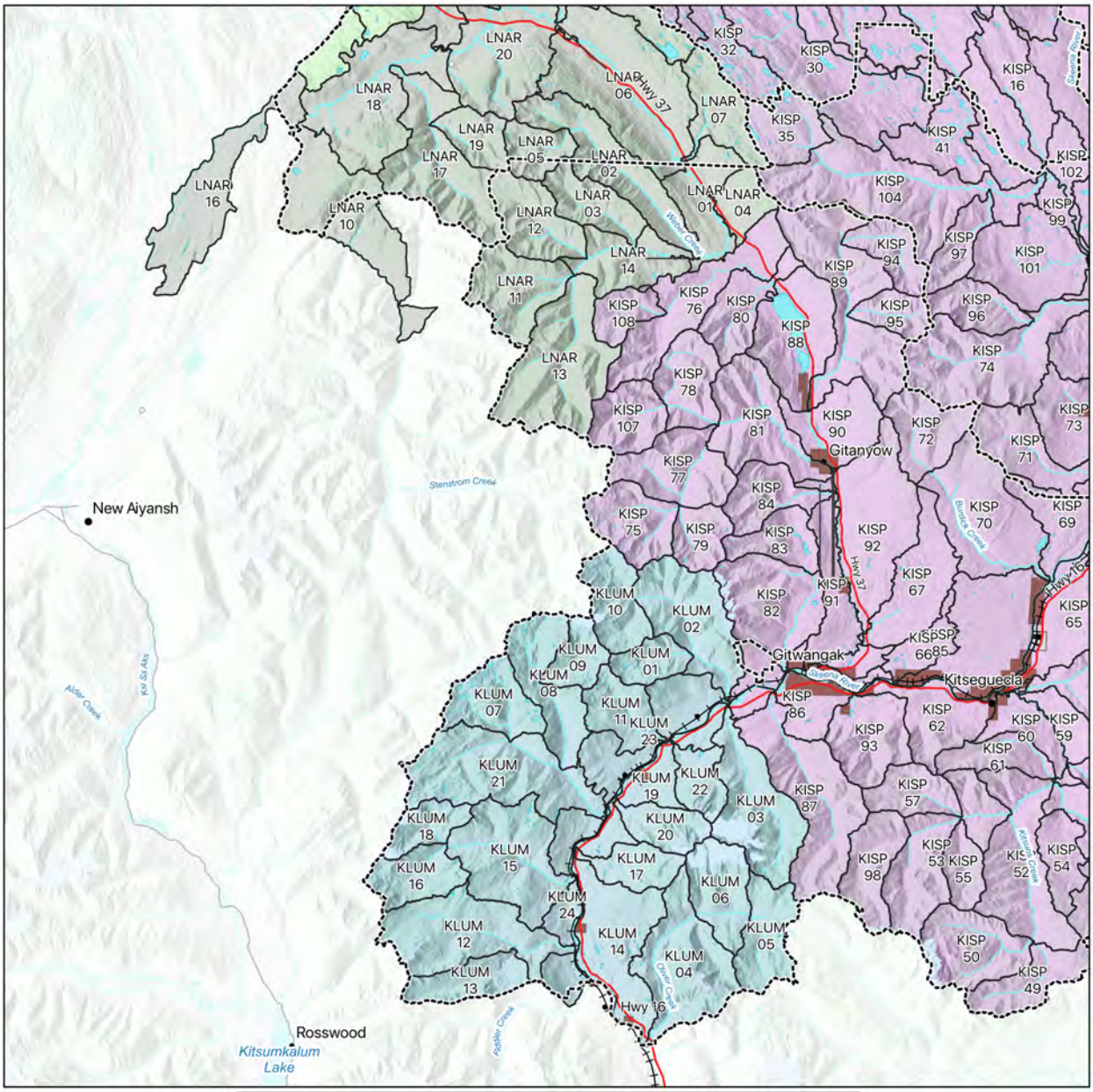
Kispiox Study Area Reference Map - Southwest



Location Map

Legend

Boundary

- Fresh Water Atlas Assessment Watershed
- Kispiox TSA Block
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- BULK
- KISP
- KLUM
- LNAR
- MSKE
- NASR

0 5 10 km

N W E S

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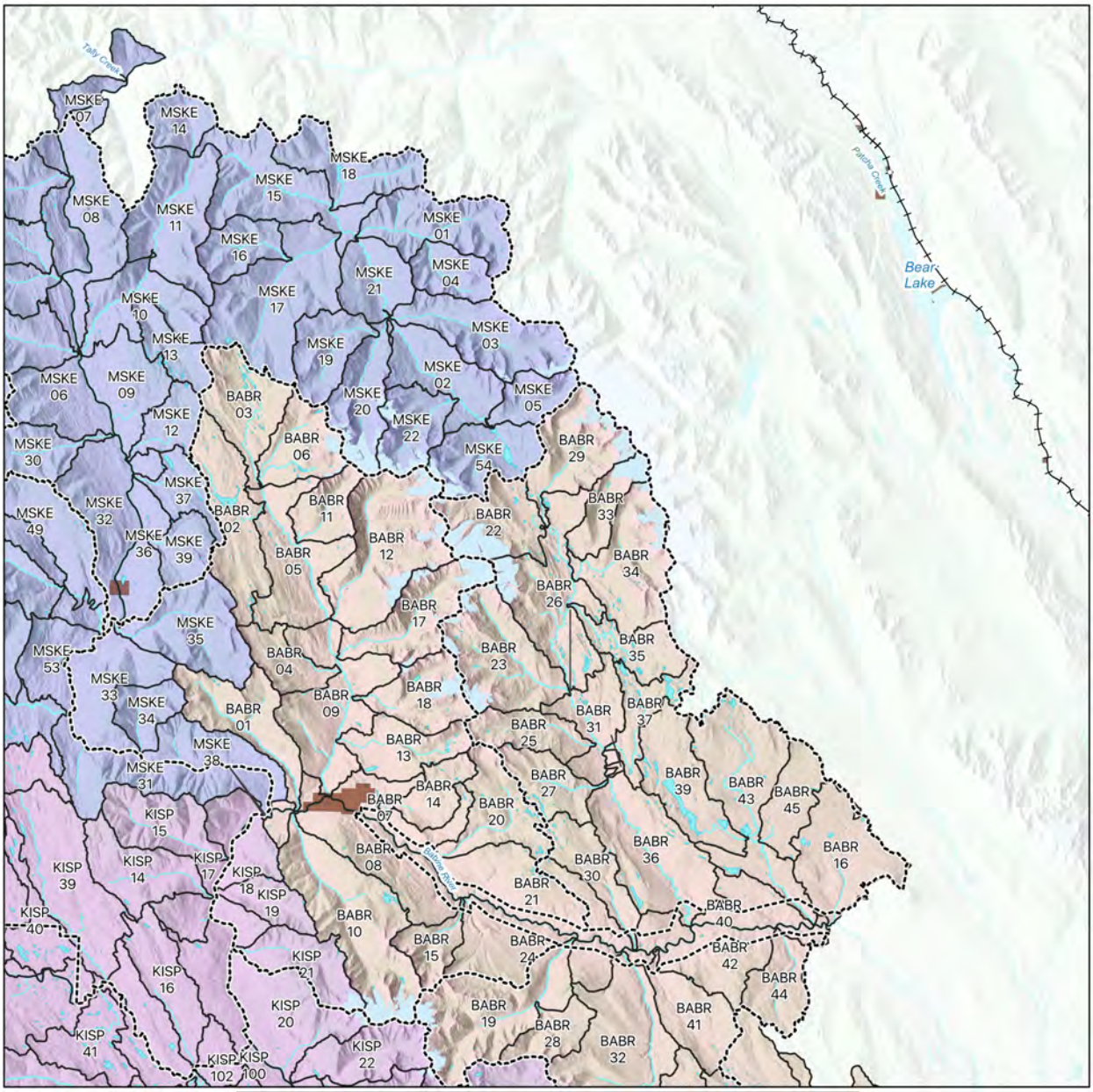
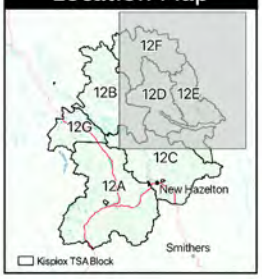
Kispiox Study Area Reference Map - Northeast



Location Map



Legend

Boundary

- Fresh Water Atlas Assessment Watershed
- Kispiox TSA Block
- Reserve Boundary

Major Watershed Group

- BABR
- BULK
- KISP
- KLUM
- LNAR
- MSKE
- NASR

0 5 10 km

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June 2020

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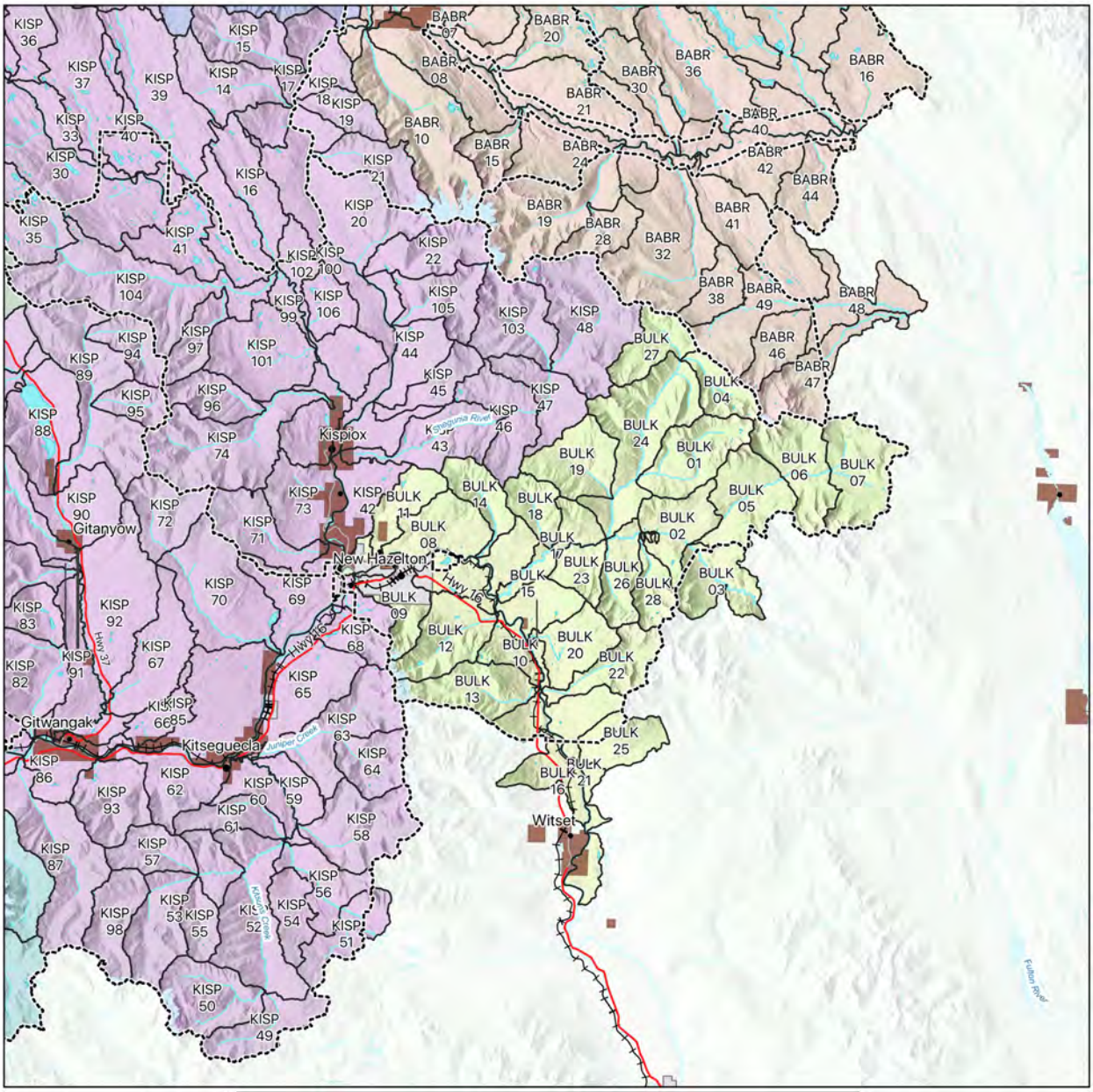
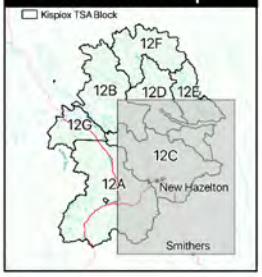
Kispiox Study Area Reference Map - Southeast



Location Map



Legend

Boundary

- Fresh Water Atlas Assessment Watershed
- Kispiox TSA Block
- Reserve Boundary

Major Watershed Group

- BABR
- BULK
- KISP
- KLUM
- LNAR
- MSKE
- NASR

0 5 10 km

N W E S

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Appendix B: Results Tables

The following tables present total riparian area, riparian area disturbed by roads, forest harvesting post 1999, and other (railways, powerlines, pipelines, and settlements), total riparian area disturbed in each boundary, percentage of disturbed riparian area, and risk (determined by Pacific Salmon Foundation thresholds) for each assessment unit.

Reference AU	Sub-watershed Name	FWA FID	Total Riparian (km^2)	Disturbed Riparian (km^2)			Total Riparian Disturbed (km^2)	Percent Disturbed (%)	Risk
				Roads	Harvested (Post 1999)	Other			
BABR-01	Sam Green Creek	424	8.28	0.00	0.00	0.00	0.00	0.01	Low
BABR-02	Damsumlo Creek	433	11.78	0.03	0.06	0.00	0.09	0.72	Low
BABR-03	Shedin Creek	436	10.14	0.04	0.00	0.00	0.04	0.41	Low
BABR-04		429	3.64	0.00	0.00	0.00	0.00	0.00	Low
BABR-05	Shedin Creek	435	9.35	0.00	0.00	0.00	0.00	0.00	Low
BABR-06		434	7.13	0.00	0.00	0.00	0.00	0.00	Low
BABR-07	Babine River	423	5.42	0.01	0.01	1.02	1.04	19.19	High
BABR-08	Babine River	492	5.86	0.04	0.00	0.19	0.23	3.86	Low
BABR-09	Shedin Creek	426	10.67	0.02	0.01	0.00	0.03	0.28	Low
BABR-10	Shegisic Creek	425	11.87	0.00	0.00	0.00	0.00	0.02	Low
BABR-11		432	4.63	0.00	0.00	0.00	0.00	0.00	Low
BABR-12	Rosenthal Creek	431	14.39	0.00	0.00	0.00	0.00	0.00	Low
BABR-13	Goathead Creek	427	5.55	0.01	0.12	0.00	0.13	2.34	Low
BABR-14		437	3.31	0.00	0.00	0.00	0.00	0.13	Low
BABR-15		439	2.79	0.00	0.00	0.00	0.00	0.03	Low
BABR-16	Shahnagh Creek	461	7.67	0.01	0.76	0.00	0.77	10.04	Moderate
BABR-17	Sperry Creek	430	8.00	0.00	0.00	0.00	0.00	0.00	Low
BABR-18		428	5.91	0.00	0.00	0.00	0.00	0.00	Low
BABR-19	Thomlinson Creek	440	7.58	0.01	0.00	0.00	0.01	0.13	Low
BABR-20	Shenismike Creek	438	7.13	0.00	0.00	0.00	0.00	0.00	Low
BABR-21	Babine River	493	11.32	0.00	0.00	0.00	0.00	0.00	Low
BABR-22	Shelagyote River	456	6.05	0.00	0.00	0.00	0.00	0.00	Low
BABR-23		449	10.95	0.00	0.00	0.00	0.00	0.00	Low
BABR-24	Babine River	494	6.99	0.01	0.00	0.00	0.01	0.09	Low
BABR-25	Cayuse Jack Creek	448	4.75	0.00	0.00	0.00	0.00	0.00	Low

Reference AU	Sub-watershed Name	FWA FID	Total Riparian (km^2)	Disturbed Riparian (km^2)			Total Riparian Disturbed (km^2)	Percent Disturbed (%)	Risk
				Roads	Harvested (Post 1999)	Other			
BABR-26	Shelagyote River	455	16.00	0.00	0.00	0.00	0.00	0.00	Low
BABR-27		446	5.84	0.00	0.00	0.00	0.00	0.00	Low
BABR-28		441	2.10	0.00	0.00	0.00	0.00	0.00	Low
BABR-29		453	7.39	0.00	0.00	0.00	0.00	0.00	Low
BABR-30	Le Clair Creek	443	5.95	0.00	0.00	0.00	0.00	0.00	Low
BABR-31	Shelagyote River	454	7.49	0.00	0.00	0.00	0.00	0.00	Low
BABR-32	Gail Creek	442	9.42	0.02	0.08	0.00	0.10	1.03	Low
BABR-33		452	3.39	0.00	0.00	0.00	0.00	0.00	Low
BABR-34	Barger Creek	451	10.04	0.00	0.00	0.00	0.00	0.00	Low
BABR-35		450	5.27	0.00	0.00	0.00	0.00	0.00	Low
BABR-36	Shelagyote River	445	9.72	0.00	0.00	0.00	0.00	0.00	Low
BABR-37		447	4.67	0.00	0.00	0.00	0.00	0.00	Low
BABR-38		486	3.12	0.00	0.07	0.00	0.08	2.44	Low
BABR-39		460	7.60	0.00	0.00	0.00	0.00	0.00	Low
BABR-40	Babine River	495	5.01	0.00	0.00	0.00	0.00	0.00	Low
BABR-41	Cataline Creek	444	3.19	0.02	0.08	0.00	0.09	2.97	Low
BABR-42	Babine River	496	4.49	0.01	0.04	0.00	0.05	1.05	Low
BABR-43	Hanawald Creek	458	11.79	0.00	0.00	0.00	0.00	0.00	Low
BABR-44		457	3.91	0.03	0.02	0.00	0.05	1.23	Low
BABR-45		459	3.32	0.00	0.04	0.00	0.04	1.13	Low
BABR-46		485	3.25	0.01	0.01	0.00	0.02	0.59	Low
BABR-47		482	5.69	0.00	0.01	0.00	0.01	0.18	Low
BABR-48	Nichyeskwa Creek	487	4.02	0.00	0.21	0.00	0.21	5.16	Moderate
BABR-49	Nichyeskwa Creek	488	8.96	0.01	0.24	0.00	0.25	2.81	Low
BULK-01	Denison Creek	1275	9.34	0.00	0.00	0.00	0.01	0.07	Low
BULK-02	Suskwa River	1298	4.33	0.01	0.00	0.00	0.01	0.27	Low
BULK-03	Harold Price Creek	1279	5.67	0.00	0.00	0.00	0.00	0.07	Low
BULK-04		1276	5.72	0.00	0.06	0.00	0.06	1.11	Low
BULK-05	Suskwa River	1299	6.20	0.01	0.00	0.00	0.01	0.12	Low
BULK-06	Suskwa River	1300	6.71	0.00	0.00	0.00	0.00	0.07	Low

Reference AU	Sub-watershed Name	FWA FID	Total Riparian (km^2)	Disturbed Riparian (km^2)			Total Riparian Disturbed (km^2)	Percent Disturbed (%)	Risk
				Roads	Harvested (Post 1999)	Other			
BULK-07	Suskwa River	1301	6.50	0.00	0.00	0.00	0.00	0.00	Low
BULK-08	Bulkley River	1267	4.92	0.03	0.00	0.75	0.78	15.80	High
BULK-09	Station Creek	1268	3.17	0.00	0.00	1.77	1.77	55.96	High
BULK-10	Bulkley River	1413	4.55	0.06	0.00	0.58	0.65	14.18	Moderate
BULK-11	Two Mile Creek	1269	2.44	0.09	0.00	0.17	0.26	10.72	Moderate
BULK-12	Mudflat Creek	1302	5.53	0.03	0.00	0.01	0.05	0.82	Low
BULK-13	Porphyry Creek	1304	6.40	0.01	0.00	0.01	0.01	0.20	Low
BULK-14	Nine Mile Creek	1270	4.11	0.00	0.00	0.00	0.00	0.05	Low
BULK-15	Bulkley River	1414	2.30	0.01	0.00	0.05	0.06	2.63	Low
BULK-16	Bulkley River	1415	3.14	0.01	0.00	0.04	0.05	1.55	Low
BULK-17	Suskwa River	1271	2.29	0.03	0.00	0.00	0.03	1.31	Low
BULK-18	Fifteen Mile Creek	1272	2.79	0.00	0.00	0.00	0.00	0.13	Low
BULK-19	Iltzul Creek	1274	5.83	0.03	0.03	0.00	0.07	1.12	Low
BULK-20	Corduroy Creek	1303	3.74	0.01	0.09	0.00	0.10	2.65	Low
BULK-21	Bulkley River	1416	3.25	0.00	0.02	0.19	0.21	6.61	Moderate
BULK-22	Luno Creek	1305	4.63	0.00	0.00	0.00	0.00	0.06	Low
BULK-23	Suskwa River	1296	1.76	0.01	0.00	0.00	0.01	0.64	Low
BULK-24	Natlan Creek	1273	13.33	0.03	0.01	0.00	0.04	0.26	Low
BULK-25	Kwun Creek	1307	2.80	0.00	0.17	0.00	0.17	6.18	Moderate
BULK-26	Suskwa River	1297	4.09	0.00	0.00	0.00	0.00	0.08	Low
BULK-27	Natlan Creek	1277	4.72	0.00	0.01	0.00	0.02	0.38	Low
BULK-28		1278	2.94	0.01	0.00	0.00	0.01	0.17	Low
KISP-01		6252	8.23	0.00	0.00	0.00	0.00	0.00	Low
KISP-02		6255	3.63	0.00	0.01	0.00	0.02	0.42	Low
KISP-03		6251	7.89	0.00	0.00	0.00	0.00	0.00	Low
KISP-04	Kispiox River	6262	6.53	0.00	0.00	0.00	0.00	0.00	Low
KISP-05	Stephens Creek	6250	6.92	0.00	0.00	0.00	0.00	0.00	Low
KISP-06	Kispiox River	6261	7.85	0.00	0.00	0.00	0.00	0.00	Low
KISP-07	East Kispiox River	6253	17.89	0.00	0.00	0.00	0.00	0.00	Low
KISP-08		6256	8.31	0.00	0.00	0.00	0.00	0.00	Low
KISP-09	Kispiox River	6260	8.49	0.03	0.10	0.00	0.13	1.52	Low

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				Roads	Harvested (Post 1999)	Other			
KISP-10		6249	2.77	0.00	0.00	0.00	0.00	0.04	Low
KISP-11		6254	10.36	0.00	0.00	0.00	0.00	0.00	Low
KISP-12		6248	3.28	0.01	0.00	0.00	0.01	0.18	Low
KISP-13	Kispiox River	6263	18.03	0.00	0.00	0.00	0.00	0.00	Low
KISP-14	Carrigan Creek	6273	6.44	0.02	0.24	0.00	0.26	4.07	Low
KISP-15	Blackstock Creek	6275	6.47	0.00	0.00	0.00	0.00	0.01	Low
KISP-16	Murder Creek	6231	4.55	0.02	0.10	0.00	0.12	2.68	Low
KISP-17	Skeena River	6287	4.50	0.01	0.13	0.00	0.14	3.18	Low
KISP-18	Skeena River	6286	3.29	0.02	0.00	0.00	0.02	0.71	Low
KISP-19	Bretson Creek	6274	3.47	0.01	0.00	0.00	0.01	0.22	Low
KISP-20	Skeena River	6285	7.32	0.02	0.02	0.01	0.05	0.67	Low
KISP-21	Shewililba Creek	6272	4.40	0.00	0.00	0.00	0.00	0.09	Low
KISP-22	Sediesh Creek	6271	4.75	0.00	0.01	0.00	0.01	0.16	Low
KISP-23	Nangeese River	6247	10.93	0.02	0.11	0.00	0.12	1.12	Low
KISP-24	Brown Paint Creek	6246	2.73	0.01	0.00	0.00	0.01	0.30	Low
KISP-25	Sweetin River	6244	5.73	0.00	0.00	0.00	0.00	0.04	Low
KISP-26	Sweetin River	6241	4.69	0.03	0.02	0.00	0.05	0.99	Low
KISP-27	Sweetin River	6245	7.85	0.00	0.00	0.00	0.00	0.00	Low
KISP-28		6242	11.61	0.00	0.00	0.00	0.00	0.03	Low
KISP-29		6243	4.58	0.00	0.00	0.00	0.00	0.00	Low
KISP-30	Kispiox River	6259	15.84	0.08	0.15	0.00	0.23	1.46	Low
KISP-31	Clifford Creek	6239	2.92	0.01	0.00	0.00	0.01	0.23	Low
KISP-32	Steep Canyon Creek	6240	5.24	0.01	0.00	0.00	0.01	0.13	Low
KISP-33	Kispiox River	6258	2.19	0.01	0.00	0.00	0.01	0.60	Low
KISP-34	Skunsnat Creek	6238	3.17	0.01	0.00	0.00	0.01	0.26	Low
KISP-35	McCully Creek	6230	5.48	0.02	0.00	0.00	0.02	0.30	Low
KISP-36	Corral Creek	6237	3.68	0.01	0.00	0.00	0.01	0.31	Low
KISP-37	Ironside Creek	6236	7.41	0.01	0.00	0.00	0.01	0.19	Low
KISP-38	Cullon Creek	6233	3.97	0.01	0.01	0.00	0.02	0.43	Low
KISP-39	Cullon Creek	6232	10.26	0.03	0.10	0.00	0.13	1.26	Low
KISP-40		6235	3.54	0.01	0.00	0.00	0.01	0.33	Low

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				Roads	Harvested (Post 1999)	Other			
KISP-41		6234	3.25	0.03	0.10	0.00	0.13	3.85	Low
KISP-42	Skeena River	6281	6.42	0.05	0.08	1.38	1.51	23.53	High
KISP-43	Shegunia River	6264	5.04	0.01	0.03	0.02	0.06	1.14	Low
KISP-44	Skeena River	6284	3.70	0.01	0.06	0.05	0.12	3.26	Low
KISP-45	Pinenut Creek	6269	2.50	0.00	0.03	0.00	0.03	1.31	Low
KISP-46	Shegunia River	6266	5.68	0.02	0.00	0.00	0.02	0.34	Low
KISP-47	Shegunia River	6267	3.30	0.01	0.02	0.00	0.03	1.00	Low
KISP-48	Shegunia River	6268	10.80	0.00	0.00	0.00	0.00	0.00	Low
KISP-49	Kitsuns Creek	6212	5.98	0.00	0.00	0.00	0.00	0.00	Low
KISP-50		6211	7.19	0.00	0.00	0.00	0.00	0.00	Low
KISP-51	Kitseguecla River	6217	4.70	0.00	0.00	0.00	0.00	0.07	Low
KISP-52	Kitsuns Creek	6206	10.11	0.01	0.09	0.00	0.10	0.95	Low
KISP-53		6207	8.40	0.01	0.12	0.00	0.13	1.57	Low
KISP-54		6213	2.57	0.00	0.01	0.00	0.01	0.38	Low
KISP-55		6209	2.99	0.00	0.02	0.00	0.02	0.83	Low
KISP-56	Kitseguecla River	6216	3.61	0.01	0.15	0.00	0.15	4.27	Low
KISP-57		6208	3.64	0.00	0.00	0.00	0.00	0.04	Low
KISP-58		6204	7.52	0.01	0.07	0.00	0.08	1.06	Low
KISP-59	Kitseguecla River	6201	1.70	0.02	0.00	0.07	0.09	5.14	Moderate
KISP-60	Kitseguecla River	6215	1.48	0.01	0.00	0.13	0.14	9.45	Moderate
KISP-61	Deep Canyon Creek	6205	2.99	0.00	0.00	0.00	0.00	0.15	Low
KISP-62	Skeena River	6278	6.06	0.12	0.04	0.35	0.51	8.38	Moderate
KISP-63	Juniper Creek	6202	6.81	0.04	0.02	0.03	0.08	1.19	Low
KISP-64	Brian Boru Creek	6203	3.64	0.00	0.00	0.00	0.00	0.00	Low
KISP-65	Skeena River	6279	6.78	0.13	0.00	0.60	0.73	10.69	Moderate
KISP-66	Andi Creek	6200	2.60	0.02	0.00	0.22	0.23	9.02	Moderate
KISP-67		6182	6.15	0.04	0.20	0.00	0.25	4.00	Low
KISP-68	Chicago Creek	6221	1.94	0.02	0.00	0.00	0.02	0.91	Low
KISP-69	Skeena River	6280	3.99	0.04	0.08	0.01	0.12	3.08	Low

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				Roads	Harvested (Post 1999)	Other			
KISP-70	Burdick Creek	6219	8.45	0.03	0.27	0.02	0.32	3.75	Low
KISP-71	Hazelton Creek	6222	5.05	0.01	0.08	0.07	0.16	3.24	Low
KISP-72	Burdick Creek	6220	4.56	0.01	0.00	0.00	0.01	0.26	Low
KISP-73	Skeena River	6282	4.22	0.01	0.01	0.53	0.55	13.02	Moderate
KISP-74	Date Creek	6224	12.79	0.02	0.26	0.07	0.35	2.75	Low
KISP-75	Kitwancool Creek	6189	5.81	0.00	0.00	0.00	0.00	0.00	Low
KISP-76	Kitwanga River	6198	7.20	0.03	0.12	0.00	0.16	2.19	Low
KISP-77	Kitwancool Creek	6188	6.03	0.00	0.00	0.00	0.00	0.00	Low
KISP-78		6185	4.92	0.00	0.08	0.00	0.08	1.61	Low
KISP-79		6187	3.10	0.00	0.00	0.00	0.00	0.00	Low
KISP-80	Kitwanga River	6197	3.96	0.01	0.03	0.00	0.04	0.92	Low
KISP-81	Kitwancool Creek	6184	7.15	0.01	0.00	0.21	0.21	2.97	Low
KISP-82	Mill Creek	6179	7.00	0.01	0.09	0.01	0.10	1.49	Low
KISP-83		6180	3.32	0.01	0.00	0.00	0.01	0.21	Low
KISP-84	Deuce Creek	6183	3.67	0.00	0.00	0.00	0.00	0.07	Low
KISP-85	Skeena River	6277	7.72	0.03	0.00	0.80	0.83	10.81	Moderate
KISP-86	Skeena River	6276	2.46	0.02	0.05	0.41	0.48	19.63	High
KISP-87		6178	8.41	0.00	0.00	0.00	0.00	0.02	Low
KISP-88	Kitwanga River	6196	4.99	0.07	0.12	0.22	0.42	8.36	Moderate
KISP-89	Moonlit Creek	6190	12.24	0.03	0.02	0.09	0.14	1.18	Low
KISP-90	Kitwanga River	6195	4.07	0.05	0.06	0.22	0.33	8.13	Moderate
KISP-91	Kitwanga River	6181	3.05	0.01	0.00	0.23	0.24	7.82	Moderate
KISP-92	Kitwanga River	6194	8.81	0.17	0.08	0.24	0.50	5.64	Moderate
KISP-93	Shandilla Creek	6199	5.46	0.01	0.16	0.13	0.30	5.59	Moderate
KISP-94		6192	4.08	0.00	0.00	0.00	0.00	0.00	Low
KISP-95		6191	3.59	0.00	0.00	0.00	0.00	0.00	Low
KISP-96		6225	3.97	0.01	0.02	0.00	0.03	0.74	Low
KISP-97		6229	3.34	0.00	0.04	0.00	0.04	1.31	Low
KISP-98		6210	3.58	0.00	0.00	0.00	0.00	0.00	Low
KISP-99	Kispiox River	6223	6.03	0.05	0.02	0.63	0.69	11.46	Moderate
KISP-100	Skeena River	6283	4.24	0.03	0.22	0.02	0.26	6.25	Moderate
KISP-101	Hevenor Creek	6226	7.09	0.04	0.13	0.00	0.17	2.45	Low

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KISP-102	Kispiox River	6257	4.69	0.04	0.09	0.00	0.13	2.69	Low
KISP-103		6265	7.58	0.00	0.00	0.00	0.00	0.00	Low
KISP-104	McCully Creek	6228	13.35	0.03	0.18	0.00	0.22	1.61	Low
KISP-105	Utsun Creek	6270	6.31	0.00	0.00	0.01	0.01	0.12	Low
KISP-106		6227	2.09	0.01	0.13	0.00	0.14	6.79	Moderate
KISP-107		6186	4.44	0.00	0.00	0.00	0.00	0.05	Low
KISP-108		6193	2.84	0.00	0.02	0.00	0.03	0.90	Low
KLUM-01		6741	3.18	0.00	0.00	0.00	0.00	0.00	Low
KLUM-02	Sedan Creek	6740	8.80	0.00	0.00	0.01	0.01	0.16	Low
KLUM-03		6743	5.77	0.00	0.00	0.00	0.00	0.06	Low
KLUM-04	Oliver Creek	6721	8.11	0.01	0.00	0.00	0.01	0.08	Low
KLUM-05	Oliver Creek	6723	5.23	0.00	0.00	0.00	0.00	0.00	Low
KLUM-06	Oliver Creek	6722	2.11	0.00	0.00	0.00	0.00	0.00	Low
KLUM-07		6736	6.84	0.00	0.00	0.00	0.00	0.00	Low
KLUM-08		6734	6.06	0.00	0.00	0.00	0.00	0.00	Low
KLUM-09		6735	2.14	0.00	0.00	0.00	0.00	0.00	Low
KLUM-10		6742	4.66	0.00	0.00	0.00	0.00	0.00	Low
KLUM-11	Wilson Creek	6738	3.24	0.01	0.00	0.00	0.01	0.41	Low
KLUM-12	Lorne Creek	6727	7.83	0.00	0.00	0.00	0.00	0.04	Low
KLUM-13	South Lorne Creek	6728	4.01	0.00	0.00	0.00	0.00	0.00	Low
KLUM-14	Skeena River	6752	5.61	0.10	0.06	0.12	0.28	4.91	Low
KLUM-15	Quill Creek	6729	6.17	0.00	0.06	0.00	0.06	1.02	Low
KLUM-16	Quill Creek	6731	2.30	0.00	0.00	0.00	0.00	0.00	Low
KLUM-17	Flint Creek	6732	1.69	0.01	0.03	0.00	0.04	2.13	Low
KLUM-18		6730	1.91	0.00	0.00	0.00	0.00	0.00	Low
KLUM-19	Skeena River	6754	2.65	0.14	0.00	0.33	0.46	17.54	High
KLUM-20	CoyoteCreek	6737	1.61	0.00	0.00	0.00	0.00	0.24	Low
KLUM-21	Insect Creek	6733	9.06	0.00	0.00	0.00	0.01	0.10	Low
KLUM-22		6739	1.93	0.00	0.01	0.00	0.01	0.61	Low
KLUM-23	Skeena River	6755	3.10	0.02	0.11	0.02	0.15	4.95	Low
KLUM-24	Skeena River	6753	1.94	0.05	0.04	0.11	0.20	10.44	Moderate
LNAR-01	Cranberry River	9034	3.21	0.02	0.15	0.00	0.17	5.21	Moderate
LNAR-02	Weber Creek	9025	8.75	0.00	0.04	0.00	0.04	0.46	Low

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LNAR-03		9027	4.58	0.00	0.00	0.00	0.00	0.00	Low
LNAR-04		9024	1.66	0.02	0.03	0.00	0.04	2.66	Low
LNAR-05		9026	3.38	0.00	0.00	0.00	0.00	0.00	Low
LNAR-06	Cranberry River	9033	14.70	0.09	0.06	0.00	0.14	0.98	Low
LNAR-07	Tsugwinselda Creek	9023	4.95	0.01	0.00	0.00	0.01	0.26	Low
LNAR-08		9021	3.62	0.00	0.04	0.00	0.04	1.05	Low
LNAR-09	Aluk Creek	9020	5.97	0.02	0.00	0.00	0.02	0.35	Low
LNAR-10	Kiteen River	8998	8.13	0.00	0.04	0.05	0.09	1.15	Low
LNAR-11		9029	8.01	0.00	0.00	0.00	0.00	0.00	Low
LNAR-12		9028	5.00	0.00	0.00	0.00	0.00	0.00	Low
LNAR-13	Cranberry River	9036	11.72	0.00	0.00	0.00	0.00	0.00	Low
LNAR-14	Cranberry River	9035	4.45	0.01	0.07	0.00	0.08	1.69	Low
LNAR-15	Weegett Creek	9022	2.64	0.01	0.00	0.00	0.01	0.21	Low
LNAR-16	Nass River	9047	4.71	0.00	0.00	0.00	0.00	0.04	Low
LNAR-17	Ginmiltkun Creek	9016	10.15	0.00	0.00	0.00	0.00	0.02	Low
LNAR-18	Cranberry River	9031	10.41	0.02	0.08	0.09	0.20	1.92	Low
LNAR-19		9017	4.26	0.00	0.00	0.00	0.00	0.00	Low
LNAR-20	Cranberry River	9032	13.34	0.07	0.13	0.00	0.20	1.50	Low
LNAR-21		9018	2.37	0.03	0.03	0.00	0.06	2.37	Low
LNAR-22	Calmin Creek	9019	3.25	0.01	0.00	0.00	0.01	0.28	Low
MSKE-01	Endless Creek	11076	10.86	0.00	0.00	0.00	0.00	0.00	Low
MSKE-02	Sicintine River	11086	4.32	0.00	0.00	0.00	0.00	0.00	Low
MSKE-03		11078	7.02	0.00	0.00	0.00	0.00	0.00	Low
MSKE-04		11077	5.27	0.00	0.00	0.00	0.00	0.00	Low
MSKE-05		11082	2.83	0.00	0.00	0.00	0.00	0.00	Low
MSKE-06	Skeena River	11146	5.64	0.01	0.00	0.00	0.01	0.13	Low
MSKE-07	Skeena River	11148	4.73	0.00	0.00	0.00	0.00	0.00	Low
MSKE-08	Skeena River	11147	4.79	0.00	0.00	0.00	0.00	0.00	Low
MSKE-09	Skeena River	11145	4.95	0.00	0.00	0.00	0.00	0.00	Low
MSKE-10	Sicintine River	11070	5.23	0.00	0.00	0.00	0.00	0.00	Low

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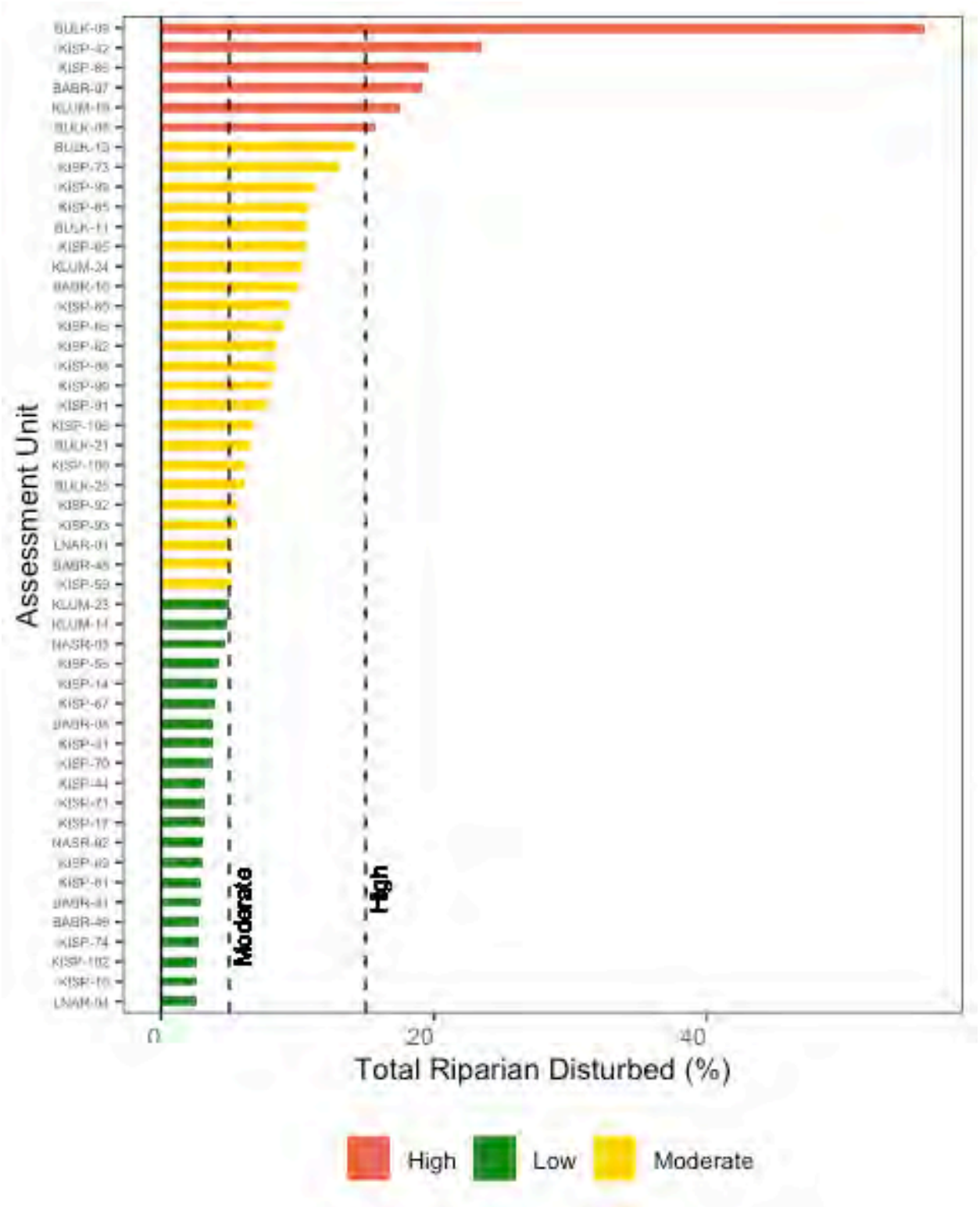
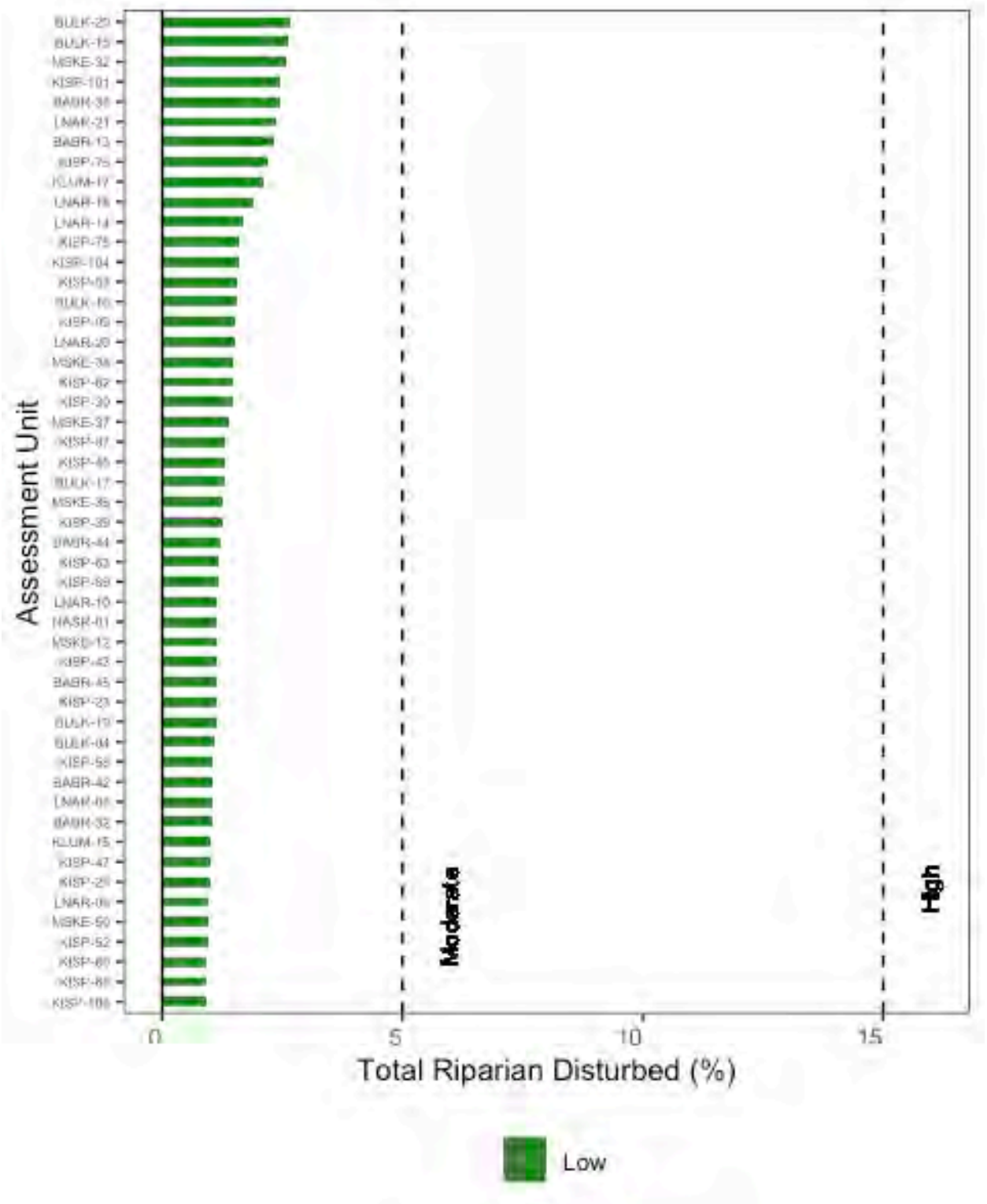
MSKE-11	Sicintine River	11083	9.38	0.00	0.00	0.00	0.00	0.00	Low
MSKE-12		11068	3.85	0.00	0.04	0.00	0.04	1.15	Low
MSKE-13		11071	3.37	0.00	0.00	0.00	0.00	0.00	Low
MSKE-14		11072	2.43	0.00	0.00	0.00	0.00	0.00	Low
MSKE-15	Sicintine River	11084	10.88	0.00	0.00	0.00	0.00	0.00	Low
MSKE-16		11075	3.84	0.00	0.00	0.00	0.00	0.00	Low
MSKE-17	Tommy Jack Creek	11074	10.99	0.02	0.00	0.00	0.02	0.22	Low
MSKE-18		11073	6.08	0.00	0.00	0.00	0.00	0.00	Low
MSKE-19		11080	4.76	0.00	0.00	0.00	0.00	0.00	Low
MSKE-20		11079	4.98	0.00	0.00	0.00	0.00	0.00	Low
MSKE-21	Sicintine River	11085	3.47	0.00	0.00	0.00	0.00	0.11	Low
MSKE-22		11081	3.44	0.00	0.00	0.00	0.00	0.00	Low
MSKE-23		11059	13.95	0.00	0.00	0.00	0.00	0.00	Low
MSKE-24		11058	5.43	0.00	0.00	0.00	0.00	0.00	Low
MSKE-25	Calamity Creek	11055	15.01	0.00	0.00	0.00	0.00	0.00	Low
MSKE-26	Sheladamus Creek	11088	7.33	0.00	0.00	0.00	0.00	0.00	Low
MSKE-27	O'Dwyer Creek	11091	6.03	0.00	0.00	0.00	0.00	0.00	Low
MSKE-28	Poison Creek	11089	4.22	0.00	0.00	0.00	0.00	0.00	Low
MSKE-29		11090	3.67	0.00	0.00	0.00	0.00	0.00	Low
MSKE-30		11069	5.53	0.00	0.00	0.00	0.00	0.03	Low
MSKE-31	Skeena River	11139	10.49	0.03	0.04	0.00	0.06	0.59	Low
MSKE-32	Skeena River	11143	6.27	0.04	0.00	0.13	0.16	2.60	Low
MSKE-33	Skeena River	11141	6.90	0.00	0.00	0.00	0.00	0.00	Low
MSKE-34		11048	4.19	0.00	0.00	0.00	0.00	0.00	Low
MSKE-35	Larkworthy Creek	11065	8.13	0.00	0.01	0.00	0.02	0.19	Low
MSKE-36	Skeena River	11144	3.42	0.03	0.01	0.00	0.04	1.27	Low
MSKE-37		11067	3.87	0.02	0.03	0.00	0.05	1.39	Low
MSKE-38	Skeena River	11140	4.67	0.02	0.05	0.00	0.07	1.49	Low
MSKE-39		11066	3.46	0.00	0.02	0.00	0.02	0.49	Low
MSKE-40	Kuldo Creek	11064	8.56	0.00	0.00	0.00	0.00	0.00	Low
MSKE-41		11060	3.23	0.00	0.00	0.00	0.00	0.00	Low

Reference AU	Sub-watershed Name	FWA FID	Total Riparian (km^2)	Disturbed Riparian (km^2)			Total Riparian Disturbed (km^2)	Percent Disturbed (%)	Risk
				Roads	Harvested (Post 1999)	Other			
MSKE-42	Kuldo Creek	11063	4.94	0.00	0.00	0.00	0.00	0.00	Low
MSKE-43		11057	7.43	0.00	0.00	0.00	0.00	0.00	Low
MSKE-44	Kuldo Creek	11062	8.21	0.00	0.00	0.00	0.00	0.00	Low
MSKE-45		11052	7.92	0.00	0.00	0.00	0.00	0.00	Low
MSKE-46	Kuldo Creek	11053	7.98	0.00	0.00	0.00	0.00	0.03	Low
MSKE-47		11054	10.45	0.00	0.00	0.00	0.00	0.00	Low
MSKE-48		11051	5.55	0.00	0.00	0.00	0.00	0.00	Low
MSKE-49	Kuldo Creek	11061	9.09	0.00	0.07	0.00	0.07	0.79	Low
MSKE-50	Deep Canoe Creek	11049	7.21	0.04	0.03	0.00	0.07	0.98	Low
MSKE-51		11056	9.76	0.00	0.00	0.00	0.00	0.00	Low
MSKE-52		11050	2.43	0.00	0.00	0.00	0.00	0.06	Low
MSKE-53	Skeena River	11142	3.66	0.03	0.00	0.00	0.03	0.75	Low
MSKE-54	Sicintine River	11087	6.94	0.00	0.00	0.00	0.00	0.00	Low
NASR-01		11840	2.63	0.00	0.00	0.03	0.03	1.15	Low
NASR-02	Derrick Creek	11839	6.10	0.04	0.10	0.05	0.19	3.14	Low
NASR-03	Nass River	11879	3.98	0.01	0.16	0.02	0.19	4.73	Low

Appendix C: Results Distribution

Results are colourized by risk threshold (low risk <5% disturbed, moderate risk 5-15% disturbed, and high risk >15% disturbed).

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MSKE-32
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BABR-38
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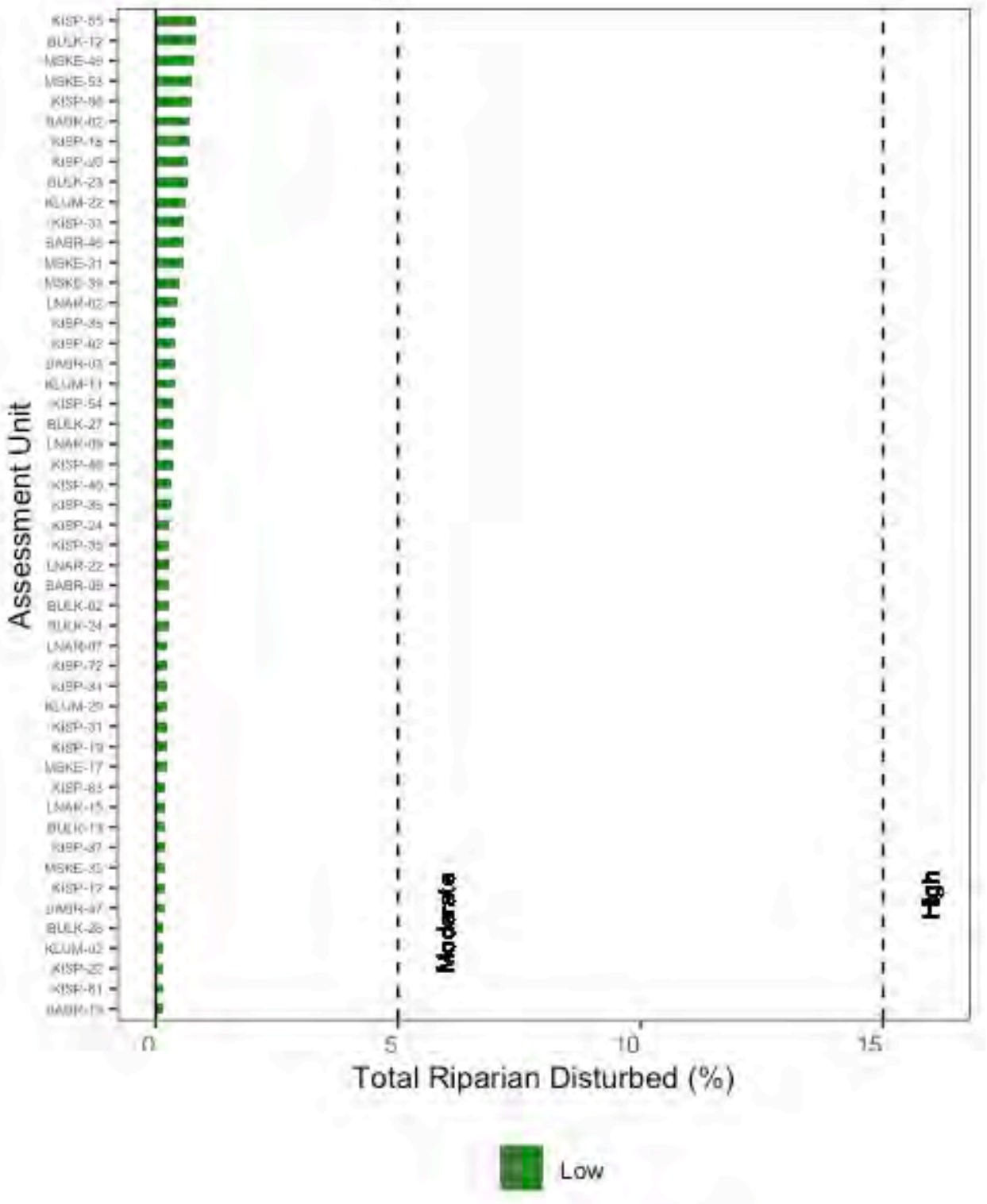
BABR-13
KISP-75
KLUM-17
LNAR-16
LNAR-14
KISP-75
KISP-104
KISP-03
BULK-16
KISP-05
LNAR-20
MSKE-36
KISP-62
KISP-30
MSKE-37
KISP-87
KISP-85
BULK-17
MSKE-35
KISP-39
LNAR-44
KISP-63
KISP-89
LNAR-10
NASR-01
MSKD-12
KISP-43
BABR-45
KISP-23
BULK-13
BULK-04
KISP-55
BABR-42
LNAR-01
BABR-32
KLUM-15
KISP-47
KISP-25
LNAR-09
MSKE-50
KISP-52
KISP-69
KISP-81
KISP-106
0
5
10
15
Moderate
High
Total Riparian Disturbed (%)
Low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BABK-02
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BULK-23
KLUM-22
KISP-33
BABR-46
MSKE-31
MSKE-39
LNAR-02
KISP-36
KISP-42
DNBR-03
KLUM-11
KISP-54
BULK-27
LNAR-09
KISP-60
KISP-40
KISP-35
KISP-24
KISP-39
LNAR-22
BABR-09
BULK-02
BULK-24
LNAR-07
KISP-72
KISP-34
KLUM-29
KISP-31
KISP-19
MSKE-17
KISP-83
LNAR-15
BULK-13
KISP-37
MSKE-33
KISP-17
DNBR-07
BULK-26
KLUM-02
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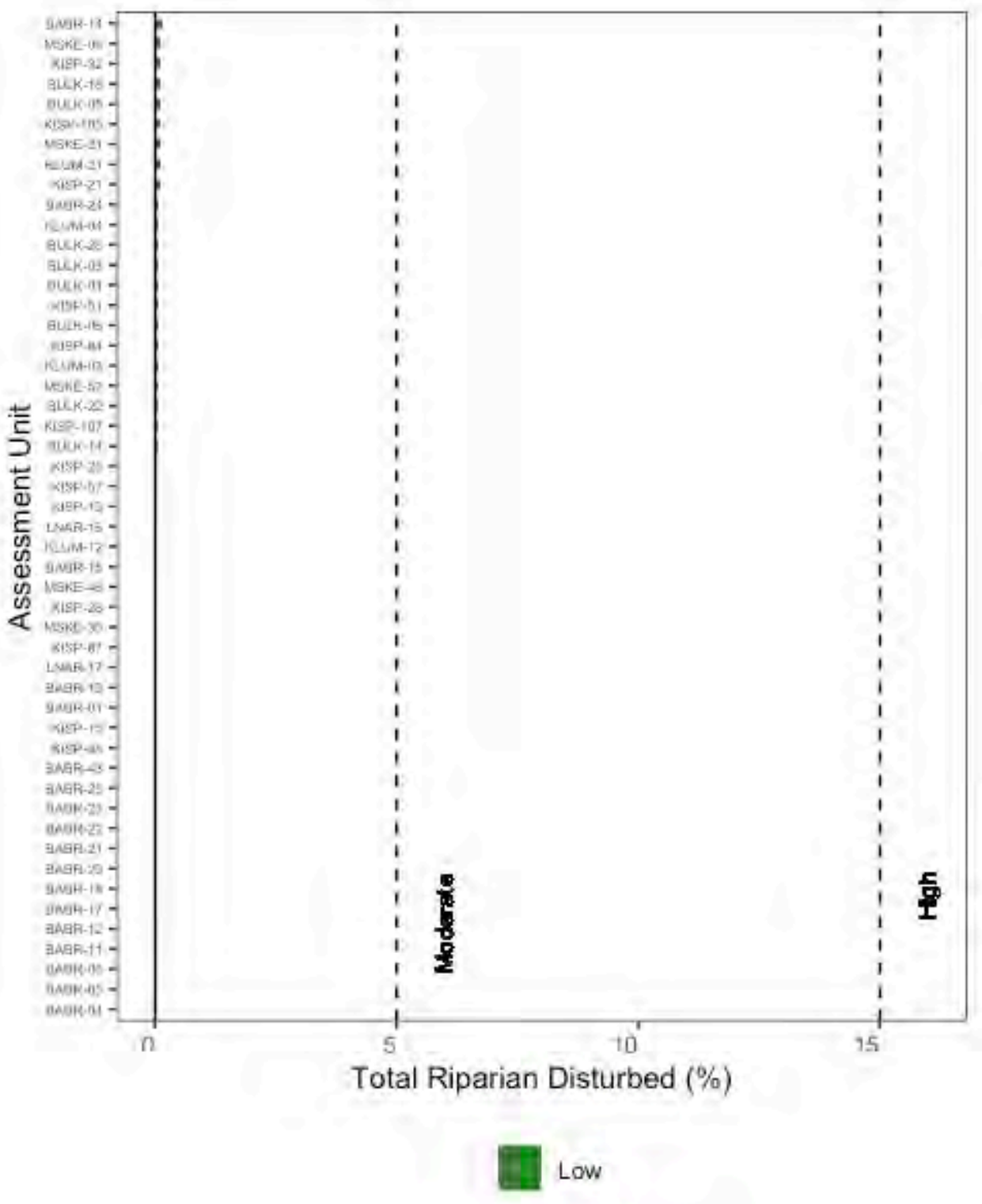
KISP-81
BABR-13
Moderate
High
0
5
10
15
Total Riparian Disturbed (%)
Low


Assessment Unit
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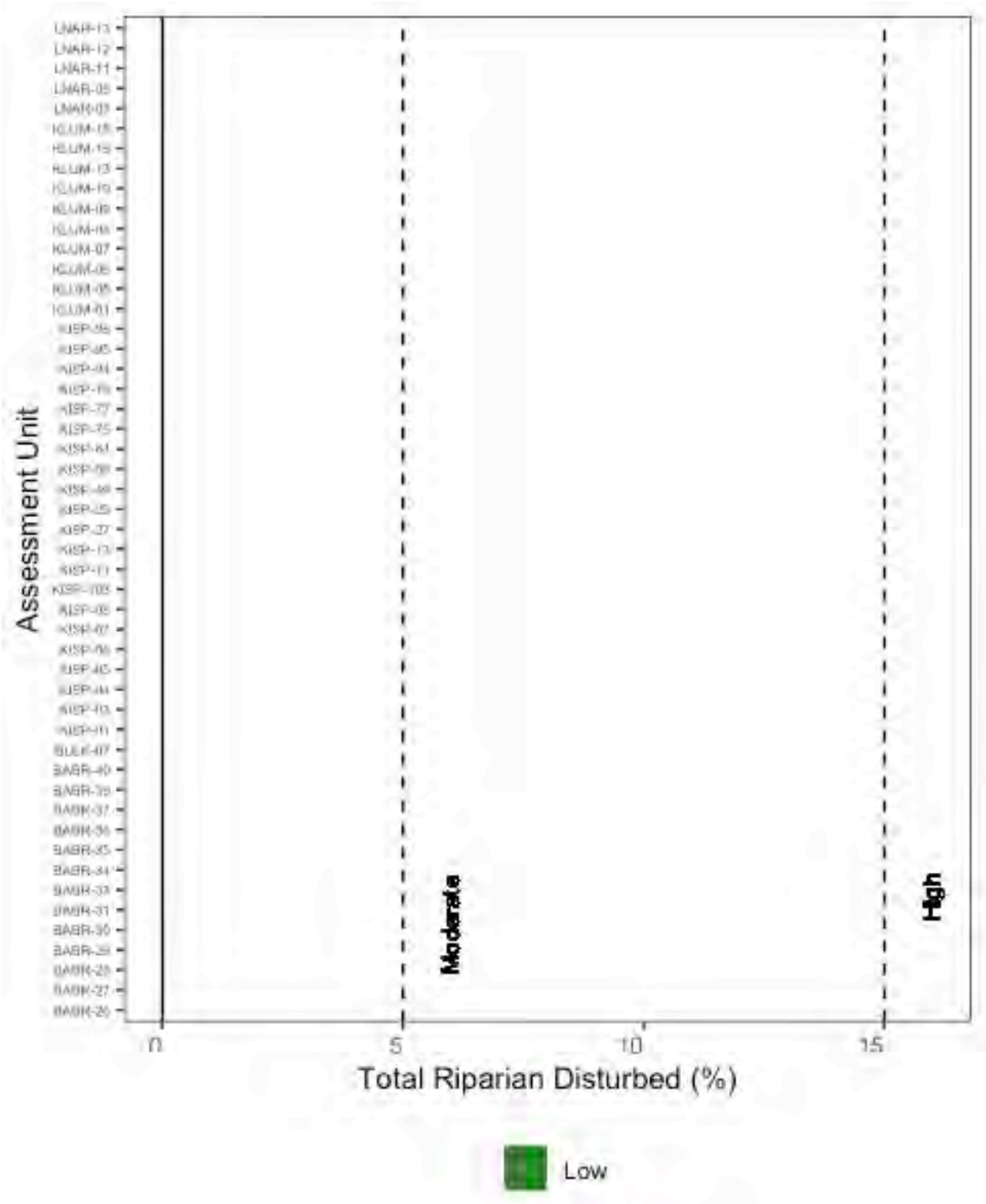
10
15
Total Riparian Disturbed (%)
Moderate
High
Low


Assessment Unit
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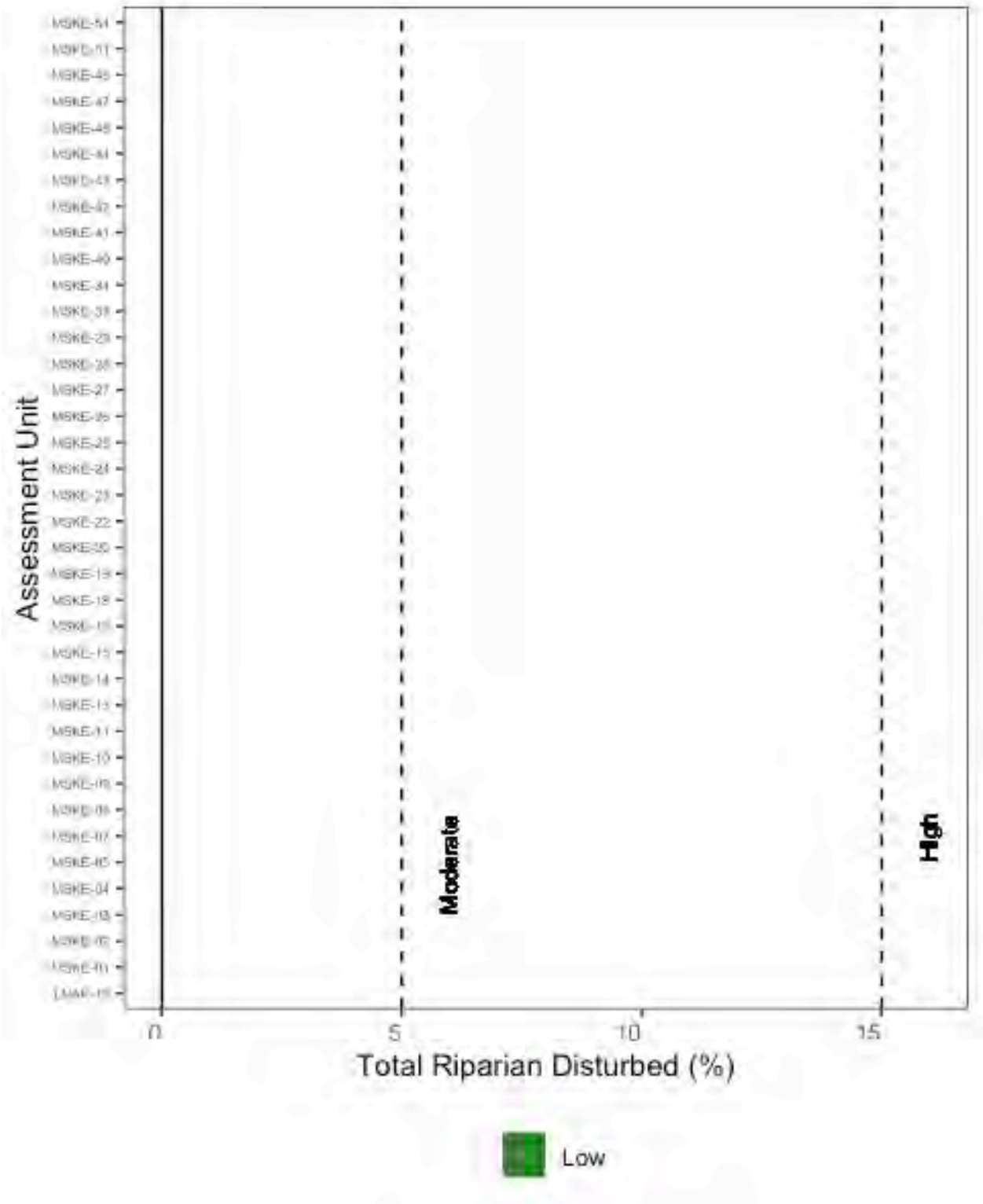
10
15
Total Riparian Disturbed (%)
Moderate
High
Low


Assessment Unit
0
5
10
15
Total Riparian Disturbed (%)
Moderate
High
Low

Appendix D: Riparian Habitat Characterization

The following tables present results for total area, riparian habitat area in which fish presence has been observed, inferred, and neither observed nor inferred, total riparian area, and percentage of total area which is riparian for each assessment unit.

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Riparian Type (km^2)			Total Riparian (km^2)	Riparian as % of Total Area
				Fish Presence Observed	Fish Presence Inferred	No Fish Presence Inferred		
BABR-01	Sam Green Creek	424	51.41	0.17	0.22	7.89	8.28	16.10
BABR-02	Damsumlo Creek	433	59.43	0.76	2.64	8.38	11.78	19.83
BABR-03	Shedin Creek	436	48.48	0.02	0.33	9.78	10.14	20.91
BABR-04		429	25.00	0.10	0.39	3.15	3.64	14.58
BABR-05	Shedin Creek	435	61.63	0.95	0.23	8.18	9.35	15.17
BABR-06		434	38.12	0.00	0.35	6.77	7.13	18.69
BABR-07	Babine River	423	40.04	1.15	0.01	4.26	5.42	13.52
BABR-08	Babine River	492	62.22	0.27	0.03	5.56	5.86	9.43
BABR-09	Shedin Creek	426	73.86	1.08	0.74	8.86	10.67	14.45
BABR-10	Shegisic Creek	425	98.45	0.08	1.14	10.65	11.87	12.05
BABR-11		432	25.74	0.01	0.03	4.58	4.63	17.96
BABR-12	Rosenthal Creek	431	91.95	0.12	1.00	13.27	14.39	15.65
BABR-13	Goathead Creek	427	37.83	0.00	1.25	4.29	5.55	14.67
BABR-14		437	25.91	0.00	0.00	3.31	3.31	12.79
BABR-15		439	22.06	0.00	0.02	2.77	2.79	12.64
BABR-16	Shahnagh Creek	461	63.26	0.00	2.05	5.61	7.67	12.12
BABR-17	Sperry Creek	430	54.23	0.07	0.64	7.28	8.00	14.75
BABR-18		428	40.13	0.15	0.14	5.62	5.91	14.72
BABR-19	Thomlinson Creek	440	82.86	0.81	0.42	6.35	7.58	9.15
BABR-20	Shenismike Creek	438	45.51	0.18	0.05	6.91	7.13	15.67
BABR-21	Babine River	493	73.51	1.14	0.26	9.92	11.32	15.40
BABR-22	Shelagyote River	456	48.30	0.68	1.50	3.86	6.05	12.52

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Riparian Type (km^2)			Total Riparian (km^2)	Riparian as % of Total Area
				Fish Presence Observed	Fish Presence Inferred	No Fish Presence Inferred		
BABR-23		449	71.44	0.38	1.10	9.48	10.95	15.33
BABR-24	Babine River	494	60.65	0.15	0.15	6.69	6.99	11.53
BABR-25	Cayuse Jack Creek	448	30.36	0.50	0.18	4.08	4.75	15.64
BABR-26	Shelagyote River	455	77.32	1.73	3.57	10.69	16.00	20.69
BABR-27		446	31.02	0.17	0.29	5.39	5.84	18.83
BABR-28		441	23.39	0.00	0.14	1.96	2.10	8.97
BABR-29		453	53.77	0.30	1.20	5.89	7.39	13.74
BABR-30	Le Clair Creek	443	33.99	0.08	0.39	5.48	5.95	17.49
BABR-31	Shelagyote River	454	35.97	0.67	1.72	5.11	7.49	20.83
BABR-32	Gail Creek	442	92.08	0.00	1.19	8.23	9.42	10.23
BABR-33		452	25.69	0.03	0.89	2.47	3.39	13.21
BABR-34	Barger Creek	451	64.93	0.88	1.52	7.64	10.04	15.46
BABR-35		450	29.62	0.03	1.90	3.34	5.27	17.80
BABR-36	Shelagyote River	445	81.34	1.14	1.92	6.66	9.72	11.95
BABR-37		447	27.67	0.05	1.85	2.77	4.67	16.89
BABR-38		486	24.75	0.04	2.62	0.46	3.12	12.62
BABR-39		460	54.97	0.00	4.09	3.51	7.60	13.82
BABR-40	Babine River	495	41.81	1.20	0.91	2.90	5.01	11.99
BABR-41	Cataline Creek	444	39.81	0.30	1.52	1.37	3.19	8.01
BABR-42	Babine River	496	47.39	0.06	0.47	3.95	4.49	9.47
BABR-43	Hanawald Creek	458	87.27	0.29	7.64	3.86	11.79	13.51
BABR-44		457	32.07	0.00	1.07	2.84	3.91	12.20
BABR-45		459	32.14	0.00	3.19	0.13	3.32	10.33
BABR-46		485	27.92	0.21	0.71	2.34	3.25	11.64
BABR-47		482	46.24	0.85	1.02	3.82	5.69	12.31
BABR-48	Nichyeskwa Creek	487	37.47	1.06	2.10	0.86	4.02	10.73

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Riparian Type (km^2)			Total Riparian (km^2)	Riparian as % of Total Area
				Fish Presence Observed	Fish Presence Inferred	No Fish Presence Inferred		
BABR-49	Nichyeskwa Creek	488	75.82	1.90	4.79	2.27	8.96	11.82
BULK-01	Denison Creek	1275	48.43	0.12	0.74	8.48	9.34	19.28
BULK-02	Suskwa River	1298	37.64	0.65	0.57	3.11	4.33	11.50
BULK-03	Harold Price Creek	1279	40.73	0.91	0.36	4.40	5.67	13.91
BULK-04		1276	23.95	0.08	0.47	5.17	5.72	23.86
BULK-05	Suskwa River	1299	49.78	0.46	0.29	5.45	6.20	12.46
BULK-06	Suskwa River	1300	50.81	0.07	0.64	5.99	6.71	13.20
BULK-07	Suskwa River	1301	54.65	0.00	1.67	4.84	6.50	11.90
BULK-08	Bulkley River	1267	48.69	1.02	0.00	3.91	4.92	10.11
BULK-09	Station Creek	1268	29.63	0.57	0.96	1.64	3.17	10.70
BULK-10	Bulkley River	1413	50.03	1.47	0.51	2.57	4.55	9.10
BULK-11	Two Mile Creek	1269	26.93	0.00	0.58	1.86	2.44	9.07
BULK-12	Mudflat Creek	1302	47.41	0.15	0.75	4.64	5.53	11.68
BULK-13	Porphyry Creek	1304	44.11	0.12	0.76	5.51	6.40	14.50
BULK-14	Nine Mile Creek	1270	26.52	0.00	0.22	3.89	4.11	15.49
BULK-15	Bulkley River	1414	49.43	0.06	0.53	1.71	2.30	4.65
BULK-16	Bulkley River	1415	39.18	1.21	0.70	1.24	3.14	8.02
BULK-17	Suskwa River	1271	26.13	0.97	0.00	1.32	2.29	8.75
BULK-18	Fifteen Mile Creek	1272	23.38	0.00	0.10	2.69	2.79	11.93
BULK-19	Iltzul Creek	1274	43.66	0.54	0.25	5.03	5.83	13.35
BULK-20	Corduroy Creek	1303	34.91	0.20	0.82	2.73	3.74	10.72
BULK-21	Bulkley River	1416	46.12	0.44	0.42	2.39	3.25	7.04
BULK-22	Luno Creek	1305	33.95	0.13	0.15	4.35	4.63	13.65

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Riparian Type (km^2)			Total Riparian (km^2)	Riparian as % of Total Area
				Fish Presence Observed	Fish Presence Inferred	No Fish Presence Inferred		
BULK-23	Suskwa River	1296	20.30	0.02	0.00	1.74	1.76	8.68
BULK-24	Natlan Creek	1273	84.75	1.23	0.16	11.94	13.33	15.73
BULK-25	Kwun Creek	1307	30.73	0.00	0.36	2.43	2.80	9.10
BULK-26	Suskwa River	1297	30.26	0.31	0.01	3.77	4.09	13.51
BULK-27	Natlan Creek	1277	30.22	0.00	0.93	3.79	4.72	15.61
BULK-28		1278	21.06	0.00	0.11	2.83	2.94	13.97
KISP-01		6252	43.80	1.08	4.37	2.78	8.23	18.78
KISP-02		6255	23.32	0.32	2.15	1.16	3.63	15.56
KISP-03		6251	43.88	2.19	3.26	2.44	7.89	17.99
KISP-04	Kispiox River	6262	40.23	0.20	1.46	4.88	6.53	16.24
KISP-05	Stephens Creek	6250	56.57	1.77	2.96	2.20	6.92	12.24
KISP-06	Kispiox River	6261	48.91	1.28	2.60	3.96	7.85	16.04
KISP-07	East Kispiox River	6253	96.94	0.00	1.21	16.67	17.89	18.45
KISP-08		6256	38.99	0.00	0.71	7.61	8.31	21.33
KISP-09	Kispiox River	6260	72.48	2.06	2.14	4.29	8.49	11.71
KISP-10		6249	24.27	0.62	0.99	1.16	2.77	11.43
KISP-11		6254	60.45	0.00	0.00	10.36	10.36	17.13
KISP-12		6248	22.25	0.05	0.44	2.79	3.28	14.74
KISP-13	Kispiox River	6263	106.02	0.00	2.79	15.24	18.03	17.01
KISP-14	Carrigan Creek	6273	44.91	0.14	0.72	5.58	6.44	14.34
KISP-15	Blackstock Creek	6275	43.50	0.00	0.03	6.44	6.47	14.88
KISP-16	Murder Creek	6231	40.63	0.72	2.33	1.50	4.55	11.20
KISP-17	Skeena River	6287	35.54	0.52	0.00	3.98	4.50	12.66
KISP-18	Skeena River	6286	30.87	0.48	0.02	2.78	3.29	10.64

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Riparian Type (km^2)			Total Riparian (km^2)	Riparian as % of Total Area
				Fish Presence Observed	Fish Presence Inferred	No Fish Presence Inferred		
KISP-19	Bretson Creek	6274	21.97	0.00	0.00	3.47	3.47	15.79
KISP-20	Skeena River	6285	61.32	0.89	0.14	6.29	7.32	11.94
KISP-21	Shewililba Creek	6272	36.63	0.00	0.00	4.40	4.40	12.01
KISP-22	Sediesh Creek	6271	42.46	0.00	0.17	4.58	4.75	11.19
KISP-23	Nangeese River	6247	87.17	2.03	2.16	6.74	10.93	12.54
KISP-24	Brown Paint Creek	6246	21.64	0.00	0.41	2.32	2.73	12.62
KISP-25	Sweetin River	6244	51.88	0.87	0.09	4.76	5.73	11.05
KISP-26	Sweetin River	6241	39.23	0.89	1.57	2.23	4.69	11.95
KISP-27	Sweetin River	6245	48.42	0.14	0.51	7.19	7.85	16.21
KISP-28		6242	77.46	0.00	1.99	9.62	11.61	14.99
KISP-29		6243	27.89	0.16	0.54	3.88	4.58	16.43
KISP-30	Kispiox River	6259	117.93	3.81	3.38	8.66	15.84	13.43
KISP-31	Clifford Creek	6239	24.21	0.45	1.02	1.45	2.92	12.08
KISP-32	Steep Canyon Creek	6240	36.61	0.25	0.89	4.11	5.24	14.32
KISP-33	Kispiox River	6258	35.86	0.20	1.85	0.15	2.19	6.12
KISP-34	Skunsnat Creek	6238	26.47	0.68	1.06	1.43	3.17	11.97
KISP-35	McCully Creek	6230	33.29	0.00	0.00	5.48	5.48	16.47
KISP-36	Corral Creek	6237	28.69	0.47	0.66	2.55	3.68	12.83
KISP-37	Ironside Creek	6236	66.26	2.16	3.51	1.73	7.41	11.18
KISP-38	Cullon Creek	6233	33.56	0.25	1.67	2.05	3.97	11.84
KISP-39	Cullon Creek	6232	81.61	1.56	4.24	4.46	10.26	12.58
KISP-40		6235	30.70	0.63	2.83	0.08	3.54	11.52

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Riparian Type (km^2)			Total Riparian (km^2)	Riparian as % of Total Area
				Fish Presence Observed	Fish Presence Inferred	No Fish Presence Inferred		
KISP-41		6234	37.94	0.51	2.19	0.54	3.25	8.55
KISP-42	Skeena River	6281	69.60	1.68	2.10	2.63	6.42	9.22
KISP-43	Shegunia River	6264	48.20	1.10	0.10	3.85	5.04	10.46
KISP-44	Skeena River	6284	38.61	0.74	0.00	2.96	3.70	9.58
KISP-45	Pinenut Creek	6269	24.84	0.00	0.51	1.99	2.50	10.07
KISP-46	Shegunia River	6266	43.44	0.20	0.11	5.36	5.68	13.07
KISP-47	Shegunia River	6267	34.82	0.00	0.52	2.78	3.30	9.49
KISP-48	Shegunia River	6268	83.75	0.00	2.20	8.61	10.80	12.90
KISP-49	Kitsuns Creek	6212	35.39	0.53	0.58	4.87	5.98	16.91
KISP-50		6211	51.59	0.43	0.28	6.47	7.19	13.93
KISP-51	Kitseguecla River	6217	33.88	0.31	0.29	4.10	4.70	13.86
KISP-52	Kitsuns Creek	6206	76.76	1.17	0.06	8.88	10.11	13.17
KISP-53		6207	64.75	0.35	0.41	7.64	8.40	12.97
KISP-54		6213	26.07	0.70	0.66	1.21	2.57	9.85
KISP-55		6209	20.17	0.02	0.07	2.90	2.99	14.82
KISP-56	Kitseguecla River	6216	34.35	0.61	0.05	2.95	3.61	10.50
KISP-57		6208	27.82	0.00	0.02	3.62	3.64	13.07
KISP-58		6204	57.80	0.08	0.16	7.28	7.52	13.02
KISP-59	Kitseguecla River	6201	22.15	0.92	0.00	0.78	1.70	7.69
KISP-60	Kitseguecla River	6215	22.58	0.01	0.28	1.19	1.48	6.57
KISP-61	Deep Canyon Creek	6205	25.58	0.03	0.50	2.46	2.99	11.68
KISP-62	Skeena River	6278	42.24	1.03	0.08	4.94	6.06	14.35
KISP-63	Juniper Creek	6202	60.50	0.55	0.30	5.96	6.81	11.26

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Riparian Type (km^2)			Total Riparian (km^2)	Riparian as % of Total Area
				Fish Presence Observed	Fish Presence Inferred	No Fish Presence Inferred		
KISP-64	Brian Boru Creek	6203	32.22	0.00	0.21	3.43	3.64	11.29
KISP-65	Skeena River	6279	64.72	1.38	0.99	4.41	6.78	10.48
KISP-66	Andi Creek	6200	20.44	0.00	2.36	0.24	2.60	12.74
KISP-67		6182	52.71	0.15	5.80	0.19	6.15	11.66
KISP-68	Chicago Creek	6221	21.01	0.29	0.40	1.24	1.94	9.21
KISP-69	Skeena River	6280	44.15	0.19	0.42	3.38	3.99	9.04
KISP-70	Burdick Creek	6219	78.51	0.12	1.56	6.77	8.45	10.76
KISP-71	Hazelton Creek	6222	41.68	0.12	1.16	3.77	5.05	12.11
KISP-72	Burdick Creek	6220	37.89	0.00	0.95	3.61	4.56	12.03
KISP-73	Skeena River	6282	45.79	0.01	0.43	3.79	4.22	9.23
KISP-74	Date Creek	6224	87.75	0.47	1.08	11.24	12.79	14.58
KISP-75	Kitwancool Creek	6189	40.26	0.00	0.34	5.48	5.81	14.43
KISP-76	Kitwanga River	6198	66.48	0.96	0.82	5.42	7.20	10.83
KISP-77	Kitwancool Creek	6188	50.99	0.22	0.59	5.22	6.03	11.83
KISP-78		6185	37.18	0.20	0.61	4.12	4.92	13.25
KISP-79		6187	24.07	0.00	0.24	2.85	3.10	12.87
KISP-80	Kitwanga River	6197	33.78	0.03	0.98	2.96	3.96	11.72
KISP-81	Kitwancool Creek	6184	60.58	0.95	0.29	5.91	7.15	11.81
KISP-82	Mill Creek	6179	63.11	1.13	0.68	5.19	7.00	11.09
KISP-83		6180	27.47	0.59	0.41	2.32	3.32	12.09
KISP-84	Deuce Creek	6183	31.89	0.49	0.28	2.89	3.67	11.51
KISP-85	Skeena River	6277	100.62	0.43	1.09	6.20	7.72	7.68
KISP-86	Skeena River	6276	32.07	0.35	0.36	1.75	2.46	7.68
KISP-87		6178	85.42	0.02	0.53	7.86	8.41	9.84
KISP-88	Kitwanga River	6196	61.90	1.46	0.51	3.01	4.99	8.06

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Riparian Type (km^2)			Total Riparian (km^2)	Riparian as % of Total Area
				Fish Presence Observed	Fish Presence Inferred	No Fish Presence Inferred		
KISP-89	Moonlit Creek	6190	91.77	0.45	1.37	10.43	12.24	13.34
KISP-90	Kitwanga River	6195	42.28	0.42	0.43	3.22	4.07	9.63
KISP-91	Kitwanga River	6181	38.89	1.06	0.26	1.73	3.05	7.85
KISP-92	Kitwanga River	6194	94.23	0.67	0.99	7.14	8.81	9.34
KISP-93	Shandilla Creek	6199	45.24	0.01	1.15	4.30	5.46	12.06
KISP-94		6192	26.00	0.00	0.00	4.08	4.08	15.70
KISP-95		6191	20.07	0.00	0.34	3.25	3.59	17.89
KISP-96		6225	28.52	0.00	0.20	3.77	3.97	13.91
KISP-97		6229	23.72	0.24	0.35	2.75	3.34	14.10
KISP-98		6210	37.64	0.00	0.73	2.85	3.58	9.51
KISP-99	Kispiox River	6223	62.80	2.76	1.55	1.72	6.03	9.61
KISP-100	Skeena River	6283	69.00	0.12	0.00	4.12	4.24	6.14
KISP-101	Hevenor Creek	6226	62.79	1.05	4.47	1.57	7.09	11.29
KISP-102	Kispiox River	6257	75.33	0.49	3.54	0.66	4.69	6.23
KISP-103		6265	51.63	0.00	1.31	6.28	7.58	14.69
KISP-104	McCully Creek	6228	111.17	0.59	2.12	10.65	13.35	12.01
KISP-105	Utsun Creek	6270	39.41	0.00	0.18	6.13	6.31	16.00
KISP-106		6227	23.00	0.19	1.54	0.36	2.09	9.07
KISP-107		6186	33.46	0.00	0.42	4.02	4.44	13.26
KISP-108		6193	20.27	0.00	0.26	2.58	2.84	14.00
KLUM-01		6741	20.82	0.21	0.02	2.95	3.18	15.28
KLUM-02	Sedan Creek	6740	63.64	0.89	0.07	7.84	8.80	13.82
KLUM-03		6743	66.62	0.04	0.67	5.05	5.77	8.66
KLUM-04	Oliver Creek	6721	71.92	0.06	0.95	7.10	8.11	11.28
KLUM-05	Oliver Creek	6723	38.80	0.00	0.25	4.98	5.23	13.48

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Riparian Type (km^2)			Total Riparian (km^2)	Riparian as % of Total Area
				Fish Presence Observed	Fish Presence Inferred	No Fish Presence Inferred		
KLUM-06	Oliver Creek	6722	40.47	0.00	0.47	1.64	2.11	5.20
KLUM-07		6736	39.29	0.00	0.12	6.72	6.84	17.42
KLUM-08		6734	49.34	0.06	0.21	5.78	6.06	12.28
KLUM-09		6735	22.14	0.00	0.06	2.09	2.14	9.68
KLUM-10		6742	36.67	0.00	0.06	4.60	4.66	12.72
KLUM-11	Wilson Creek	6738	30.88	0.28	0.32	2.64	3.24	10.48
KLUM-12	Lorne Creek	6727	76.37	0.39	0.02	7.42	7.83	10.25
KLUM-13	South Lorne Creek	6728	30.80	0.00	0.01	4.01	4.01	13.03
KLUM-14	Skeena River	6752	67.50	0.80	0.30	4.51	5.61	8.32
KLUM-15	Quill Creek	6729	74.47	0.10	0.00	6.07	6.17	8.29
KLUM-16	Quill Creek	6731	32.41	0.00	0.00	2.30	2.30	7.08
KLUM-17	Flint Creek	6732	24.90	0.04	0.00	1.65	1.69	6.79
KLUM-18		6730	22.13	0.00	0.00	1.91	1.91	8.63
KLUM-19	Skeena River	6754	38.26	1.24	0.10	1.31	2.65	6.92
KLUM-20	CoyoteCreek	6737	25.14	0.05	0.04	1.51	1.61	6.39
KLUM-21	Insect Creek	6733	89.68	0.78	0.03	8.24	9.06	10.10
KLUM-22		6739	22.46	0.00	0.05	1.87	1.93	8.58
KLUM-23	Skeena River	6755	50.29	0.07	0.42	2.61	3.10	6.16
KLUM-24	Skeena River	6753	40.39	0.37	0.28	1.28	1.94	4.80
LNAR-01	Cranberry River	9034	40.16	1.25	0.51	1.45	3.21	7.99
LNAR-02	Weber Creek	9025	63.18	0.56	0.67	7.52	8.75	13.85
LNAR-03		9027	31.75	0.00	0.08	4.50	4.58	14.41
LNAR-04		9024	20.68	0.35	0.06	1.25	1.66	8.01
LNAR-05		9026	22.83	0.00	0.10	3.28	3.38	14.80
LNAR-06	Cranberry River	9033	117.46	1.65	1.93	11.12	14.70	12.52

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Riparian Type (km^2)			Total Riparian (km^2)	Riparian as % of Total Area
				Fish Presence Observed	Fish Presence Inferred	No Fish Presence Inferred		
LNAR-07	Tsugwinsel da Creek	9023	37.66	0.03	0.03	4.90	4.95	13.15
LNAR-08		9021	25.28	0.00	0.62	3.00	3.62	14.32
LNAR-09	Aluk Creek	9020	46.51	0.05	1.43	4.49	5.97	12.84
LNAR-10	Kiteen River	8998	83.65	1.42	0.44	6.27	8.13	9.72
LNAR-11		9029	46.97	0.00	0.47	7.54	8.01	17.05
LNAR-12		9028	41.90	0.00	0.10	4.89	5.00	11.93
LNAR-13	Cranberry River	9036	87.01	0.50	0.72	10.49	11.72	13.47
LNAR-14	Cranberry River	9035	39.72	0.71	0.01	3.73	4.45	11.21
LNAR-15	Weegett Creek	9022	22.38	0.00	1.33	1.31	2.64	11.79
LNAR-16	Nass River	9047	67.51	1.12	0.81	2.78	4.71	6.97
LNAR-17	Ginmiltkun Creek	9016	76.18	0.12	1.32	8.71	10.15	13.33
LNAR-18	Cranberry River	9031	90.18	1.40	1.63	7.39	10.41	11.55
LNAR-19		9017	23.62	0.00	0.09	4.18	4.26	18.05
LNAR-20	Cranberry River	9032	85.23	1.33	2.17	9.83	13.34	15.65
LNAR-21		9018	20.70	0.54	1.20	0.63	2.37	11.45
LNAR-22	Calmin Creek	9019	26.00	0.04	0.67	2.53	3.25	12.49
MSKE-01	Endless Creek	11076	57.26	0.00	1.16	9.70	10.86	18.97
MSKE-02	Sicintine River	11086	48.48	1.05	0.41	2.87	4.32	8.92
MSKE-03		11078	62.72	0.00	1.08	5.94	7.02	11.19
MSKE-04		11077	26.32	0.00	0.37	4.90	5.27	20.03
MSKE-05		11082	23.56	0.00	0.15	2.68	2.83	12.03
MSKE-06	Skeena River	11146	48.99	0.93	0.40	4.31	5.64	11.50
MSKE-07	Skeena River	11148	47.41	1.50	0.03	3.19	4.73	9.97
MSKE-08	Skeena River	11147	58.16	0.01	0.00	4.79	4.79	8.24
MSKE-09	Skeena River	11145	43.23	0.39	0.39	4.17	4.95	11.44

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Riparian Type (km^2)			Total Riparian (km^2)	Riparian as % of Total Area
				Fish Presence Observed	Fish Presence Inferred	No Fish Presence Inferred		
MSKE-10	Sicintine River	11070	46.74	0.83	0.13	4.26	5.23	11.18
MSKE-11	Sicintine River	11083	68.27	0.81	0.77	7.80	9.38	13.73
MSKE-12		11068	23.12	0.00	0.01	3.84	3.85	16.65
MSKE-13		11071	24.40	0.00	0.24	3.13	3.37	13.80
MSKE-14		11072	23.32	0.00	0.74	1.69	2.43	10.42
MSKE-15	Sicintine River	11084	72.07	0.98	0.47	9.43	10.88	15.09
MSKE-16		11075	28.05	0.00	0.54	3.31	3.84	13.70
MSKE-17	Tommy Jack Creek	11074	91.17	0.75	1.13	9.12	10.99	12.05
MSKE-18		11073	44.85	0.00	1.33	4.75	6.08	13.56
MSKE-19		11080	35.90	0.00	0.03	4.73	4.76	13.27
MSKE-20		11079	43.25	0.00	0.54	4.44	4.98	11.52
MSKE-21	Sicintine River	11085	36.10	0.60	0.10	2.77	3.47	9.60
MSKE-22		11081	35.59	0.00	0.83	2.61	3.44	9.66
MSKE-23		11059	65.73	0.00	1.06	12.89	13.95	21.23
MSKE-24		11058	27.97	0.00	0.72	4.71	5.43	19.41
MSKE-25	Calamity Creek	11055	91.55	0.00	1.66	13.35	15.01	16.39
MSKE-26	Sheladamus Creek	11088	48.70	0.00	0.05	7.28	7.33	15.06
MSKE-27	O'Dwyer Creek	11091	41.60	0.00	0.31	5.73	6.03	14.51
MSKE-28	Poison Creek	11089	27.53	0.00	0.38	3.83	4.22	15.31
MSKE-29		11090	25.21	0.00	0.07	3.60	3.67	14.56
MSKE-30		11069	32.01	0.00	0.10	5.43	5.53	17.29
MSKE-31	Skeena River	11139	60.04	1.45	0.01	9.03	10.49	17.48
MSKE-32	Skeena River	11143	55.70	1.06	0.02	5.19	6.27	11.25
MSKE-33	Skeena River	11141	52.48	0.65	0.36	5.90	6.90	13.16
MSKE-34		11048	23.98	0.00	0.03	4.16	4.19	17.48

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Riparian Type (km^2)			Total Riparian (km^2)	Riparian as % of Total Area
				Fish Presence Observed	Fish Presence Inferred	No Fish Presence Inferred		
MSKE-35	Larkworthy Creek	11065	60.87	0.16	0.25	7.71	8.13	13.35
MSKE-36	Skeena River	11144	35.99	0.01	0.06	3.35	3.42	9.49
MSKE-37		11067	23.41	0.01	0.00	3.86	3.87	16.54
MSKE-38	Skeena River	11140	35.09	0.01	0.03	4.64	4.67	13.32
MSKE-39		11066	24.04	0.00	0.00	3.46	3.46	14.38
MSKE-40	Kuldo Creek	11064	46.77	0.29	1.07	7.20	8.56	18.30
MSKE-41		11060	20.32	0.00	0.16	3.07	3.23	15.89
MSKE-42	Kuldo Creek	11063	33.79	0.45	0.33	4.16	4.94	14.62
MSKE-43		11057	37.52	0.00	1.08	6.35	7.43	19.80
MSKE-44	Kuldo Creek	11062	56.41	0.59	0.51	7.11	8.21	14.55
MSKE-45		11052	58.36	0.00	0.45	7.47	7.92	13.57
MSKE-46	Kuldo Creek	11053	57.62	1.30	0.43	6.25	7.98	13.84
MSKE-47		11054	54.36	0.00	0.13	10.32	10.45	19.22
MSKE-48		11051	34.68	0.00	0.41	5.14	5.55	16.00
MSKE-49	Kuldo Creek	11061	58.40	0.15	0.15	8.79	9.09	15.56
MSKE-50	Deep Canoe Creek	11049	53.85	0.72	0.42	6.07	7.21	13.39
MSKE-51		11056	51.81	0.00	0.85	8.91	9.76	18.83
MSKE-52		11050	20.56	0.01	0.22	2.20	2.43	11.83
MSKE-53	Skeena River	11142	31.31	0.02	0.02	3.62	3.66	11.68
MSKE-54	Sicintine River	11087	44.91	0.51	2.25	4.19	6.94	15.46
NASR-01		11840	28.26	0.00	0.69	1.94	2.63	9.32
NASR-02	Derrick Creek	11839	56.34	0.00	1.59	4.51	6.10	10.83
NASR-03	Nass River	11879	35.43	0.44	0.02	3.53	3.98	11.23

WSP Indicator Analysis for the Kispiox TSA:

Road Density

Freshwater Atlas (FWA) Assessment Watersheds

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September 2020

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. Some inaccuracy is expected due to the inherent limitations and uncertainties that exist in the base input datasets, and no representation of current condition is made.

Acknowledgements

We would like to thank Sarah Railton, Greg Knox, and Julia Hill Sorochan for their contributions and feedback, and to Glen Buhr for his assistance and guidance.

WSP Indicator Analysis for the Kispiox TSA

Pressure Indicator: Road Density

Assessment Units: FWA Assessment Watersheds

Description of Pressure Indicator

Road density has been widely correlated to salmon habitat degradation and declines of salmon populations in the Pacific Northwest, and has been ranked as a high value indicator by the Wild Salmon Policy (WSP) Habitat Working Group (Stalberg et al., 2009). Road development can interfere with natural flow and increase peak flows within a watershed as well as cause increased erosion and sediment deposition and stream turbidity (Porter et al., 2019).

Road density is defined as the total length of roads in an area divided by the total area (km/km^2), and is closely associated with watershed land cover alterations, stream crossings and barriers, and riparian habitat disturbance (Porter et al., 2019).

Study Area

The Kispiox timber supply area (TSA) is situated in the interior of northwest BC and encompasses the District of New Hazelton and the communities of Hazelton, South Hazelton, Kitwanga, Cedarvale, Kispiox, Gitsegukla, Gitwangak, Gitanyow, Hagwilget, Glen Vowell and Gitanmaax (Figure 1). The Kispiox TSA is part of the Skeena Natural Resource Region and is administered by the Skeena Stikine Natural Resource District office in Smithers.

The Kispiox TSA is comprised of seven TSA supply blocks (12A to 12G), with the Cranberry TSA consolidated with the Kispiox TSA on March 31, 2009 as Block 12G. The current allowable annual cut for the Kispiox TSA is 1,087,000 cubic metres (Province of BC, 2019).

This report presents results for BC Freshwater Atlas (FWA) assessment watersheds within the Kispiox TSA and the neighbouring upper Kispiox River and Swan Lake watersheds. The 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 key for the identification of assessment units was developed based on groupings by major watershed, and reference maps of the study area with Kispiox TSA and FWA assessment watersheds are included as Appendix A.

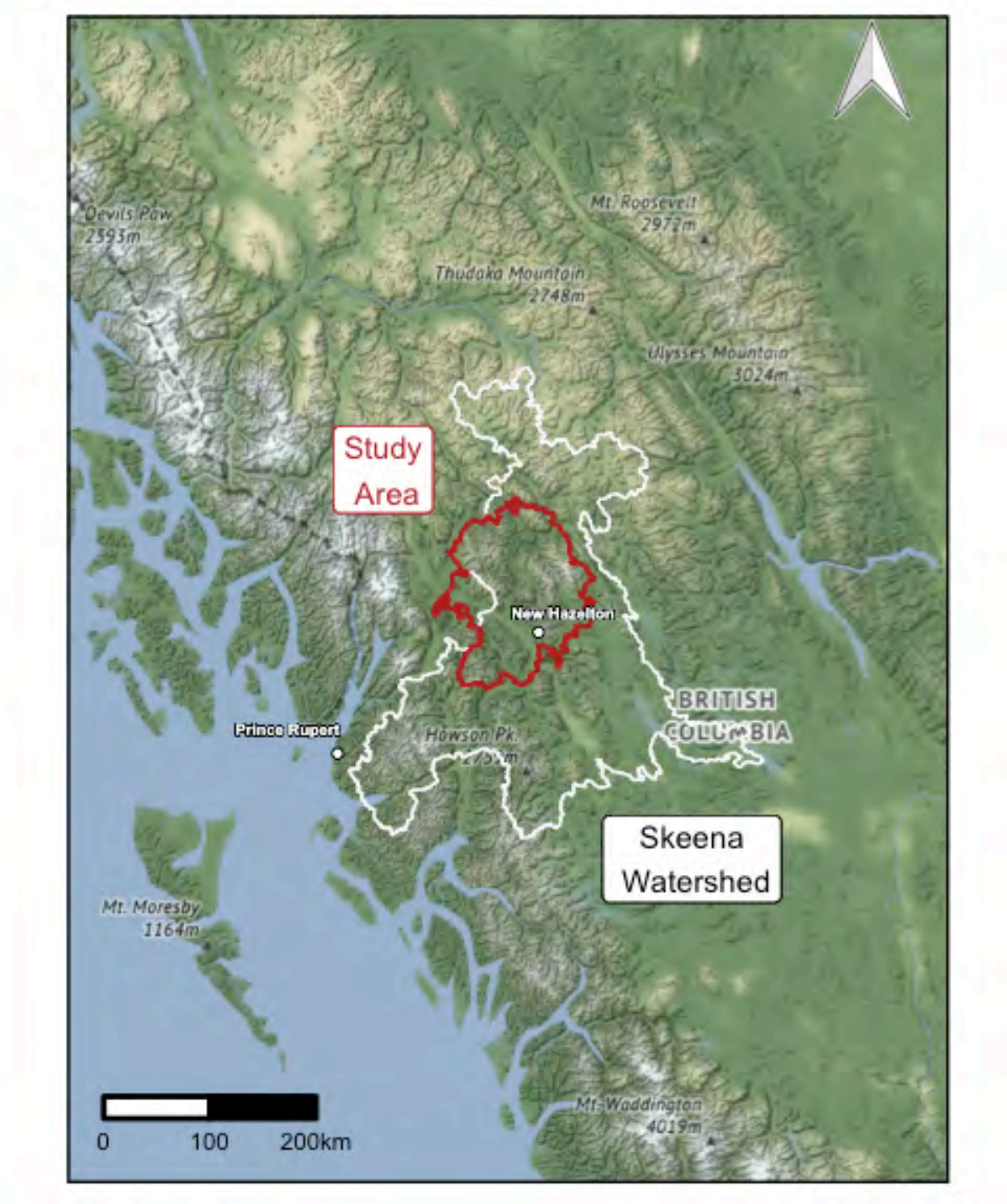

Figure 1: The study area is indicated in red. The grey polygon indicates the outline of the Skeena River watershed.

Methodology

Data layers used to perform the spatial analysis include:

- Kispiox Road Inventory (BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development [BC MFLNRORD], 2017)
- Freshwater Atlas Assessment Watersheds (BC MFLNRORD, 2019)

FWA assessment watersheds were used as assessment units for the road density analysis. Total road length (km) for each FWA assessment watershed was calculated by summing all the road segments within each assessment unit. Road density (km/km^2) was calculated by dividing the total road length by the area of each assessment unit. An overview of road segments within the study area is provided as Figure 2.

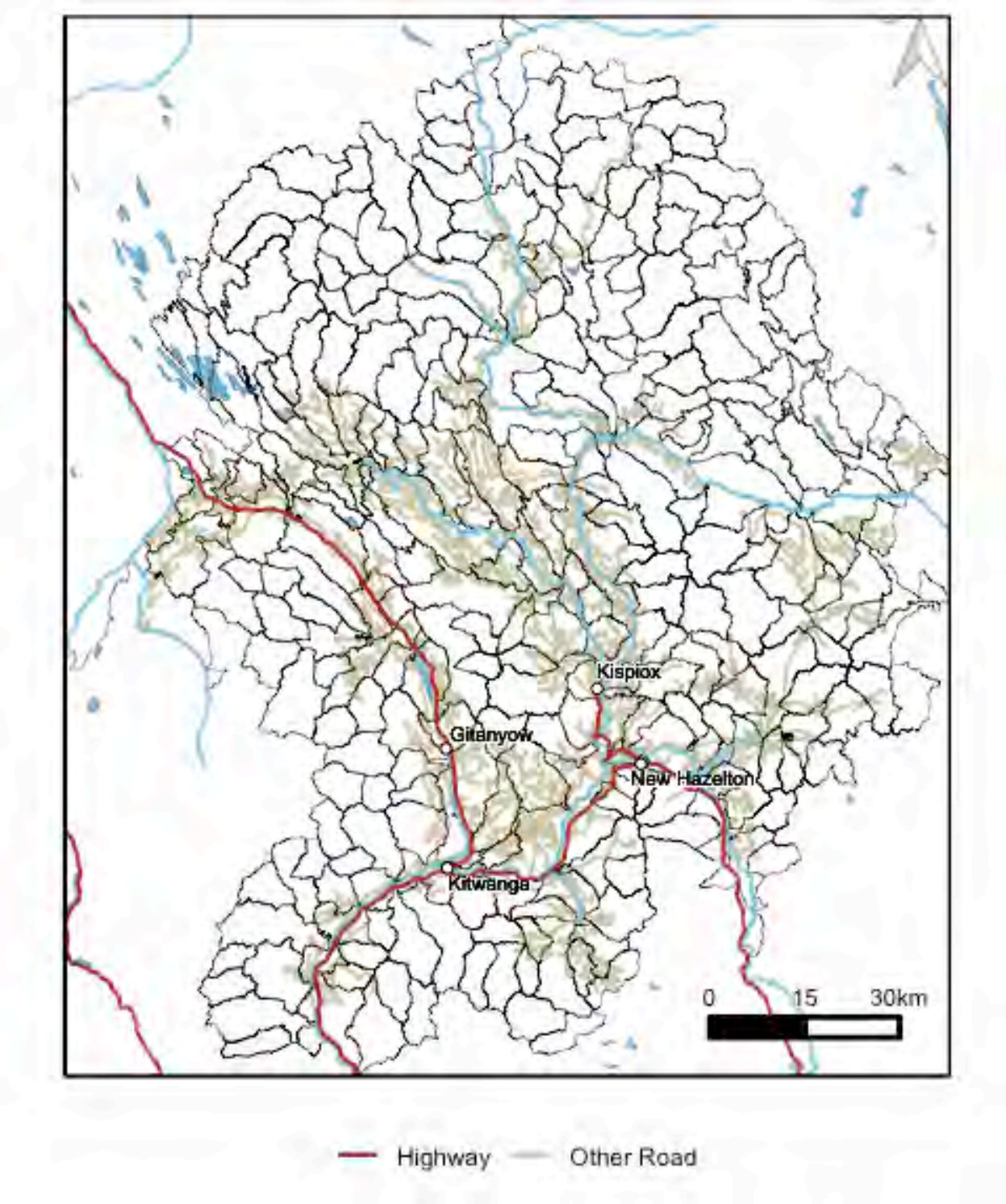

Figure 2: Roads and assessment units located in the study area are shown.

Risk Thresholds

Categorical risk thresholds applied were generated by the Pacific Salmon Foundation based on recommendations from the Wild Salmon Policy Habitat Working Group (Porter et al., 2014; Stalberg et al., 2009) and are tabulated below:

Threshold Rating	Road Density (km / km²)
Low	< 0.40
Moderate	0.40 - 1.2
High	> 1.2

Results of Analysis

A summary of the results of the road density 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 B, and the distribution of the assessment results are shown as a series of figures in Appendix C.

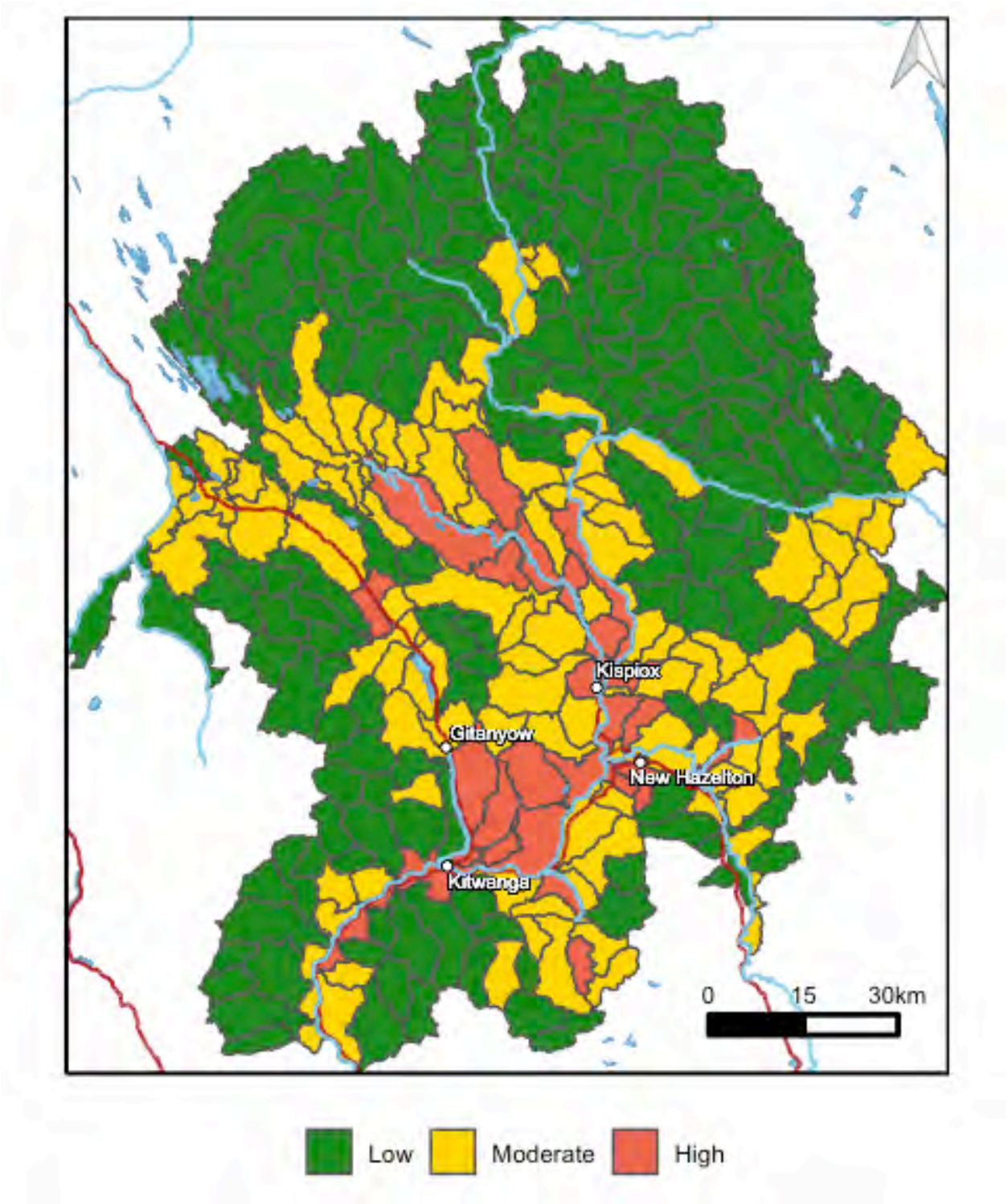

Figure 3: Road density (km/km^2) for each boundary in the study area is shown on a study area map. The results are colorized by risk threshold (low risk < 0.40 km/km^2, moderate risk 0.40-1.2 km/km^2, high risk >1.2 km/km^2).

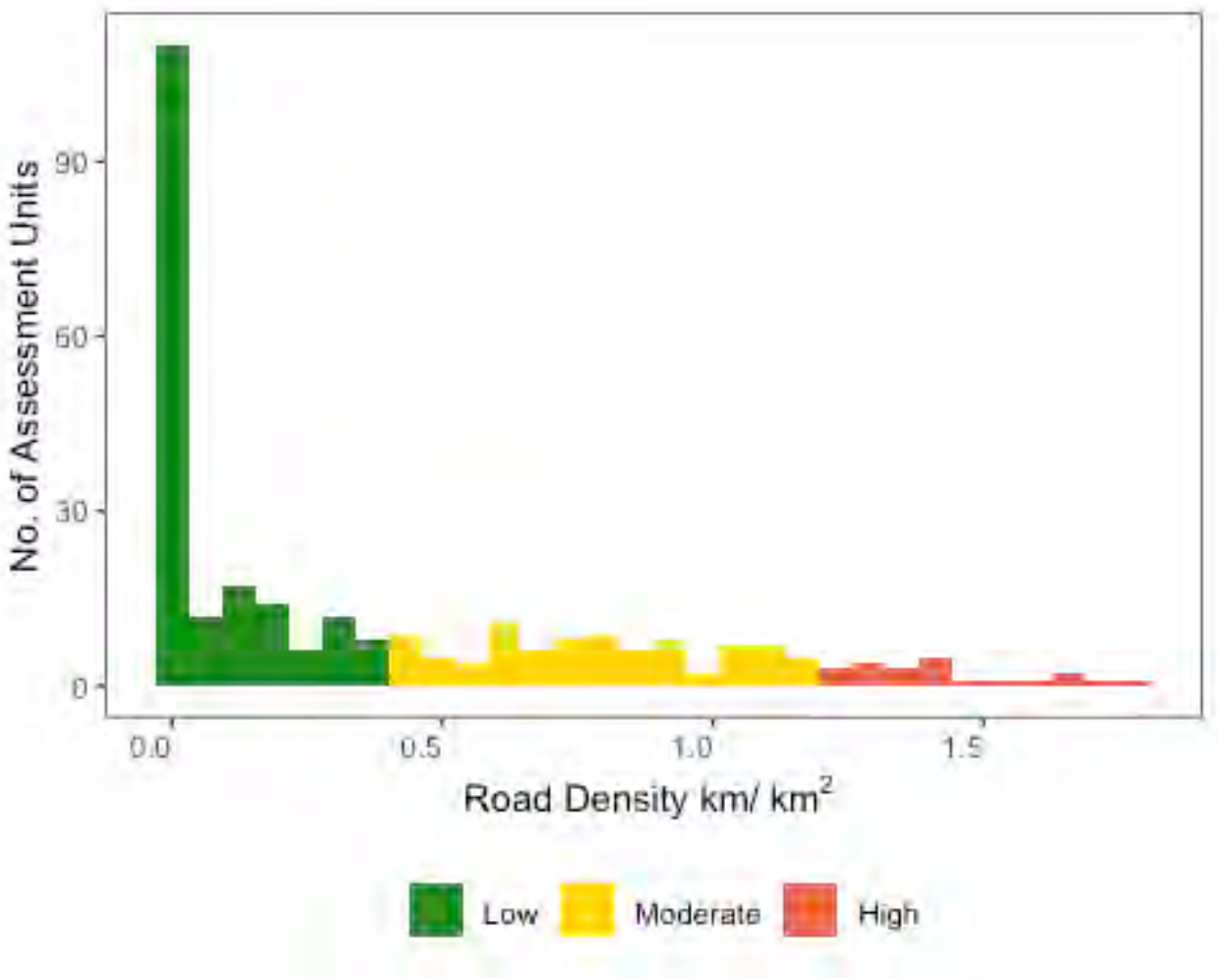

Figure 4: Distribution of results showing the number (count) of assessment units by road density. The results are colorized by risk threshold (low risk < 0.40 km/km^2, moderate risk 0.40-1.2 km/km^2, high risk >1.2 km/km^2).

Road density was calculated for a total of 288 FWA assessment watersheds within the study area. Road density values ranged from 0 to 1.78 km/ km^2, with a total of 22 assessment units with road densities above the upper threshold of 1.2 km/km^2 and 87 assessment units with road densities in the moderate risk threshold rating (Figure 4; Appendix B and Appendix C).

Assessment units with moderate and high road densities are associated with road development within the central portion of the study area (Figures 2 and 3).

Interactive visualizations of the indicator analysis results calculated as part of the Kispiox TSA WSP Indicator Analysis are available at https://data.skeenasalmon.info/dataset/wild-salmon-policy-indicator-analysis-for-the-kispiox-tsa.

Summary of Results

Road density estimations were calculated for 288 FWA assessment watersheds within the Kispiox TSA and adjacent Swan Lake and upper Kispiox River sub-watersheds 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 road development.

Road density values ranged from 0 to 1.78 km/ km^2, with high and moderate impacts concentrated within the central portion of the study area.

References

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Stalberg, H.C., Lauzier, R.B., MacIsaac, E.A., Porter, M., and Murray, C. 2009. Canada's policy for conservation of wild pacific salmon: Stream, lake, and estuarine habitat indicators. Can. Manuscr. Fish. Aquat. Sci. 2859: xiii + 135p.

Appendix A: Reference Maps

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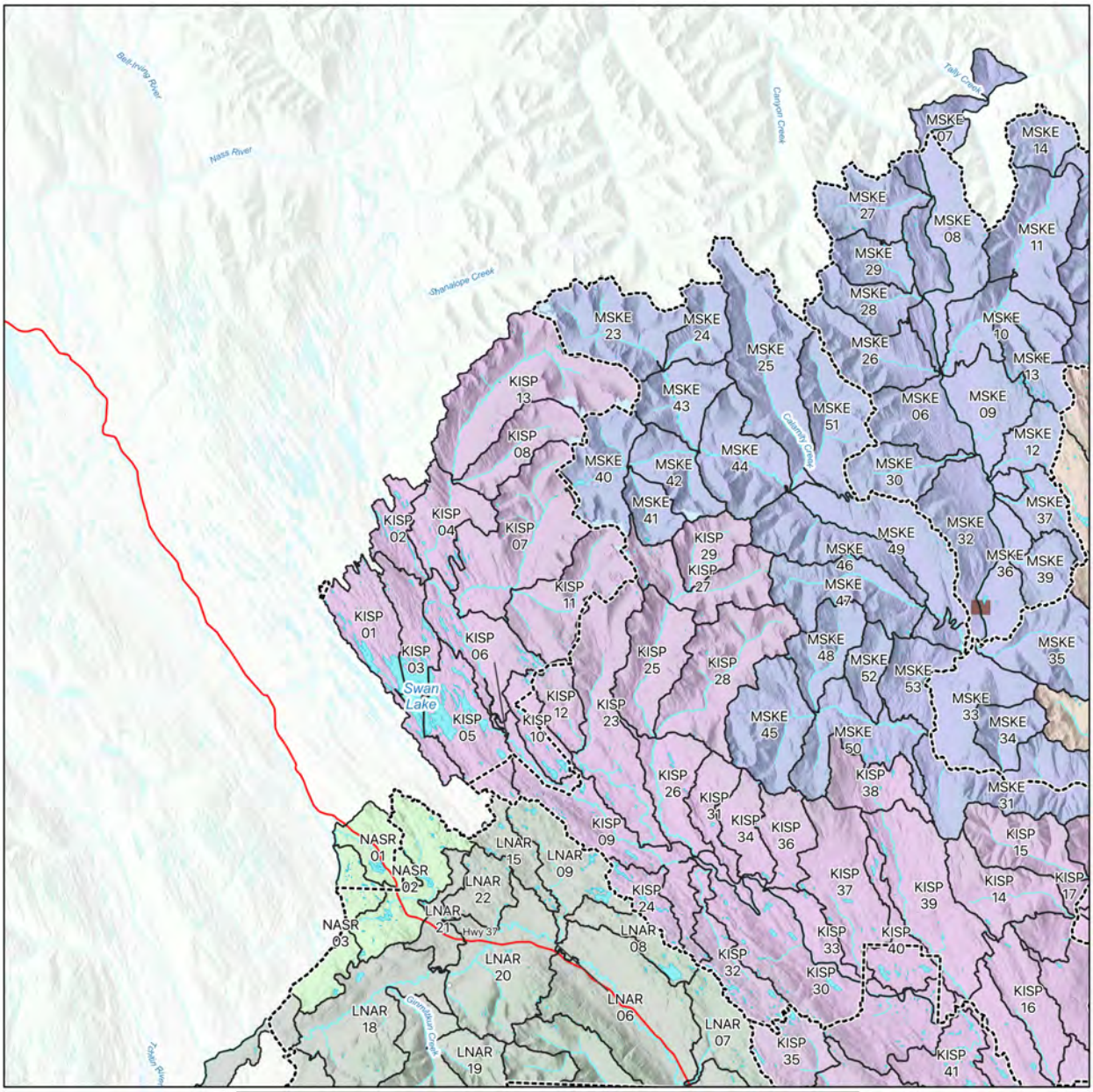
Kispiox Study Area Reference Map - Northwest



Location Map

Legend

Boundary

- Fresh Water Atlas Assessment Watershed
- Kispiox TSA Block
- Reserve Boundary

Major Watershed Group

- BABR
- BULK
- KISP
- KLUM
- LNAR
- MSKE
- NASR

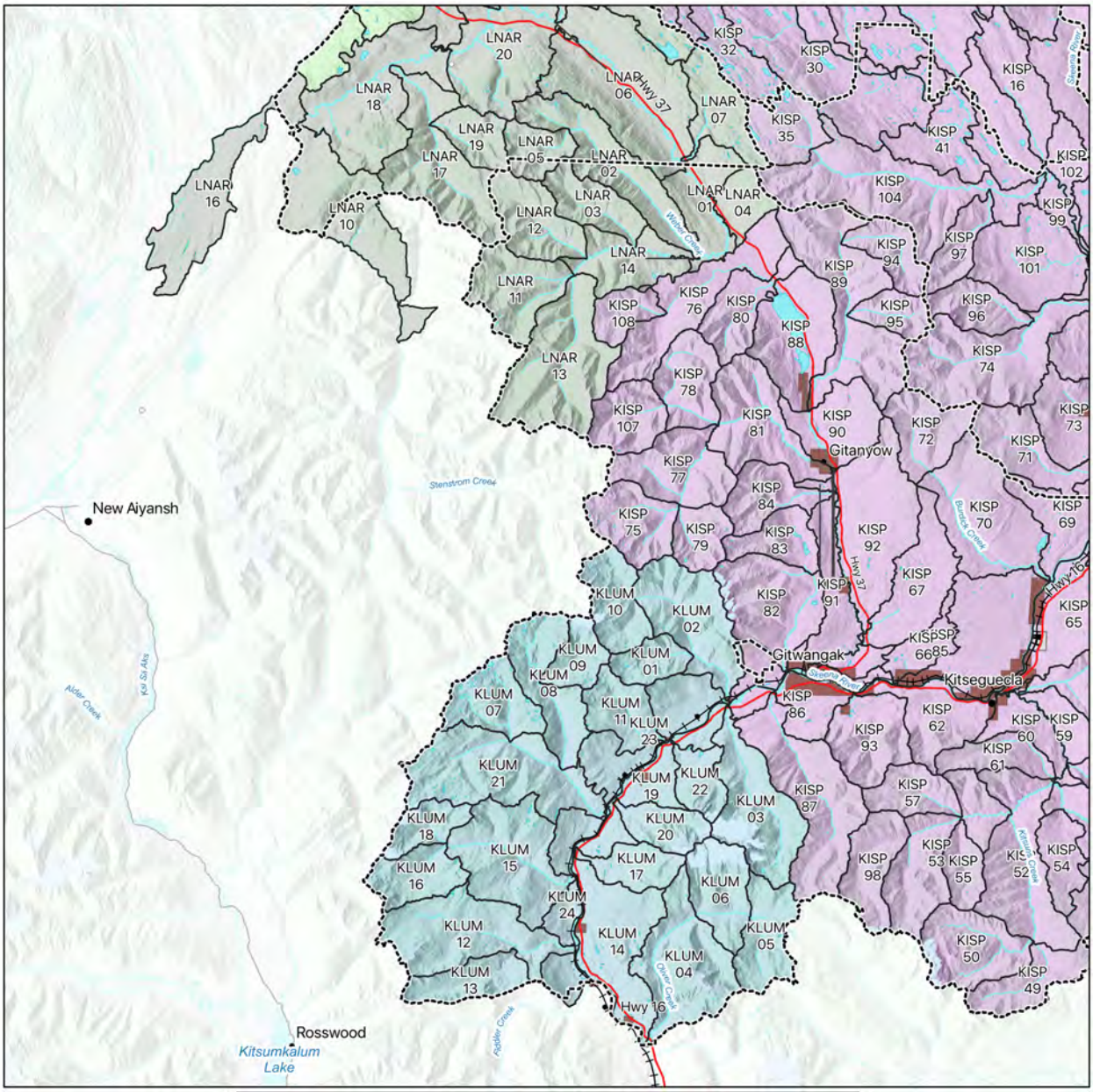
0 5 10 km

N
W E
S

Prepared for SkeenaWild
by Eclipse Geomatics Ltd.,
June 2020

eclipse GEOMATICS

Kispiox Study Area Reference Map - Southwest



Location Map

Legend

Boundary

- Fresh Water Atlas Assessment Watershed
- Kispiox TSA Block
- Reserve Boundary

Major Watershed Group

- BABR
- BULK
- KISP
- KLUM
- LNAR
- MSKE
- NASR

0 5 10 km

N W E S

Prepared for SkeenaWild by Eclipse Geomatics Ltd., June 2020

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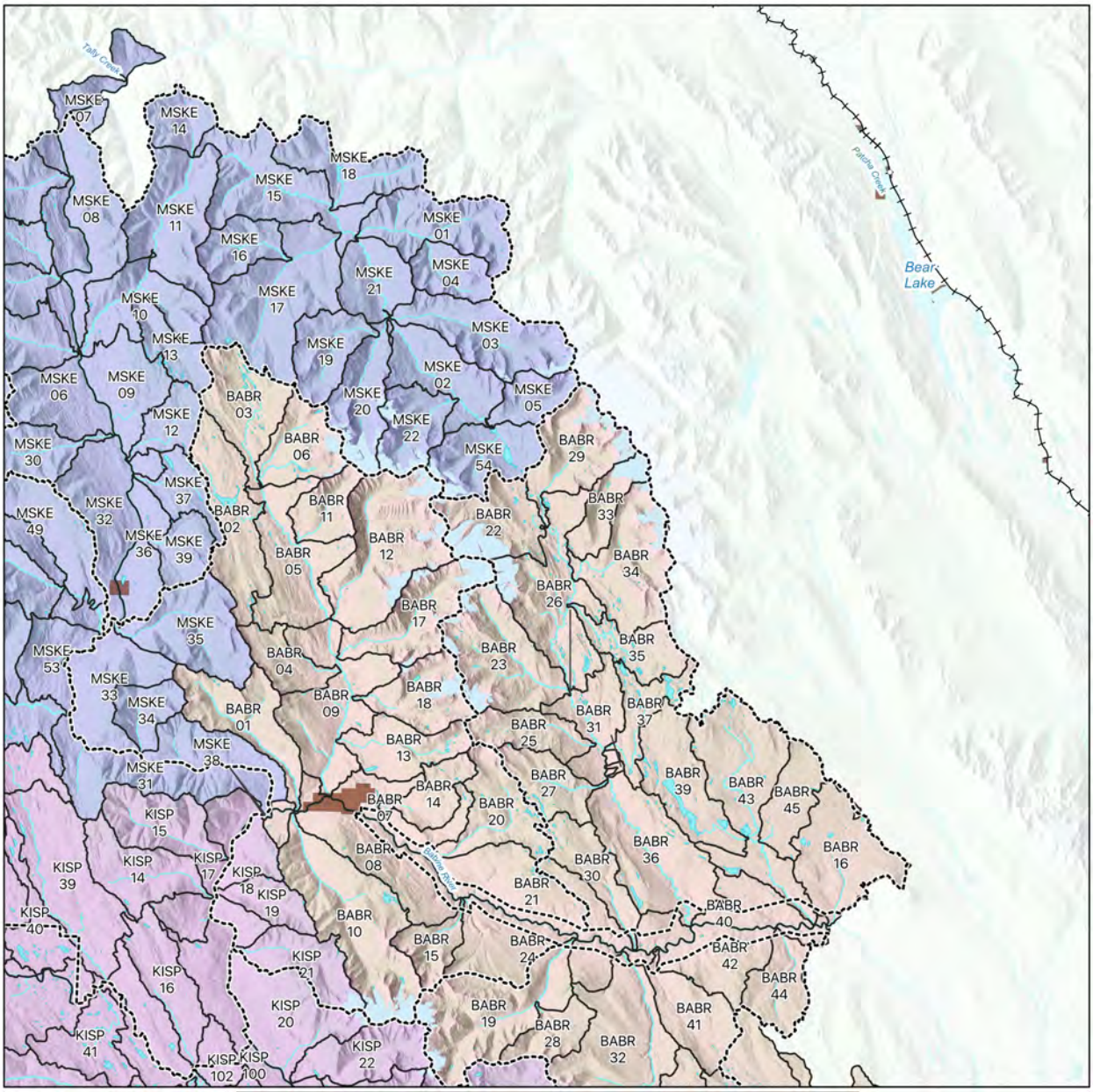
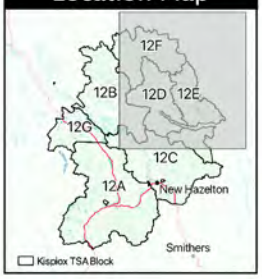
Kispiox Study Area Reference Map - Northeast



Location Map



Legend

Boundary

- Fresh Water Atlas Assessment Watershed
- Kispiox TSA Block
- Reserve Boundary

Major Watershed Group

- BABR
- BULK
- KISP
- KLUM
- LNAR
- MSKE
- NASR

0 5 10 km

N
W E
S

Prepared for SkeenaWild
by Eclipse Geomatics Ltd.,
June 2020

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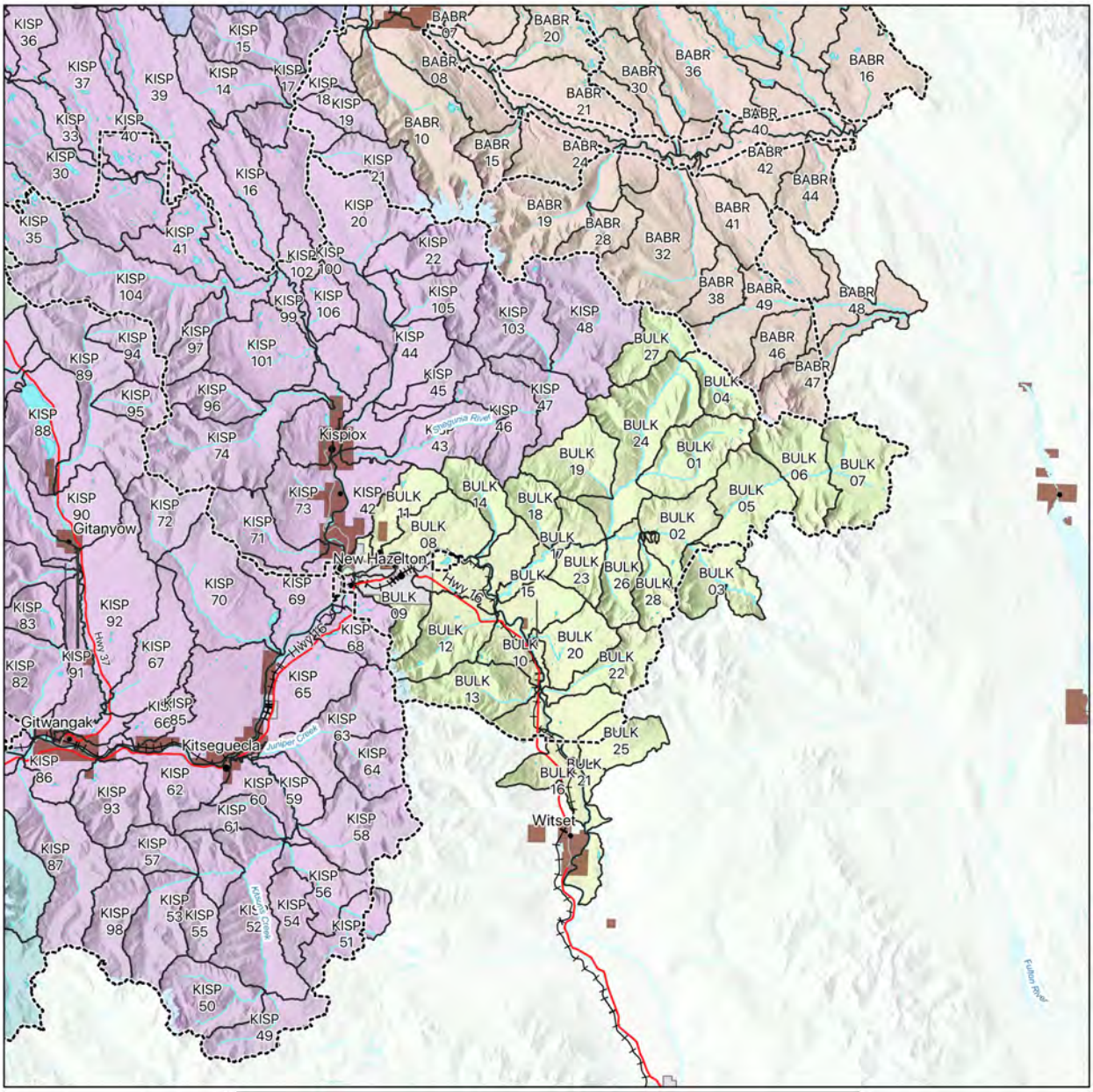
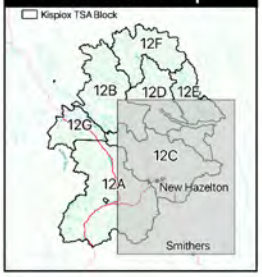
Kispiox Study Area Reference Map - Southeast



Location Map



Legend

Boundary

- Fresh Water Atlas Assessment Watershed
- Kispiox TSA Block
- Reserve Boundary

Major Watershed Group

- BABR
- BULK
- KISP
- KLUM
- LNAR
- MSKE
- NASR

0 5 10 km

N W E S

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June 2020

Appendix B: Results Tables

The following tables present total area for each boundary studied, total road length for each boundary studied, road density, and risk (determined by Pacific Salmon Foundation thresholds).

Reference AU	Sub-Watershed Name	FWA FID	Area (km^2)	Road Length (km)	Road Density (km/km^2)	Risk
BABR-01	Sam Green Creek	424	51.41	1.19	0.02	Low
BABR-02	Damsumlo Creek	433	59.43	9.05	0.15	Low
BABR-03	Shedin Creek	436	48.48	12.00	0.25	Low
BABR-04		429	25.00	0.00	0.00	Low
BABR-05	Shedin Creek	435	61.63	0.00	0.00	Low
BABR-06		434	38.12	0.00	0.00	Low
BABR-07	Babine River	423	40.04	13.95	0.35	Low
BABR-08	Babine River	492	62.22	56.83	0.91	Moderate
BABR-09	Shedin Creek	426	73.86	20.81	0.28	Low
BABR-10	Shegisic Creek	425	98.45	1.25	0.01	Low
BABR-11		432	25.74	0.00	0.00	Low
BABR-12	Rosenthal Creek	431	91.95	0.00	0.00	Low
BABR-13	Goathead Creek	427	37.83	10.83	0.29	Low
BABR-14		437	25.91	3.00	0.12	Low
BABR-15		439	22.06	2.25	0.10	Low
BABR-16	Shahnagh Creek	461	63.26	67.00	1.06	Moderate
BABR-17	Sperry Creek	430	54.23	0.00	0.00	Low
BABR-18		428	40.13	0.00	0.00	Low
BABR-19	Thomlinson Creek	440	82.86	9.44	0.11	Low
BABR-20	Shenismike Creek	438	45.51	0.00	0.00	Low
BABR-21	Babine River	493	73.51	0.00	0.00	Low
BABR-22	Shelagyote River	456	48.30	0.00	0.00	Low
BABR-23		449	71.44	0.00	0.00	Low
BABR-24	Babine River	494	60.65	7.32	0.12	Low
BABR-25	Cayuse Jack Creek	448	30.36	0.00	0.00	Low
BABR-26	Shelagyote River	455	77.32	0.00	0.00	Low
BABR-27		446	31.02	0.00	0.00	Low
BABR-28		441	23.39	3.86	0.16	Low
BABR-29		453	53.77	0.00	0.00	Low

Reference AU	Sub-Watershed Name	FWA FID	Area (km^2)	Road Length (km)	Road Density (km/km^2)	Risk
BABR-30	Le Clair Creek	443	33.99	0.00	0.00	Low
BABR-31	Shelagyote River	454	35.97	0.00	0.00	Low
BABR-32	Gail Creek	442	92.08	71.61	0.78	Moderate
BABR-33		452	25.69	0.00	0.00	Low
BABR-34	Barger Creek	451	64.93	0.00	0.00	Low
BABR-35		450	29.62	0.00	0.00	Low
BABR-36	Shelagyote River	445	81.34	0.00	0.00	Low
BABR-37		447	27.67	0.00	0.00	Low
BABR-38		486	24.75	16.11	0.65	Moderate
BABR-39		460	54.97	0.00	0.00	Low
BABR-40	Babine River	495	41.81	0.00	0.00	Low
BABR-41	Cataline Creek	444	39.81	42.62	1.07	Moderate
BABR-42	Babine River	496	47.39	20.53	0.43	Moderate
BABR-43	Hanawald Creek	458	87.27	0.80	0.01	Low
BABR-44		457	32.07	24.84	0.77	Moderate
BABR-45		459	32.14	7.41	0.23	Low
BABR-46		485	27.92	20.54	0.74	Moderate
BABR-47		482	46.24	3.62	0.08	Low
BABR-48	Nichyeskwa Creek	487	37.47	2.80	0.07	Low
BABR-49	Nichyeskwa Creek	488	75.82	34.84	0.46	Moderate
BULK-01	Denison Creek	1275	48.43	18.68	0.39	Low
BULK-02	Suskwa River	1298	37.64	22.05	0.59	Moderate
BULK-03	Harold Price Creek	1279	40.73	2.42	0.06	Low
BULK-04		1276	23.95	5.45	0.23	Low
BULK-05	Suskwa River	1299	49.78	15.01	0.30	Low
BULK-06	Suskwa River	1300	50.81	10.81	0.21	Low
BULK-07	Suskwa River	1301	54.65	0.00	0.00	Low
BULK-08	Bulkley River	1267	48.69	52.99	1.09	Moderate
BULK-09	Station Creek	1268	29.63	38.40	1.30	High
BULK-10	Bulkley River	1413	50.03	48.91	0.98	Moderate
BULK-11	Two Mile Creek	1269	26.93	33.82	1.26	High
BULK-12	Mudflat Creek	1302	47.41	15.56	0.33	Low

Reference AU	Sub-Watershed Name	FWA FID	Area (km^2)	Road Length (km)	Road Density (km/km^2)	Risk
BULK-13	Porphyry Creek	1304	44.11	2.56	0.06	Low
BULK-14	Nine Mile Creek	1270	26.52	3.40	0.13	Low
BULK-15	Bulkley River	1414	49.43	55.37	1.12	Moderate
BULK-16	Bulkley River	1415	39.18	10.88	0.28	Low
BULK-17	Suskwa River	1271	26.13	41.63	1.59	High
BULK-18	Fifteen Mile Creek	1272	23.38	2.82	0.12	Low
BULK-19	Iltzul Creek	1274	43.66	35.16	0.81	Moderate
BULK-20	Corduroy Creek	1303	34.91	29.00	0.83	Moderate
BULK-21	Bulkley River	1416	46.12	20.03	0.43	Moderate
BULK-22	Luno Creek	1305	33.95	7.15	0.21	Low
BULK-23	Suskwa River	1296	20.30	23.23	1.14	Moderate
BULK-24	Natlan Creek	1273	84.75	58.77	0.69	Moderate
BULK-25	Kwun Creek	1307	30.73	2.54	0.08	Low
BULK-26	Suskwa River	1297	30.26	20.49	0.68	Moderate
BULK-27	Natlan Creek	1277	30.22	6.84	0.23	Low
BULK-28		1278	21.06	2.98	0.14	Low
KISP-01		6252	43.80	0.51	0.01	Low
KISP-02		6255	23.32	2.88	0.12	Low
KISP-03		6251	43.88	0.00	0.00	Low
KISP-04	Kispiox River	6262	40.23	0.00	0.00	Low
KISP-05	Stephens Creek	6250	56.57	0.00	0.00	Low
KISP-06	Kispiox River	6261	48.91	0.00	0.00	Low
KISP-07	East Kispiox River	6253	96.94	0.00	0.00	Low
KISP-08		6256	38.99	0.00	0.00	Low
KISP-09	Kispiox River	6260	72.48	64.85	0.89	Moderate
KISP-10		6249	24.27	3.80	0.16	Low
KISP-11		6254	60.45	0.00	0.00	Low
KISP-12		6248	22.25	7.44	0.33	Low
KISP-13	Kispiox River	6263	106.02	0.00	0.00	Low
KISP-14	Carrigan Creek	6273	44.91	35.24	0.78	Moderate
KISP-15	Blackstock Creek	6275	43.50	0.26	0.01	Low
KISP-16	Murder Creek	6231	40.63	35.48	0.87	Moderate

Reference AU	Sub-Watershed Name	FWA FID	Area (km^2)	Road Length (km)	Road Density (km/km^2)	Risk
KISP-17	Skeena River	6287	35.54	30.76	0.87	Moderate
KISP-18	Skeena River	6286	30.87	27.00	0.87	Moderate
KISP-19	Bretson Creek	6274	21.97	11.47	0.52	Moderate
KISP-20	Skeena River	6285	61.32	49.44	0.81	Moderate
KISP-21	Shewililba Creek	6272	36.63	21.66	0.59	Moderate
KISP-22	Sediesh Creek	6271	42.46	5.47	0.13	Low
KISP-23	Nangeese River	6247	87.17	45.28	0.52	Moderate
KISP-24	Brown Paint Creek	6246	21.64	11.77	0.54	Moderate
KISP-25	Sweetin River	6244	51.88	6.31	0.12	Low
KISP-26	Sweetin River	6241	39.23	42.73	1.09	Moderate
KISP-27	Sweetin River	6245	48.42	0.00	0.00	Low
KISP-28		6242	77.46	3.81	0.05	Low
KISP-29		6243	27.89	0.00	0.00	Low
KISP-30	Kispiox River	6259	117.93	155.36	1.32	High
KISP-31	Clifford Creek	6239	24.21	18.54	0.77	Moderate
KISP-32	Steep Canyon Creek	6240	36.61	16.24	0.44	Moderate
KISP-33	Kispiox River	6258	35.86	47.49	1.32	High
KISP-34	Skunsnat Creek	6238	26.47	19.12	0.72	Moderate
KISP-35	McCully Creek	6230	33.29	9.04	0.27	Low
KISP-36	Corral Creek	6237	28.69	23.87	0.83	Moderate
KISP-37	Ironside Creek	6236	66.26	68.38	1.03	Moderate
KISP-38	Cullon Creek	6233	33.56	21.75	0.65	Moderate
KISP-39	Cullon Creek	6232	81.61	105.86	1.30	High
KISP-40		6235	30.70	34.42	1.12	Moderate
KISP-41		6234	37.94	62.91	1.66	High
KISP-42	Skeena River	6281	69.60	114.61	1.65	High
KISP-43	Shegunia River	6264	48.20	39.86	0.83	Moderate
KISP-44	Skeena River	6284	38.61	36.36	0.94	Moderate
KISP-45	Pinenut Creek	6269	24.84	12.22	0.49	Moderate
KISP-46	Shegunia River	6266	43.44	22.89	0.53	Moderate
KISP-47	Shegunia River	6267	34.82	21.07	0.61	Moderate
KISP-48	Shegunia River	6268	83.75	1.80	0.02	Low

Reference AU	Sub-Watershed Name	FWA FID	Area (km^2)	Road Length (km)	Road Density (km/km^2)	Risk
KISP-49	Kitsuns Creek	6212	35.39	0.10	0.00	Low
KISP-50		6211	51.59	0.00	0.00	Low
KISP-51	Kitseguecla River	6217	33.88	24.71	0.73	Moderate
KISP-52	Kitsuns Creek	6206	76.76	36.07	0.47	Moderate
KISP-53		6207	64.75	35.62	0.55	Moderate
KISP-54		6213	26.07	36.76	1.41	High
KISP-55		6209	20.17	3.55	0.18	Low
KISP-56	Kitseguecla River	6216	34.35	30.81	0.90	Moderate
KISP-57		6208	27.82	5.82	0.21	Low
KISP-58		6204	57.80	19.08	0.33	Low
KISP-59	Kitseguecla River	6201	22.15	25.85	1.17	Moderate
KISP-60	Kitseguecla River	6215	22.58	28.66	1.27	High
KISP-61	Deep Canyon Creek	6205	25.58	16.18	0.63	Moderate
KISP-62	Skeena River	6278	42.24	47.86	1.13	Moderate
KISP-63	Juniper Creek	6202	60.50	32.24	0.53	Moderate
KISP-64	Brian Boru Creek	6203	32.22	0.00	0.00	Low
KISP-65	Skeena River	6279	64.72	68.09	1.05	Moderate
KISP-66	Andi Creek	6200	20.44	35.39	1.73	High
KISP-67		6182	52.71	71.69	1.36	High
KISP-68	Chicago Creek	6221	21.01	15.86	0.75	Moderate
KISP-69	Skeena River	6280	44.15	63.76	1.44	High
KISP-70	Burdick Creek	6219	78.51	96.00	1.22	High
KISP-71	Hazelton Creek	6222	41.68	18.59	0.45	Moderate
KISP-72	Burdick Creek	6220	37.89	17.27	0.46	Moderate
KISP-73	Skeena River	6282	45.79	33.67	0.74	Moderate
KISP-74	Date Creek	6224	87.75	39.08	0.45	Moderate
KISP-75	Kitwancool Creek	6189	40.26	0.00	0.00	Low
KISP-76	Kitwanga River	6198	66.48	74.75	1.12	Moderate
KISP-77	Kitwancool Creek	6188	50.99	0.00	0.00	Low
KISP-78		6185	37.18	7.13	0.19	Low
KISP-79		6187	24.07	0.00	0.00	Low

Reference AU	Sub-Watershed Name	FWA FID	Area (km^2)	Road Length (km)	Road Density (km/km^2)	Risk
KISP-80	Kitwanga River	6197	33.78	21.00	0.62	Moderate
KISP-81	Kitwancool Creek	6184	60.58	25.17	0.42	Moderate
KISP-82	Mill Creek	6179	63.11	22.44	0.36	Low
KISP-83		6180	27.47	17.50	0.64	Moderate
KISP-84	Deuce Creek	6183	31.89	11.00	0.34	Low
KISP-85	Skeena River	6277	100.62	142.55	1.42	High
KISP-86	Skeena River	6276	32.07	39.02	1.22	High
KISP-87		6178	85.42	9.21	0.11	Low
KISP-88	Kitwanga River	6196	61.90	71.81	1.16	Moderate
KISP-89	Moonlit Creek	6190	91.77	29.47	0.32	Low
KISP-90	Kitwanga River	6195	42.28	44.00	1.04	Moderate
KISP-91	Kitwanga River	6181	38.89	15.35	0.39	Low
KISP-92	Kitwanga River	6194	94.23	129.08	1.37	High
KISP-93	Shandilla Creek	6199	45.24	10.36	0.23	Low
KISP-94		6192	26.00	0.00	0.00	Low
KISP-95		6191	20.07	0.00	0.00	Low
KISP-96		6225	28.52	17.19	0.60	Moderate
KISP-97		6229	23.72	14.19	0.60	Moderate
KISP-98		6210	37.64	0.00	0.00	Low
KISP-99	Kispiox River	6223	62.80	88.68	1.41	High
KISP-100	Skeena River	6283	69.00	122.91	1.78	High
KISP-101	Hevenor Creek	6226	62.79	64.88	1.03	Moderate
KISP-102	Kispiox River	6257	75.33	115.65	1.54	High
KISP-103		6265	51.63	0.00	0.00	Low
KISP-104	McCully Creek	6228	111.17	68.90	0.62	Moderate
KISP-105	Utsun Creek	6270	39.41	4.01	0.10	Low
KISP-106		6227	23.00	25.67	1.12	Moderate
KISP-107		6186	33.46	0.00	0.00	Low
KISP-108		6193	20.27	5.87	0.29	Low
KLUM-01		6741	20.82	0.00	0.00	Low
KLUM-02	Sedan Creek	6740	63.64	1.15	0.02	Low
KLUM-03		6743	66.62	1.17	0.02	Low

Reference AU	Sub-Watershed Name	FWA FID	Area (km^2)	Road Length (km)	Road Density (km/km^2)	Risk
KLUM-04	Oliver Creek	6721	71.92	4.34	0.06	Low
KLUM-05	Oliver Creek	6723	38.80	0.00	0.00	Low
KLUM-06	Oliver Creek	6722	40.47	0.00	0.00	Low
KLUM-07		6736	39.29	0.00	0.00	Low
KLUM-08		6734	49.34	0.00	0.00	Low
KLUM-09		6735	22.14	0.00	0.00	Low
KLUM-10		6742	36.67	0.00	0.00	Low
KLUM-11	Wilson Creek	6738	30.88	14.01	0.45	Moderate
KLUM-12	Lorne Creek	6727	76.37	0.00	0.00	Low
KLUM-13	South Lorne Creek	6728	30.80	0.00	0.00	Low
KLUM-14	Skeena River	6752	67.50	49.53	0.73	Moderate
KLUM-15	Quill Creek	6729	74.47	11.98	0.16	Low
KLUM-16	Quill Creek	6731	32.41	0.00	0.00	Low
KLUM-17	Flint Creek	6732	24.90	18.22	0.73	Moderate
KLUM-18		6730	22.13	0.00	0.00	Low
KLUM-19	Skeena River	6754	38.26	52.97	1.38	High
KLUM-20	CoyoteCreek	6737	25.14	4.43	0.18	Low
KLUM-21	Insect Creek	6733	89.68	6.33	0.07	Low
KLUM-22		6739	22.46	0.78	0.03	Low
KLUM-23	Skeena River	6755	50.29	46.26	0.92	Moderate
KLUM-24	Skeena River	6753	40.39	26.02	0.64	Moderate
LNAR-01	Cranberry River	9034	40.16	56.02	1.40	High
LNAR-02	Weber Creek	9025	63.18	9.81	0.16	Low
LNAR-03		9027	31.75	0.00	0.00	Low
LNAR-04		9024	20.68	18.37	0.89	Moderate
LNAR-05		9026	22.83	0.00	0.00	Low
LNAR-06	Cranberry River	9033	117.46	82.34	0.70	Moderate
LNAR-07	Tsugwinselda Creek	9023	37.66	14.94	0.40	Low
LNAR-08		9021	25.28	2.36	0.09	Low
LNAR-09	Aluk Creek	9020	46.51	24.20	0.52	Moderate
LNAR-10	Kiteen River	8998	83.65	24.86	0.30	Low

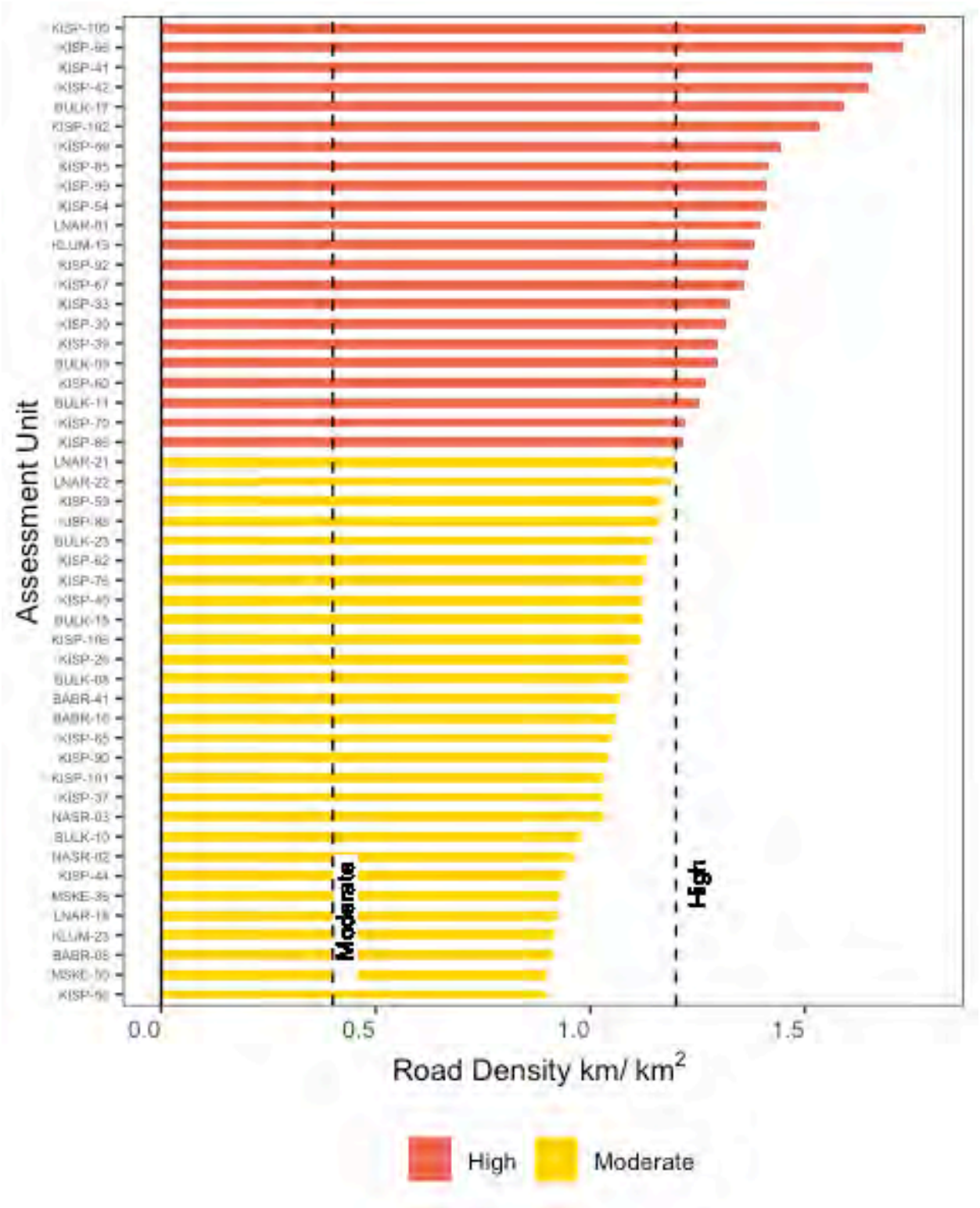
Reference AU	Sub-Watershed Name	FWA FID	Area (km^2)	Road Length (km)	Road Density (km/km^2)	Risk
LNAR-11		9029	46.97	0.00	0.00	Low
LNAR-12		9028	41.90	0.00	0.00	Low
LNAR-13	Cranberry River	9036	87.01	0.00	0.00	Low
LNAR-14	Cranberry River	9035	39.72	13.14	0.33	Low
LNAR-15	Weegett Creek	9022	22.38	8.72	0.39	Low
LNAR-16	Nass River	9047	67.51	1.07	0.02	Low
LNAR-17	Ginmiltkun Creek	9016	76.18	8.24	0.11	Low
LNAR-18	Cranberry River	9031	90.18	83.16	0.92	Moderate
LNAR-19		9017	23.62	0.00	0.00	Low
LNAR-20	Cranberry River	9032	85.23	67.84	0.80	Moderate
LNAR-21		9018	20.70	24.77	1.20	Moderate
LNAR-22	Calmin Creek	9019	26.00	30.86	1.19	Moderate
MSKE-01	Endless Creek	11076	57.26	0.00	0.00	Low
MSKE-02	Sicintine River	11086	48.48	0.00	0.00	Low
MSKE-03		11078	62.72	0.00	0.00	Low
MSKE-04		11077	26.32	0.00	0.00	Low
MSKE-05		11082	23.56	0.00	0.00	Low
MSKE-06	Skeena River	11146	48.99	15.93	0.33	Low
MSKE-07	Skeena River	11148	47.41	0.00	0.00	Low
MSKE-08	Skeena River	11147	58.16	0.00	0.00	Low
MSKE-09	Skeena River	11145	43.23	0.00	0.00	Low
MSKE-10	Sicintine River	11070	46.74	0.00	0.00	Low
MSKE-11	Sicintine River	11083	68.27	0.00	0.00	Low
MSKE-12		11068	23.12	1.87	0.08	Low
MSKE-13		11071	24.40	0.00	0.00	Low
MSKE-14		11072	23.32	0.00	0.00	Low
MSKE-15	Sicintine River	11084	72.07	0.00	0.00	Low
MSKE-16		11075	28.05	0.00	0.00	Low
MSKE-17	Tommy Jack Creek	11074	91.17	18.31	0.20	Low
MSKE-18		11073	44.85	0.00	0.00	Low
MSKE-19		11080	35.90	0.00	0.00	Low
MSKE-20		11079	43.25	0.00	0.00	Low

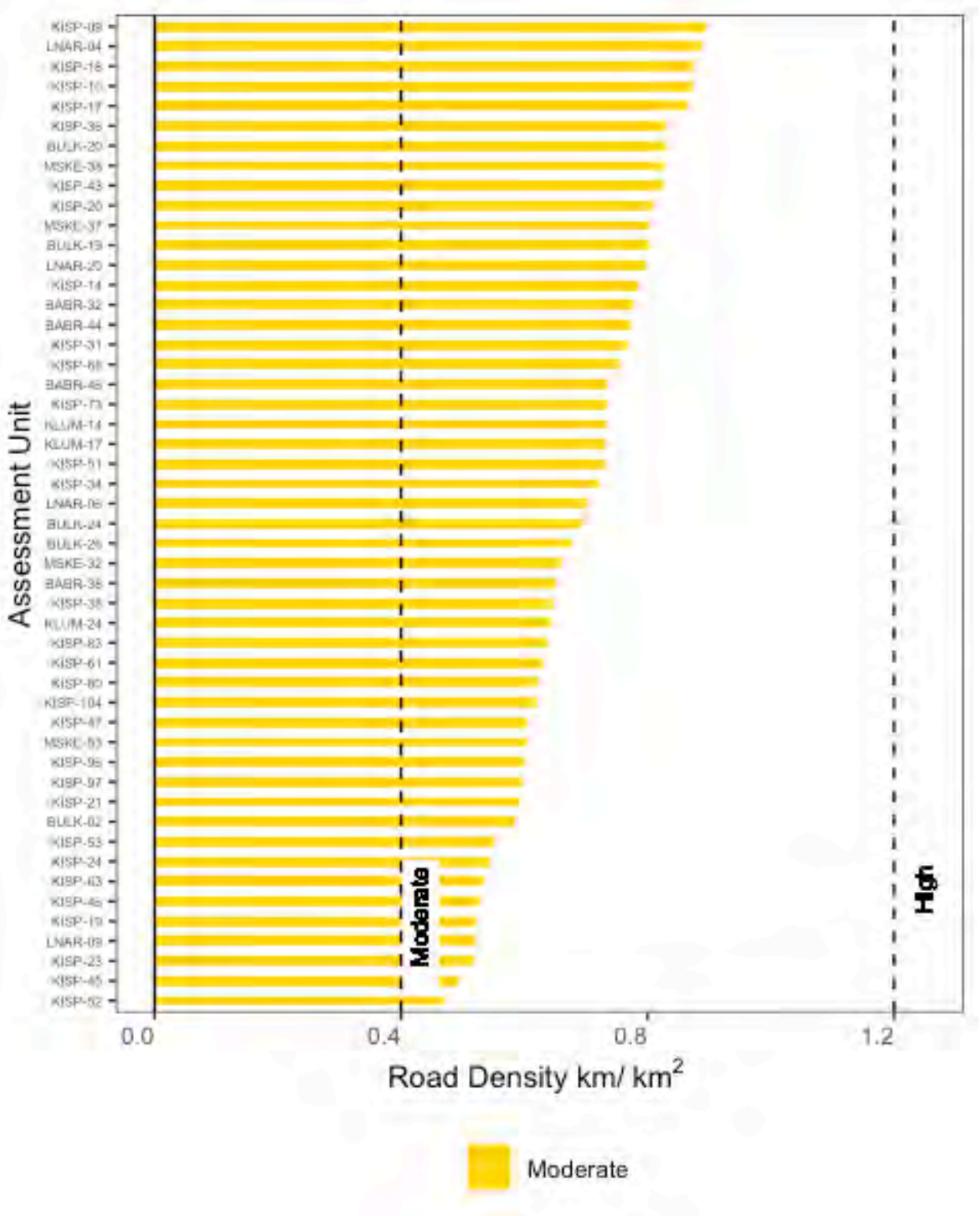
Reference AU	Sub-Watershed Name	FWA FID	Area (km^2)	Road Length (km)	Road Density (km/km^2)	Risk
MSKE-21	Sicintine River	11085	36.10	6.59	0.18	Low
MSKE-22		11081	35.59	0.00	0.00	Low
MSKE-23		11059	65.73	0.00	0.00	Low
MSKE-24		11058	27.97	0.00	0.00	Low
MSKE-25	Calamity Creek	11055	91.55	0.00	0.00	Low
MSKE-26	Sheladamus Creek	11088	48.70	0.00	0.00	Low
MSKE-27	O'Dwyer Creek	11091	41.60	0.00	0.00	Low
MSKE-28	Poison Creek	11089	27.53	0.00	0.00	Low
MSKE-29		11090	25.21	0.00	0.00	Low
MSKE-30		11069	32.01	1.32	0.04	Low
MSKE-31	Skeena River	11139	60.04	21.25	0.35	Low
MSKE-32	Skeena River	11143	55.70	36.91	0.66	Moderate
MSKE-33	Skeena River	11141	52.48	0.00	0.00	Low
MSKE-34		11048	23.98	0.28	0.01	Low
MSKE-35	Larkworthy Creek	11065	60.87	2.84	0.05	Low
MSKE-36	Skeena River	11144	35.99	33.38	0.93	Moderate
MSKE-37		11067	23.41	18.86	0.81	Moderate
MSKE-38	Skeena River	11140	35.09	29.04	0.83	Moderate
MSKE-39		11066	24.04	3.72	0.15	Low
MSKE-40	Kuldo Creek	11064	46.77	0.00	0.00	Low
MSKE-41		11060	20.32	0.00	0.00	Low
MSKE-42	Kuldo Creek	11063	33.79	0.00	0.00	Low
MSKE-43		11057	37.52	0.00	0.00	Low
MSKE-44	Kuldo Creek	11062	56.41	0.00	0.00	Low
MSKE-45		11052	58.36	0.00	0.00	Low
MSKE-46	Kuldo Creek	11053	57.62	8.18	0.14	Low
MSKE-47		11054	54.36	0.00	0.00	Low
MSKE-48		11051	34.68	0.00	0.00	Low
MSKE-49	Kuldo Creek	11061	58.40	11.01	0.19	Low
MSKE-50	Deep Canoe Creek	11049	53.85	48.47	0.90	Moderate
MSKE-51		11056	51.81	0.00	0.00	Low
MSKE-52		11050	20.56	2.08	0.10	Low

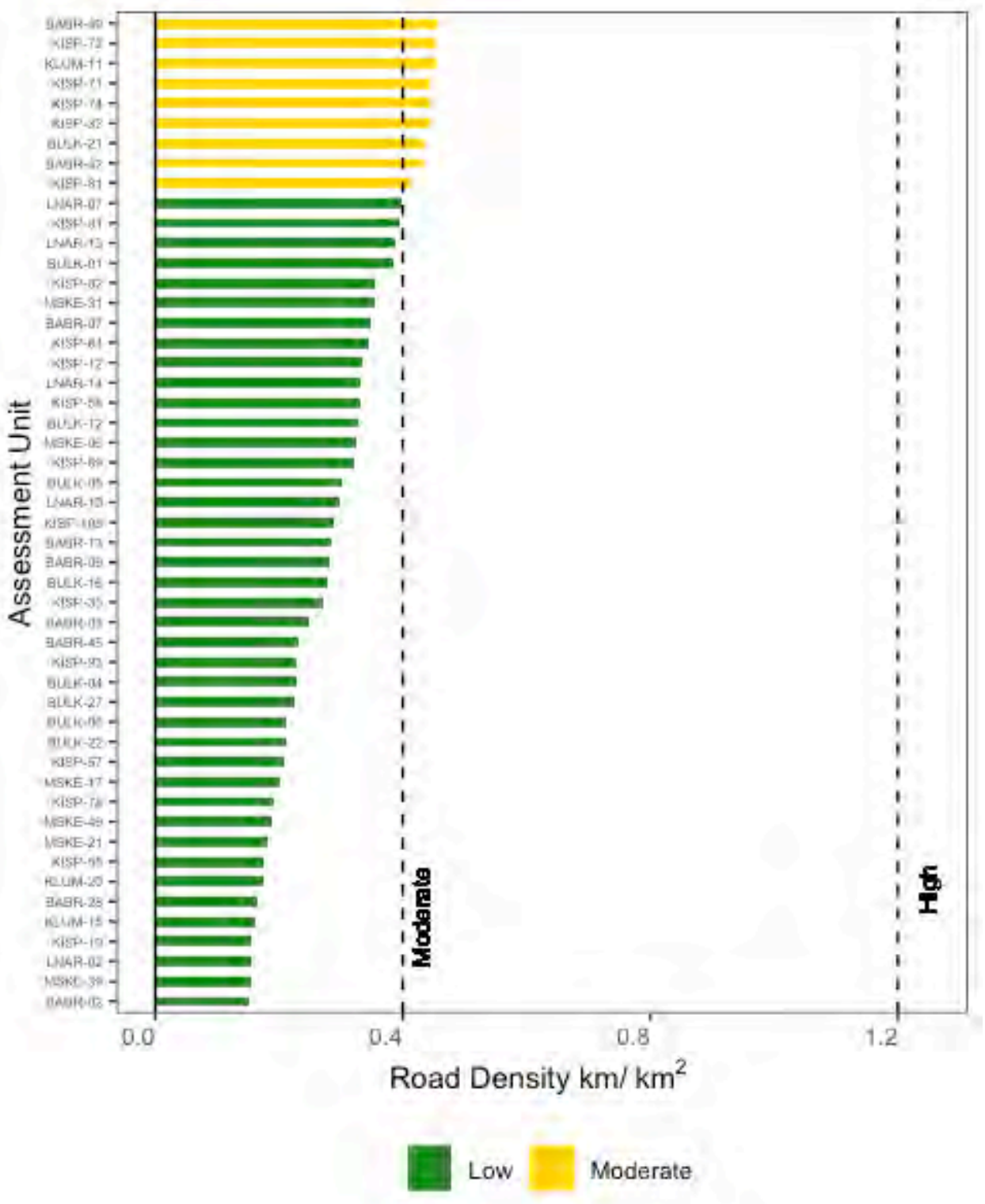
Reference AU	Sub-Watershed Name	FWA FID	Area (km^2)	Road Length (km)	Road Density (km/km^2)	Risk
MSKE-53	Skeena River	11142	31.31	18.95	0.61	Moderate
MSKE-54	Sicintine River	11087	44.91	0.00	0.00	Low
NASR-01		11840	28.26	0.82	0.03	Low
NASR-02	Derrick Creek	11839	56.34	54.22	0.96	Moderate
NASR-03	Nass River	11879	35.43	36.52	1.03	Moderate

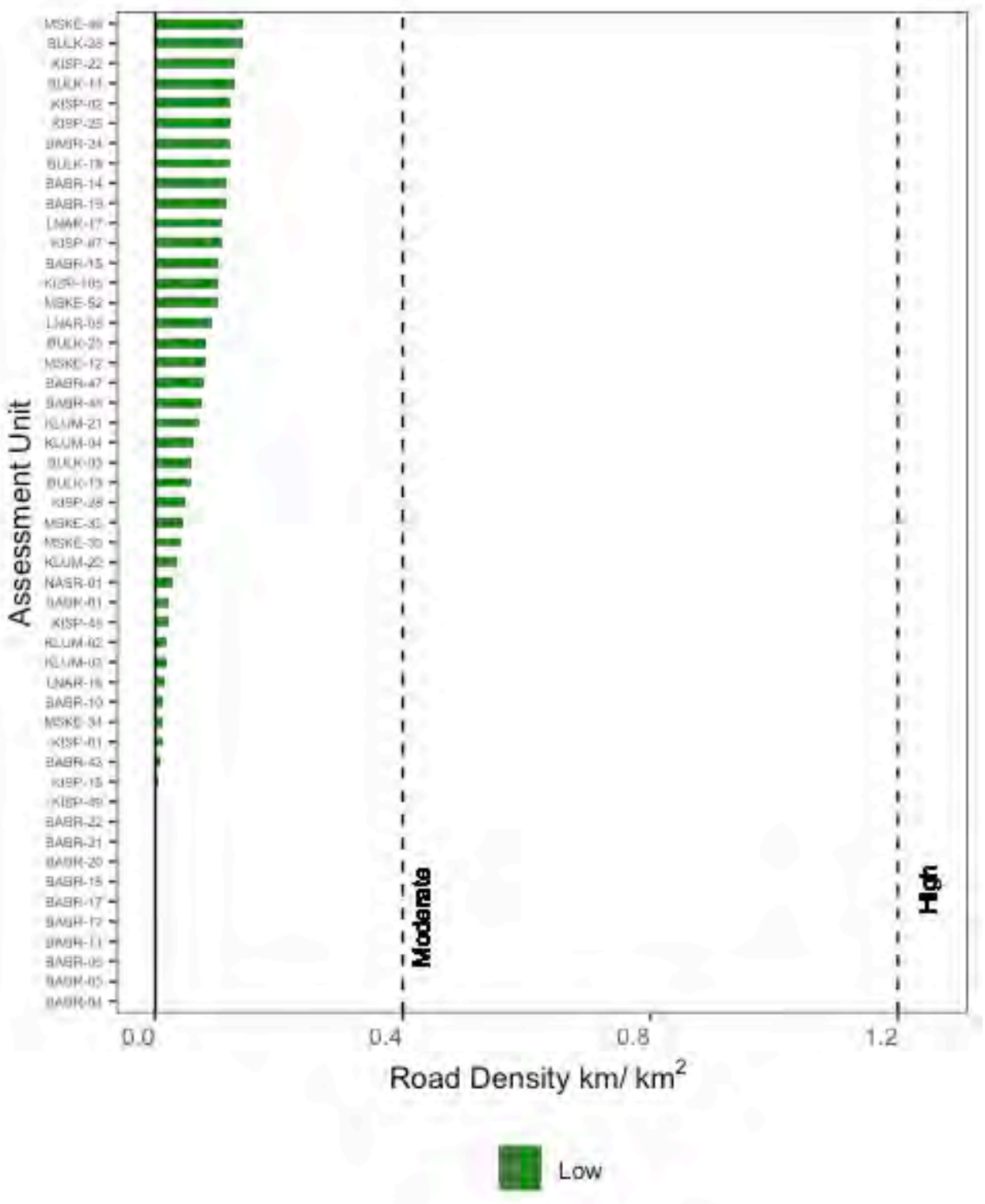
Appendix C: Results Distribution

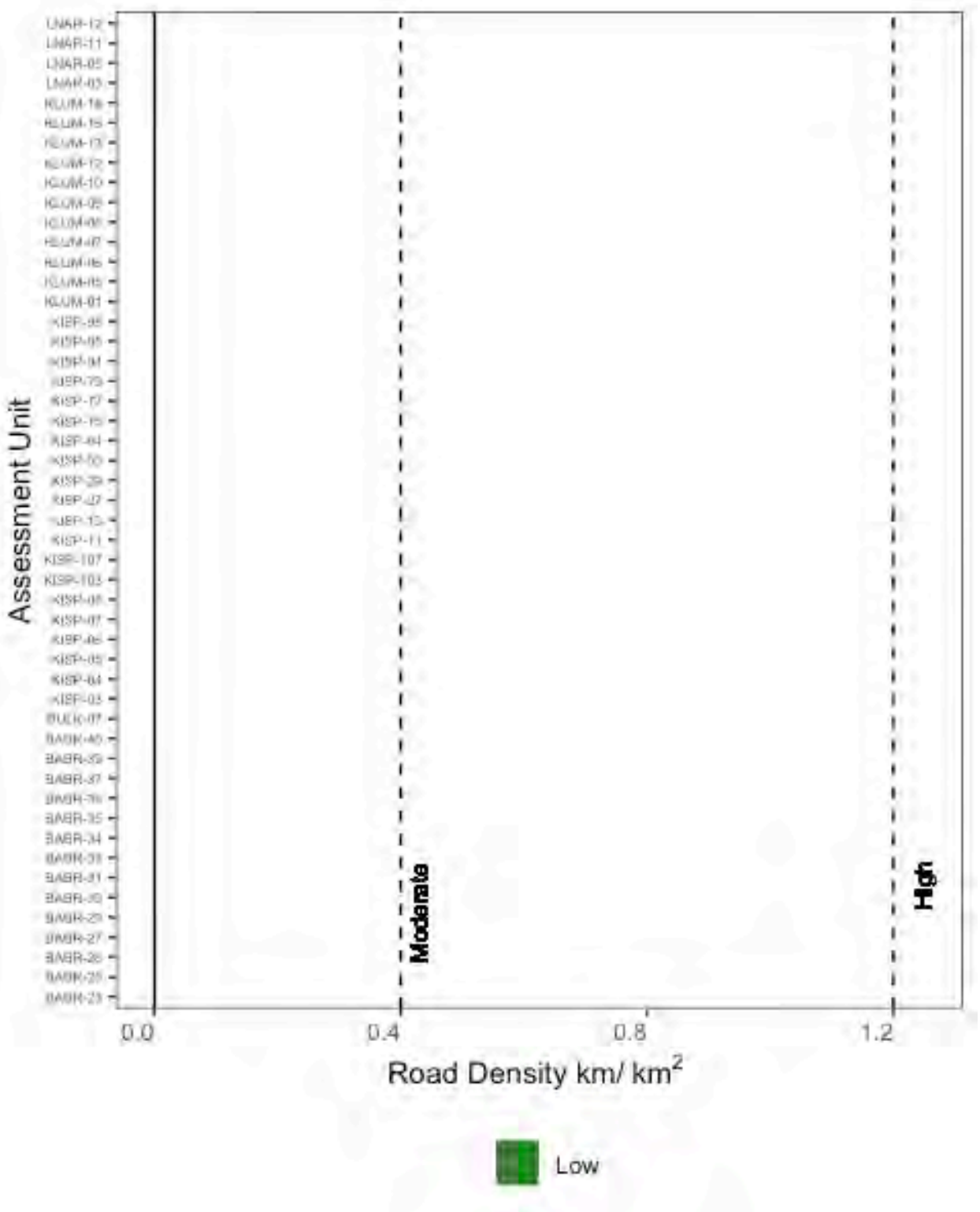
Results are colourized by risk threshold (low risk < 0.40 km/km^2, moderate risk 0.40-1.2 km/km^2, high risk >1.2 km/km^2).

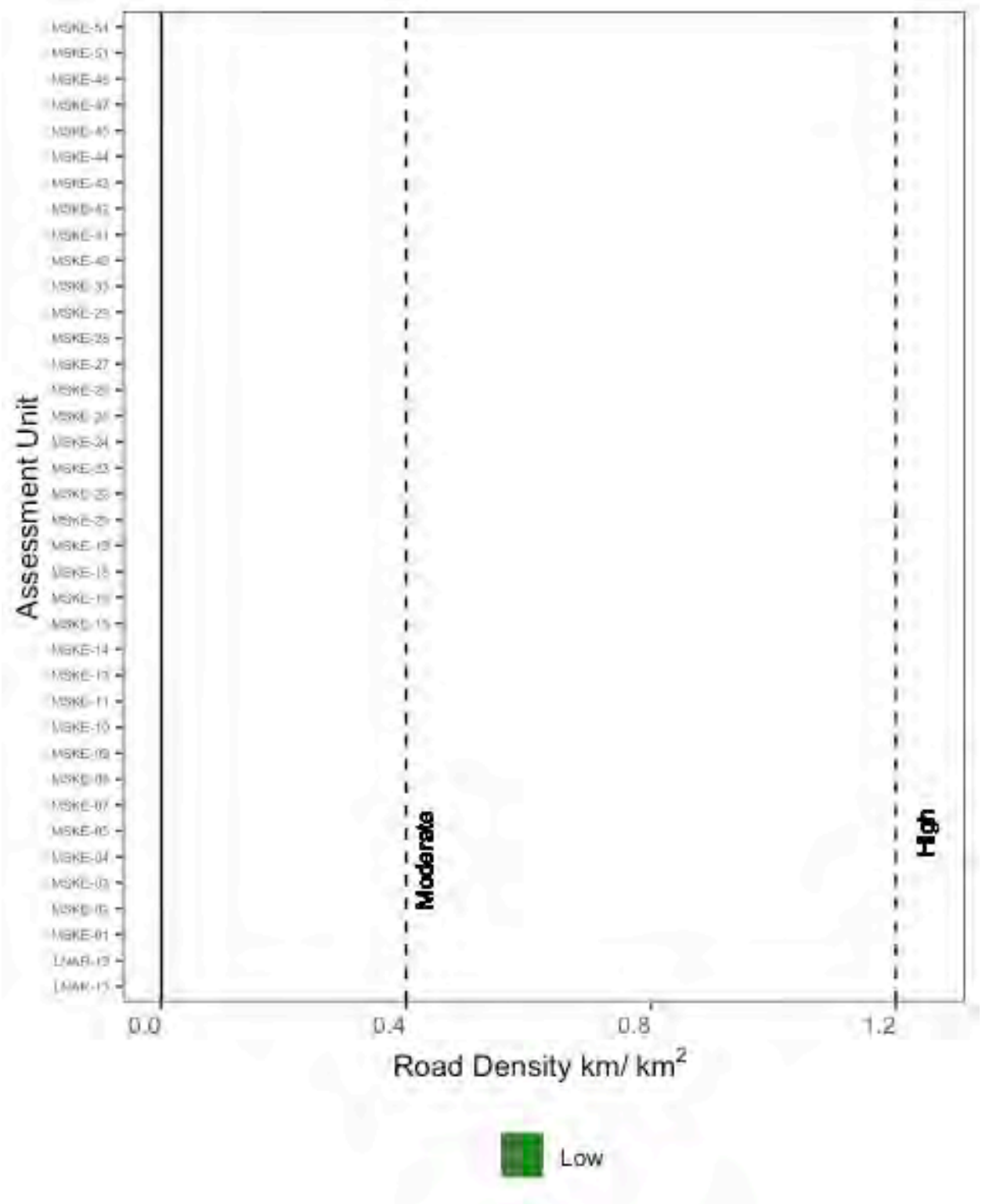



Assessment Unit
KISP-09
LNAR-04
KISP-16
KISP-10
KISP-17
KISP-36
BULK-20
MSKE-38
KISP-43
KISP-20
MSKE-37
BULK-19
LNAR-20
KISP-14
BABR-32
BABR-44
KISP-31
KISP-68
BABR-46
KISP-73
KLUM-14
KLUM-17
KISP-51
KISP-34
LNAR-06
BULK-24
BULK-26
MSKE-32
BABR-38
KISP-38
KLUM-24
KISP-83
KISP-61
KISP-80
KISP-104
KISP-47
MSKE-53
KISP-95
KISP-97
KISP-21
BULK-02
KISP-53
KISP-24
KISP-63
KISP-48
KISP-13
LNAR-09
KISP-23
KISP-45
KISP-52
Moderate
High
0.0
0.4
0.8
1.2
Road Density km/ km2
Moderate


Assessment Unit
Moderate
High
0.0
0.4
0.8
1.2
Road Density km/ km²
Low
Moderate


Assessment Unit
MSKE-49
BULK-26
KISP-22
BULK-11
KISP-02
KISP-25
BABR-24
BULK-18
BABR-14
BABR-13
LNAR-17
KISP-07
BABR-15
KISP-105
MSKE-52
LNAR-05
BULK-25
MSKE-12
BABR-47
BABR-46
KLUM-21
KLUM-04
BULK-03
BULK-13
KISP-28
MSKE-32
MSKE-30
KLUM-22
NASR-01
BABR-01
KISP-45
KLUM-02
KLUM-03
LNAR-16
BABR-10
MSKE-34
KISP-01
BABR-43
KISP-15
KISP-89
BABR-22
BABR-21
BABR-20
BABR-16
BABR-17
BABR-12
BABR-11
BABR-05
BABR-03
BABR-04
0.0
0.4
0.8
1.2
Moderate
High
Road Density km/ km2
Low


Assessment Unit
Moderate
High
0.0
0.4
0.8
1.2
Road Density km/ km²
Low


Assessment Unit
0.0
0.4
0.8
1.2
Road Density km/ km²
Moderate
High
Low

WSP Indicator Analysis for the Kispiox TSA:

Stream Crossing Density

Freshwater Atlas (FWA) Assessment Watersheds

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September 2020

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. Some inaccuracy is expected due to the inherent limitations and uncertainties that exist in the base input datasets, and no representation of current condition is made.

Acknowledgements

We would like to thank Sarah Railton, Greg Knox, and Julia Hill Sorochan for their contributions and feedback, and to Glen Buhr for his assistance and guidance.

WSP Indicator Analysis for the Kispiox TSA

Pressure Indicator: Stream Crossing Density

Assessment Units: FWA Assessment Watersheds

Description of Pressure Indicator

Stream crossings at road intersections present potential barriers to fish passage as well as potential inputs of fine sediment and intercepted flow (Porter et al., 2019). Open-bottom structures, such as bridges and some larger culverts, typically retain or emulate natural stream channel morphology and fish habitat, whereas smaller closed-bottom structures (CBS), such as culverts (corrugated metal pipes), often do not. The change to stream morphology created by installation of a CBS often creates a barrier to fish passage (Mount et al., 2011). Stream crossing density is measured as crossings per square kilometer (km^2), and is related to road development, which has been ranked as a high value indicator by the Wild Salmon Policy (WSP) Habitat Working Group (Stalberg et al., 2009).

Study Area

The Kispiox timber supply area (TSA) is situated in the interior of northwest BC and encompasses the District of New Hazelton and the communities of Hazelton, South Hazelton, Kitwanga, Cedarvale, Kispiox, Gitsegukla, Gitwangak, Gitanyow, Hagwilget, Glen Vowell and Gitanmaax (Figure 1). The Kispiox TSA is part of the Skeena Natural Resource Region and is administered by the Skeena Stikine Natural Resource District office in Smithers.

The Kispiox TSA is comprised of seven TSA supply blocks (12A to 12G), with the Cranberry TSA consolidated with the Kispiox TSA on March 31, 2009 as Block 12G. The current allowable annual cut for the Kispiox TSA is 1,087,000 cubic metres (Province of BC, 2019).

This report presents results for BC Freshwater Atlas (FWA) assessment watersheds within the Kispiox TSA and the neighbouring upper Kispiox River and Swan Lake watersheds. The 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 key for the identification of assessment units was developed based on groupings by major watershed, and reference maps of the study area with Kispiox TSA and FWA assessment watersheds are included as Appendix A.

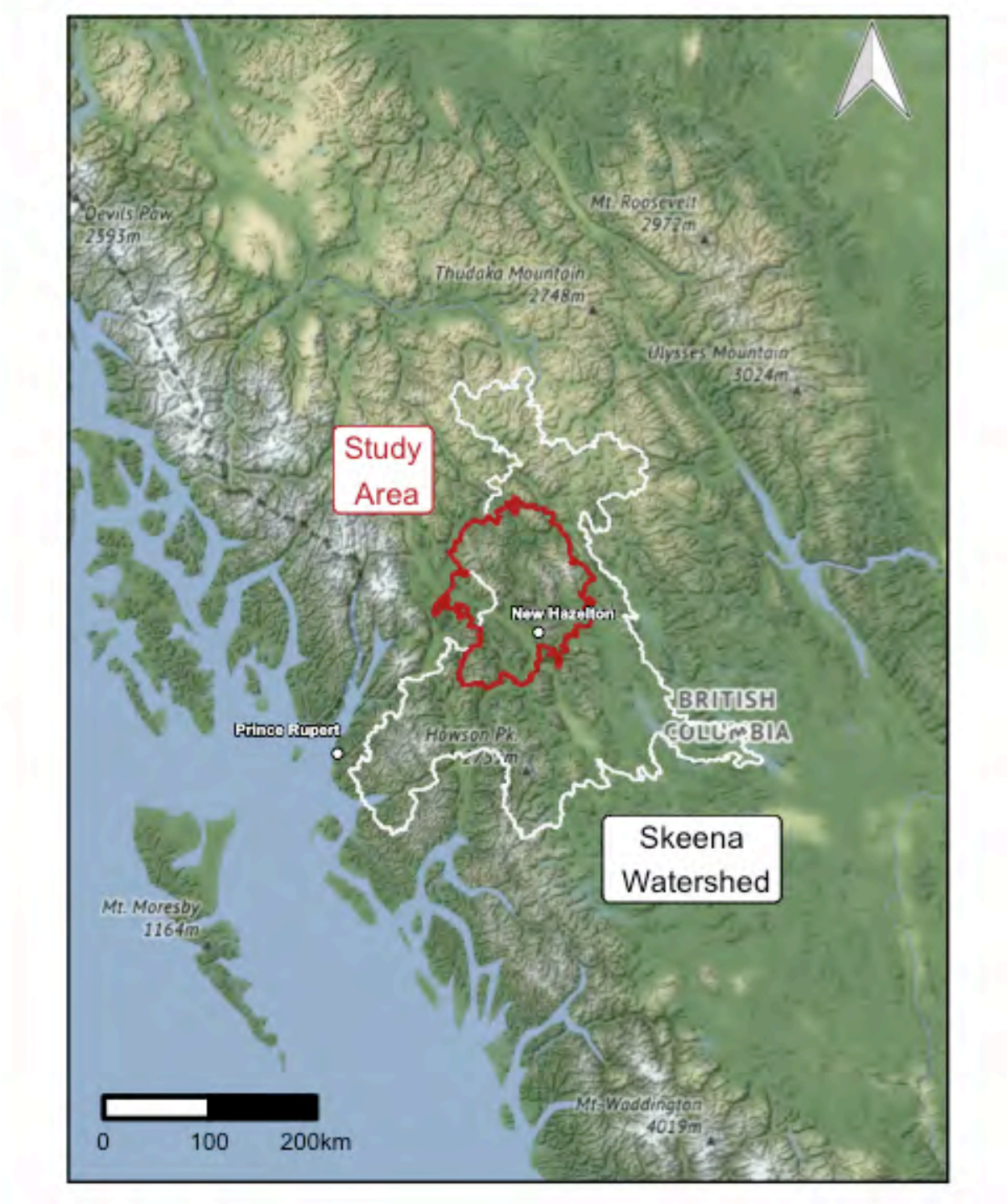

Figure 1: The study area is indicated in red. The grey polygon indicates the outline of the Skeena River watershed.

Methodology

Data layers used to perform the spatial analysis include:

- Kispiox Road Inventory (BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development [BC MFLNRORD], 2017)
- Freshwater Atlas Stream Network (BC MFLNRORD, 2019a)
- Provincial Stream Crossing Information System (PSCIS) Assessments (BC MECSS, 2020)
- Fish Habitat and Road Crossings Model (BC MECCS, 2019)
- FWA Assessment Watersheds (BC MFLNRORD, 2019b)

Stream crossings were computed through the intersection of the provided Kispiox Road Inventory and FWA stream network. The intersection points were compared with the fish habitat and road crossings model (Norris and Mount, 2016) and with the provincial PSCIS stream crossing assessment database in order to categorize the crossings as culverts or other, where 'other' consists of all points that are likely bridges or other open-bottomed structures (Norris and Mount, 2016). Where intersection points did not overlap with the reference data sets, points falling on single-lined streams were classified as culverts and points falling on double-lined streams as 'other', following the methodology of Norris and Mount (2016). The stream crossing data does not include any culvert information collected directly by industry.

FWA assessment watersheds were used as assessment units for the stream crossing density analysis. The total number of CBS (culverts), regardless of fish habitat presence, for each assessment unit was calculated by summing all the CBS within each assessment unit. Stream crossing density (CBS crossings/km^2) was calculated by dividing the total number of CBS crossings by the area of each assessment unit. An overview of culverts and other stream crossing locations for the study area is provided as Figure 2.

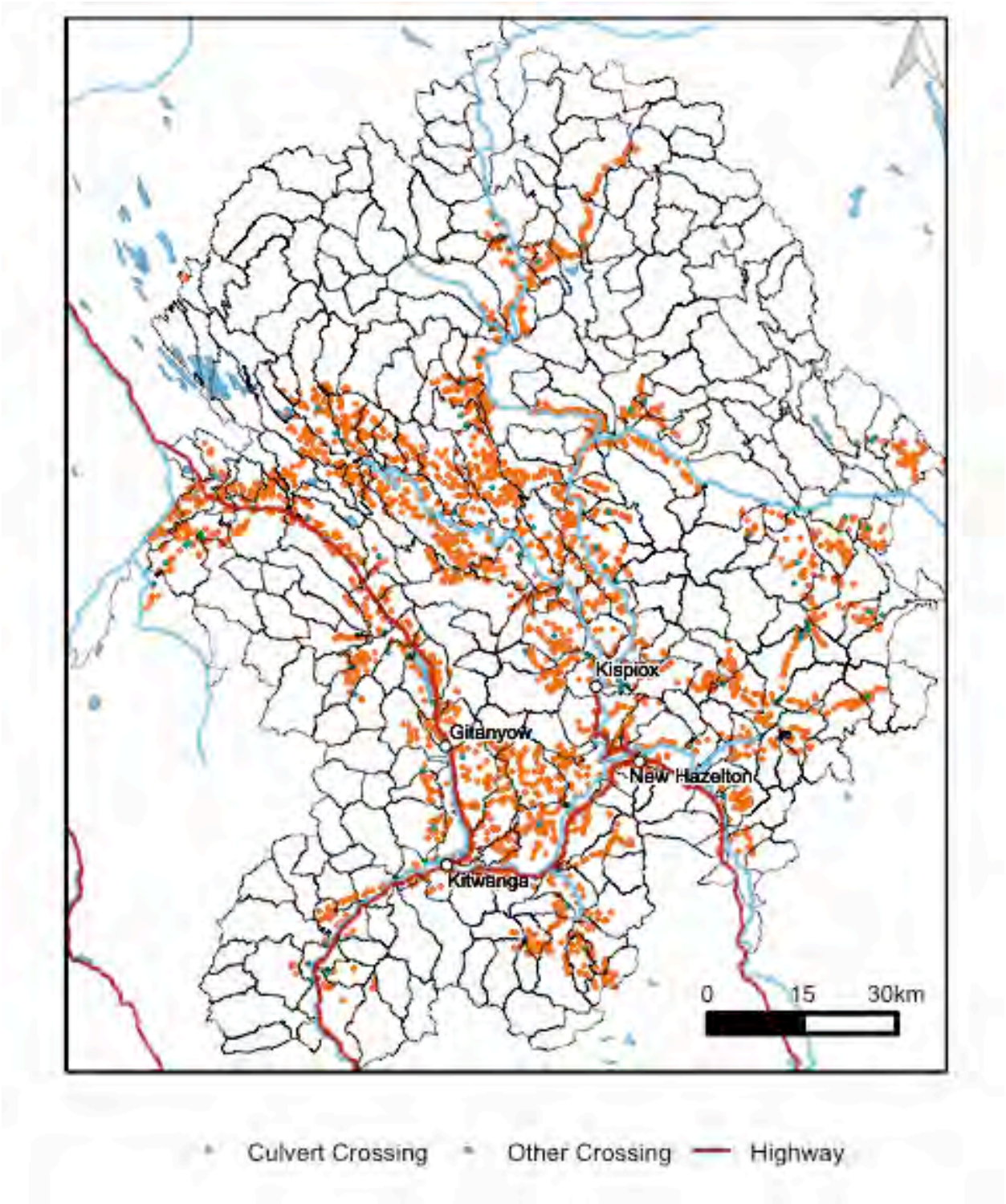

Figure 2: Stream crossings and assessment units located in the study area are shown, with closed-bottom (culvert) stream crossings shown in red and open-bottom crossings (primarily bridges) shown in green.

Risk Thresholds

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	Stream Crossing Density (crossings / km²)
Low	< 0.20
Moderate	0.20 - 0.58
High	> 0.58

Results of Analysis

A summary of the results of the stream crossing density 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 B, and the distribution of the assessment results are shown as a series of figures in Appendix C.

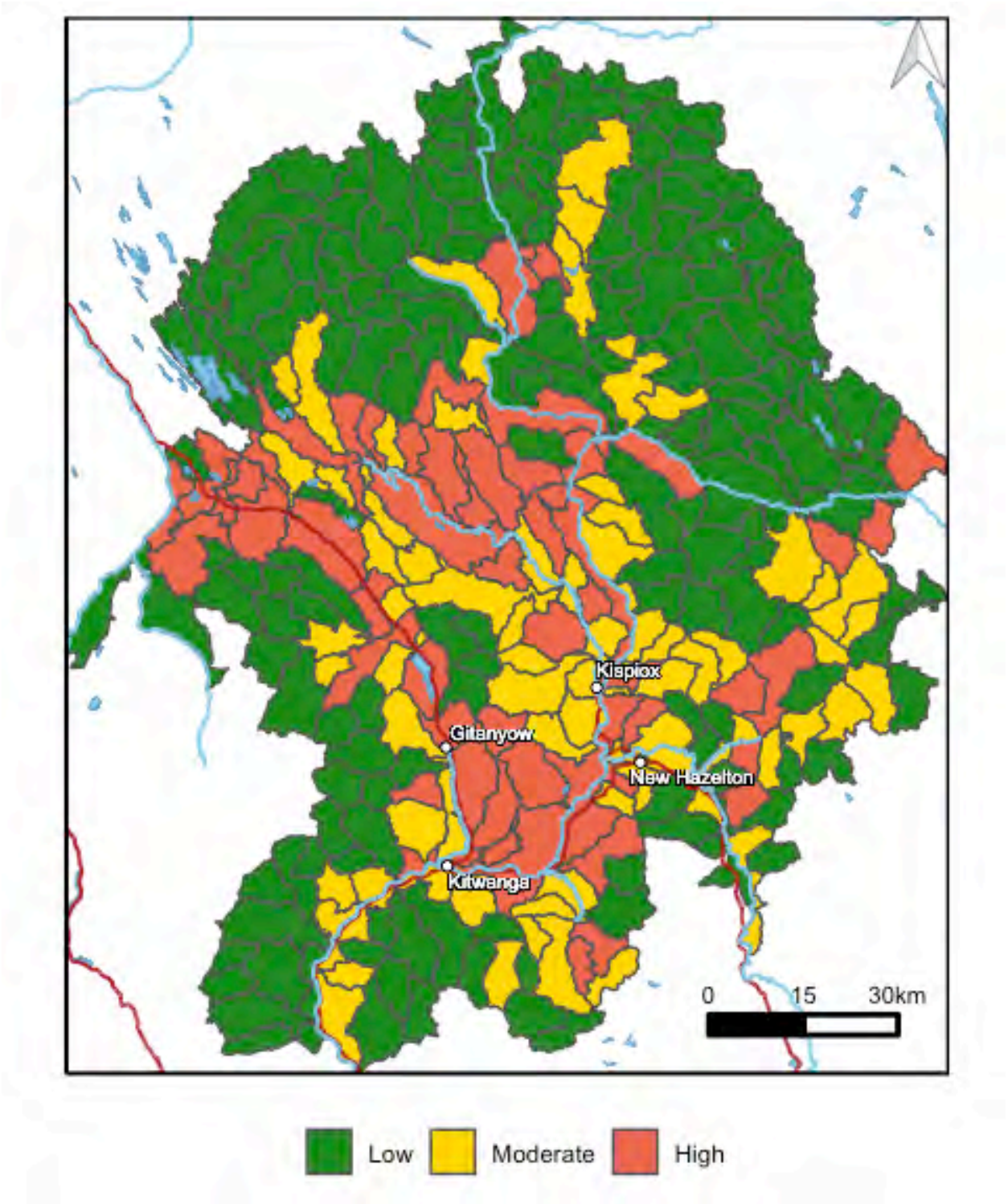

Figure 3: CBS stream crossing density (CBS crossings/km^2) for each boundary in the study area is shown on a study area map. The results are colorized by risk threshold (low risk < 0.2 crossings/km^2, moderate risk 0.2-0.58 crossing/km^2, high risk > 0.58 crossings/km^2).

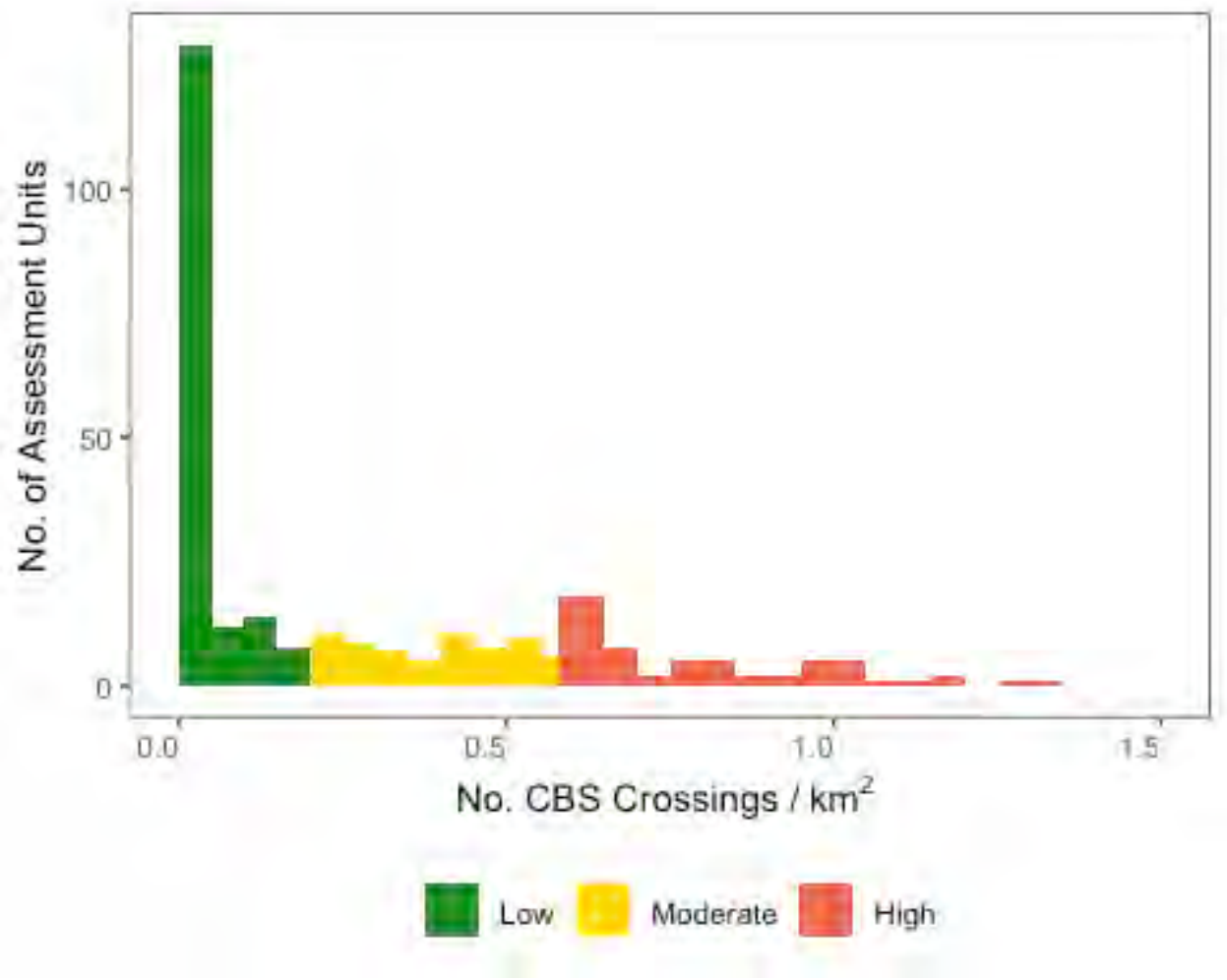

Figure 4: Distribution of results showing the number (count) of assessment units by CBS stream density. The results are colourized by risk threshold (low risk < 0.2 crossings/km^2, moderate risk 0.2-0.58 crossing/km^2, high risk > 0.58 crossings/km^2).

Stream crossing density of CBS (culverts) was calculated for a total of 288 FWA assessment watersheds within the study area. Stream crossing densities ranged from 0 to 1.35 crossings/km^2 with densities for 58 assessment units above the upper threshold of 0.58 crossings/km^2 and densities for 67 assessment units in the moderate risk threshold range (Figure 4; Appendix B and Appendix C).

The majority of assessment units with moderate and high stream crossing densities are associated with stream crossings within the central and southern portions of the study area (Figure 2 and Figure 3).

Interactive visualizations of the indicator analysis results calculated as part of the Kispiox TSA WSP Indicator Analysis are available at https://data.skeenasalmon.info/dataset/wild-salmon-policy-indicator-analysis-for-the-kispiox-tsa.

Summary of Results

Stream crossing density estimations were calculated for 288 FWA assessment watersheds within the Kispiox TSA and adjacent Swan Lake and upper Kispiox River sub-watersheds 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 stream crossings.

Results of the analysis indicated stream crossing density within the study area ranged from 0 to 1.35 crossings/km^2 for each assessment unit, with areas of moderate and high risk from stream crossings found in the central and southern portions of the study area.

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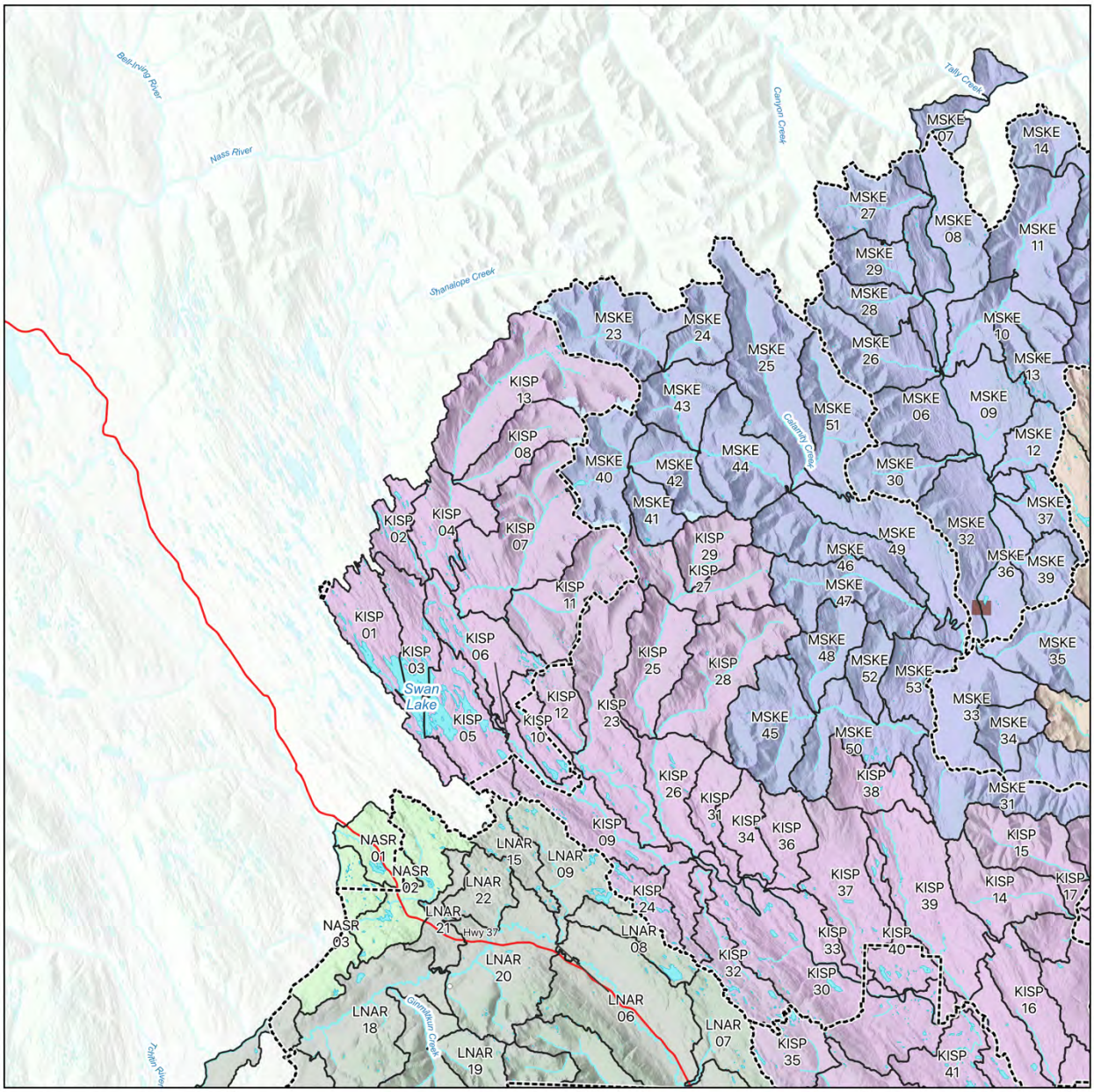
Appendix A: Reference Maps

eclipse GEOMATICS

Kispiox Study Area Reference Map - Northwest



Location Map

Legend

Boundary

- Fresh Water Atlas Assessment Watershed
- Kispiox TSA Block
- Reserve Boundary

Major Watershed Group

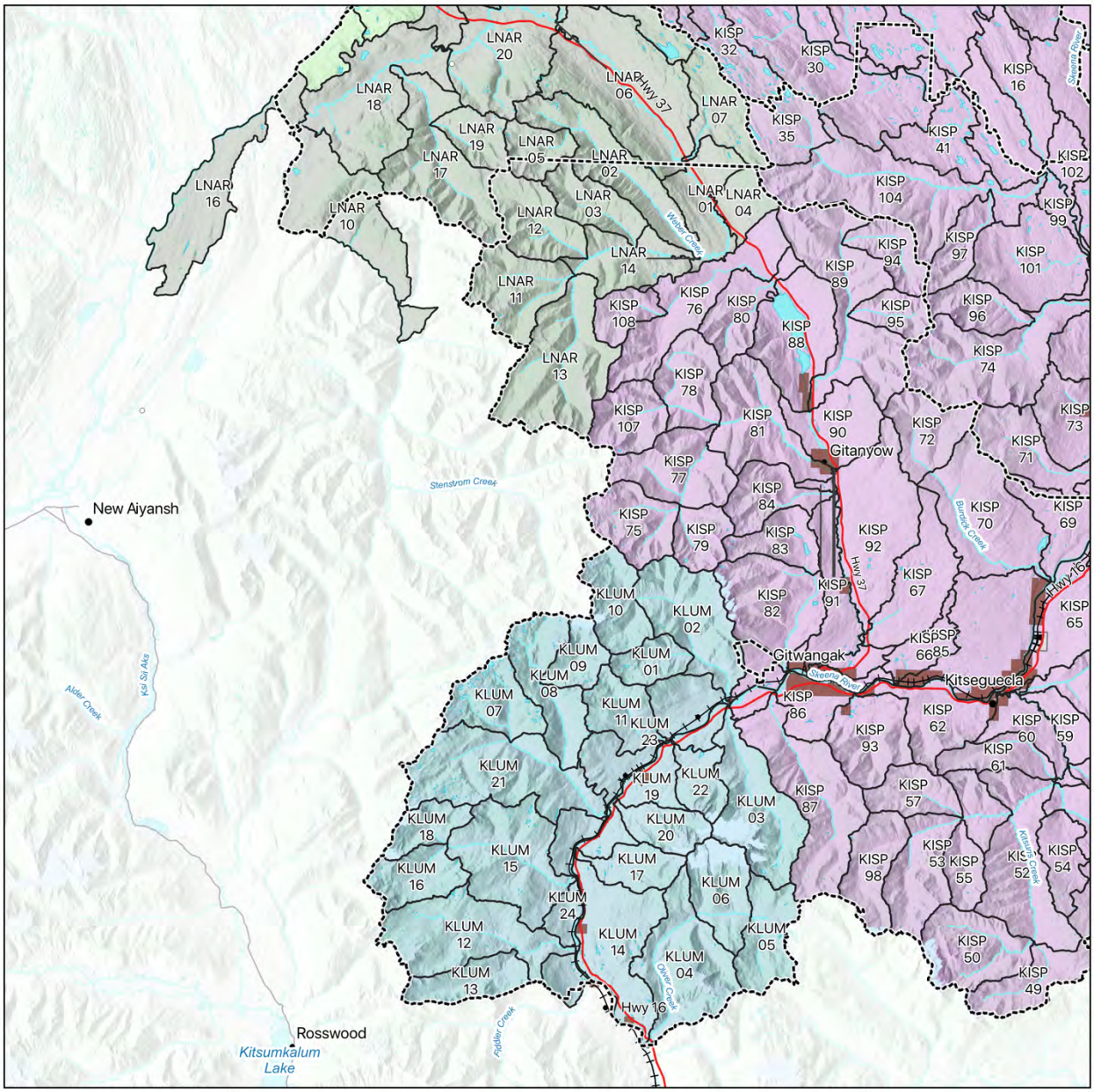
- BABR
- BULK
- KISP
- KLUM
- LNAR
- MSKE
- NASR

0 5 10 km

N
W E
S

Prepared for SkeenaWild
by Eclipse Geomatics Ltd.,
June 2020

Kispiox Study Area Reference Map - Southwest



Location Map

Legend

Boundary

- Fresh Water Atlas Assessment Watershed
- Kispiox TSA Block
- Reserve Boundary

Major Watershed Group

- BABR
- BULK
- KISP
- KLUM
- LNAR
- MSKE
- NASR

0 5 10 km

N
W E
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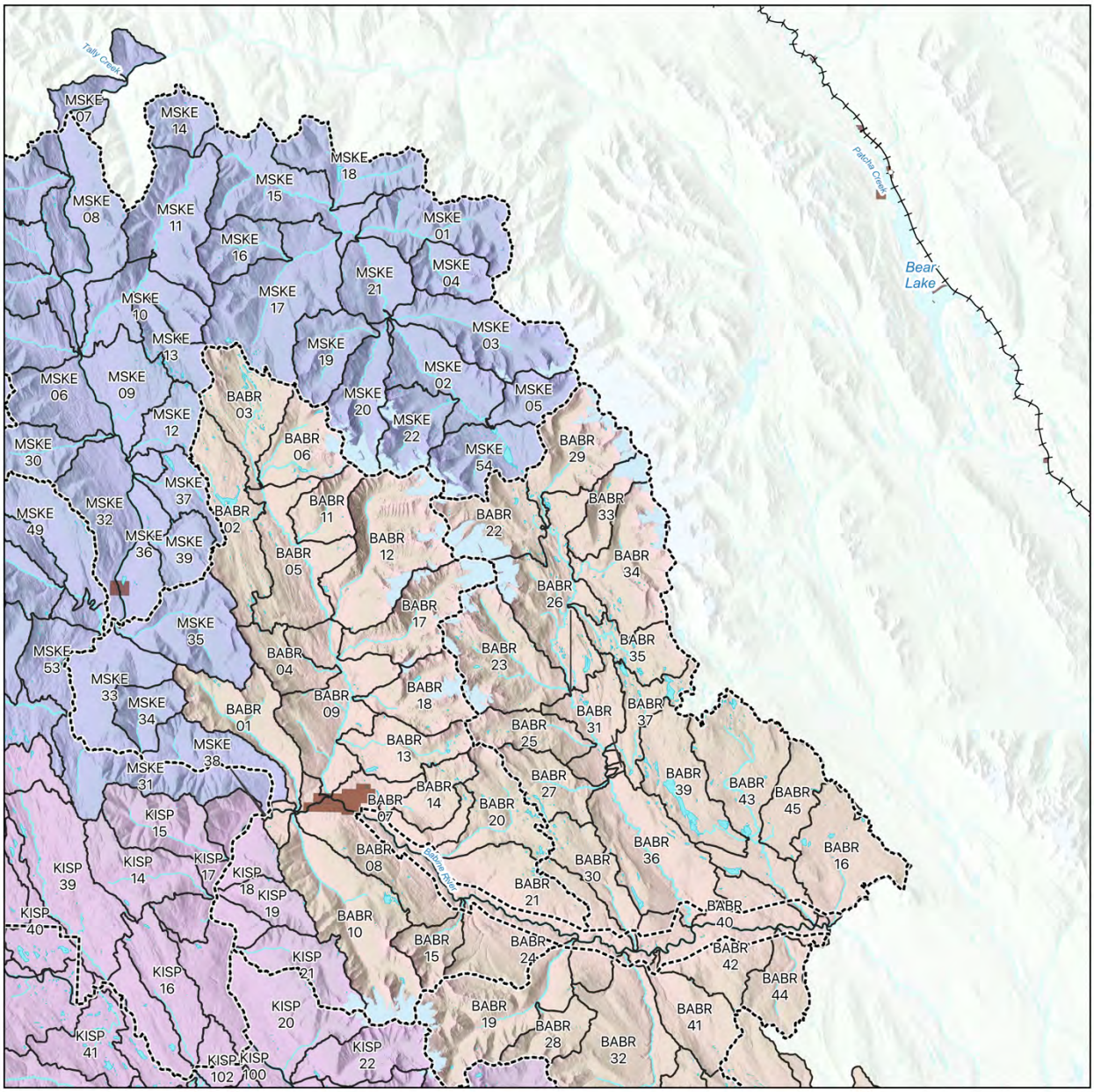
Prepared for SkeenaWild
by Eclipse Geomatics Ltd.,
June 2020

eclipse GEOMATICS

Kispiox Study Area Reference Map - Northeast



Location Map

Legend

Boundary

- Fresh Water Atlas Assessment Watershed
- Kispiox TSA Block
- Reserve Boundary

Major Watershed Group

- BABR
- BULK
- KISP
- KLUM
- LNAR
- MSKE
- NASR

0 5 10 km

N W E S

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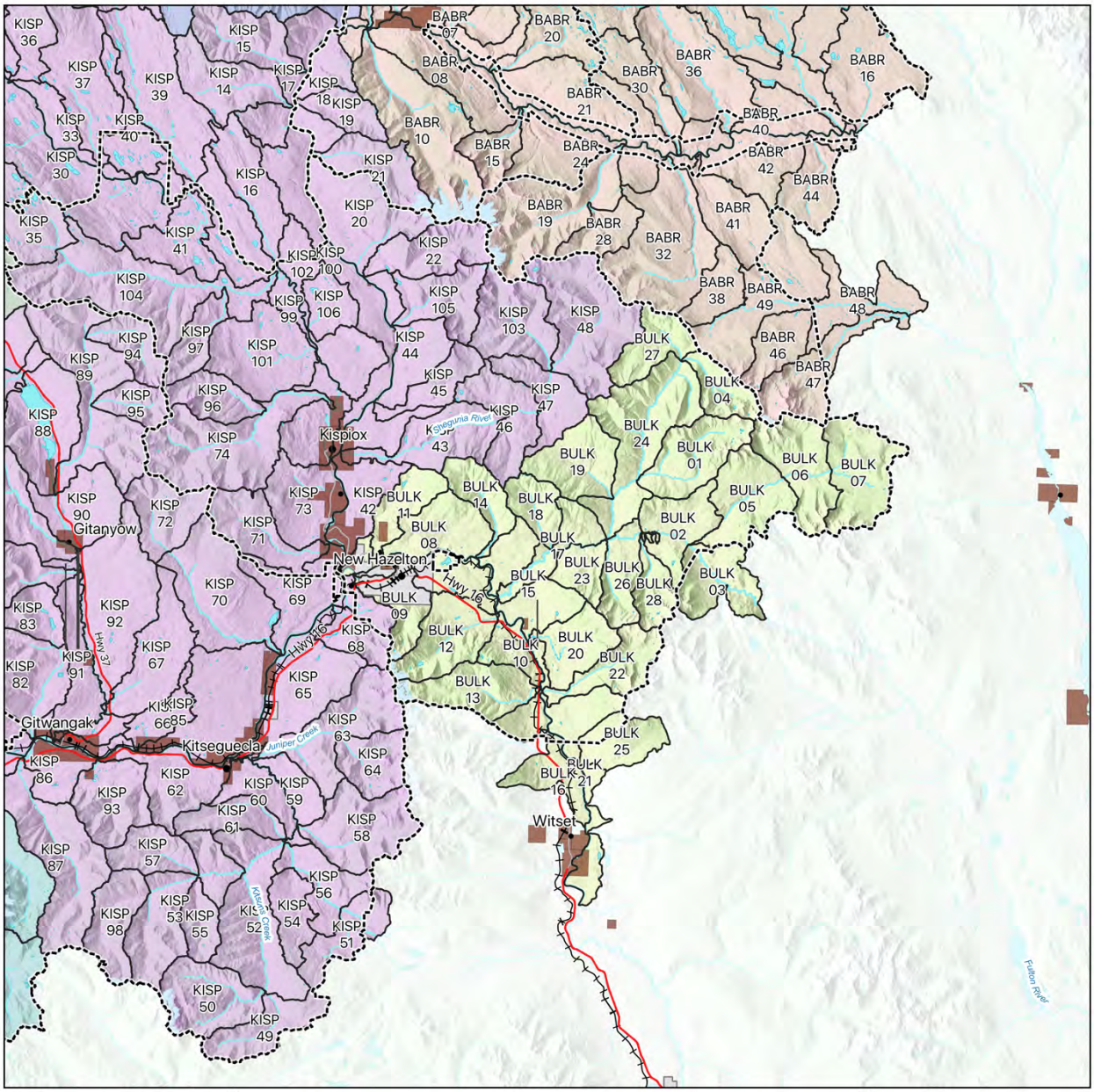
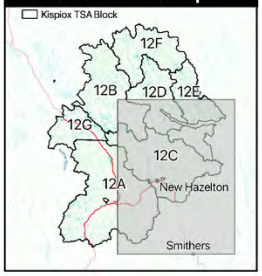
Kispiox Study Area Reference Map - Southeast



Location Map



Legend

Boundary

- Fresh Water Atlas Assessment Watershed
- Kispiox TSA Block
- Reserve Boundary

Major Watershed Group

- BABR
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- MSKE
- NASR

0 5 10 km

N W E S

Prepared for SkeenaWild
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Appendix B: Results Tables

The following tables present total area for each boundary studied, number of closed-bottom (culvert) and open-bottom (primarily bridges) crossings, culvert density (crossings per km^2), and risk (determined by Pacific Salmon Foundation thresholds).

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Culvert Crossings	Other Crossings	Culvert Density (Crossings per km^2)	Risk
BABR-01	Sam Green Creek	424	51.41	0	1	0.00	Low
BABR-02	Damsumlo Creek	433	59.43	28	0	0.47	Moderate
BABR-03	Shedin Creek	436	48.48	27	1	0.56	Moderate
BABR-04		429	25.00	0	0	0.00	Low
BABR-05	Shedin Creek	435	61.63	0	0	0.00	Low
BABR-06		434	38.12	0	0	0.00	Low
BABR-07	Babine River	423	40.04	8	1	0.20	Low
BABR-08	Babine River	492	62.22	50	2	0.80	High
BABR-09	Shedin Creek	426	73.86	28	1	0.38	Moderate
BABR-10	Shegisic Creek	425	98.45	2	0	0.02	Low
BABR-11		432	25.74	0	0	0.00	Low
BABR-12	Rosenthal Creek	431	91.95	0	0	0.00	Low
BABR-13	Goathead Creek	427	37.83	16	1	0.42	Moderate
BABR-14		437	25.91	4	0	0.15	Low
BABR-15		439	22.06	1	0	0.05	Low
BABR-16	Shahnagh Creek	461	63.26	48	0	0.76	High
BABR-17	Sperry Creek	430	54.23	0	0	0.00	Low
BABR-18		428	40.13	0	0	0.00	Low
BABR-19	Thomlinson Creek	440	82.86	9	2	0.11	Low

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Culvert Crossings	Other Crossings	Culvert Density (Crossings per km^2)	Risk
BABR-20	Shenismike Creek	438	45.51	0	0	0.00	Low
BABR-21	Babine River	493	73.51	0	0	0.00	Low
BABR-22	Shelagyote River	456	48.30	0	0	0.00	Low
BABR-23		449	71.44	0	0	0.00	Low
BABR-24	Babine River	494	60.65	6	0	0.10	Low
BABR-25	Cayuse Jack Creek	448	30.36	0	0	0.00	Low
BABR-26	Shelagyote River	455	77.32	0	0	0.00	Low
BABR-27		446	31.02	0	0	0.00	Low
BABR-28		441	23.39	0	0	0.00	Low
BABR-29		453	53.77	0	0	0.00	Low
BABR-30	Le Clair Creek	443	33.99	0	0	0.00	Low
BABR-31	Shelagyote River	454	35.97	0	0	0.00	Low
BABR-32	Gail Creek	442	92.08	29	2	0.31	Moderate
BABR-33		452	25.69	0	0	0.00	Low
BABR-34	Barger Creek	451	64.93	0	0	0.00	Low
BABR-35		450	29.62	0	0	0.00	Low
BABR-36	Shelagyote River	445	81.34	0	0	0.00	Low
BABR-37		447	27.67	0	0	0.00	Low
BABR-38		486	24.75	13	0	0.53	Moderate
BABR-39		460	54.97	0	0	0.00	Low
BABR-40	Babine River	495	41.81	0	0	0.00	Low
BABR-41	Cataline Creek	444	39.81	26	0	0.65	High

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Culvert Crossings	Other Crossings	Culvert Density (Crossings per km^2)	Risk
BABR-42	Babine River	496	47.39	9	1	0.19	Low
BABR-43	Hanawald Creek	458	87.27	1	0	0.01	Low
BABR-44		457	32.07	29	1	0.90	High
BABR-45		459	32.14	4	2	0.12	Low
BABR-46		485	27.92	16	1	0.57	Moderate
BABR-47		482	46.24	4	0	0.09	Low
BABR-48	Nichyeskwa Creek	487	37.47	0	1	0.00	Low
BABR-49	Nichyeskwa Creek	488	75.82	16	0	0.21	Moderate
BULK-01	Denison Creek	1275	48.43	8	1	0.17	Low
BULK-02	Suskwa River	1298	37.64	21	0	0.56	Moderate
BULK-03	Harold Price Creek	1279	40.73	5	0	0.12	Low
BULK-04		1276	23.95	9	1	0.38	Moderate
BULK-05	Suskwa River	1299	49.78	20	0	0.40	Moderate
BULK-06	Suskwa River	1300	50.81	15	1	0.30	Moderate
BULK-07	Suskwa River	1301	54.65	0	0	0.00	Low
BULK-08	Bulkley River	1267	48.69	22	1	0.45	Moderate
BULK-09	Station Creek	1268	29.63	15	0	0.51	Moderate
BULK-10	Bulkley River	1413	50.03	22	1	0.44	Moderate
BULK-11	Two Mile Creek	1269	26.93	24	0	0.89	High
BULK-12	Mudflat Creek	1302	47.41	9	1	0.19	Low

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Culvert Crossings	Other Crossings	Culvert Density (Crossings per km^2)	Risk
BULK-13	Porphyry Creek	1304	44.11	1	0	0.02	Low
BULK-14	Nine Mile Creek	1270	26.52	1	0	0.04	Low
BULK-15	Bulkley River	1414	49.43	9	0	0.18	Low
BULK-16	Bulkley River	1415	39.18	3	0	0.08	Low
BULK-17	Suskwa River	1271	26.13	13	1	0.50	Moderate
BULK-18	Fifteen Mile Creek	1272	23.38	3	0	0.13	Low
BULK-19	Iltzul Creek	1274	43.66	42	1	0.96	High
BULK-20	Corduroy Creek	1303	34.91	40	1	1.15	High
BULK-21	Bulkley River	1416	46.12	11	0	0.24	Moderate
BULK-22	Luno Creek	1305	33.95	1	1	0.03	Low
BULK-23	Suskwa River	1296	20.30	16	1	0.79	High
BULK-24	Natlan Creek	1273	84.75	51	5	0.60	High
BULK-25	Kwun Creek	1307	30.73	3	0	0.10	Low
BULK-26	Suskwa River	1297	30.26	9	1	0.30	Moderate
BULK-27	Natlan Creek	1277	30.22	2	1	0.07	Low
BULK-28		1278	21.06	4	1	0.19	Low
KISP-01		6252	43.80	0	0	0.00	Low
KISP-02		6255	23.32	3	0	0.13	Low
KISP-03		6251	43.88	0	0	0.00	Low
KISP-04	Kispiox River	6262	40.23	0	0	0.00	Low
KISP-05	Stephens Creek	6250	56.57	0	0	0.00	Low

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Culvert Crossings	Other Crossings	Culvert Density (Crossings per km^2)	Risk
KISP-06	Kispiox River	6261	48.91	0	0	0.00	Low
KISP-07	East Kispiox River	6253	96.94	0	0	0.00	Low
KISP-08		6256	38.99	0	0	0.00	Low
KISP-09	Kispiox River	6260	72.48	58	0	0.80	High
KISP-10		6249	24.27	1	1	0.04	Low
KISP-11		6254	60.45	0	0	0.00	Low
KISP-12		6248	22.25	5	0	0.22	Moderate
KISP-13	Kispiox River	6263	106.02	0	0	0.00	Low
KISP-14	Carrigan Creek	6273	44.91	47	0	1.05	High
KISP-15	Blackstock Creek	6275	43.50	1	0	0.02	Low
KISP-16	Murder Creek	6231	40.63	25	1	0.62	High
KISP-17	Skeena River	6287	35.54	32	0	0.90	High
KISP-18	Skeena River	6286	30.87	19	0	0.62	High
KISP-19	Bretson Creek	6274	21.97	12	1	0.55	Moderate
KISP-20	Skeena River	6285	61.32	29	2	0.47	Moderate
KISP-21	Shewililba Creek	6272	36.63	15	2	0.41	Moderate
KISP-22	Sediesh Creek	6271	42.46	5	1	0.12	Low
KISP-23	Nangeese River	6247	87.17	24	2	0.28	Moderate
KISP-24	Brown Paint Creek	6246	21.64	9	0	0.42	Moderate
KISP-25	Sweetin River	6244	51.88	3	0	0.06	Low

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Culvert Crossings	Other Crossings	Culvert Density (Crossings per km^2)	Risk
KISP-26	Sweetin River	6241	39.23	47	1	1.20	High
KISP-27	Sweetin River	6245	48.42	0	0	0.00	Low
KISP-28		6242	77.46	6	0	0.08	Low
KISP-29		6243	27.89	0	0	0.00	Low
KISP-30	Kispiox River	6259	117.93	119	1	1.01	High
KISP-31	Clifford Creek	6239	24.21	19	1	0.78	High
KISP-32	Steep Canyon Creek	6240	36.61	12	0	0.33	Moderate
KISP-33	Kispiox River	6258	35.86	21	1	0.59	High
KISP-34	Skunsnat Creek	6238	26.47	14	0	0.53	Moderate
KISP-35	McCully Creek	6230	33.29	17	0	0.51	Moderate
KISP-36	Corral Creek	6237	28.69	21	0	0.73	High
KISP-37	Ironside Creek	6236	66.26	43	1	0.65	High
KISP-38	Cullon Creek	6233	33.56	18	2	0.54	Moderate
KISP-39	Cullon Creek	6232	81.61	84	2	1.03	High
KISP-40		6235	30.70	20	1	0.65	High
KISP-41		6234	37.94	25	1	0.66	High
KISP-42	Skeena River	6281	69.60	45	7	0.65	High
KISP-43	Shegunia River	6264	48.20	15	1	0.31	Moderate
KISP-44	Skeena River	6284	38.61	15	0	0.39	Moderate
KISP-45	Pinenut Creek	6269	24.84	5	0	0.20	Moderate

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Culvert Crossings	Other Crossings	Culvert Density (Crossings per km^2)	Risk
KISP-46	Shegunia River	6266	43.44	24	0	0.55	Moderate
KISP-47	Shegunia River	6267	34.82	16	0	0.46	Moderate
KISP-48	Shegunia River	6268	83.75	0	0	0.00	Low
KISP-49	Kitsuns Creek	6212	35.39	0	0	0.00	Low
KISP-50		6211	51.59	0	0	0.00	Low
KISP-51	Kitseguecla River	6217	33.88	15	0	0.44	Moderate
KISP-52	Kitsuns Creek	6206	76.76	31	0	0.40	Moderate
KISP-53		6207	64.75	33	1	0.51	Moderate
KISP-54		6213	26.07	19	1	0.73	High
KISP-55		6209	20.17	3	1	0.15	Low
KISP-56	Kitseguecla River	6216	34.35	23	0	0.67	High
KISP-57		6208	27.82	2	1	0.07	Low
KISP-58		6204	57.80	10	1	0.17	Low
KISP-59	Kitseguecla River	6201	22.15	7	0	0.32	Moderate
KISP-60	Kitseguecla River	6215	22.58	12	2	0.53	Moderate
KISP-61	Deep Canyon Creek	6205	25.58	13	1	0.51	Moderate
KISP-62	Skeena River	6278	42.24	57	0	1.35	High
KISP-63	Juniper Creek	6202	60.50	39	1	0.64	High
KISP-64	Brian Boru Creek	6203	32.22	0	0	0.00	Low
KISP-65	Skeena River	6279	64.72	40	0	0.62	High
KISP-66	Andi Creek	6200	20.44	20	0	0.98	High

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Culvert Crossings	Other Crossings	Culvert Density (Crossings per km^2)	Risk
KISP-67		6182	52.71	43	1	0.82	High
KISP-68	Chicago Creek	6221	21.01	5	0	0.24	Moderate
KISP-69	Skeena River	6280	44.15	30	0	0.68	High
KISP-70	Burdick Creek	6219	78.51	75	1	0.96	High
KISP-71	Hazelton Creek	6222	41.68	12	1	0.29	Moderate
KISP-72	Burdick Creek	6220	37.89	23	0	0.61	High
KISP-73	Skeena River	6282	45.79	14	1	0.31	Moderate
KISP-74	Date Creek	6224	87.75	40	1	0.46	Moderate
KISP-75	Kitwancool Creek	6189	40.26	0	0	0.00	Low
KISP-76	Kitwanga River	6198	66.48	64	0	0.96	High
KISP-77	Kitwancool Creek	6188	50.99	0	0	0.00	Low
KISP-78		6185	37.18	2	1	0.05	Low
KISP-79		6187	24.07	0	0	0.00	Low
KISP-80	Kitwanga River	6197	33.78	14	3	0.41	Moderate
KISP-81	Kitwancool Creek	6184	60.58	13	0	0.21	Moderate
KISP-82	Mill Creek	6179	63.11	15	2	0.24	Moderate
KISP-83		6180	27.47	16	0	0.58	High
KISP-84	Deuce Creek	6183	31.89	1	1	0.03	Low
KISP-85	Skeena River	6277	100.62	65	1	0.65	High
KISP-86	Skeena River	6276	32.07	14	2	0.44	Moderate
KISP-87		6178	85.42	3	1	0.04	Low

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Culvert Crossings	Other Crossings	Culvert Density (Crossings per km^2)	Risk
KISP-88	Kitwanga River	6196	61.90	49	1	0.79	High
KISP-89	Moonlit Creek	6190	91.77	10	1	0.11	Low
KISP-90	Kitwanga River	6195	42.28	35	1	0.83	High
KISP-91	Kitwanga River	6181	38.89	8	2	0.21	Moderate
KISP-92	Kitwanga River	6194	94.23	82	8	0.87	High
KISP-93	Shandilla Creek	6199	45.24	12	0	0.27	Moderate
KISP-94		6192	26.00	0	0	0.00	Low
KISP-95		6191	20.07	0	0	0.00	Low
KISP-96		6225	28.52	14	1	0.49	Moderate
KISP-97		6229	23.72	8	0	0.34	Moderate
KISP-98		6210	37.64	0	0	0.00	Low
KISP-99	Kispiox River	6223	62.80	22	4	0.35	Moderate
KISP-100	Skeena River	6283	69.00	70	0	1.01	High
KISP-101	Hevenor Creek	6226	62.79	48	1	0.76	High
KISP-102	Kispiox River	6257	75.33	42	0	0.56	Moderate
KISP-103		6265	51.63	0	0	0.00	Low
KISP-104	McCully Creek	6228	111.17	46	2	0.41	Moderate
KISP-105	Utsun Creek	6270	39.41	1	0	0.03	Low
KISP-106		6227	23.00	15	0	0.65	High
KISP-107		6186	33.46	0	0	0.00	Low
KISP-108		6193	20.27	5	1	0.25	Moderate
KLUM-01		6741	20.82	0	0	0.00	Low

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Culvert Crossings	Other Crossings	Culvert Density (Crossings per km^2)	Risk
KLUM-02	Sedan Creek	6740	63.64	0	1	0.00	Low
KLUM-03		6743	66.62	0	1	0.00	Low
KLUM-04	Oliver Creek	6721	71.92	3	1	0.04	Low
KLUM-05	Oliver Creek	6723	38.80	0	0	0.00	Low
KLUM-06	Oliver Creek	6722	40.47	0	0	0.00	Low
KLUM-07		6736	39.29	0	0	0.00	Low
KLUM-08		6734	49.34	0	0	0.00	Low
KLUM-09		6735	22.14	0	0	0.00	Low
KLUM-10		6742	36.67	0	0	0.00	Low
KLUM-11	Wilson Creek	6738	30.88	9	1	0.29	Moderate
KLUM-12	Lorne Creek	6727	76.37	0	0	0.00	Low
KLUM-13	South Lorne Creek	6728	30.80	0	0	0.00	Low
KLUM-14	Skeena River	6752	67.50	27	0	0.40	Moderate
KLUM-15	Quill Creek	6729	74.47	5	1	0.07	Low
KLUM-16	Quill Creek	6731	32.41	0	0	0.00	Low
KLUM-17	Flint Creek	6732	24.90	5	1	0.20	Moderate
KLUM-18		6730	22.13	0	0	0.00	Low
KLUM-19	Skeena River	6754	38.26	11	0	0.29	Moderate
KLUM-20	CoyoteCreek	6737	25.14	0	1	0.00	Low
KLUM-21	Insect Creek	6733	89.68	1	1	0.01	Low
KLUM-22		6739	22.46	1	0	0.04	Low
KLUM-23	Skeena River	6755	50.29	26	0	0.52	Moderate
KLUM-24	Skeena River	6753	40.39	1	2	0.02	Low

Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Culvert Crossings	Other Crossings	Culvert Density (Crossings per km^2)	Risk
LNAR-01	Cranberry River	9034	40.16	26	1	0.65	High
LNAR-02	Weber Creek	9025	63.18	7	0	0.11	Low
LNAR-03		9027	31.75	0	0	0.00	Low
LNAR-04		9024	20.68	10	0	0.48	Moderate
LNAR-05		9026	22.83	0	0	0.00	Low
LNAR-06	Cranberry River	9033	117.46	72	3	0.61	High
LNAR-07	Tsugwinsel da Creek	9023	37.66	8	1	0.21	Moderate
LNAR-08		9021	25.28	1	0	0.04	Low
LNAR-09	Aluk Creek	9020	46.51	17	0	0.37	Moderate
LNAR-10	Kiteen River	8998	83.65	6	1	0.07	Low
LNAR-11		9029	46.97	0	0	0.00	Low
LNAR-12		9028	41.90	0	0	0.00	Low
LNAR-13	Cranberry River	9036	87.01	0	0	0.00	Low
LNAR-14	Cranberry River	9035	39.72	11	0	0.28	Moderate
LNAR-15	Weegett Creek	9022	22.38	13	0	0.58	High
LNAR-16	Nass River	9047	67.51	0	0	0.00	Low
LNAR-17	Ginmiltkun Creek	9016	76.18	3	1	0.04	Low
LNAR-18	Cranberry River	9031	90.18	55	6	0.61	High
LNAR-19		9017	23.62	0	0	0.00	Low
LNAR-20	Cranberry River	9032	85.23	54	1	0.63	High
LNAR-21		9018	20.70	14	0	0.68	High
LNAR-22	Calmin Creek	9019	26.00	28	0	1.08	High
MSKE-01	Endless Creek	11076	57.26	0	0	0.00	Low

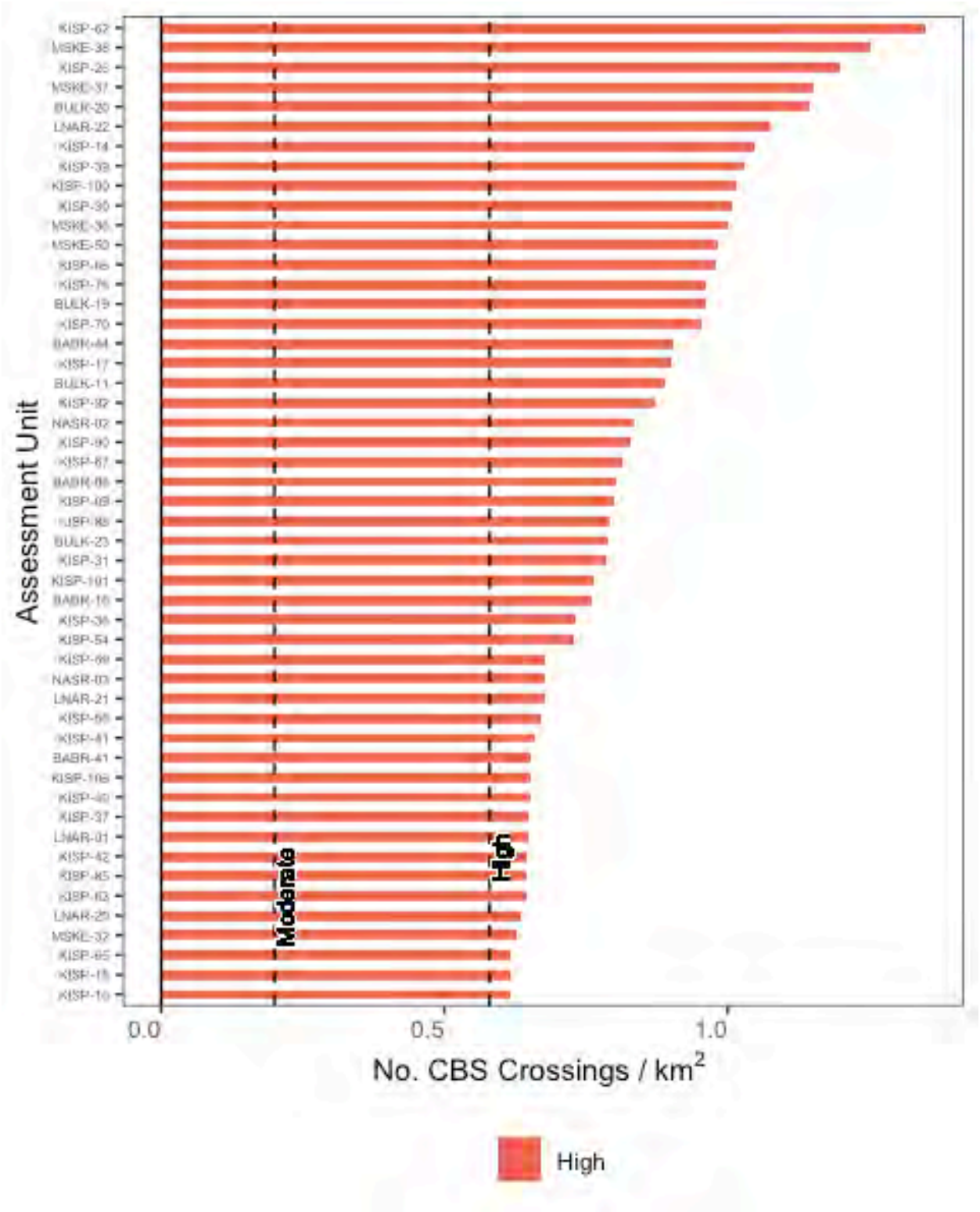
Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Culvert Crossings	Other Crossings	Culvert Density (Crossings per km^2)	Risk
MSKE-02	Sicintine River	11086	48.48	0	0	0.00	Low
MSKE-03		11078	62.72	0	0	0.00	Low
MSKE-04		11077	26.32	0	0	0.00	Low
MSKE-05		11082	23.56	0	0	0.00	Low
MSKE-06	Skeena River	11146	48.99	6	1	0.12	Low
MSKE-07	Skeena River	11148	47.41	0	0	0.00	Low
MSKE-08	Skeena River	11147	58.16	0	0	0.00	Low
MSKE-09	Skeena River	11145	43.23	0	0	0.00	Low
MSKE-10	Sicintine River	11070	46.74	0	0	0.00	Low
MSKE-11	Sicintine River	11083	68.27	0	0	0.00	Low
MSKE-12		11068	23.12	3	0	0.13	Low
MSKE-13		11071	24.40	0	0	0.00	Low
MSKE-14		11072	23.32	0	0	0.00	Low
MSKE-15	Sicintine River	11084	72.07	0	0	0.00	Low
MSKE-16		11075	28.05	0	0	0.00	Low
MSKE-17	Tommy Jack Creek	11074	91.17	28	0	0.31	Moderate
MSKE-18		11073	44.85	0	0	0.00	Low
MSKE-19		11080	35.90	0	0	0.00	Low
MSKE-20		11079	43.25	0	0	0.00	Low
MSKE-21	Sicintine River	11085	36.10	5	0	0.14	Low
MSKE-22		11081	35.59	0	0	0.00	Low
MSKE-23		11059	65.73	0	0	0.00	Low
MSKE-24		11058	27.97	0	0	0.00	Low

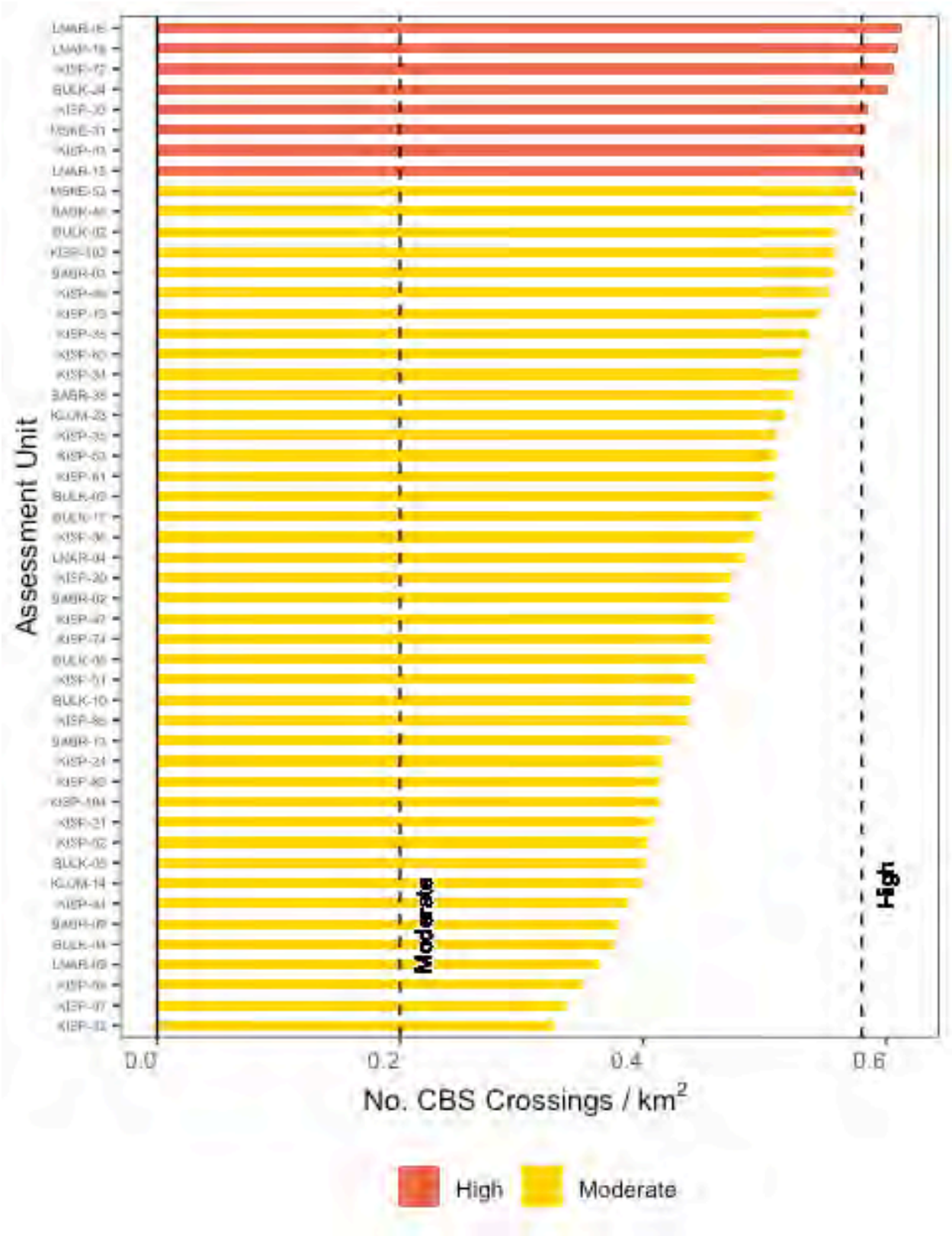
Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Culvert Crossings	Other Crossings	Culvert Density (Crossings per km^2)	Risk
MSKE-25	Calamity Creek	11055	91.55	0	0	0.00	Low
MSKE-26	Sheladamus Creek	11088	48.70	0	0	0.00	Low
MSKE-27	O'Dwyer Creek	11091	41.60	0	0	0.00	Low
MSKE-28	Poison Creek	11089	27.53	0	0	0.00	Low
MSKE-29		11090	25.21	0	0	0.00	Low
MSKE-30		11069	32.01	1	1	0.03	Low
MSKE-31	Skeena River	11139	60.04	35	0	0.58	High
MSKE-32	Skeena River	11143	55.70	35	3	0.63	High
MSKE-33	Skeena River	11141	52.48	0	0	0.00	Low
MSKE-34		11048	23.98	1	0	0.04	Low
MSKE-35	Larkworthy Creek	11065	60.87	1	0	0.02	Low
MSKE-36	Skeena River	11144	35.99	36	1	1.00	High
MSKE-37		11067	23.41	27	1	1.15	High
MSKE-38	Skeena River	11140	35.09	44	0	1.25	High
MSKE-39		11066	24.04	3	0	0.12	Low
MSKE-40	Kuldo Creek	11064	46.77	0	0	0.00	Low
MSKE-41		11060	20.32	0	0	0.00	Low
MSKE-42	Kuldo Creek	11063	33.79	0	0	0.00	Low
MSKE-43		11057	37.52	0	0	0.00	Low
MSKE-44	Kuldo Creek	11062	56.41	0	0	0.00	Low
MSKE-45		11052	58.36	0	0	0.00	Low
MSKE-46	Kuldo Creek	11053	57.62	7	1	0.12	Low
MSKE-47		11054	54.36	0	0	0.00	Low
MSKE-48		11051	34.68	0	0	0.00	Low

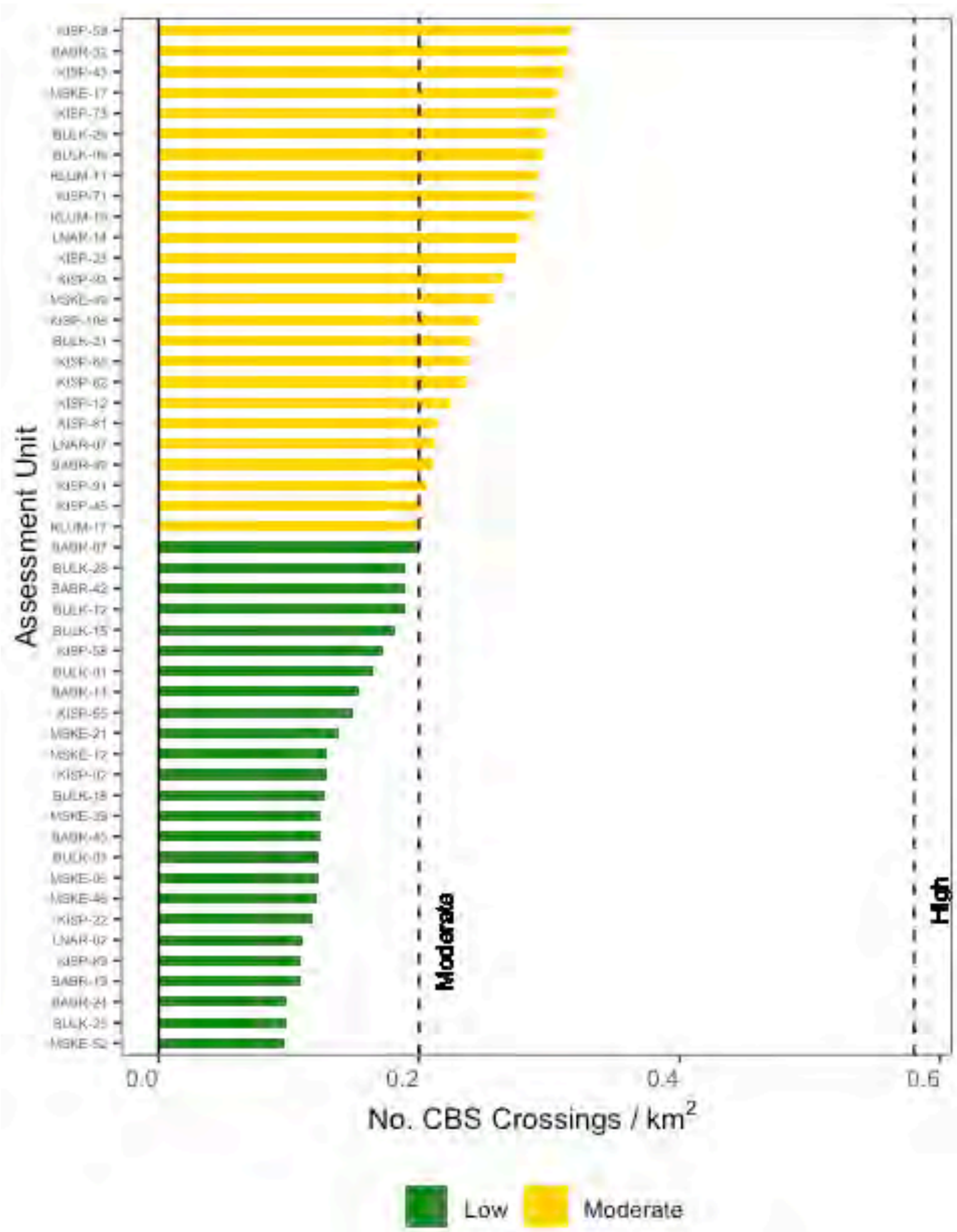
Reference AU	Sub-watershed Name	FWA FID	Area (km^2)	Culvert Crossings	Other Crossings	Culvert Density (Crossings per km^2)	Risk
MSKE-49	Kuldo Creek	11061	58.40	15	0	0.26	Moderate
MSKE-50	Deep Canoe Creek	11049	53.85	53	1	0.98	High
MSKE-51		11056	51.81	0	0	0.00	Low
MSKE-52		11050	20.56	2	0	0.10	Low
MSKE-53	Skeena River	11142	31.31	18	1	0.57	Moderate
MSKE-54	Sicintine River	11087	44.91	0	0	0.00	Low
NASR-01		11840	28.26	0	0	0.00	Low
NASR-02	Derrick Creek	11839	56.34	47	0	0.83	High
NASR-03	Nass River	11879	35.43	24	0	0.68	High

Appendix C: Results Distribution

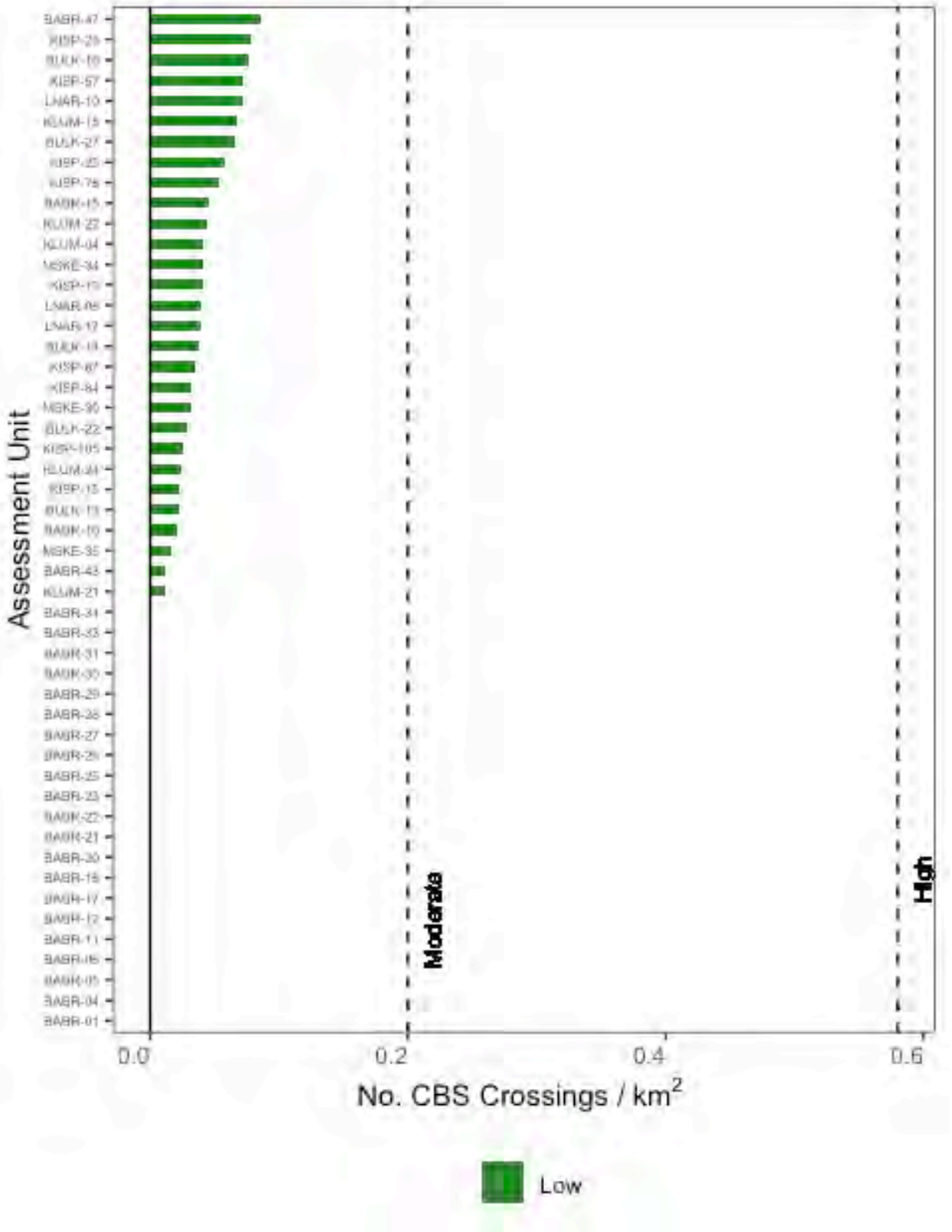
Results are colourized by risk threshold (low risk < 0.2 crossings/km^2, moderate risk 0.2-0.58 crossing/km^2, high risk > 0.58 crossings/km^2).

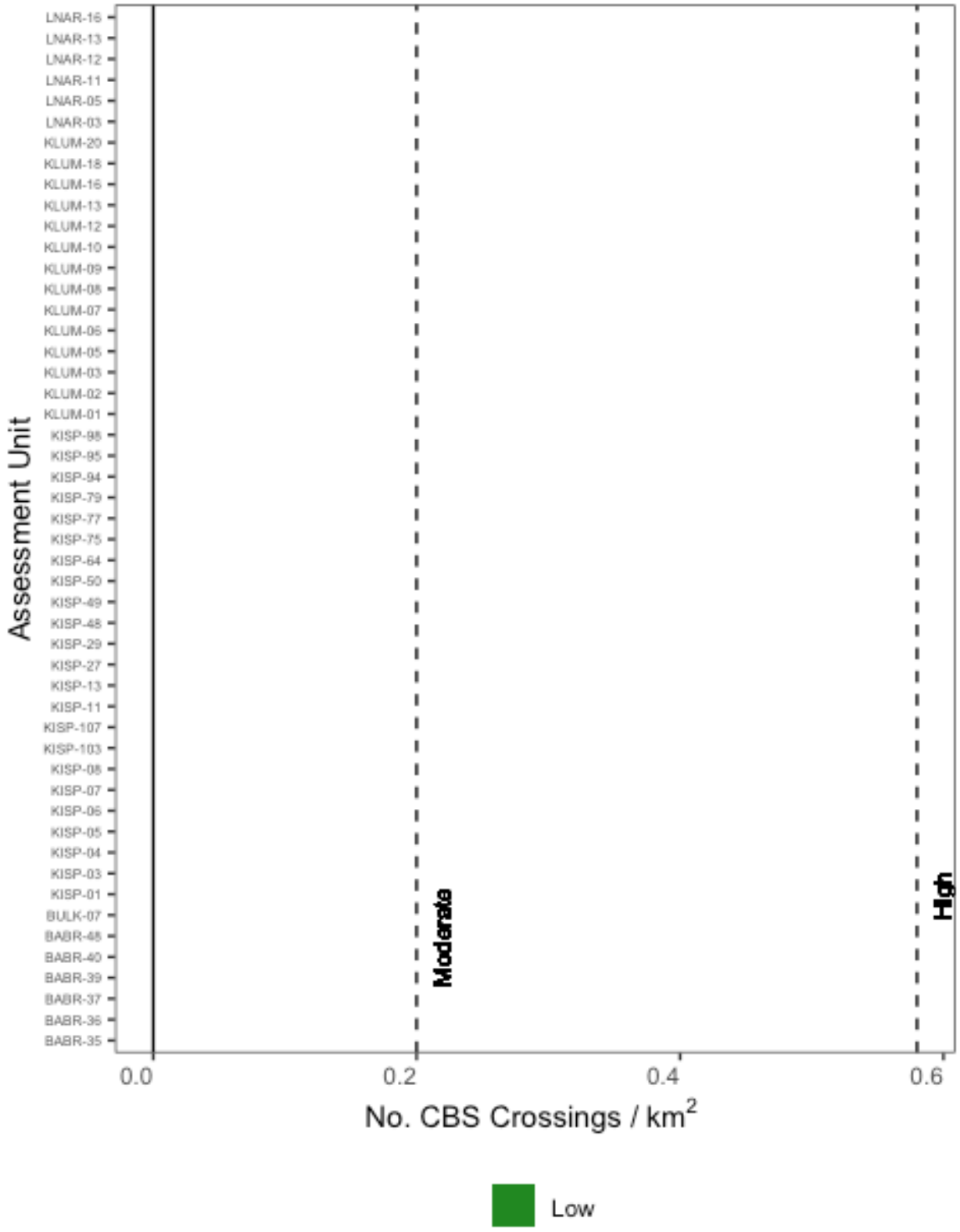


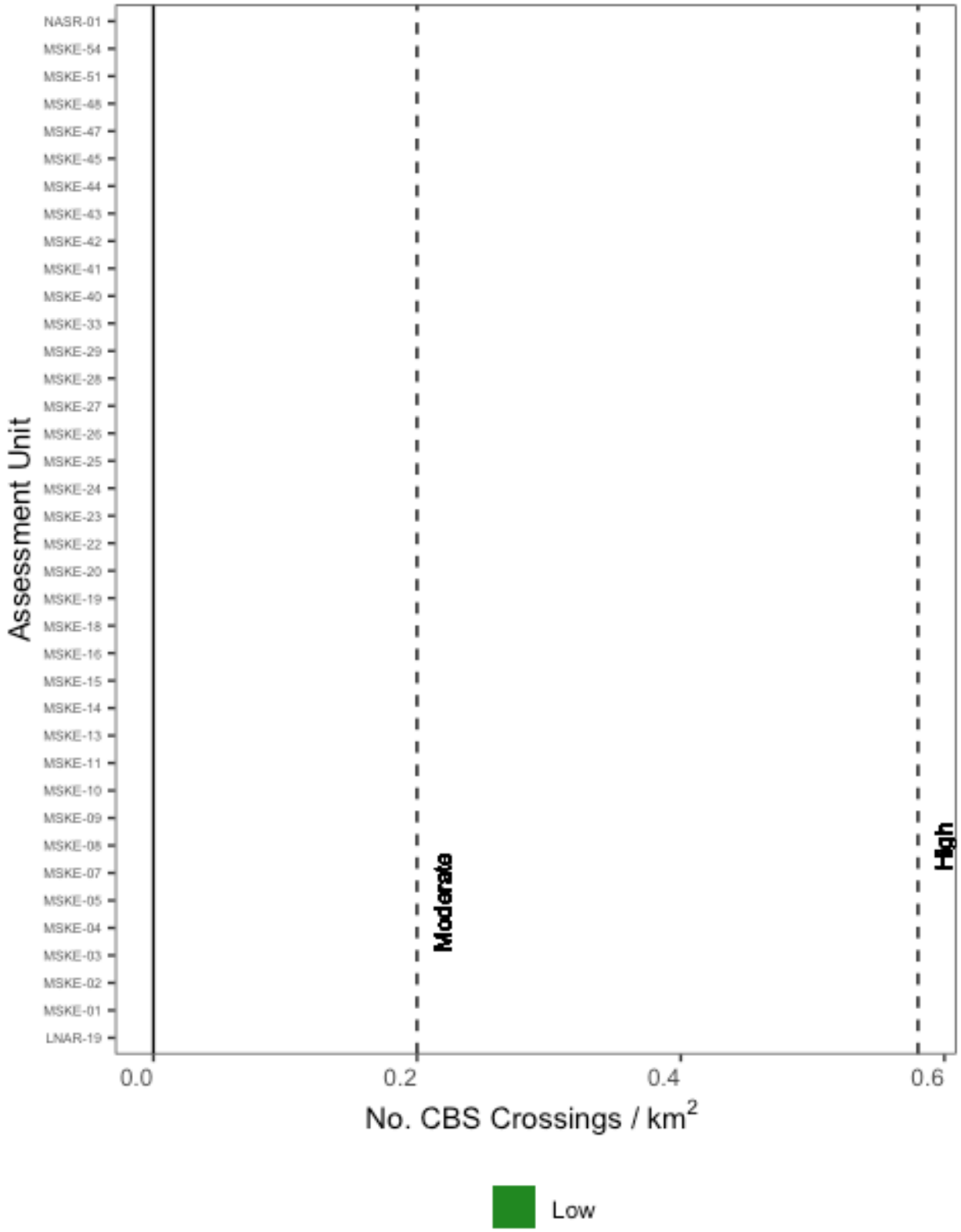

Assessment Unit
Moderate
High
0.0
0.2
0.4
0.6
No. CBS Crossings / km²
High
Moderate



Assessment Unit
No. CBS Crossings / km^2
0.0
0.2
0.4
0.6
Moderate
High
Low
Moderate


Assessment Unit
BABR-47
KISP-29
BUEK-10
KISP-57
LNAR-10
KLUM-15
BUEK-27
KISP-45
KISP-79
BABK-15
KLUM-22
KLUM-04
MSKE-34
KISP-13
LNAR-05
LNAR-17
BUEK-18
KISP-67
KISP-84
MSKE-36
BUEK-22
KISP-105
KLUM-41
KISP-15
BUEK-13
BABK-10
MSKE-35
BABR-43
KLUM-21
BABR-34
BABR-33
BABR-31
BABK-30
BABR-29
BABR-28
BABR-27
BABR-26
BABR-25
BABR-23
BABK-22
BABR-21
BABR-20
BABR-19
BABR-17
BABR-12
BABR-11
BABR-06
BABR-05
BABR-04
BABR-01
0.0
0.2
0.4
0.6
No. CBS Crossings / km2
Moderate
High
Low


Assessment Unit
LNAR-16
LNAR-13
LNAR-12
LNAR-11
LNAR-05
LNAR-03
KLUM-20
KLUM-18
KLUM-16
KLUM-13
KLUM-12
KLUM-10
KLUM-09
KLUM-08
KLUM-07
KLUM-06
KLUM-05
KLUM-03
KLUM-02
KLUM-01
KISP-98
KISP-95
KISP-94
KISP-79
KISP-77
KISP-75
KISP-64
KISP-50
KISP-49
KISP-48
KISP-29
KISP-27
KISP-13
KISP-11
KISP-107
KISP-103
KISP-08
KISP-07
KISP-06
KISP-05
KISP-04
KISP-03
KISP-01
BULK-07
BABR-48
BABR-40
BABR-39
BABR-37
BABR-36
BABR-35
Moderate
High
0.0
0.2
0.4
0.6
No. CBS Crossings / km2
Low


NASR-01
MSKE-54
MSKE-51
MSKE-48
MSKE-47
MSKE-45
MSKE-44
MSKE-43
MSKE-42
MSKE-41
MSKE-40
MSKE-33
MSKE-29
MSKE-28
MSKE-27
MSKE-26
MSKE-25
MSKE-24
MSKE-23
MSKE-22
MSKE-20
MSKE-19
MSKE-18
MSKE-16
MSKE-15
MSKE-14
MSKE-13
MSKE-11
MSKE-10
MSKE-09
MSKE-08
MSKE-07
MSKE-05
MSKE-04
MSKE-03
MSKE-02
MSKE-01
LNAR-19
Assessment Unit
Moderate
High
0.0
0.2
0.4
0.6
No. CBS Crossings / km2
Low

WSP Indicator Analysis for the Kispiox TSA:

Total Land Cover Alteration

Freshwater Atlas (FWA) Assessment Watersheds

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September 2020

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. Some inaccuracy is expected due to the inherent limitations and uncertainties that exist in the base input datasets, and no representation of current condition is made.

Acknowledgements

We would like to thank Sarah Railton, Greg Knox, and Julia Hill Sorochan for their contributions and feedback, and to Glen Buhr for his assistance and guidance.

WSP Indicator Analysis for the Kispiox TSA

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 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 Kispiox timber supply area (TSA) is situated in the interior of northwest BC and encompasses the District of New Hazelton and the communities of Hazelton, South Hazelton, Kitwanga, Cedarvale, Kispiox, Gitsegukla, Gitwangak, Gitanyow, Hagwilget, Glen Vowell and Gitanmaax (Figure 1). The Kispiox TSA is part of the Skeena Natural Resource Region and is administered by the Skeena Stikine Natural Resource District office in Smithers.

The Kispiox TSA is comprised of seven TSA supply blocks (12A to 12G), with the Cranberry TSA consolidated with the Kispiox TSA on March 31, 2009 as Block 12G. The current allowable annual cut for the Kispiox TSA is 1,087,000 cubic metres (Province of BC, 2019).

This report presents results for BC Freshwater Atlas (FWA) assessment watersheds within the Kispiox TSA and the neighbouring upper Kispiox River and Swan Lake watersheds. The 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 key for the identification of assessment units was developed based on groupings by major watershed, and reference maps of the study area with Kispiox TSA and FWA assessment watersheds are 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:

- Kispiox Road Inventory (BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development [BC MFLNRORD], 2017)
- BC Transmission Lines (BC MFLNRORD, 2020a)
- Harvested Areas of BC (Consolidated Cutblocks) (BC MFLNRORD, 2020b)
- TANTALIS – Crown Tenures (BC MFLNRORD, 2020c)
- Railway Track Line (BC MFLNRORD, 2019a)
- Municipalities - Legally Defined Administrative Areas of BC (BC Ministry of Municipal Affairs and Housing, 2019)
- Reserves & Band Names - Administrative Boundaries (BC MFLNRORD, 2019b)
- Freshwater Atlas Assessment Watersheds (BC MFLNRORD, 2019d)

For the purposes of this study, only anthropogenic alterations to the land base were calculated, and natural disturbance such as from insect infestations or wildfires were not included. Principal sources of human disturbance identified within the study area include settlements, forest harvesting (cutblocks), and road, railway, and electric powerline corridors.

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

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	30
Transmission Line	60

The Consolidated Cutblocks layer was used to identify disturbance from forest harvesting within the last 20 years (i.e. harvested since 1999). A 20-year time frame for achieving hydrologically effective green-up in disturbed riparian areas has been selected as a reasonable benchmark based on the provincial reforestation requirements for achieving Free Growing status (trees of sufficient height, health, and vigour) in cutblocks under the Forest and Range Practices Act. For the purposes of office-based analysis such as these WSP Habitat Indicator Assessment Reports, selecting the 20-year time frame in line with Provincial green-up standards allows for an administrative benchmark consistent with current government and industry practice. More detailed ground-based WSP habitat indicator assessments may reveal a need to use a longer or shorter time frame for benchmarking hydrologically effective green-up in disturbed riparian areas, however this level of detail falls outside the scope of the initial office-based assessment reports.

Municipal and reserve boundaries were used to estimate disturbance from settlements in the study area. Additional sources of land cover alteration were estimated from the TANTALIS – Crown Tenures dataset selected for agriculture, industrial, utility, transportation, commercial, quarrying, residential, and community tenure purposes with a tenure stage of "tenure" (i.e. active tenures). The utility category does not include the Prince Rupert Gas Transmission Project, which has been permitted but to our knowledge not constructed.

TLCA was calculated by unioning the types of land disturbance described above and dividing by the overall area using FWA assessment watersheds as assessment units. Figure 2 shows the location and types of land cover alteration with respect to the assessment units.

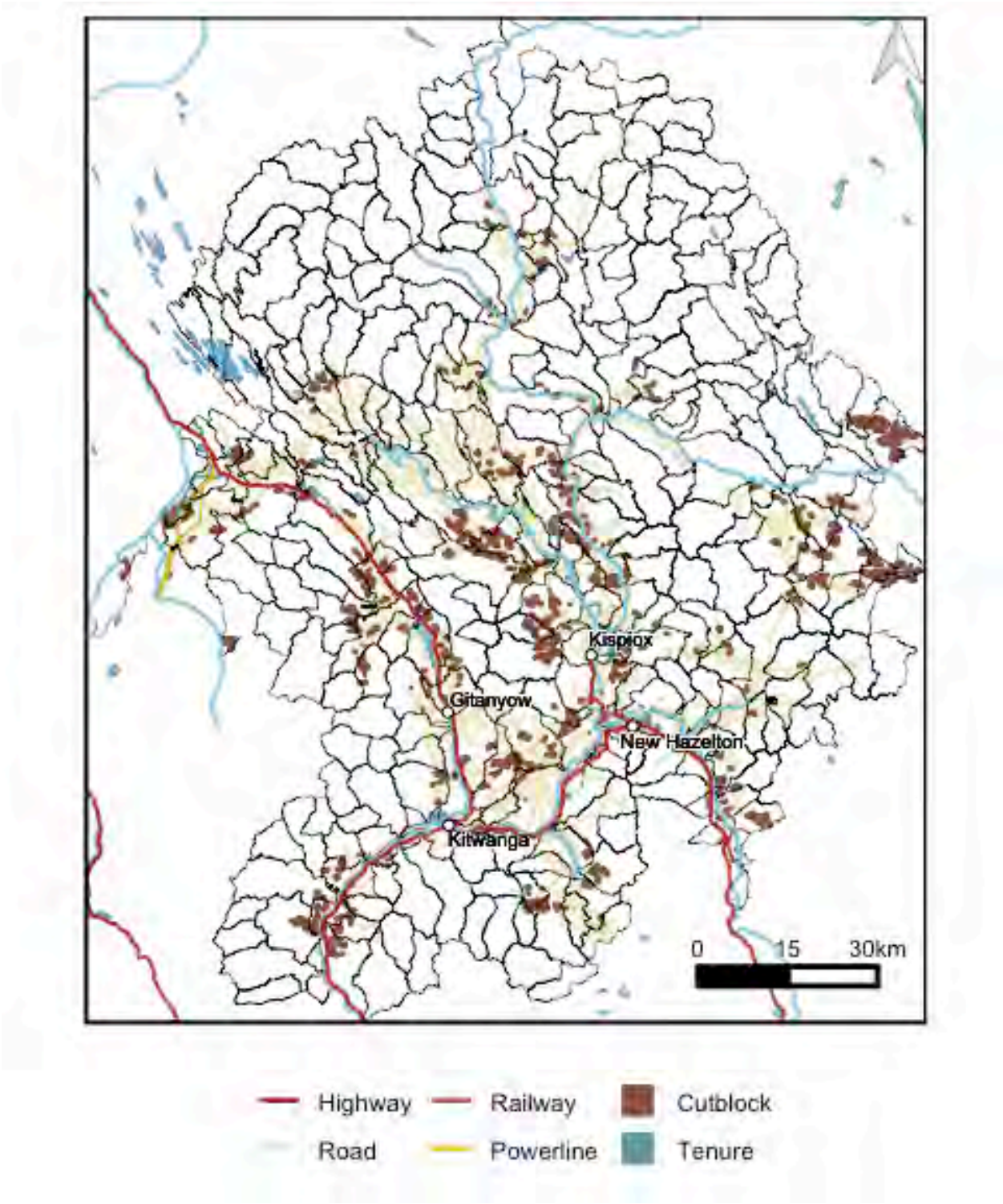

Figure 2: Assessment units and land cover alteration in the study area, including alteration by agricultural, industrial, utility, transportation, commercial, quarrying, residential and community land tenures, forest harvesting, roads, railways, powerlines, and settlements.

Risk Thresholds

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 - 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 B, and the distribution of the assessment results are shown as a series of figures in Appendix C.

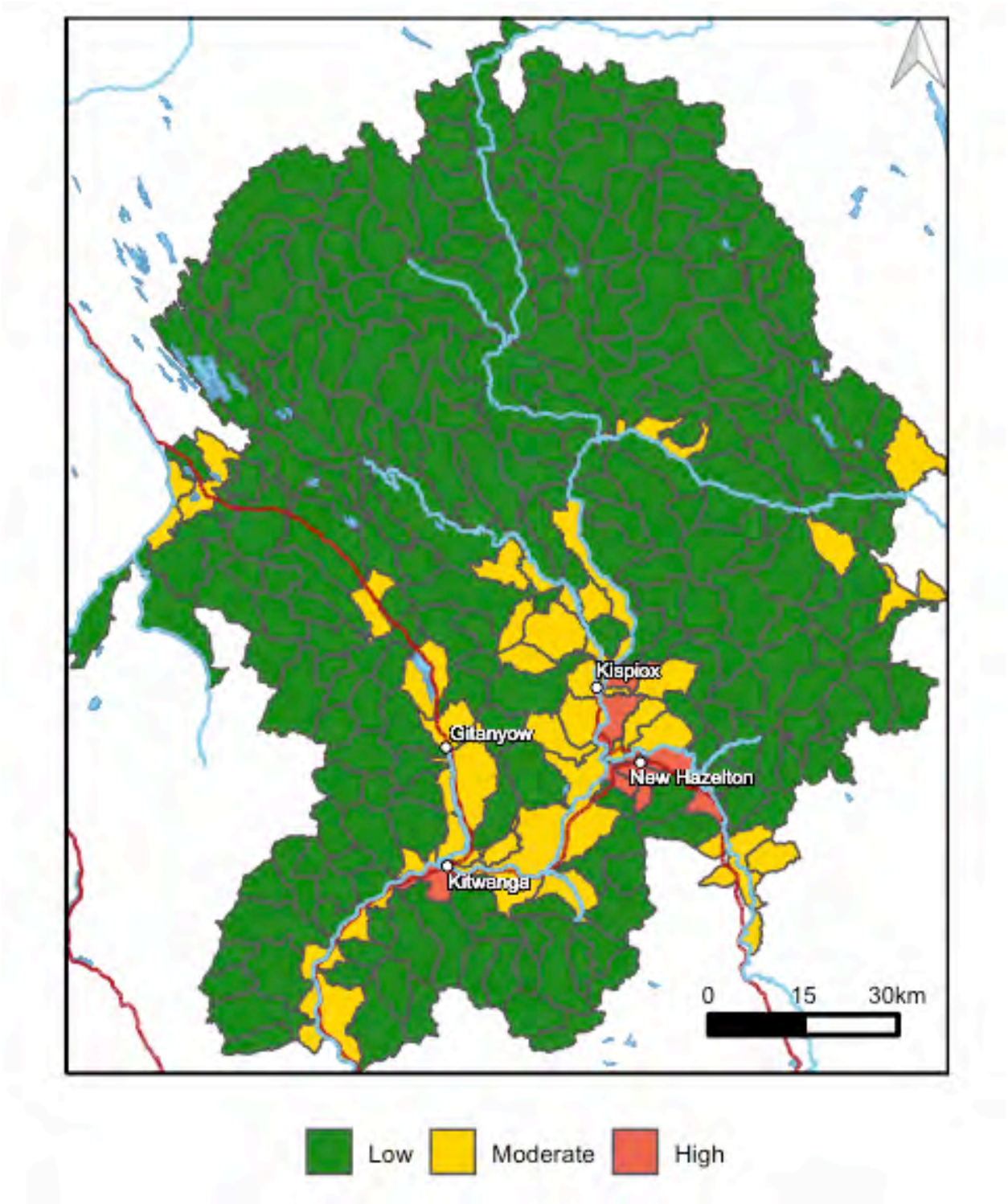

Figure 3: Total land cover alteration for each boundary in the study area is shown on a study area map. The results are colorized by risk threshold (low risk < 6.4 % of land area altered, moderate risk 6.4 - 22 % of land area altered, high risk > 22% of land area altered).

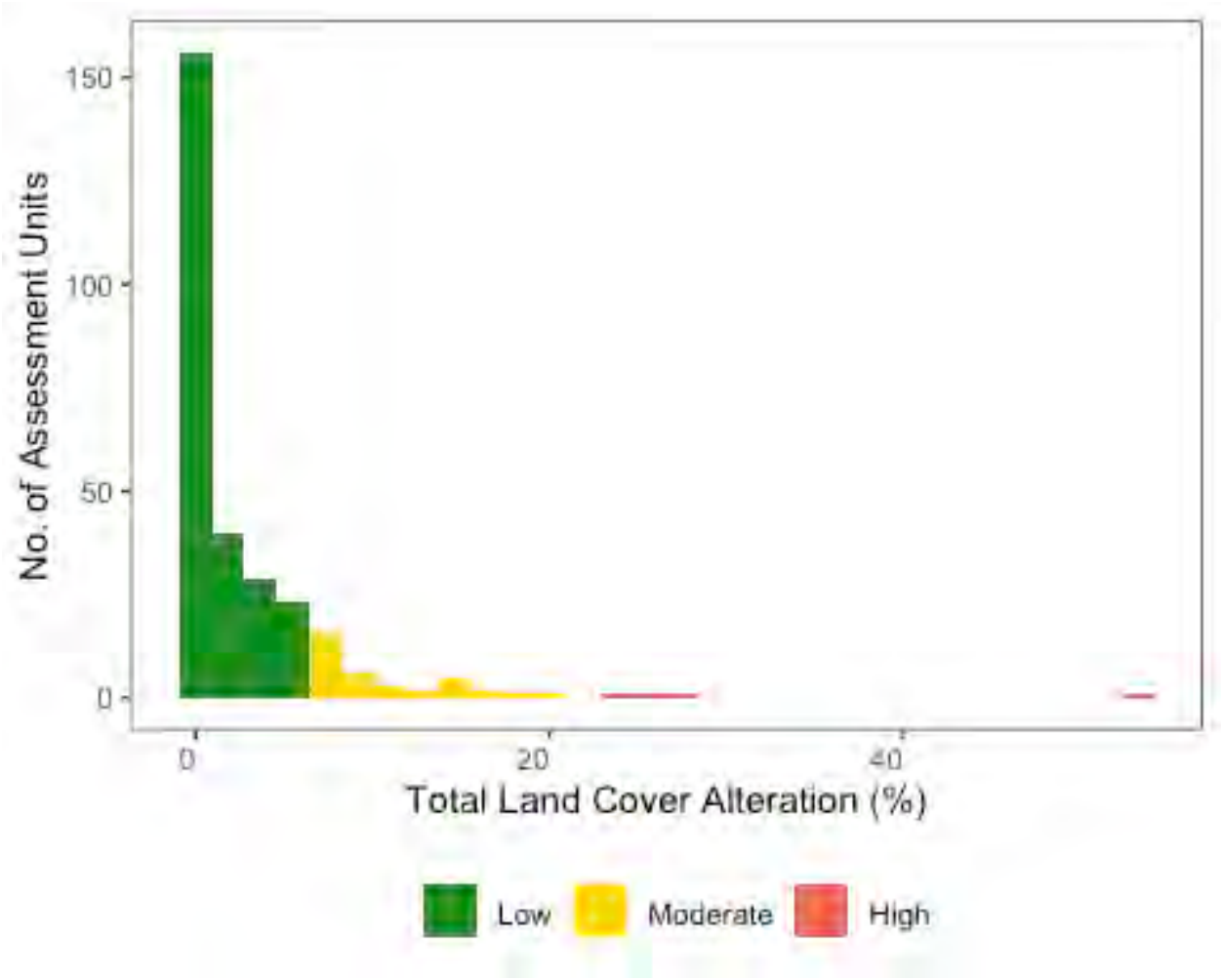

Figure 4: Distribution of results showing the number (count) of assessment units by total land cover alteration. The results are colorized by risk threshold (low risk < 6.4 % of land area altered, moderate risk 6.4 - 22 % of land area altered, high risk > 22% of land area altered).

Total land cover alteration was calculated for a total of 288 assessment units. Values ranged from 0 to a maximum of 53.22% within the Station Creek (BULK-09) sub-watershed, with TLCA values within the majority of the assessment units below the lower threshold of 6.4% (Figure 4; Appendix B and Appendix C). Four assessment units had TLCA values above the threshold for high risk, all of which were associated with the settlements near New Hazelton and Gitanyow (Figure 3). Thirty-six assessment units had TLCA values in the moderate risk threshold range. Assessment units with moderate risk of TLCA impacts were largely situated along the highways in the central portion of the study area, with some units in the northwest and northeast likely associated with higher densities of cutblock locations (Figures 2 and 3).

Interactive visualizations of the indicator analysis results calculated as part of the Kispiox TSA WSP Indicator Analysis are available at https://data.skeenasalmon.info/dataset/wild-salmon-policy-indicator-analysis-for-the-kispiox-tsa.

Summary of Results

Total land cover alteration estimations from forestry activities, transportation and utility corridors, settlements, and other industrial activities were calculated for 288 FWA assessment watersheds within the Kispiox TSA and adjacent Swan Lake and upper Kispiox River sub-watersheds using datasets sourced from the Province of BC. Risk categories derived by the Pacific Salmon Foundation were used to assess risk to freshwater habitat as a result of TLCA.

Results of the analysis indicated TLCA within the study area ranged from 0 to 53.22 % of the total assessment unit area, with areas of high risk from TLCA found near the communities of New Hazelton and Gitanyow in the central portion of the study area. Assessment units at moderate risk from TLCA impacts were situated in the central, northeast, and northwest portions of the study area.

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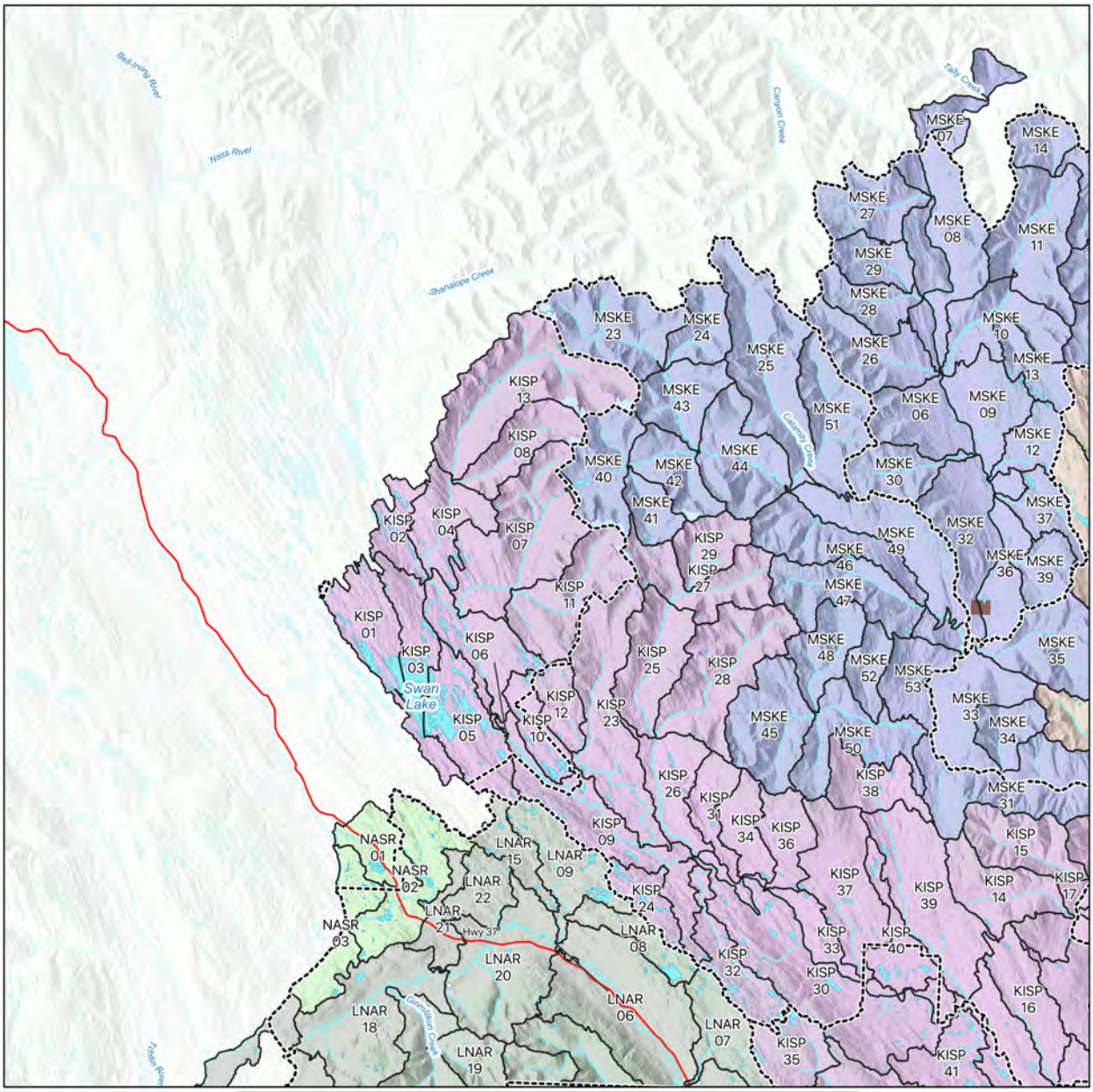
Appendix A: Reference Maps

eclipse GEOMATICS

Kispiox Study Area Reference Map - Northwest



Location Map

Legend

Boundary

- Fresh Water Atlas Assessment Watershed
- Kispiox TSA Block
- Reserve Boundary

Major Watershed Group

- BABR
- BULK
- KISP
- KLUM
- LNAR
- MSKE
- NASR

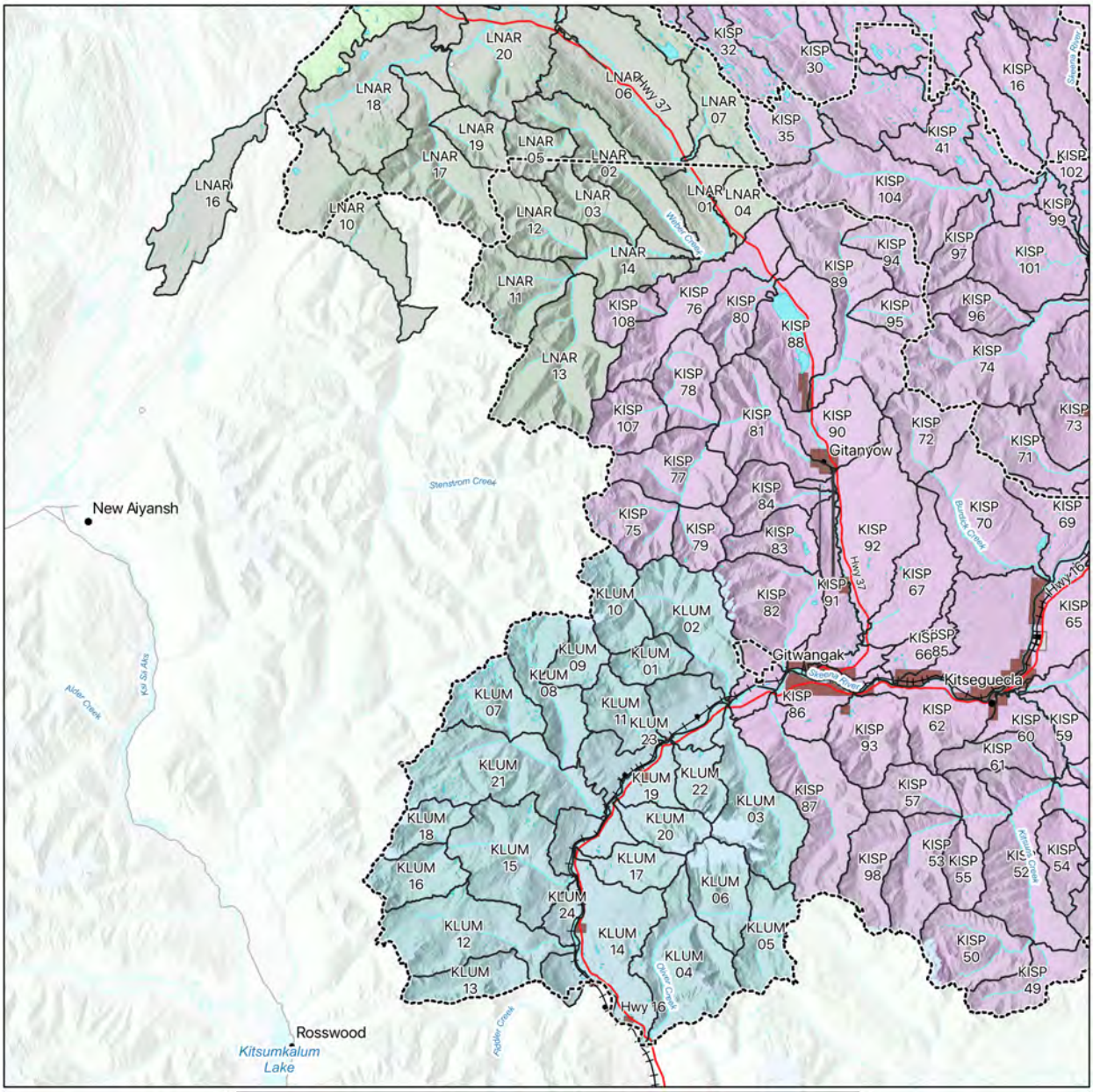
0 5 10 km

N
W E
S

Prepared for SkeenaWild
by Eclipse Geomatics Ltd.,
June 2020

eclipse GEOMATICS

Kispiox Study Area Reference Map - Southwest



Location Map

Legend

Boundary

- Fresh Water Atlas Assessment Watershed
- Kispiox TSA Block
- Reserve Boundary

Major Watershed Group

- BABR
- BULK
- KISP
- KLUM
- LNAR
- MSKE
- NASR

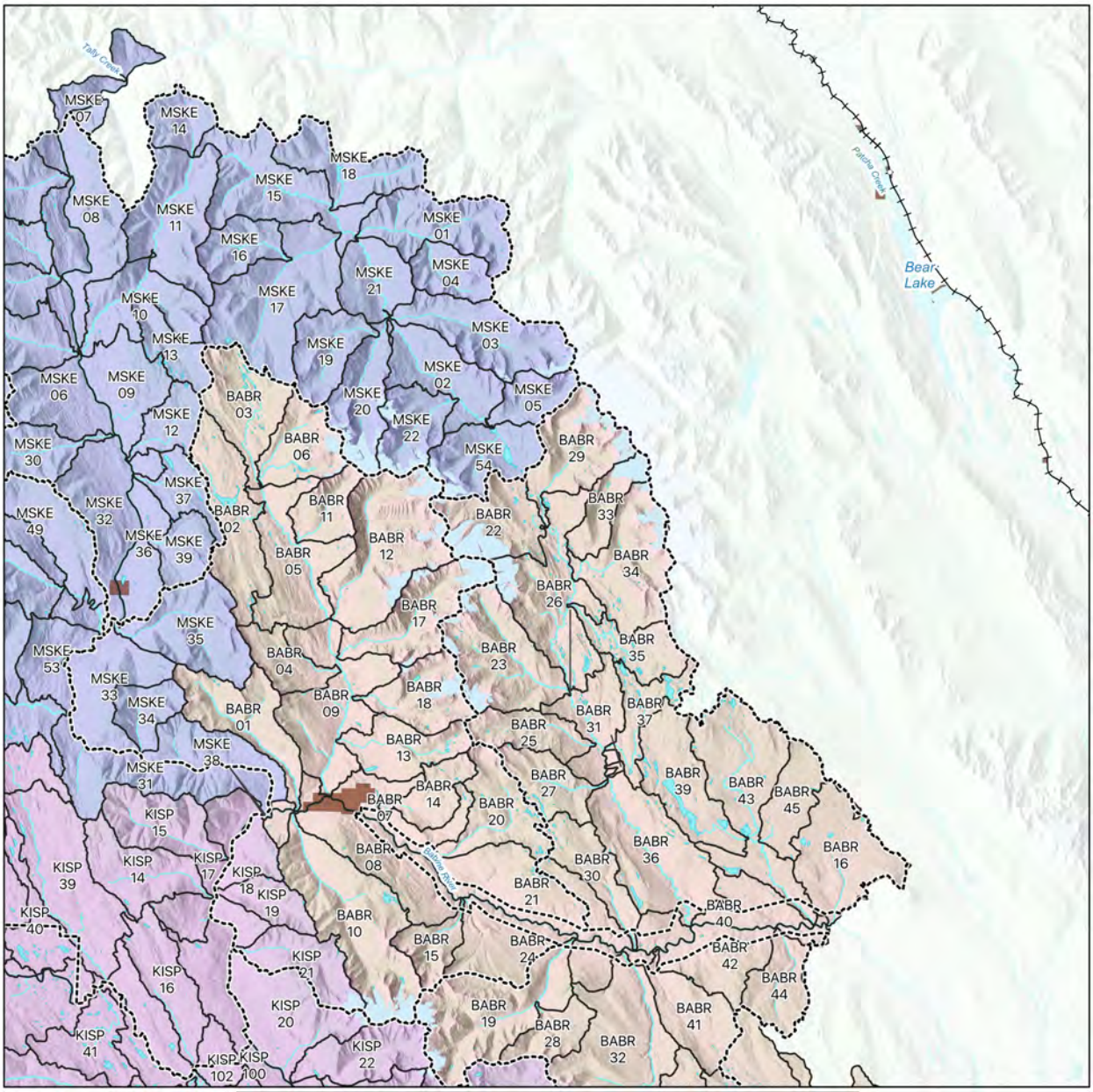
0 5 10 km

N W E S

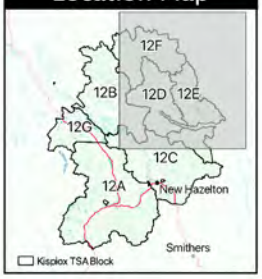
Prepared for SkeenaWild by Eclipse Geomatics Ltd., June 2020

eclipse GEOMATICS

Kispiox Study Area Reference Map - Northeast



Location Map



Legend

Boundary

- Fresh Water Atlas Assessment Watershed
- Kispiox TSA Block
- Reserve Boundary

Major Watershed Group

- BABR
- BULK
- KISP
- KLUM
- LNAR
- MSKE
- NASR

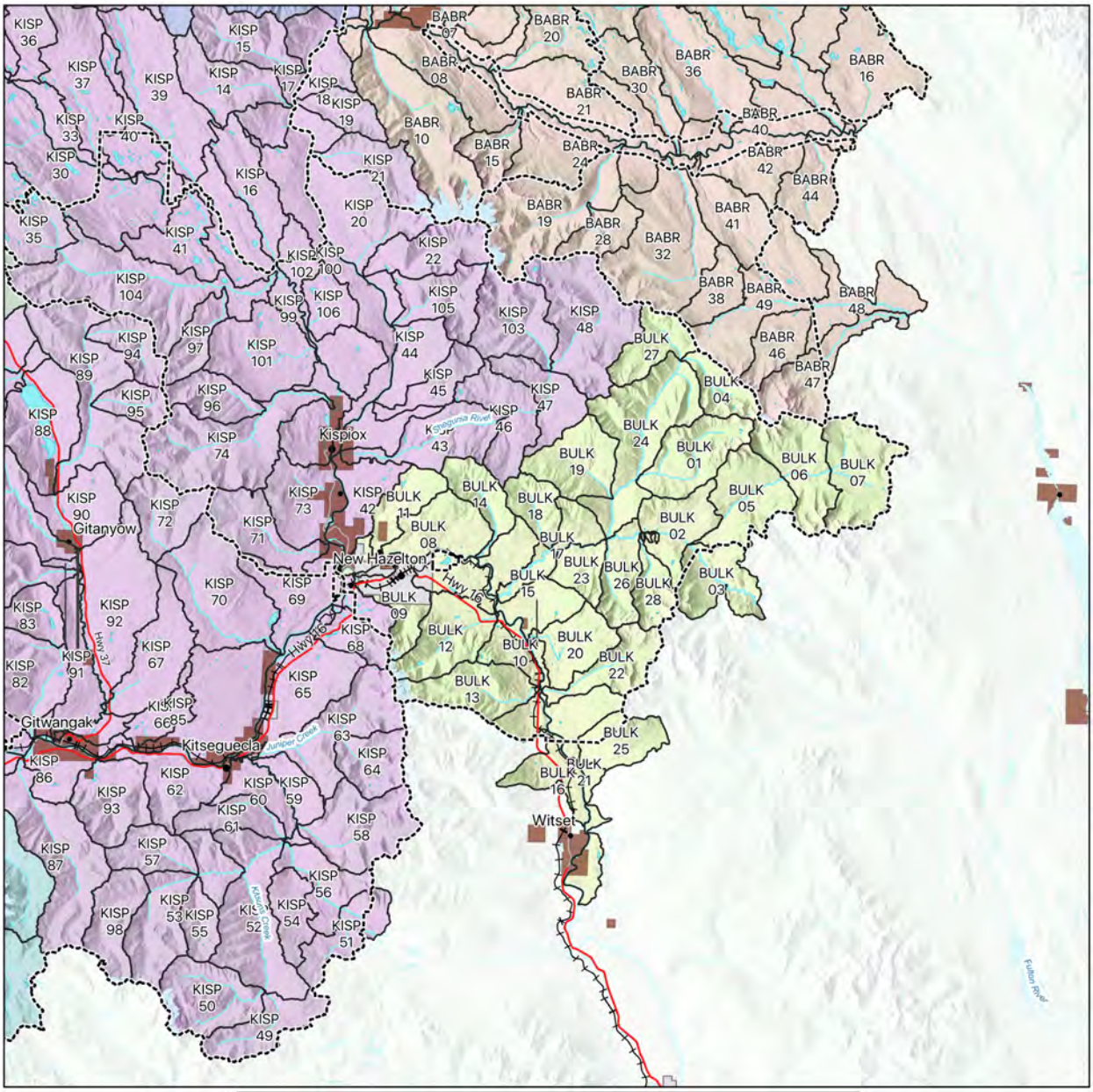
0 5 10 km

N
W E
S

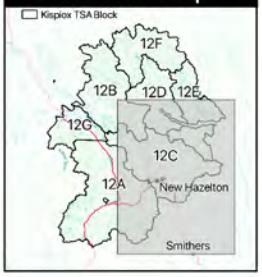
Prepared for SkeenaWild
by Eclipse Geomatics Ltd.,
June 2020

eclipse GEOMATICS

Kispiox Study Area Reference Map - Southeast



Location Map



Legend

Boundary

- Fresh Water Atlas Assessment Watershed
- Kispiox TSA Block
- Reserve Boundary

Major Watershed Group

- BABR
- BULK
- KISP
- KLUM
- LNAR
- MSKE
- NASR

0 5 10 km

N W E S

Prepared for SkeenaWild
by Eclipse Geomatics Ltd.,
June 2020

Appendix B: Results Tables

The following tables present disturbed area and total area for each assessment unit, percent of land cover altered, and risk (determined by Pacific Salmon Foundation thresholds).

Assessment Unit	Sub-watershed Name	FWA FID	Total Disturbed Area (km^2)	Area (km^2)	Total Land Cover Alteration (%)	Risk
BABR-01	Sam Green Creek	424	0.02	51.41	0.04	Low
BABR-02	Damsumlo Creek	433	0.44	59.43	0.75	Low
BABR-03	Shedin Creek	436	0.24	48.48	0.50	Low
BABR-04		429	0.00	25.00	0.00	Low
BABR-05	Shedin Creek	435	0.00	61.63	0.00	Low
BABR-06		434	0.00	38.12	0.00	Low
BABR-07	Babine River	423	6.77	40.04	16.92	Moderate
BABR-08	Babine River	492	3.75	62.22	6.03	Low
BABR-09	Shedin Creek	426	0.69	73.86	0.93	Low
BABR-10	Shegisic Creek	425	0.02	98.45	0.02	Low
BABR-11		432	0.00	25.74	0.00	Low
BABR-12	Rosenthal Creek	431	0.00	91.95	0.00	Low
BABR-13	Goathead Creek	427	1.16	37.83	3.07	Low
BABR-14		437	0.05	25.91	0.17	Low
BABR-15		439	0.02	22.06	0.10	Low
BABR-16	Shahnagh Creek	461	10.87	63.26	17.19	Moderate
BABR-17	Sperry Creek	430	0.00	54.23	0.00	Low
BABR-18		428	0.00	40.13	0.00	Low
BABR-19	Thomlinson Creek	440	0.17	82.86	0.21	Low
BABR-20	Shenismike Creek	438	0.00	45.51	0.00	Low
BABR-21	Babine River	493	0.00	73.51	0.00	Low
BABR-22	Shelagyote River	456	0.00	48.30	0.00	Low
BABR-23		449	0.00	71.44	0.00	Low
BABR-24	Babine River	494	0.43	60.65	0.72	Low
BABR-25	Cayuse Jack Creek	448	0.00	30.36	0.00	Low
BABR-26	Shelagyote River	455	0.00	77.32	0.00	Low
BABR-27		446	0.00	31.02	0.00	Low

Assessment Unit	Sub-watershed Name	FWA FID	Total Disturbed Area (km^2)	Area (km^2)	Total Land Cover Alteration (%)	Risk
BABR-28		441	0.06	23.39	0.25	Low
BABR-29		453	0.00	53.77	0.00	Low
BABR-30	Le Clair Creek	443	0.00	33.99	0.00	Low
BABR-31	Shelagyote River	454	0.00	35.97	0.00	Low
BABR-32	Gail Creek	442	2.85	92.08	3.10	Low
BABR-33		452	0.00	25.69	0.00	Low
BABR-34	Barger Creek	451	0.00	64.93	0.00	Low
BABR-35		450	0.00	29.62	0.00	Low
BABR-36	Shelagyote River	445	0.00	81.34	0.00	Low
BABR-37		447	0.00	27.67	0.00	Low
BABR-38		486	0.94	24.75	3.81	Low
BABR-39		460	0.00	54.97	0.00	Low
BABR-40	Babine River	495	0.00	41.81	0.00	Low
BABR-41	Cataline Creek	444	2.71	39.81	6.81	Moderate
BABR-42	Babine River	496	1.67	47.39	3.52	Low
BABR-43	Hanawald Creek	458	0.01	87.27	0.01	Low
BABR-44		457	0.95	32.07	2.97	Low
BABR-45		459	1.88	32.14	5.84	Low
BABR-46		485	0.55	27.92	1.98	Low
BABR-47		482	1.59	46.24	3.44	Low
BABR-48	Nichyeskwa Creek	487	5.71	37.47	15.25	Moderate
BABR-49	Nichyeskwa Creek	488	4.78	75.82	6.30	Low
BULK-01	Denison Creek	1275	0.40	48.43	0.82	Low
BULK-02	Suskwa River	1298	0.31	37.64	0.83	Low
BULK-03	Harold Price Creek	1279	0.03	40.73	0.07	Low
BULK-04		1276	0.78	23.95	3.24	Low
BULK-05	Suskwa River	1299	0.19	49.78	0.39	Low
BULK-06	Suskwa River	1300	0.12	50.81	0.23	Low
BULK-07	Suskwa River	1301	0.00	54.65	0.00	Low
BULK-08	Bulkley River	1267	5.42	48.69	11.12	Moderate
BULK-09	Station Creek	1268	15.77	29.63	53.22	High

Assessment Unit	Sub-watershed Name	FWA FID	Total Disturbed Area (km^2)	Area (km^2)	Total Land Cover Alteration (%)	Risk
BULK-10	Bulkley River	1413	12.44	50.03	24.85	High
BULK-11	Two Mile Creek	1269	2.04	26.93	7.56	Moderate
BULK-12	Mudflat Creek	1302	1.74	47.41	3.67	Low
BULK-13	Porphyry Creek	1304	0.23	44.11	0.53	Low
BULK-14	Nine Mile Creek	1270	0.04	26.52	0.16	Low
BULK-15	Bulkley River	1414	1.57	49.43	3.18	Low
BULK-16	Bulkley River	1415	2.66	39.18	6.79	Moderate
BULK-17	Suskwa River	1271	0.72	26.13	2.75	Low
BULK-18	Fifteen Mile Creek	1272	0.04	23.38	0.18	Low
BULK-19	Iltzul Creek	1274	1.24	43.66	2.84	Low
BULK-20	Corduroy Creek	1303	1.51	34.91	4.31	Low
BULK-21	Bulkley River	1416	3.79	46.12	8.22	Moderate
BULK-22	Luno Creek	1305	1.05	33.95	3.09	Low
BULK-23	Suskwa River	1296	0.33	20.30	1.62	Low
BULK-24	Natlan Creek	1273	1.23	84.75	1.45	Low
BULK-25	Kwun Creek	1307	3.18	30.73	10.35	Moderate
BULK-26	Suskwa River	1297	0.68	30.26	2.24	Low
BULK-27	Natlan Creek	1277	0.51	30.22	1.70	Low
BULK-28		1278	0.04	21.06	0.20	Low
KISP-01		6252	0.00	43.80	0.01	Low
KISP-02		6255	0.07	23.32	0.29	Low
KISP-03		6251	0.00	43.88	0.00	Low
KISP-04	Kispiox River	6262	0.00	40.23	0.00	Low
KISP-05	Stephens Creek	6250	0.00	56.57	0.00	Low
KISP-06	Kispiox River	6261	0.00	48.91	0.00	Low
KISP-07	East Kispiox River	6253	0.00	96.94	0.00	Low
KISP-08		6256	0.00	38.99	0.00	Low
KISP-09	Kispiox River	6260	1.90	72.48	2.62	Low
KISP-10		6249	0.07	24.27	0.27	Low
KISP-11		6254	0.00	60.45	0.00	Low
KISP-12		6248	0.13	22.25	0.56	Low
KISP-13	Kispiox River	6263	0.00	106.02	0.00	Low

Assessment Unit	Sub-watershed Name	FWA FID	Total Disturbed Area (km^2)	Area (km^2)	Total Land Cover Alteration (%)	Risk
KISP-14	Carrigan Creek	6273	2.55	44.91	5.68	Low
KISP-15	Blackstock Creek	6275	0.00	43.50	0.01	Low
KISP-16	Murder Creek	6231	2.00	40.63	4.93	Low
KISP-17	Skeena River	6287	1.87	35.54	5.27	Low
KISP-18	Skeena River	6286	0.51	30.87	1.66	Low
KISP-19	Bretson Creek	6274	0.15	21.97	0.69	Low
KISP-20	Skeena River	6285	1.41	61.32	2.31	Low
KISP-21	Shewililba Creek	6272	0.24	36.63	0.66	Low
KISP-22	Sediesh Creek	6271	0.28	42.46	0.66	Low
KISP-23	Nangeese River	6247	3.51	87.17	4.03	Low
KISP-24	Brown Paint Creek	6246	0.17	21.64	0.79	Low
KISP-25	Sweetin River	6244	0.09	51.88	0.18	Low
KISP-26	Sweetin River	6241	0.72	39.23	1.83	Low
KISP-27	Sweetin River	6245	0.00	48.42	0.00	Low
KISP-28		6242	0.04	77.46	0.05	Low
KISP-29		6243	0.00	27.89	0.00	Low
KISP-30	Kispiox River	6259	5.50	117.93	4.66	Low
KISP-31	Clifford Creek	6239	0.38	24.21	1.58	Low
KISP-32	Steep Canyon Creek	6240	0.18	36.61	0.50	Low
KISP-33	Kispiox River	6258	1.66	35.86	4.62	Low
KISP-34	Skunsnat Creek	6238	0.28	26.47	1.07	Low
KISP-35	McCully Creek	6230	0.14	33.29	0.41	Low
KISP-36	Corral Creek	6237	0.29	28.69	1.00	Low
KISP-37	Ironside Creek	6236	0.86	66.26	1.30	Low
KISP-38	Cullon Creek	6233	0.39	33.56	1.17	Low
KISP-39	Cullon Creek	6232	3.44	81.61	4.21	Low
KISP-40		6235	0.51	30.70	1.65	Low
KISP-41		6234	4.25	37.94	11.21	Moderate
KISP-42	Skeena River	6281	19.16	69.60	27.54	High
KISP-43	Shegunia River	6264	3.13	48.20	6.49	Moderate
KISP-44	Skeena River	6284	1.52	38.61	3.95	Low
KISP-45	Pinenut Creek	6269	0.46	24.84	1.86	Low

Assessment Unit	Sub-watershed Name	FWA FID	Total Disturbed Area (km^2)	Area (km^2)	Total Land Cover Alteration (%)	Risk
KISP-46	Shegunia River	6266	0.60	43.44	1.37	Low
KISP-47	Shegunia River	6267	0.72	34.82	2.06	Low
KISP-48	Shegunia River	6268	0.03	83.75	0.03	Low
KISP-49	Kitsuns Creek	6212	0.00	35.39	0.00	Low
KISP-50		6211	0.00	51.59	0.00	Low
KISP-51	Kitseguecla River	6217	0.30	33.88	0.88	Low
KISP-52	Kitsuns Creek	6206	1.96	76.76	2.56	Low
KISP-53		6207	2.23	64.75	3.44	Low
KISP-54		6213	0.54	26.07	2.06	Low
KISP-55		6209	0.52	20.17	2.57	Low
KISP-56	Kitseguecla River	6216	1.27	34.35	3.68	Low
KISP-57		6208	0.07	27.82	0.27	Low
KISP-58		6204	2.32	57.80	4.02	Low
KISP-59	Kitseguecla River	6201	1.56	22.15	7.04	Moderate
KISP-60	Kitseguecla River	6215	1.75	22.58	7.73	Moderate
KISP-61	Deep Canyon Creek	6205	0.20	25.58	0.76	Low
KISP-62	Skeena River	6278	6.00	42.24	14.20	Moderate
KISP-63	Juniper Creek	6202	1.00	60.50	1.66	Low
KISP-64	Brian Boru Creek	6203	0.00	32.22	0.00	Low
KISP-65	Skeena River	6279	8.50	64.72	13.13	Moderate
KISP-66	Andi Creek	6200	1.70	20.44	8.33	Moderate
KISP-67		6182	3.33	52.71	6.32	Low
KISP-68	Chicago Creek	6221	0.35	21.01	1.66	Low
KISP-69	Skeena River	6280	3.89	44.15	8.81	Moderate
KISP-70	Burdick Creek	6219	4.81	78.51	6.13	Low
KISP-71	Hazelton Creek	6222	2.83	41.68	6.79	Moderate
KISP-72	Burdick Creek	6220	0.20	37.89	0.54	Low
KISP-73	Skeena River	6282	8.89	45.79	19.41	Moderate
KISP-74	Date Creek	6224	5.45	87.75	6.21	Low

Assessment Unit	Sub-watershed Name	FWA FID	Total Disturbed Area (km^2)	Area (km^2)	Total Land Cover Alteration (%)	Risk
KISP-75	Kitwancool Creek	6189	0.00	40.26	0.00	Low
KISP-76	Kitwanga River	6198	3.48	66.48	5.23	Low
KISP-77	Kitwancool Creek	6188	0.00	50.99	0.00	Low
KISP-78		6185	1.71	37.18	4.59	Low
KISP-79		6187	0.00	24.07	0.00	Low
KISP-80	Kitwanga River	6197	1.15	33.78	3.41	Low
KISP-81	Kitwancool Creek	6184	1.87	60.58	3.09	Low
KISP-82	Mill Creek	6179	1.86	63.11	2.95	Low
KISP-83		6180	0.19	27.47	0.70	Low
KISP-84	Deuce Creek	6183	0.15	31.89	0.46	Low
KISP-85	Skeena River	6277	18.85	100.62	18.73	Moderate
KISP-86	Skeena River	6276	7.58	32.07	23.63	High
KISP-87		6178	0.11	85.42	0.13	Low
KISP-88	Kitwanga River	6196	6.19	61.90	10.00	Moderate
KISP-89	Moonlit Creek	6190	2.07	91.77	2.26	Low
KISP-90	Kitwanga River	6195	5.94	42.28	14.05	Moderate
KISP-91	Kitwanga River	6181	2.67	38.89	6.86	Moderate
KISP-92	Kitwanga River	6194	6.62	94.23	7.02	Moderate
KISP-93	Shandilla Creek	6199	2.34	45.24	5.16	Low
KISP-94		6192	0.00	26.00	0.00	Low
KISP-95		6191	0.00	20.07	0.00	Low
KISP-96		6225	2.66	28.52	9.33	Moderate
KISP-97		6229	1.74	23.72	7.34	Moderate
KISP-98		6210	0.00	37.64	0.00	Low
KISP-99	Kispiox River	6223	9.35	62.80	14.89	Moderate
KISP-100	Skeena River	6283	9.88	69.00	14.32	Moderate
KISP-101	Hevenor Creek	6226	4.62	62.79	7.35	Moderate
KISP-102	Kispiox River	6257	3.51	75.33	4.65	Low
KISP-103		6265	0.00	51.63	0.00	Low
KISP-104	McCully Creek	6228	5.47	111.17	4.92	Low
KISP-105	Utsun Creek	6270	0.20	39.41	0.51	Low
KISP-106		6227	2.05	23.00	8.90	Moderate
KISP-107		6186	0.05	33.46	0.14	Low

Assessment Unit	Sub-watershed Name	FWA FID	Total Disturbed Area (km^2)	Area (km^2)	Total Land Cover Alteration (%)	Risk
KISP-108		6193	0.55	20.27	2.71	Low
KLUM-01		6741	0.00	20.82	0.00	Low
KLUM-02	Sedan Creek	6740	0.10	63.64	0.15	Low
KLUM-03		6743	0.03	66.62	0.04	Low
KLUM-04	Oliver Creek	6721	0.07	71.92	0.09	Low
KLUM-05	Oliver Creek	6723	0.00	38.80	0.00	Low
KLUM-06	Oliver Creek	6722	0.00	40.47	0.00	Low
KLUM-07		6736	0.00	39.29	0.00	Low
KLUM-08		6734	0.00	49.34	0.00	Low
KLUM-09		6735	0.00	22.14	0.00	Low
KLUM-10		6742	0.00	36.67	0.00	Low
KLUM-11	Wilson Creek	6738	0.44	30.88	1.42	Low
KLUM-12	Lorne Creek	6727	0.02	76.37	0.02	Low
KLUM-13	South Lorne Creek	6728	0.00	30.80	0.00	Low
KLUM-14	Skeena River	6752	4.49	67.50	6.65	Moderate
KLUM-15	Quill Creek	6729	2.26	74.47	3.04	Low
KLUM-16	Quill Creek	6731	0.00	32.41	0.00	Low
KLUM-17	Flint Creek	6732	1.16	24.90	4.67	Low
KLUM-18		6730	0.00	22.13	0.00	Low
KLUM-19	Skeena River	6754	3.48	38.26	9.09	Moderate
KLUM-20	CoyoteCreek	6737	0.48	25.14	1.90	Low
KLUM-21	Insect Creek	6733	0.58	89.68	0.64	Low
KLUM-22		6739	0.05	22.46	0.24	Low
KLUM-23	Skeena River	6755	2.66	50.29	5.29	Low
KLUM-24	Skeena River	6753	3.22	40.39	7.98	Moderate
LNAR-01	Cranberry River	9034	3.32	40.16	8.26	Moderate
LNAR-02	Weber Creek	9025	1.28	63.18	2.02	Low
LNAR-03		9027	0.00	31.75	0.00	Low
LNAR-04		9024	0.77	20.68	3.71	Low
LNAR-05		9026	0.00	22.83	0.00	Low
LNAR-06	Cranberry River	9033	4.13	117.46	3.52	Low
LNAR-07	Tsugwinselda Creek	9023	0.20	37.66	0.53	Low

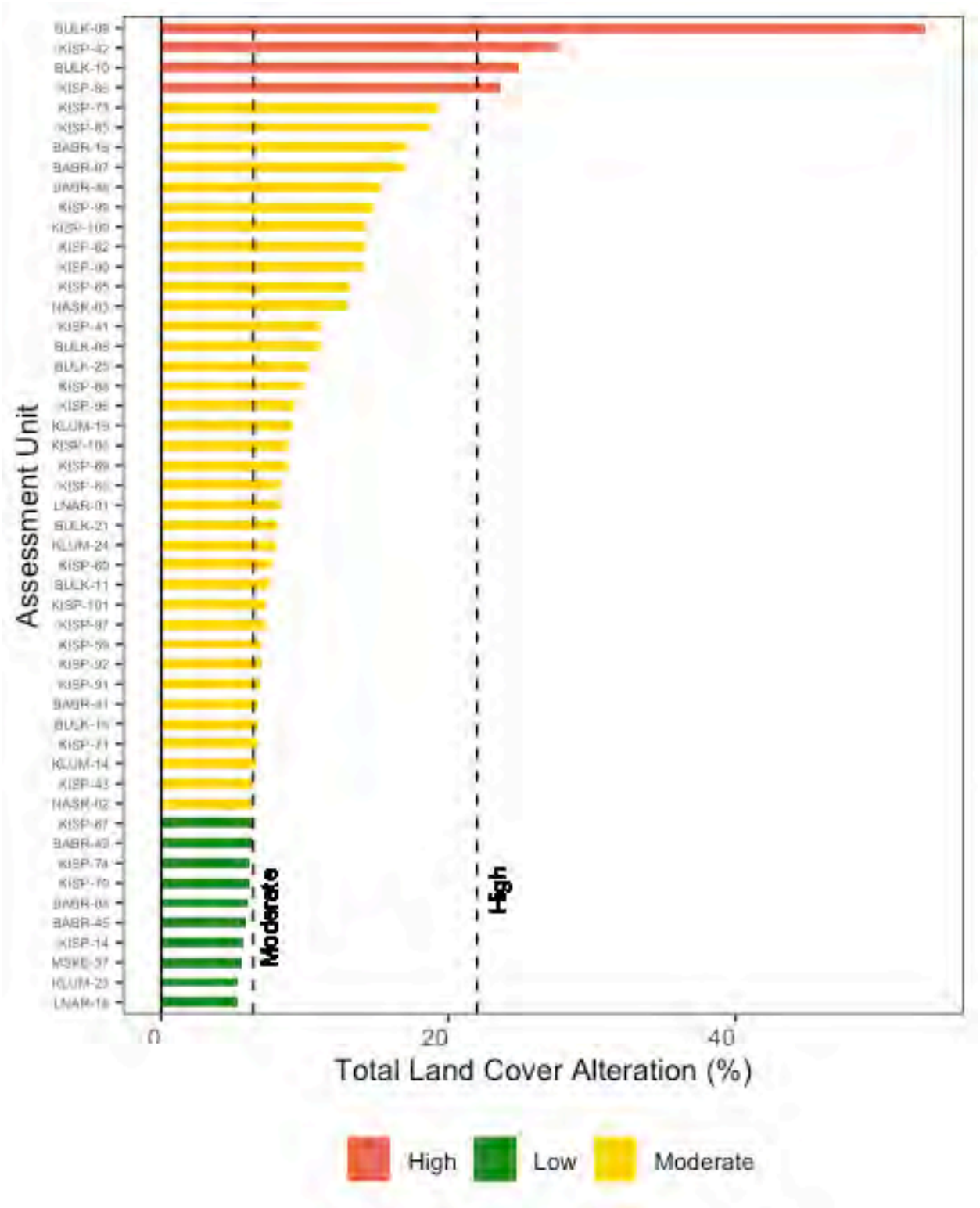
Assessment Unit	Sub-watershed Name	FWA FID	Total Disturbed Area (km^2)	Area (km^2)	Total Land Cover Alteration (%)	Risk
LNAR-08		9021	0.44	25.28	1.73	Low
LNAR-09	Aluk Creek	9020	1.00	46.51	2.14	Low
LNAR-10	Kiteen River	8998	3.53	83.65	4.22	Low
LNAR-11		9029	0.00	46.97	0.00	Low
LNAR-12		9028	0.00	41.90	0.00	Low
LNAR-13	Cranberry River	9036	0.00	87.01	0.00	Low
LNAR-14	Cranberry River	9035	2.02	39.72	5.09	Low
LNAR-15	Weegett Creek	9022	0.10	22.38	0.44	Low
LNAR-16	Nass River	9047	1.40	67.51	2.07	Low
LNAR-17	Ginmiltkun Creek	9016	0.40	76.18	0.52	Low
LNAR-18	Cranberry River	9031	4.76	90.18	5.28	Low
LNAR-19		9017	0.00	23.62	0.00	Low
LNAR-20	Cranberry River	9032	2.74	85.23	3.22	Low
LNAR-21		9018	0.97	20.70	4.67	Low
LNAR-22	Calmin Creek	9019	0.77	26.00	2.95	Low
MSKE-01	Endless Creek	11076	0.00	57.26	0.00	Low
MSKE-02	Sicintine River	11086	0.00	48.48	0.00	Low
MSKE-03		11078	0.00	62.72	0.00	Low
MSKE-04		11077	0.00	26.32	0.00	Low
MSKE-05		11082	0.00	23.56	0.00	Low
MSKE-06	Skeena River	11146	0.87	48.99	1.77	Low
MSKE-07	Skeena River	11148	0.00	47.41	0.00	Low
MSKE-08	Skeena River	11147	0.00	58.16	0.00	Low
MSKE-09	Skeena River	11145	0.00	43.23	0.00	Low
MSKE-10	Sicintine River	11070	0.00	46.74	0.00	Low
MSKE-11	Sicintine River	11083	0.00	68.27	0.00	Low
MSKE-12		11068	0.41	23.12	1.78	Low
MSKE-13		11071	0.00	24.40	0.00	Low
MSKE-14		11072	0.00	23.32	0.00	Low
MSKE-15	Sicintine River	11084	0.00	72.07	0.00	Low
MSKE-16		11075	0.00	28.05	0.00	Low

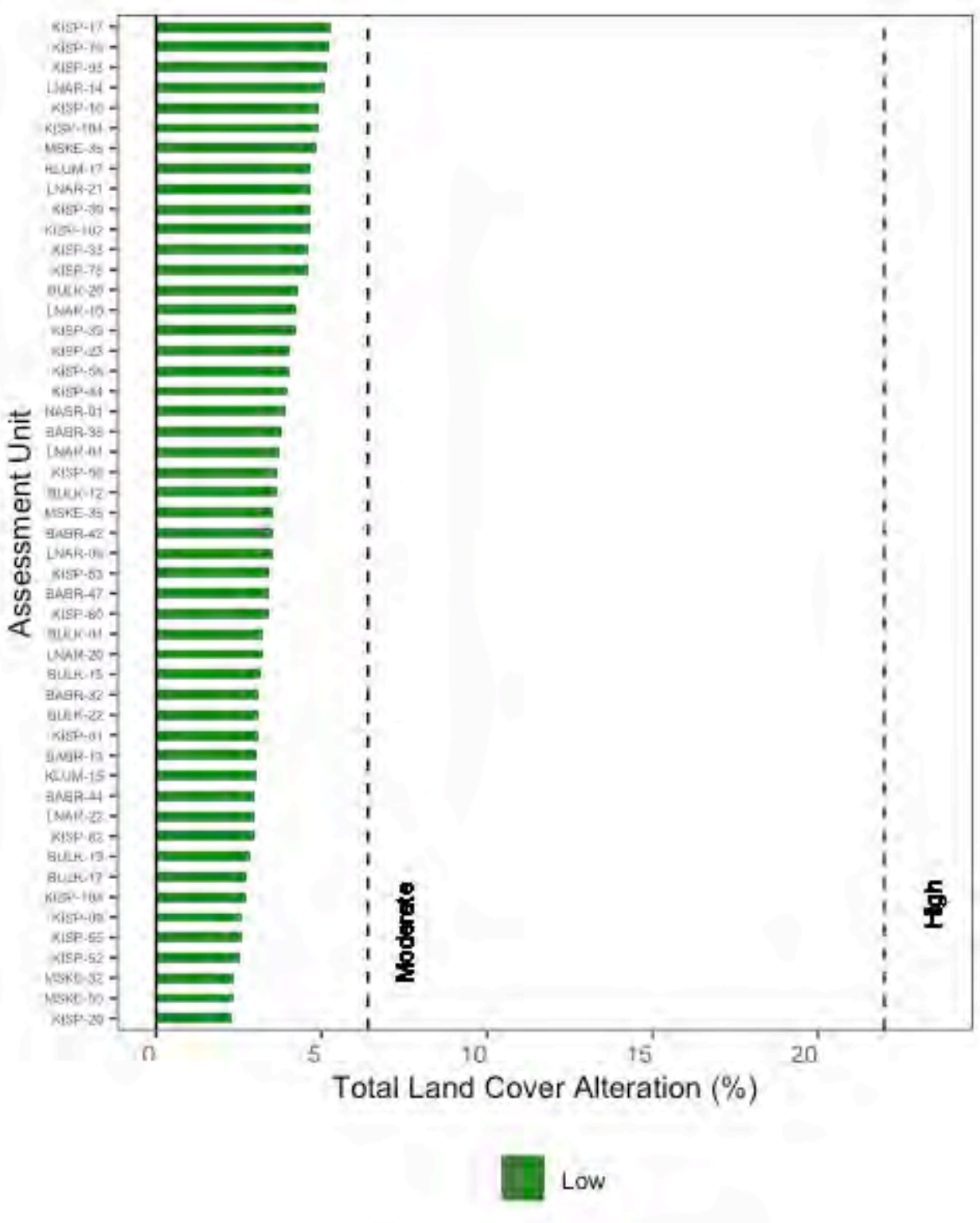
Assessment Unit	Sub-watershed Name	FWA FID	Total Disturbed Area (km^2)	Area (km^2)	Total Land Cover Alteration (%)	Risk
MSKE-17	Tommy Jack Creek	11074	0.19	91.17	0.21	Low
MSKE-18		11073	0.00	44.85	0.00	Low
MSKE-19		11080	0.00	35.90	0.00	Low
MSKE-20		11079	0.00	43.25	0.00	Low
MSKE-21	Sicintine River	11085	0.07	36.10	0.18	Low
MSKE-22		11081	0.00	35.59	0.00	Low
MSKE-23		11059	0.00	65.73	0.00	Low
MSKE-24		11058	0.00	27.97	0.00	Low
MSKE-25	Calamity Creek	11055	0.00	91.55	0.00	Low
MSKE-26	Sheladamus Creek	11088	0.00	48.70	0.00	Low
MSKE-27	O'Dwyer Creek	11091	0.00	41.60	0.00	Low
MSKE-28	Poison Creek	11089	0.00	27.53	0.00	Low
MSKE-29		11090	0.00	25.21	0.00	Low
MSKE-30		11069	0.06	32.01	0.17	Low
MSKE-31	Skeena River	11139	0.79	60.04	1.32	Low
MSKE-32	Skeena River	11143	1.32	55.70	2.37	Low
MSKE-33	Skeena River	11141	0.00	52.48	0.00	Low
MSKE-34		11048	0.00	23.98	0.00	Low
MSKE-35	Larkworthy Creek	11065	0.15	60.87	0.24	Low
MSKE-36	Skeena River	11144	1.75	35.99	4.86	Low
MSKE-37		11067	1.31	23.41	5.62	Low
MSKE-38	Skeena River	11140	1.25	35.09	3.55	Low
MSKE-39		11066	0.38	24.04	1.57	Low
MSKE-40	Kuldo Creek	11064	0.00	46.77	0.00	Low
MSKE-41		11060	0.00	20.32	0.00	Low
MSKE-42	Kuldo Creek	11063	0.00	33.79	0.00	Low
MSKE-43		11057	0.00	37.52	0.00	Low
MSKE-44	Kuldo Creek	11062	0.00	56.41	0.00	Low
MSKE-45		11052	0.00	58.36	0.00	Low
MSKE-46	Kuldo Creek	11053	0.11	57.62	0.18	Low
MSKE-47		11054	0.00	54.36	0.00	Low
MSKE-48		11051	0.00	34.68	0.00	Low

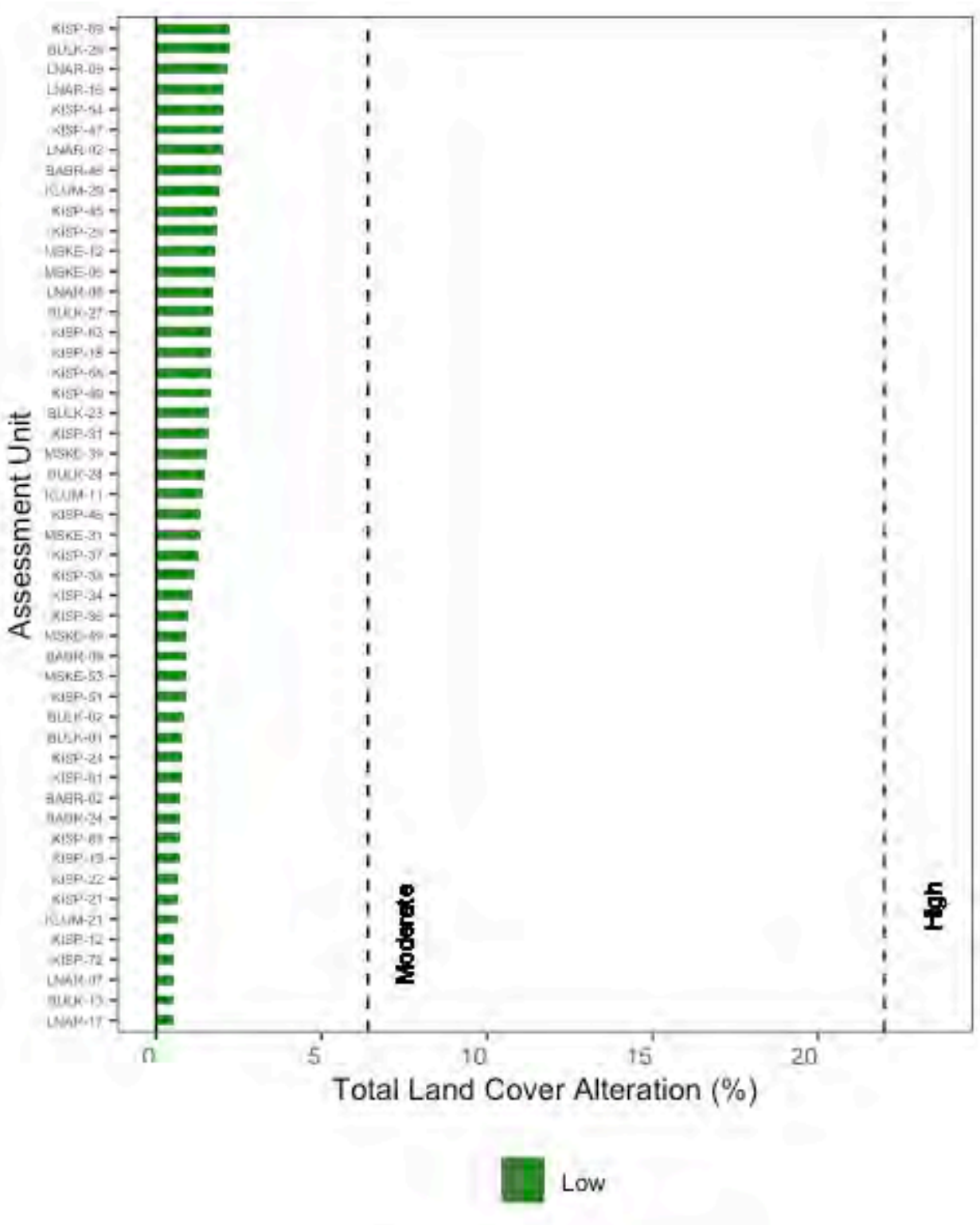
Assessment Unit	Sub-watershed Name	FWA FID	Total Disturbed Area (km^2)	Area (km^2)	Total Land Cover Alteration (%)	Risk
MSKE-49	Kuldo Creek	11061	0.55	58.40	0.94	Low
MSKE-50	Deep Canoe Creek	11049	1.27	53.85	2.35	Low
MSKE-51		11056	0.00	51.81	0.00	Low
MSKE-52		11050	0.02	20.56	0.10	Low
MSKE-53	Skeena River	11142	0.28	31.31	0.91	Low
MSKE-54	Sicintine River	11087	0.00	44.91	0.00	Low
NASR-01		11840	1.10	28.26	3.90	Low
NASR-02	Derrick Creek	11839	3.65	56.34	6.47	Moderate
NASR-03	Nass River	11879	4.58	35.43	12.92	Moderate

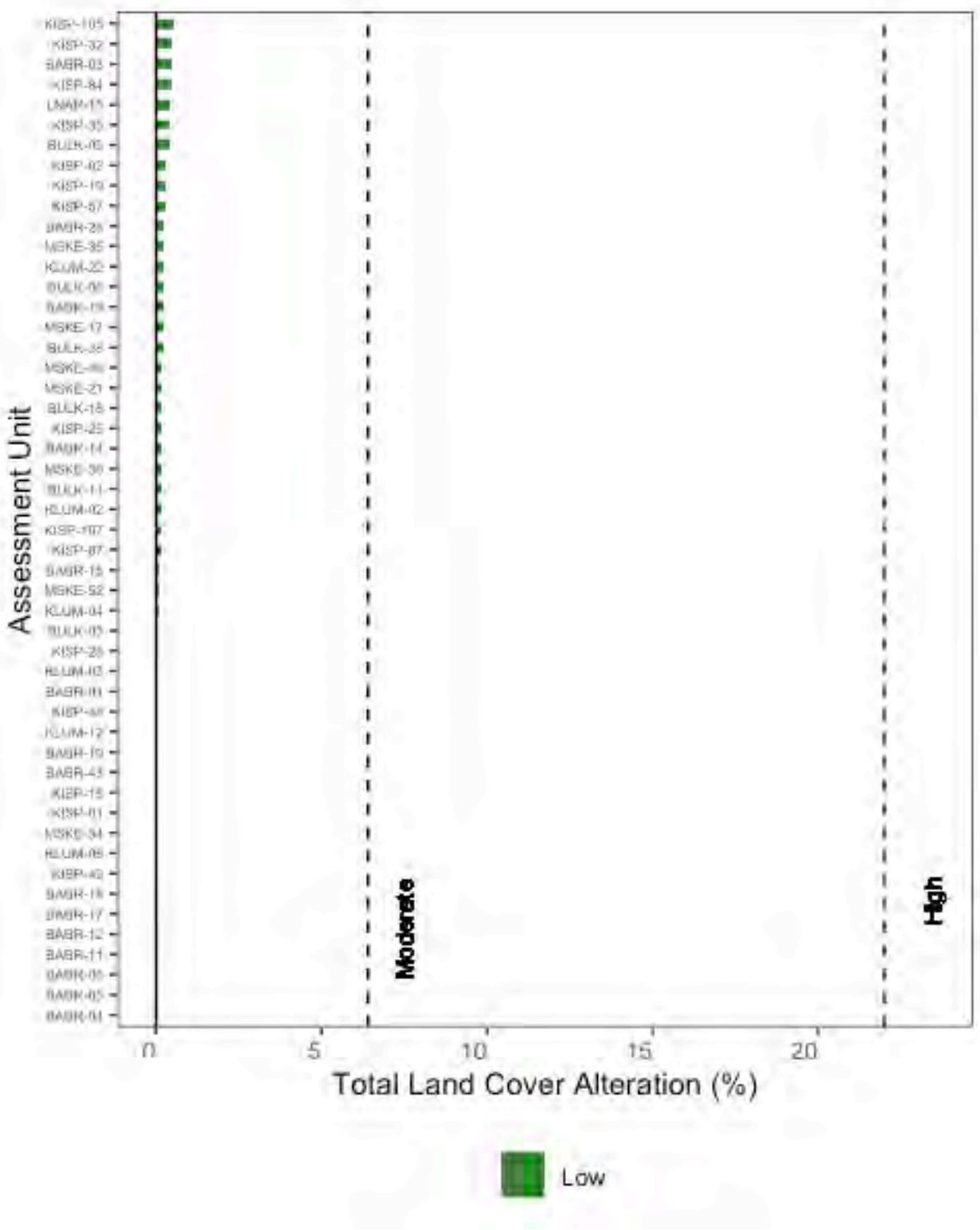
Appendix C: Results Distribution

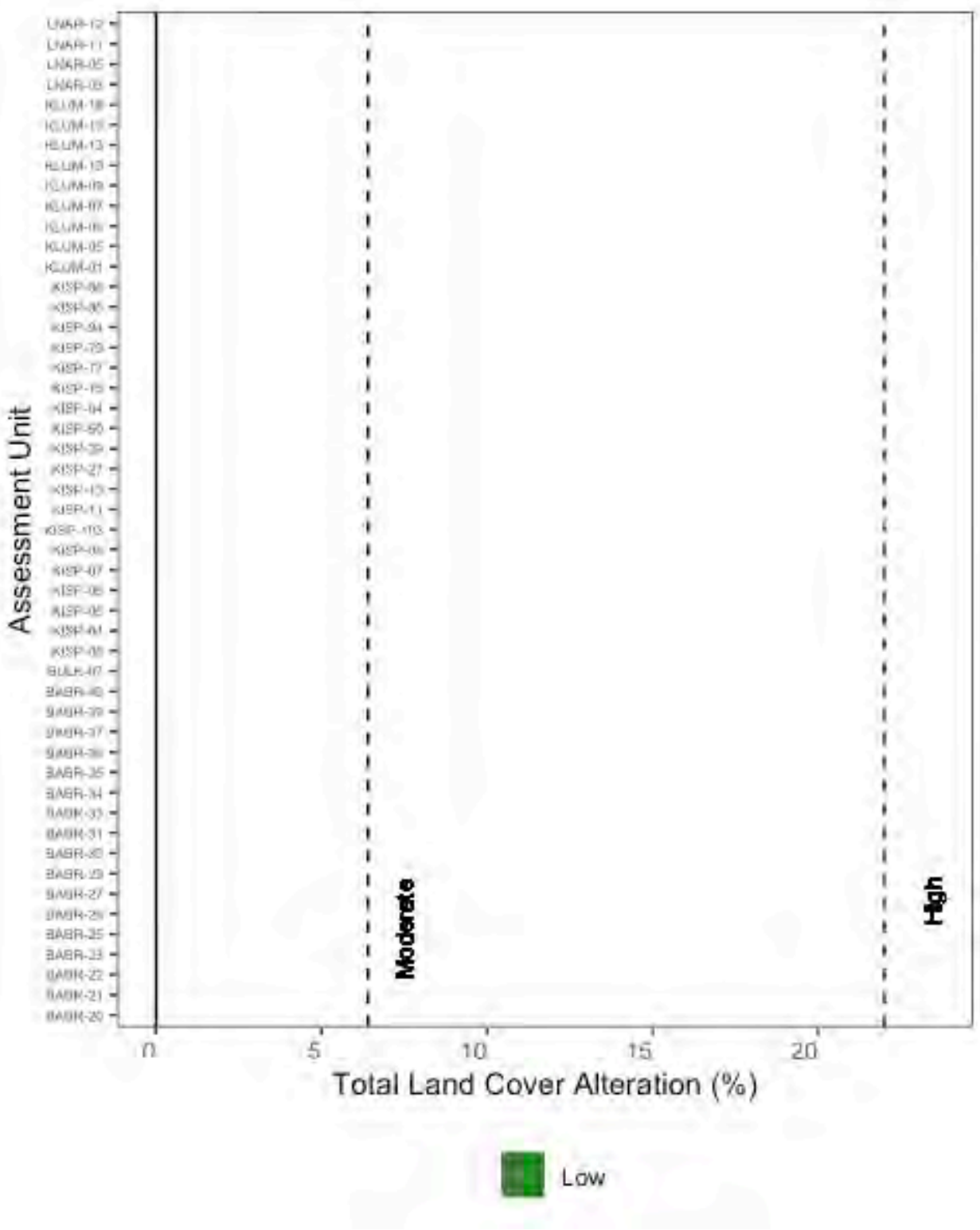
The results are colorized by risk threshold (low risk < 6.4 % of land area altered, moderate risk 6.4 - 22 % of land area altered, high risk > 22% of land area altered).

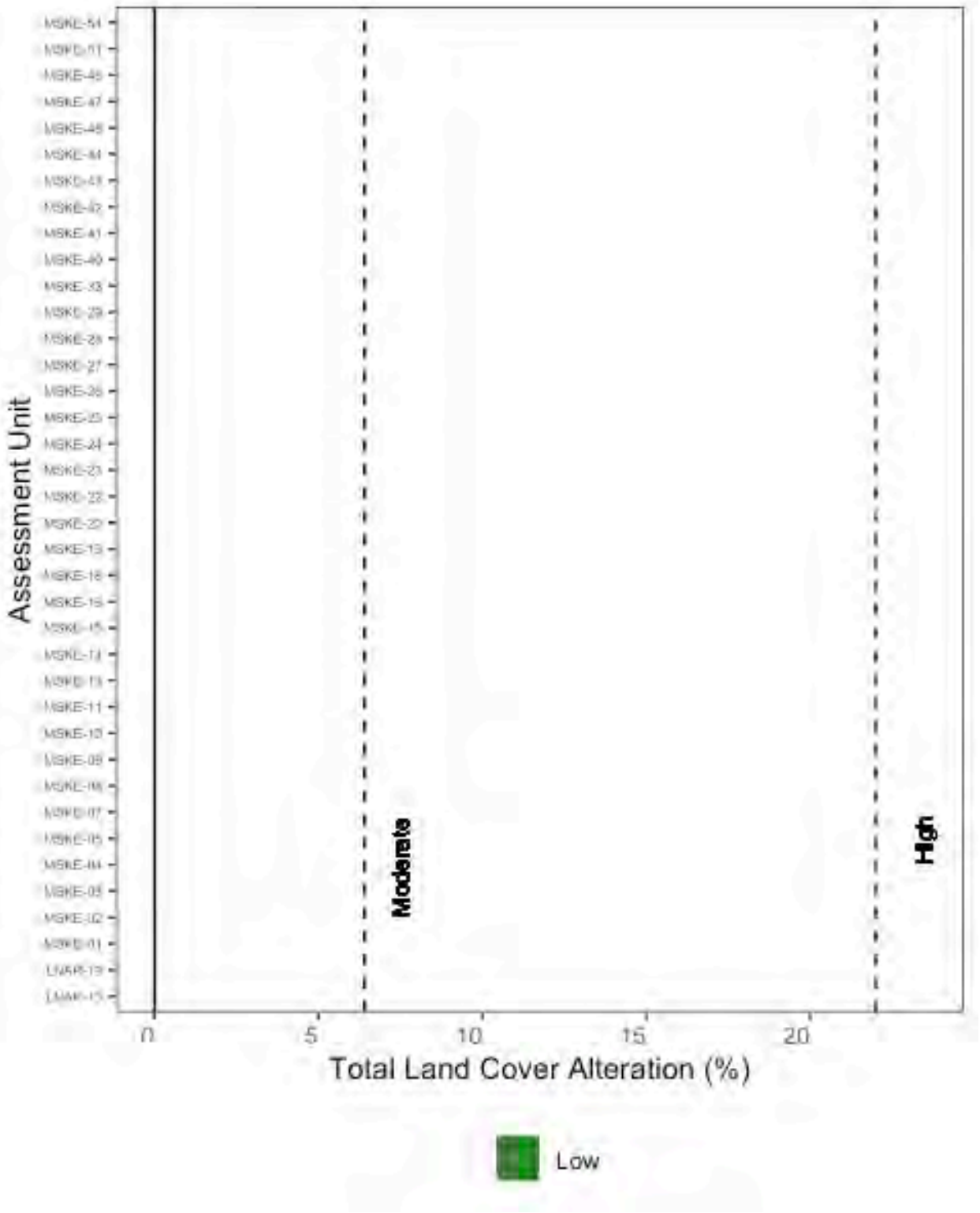



Assessment Unit
KISP-17
KISP-76
KISP-93
LNAR-14
KISP-10
KISP-104
MSKE-35
KLUM-17
LNAR-21
KISP-39
KISP-102
KISP-33
KISP-75
BULK-29
LNAR-10
KISP-30
KISP-23
KISP-58
KISP-64
NASR-01
BABR-38
LNAR-01
KISP-50
BULK-12
MSKE-35
BABR-42
LNAR-09
KISP-53
BABR-47
KISP-80
BULK-01
LNAR-20
BULK-15
BABR-32
BULK-22
KISP-01
BABR-13
KLUM-15
BABR-44
LNAR-22
KISP-62
BULK-13
BULK-17
KISP-104
KISP-09
KISP-55
KISP-52
MSKE-32
MSKE-10
KISP-29
0
5
10
15
20
Total Land Cover Alteration (%)
Moderate
High
Low


Assessment Unit
Total Land Cover Alteration (%)
0
5
10
15
20
Moderate
High
Low


Assessment Unit
Moderate
High
0
5
10
15
20
Total Land Cover Alteration (%)
Low


Assessment Unit
Moderate
High
0
5
10
15
20
Total Land Cover Alteration (%)
Low


Assessment Unit
Moderate
High
0
5
10
15
20
Total Land Cover Alteration (%)
Low