Stillwater PGM-Cu Project
Proposed Caribou Habitat
Off-site Mitigation

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Abstract

The Marathon PGM-Cu project proposed by Stillwater Canada Inc may have residual effects on woodland caribou or their habitat, even after appropriate on-site mitigation measures have been applied. Of greatest concern is the potential for reduced connectivity within the Coastal Range and adjacent ranges, as well as some loss or impairment of potential caribou habitat on site during the mine lifespan and after post-closure remediation. SCI has proposed to offset potential loss of function through off-site mitigation that would benefit woodland caribou by restoring natural forest ecosystems. Based on direction from OMNR, we investigated potential off-site mitigation opportunities consisting of enhanced silviculture, stand improvement, slash pile remediation, road decommissioning and applied research. Based on greatest benefit to caribou, four strategic areas were identified in the "Coastal" and "Discontinuous" ranges for off-site mitigation in or near the "Neys-Killala Linkage".

The proposed off-site mitigation measures are as follows:

1. active decommissioning and planting of the approximately 55 km of the Nama Creek Road Network to reduce anthropogenic disturbance and improve future caribou habitat;
2. active decommissioning of approximately 9 km "Neys" Retired Road to reduce anthropogenic disturbance and improve future caribou habitat;
3. active road decommissioning of approximately 13 km of Vein Lake West Road Network with enhanced silviculture and slash pile remediation in adjacent roadside areas; and
4. vegetation management (e.g. herbicide/brush saw) and infill planting in the 80-ha Deadhorse Creek / McLaren Lake Block to increase the conifer component and improve future potential caribou habitat.

The proposed off-site mitigation will result in the addition of approximately 115 ha of future conifer forest on the rehabilitated roadbeds and associated landings. This is approximately the amount of undisturbed potential refuge habitat (according to OMNR models) lost on the Project site. The mitigation will also result in the removal of over 4000 ha of disturbance (i.e. when considering the 500 m buffer) associated with the roads and enhance potential connectivity within and among ranges. Enhanced silviculture and slash remediation in the proposed areas will also increase the suitability of these strategic areas as future caribou habitat, with final prescriptions and extent to be determined by field surveys. Effectiveness monitoring will evaluate the success of treatments and guide further actions. The proposed actions will more than offset possible loss or impairment of potential caribou habitat and connectivity at the SCI project site.

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1 Introduction

The proposed Stillwater PGM-Cu Project is located within the Lake Superior Coastal Range and immediately adjacent to the Lake Superior Uplands Linkage ("Discontinuous Range"), as defined by the Ontario Ministry of Natural Resources (MNR) in the Caribou Conservation Plan (CCP)(MNR 2009)(Figure 1). As detailed in the woodland caribou impact assessment for the Project (Foster and Harris 2012), there is the potential for residual effects on woodland caribou or their habitat from the Project, even after appropriate mitigation measures have been applied on-site. While complex and difficult to quantify, the potential impacts centre on functional effects to potential occupancy and connectivity within the Coastal Range and adjacent ranges, as well as some loss or diminishment of function of potential caribou habitat on the Project site after closure and site remediation.

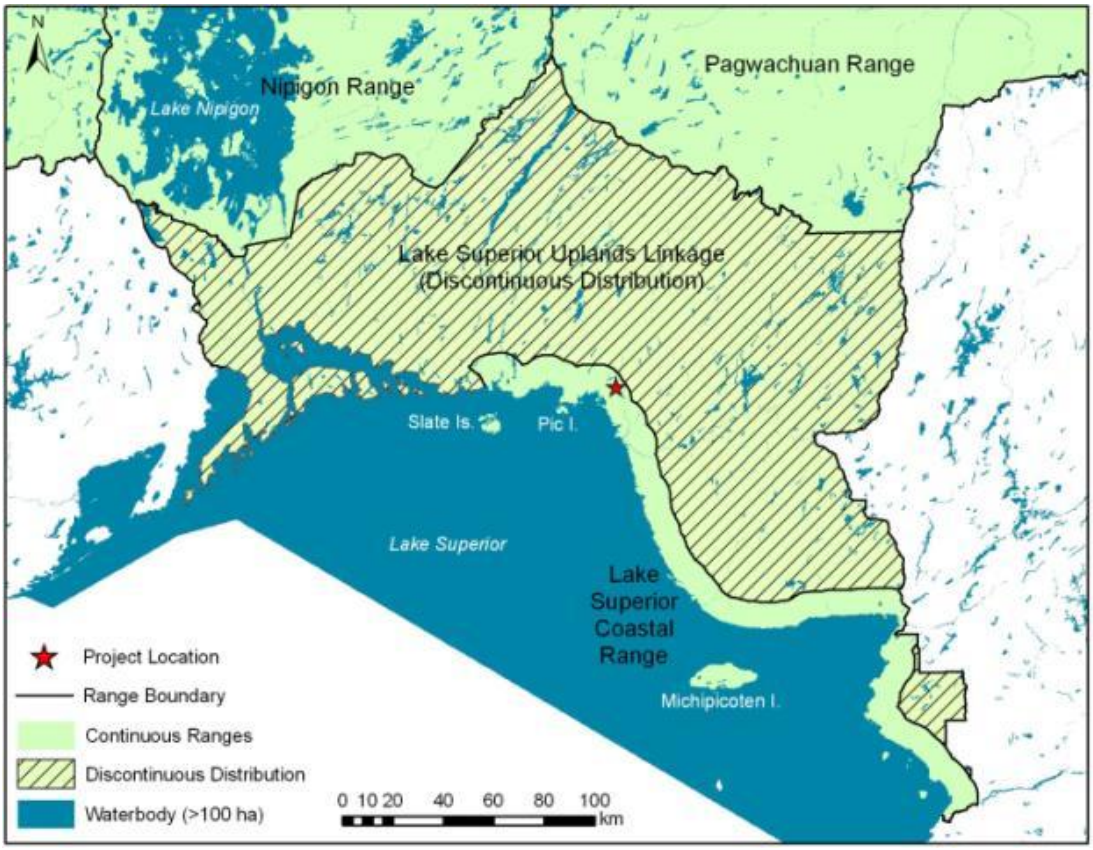

Figure 1. Location of Project in relation to woodland caribou ranges as described by MNR.

1.1 Spatial and Temporal Scale of Impacts and On-site Remediation

Both spatial and temporal scales must be considered when assessing impacts of the proposed Project on woodland caribou in the context of the EA as well as determining the appropriate scale of offsetting activities to be consistent with the principles of overall in the context of the ESA. While recognizing the limitation of existing caribou habitat models, the Project footprint directly overlaps approximately 700 ha of preferred and usable refuge habitat (Figure 2) but of that only about 104 ha is currently considered undisturbed i.e., >500 m away from existing

disturbance. Winter habitat is considerably less according to MNR models, and any potential calving habitat on Bamoos Lake is well outside the project footprint (>1000 m). As discussed below, most of the site is considered Category 2 caribou habitat with the currently disturbed areas considered Category 3.

Variability in the degree and duration of impairment or loss depends on the project component and on-site remediation/mitigation. Figure 3 shows the Project footprint as of Year 12 and Table 1 summarizes the area of the various Project components and on-site mitigation. The project footprint is approximately 900 ha, of which some is already disturbed from existing roads, trails, forest harvesting, aggregate extraction and mineral exploration. The vast majority of the project components will be remediated, with the exception of pre-existing roads and some new roads and other cleared areas, which will be needed for continued access to the Project site after closure for maintenance and monitoring. Project components will impair the potential connectivity and the use of potential caribou habitat on site during the planned duration of the Project.

After closure and associated on-site mitigation measures have been applied, there will be a time lag before habitat is potentially suitable for use by caribou. For example, it will take the main pit at least 40 years to fill and become a lake. It will also take approximately 40 years before trees planted in the transmission line right-of-way will be of sufficient height that they will longer be considered young forest (i.e., disturbance) according to MNR caribou models. Of course, this time lag for forest renewal also occurs in clearcuts and forest fires as well.

As identified in the draft closure plan, where Project site conditions historically supported a conifer-dominated forest, this will be the preferred future condition consistent with FMP direction and the CCP. As with forestry, the goal should still be to produce suitable caribou habitat. The final habitat conditions for the various project components will depend on the site conditions and silvicultural constraints. These areas may therefore have different value as caribou habitat once remediation/renewal is complete. For example, all else being equal, productive sites with abundant forage or browse for deer or moose are less suitable for caribou than lower productivity sites. Although a lower productivity site may not provide much forage for caribou, it may provide refuge habitat for caribou if it supports fewer numbers of alternative prey. Even where remediation of a Project component is not to conifer-dominated forest, there may still be partial benefit to caribou if the habitat in the remediated area is preferable to what existed prior to development, or at least does not provide forage for alternate prey or predators.

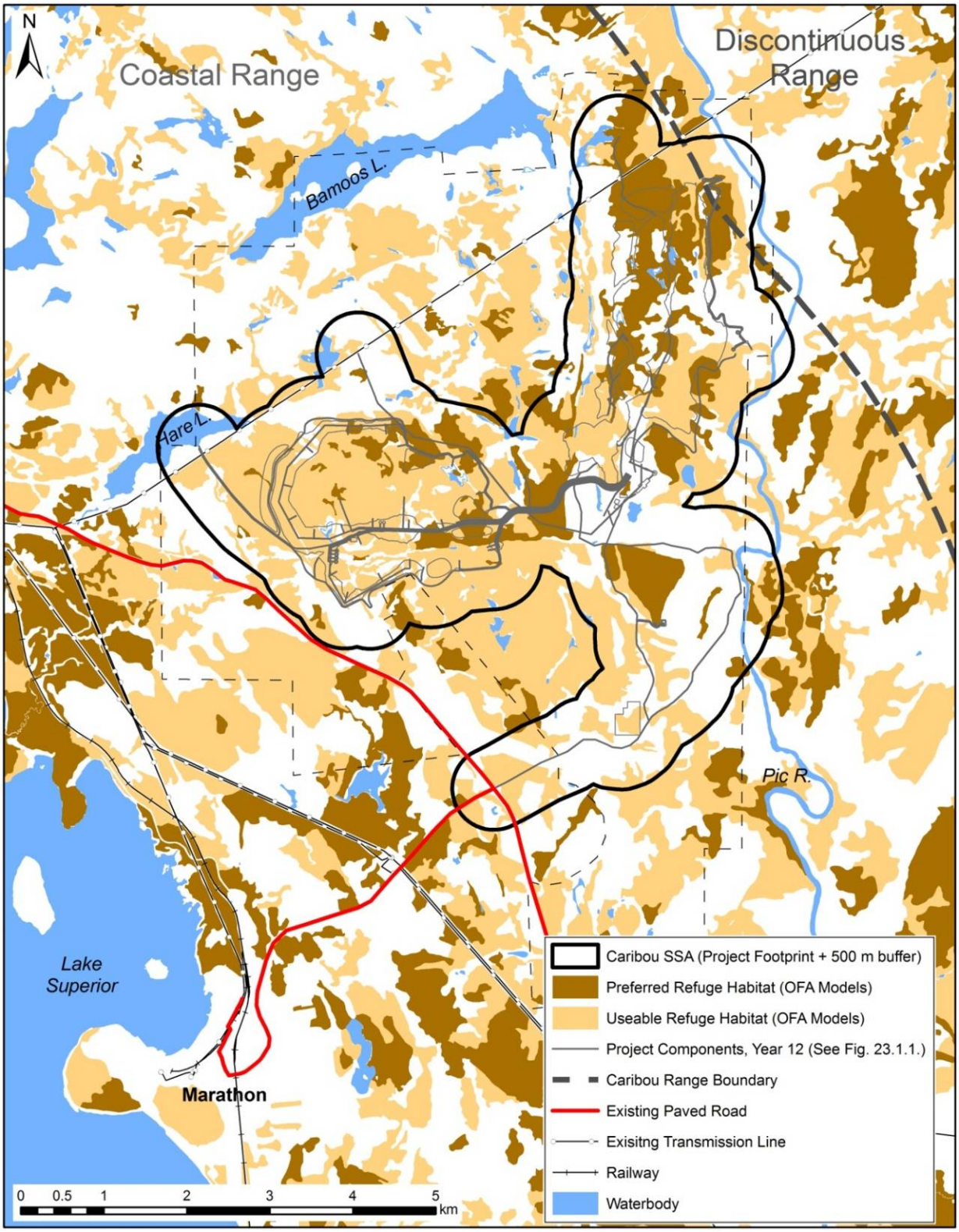

Figure 2. Caribou refuge habitat modeled by MNR using 2012 eFRI and ecosite-based models in relation to Study Area (Site Study Area [Project Footprint] + 500 m) and Project components (Figure 23.1.5 from the response to IR 23.1).

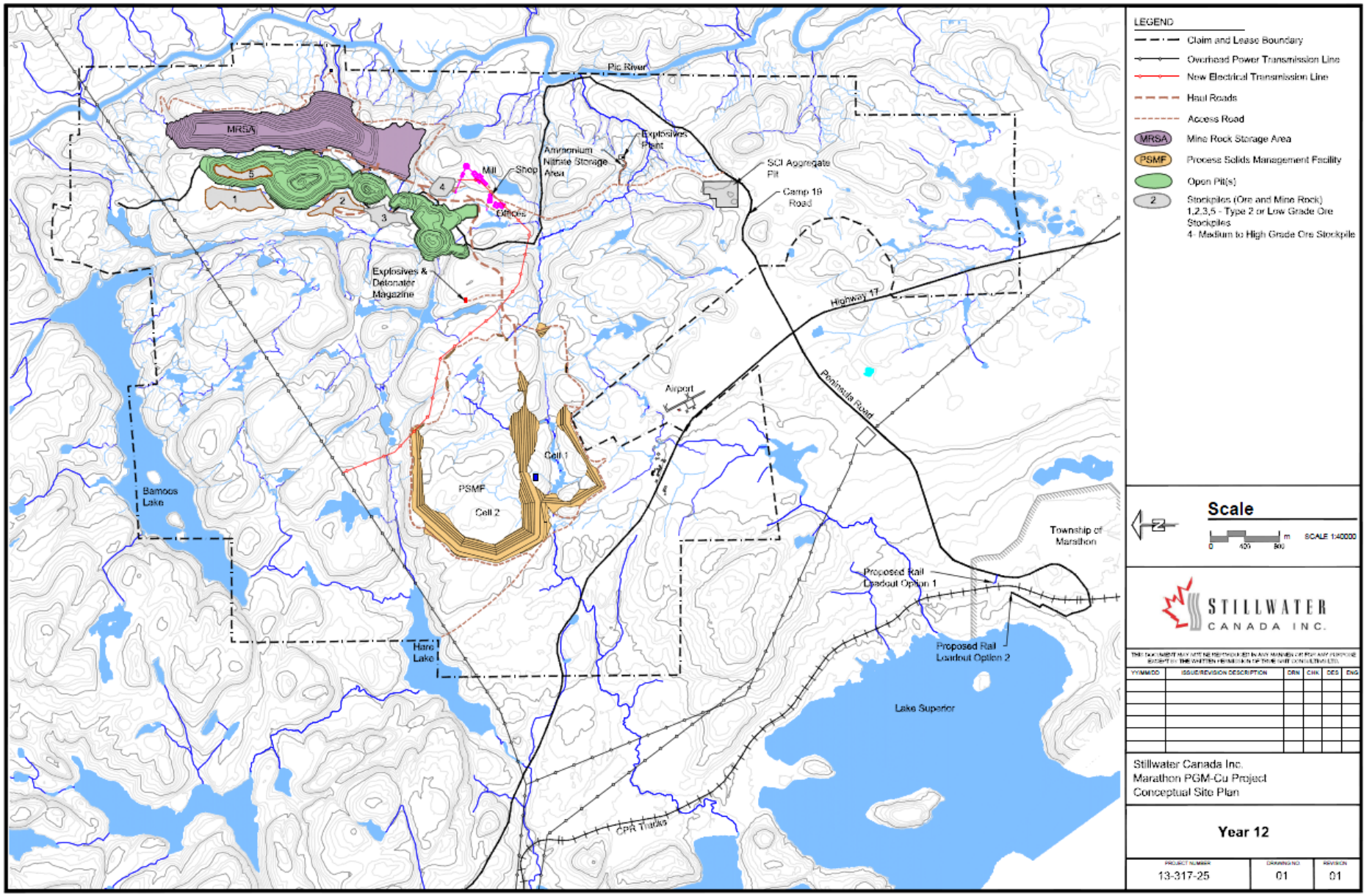

Figure 3. Conceptual Project footprint as of Year 12.

Table 1. Stillwater Marathon PGM-Cu Project components and on-site mitigation.

Component	Maximum Area (ha)	Habitat Category*	Habitat Value for Caribou	% of Component that will be remediated	Projected Duration of Impairment post-closure	Type of Eventual Habitat Remediation after closure	Eventual Habitat Value for Caribou
Process Solid Management Facility (tailings)	428	2,3	low	100	5	revegetated to open habitat	low
Waste Rock Storage	141	2,3	moderate	100	10	revegetated to open habitat	very low
Main Pit	165	2,3	moderate	100	50	lake	low
Satellite Pit (includes ore & other stockpiles)	80	2	moderate	100	20	lake-wetland-streams	low
Existing Roads and Landings	46	2,3	very low	0	0	na	very low
New Roads and Landings	61	2,3	moderate	80	40	revegetated to forest	moderate
Transmission Line	10	2,3	moderate	100	40	revegetated to forest	moderate
Remainder of direct Project Footprint (i.e., all cleared areas)	30	2,3	moderate	80	40	revegetated to forest	moderate

*anticipated project-specific caribou habitat categorization to be provided by MNR (Appendix

2 Environmental Assessment and Policy Context

Off-site mitigation is proposed in order to:

- offset potential residual impacts to caribou habitat and connectivity from the Project;
- meet the requirements of ESA Regulation for Newly Listed and Transition Species - Development; and
- use a precautionary approach consistent with provincial and federal caribou recovery strategies.

At this time, SCI intends to pursue approval under section 23.13 (Newly-listed and transition species development) of Ontario Regulation 242/08 under the Endangered Species Act, 2007. However, the proposed off-site mitigation will incorporate the principles for overall benefit, described in the Endangered Species Act Submission Standards for Activity Review and 17(2)(c) Overall Benefits Permits document (OMNR, February 2012).

Off-site caribou habitat remediation/enhancement is an obvious and appropriate mechanism for offsetting the loss or impairment of potential woodland caribou habitat and connectivity on the Project site. Woodland caribou numbers on the mainland Coastal Range are very low (Foster and Harris 2012). Improving future forest condition (e.g., increased conifer) through off-site mitigation is intended to help increase the probability of persistence of the mainland coastal caribou. Improved future habitat conditions may contribute to increasing caribou population numbers and geographic breadth of occupancy in the Coastal Range (MNR 2013b). Increased caribou numbers and occupancy will improve resiliency, opportunities for connectivity and probability of persistence.

Increasing the size of woodland populations, quality and quantity of habitat, and connectivity opportunities is a long term process. Woodland caribou are understood to require a landscape pattern of large landscape patches of suitable habitat, including mature and old forest dominated by conifer. Caribou habitat is dynamic, and large natural disturbance events such as fires occur, as well as ongoing forest management/harvesting and other anthropogenic activities. Woodland caribou are believed to use the landscape at many spatial scales. In the absence of an integrative strategy for the Coastal and Discontinuous Ranges, the Forest Management Plans (FMPs) for these areas incorporate the most current understanding of caribou habitat use and consider and incorporate caribou habitat strategies and objectives. The off-site mitigation measures set out herein are consistent with the direction provided within those FMPs and build upon existing habitat and forest management activities and initiatives.

2.1 Habitat Categorization

Interpretation of habitat survey results based upon recent direction policy direction (OMNR 2012a) and the General Habitat Description for the Forest-dwelling Woodland Caribou (OMNR 2013b) suggests there is no Category 1 habitat (e.g. calving/nursery area, travel corridor) habitat directly impacted by the Project. This has recently) been confirmed by OMNR's application of general habitat protection (categorization) for woodland caribou for the

Marathon Platinum Group Metals and Copper Mine Project (OMNR 2013a). The only Category 1 habitat within 25 km of the Project site is located on Pic Island within Neys Provincial Park (Figure 4). All the landscape in the categorized area that is disturbed is considered Category 3. Disturbance is defined as: (a) all forest <40 years old; and (b) all anthropogenic features, (e.g. roads, transmission corridors, urban areas, aggregate pits, etc). All the remaining landscape that is not "disturbed" in the LSCR and Neys-Coldwell-Killala linkage area of the discontinuous distribution is considered Category 2 i.e., seasonal range. The SCI property is mapped as a mix of Category 2 and 3 depending upon available disturbance layers. As stated in OMNR (2013a), for the purposes of the EA and ESA authorization for the SCI PGM-Cu Project, Category 2 or 3 categorization differentiation does not affect off-site selection criteria for. All sites proposed for off-site mitigation would be classed as Category 3, since they are all consist of anthropogenic disturbance areas.

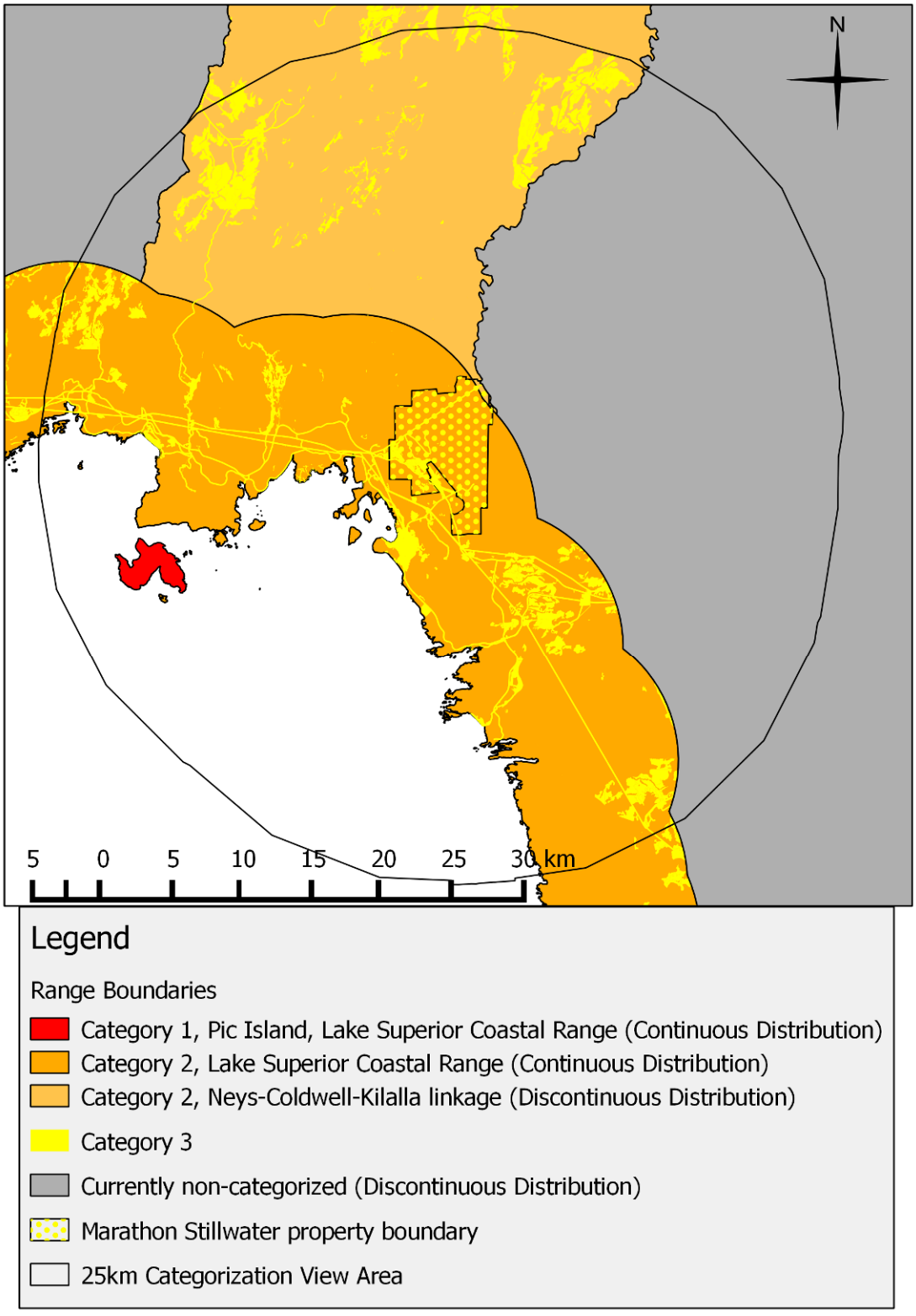

Figure 4. Categorization of caribou habitat within 25 km of the Marathon PGM-Cu Project property (OMNR 2013).

3 Potential Off-site Mitigation

Potential opportunities examined for offsetting impacts to potential caribou habitat as a result of the Project were:

- Enhanced silviculture,
- Road and trail decommissioning
- Slash pile and chipper debris pile remediation,
- Stand improvement, and
- Research and enhanced monitoring.

Each of these are discussed in more detail below.

3.1 Enhanced Silviculture

Enhanced silviculture is a mechanism for improving habitat values for woodland caribou particularly with respect to potential winter or refuge habitat. The current approved FMPs that overlap the Coastal Range have specific objectives for maintaining or enhancing conifer component to benefit caribou. However, there is a considerable silvicultural implementation backlog and despite best intentions, FMP objectives have not to date been consistently met. There will be considerable challenges in achieving FMP silviculture targets in the coastal zone over the course of the plan.

3.1.1 Identification of Sites

KBM Resources Group was engaged to help identify potential opportunities for potential caribou habitat remediation/enhancement within the Big Pic and Pic River forest management units. Preferred potential locations include those (in general descending order of priority identified in consultation with MNR):

- Adjacent to the Project within the Coastal Range between Terrace Bay and Pukaskwa National Park
- within the Neys-Killala Corridor portion of the Discontinuous Range, especially near Killala Lake Conservation Reserve (Figure 2);
- Other locations within the adjacent Discontinuous Range within 10 km of the Coastal Range) between Neys Provincial Park and Pukaskwa National Park.
- Elsewhere in the Discontinuous Range e.g., especially in the 2002 Owl Lake fire area.

Areas were sought that require remediation and/or supplemental silviculture treatments (e.g., infill planting, tending, slash pile burning, etc.) to increase the productive land base and enhance the habitat value for caribou. Free-to-grow layers included in the annual report (AR) submissions for the Pic River Ojiway and Big Pic Forests were queried to identify potential candidate stands. Included in the analysis were the 2005, 2006 & 2010 submissions for the Pic River Ojibway Forest and the 2012 submission for the Big Pic Forest. The data set was initially queried for stands which did not meet the assigned free growing standards and those which have a stocking of < 65%. Suitable remedial treatments were prescribed for some of these stands where possible.

The “Marathon Block” Forest Resource Inventory (eFRI) was also queried to identify the following.

- DEVSTAGE = LOWNAT and Age older than 120 yrs, and
- DEVSTAGE = LOWMGMT.

A spatial query was also performed to select stands within 500m of a mapped road (an updated roads layers is currently be used to confirm, and field visit or communication with MNR may be needed to verify access). For selected LOWNAT stands, treatment options will require an additional site visit to determine treatment options (if any). Most of these are barren and scattered (B&S) and require aggressive and costly site preparation to retreat (spray & or shear blade + plant). All selected LOWMGMT stands were selected with treatment options contingent on a site visit. These sites are well scattered and may not be readily accessible.

3.1.2 Stand Treatment Package (STP) Summary

A suite of twelve silvicultural treatment options (was put together including:

- Aerial Spray
- Ground Spray
- Mechanical Cleaning (brushsaw)
- Seedlings
- Low Density Fill Plant (<500 seedlings/ha)
- High Density Fill Plant (500-1000 seedlings/ha)
- Full Plant (1800 seedlings/ha)
- Aerial Seeding
- Bracke seeding 2m x 2m spacing
- Bracke seeding 1.5m x 2m spacing
- Site Preparation; disk trenching/intermittent patch
- Straight & Shear Blading
- Slash Piling and Burning

For each of the blocks tagged for remediation a stand treatment package (STP) was assigned. The STP consists of a combination of treatment activities needed to achieve a final conifer dominated stand with sufficient stocking (>65%). A conservative approach was taken assuming the highest cost STP based on the best available stand information.

Areas which were selected from the free-to-grow (FTG) submissions were either determined to have not reached free-growing status, had stocking less than 65% or did not reach the target forest unit. Stands which did not reach FTG had no available information on current stocking, height or species composition. All of these stands were assigned an STP of spray, site prep and high density fill plant. Further ground truthing may indicate that such an aggressive STP is not required on some of these blocks. Stands which have been surveyed as being FTG (stocking >40%) were generally assigned a less aggressive STP in order to preserve existing conifer regeneration. Aerial spray was assigned to all of these blocks since competition information is not available. Stands with a surveyed hardwood component greater than 30% were assigned a high density fill plant to compensate for the stocking loss from the glyphosate spray.

Older barren and scattered stands (>120yrs) and naturally fire depleted stands were flagged with the highest cost STP based on the need to spray, shear blade and plant. B&S stands are typified by heavy brush and minimal understory conifer regeneration while regeneration from fire depleted areas is variable.

3.1.3 Older Stands

The treatment of older stands (>20years) with the intent to improve available potential caribou habitat poses significant challenges in terms of access, cost and operational feasibility. Accessibility for many of these sites is limited due to degraded road conditions and decommissioned water crossings. The majority of these stands would require an aerial spray to release existing conifer trees from deciduous competition. Since these stands are past the juvenile development phase it would be extremely difficult to increase stocking in areas which are presently occupied with broadleaf tree species. Manual cleaning using brush saws would be required in order to allow direct planting (no scarification) of large stock conifer seedlings. It would therefore be advisable that the off-site mitigation efforts be focused on younger developing stands which are less costly to treat and far more likely to achieve the desired habitat conditions.

3.1.4 Potential Enhanced Silviculture Sites

A total of 281 blocks that could benefit from treatment were identified on the Pic River and Big Pic forest management units. These sites were then grouped into 21 Cluster in geographic proximity (Figure 5) to facilitate evaluation and discussion. For efficiency sake, a larger pool of potential sites for remediation was initially identified i.e., the "long list". The block attributes of these 21 groups are summarized in Table 2.

Based on the considerations discussed above, the 22 blocks in Cluster #2-5 are the most suitable candidates for inclusion as off-site mitigation (Figure 5). They represent a total area of 466 ha and include all the identified blocks in the mainland coastal range, as well as the nearest adjacent blocks in the Discontinuous Range within the Neys-Killala Corridor. Relatively few FTG sites were identified in the Coastal Range compared to the Discontinuous Range due to the low level of recent harvest in the Coastal Range.

These sites would increase the patch size of the eventual forest and future potential caribou habitat, improve connectivity and add value to existing management actions i.e., deferral. This is particularly useful given the fragmented state of the Coastal Range west of Pukaskwa National Park (Foster and Harris 2012).

Table 2. Summary of clusters of potential enhanced silviculture blocks (long list). See Figure 5 for location of blocks.

Cluster	# Blocks	Minimum Block Size (ha)	Maximum Block Size (ha)	Mean Block Size (ha)	Total Block Area (ha)	MNR Caribou Range	Approx. Distance from Coastal Range	Approx. Distance from Project (km)	FMU	Inside Killala Corridor	Inside Deferral Area	Priority
1	9	1.0	12.9	4.7	41.9	Coastal	0	35	Pic River	partial	yes	high
2	5	0.4	81.8	35.3	176.6	Coastal	0	25	Pic River	no	no	high
3	5	4.5	29.2	11.8	59.0	Coastal	0	30	Pic River	no	partial	high
4	6	0.8	47.2	10.7	64.0	Discontinuous	2	30	Pic River	no	no	high
5	6	3.5	11.8	6.8	40.8	Discontinuous	10	25	Pic River	yes	yes	high
6	1	83.8	83.8	83.8	83.8	Discontinuous	10	30	Pic River	no	no	low
7	6	3.8	35.3	14.6	87.6	Discontinuous	10	30	Pic River	no	no	low
8	3	9.9	11.9	10.8	32.5	Discontinuous	15	30	Pic River	no	no	low
9	6	4.9	32.7	12.9	77.3	Discontinuous	15	40	Pic River	no	no	low
10	1	43.6	43.6	43.6	43.6	Discontinuous	15	40	Pic River	no	no	low
11	8	6.0	57.6	21.1	169.0	Discontinuous	20	35	Pic River	no	no	low
12	1	13.2	13.2	13.2	13.2	Discontinuous	25	45	Pic River	no	no	low
13	82	5.2	95.0	26.8	2,195.2	Discontinuous	15	50	Pic River	no	no	low
14	1	17.7	17.7	17.7	17.7	Discontinuous	30	45	Pic River	no	no	low
15	3	5.0	38.4	17.5	52.4	Discontinuous	35	50	Pic River	no	no	low
16	1	106.0	106.0	106.0	106.0	Discontinuous	35	50	Pic River	no	no	low
17	2	40.0	43.2	41.6	83.2	Discontinuous	40	50	Pic River	no	no	low
18	17	4.5	72.3	21.5	365.8	Discontinuous	25	30	Pic River	yes	no	medium
19	29	0.6	28.8	8.6	249.7	Discontinuous	35	40	Big Pic	yes	no	medium
20	6	0.7	4.9	2.8	16.9	Discontinuous	50	50	Big Pic	yes	no	low
21	83	0.2	54.5	8.8	730.3	Discontinuous	70	70	Big Pic	yes	no	low
Total	281	0.2	106.0	16.7	4,706.4							

Table 3. Characteristics of potential higher priority of blocks (Groups 1-5) for enhanced silviculture.

Group	Block_Id	FtgYear	YRDEP	FTG	DEPFU	FU	PLANFU	SPCOMP	DEVSTAGE	Proposed Treatment	Area (ha)
1	17	2006	1996	N	BWPUR					Aerial spray, SIP trenching & high density fill plant	4.9
1	34	2006	1996	N	BWPUR					Aerial spray, SIP trenching & high density fill plant	6.7
1	165005400-0162		0	n/a				Bw 50Sw 20Sb 20Bf 10	LOWMGMT	Aerial spray, shear blading, high density fill plant	3.0
1	165105400-0043		0	n/a				Bw 50Pt 20Sb 20Bf 10	LOWMGMT	Aerial spray, shear blading, high density fill plant	1.0
1	165105400-0069		0	n/a				Sb 50Bw 40Cw 10	LOWNAT	Aerial spray, shear blading, high density fill plant	3.4
1	165105400-0546		0	n/a				Sb 90Bw 10	LOWNAT	Aerial spray, shear blading, high density fill plant	1.0
1	165105400-0632		0	n/a				Sb 60La 30Sw 10	LOWMGMT	Aerial spray, shear blading, high density fill plant	12.9
1	165105400-0679		0	n/a				Sb 40Sw 40Bw 10Pb 10	LOWNAT	Aerial spray, shear blading, high density fill plant	7.1
1	165305400-0352		0	n/a				Sb 90Bf 10	LOWMGMT	Aerial spray, shear blading, high density fill plant	2.0
2	pr5254118180	2005	1997	N	SPUP		SPUP			Aerial spray, SIP trenching & high density fill plant	80.9
2	pr5254135090	2005	1997	N	SPUP		SPUP			Aerial spray, SIP trenching & high density fill plant	81.8
2	pr5254170120	2005	1997	N	SPUP		SPUP			Aerial spray, SIP trenching & high density fill plant	12.1
2	165205410-0029		0	n/a				Sb 100	LOWMGMT	Aerial spray, shear blading, high density fill plant	0.4
2	165205410-0030		0	n/a				Sb 100	LOWMGMT	Aerial spray, shear blading, high density fill plant	1.4
3	pr5254119600	2005	1998	N	CONMX		CONMX			Aerial spray, SIP trenching & high density fill plant	14.6
3	pr5254131450	2005	1997	N	SPUP		SPUP			Aerial spray, SIP trenching & high density fill plant	4.5
3	pr5154174440		1989	Y		HWDMX	SPUP			Aerial spray, high density fill plant	5.7
3	pr5154175530		1989	Y		HWDMX	CONMX			Aerial spray, high density fill plant	29.2
3	pr5154176460		1989	Y		HWDMX	SPUP			Aerial spray, high density fill plant	5.0
4	pr5254124920	2005	1989	Y	CONMX	HWDMX	CONMX			Aerial spray, high density fill plant	2.9
4	pr525412820	2005	1993	Y	CONMX	HWDMX	CONMX			Aerial spray, high density fill plant	4.6
4	pr5254128970	2005	1998	N	CONMX		CONMX			Aerial spray, SIP trenching & high density fill plant	3.5
4	pr525414700	2005	1989	Y	CONMX	HWDMX	CONMX			Aerial spray, high density fill plant	5.0
4	165205410-0415		0	n/a				Sb 90Bw 10	LOWMGMT	Aerial spray, shear blading, high density fill plant	0.8
4	165105410-0616		0					Bw 60Bf 10Pj 10Sb 10Sw 10	DEPNAT	Aerial spray, shear blading, high density fill plant	47.2
5	pr535422840	2005	1989	Y	PJPUR	CONMX	PJPUR			Aerial spray, low density fill plant	9.1
5	165305420-0024		0	n/a				Pt 50Bf 20Bw 20Sw 10	LOWMGMT	Aerial spray, shear blading, high density fill plant	5.2
5	165305420-0152		0	n/a				Sb 90Bw 10	LOWMGMT	Aerial spray, shear blading, high density fill plant	4.6
5	165305420-0174		0	n/a				Sb 80La 20	LOWMGMT	Aerial spray, shear blading, high density fill plant	11.8
5	165305420-0480		0	n/a				Sb 80La 10Pt 10	LOWMGMT	Aerial spray, shear blading, high density fill plant	6.4
5	165305420-0735		0	n/a				Pt 100	LOWMGMT	Aerial spray, shear blading, high density fill plant	3.5

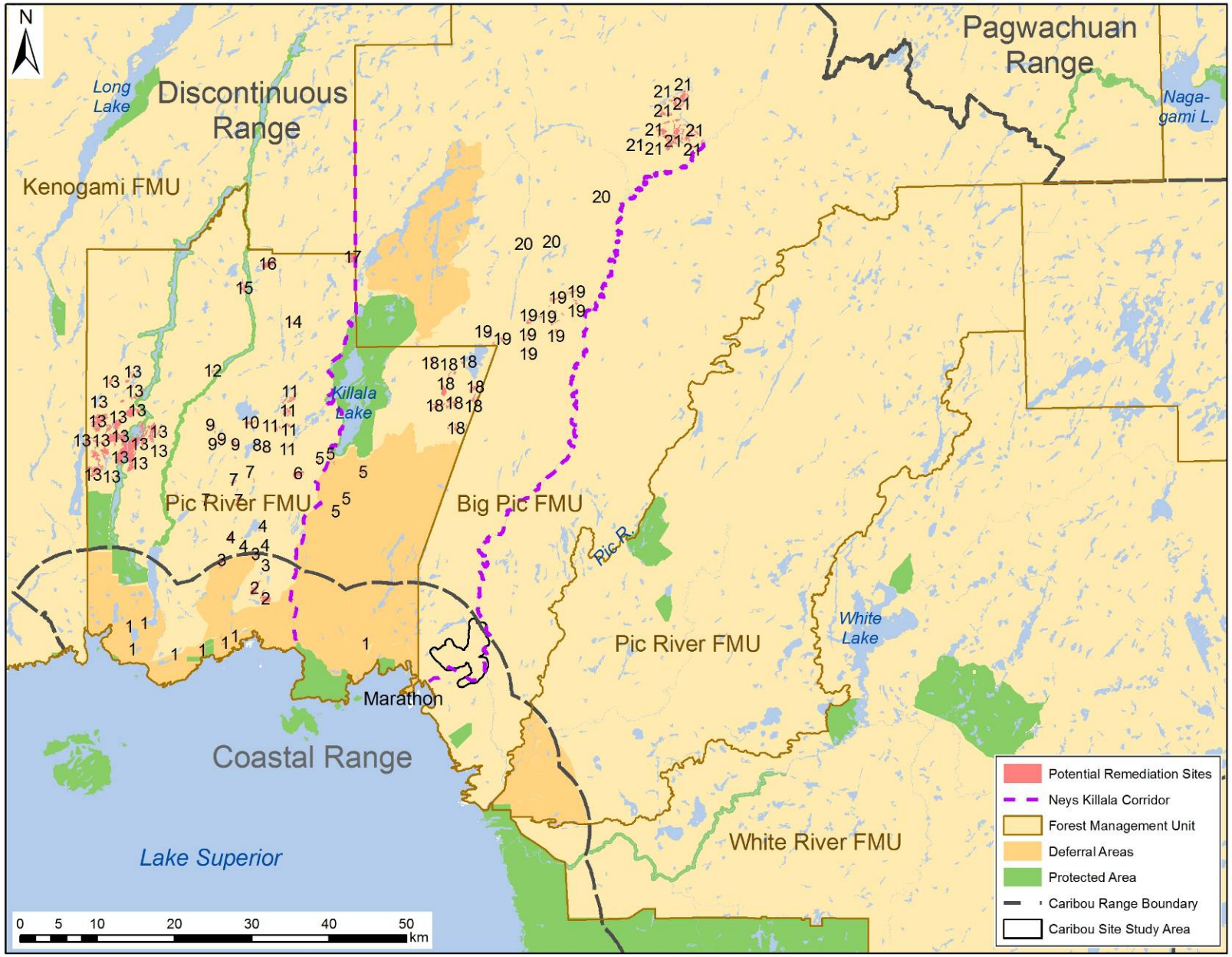

Figure 5. Location of potential caribou enhanced silviculture blocks as possible off-site mitigation for the Marathon PGM-Cu Project. See Table 1 for summaries of the 21 clusters and Table 5 for details for selected sites in Clusters 2-5.

Figure 6. Location of selected potential enhanced silviculture blocks in or near the Coastal Range (Groups 1-4).

Figure 7. Location of selected potential enhanced silviculture sites sites in or near the southern portion of the Neys-Killala Corridor (Group 5).

3.2 Slash and Landing Remediation

Other opportunities for habitat rehabilitation include roadside areas and landings that are degraded due to slash or chipper debris piles. Areas covered with slash are generally rendered unproductive for long periods of time until the woody debris decomposes. Left untreated these areas will typically become occupied with grass and shrub vegetation. Mobile chipping operations also leave behind chip residue which in turn hinders long term site productivity and conifer regeneration. Untreated chipper debris piles and slash represent formerly areas that will not return to a forested state at the same time as the adjacent clearcuts (i.e., within the next rotation) and therefore represent an impairment of potential future caribou habitat. In addition, they expand the footprint of the associated linear corridor, with potential effects on potential woodland caribou use of the area.

Roadside piling of woody debris (e.g., branches, tops, unmerchantable species) resulting from forestry operations is a common practice in boreal Ontario to reduce the area lost to slash and increase the land base suitable for renewal through planting, seeding, or natural regeneration. These piles are often burnt where possible, in part to return nutrients to the soil. Slash pile burning was identified by MNR (MNR 2013b) as a potential option for off-site mitigation. Species at Risk Stewardship funding from MNR has been used for slash pile burning and chipper debris trials on other forest management units in northwestern Ontario in the past (e.g. Kenogami Forest 2010, Lac Seul Forest 2011).

Slash and chipper debris pad was explored using remote imagery (Figure 8) available for the Big Pic Forest and GoogleEarth imagery for other forest management units in the Coastal Range and the Killala Lake. Imagery was visually scanned to identify older slash piles/rows and tree-length piles that are older and could potentially benefit from remediation. Areas occupied with slash and/or chipper debris were delineated and given a general classification based on the estimated age and condition of the slash. Areas typed as ‘old slash’ consisted of stands with an approximate age >20 years. Due to the surrounding vegetation and the advanced decomposition of the slash in these areas, remediation activities would be limited to piling/scarifying and planting without burning. Areas typed as ‘tree length’ slash were found to have an approximate age <20 years. Most of these areas could be piled, burned and planted. Areas typed as ‘chipper pad’ consisted of old chipper pads with remediation activities dependent on the depth of chip residual. Chipper pad remediation typically requires an excavator to make planting mounds.

In the Big Pic Forest, most slash piles that could be potentially remediated were located in the northern portion of the unit, with none identified in the Coastal Zone (Appendix 1). Six locations in the Coastal Zone and near Killala Lake were identified with GoogleEarth Imagery for adjacent FMUs (Appendix 2). All of these areas still require ground-truthing to confirm the condition of the harvest debris and whether suitable access exists. Potential field verification would need to occur at the same time as treatment package verification.

Figure 8. Sample imagery for assessing slash pile remediation.

In general, relative to other off-site mitigation options, slash and chipper debris pad remediation is considered a lower priority due to the lower perceived benefit to woodland caribou relative to other options. The most likely opportunity identified by NBS is Site #2 in and immediately west of the 3730 ha Deadhorse Block in the Coastal Range (Figure 10, Figure 12). It is located in the same area as proposed enhanced silviculture blocks of Groups 2 and 3, which could help create a less fragmented future stand in this area.

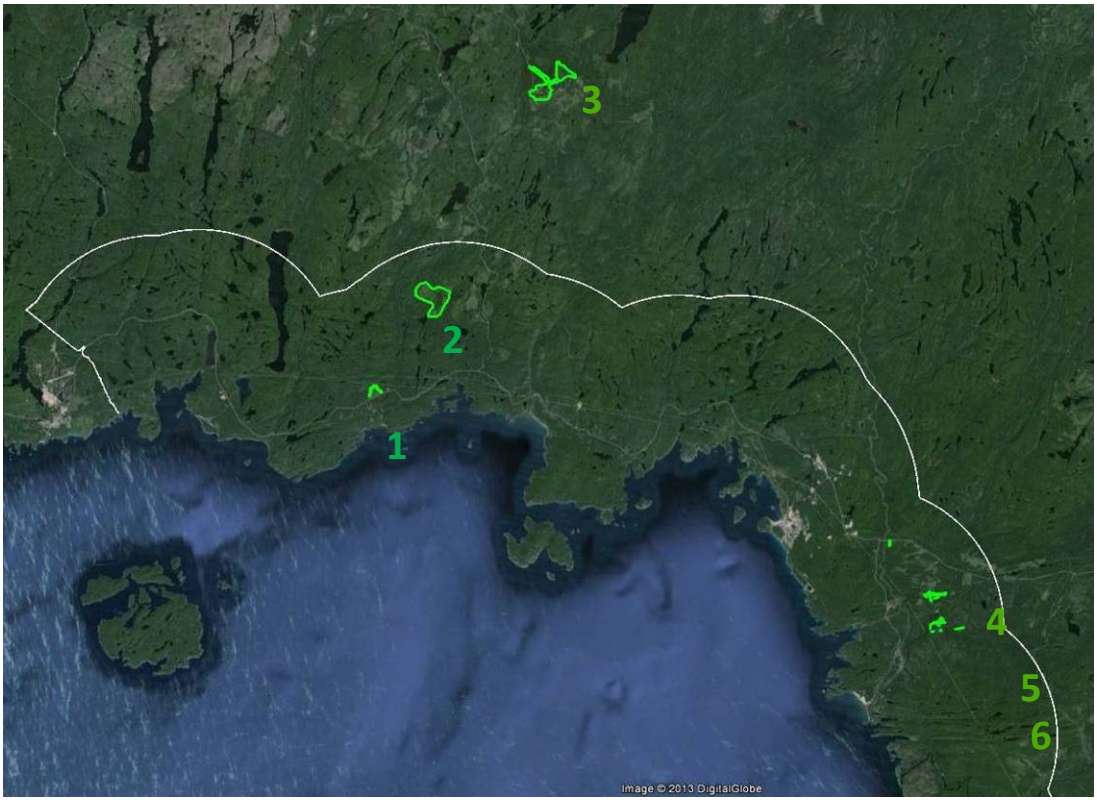

Figure 9. Old slash and tree length piles with potential for remediation.

Figure 10. Potential slash remediation Site #2.

3.3 Stand improvement

Another potential option for off-site mitigation is the strategic harvesting and renewal of degraded and decadent hardwood stands. This would allow MNR to target specific areas within the Coastal range and the Killala corridor which would benefit from a stand improvement treatment.

Within these areas a selection criteria of: hardwood composition >=60%, Age >=80% and crown closure <=60% was used to delineated hardwood dominated stands which are currently in the later successional development stage. These areas have long been by-passed by commercial operators due to low merchantable volumes, poor access and severe topographic relief. Target areas would be focused within the Killala corridor and south of the northern boundary of the Coastal Range.

Of the total 5000 hectares of degraded hardwood stands identified within this area, access and terrain are critical constraints in identifying the target areas. Due to the low volumes and late stage development of these stands, biomass grinding operations would be the most ideal way of merchandizing all of the trees within the block. Unlike tree length and in-bush chipper operations, biomass grinding does not leave behind roadside fiber residue. Since these operations would be concentrated in less than desirable stands the operator may require their rate to be subsidized in order to compensate for extraneous operational costs. Stands which have a net merchantable volume <65 m3/ha are eligible for a reduced crown stumpage rate. The Terrace Bay mill currently operates a 50MW biomass boiler with the target harvest areas located within an economically feasible trucking distance.

Harvesting operations would be conducted as per the direction of the FMP and the Stand & Site Guidelines. Required residual tree retention under the NDPEG guideline would be focused on any available mature conifer trees (Jack Pine, Black Spruce, White Spruce). This would provide the site with an additional source of conifer seed. Following harvesting the block would be site prepared using conventional methods (disk trenching or Bracke scarifiers) and planted with larger conifer seedling. White Spruce trees are best suited to rich upland sites and can tolerate a couple seasons of deciduous encroachment prior to release. Since the selection criteria would be focused on sites with richer soil types and heavy deciduous cover, a glyphosate spray would be required to control competition. This would likely be done prior to planting and may be repeated two-three years post establishment depending on the observed site conditions.

Stand improvement opportunities are included in Appendix 4 as potential options, however there are a number of questions that would need to be resolved before these could be confirmed as part of an off-site mitigation package for woodland caribou. Of primary importance is that many of the potential stand improvement stands are in blocks that are currently deferred from harvest in the existing FMPs. Many of these sites or portion of thereof may also not be feasible for harvest due to terrain restriction and low volumes of merchantable timber.

At this time, the highest priority area for stand improvement is the Deadhorse Block (Figure 12). This area has a number of attributes which make it a good candidate including:

- located within the Coastal Range;
- portions are scheduled for harvest within the next 5 year term of the Pic River FMP;
- includes 7 blocks (Group # 2 & 3) covering 197 ha that area identified for enhanced silviculture in Section 3.1.4.
- includes potential slash pile remediation within the block and immediately adjacent to the west in a previously harvested stand
- includes potential road decommissioning opportunities once renewal (planting and FTG assessments) have been completed (approximately 7-10 years post-harvest).

Four stands have been identified in the Deadhorse Block for potential stand improvement (Table 4). All are birch-dominated stands that are over 110 years of age with fairly poor canopy closure and likely have a fairly dense balsam fir understory. The total area is approximately 70 ha.

Table 4. Attributes of stands identified for potential stand improvement actions in the Deadhorse Block. See Figure 12 for locations.

Polygon Id	Year of Origin	Tree Species Composition	Height (m)	Canopy Closure (%)	Site Class	Primary Ecosite	Area (ha)
165205410-0035	1911	Bw_8Sb_2	16	50	3	B055TtD n	31.0
165205410-0052	1911	$Bw_7Sb_2Bf_1$	16	60	3	B055TtM n	10.7
165205410-1036	1901	$Bw_6Sb_3Bf_1$	15	60	3	B055TtM n	13.7
165205410-1038	1911	Bw_6Sb_4	15	60	3	B055TtM n	13.3

Stand improvement in the Deadhorse Block would improve the current and future habitat suitability of this area for woodland caribou.

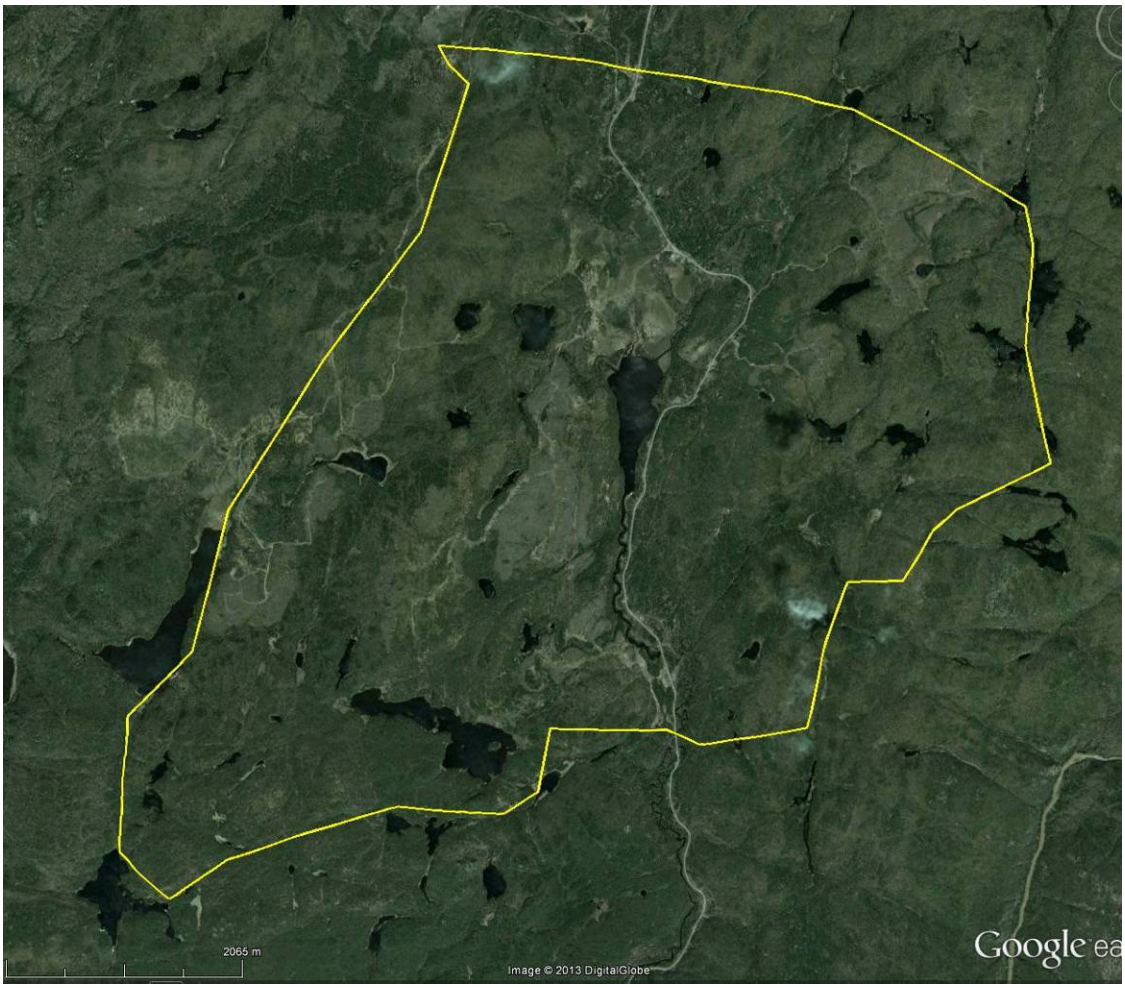

Figure 11. Deadhorse Creek block with potential opportunities for slash remediation, stand improvement, and enhanced silvicuture.

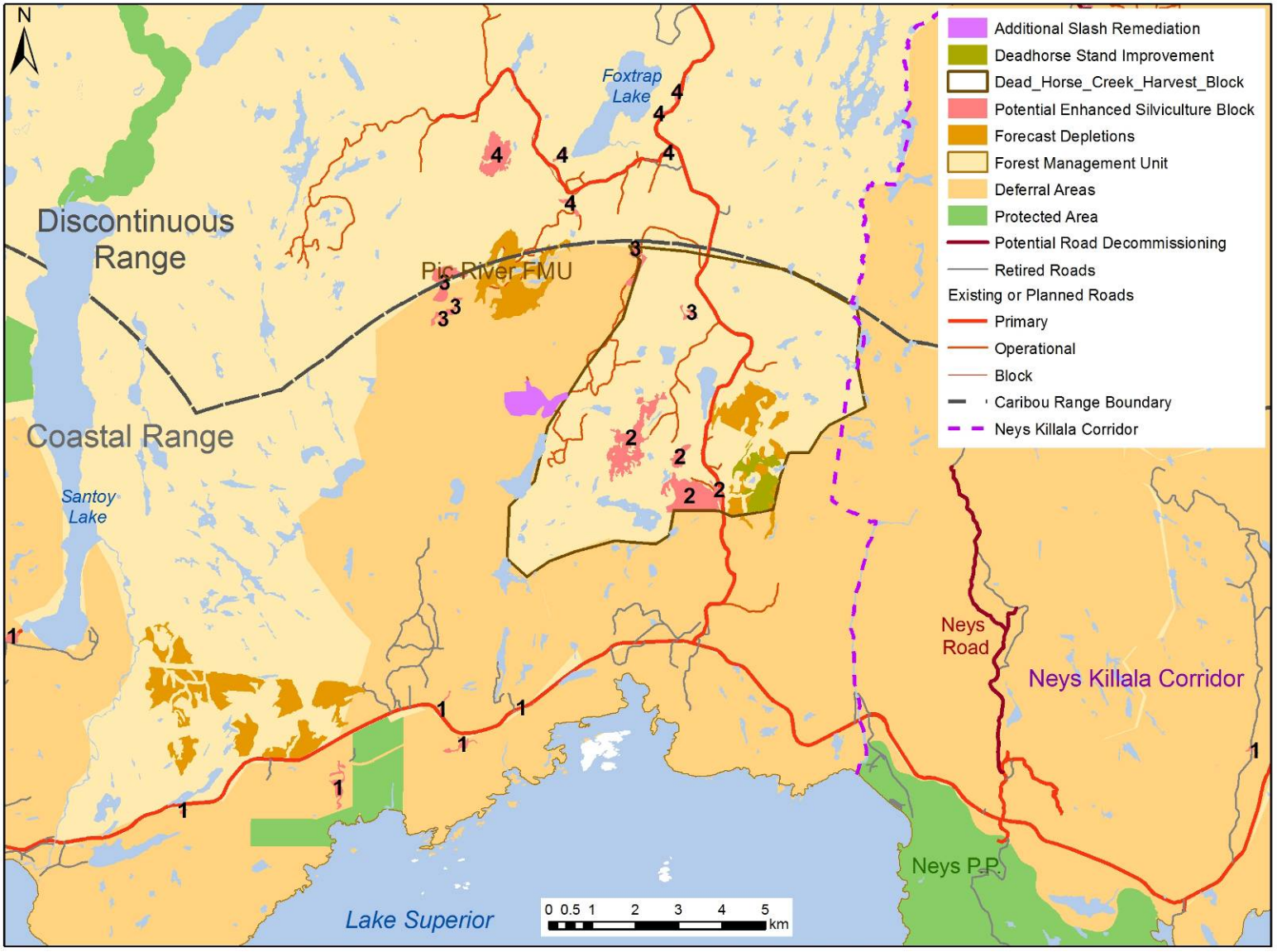

Figure 12. Location of potential stand improvement blocks in the Deadhorse block in relation to enhanced silviculture and slash pile remdiation / road decommissioning opportunities.

3.4 Road and Trail Decommissioning

3.4.1 Introduction

Roads, trails, utility right-of-ways, and other linear features can cause negative impacts on woodland caribou due to avoidance effects by caribou and higher mortality due to increased foraging efficiency of predators such as wolves (OMNR 2006). Recent research supported by MNR found that wolves used linear features such as roads to quickly navigate their territory while targeting moose habitat near forest access roads. As the most efficient search trajectories occurred near roads, moose and woodland caribou were concluded to be likely to be at significantly greater risk of predation in sites with high road densities (Moffatt 2013). Section 3.7.3 of the provincial CCP (3.7.3) commits the Province of Ontario to develop policy to manage densities (thresholds) of roads and other linear features to support caribou persistence. Although this policy has not yet been developed, nor thresholds established, the high density of linear features in the Lake Superior Coastal Range suggests that the decommissioning of unneeded forest access roads or other unneeded linear features would increase the probability of persistence of woodland caribou in this landscape.

Road decommissioning will focus on revegetating the road bed with conifer trees to reduce foraging efficiency of wolves in the short terms and eventually return the road bed to mature, productive forest suitable for potential caribou refuge habitat. Restricting human access is a secondary objective to minimize damage to regenerating conifer trees where necessary, and reducing potential anthropogenic disturbance from motorized traffic (e.g., trucks, snowmachines and ATVs and accidental mortality from hunters

3.4.2 Decommissioning Treatments

Road decommissioning are activities that result in the stabilization and restoration of unneeded roads to a more natural state. Road decommissioning can involve different levels of treatment depending on the objective including:

- Blocking of entrance through berms, ditches, boulders, or other barriers to prevent/mimimize access with motorized vehicles;
- Removal and remediation of water crossings (e.g., culverts and bridges) to prevent access beyond watercourse and to minimize long-term risk to aquatic resources;
- Contouring of roadway (e.g., Figure 13) with heavy machinery to discourage motorized travel along roadway (Figure 14);
- Revegetate roadway through scarification (site preparation) of roadbed and subsequent planting or seeding to discourage access in the short-term and restore forested condition in the long-term (Figure 15); and
- Full obliteration, recontouring, and restoring natural slopes to eliminate roadway as a feature.

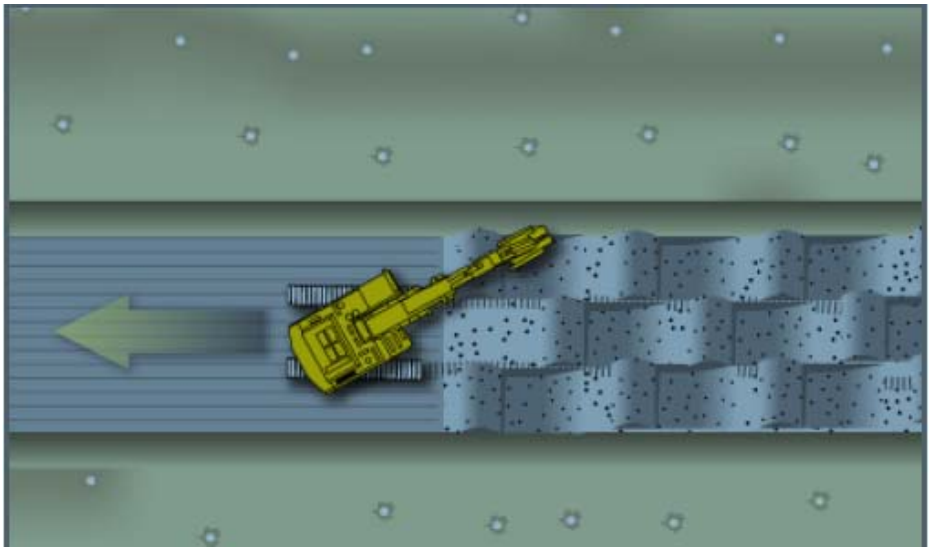

Figure 13. Road decommissioning with an excavator using a five-of-dice pattern (Sutherland 2011).

Figure 14. Untreated Linear corridor (left) and corridor after mounding (ACCRP 2006).

Figure 15. Linear corridor before and after regeneration (ACCRP 2006).

3.4.3 Plan Road Classification and Use Strategies

The relevant Forest Management Plans were assessed to determine suitable opportunities for road decommissioning. Forest Management Plans identify 3 classes of roads:

- **Primary Road:** is a road that is usually permanent and provides principle access to the management unit 3 and is constructed, maintained and used as part of the main road system.
- **Branch Road:** is a road other 4 than a primary road that branches off an existing or new primary or branch road providing access to, 5 through or between areas of operations on the management unit. (Note: in previous FMPs, these were formerly called *secondary roads*.)
- **Operational Road:** is a road within an 6 operational road boundary, other than a primary or branch road that provides short-term access, for 7 harvest, renewal and tending operations. Operational roads are normally not maintained after they are no 8 longer required for forest management purposes. . (Note: in previous FMPs, these were formerly called *tertiary roads*.)

During the FMP process, detailed reviews of existing roads on the Pic River, Big Pic, and White River FMUs were conducted by the SFLs and the MNR to determine road responsibility and condition. The roads inventories were reviewed and updated to their current status based on information from field experience. Older roads no longer considered safely drivable and not required for forest management activities are part of the "retired road" GIS database and are not included in the current FMP road database or management. The planning team then assessed all current roads under SFL responsibility and determined which roads were anticipated to be transferred to the MNR and the assigned time frame. Each existing road and road network that is the responsibility of the sustainable forest licensee, and the associated use management strategy, has been documented in Table FMP-18 in each FMP. Use management strategies deal with maintenance and monitoring provisions, access controls (if applicable) and future use management.

According to the FMPs, the “life expectancy” of any given road is variable depending on a number of factors (e.g. the standards of construction, construction materials, levels of maintenance, location relative to future allocations, road user groups, etc.). All roads that are anticipated to be transferred to MNR within 20 years have been identified in Table FMP-18 and Supplementary Documentation 6.1.7, along with a timeframe of transfer and MNR's associated management intent. When the intent to transfer the road has been expressed by the SFL holder, the MNR has in certain circumstances (e.g. areas near remote tourism lakes, Continuous Distribution Zone and lake trout AOC) made a preliminary determination whether or not the road/road network will be maintained for public use. MNR's management intent for these roads may include: MNR maintain, transfer responsibility to another party, decommission, and no longer maintain. Activities required prior to transfer are only identified for roads that are being transferred by the SFL in the first five years of the FMP (2013-2018 for the Pic River FMP). For more information on activities required prior to transfer, see Supplementary Documentation 6.1.7 – common clauses in each FMP.

3.4.4 Road Decommissioning Opportunities

According to the FMPs that overlap the Coastal Range, it is MNR's management intent that roads that have fulfilled their forest management purpose will no longer be maintained for

public use. Roads that have been identified for decommissioning in FMPs have undergone public consultation with potential stakeholders and Aboriginal Groups. These roads will typically be decommissioned by removal of water crossing(s) where feasible and creation of berms to make them impassable to vehicular traffic. Less commonly, roadbeds may also be actively decommissioned to discourage motorized access to protect remote tourism or other sensitive values. Decommissioning of the road bed by scarification and planting would further enhance the potential future habitat for caribou and reduce potential impacts to caribou associated with linear disturbances and help create a more contiguous, unfragmented forest stand that improves future potential woodland caribou winter and refuge habitat.

The following potential opportunities for decommissioning of linear features were considered:

- Existing or planned roads in the FMP including:
    - roads identified for decommissioning by removing water crossings only; additional benefit to caribou would result from active decommissioning of roadbed. Although removal of water crossing may deter human access it does little to reduce the effects of the road with respect to travel by wolves, nor does the road bed provide future forest habitat (i.e., caribou habitat)
    - roads identified for active decommissioning including roadbed. Although decommissioning of these roads is the responsibility of the MNR or the SFL holder, these roads represent potential opportunities for decommissioning as part of an off-site mitigation package if:
        - if the MNR is unable to conduct decommissioning in the foreseeable future due to lack of resources; or
        - if the roads were identified in a previous FMP but the decommissioning was not carried out (e.g., due to bankruptcy of SFL holder) and neither the current SFL holder or MNR is responsible for its decommissioning;
- "Retired roads" identified in MNR GIS layers that were not previously identified for decommissioning;

At this time, MNR does not have a strategy to address the large number of existing roads in the Coastal Range due to lack of funds and uncertainty over responsibility for the cost (Pic River FMP Supp Doc, p. 526, final list of alterations ID 57039).

3.4.4.1 Potential FMP Opportunities

Table 5 and Figure 16 present the attributes and locations of road networks in the Coastal and adjacent Discontinuous range that may represent current or future opportunities for decommissioning as part of an off-site mitigation package for caribou/caribou habitat. This can be considered the "long list" of potential road decommissioning opportunities.

According to the Pic River FMP (Roads Suppdoc, final list of required alterations ID 57105), OMNR's 2009 Forest Management Planning Manual (page A62 Line 4-8) requirements are that decommissioning strategy/methodology need not be described for roads that are planned for

decommissioning in the second 5 years (Phase II). Although the management intent and decommissioning treatment for such road networks (e.g., Little Black River) may not yet be clear, these may represent potential future decommissioning opportunities as part of an off-site mitigation package. The projected duration of the SCI mine (closure circa 2030) may line up with timelines for decommissioning for at least some road networks.

3.4.4.1.1 Coastal Range

Road decommissioning in the Coastal Range is considered a higher priority than in the Discontinuous Range since reducing the risk of predation would benefit any caribou that are still resident in the Coastal Range. In addition, it would better offset potential disturbance at the Project site due to the closer proximity compared to road networks farther away in the Discontinuous Range. However, no decommissioning of existing roads in the Coastal Range is identified as occurring in the first 5 years (Phase I) of the current Pic River, Big Pic or White River FMPs. All roads within the Caribou Conservation Zone of the Pic River FMU will need to be identified for transfer/decommissioning following completion of forest management activities (including silviculture); this would likely occur after 2018. Activities required prior to transfer will be identified in future FMPs. Potential future (Phase II) decommissioning opportunities in the Coastal Range of current FMP roads include the McLaren Lake and Little Black River road networks.

A potential opportunity for road decommissioning in the Coastal Range in the immediate or near future may be on the White River FMU. Operational road networks off the western end of the 770 road network (Figure 16, Figure 17) have been identified in Appendix VII (Roads Supplementary Documentation) of the 2008-2018 FMP for decommissioning. They fall within the Coastal Range on the south side of the White River near Umbata Falls, with the abandonment plan calling for all water crossing within 2 km of Umbata Falls to be removed as the associated operations cease. More active decommissioning of these roads e.g., site preparation, planting, could be investigated as a means of reducing the potential negative impacts of these linear disturbance on caribou. This would reduce foraging efficiency of wolves in this strategic location near Pukaskwa National Park and increase future potential connectivity between the park and the area to the west.

3.4.4.1.2 Discontinuous Range

Most of the planned road decommissioning in the Discontinuous Range is at least 30 km from the SCI Project and a lower priority than decommissioning in the Coastal Range.

In the Pic River Forest, the Islington, Deutzia, and Cornish Lake road networks are identified for transfer from the SFL to the Crown in the 2013-2018 period (Table 5). These networks are however located more than 45 km northwest of the Project.

The main foci for road decommissioning on the Big Pic FMU are the Nama Creek, Bishop Lake, Flanders Lake, Gene Lake, Hatley Lake, and Phillip Creek areas. The Nama Creek and Cable Road areas are the nearest to the Project site at approximately 30 km and given their location in the Neys-Killala Corridor are potentially useful for off-site mitigation given their strategic role

in improving possible north-south connectivity for caribou. Other road networks further north in the Big Pic Forest are considered a lower priority for inclusion as off-site mitigation.

In the White River FMU, the high priority decommissioning opportunities in the Discontinuous Range are near the 765 and 769 road networks near the White River and the 720 road network leading to Pukaskwa N.P. off 770 Road. These roads are located in a potentially strategic location for current and future caribou connectivity between Pukaskwa and the Coastal Range to the west, as well as northeast towards White Lake. The availability of these networks for decommissioning is not clear however.

Table 5. Attributes of potential road current and future road decommissioning opportunities. See Figure 16 for locations.

FMU	Road Network Name	Road Type	Approx. Road Network Length* (km)	Management Intent	Decommissioning Treatment	Potential Benefit
Pic River	Deutzia Lake	Active	42.5	identified for transfer to MNR in the 2013-2018 period after rehabilitation by SFL	Unknown but likely removal of some or all of the water crossings only; road is currently not drivable past the 3.7 km mark due to bridge removal	active decommissioning and rehabilitation of roadbed would potentially result in improved future forest habitat for caribou and lower risk of caribou mortality from wolf predation in the Discontinuous Range
Pic River	Islington	Active	35.9	identified for transfer to MNR in the 2013-2018 period after rehabilitation by SFL	Unknown but likely removal of some or all of the water crossings only; road is currently not drivable past the 2.8 km mark due to bridge removal	
Pic River	Cornish	Active	6.4	identified for transfer to MNR in the 2013-2018 period after rehabilitation by SFL	Unknown; likely pulling some or all of the water crossings only with no active decommissioning of roadbed	active decommissioning and rehabilitation of roadbed would potentially result in improved future forest habitat for caribou and lower risk of caribou mortality from wolf predation. In particular, would result in a larger contiguous block of future potential caribou habitat near Killala Lake and the deferral block immediately to the north in the Neys-Killala Corridor
Pic River	Trout	Active	19.3	MNR to decommission	unknown	active decommissioning and rehabilitation of roadbed would potentially result in improved future forest habitat for caribou and lower risk of caribou mortality from wolf predation in the Discontinuous Range
Pic River	Fishnet	Active	12.9	MNR to decommission	unknown	
Pic River	Little Black River Road	Active	9.1	MNR to decommission	unknown	active decommissioning and rehabilitation of roadbed would potentially result in improved future forest habitat for caribou and lower risk of caribou mortality from wolf predation in the Discontinuous Range

FMU	Road Network Name	Road Type	Approx. Road Network Length* (km)	Management Intent	Decommissioning Treatment	Potential Benefit
Pic River	McLaren Lake	Active	25.7	MNR to decommission	unknown	active decommissioning and rehabilitation of roadbed would potentially result in improved future forest habitat for caribou and lower risk of caribou mortality from wolf predation in the Coastal Range
Pic River	Vein Lake West	Retired	10.4	none	none currently planned	would potentially result in improved future forest habitat for caribou, increased connectivity, and lower risk of caribou mortality from wolf predation in the Coastal Range including the Neys-Killala Corridor
Pic River	"Neys" Road	Retired	8.9	none	none currently planned	
Big Pic	Nama Creek	Active	55.9	MNR to decommission	pull water crossings and actively decommission roadbed	if implemented, planned decommissioning would potentially result in improved future forest habitat for caribou, increased connectivity, and lower risk of caribou mortality from wolf predation in the Discontinuous Range immediately adjacent to Neys-Killala Corridor. These networks are immediately adjacent to the Neys-Killala Corridor and closest to the project site. Complete decommissioning (including rehabilitation of the road bed) would potentially reduce predator access to the Neys-Killala Corridor thereby potentially improving connectivity between the Coastal and Pagwachuan ranges. By reducing the future forest fragmentation in that area, it would also create a larger contiguous future caribou habitat block that could be used as a "stepping stone" between the ranges as well as supporting temporary occupancy in the Discontinuous Range.
Big Pic	Cable	Active	7.3	MNR to decommission	pull water crossings and actively decommission roadbed	
White River	770 Operational Roads (770-5,770-51,770-60,770-65,770-7))	Active	~ 25	decommission	pull water crossings within 2 km of Umbata Falls on the White River	active decommissioning and rehabilitation of roadbed would potentially result in improved future forest habitat for caribou and lower risk of caribou mortality from wolf predation in this strategic area in the Coastal Range adjacent to PNP

FMU	Road Network Name	Road Type	Approx. Road Network Length* (km)	Management Intent	Decommissioning Treatment	Potential Benefit
White River	770	Active	26.3	maintain	none currently planned	The construction of this road was strongly opposed by PNP (e.g., Théberge 2002) due to possible impacts on ecological integrity and wolves. Would remove major E-W corridor for wolves immediately adjacent to PNP and coastal zone and potentially strategic landscape linkage
White River	720	Active	7.1	not maintain	none currently planned	would reduce wolf mobility in a N-S direction to PNP and reduce fragmentation of future forest condition thereby improving potential habitat value for caribou.
White River	760 (incl. 760-02, 760-21 to 760-23)	Active	19.3	not maintain	none currently planned	would reduce wolf mobility and reduce fragmentation of future forest condition thereby improving potential habitat value for caribou. Could serve as potential future linkage with main part and caribou range to NE and decommissioning roads along this landscape corridor would improve future connectivity.
White River	765 (incl. 765-01 to 765-08)	Active	16.0	not maintain	none currently planned	

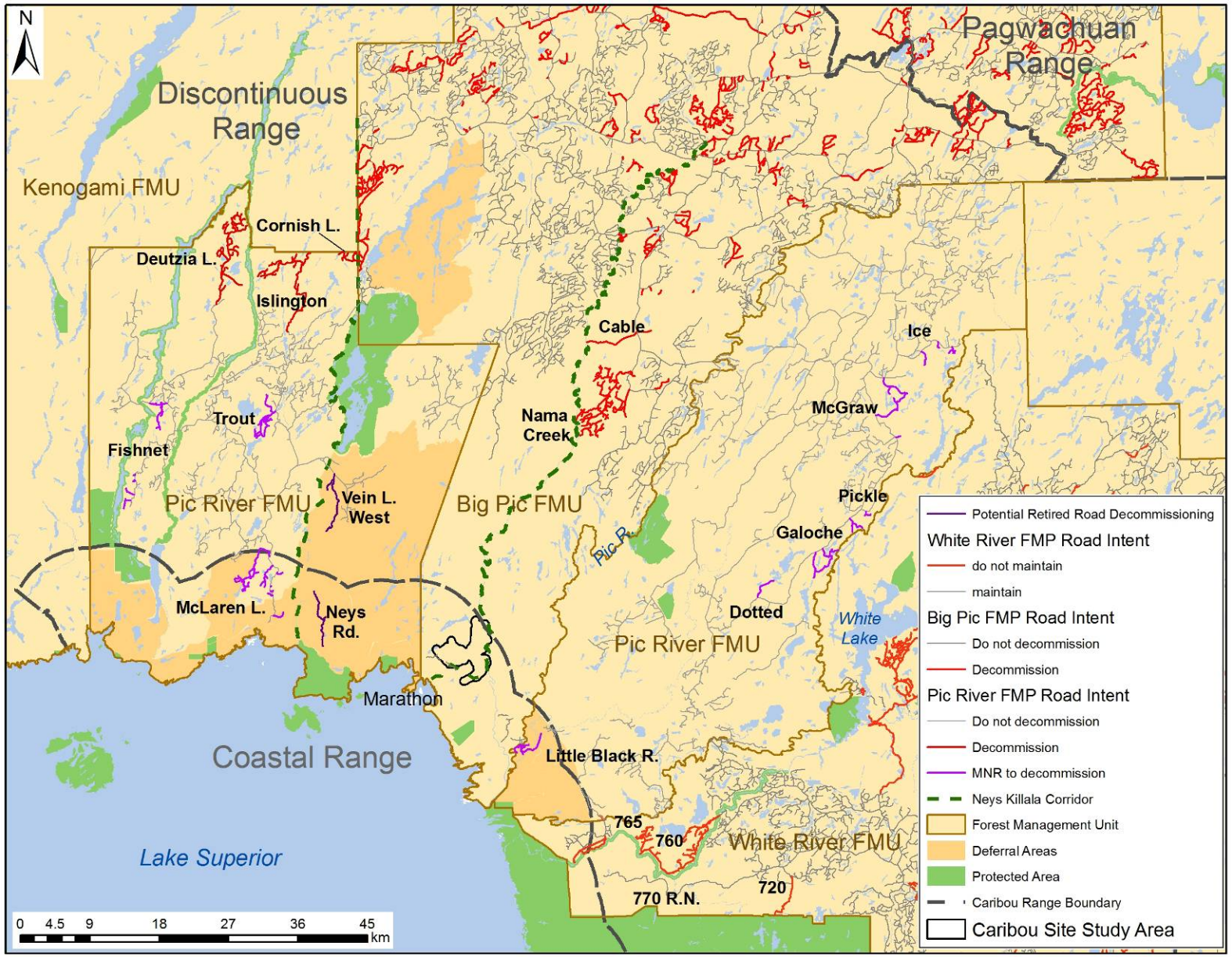

Figure 16. Location of potential road current and future road decommissioning opportunities

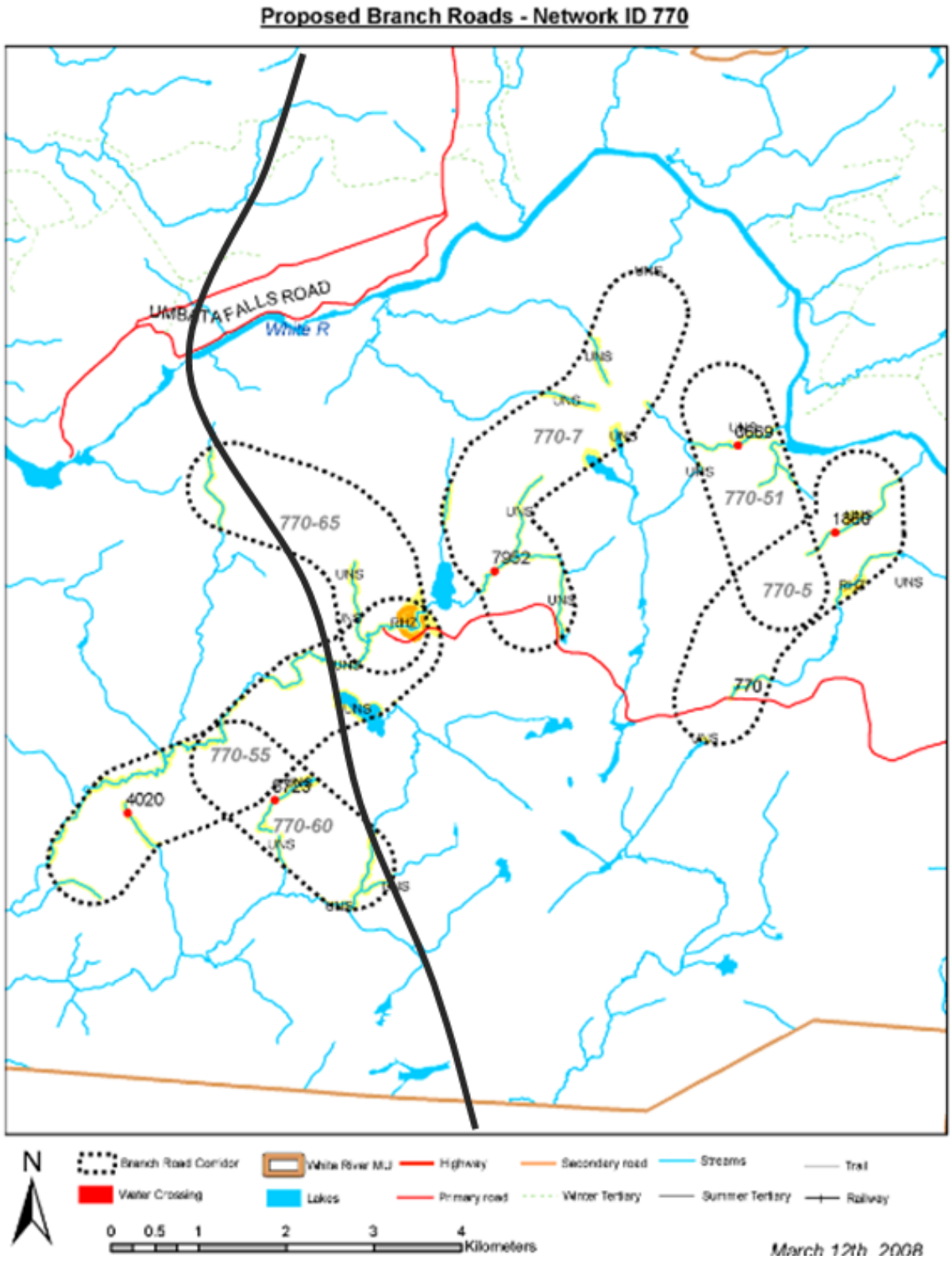

Figure 17. Potential road decommissioning opportunities in 770 Road Network near the boundary of the Coastal Range (heavy black line) along the White River (White River FMP SuppDoc p. 214)

3.4.4.2 Potential Retired Road Decommissioning

GIS mapping, GoogleEarth , and high resolution imagery from the current eFRI were examined by Northern Bioscience and MNR district staff to identify potential opportunities for decommissioning old access roads that are no longer required for forestry. Two potential candidates were identified (Figure 18): the Neys Road and the Vein Lake Road West network.

Figure 18. Location of Neys Road and Vein Lake road network, two "retired" roads with potential for decomissioning.

3.4.5 Other Considerations

The treatments used for decommissioning can vary depending on the intent e.g., preventing motorized access, reducing efficiency of predator travel, or restoring future forested condition. Prescribed decommissioning strategy will require site visit and consideration of location road conditions, environmental values, history of use, and other factors. For example berming and tree felling may only need to be done at the start of the road network to prevent access, but if there is higher potential for ATV use, then more aggressive treatment (e.g., five of dice) may be required over a greater length of road to discourage access. In addition, treatments may not need to be consistently applied along the length of the entire road. For example, access traps may be concentrated at the start of the road network, and can be less frequent or intense in more remote portions of the road. Not all water crossing may be removed depending on long-term environmental risk to aquatic resources and what effect removal might have on reducing use of the road by people and wolves. Active decommissioning will need to include berming/ditching at intervals to discourage vehicle, ATV, and other access and prevent damage to regeneration. For example, 100 m of 5 of dice might be followed by 400 m of scarification and planting, then repeated. Untreated slash along the margins of the roadway may potentially be piled to free up that area for regeneration (i.e., create plantable spaces). The slash piles could potentially be used to reduce human and predator access on the road and reduce predator sight lines as has been done on decommissioning efforts in northwestern Ontario (e.g., Sioux Lookout district) and in western Canada (Golder Associates 2012).

4 Proposed Off-site Mitigation

4.1 Rationale

Off-site caribou habitat remediation is looked at as a mechanism for offsetting the loss or impairment of potential woodland caribou habitat on the Project site. Potential woodland caribou habitat in the Local Study Area (LSA) may be impaired during operation and some areas will remain impaired after closure even when on-site mitigation measures have been fully applied. Woodland caribou numbers on the mainland Coastal Range are very low (Foster and Harris 2012), and improving future forest condition (e.g., increased conifer) through off-site mitigation is intended to help increase the probability of persistence of the mainland coastal caribou, a CCP objective. Improved future habitat conditions may contribute to increasing caribou population numbers and geographic breadth of occupancy in the Coastal Range (MNR 2013b). Increased caribou numbers and occupancy will improve resiliency, opportunities for connectivity through other locations, and probability of persistence.

Increasing the size of woodland populations, quality and quantity of habitat, and connectivity opportunities is a long-term process. Habitat requires a landscape pattern of large landscape patches of suitable habitat, which is mature and old forest dominated by conifer. Caribou habitat is dynamic, and large natural disturbance events occur, as well as ongoing forest management and other anthropogenic activities. Woodland caribou use the landscape at many spatial scales, and habitat patches must be arranged in a suitable pattern to function at a variety of spatial and temporal scales while facilitating connectivity. In order to achieve these objectives in caribou recovery, and more specifically in mitigation packages, a comprehensive approach utilizing many strategies is warranted (MNR 2013b). Woodland caribou distribution, habitat use, and movements are poorly understood in the Coastal and Discontinuous ranges. In the absence of an integrative strategy for the coastal and discontinuous ranges, the FMPs for these areas incorporate the most current understanding of caribou habitat use for those FMUs and have caribou habitat strategies and objectives. To be most effective, off-site mitigation measures will be consistent with the direction provided within those FMPs and build upon existing habitat and forest management activities and initiatives.

After examination of the potential opportunities identified in the Coastal and Discontinuous ranges, the following areas are proposed for off-site mitigation:

1. Nama Creek Road Network - primarily active road decommissioning, with some enhanced silviculture of landings and slash piles;
2. "Neys" Retired Road - primarily active road decommissioning, with some enhanced silviculture of landings and slash piles;
3. Vein Lake West Road Network - active road decommissioning, enhanced silviculture, and slash pile remediation; and
4. Deadhorse Creek / McLaren Lake Block - primarily active road decommissioning, with some enhanced silviculture of landings and slash piles.

These sites were selected because they represent the best opportunities available for conducting off-site mitigation to improve caribou habitat to help meet the goal of OMNR's Caribou Conservation Plan i.e., to maintain self-sustaining, genetically-connected local populations of forest dwelling caribou where they currently exist; improve security and connections among isolated mainland local populations; and to facilitate the return of caribou to strategic areas near currently occupied range. They were also selected because they do not have liabilities associated with current SFL holders. For example, road decommissioning using water crossing removals was planned in the current FMP and underwent public consultation as part of the FMP planning process. The proposed mitigation treatments will improve upon the water crossing removals through enhanced additional silviculture for roadbed reforestation, landings, and any other voids not regenerated as part of the approved plan. The four proposed off-site mitigation locations support caribou-related strategies in existing forest management plans on the Big Pic FMU and the Pic River forest management units which include the development of a dynamic caribou habitat schedule (DCHS) within the continuous distribution zone (Figure 19) and the enhancement of current and future connectivity between the (Pagwachuan and Nipigon ranges (northern continuous zone) and the southern Lake Superior Coastal Range (coastal continuous zone).

As detailed in Section 3.2.2 of the 2007-2017 FMP, the Big Pic Forest was divided into three separate zones, each with a different habitat management strategy. A DCHS has been developed for the Pagwachuan Range in the northern continuous zone at the north end of the Big Pic Forest (Figure 19). The intent within this area is to promote the consolidation of disturbance areas and limit new fragmentation of the forest, and therefore there are no A mosaic blocks (i.e., those planned for harvest in the next 20 year term in order to limit access to areas that have not been previously disturbed. It is envisaged that this zone will provide a source of caribou immigrants to the coastal zone (grey arrows on Figure 19, which would provide critical demographic and genetic interchange for smaller, isolated populations along the coast. This could potentially occur from long-range dispersal of individuals, likely males, or perhaps through a slower process of temporary residency in suitable habitat patches in the Discontinuous Range (D. Elder, pers. comm.).

The 2009 Annual Report for the Big Pic FMP outlines management direction for providing suitable, landscape-level habitat patches in the Discontinuous Range that will enhance opportunities for north-south connectivity. Connectivity between these two zones will be achieved primarily through the creation of a large deferral block (which also functions as a marten core) on the Big Pic Forest, which is complemented by the similar the establishment of a proposed deferral corridor on the Pic River Forest from Neys Provincial Park (in the south) to the Killala Lake Conservation Reserve (in the north). This will link to the planned deferral block (shaded dark pink on Figure 19). Marten core block deferral areas and reserved forest area (e.g. parks and conservation reserves) will provide additional large landscape patches of undisturbed forest in the discontinuous and coastal zones allowing for travel opportunities for caribou. The location and sizes of these patches of undisturbed forest cover will provide "stepping stones" to allow for connectivity between the two continuous distribution zones (northern and coastal), directly north to the Caramat area or further east to remnant populations in the Nagagami area

and to the adjacent Nagagami Forest in the northeast. This strategy is consistent with Sections 2.7, 4.1.3 and 4.1.4 of the CCP. Deferring harvest from potentially key habitat tracts/linkages will ensure Phase II operations will not compromise the strategic landscape direction in the future. Proposed road decommissioning in the Nama Creek (see Section 4.2) and decommissioning/ enhanced silviculture in the Vein Lake West Road retired road (see Section 4.3) will improve potential caribou habitat in large habitat patches and connectivity in the Discontinuous Range.

Due to the geography, existing disturbance, and limited size of the Coastal Range, development/incorporation of a typical DCHS in the coastal zone during forest management planning was not feasible. The current DCHS approach in the Big Pic and Pic River plans are designed around defragmentation opportunities with existing road networks, using a combination of "clean-up" blocks and deferral blocks. The deferrals are for 20 years initially, which provides time over the life of the current 10-year plan to develop a longer term strategy for the large landscape patches (LLP's). LLP's are and will continue to be central to the concept of existing and future residency and stepping stone connectivity, and are consistent with the most recent science developed on landscape texture and coarse filter management in Ontario's boreal forest. This approach does not foreclose on any opportunities to be integrated into a larger coastal and discontinuous distribution zone strategy currently under development (G. Hooper, pers. comm.)

The strategy for this zone was therefore to define habitat/ecological tracts as best as possible, and develop operational harvest blocks and deferral periods (Figure 19). This is to ensure that this area will provide sufficient habitat in support of caribou's continued coastal occupancy (security and persistence) as well as support movement between remnant populations, consistent with the intent of the CCP (Section 4.1.4). Active decommissioning of the "Neys Road" (see Section 4.4) and enhanced silviculture of the Deadhorse Creek - McLaren Lake block (see Section 4.5) will improve potential caribou habitat in these deferred blocks in the Coastal Zone.

These locations were chosen based on the following criteria:

- Strategic location in the Coastal Range and or Neys-Killala corridor;
- Opportunities to create more contiguous clusters of suitable habitat;
- Large landscape patches will be part of a "stepping stone" mosaic that will contribute to connectivity both within the coastal Range and with ranges farther north; and
- Of appropriate scale to compensate for potential lost connectivity during the active phase of the proposed SCI mine and potentially impaired connectivity after remediation post-closure.

There were fewer opportunities on the east site of the proposed project. This area has a long history of forest management, as well as active mineral exploration (e.g. Harte Gold Sugar Zone project) and existing or planned hydroelectric development on the Black River and White River. The high degree of forest fragmentation has resulted in fewer large landscape patches in this area, and increased road access required for multiple commercial activities (e.g., hydropower,

mineral exploration, forestry) limits the opportunities for road decomissioning. The relative lack of caribou research and monitoring work in this area limits OMNR's understanding of caribou numbers and any use in this area (R. Wheldon, pers. comm.). However, there appears to be less current use of this area by woodland caribou based on the paucity of recent observations. All the recent PNP observations are clustered much farther down the coast near Otter Island. In contrast, the Pic Island area west of the Project has the greatest concentration of recent observation in the mainland Coastal Range outside Pukaskwa National Park (PNP).

Table 6 summarizes how the proposed offsite mitigation will meet the principles of the CCP, and the applicable FMPs.

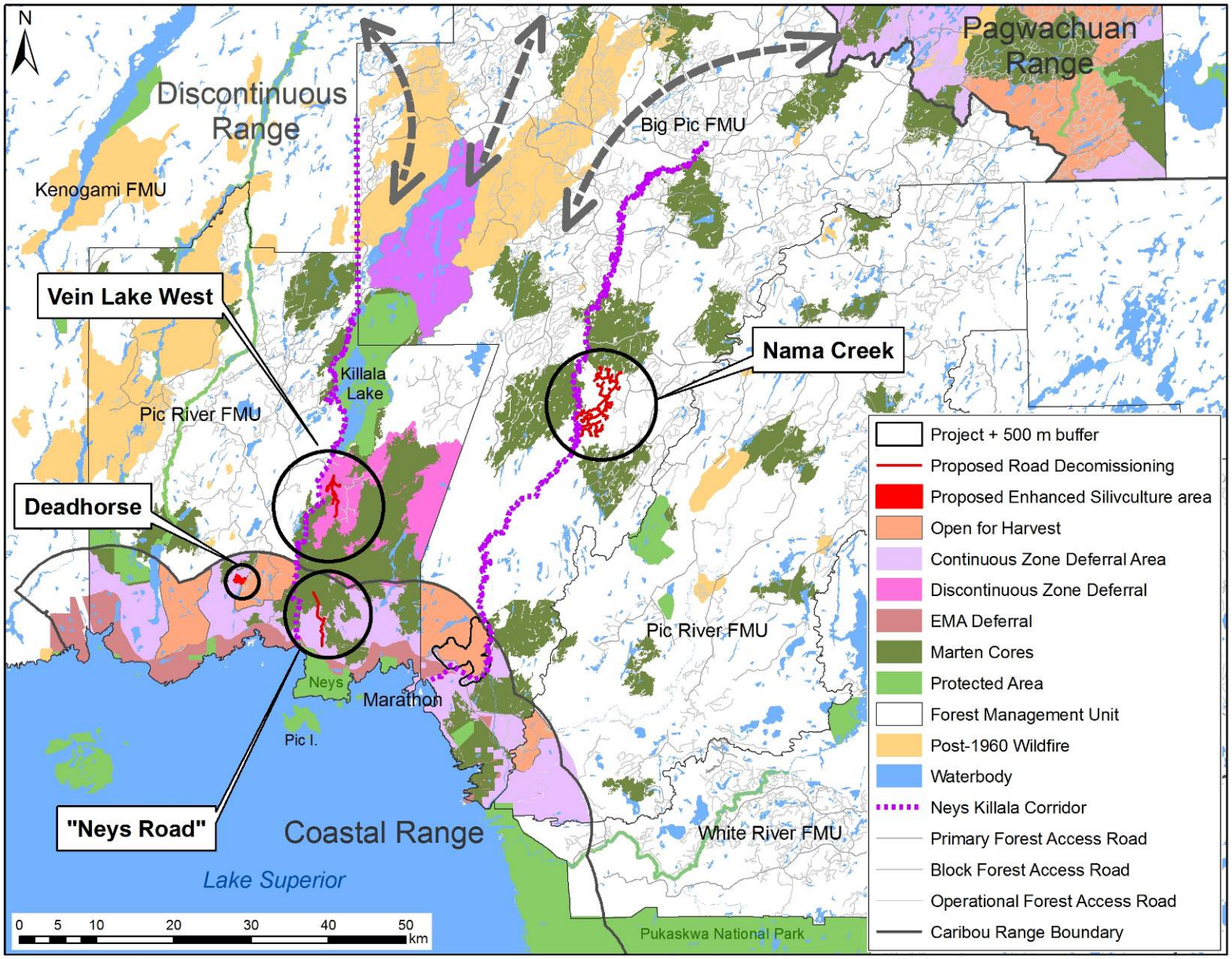

Figure 19. Location of proposed off-site remediation with respect to landscape level habitat patches and potential caribou movement (dashed arrows) through the Neys-Killala Corridor.

Table 6. Summary of concordance between policy direction and proposed off-site mitigation.

POLICY	Off-site Mitigation
Benefits will be scaled and assessed on a contextual basis	Proposed scale of off-site mitigation is appropriate given: • the disturbed current state of much of the potential caribou habitat on at the Project site and surrounding landscape; • Project-specific categorization for much of the project site and surrounding landscape as Category 2 - seasonal range and some Category 3-disturbed areas; • lack of documented current use of the Project site by caribou; • very low numbers of caribou in the Coastal Range that could be potentially impacted; • on-site mitigation measures to remediate habitat post-closure; • sensitivity of caribou to anthropogenic disturbance and disturbed condition of much of the Coastal Range west of Pukaskwa N.P.
Benefits must be achieved within a reasonable time	Caribou habitat (i.e., forest) management requires long time frames (e.g., decades) as will potential recovery of caribou populations in the Coastal Range. Road decommissioning have beneficial impacts on reducing human and predator mobility within 10 years, and will result in potential caribou refuge habitat within 40 years when the forest matures sufficiently.
Benefits are outcome-oriented	Decommissioning roads and increasing the conifer component of future forest stands will measurably defragment and improve current and future caribou habitat in the Coastal Range and adjacent Discontinuous Range. These are directly associated with lower mortality and increased probability of persistence of caribou populations.
Outcomes should involve consideration of where the greatest overall benefit can be achieved for the species	OMNR is committed to the recovery of caribou populations in the Coastal Range and the off-site mitigation is targeted to those areas and adjacent discontinuous range to provide connectivity with continuous range farther north. The off-site mitigation will occur in the landscape near the Project where the caribou populations that could be potentially affected by the Project are resident.
Proposed actions should be based on the best available scientific information	The link between habitat fragmentation, predation, and caribou is widely acknowledged by caribou experts. The proposed monitoring will build upon the most recent science examining the relationships among of linear features, wolves, and caribou and will help guide future decommissioning efforts.
Proposed actions should involve consideration of ecological function	The EIA for caribou thoroughly examined caribou ecology in the Coastal Range, including the important role of Lake Superior shoreline and islands as escape habitat. This has explicitly guided consideration of linear feature research, improving refuge habitat, and road decommissioning as off-site mitigation actions. Effectiveness monitoring of off-site mitigation will also contribute to a better understanding.
An assessment of benefit will involve consideration of relevant uncertainties and risks	Although there is no documented use of the Project site by caribou, due to the Project's location and lack of scientific research there is uncertainty about the potential to impair connectivity now or in the future. As a result SCI has erred on the side of caution by proposing off-site mitigation actions at a larger scale and multiple sites, and proposed multiple actions, to address this increased potential for risk.

4.2 Nama Creek Road Network

The Nama Creek block is in a strategic location immediately adjacent to the Killala Corridor (Figure 19) and will provide future caribou habitat as adjacent marten cores senesce. Proposed decommissioning would potentially result in improved future forest habitat for caribou, increased connectivity, and lower risk of caribou mortality from wolf predation in the Discontinuous Range immediately adjacent to Neys-Killala Corridor. Active road decommissioning through access traps and scarifying and replanting the roadbed will benefit caribou in the near term through reduced predator mobility and foraging efficiency and will create suitable future refuge habitat once the regenerating conifers mature.

The active decommissioning of 55 km of roadbed results in approximately 80 ha of new refuge habitat. In addition, as shown in Figure 20, active decommissioning would remove approximately 3500 ha of what would otherwise remain as disturbance on the landscape according to Environment Canada's (2013) and OMNR's caribou habitat models if only the water crossings had been pulled without any remediation of the roadbed. By reducing the future forest fragmentation in that area, it the proposed off-site mitigation will create a larger contiguous future caribou habitat block that could be used as a "stepping stone" between the ranges as well as supporting temporary occupancy in the Discontinuous Range. Complete decommissioning including rehabilitation of the road bed will potentially reduce predator access with regenerating conifers on the road reducing wolf foraging efficiency. This will potentially reduce predation risk to caribou in and near the Neys-Killala Corridor and potentially improve connectivity between the Coastal and Pagwachuan ranges.

The Nama Creek Road area is slated for decommissioning when forest harvest is complete during the next 5 year planning term of the Big Pic FMP. As identified in the FMP, decommissioning will include removal of the bridge over Nama Creek as well as other water crossings (e.g. culverts) in the block where necessary. Off-site mitigation is proposed to actively decommission approximately 55 km of primary, branch and operational forest access roads beyond the Nama Creek Bridge. This would involve scarifying the roadbed (Figure 21) and planting it with conifer(e.g. jack pine, black spruce) stock, with more aggressive techniques e.g., berming, five-of-diamonds used selectively to strategically deter motorized use (primarily snowmachines). Associated landings would be similarly scarified and planted (Figure 21) and roadside slash will be piled to create plantable spaces where possible.

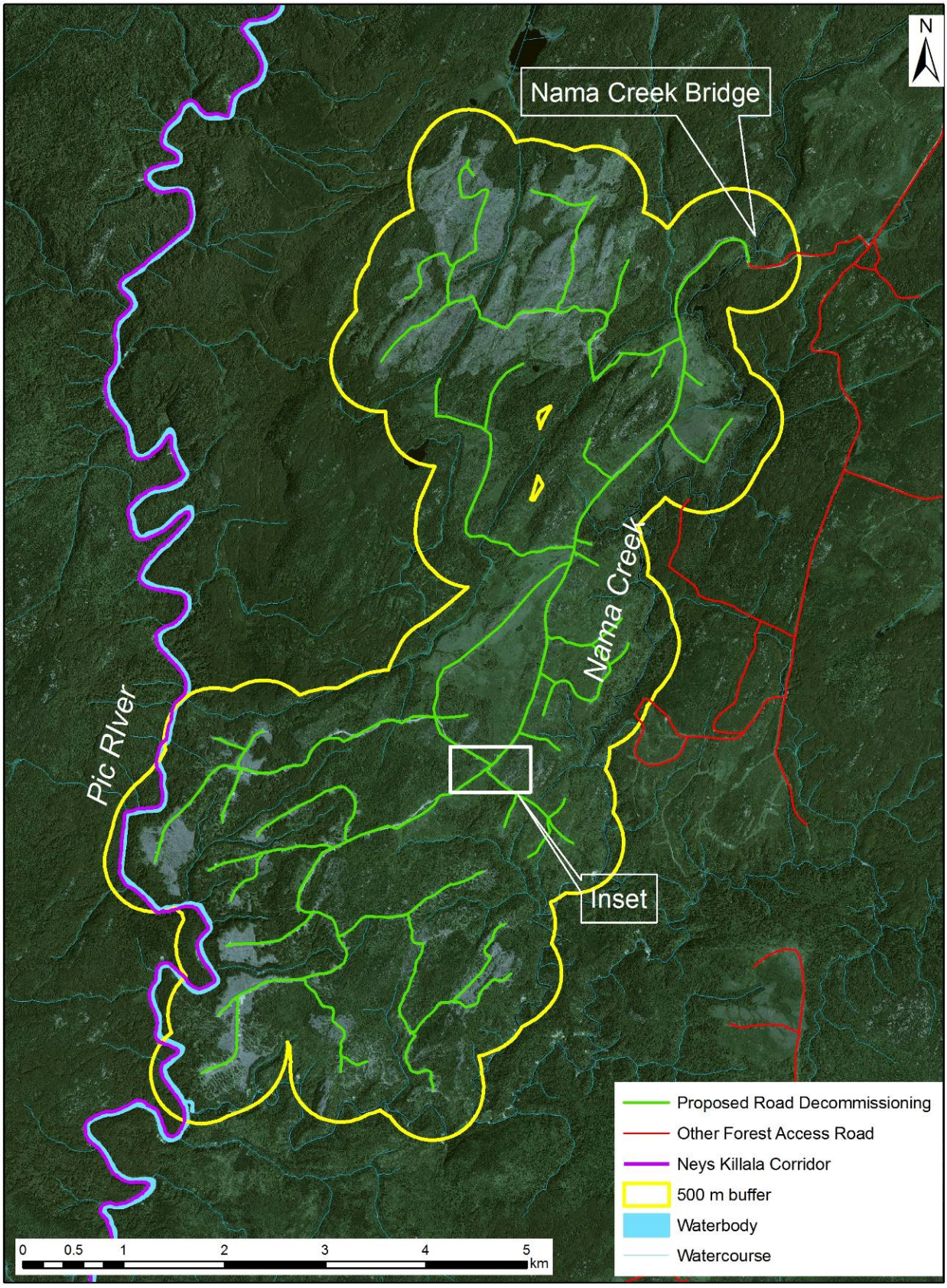

Figure 20. Proposed acive road decommissioning of the Nama Creek Road network and 500 m buffer.

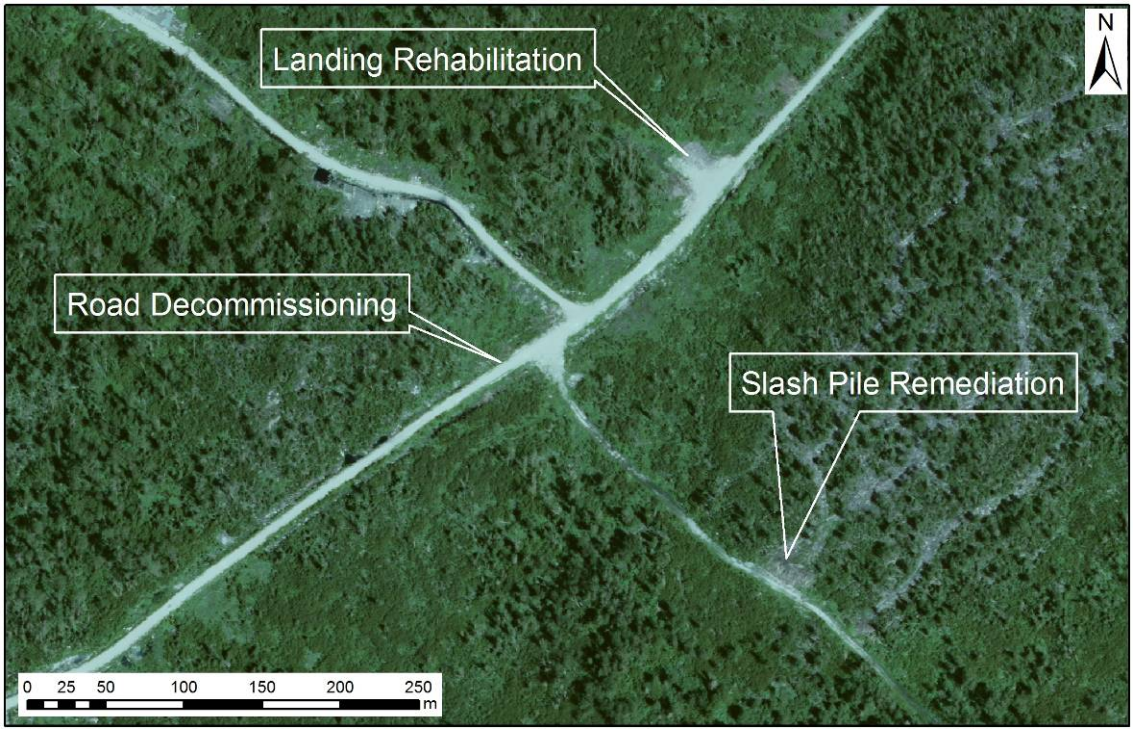

Figure 21. Inset detail of examples of off-site mitgation in the Nama Creek road network.

4.3 Vein Lake West Retired Road Network

Off-site mitigation activities are proposed along the Vein Lake West retired road network (Figure 19). The proposed mitigation is in a large deferral block in the discontinuous zone just south of Killala Lake in the Neys-Killala Corridor approximately 6 km north of the Coastal Range boundary. It is a strategically-located area between Pic Island, which is a Category 1 habitat as it is a traditionally used calving and high use wintering area (Figure 4), and the Killala Lake Conservation Reserve, a key protected area in the Neys-Killala Corridor. The Killala Lake Conservation Area can potentially serve as a "stepping stone" for movement of caribou between Coastal Range and northern continuous ranges. Improvement of habitat suitability for caribou over the long term would complement landscape pattern and dynamics that benefit caribou. The area is located just west and north of mature conifer-dominated marten cores in this deferral block that can currently provide winter and refuge quality for caribou (Figure 19). Decommissioning would reduce potential north-south wolf movement in Neys-Killala Corridor and would therefore increase suitability of refuge habitat in local landscape, particularly Neys-Killala Corridor.

A total of 13 km of former operational (secondary) forest access road have been provisionally identified for potential decommissioning within this road network (Figure 22). Eventual restoration of road to mature forest is equivalent to removal of approximately 13 km^2 or 1300 ha of disturbance (13 km of road with 500 m buffer on either side). By defragmenting the future forest, removal of the roadbed will improve future habitat suitability for caribou and reducing predator travel and foraging efficiency will also potentially benefit caribou in the near term as well. Associated roadside landings will also be rehabilitated and planted (Figure 23).

Examination of eFRI imagery indicates that there are patches of low conifer stocking (Figure 23) in some of the regenerating cutovers adjacent to the proposed road decommissioning block where enhanced silviculture could improve the future suitability of the stand as woodland caribou winter and refuge habitat (Figure 26). These stands, totally approximately 370 ha, were harvested from 1981 to 200, with the most recently harvested stand a 40 ha block in the northwest. Not all of this area will have off-site mitigation measures applied; rather these stands delineate the outer geographic extent of potential actions. Preliminary identification of areas to be treated and possible treatment packages will be undertaken in early 2014 using 3-D eFRI imagery. These preliminary options will be jointly ground-truthed with OMNR and SCI (or its representatives) during the snow-free season in 2014 to finalize the enhanced silviculture packages to be undertaken for off-site mitigation.

Silvicultural objectives will be consistent with the FMP objectives for this stand i.e., to increase conifer component and return the area to a more natural historical forest condition that existed prior to fire suppression and forest management. The desired Forest Unit for these areas are Sb1, PJ1, PJ2 and in-fill planting with black spruce or jack pine would increase the stocking of the site and resulting in a higher conifer component in the future stand, increasing its suitability as refuge habitat for woodland caribou. The intent of vegetation management is not to reduce moose populations at the WMU level, since direction from OMNR's Cervid Management Strategy is to manage moose and caribou in this Cervid Ecological Zone. The management intent is rather it is to provide large block of relatively even-aged conifer dominated forest as would have happened under natural fire regimes (i.e., emulating natural disturbance). These habitat patches provide refuge habitat for woodland caribou (as well as marten and other species) in a more disturbed landscape matrix of young forest which provides habitat for species such as moose that also require on younger forests.

The off-site mitigation actions will be silviculturally appropriate and consider tree species autecology, site conditions, and vegetation competition. Although done outside the context of a FMP, they will be consistent with approved OMNR silvicultural ground rules (SGRs) in order to meet silvicultural objectives for the future forest condition. Use of mechanical site preparation (e.g. disk trencher) is unlikely to avoid damaging existing regeneration, particularly any Free to Grow (FTG) conifer already established. Potential treatments include chemical (aerial spray or backpack spray of herbicides) and/or mechanical release (i.e., brushsaw) to reduce graminoid (e.g. bluejoint grass), herbaceous (e.g., raspberries) and/or woody competing vegetation (e.g., alder, willow). This will likely be followed with in-fill planting if necessary using pine and or spruce depending on the site conditions and silvicultural objectives.

Rehabilitation of older slash piles from previous forest management plans is not the responsibility of the current sustainable SFL holders. Nawiinginokiima Forest Management Corporation (NFMC) has taken over forest management responsibility for the Big Pic Forest from the former SFL holder was Marathon Pulp Inc. (MPI), now in bankruptcy protection. Where practical, old slash along roadsides will be piled and exposed mineral soil planted with appropriate stock to reclaim productive landbase and improve conifer component.

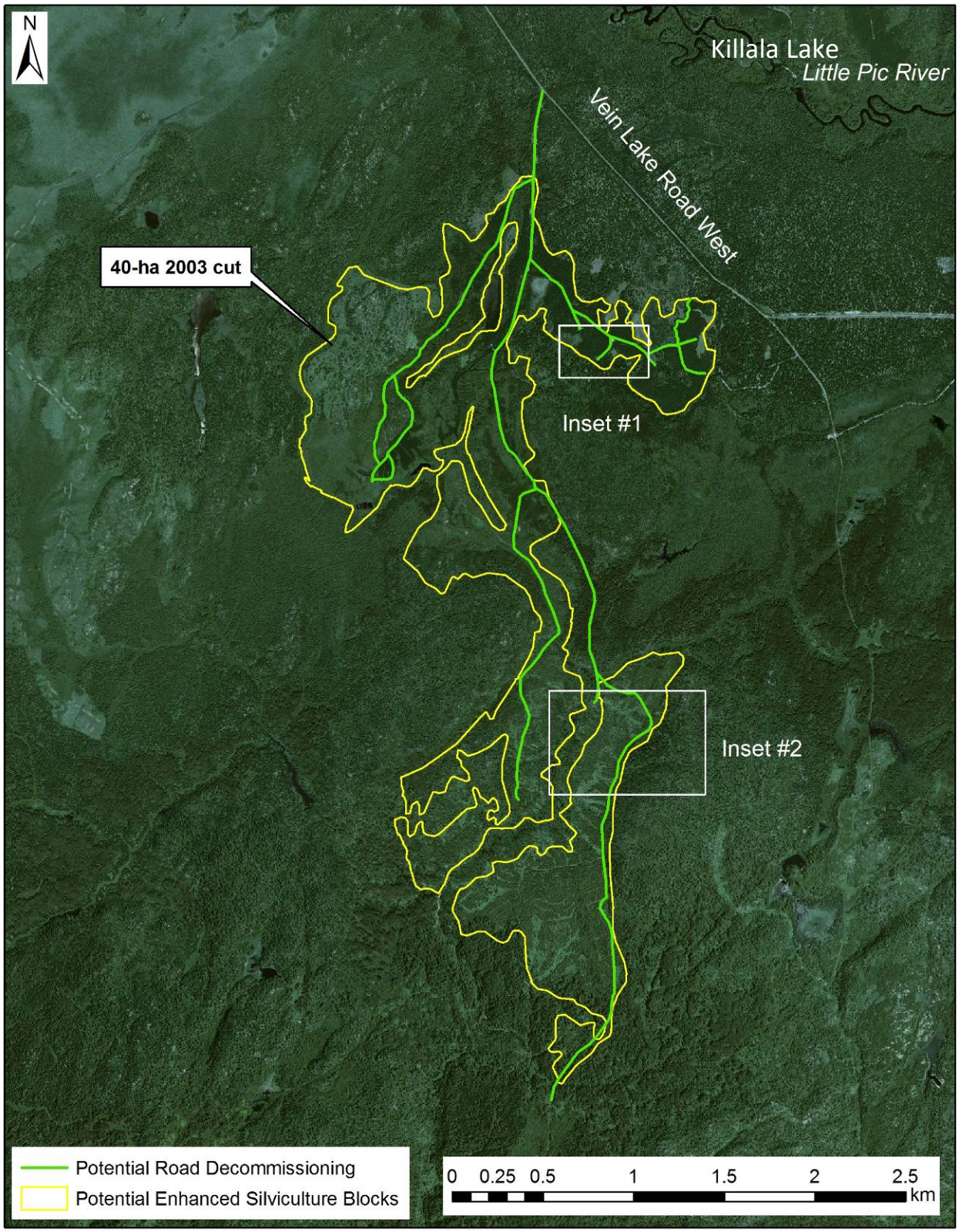

Figure 22. "Retired" Vein Lake Road network road south of Killala Lake with potential for decomissioning.

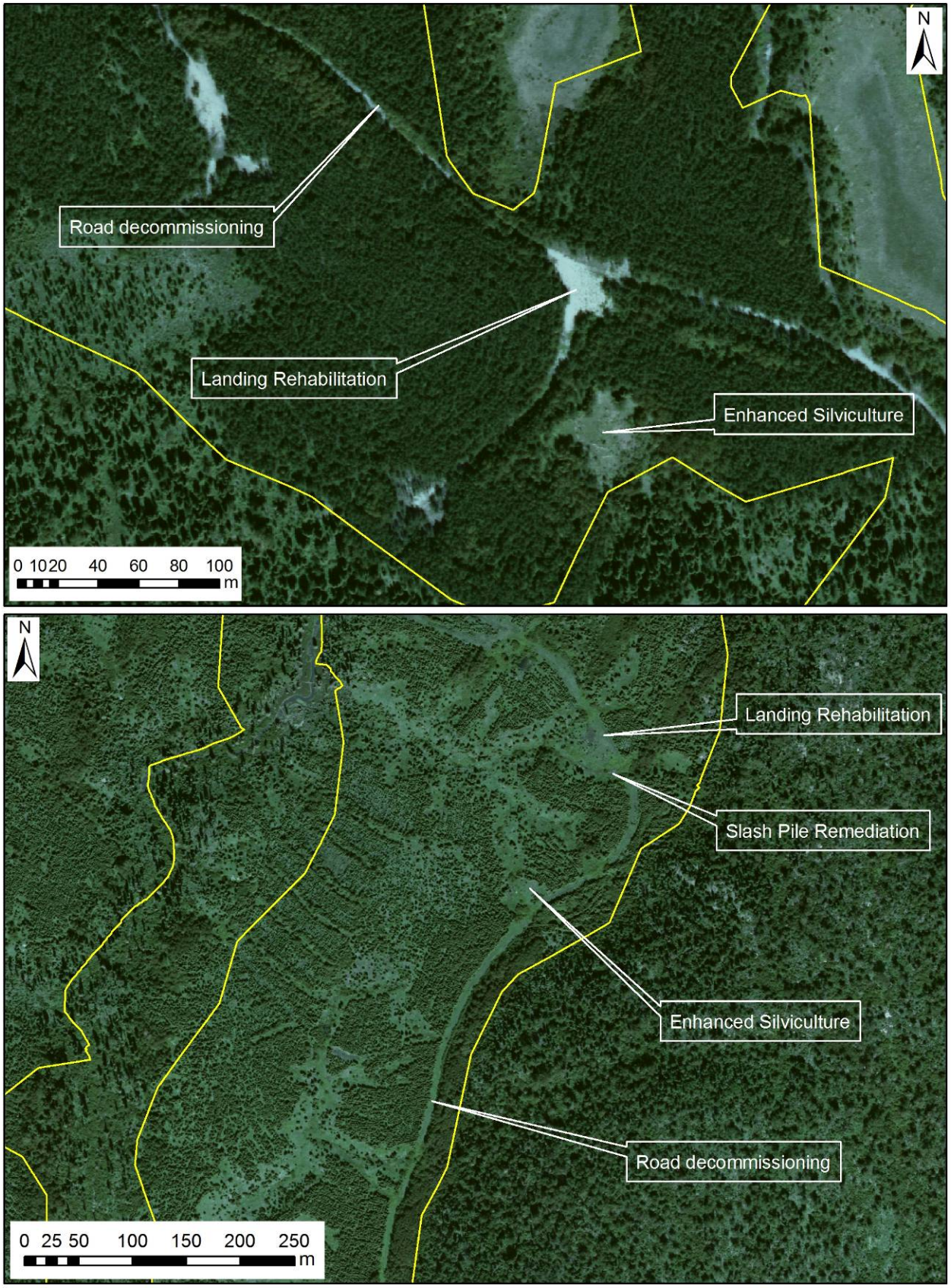

Figure 23. Insets of potential off-site mitigation activities in the Vein Lake West retired road network.

4.4 Neys Road

Approximately 9 km of this former operational (secondary) access road in Pic River FMU is proposed for decommissioning (Figure 24). The Neys Road has a strategic location in the Coastal Range at the base of OMNR's Neys-Killala Corridor, and it is immediately adjacent to Neys Provincial Park and Pic Island, which appear to still be used by coastal caribou. Furthermore, it is located in a deferral block and is immediately adjacent to a large marten core. Active decommissioning (e.g. scarification, berming, five of diamonds) and planting of the road will reduce potential north-south wolf movement in Neys-Killala Corridor and linkages to adjacent transmission line right of way and Hwy 17. The road is located adjacent to rocky outcrops with good potential winter and refuge habitat, and it rehabilitation would increase suitability of refuge habitat in local landscape, particularly Neys-Killala Corridor. Rehabilitation will eventually return approximately 10-15 ha of roadbed to conifer forest and the eventual restoration of road to mature forest is equivalent to removal of approximately 9 km^2 or 900 ha of disturbance (~ 9 km of road with 500 m buffer on either side).

The "Neys" road is part of OMNR's "retired roads layers" and is no longer used for forest management, mining, or other industrial users. The road is impassable by vehicles due to washout at south end but it may see some local use by recreational or traditional users on ATV, snow machine, or foot. As a result, more aggressive decommissioning techniques (berming, five of diamonds) may be required at strategic locations, particularly near the southern terminus of the road, to discourage motorized access to prevent damage to regenerating trees on the rehabilitated road.

Figure 24. Neys Road, potential "retired" road proposed for decomissioning (yellow line).

4.5 Deadhorse - McLaren Lake

This proposed off-site mitigation block is located within the Coastal Range, within a DCHS block that is deferred from planned harvest. Improving the future stand condition of this area would contribute to future caribou habitat by creating a more-even aged, spruce-dominated conifer stand preferred by caribou.

The 80-ha Deadhorse-McLaren area proposed for off-site mitigation is located north of McLaren Lake and immediately west of the Deadhorse Creek harvest block (Figure 19, Figure 25). The Deadhorse Creek DCHS block is planned for continued harvested under the next 5-year term of the current Pic River FMP (Figure 12). The off-site mitigation area proposed for enhanced silviculture was cut as a winter harvest in 2000 under the former SFL holder (now bankrupt). The block was scarified and planted with black spruce, but eFRI imagery indicates large areas of low conifer stocking within the block (Figure 26). In-fill planting with black spruce would increase the stocking of the site and resulting in a higher conifer component in the future stand, increasing its suitability as refuge habitat for woodland caribou. Planting of the winter road would also help reduce the legacy of anthropogenic disturbance from harvesting and eventually result in a more closed canopy.

As with proposed enhanced silviculture in the Vein Lake Area, treatment will be dependent on a site visit during snow-free conditions in 2014 to determine the appropriate treatment based on site conditions and what is silviculturally appropriate to meet desired future forest condition.

If the winter road which was used to access this block in the previous forest management plan is upgraded to access allocated stands to the east in the Deadhorse Block in the current FMP, then there is the potential to bring in equipment to remediate slash piles in the block that were identified in Section 3.2 (Figure 11, Figure 26). Due to the elapsed time since there were active operations in the block (>10 years), the slash piles have likely degraded to the extent that they cannot be burned, but a minor increase in future forest area could be achieved by piling the slash. In the absence of adjacent forest operations, the cost and impact of upgrading the road would negate the potential benefit from slash remediation.

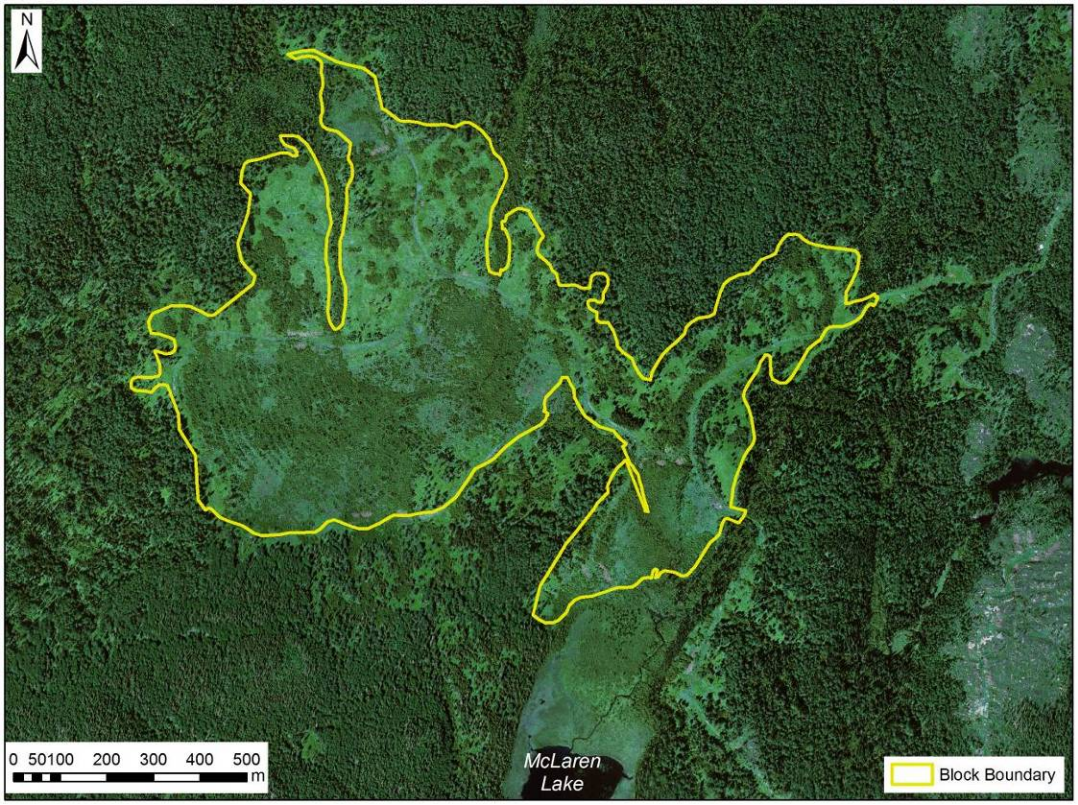

Figure 25. Deadhorse off-site mitigation block proposed for enhanced silviculture.

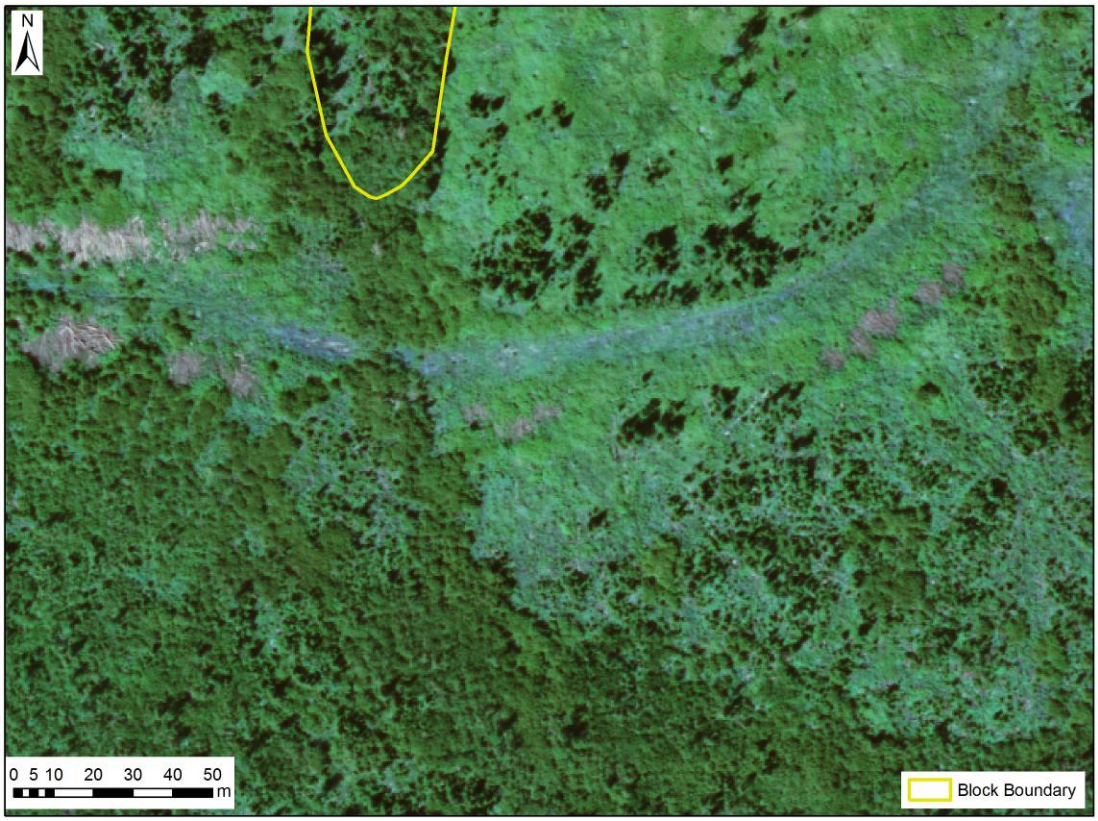

Figure 26. Detail of Deadhorse off-site mitigation block showing low conifer stocking and slash piles.

5 Effectiveness Monitoring

An effectiveness monitoring program will be undertaken to determine if the proposed off-site mitigation actions have had the intended results. In particular, the effectiveness monitoring program will assess if:

- Enhanced silviculture measures have successfully regenerated poorly stocked cutovers;
- The regeneration on the rehabilitated roads, landings, and slash piles is sufficient; and
- Predator mobility has been reduced.

The details of the effectiveness monitoring program will be developed will be developed with OMNR input once an operational plan for road decommissioning, enhanced silviculture, and slash pile management has been developed after once confirmatory field surveys have been undertaken.

The effectiveness monitoring program will likely include the following components:

- regeneration surveys using the standard methodology used by the forest industry and OMNR i.e., Well-Spaced Free-Growing (WSFG) Regeneration Survey Assessment Procedure for Ontario (OMNR 2005). Details of the regeneration survey methodology;
- human access of decommissioned roads will be assessed by conducting a visual assessment of each road and making a determination as to whether or not the road is driveable by off-road vehicle (i.e., truck, ATV, snowmachine). This will include visual surveys with georeferenced photo documentation of human access; and
- trail cameras to determine the degree of use of the decommissioned road networks by large mammals i.e., wolves, bears, caribou, deer, and moose. The use of trail cameras to monitor wildlife is well-established (e.g., Damm 2010; Dreibelbis 2009; KHLP 2012; McCoy et al. 2011; Rovero, and Marshall 2009). Sample trail camera projects include:
    - For the last three years, Parks Canada has been using a network of 16 trail cameras in Pukaskwa National Park to monitoring woodland caribou, moose, white-tailed deer, wolves, and other incidental wildlife on offshore islands and adjacent mainland areas (C. Drake, pers. comm.) and OMNR has successfully used camera traps to monitor caribou presence/absence and movement at Neys Provincial Park (S. Kingston pers. comm.), as well as and at selected locations elsewhere in the Coastal Range (R. Tyhuis pers. comm.).

The results of the effectiveness monitoring will contribute to a better understanding on how decommissioning affects predator mobility and ultimately search efficiency and the risk of caribou mortality. In an MNR-sponsored workshop on woodland caribou research in Ontario (Rogers 2006) research on predation and effects of roads and other corridors were clearly identified as high priorities for future investigation. Section 3.7.3 of the provincial CCP (3.7.3) commits the Province of Ontario to develop policy to manage densities (thresholds) of roads and other linear features to support caribou persistence. Results of the monitoring program will be made available to the OMNR and can help inform development of decommissioning strategies in the Coastal and Discontinuous ranges.

The Coastal Range differs significantly from the study areas of CNFER's caribou-moose-wolf studies (OMNR 2012b) farther north in continuous caribou rang in a number of potentially significant ways such as:

- its geographic location at the southern edge of the range of caribou range,
- presence of white-tailed deer as alternate prey,
- presence of major linear features e.g., Hwy 11,
- more rugged landscape of Lake Superior Highlands, and
- presence of Lake Superior islands as escape habitat.

As such, results of effectiveness monitoring effectiveness monitoring may provide local insight to help inform future road decommissioning efforts in the Coastal and Discontinuous ranges. Information gathered could also support development and implementation of MNR's caribou conservation strategy for the Coastal and Discontinuous ranges. The proposed effectiveness monitoring would be beneficial to understanding the how wolves, caribou and other wildlife (e.g., black bear, moose, white-tailed deer) used corridors in the Coastal Range and adjacent Discontinuous Range. The coastal landscape and wildlife community (e.g. white-tailed deer) differ from the Auden and other study areas in the ongoing OMNR study. In addition, there is a greater density of existing linear disturbances in the Coastal Range as well planned ones such as the East-West Tie (OEB 2013) and forest or mining access roads. A better understanding of the effectiveness of various decommissioning strategies will help support resource management and planning with the intent of increasing the probability of persistence of caribou in the Coastal Range.

5.1 Summary

The proposed off-site mitigation measures are as follows:

1. Active decommissioning and planting of the approximately 55 km of the Nama Creek Road Network to reduce anthropogenic disturbance and improve future caribou habitat;
2. Active decommissioning of approximately 9 km "Neys" Retired Road to reduce anthropogenic disturbance and improve future caribou habitat;
3. Active road decommissioning of approximately 13 km of Vein Lake West Road Network with enhanced silviculture and slash pile remediation in adjacent roadside areas; and
4. Vegetation management (e.g. herbicide/brush saw) and infill planting in the 80-ha Deadhorse Creek / McLaren Lake Block to increase the conifer component and improve future potential caribou habitat.

The proposed off-site mitigation will result in the addition of approximately 115 ha of future conifer forest on the rehabilitated roadbeds and associated landings. This is approximately the amount of undisturbed potential refuge habitat (according to OMNR models) lost on the Project site. The mitigation will also result in the removal of over 4000 ha of disturbance (i.e. when considering the 500 m buffer) associated with the roads and enhance connectivity within and among ranges. Enhanced silviculture and slash remediation in the proposed areas will also increase the suitability of these strategic areas as future caribou habitat, with final prescriptions and extent to be determined by field surveys. Effectiveness monitoring will evaluate the success

of treatments and guide further actions. The proposed actions will more than offset any loss or impairment of potential caribou habitat and connectivity at the SCI project site.

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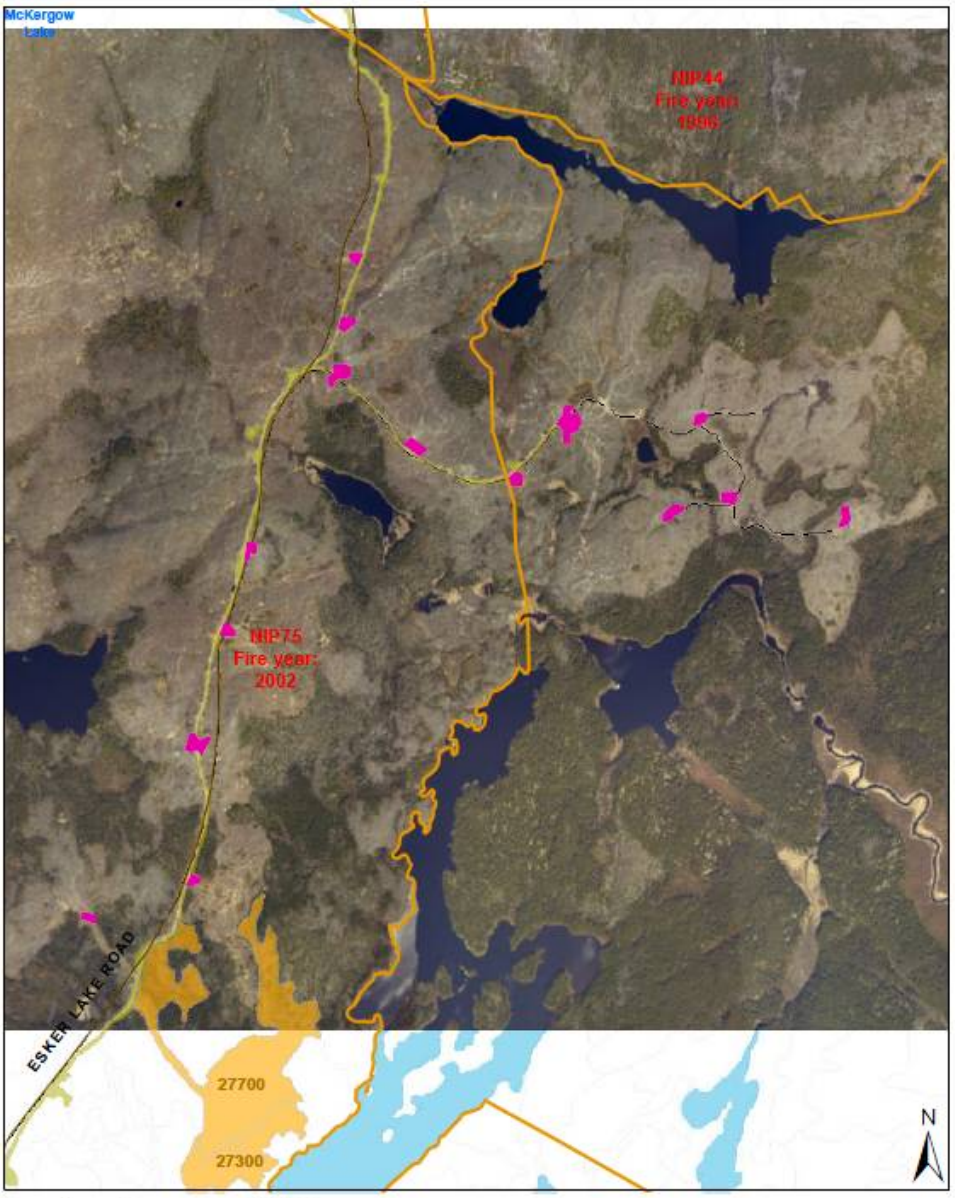
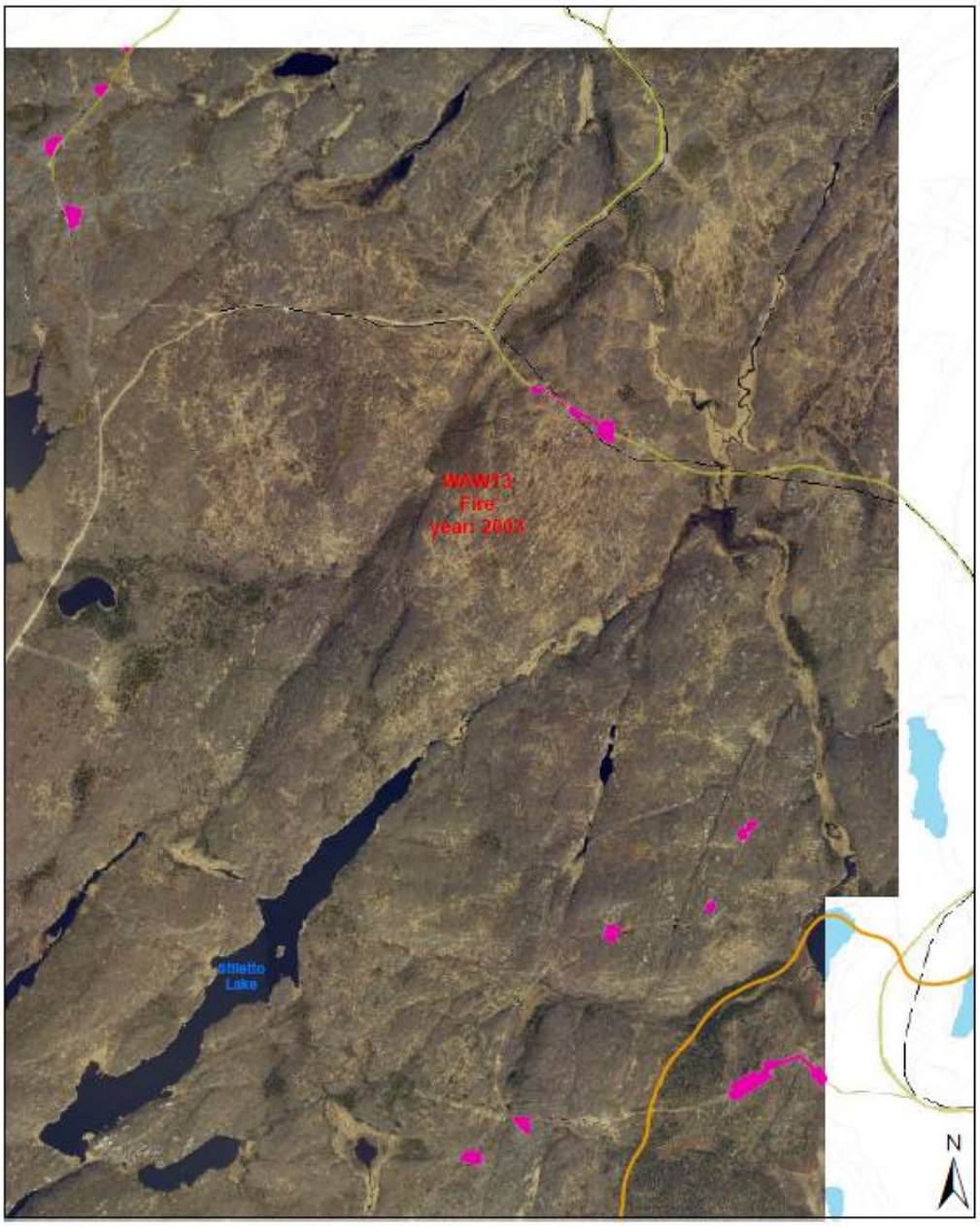
Appendix 1. Potential Slash/Chipper Pile Remediation Sites in the northern Neys-Killala Corridor.





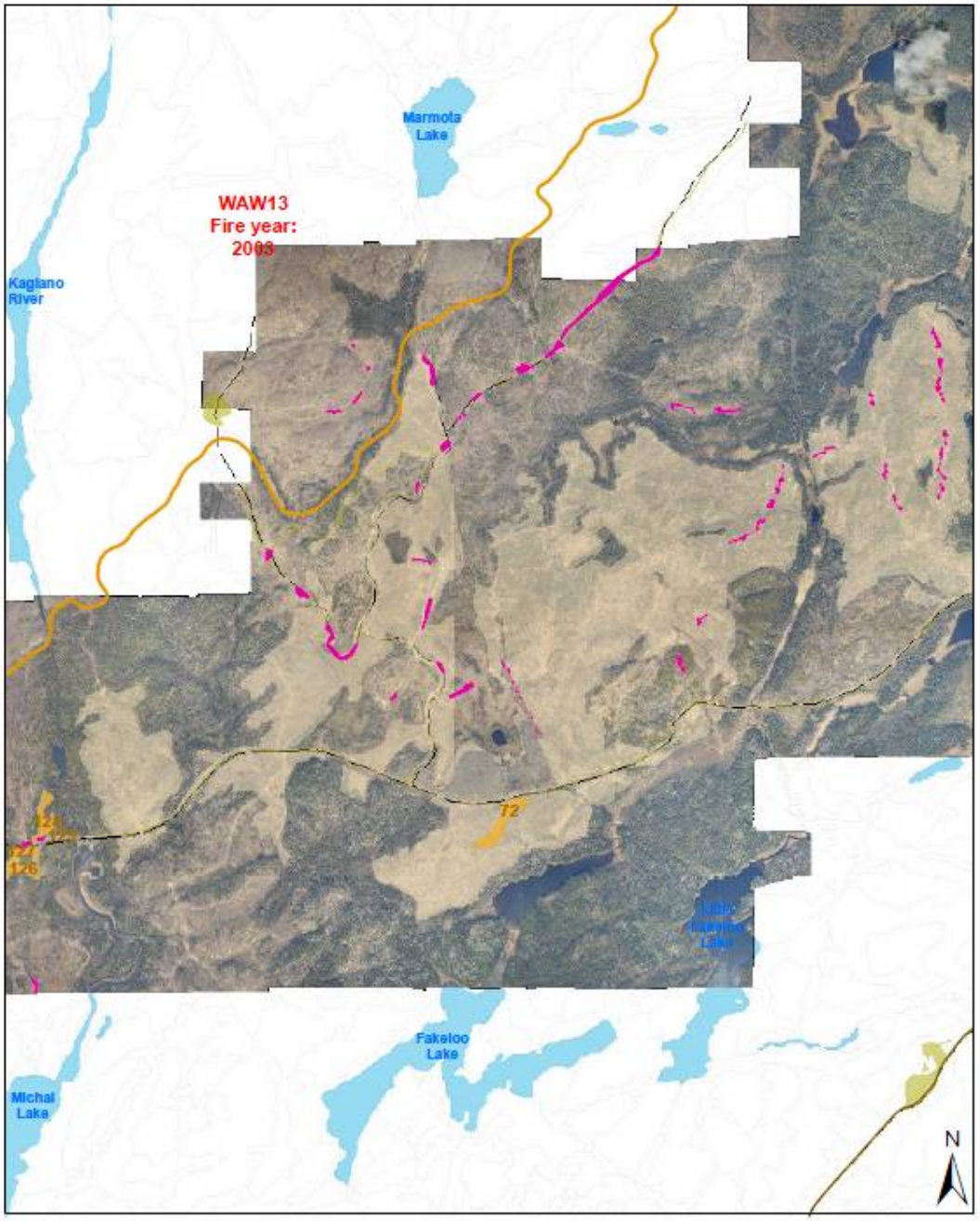
Old landing or slash piles
Unclassified Land (UCL)
Pri Stand Boundary's
MNR Road (not verified)
Historical Fire Boundary

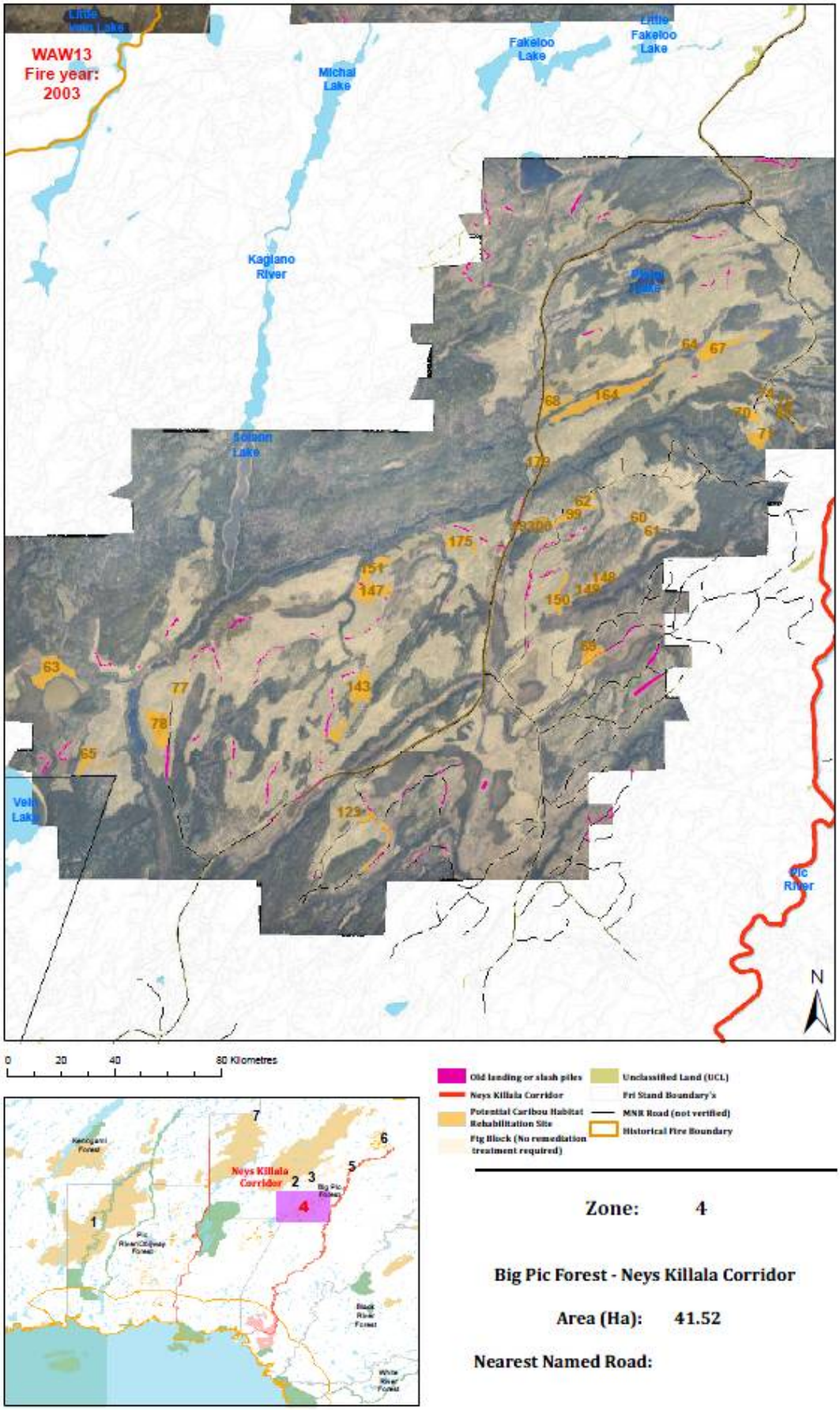
Zone: 2

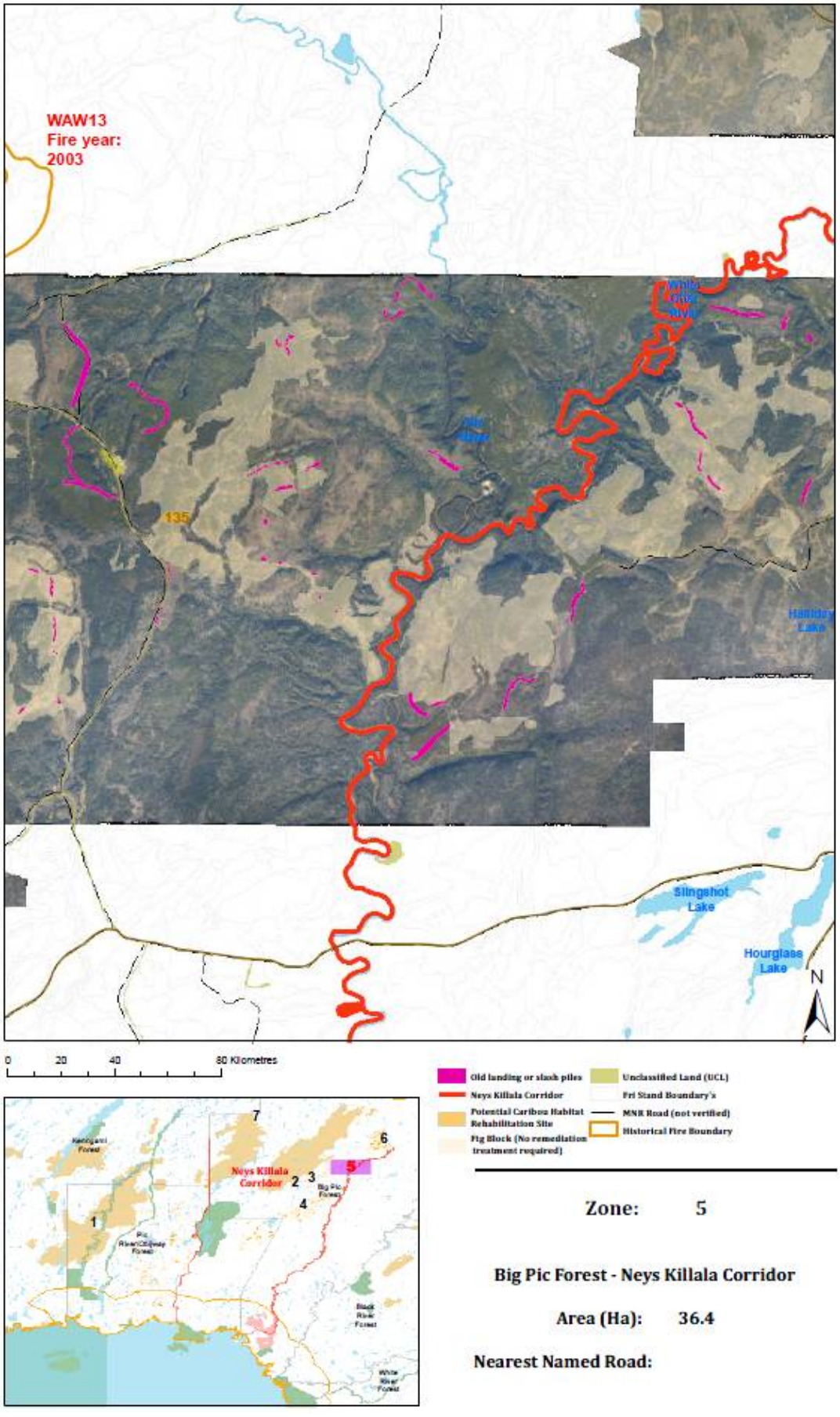
Big Pic Forest - Neys Killala Corridor

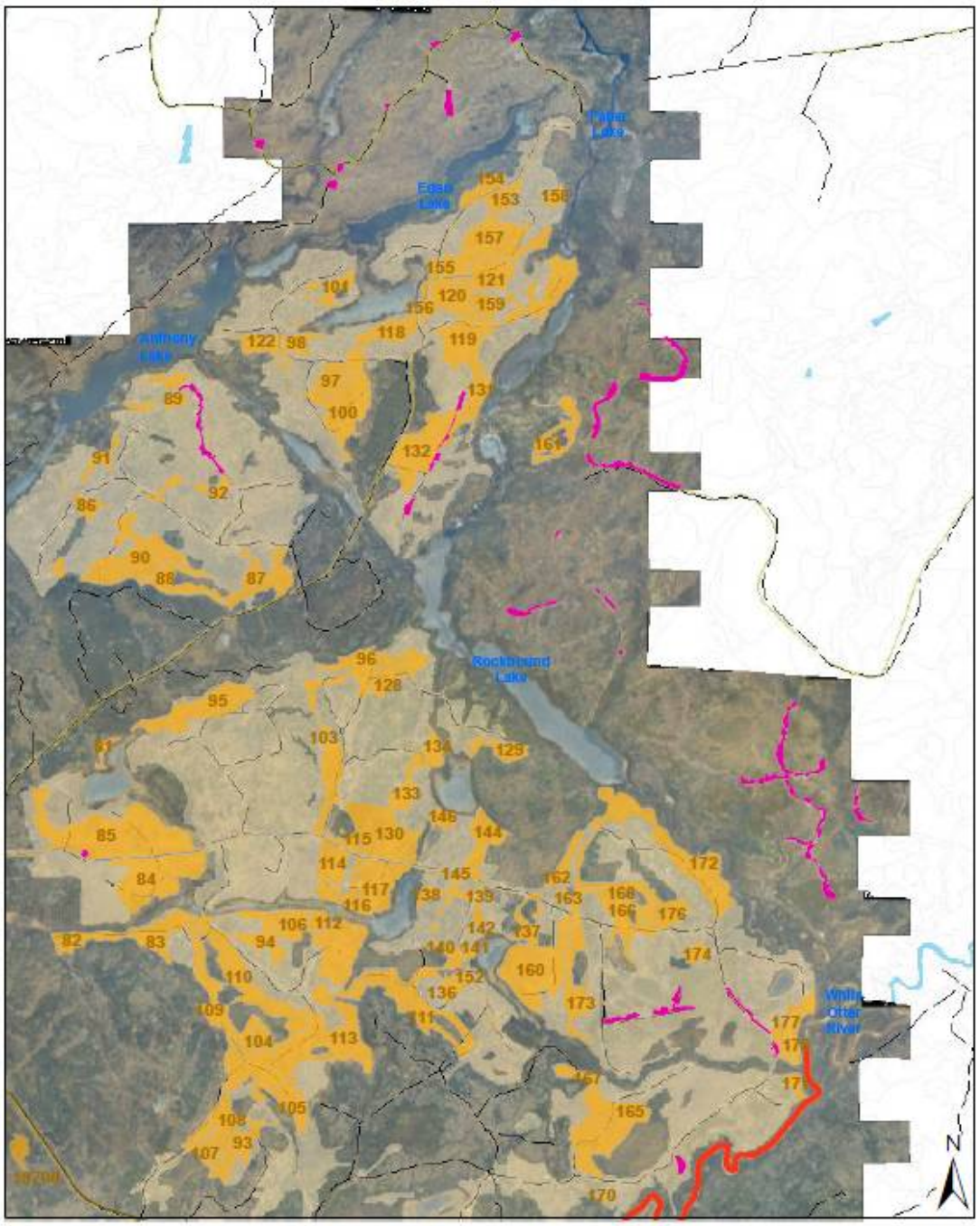
Area (Ha): 4.68

Nearest Named Road:

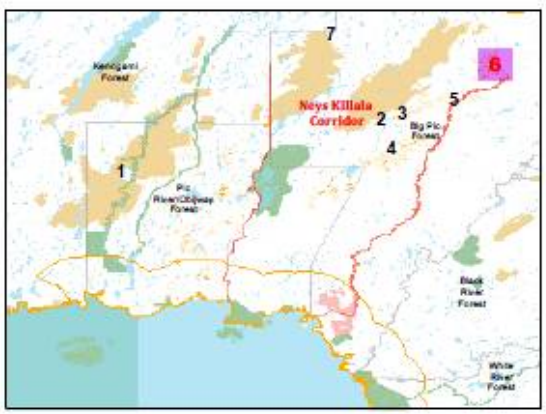

Marmota Lake
WAW13
Fire year:
2003
Kagiano River
T2
T1
T3
T4
T5
T6
Fakeloo Lake
Michal Lake
N
0
20
40
80 Kilometres
Old landing or slash piles
Potential Caribou Habitat Rehabilitation Site
Pig Block (No remediation treatment required)
Unclassified Land (UCL)
Fri Stand Boundary's
MNR Road (not verified)
Historical Fire Boundary
Neys Killala Corridor
1
2
3
4
5
6
7
Zone: 3
Big Pic Forest - Neys Killala Corridor
Area (Ha): 16.4
Nearest Named Road:


WAW13
Fire year:
2003
Little Fakeloo Lake
Fakeloo Lake
Michal Lake
Kagiano River
Solomon Lake
Pic River
N
0 20 40 80 Kilometres
Old landing or slash piles
Neys Killala Corridor
Potential Caribou Habitat Rehabilitation Site
Ftg Block (No remediation treatment required)
Unclassified Land (UCL)
Frt Stand Boundary's
MNR Road (not verified)
Historical Fire Boundary
Neys Killala Corridor
Zone: 4
Big Pic Forest - Neys Killala Corridor
Area (Ha): 41.52
Nearest Named Road:


WAW13
Fire year:
2003
White River
Halliday Lake
Slingshot Lake
Hourglass Lake
N
0 20 40 80 Kilometres
Old landing or slash piles
Neys Killala Corridor
Potential Caribou Habitat Rehabilitation Site
Pg Block (No remediation treatment required)
Unclassified Land (UCL)
Fri Stand Boundary's
MNR Road (not verified)
Historical Fire Boundary
Neys Killala Corridor
1
2
3
4
5
6
7
Zone: 5
Big Pic Forest - Neys Killala Corridor
Area (Ha): 36.4
Nearest Named Road:



0 20 40 80 Kilometres



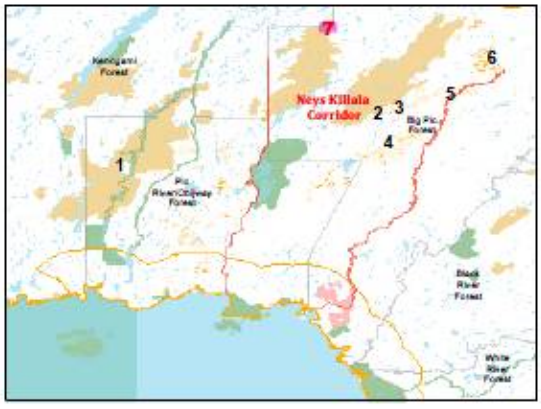
Old landing or slash piles
Neys Killala Corridor
Potential Caribou Habitat Rehabilitation Site
Pig Block (No remediation treatment required)
Unclassified Land (UCL)
Pri Stand Boundary's
MNR Road (not verified)

Zone: 6

Big Pic Forest - Neys Killala Corridor

Area (Ha): 27.58

Nearest Named Road:



Old landing or slash piles
Unclassified Land (UCL)
Fri Stand Boundary's
MNR Road (not verified)
Historical Fire Boundary

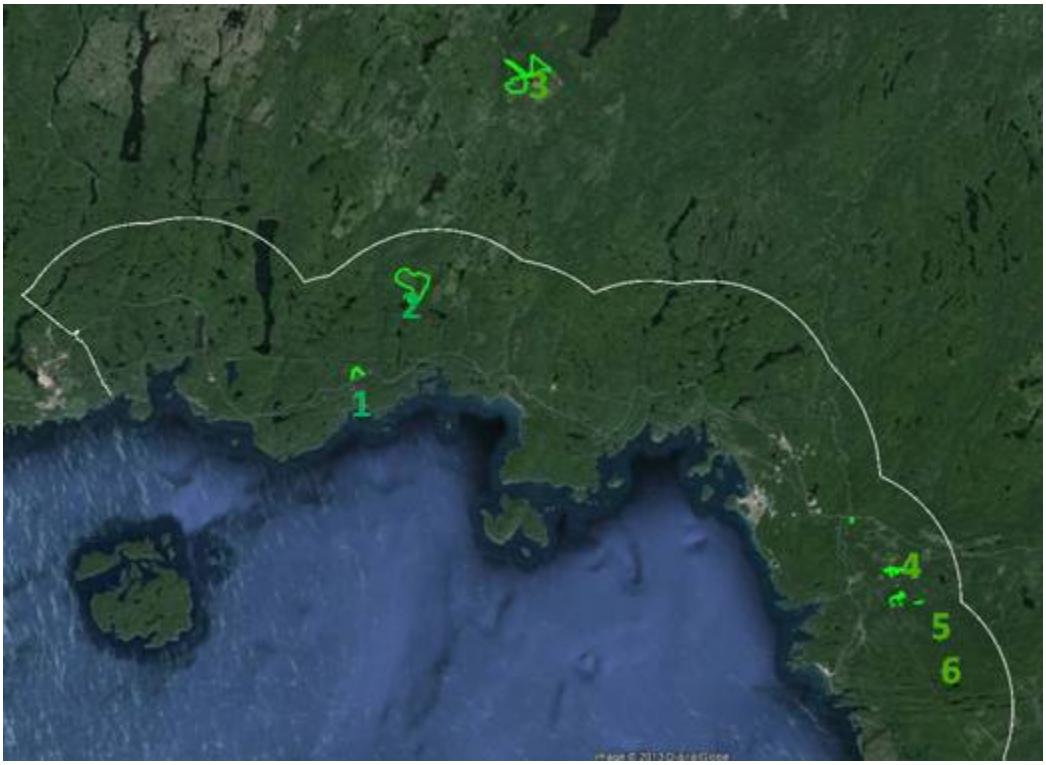
Zone: 7

Big Pic Forest - Neys Killala Corridor

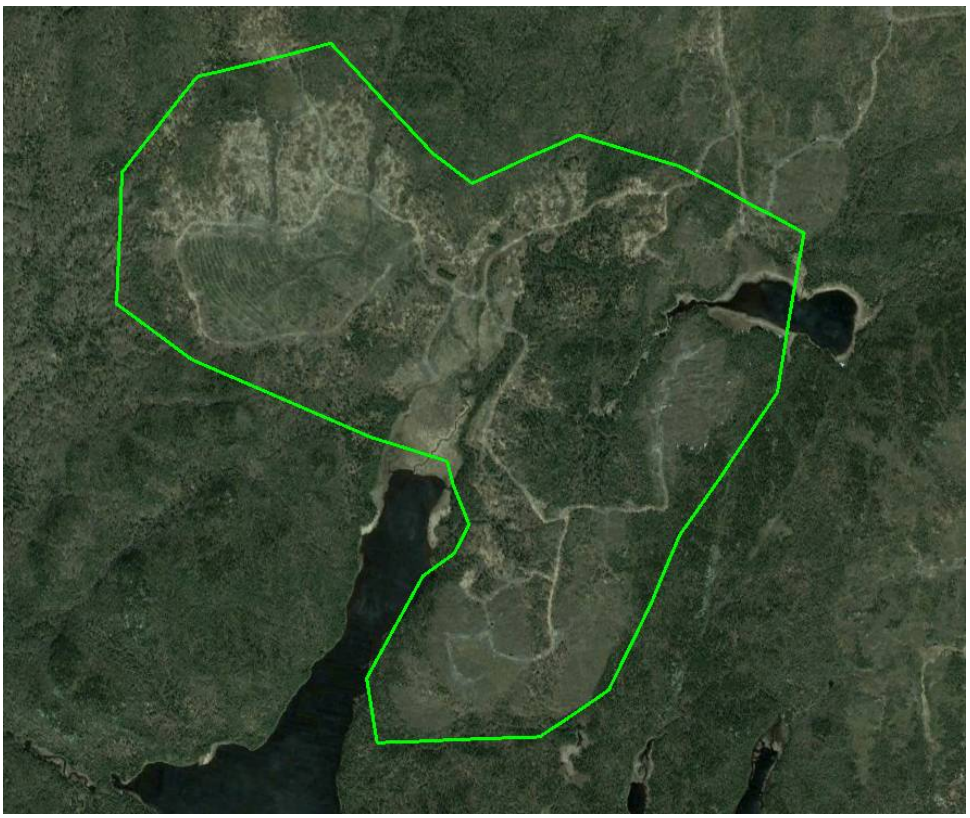
Area (Ha): 17

Nearest Named Road:

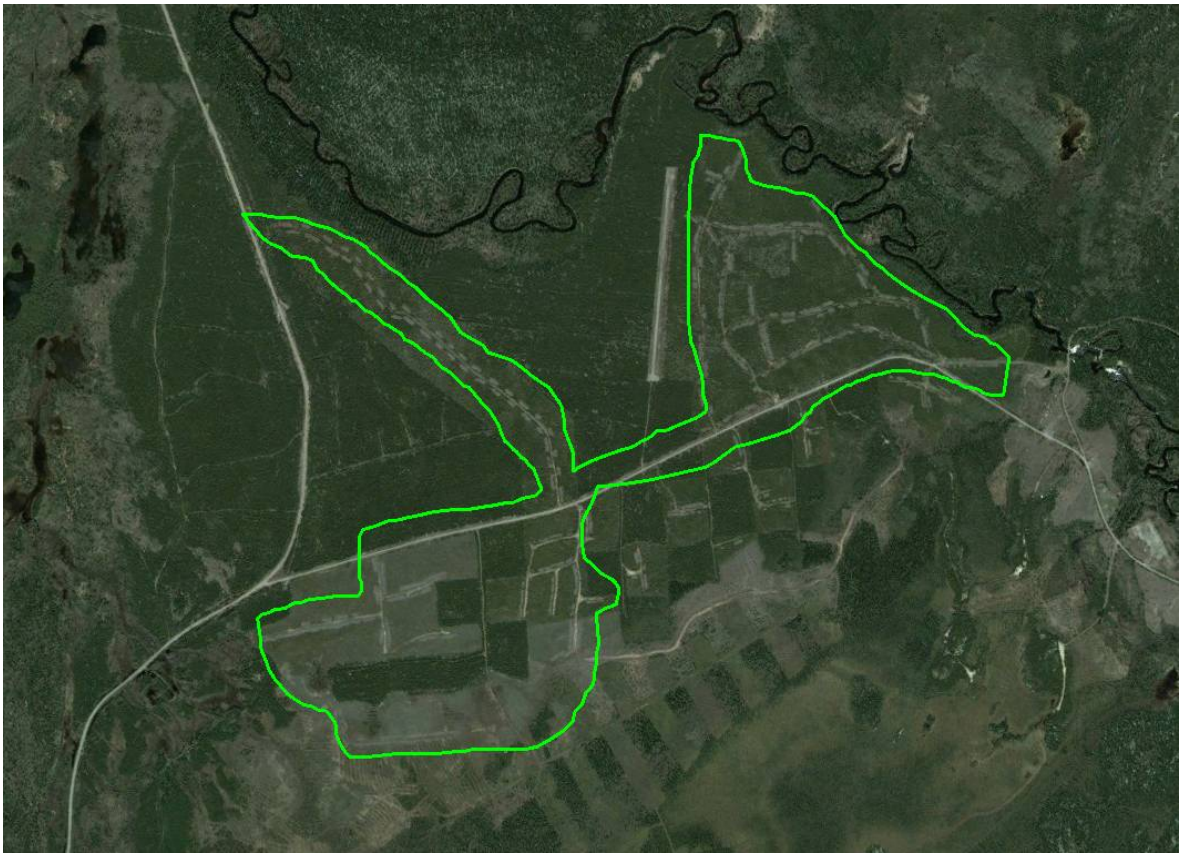
Appendix 2. Potential Slash/Chipper Pile Remediation Sites in the Coastal Range.



Potential slash remediation Site #1.

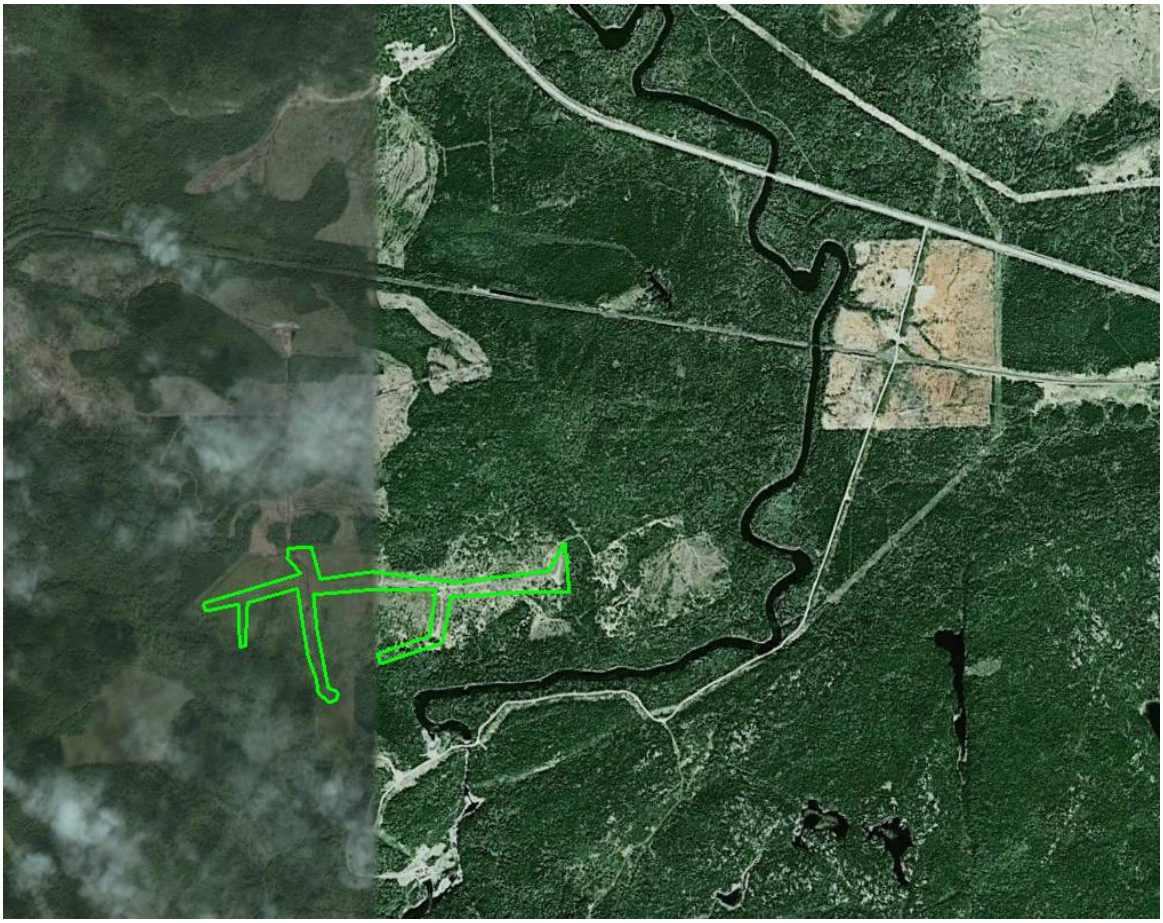


Potential slash remediation Site #2.

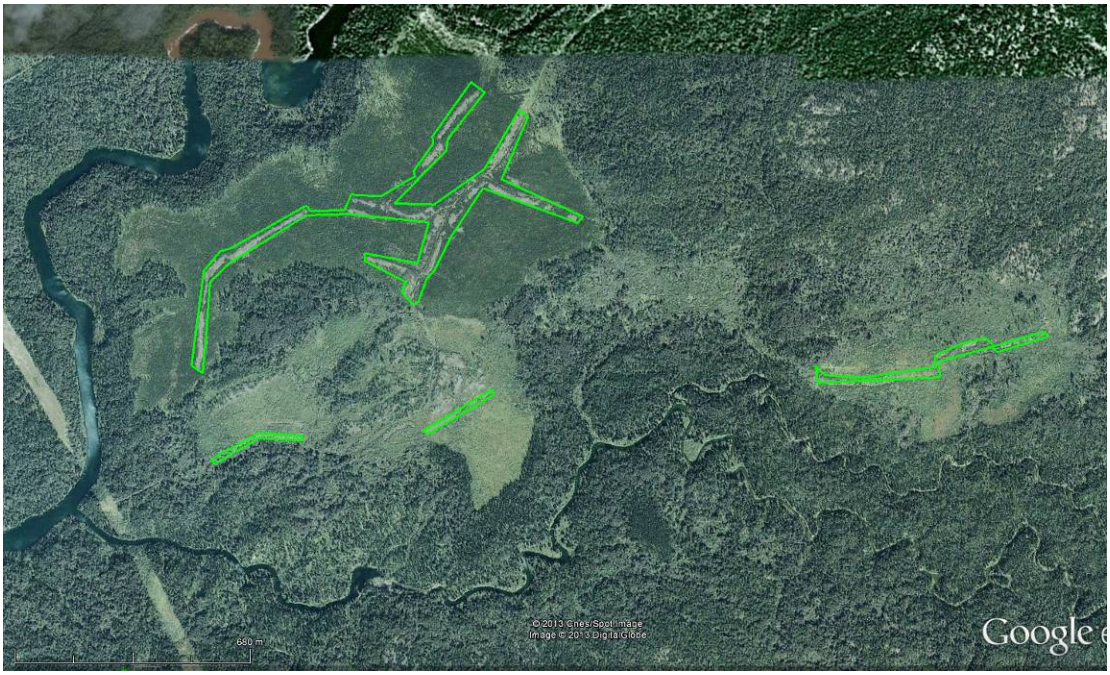


Potential slash remediation Site #3.

Potential slash remediation Site #4.

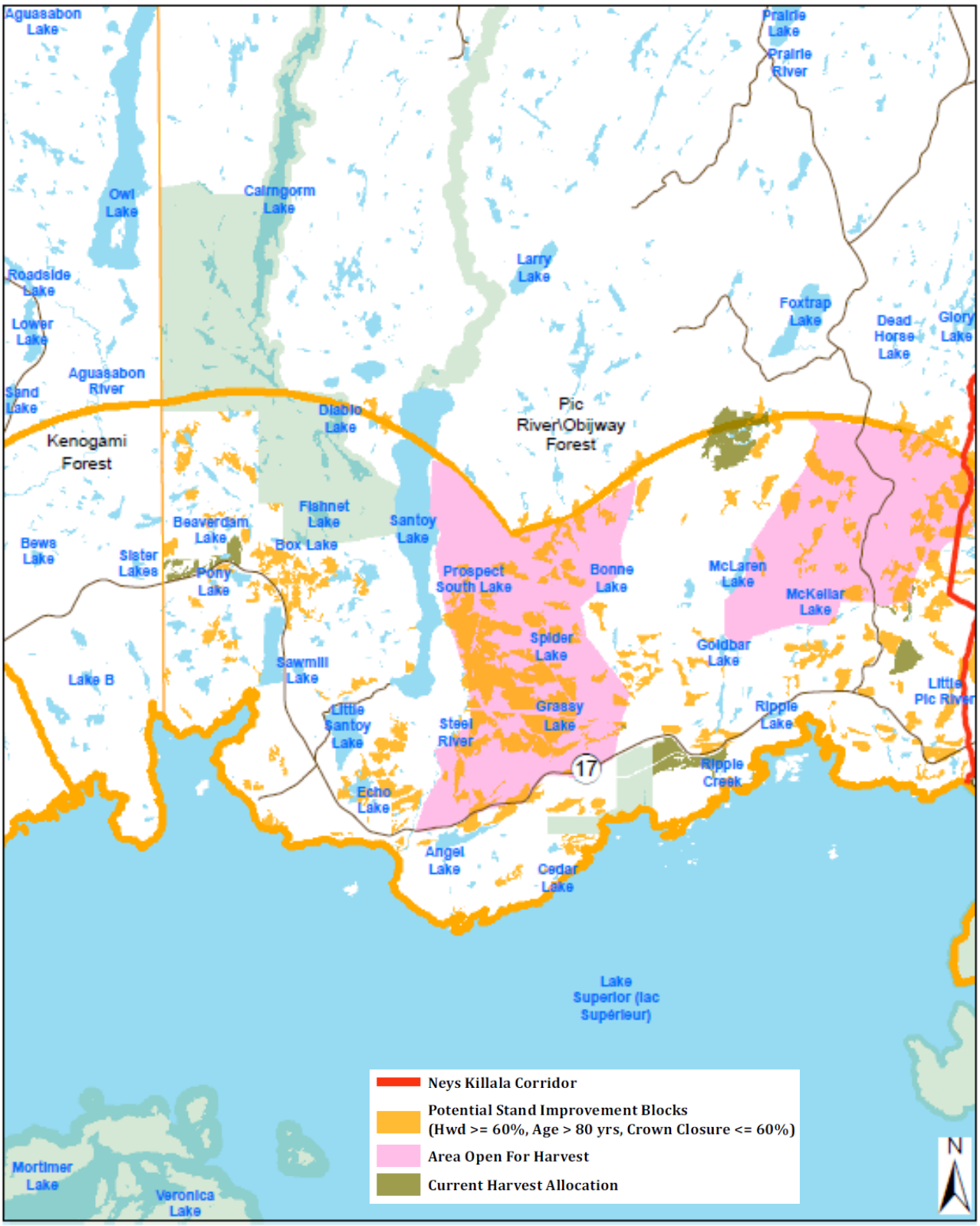


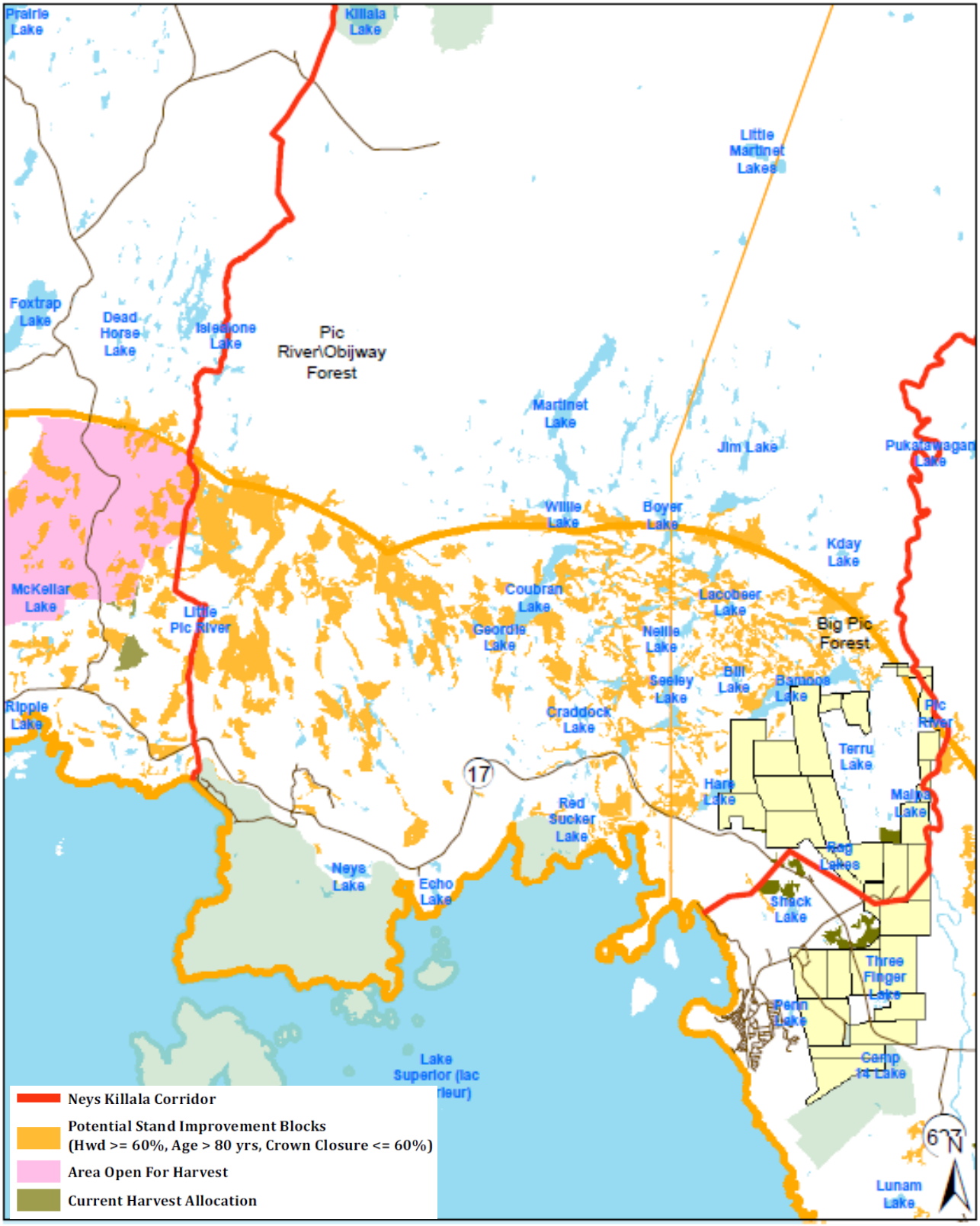
Potential slash remediation Site #5.



Potential slash remediation Site #6.

Appendix 3. Potential stand improvement sites in the Coastal Range.




Prairie Lake
Killala Lake
Little Martinet Lakes
Foxtrap Lake
Dead Horse Lake
Isleborne Lake
Pic River\Obijway Forest
Martinet Lake
Jim Lake
Pukatawagan Lake
Willie Lake
Boyer Lake
Kday Lake
McKellar Lake
Little Pic River
Coubran Lake
Geordis Lake
Lacobeer Lake
Nellie Lake
Big Pic Forest
Seeley Lake
Bill Lake
Bamoos Lake
Ripple Lake
Craddock Lake
Pic River
Terru Lake
17
Hare Lake
Red Sucker Lake
Malka Lake
Rag Lakes
Neys Lake
Echo Lake
Shack Lake
Three Finger Lake
Perin Lake
Gerhp ht Lake
Lake Superior (lac rieur)
Lunam Lake
N
Neys Killala Corridor
Potential Stand Improvement Blocks
(Hwd >= 60%, Age > 80 yrs, Crown Closure <= 60%)
Area Open For Harvest
Current Harvest Allocation


North Skipper Lake
Beggs Lake
Teddybear Lake
Alberta Lake
Kday Lake
Budall Lake
Fallen Lake
Lacobeer Lake
Page Lake
Nellie Lake
Veronica Lake
Seeley Lake
Bill Lake
Bamoos Lake
Lola Lake
Wolf Camp Lake
Terru Lake
Wire Lake
Lorna Lake
Hare Lake
Malga Lake
Gowan Lake
Pic River Obijway Forest
Peacock Lake
Little Harriet Lake
Harriet Lake
Big Pic Forest
Rag Lakes
Shack Lake
Pic River
Three Finger Lake
Perth Lake
Camp 14 Lake
17
Black River Forest
Camp 36 Lake
Melgund Lake
Rous Lake
Onpaco Lake
Lunam Lake
627
Log Pond
Campfire Lake
Cache Lake
Lake Superior (lac Supérieur)
Bells Lake
Gulliver Lake
Elk Lake
Mussy Lake
Gus Lake
White River Forest
Hayward Creek
White River
N
Neys Killala Corridor
Potential Stand Improvement Blocks
(Hwd >= 60%, Age > 80 yrs, Crown Closure <= 60%)
Area Open For Harvest
Current Harvest Allocation