

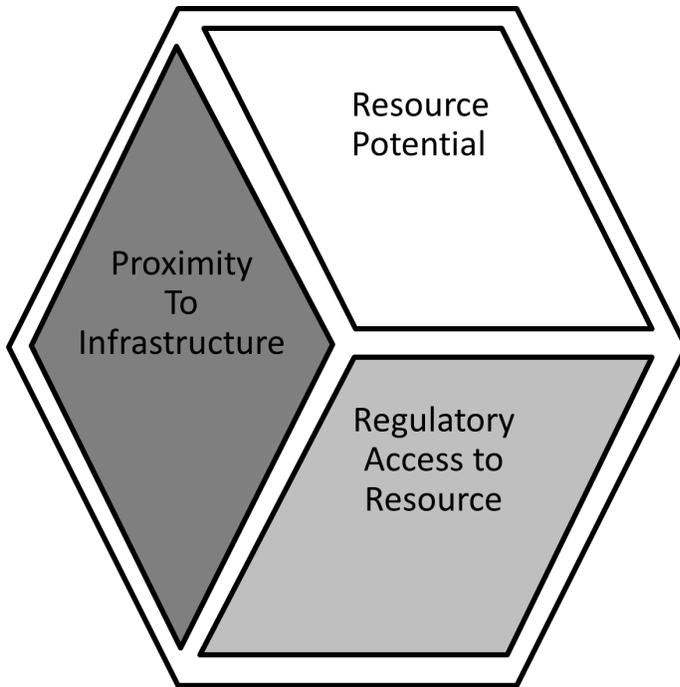
## Appendix D. Exploring Different Range Plan Scenarios

After using Marxan (Ball et al. 2009) to delineate important areas for boreal caribou based on seasonal habitat preference maps and GPS collar data (Appendix C), further Marxan analyses were carried out to incorporate consideration of resource development potential and existing land protection in the Wek'èezhì range planning region. These analyses were used to generate different scenarios for what the map of management class areas for the Range Plan might look like. Resource development potential was considered in Marxan by representing it as a relative cost, and existing land protections in the region were considered by locking in planning units that occurred within areas that provide levels of habitat protection that might be considered equivalent to an Enhanced or Intensive management class area, as described in the Framework. Four scenarios were run in Marxan:

- **Scenario 1:** Select planning units based only on habitat importance for caribou (equivalent to the Marxan analysis used to identify important areas).
- **Scenario 2:** Select planning units based on habitat importance while locking in protected areas and certain land use planning zones.
- **Scenario 3:** Select planning units based on habitat importance and relative cost (development potential).
- **Scenario 4:** Select planning units based on habitat importance, relative cost, and locking in protected areas and certain land use planning zones.

The relative cost value of planning units was defined in terms of their relative resource development potential value. When Marxan selects planning units, it attempts to maximize the value of areas selected for boreal caribou while minimizing the cost of the planning units selected in the final solution of each run. Here “cost” essentially represents missed development opportunity or missed revenue potential if a planning unit was selected for inclusion in an Enhanced or Intensive management class area for boreal caribou. Although areas within Enhanced and Intensive management areas do not preclude development, the cost of carrying out development in those management areas would likely be much higher due to the more stringent management actions required. Cost was represented as an index on a relative scale because the potential monetary value of the primary resources considered (oil and gas, minerals and timber) in planning units could not be estimated. Cost considered three factors for each planning unit: (1) resource potential, (2) regulatory access to the resource and (3) proximity to infrastructure (**Figure D-1**). This approach to representing resource development potential was based on methods developed for conservation planning in northern British Columbia (Suzuki and Parker 2016). “Resource potential” considered the relative abundance, value or likelihood of finding a resource of value in a given area. “Regulatory access” considered whether a proponent would be allowed to obtain tenure and permits to explore for, or develop, a resource in an area given existing land protections (i.e., land withdrawals, protected areas, and land use plan zones that prohibit certain types of development). “Proximity to infrastructure” was considered in two separate GIS layers. The first layer considered proximity to all-season roads, and the second layer considered proximity to all-season roads + winter roads. For the

hydrocarbon resource potential layer, proximity to pipelines was also considered. Given that hydrocarbon potential information in the Wek'èezhì region was not available, hydrocarbon potential contributed little to the cost value of planning units within the region.



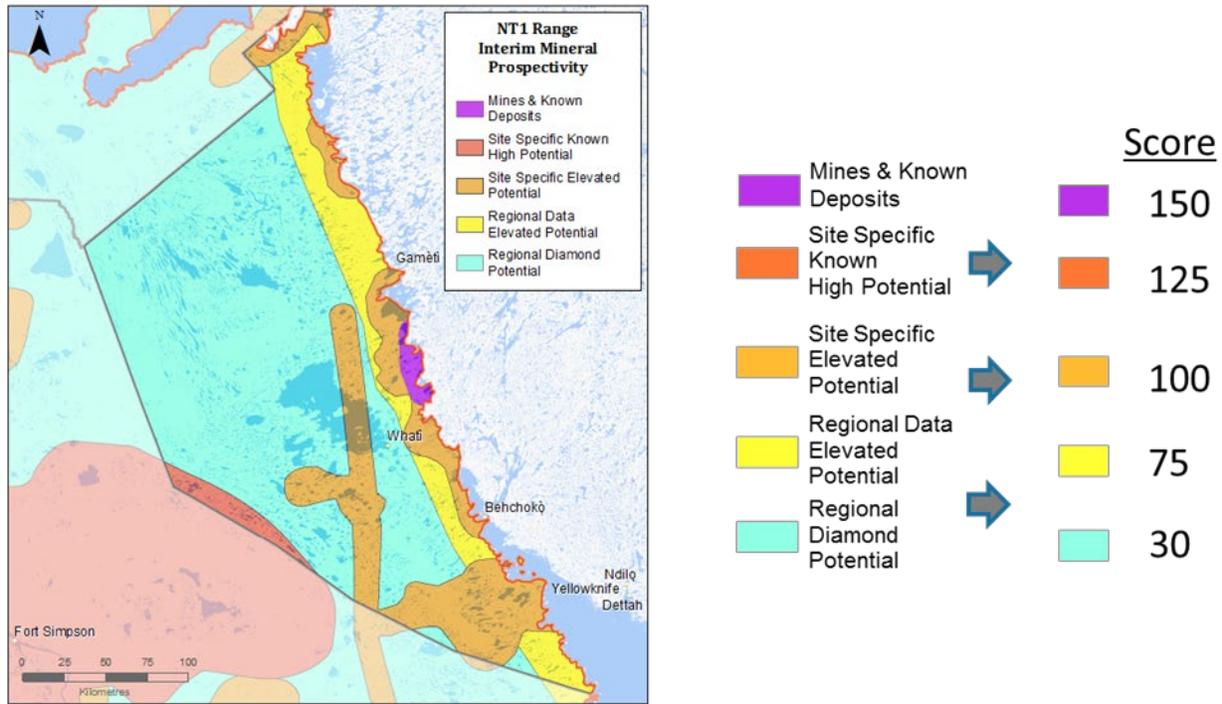
**Figure D-1.** Cost associated with 5 km<sup>2</sup> hexagonal planning units used in Marxan analyses considered resource potential, regulatory access to resources and proximity to infrastructure. Cost in each planning unit was represented on a relative scale.

Resource development potential layers for the minerals, oil and gas (hydrocarbon), and forestry sectors were first created as raster files with a 30 m pixel resolution at the scale of the NT1 range. Resource development potential (including consideration of regulatory access) was ranked on a similar scale (0-450) for each of the three sectors. The scores for the three sectors were then summed and combined with the score for proximity to infrastructure. The process for developing the final cost layer considering all three sectors and proximity to infrastructure is described in further detail below. The cost value of pixels was then summed within each 5 km<sup>2</sup> planning unit, and summed cost values within planning units were re-scaled between 3,500-12,500. In Marxan Scenarios 1 and 2, where resource development potential was not considered, all planning units were given a base cost value of 2,500. All Marxan scenarios were run at the scale of the NT1 range with representation targets for seasonal boreal caribou RSF layers and the collar data density index layer that had to be met within each range planning region, similar to the approach described in Appendix C.

### **Mineral Resource Development Potential**

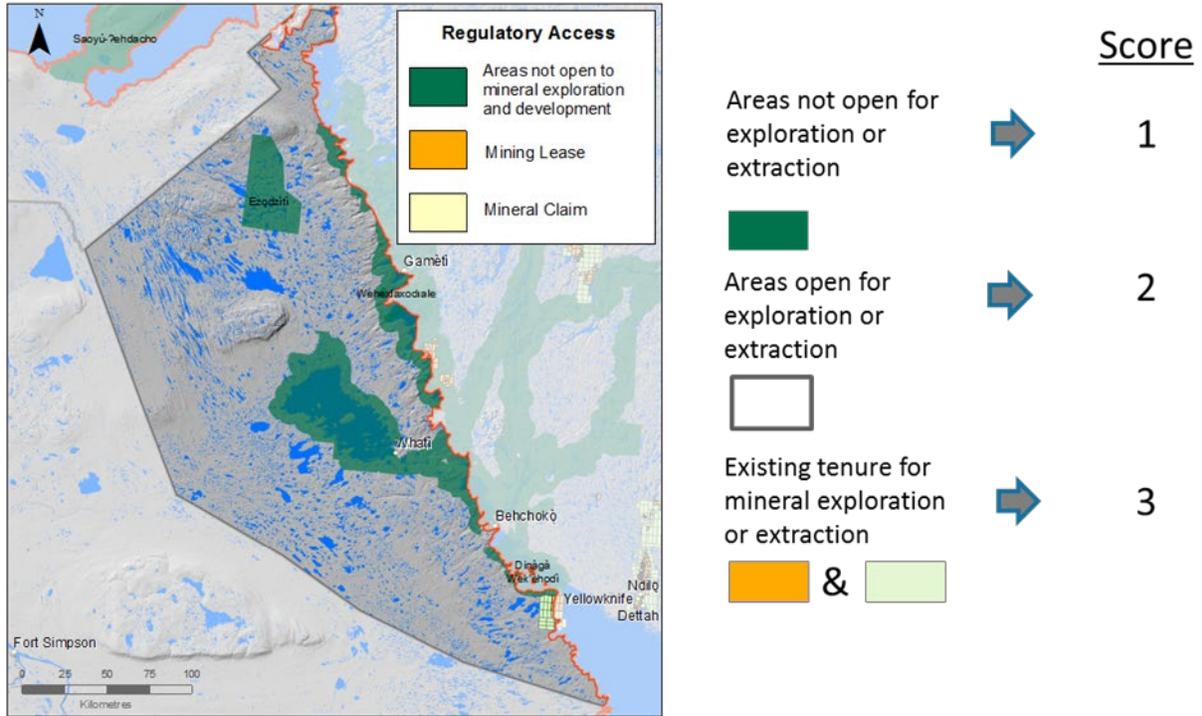
Mineral resource potential was quantified on a relative scale based on the interim mineral prospectivity map provided to GNWT-ECC by the Northwest Territories Geological Survey (NTGS). Areas with mines and known deposits were given the highest score (150), while areas with regional

diamond potential (essentially the entire NT1 boreal caribou range) were given the lowest score (30). **Figure D-2** shows how the different mineral prospectivity categories were ranked. Where different mineral prospectivity layers overlapped, areas were assigned the score for the layer with the higher prospectivity rating (**Figure D-2**).

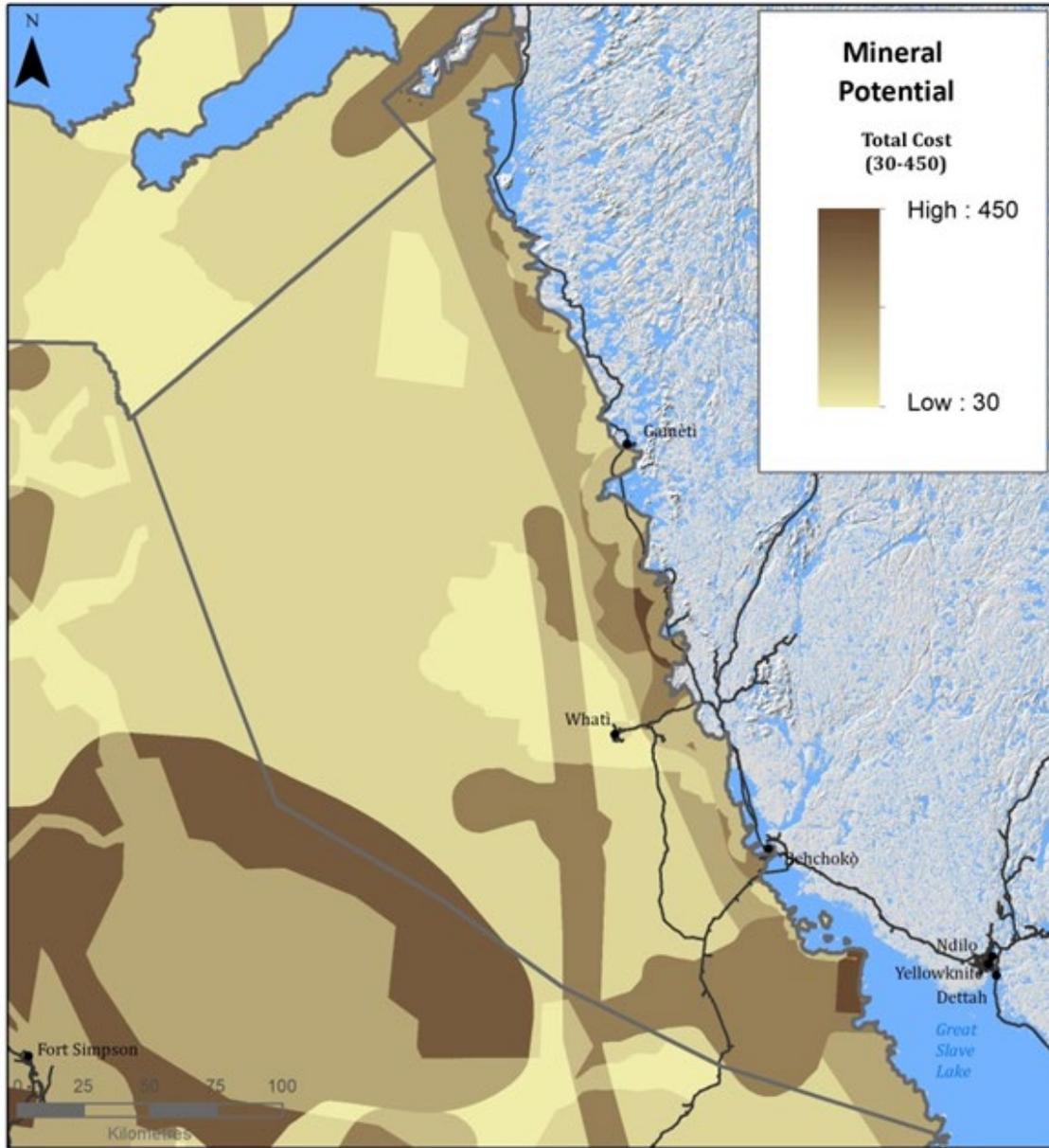


**Figure D-2.** Derivation of relative mineral resource potential scores based on a map of mineral prospectivity categories provided to GNWT-ECC by the NTGS.

Resource potential scores were then multiplied by a score for regulatory access. Areas that have existing active tenure for mineral exploration or mining were given a multiplier of three, areas that are open for mineral exploration and mining were given a multiplier of two, and areas that are not open for mineral exploration or development were given a score of one (**Figure D-3**). Areas that were considered not open for mineral exploration and mining included cultural heritage zones, traditional use zones, habitat management zones, and land use exclusion zones within the Tłı̄chǝ Land Use Plan, Ezǝdzitì, and the Dınàgà Wek'èhodì candidate protected area (**Figure D-3**). Multiplying the resource potential score by the regulatory access score provided an overall resource development potential score ranging between 30 and 450 (**Figure D-4**).



**Figure D-3.** Regulatory access categories for mineral exploration and mining in the Wek'èezhì range planning region and corresponding multipliers used to calculate a mineral resource development potential index layer. Areas open for exploration or extraction are those that are not green on the map. Regulatory access scores were multiplied by the resource potential scores shown in **Figure D-2**.

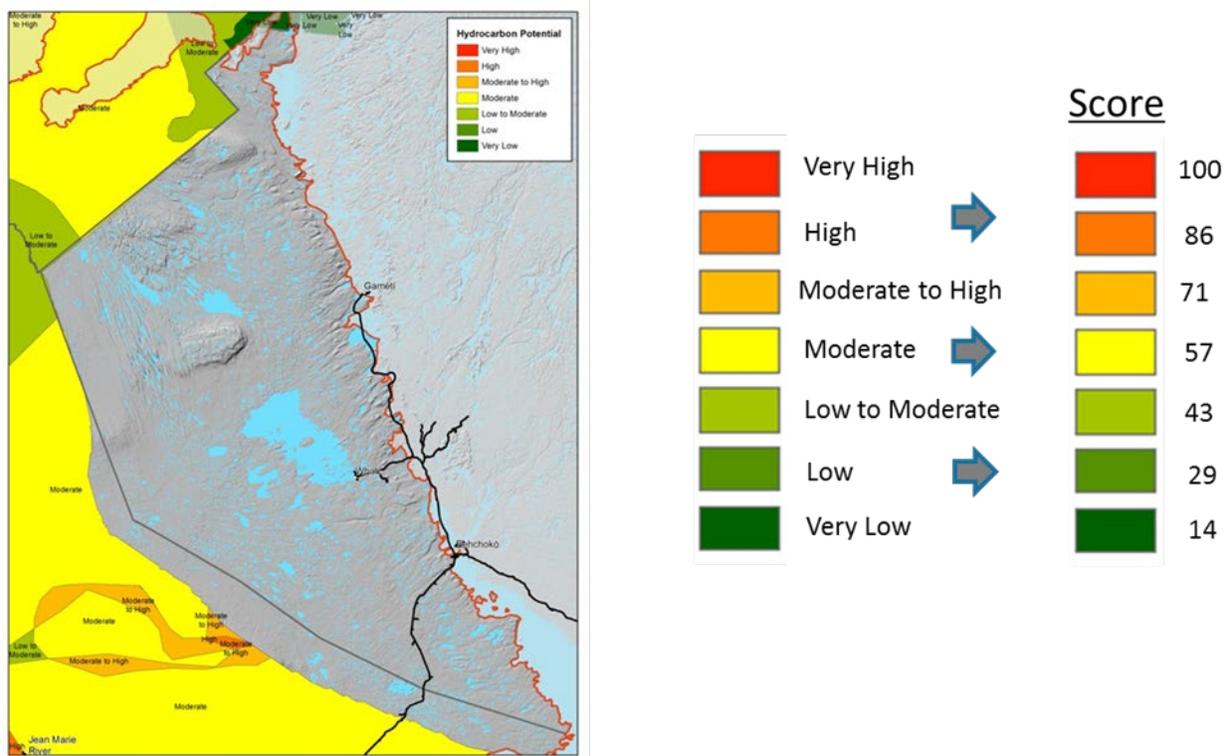


**Figure D-4.** Final mineral resource development potential later incorporating considerations of relative mineral prospectivity and regulatory access.

### Oil and Gas (Hydrocarbon) Resource Development Potential

Hydrocarbon resource potential was characterized using the “Compiled Hydrocarbon Play Polygons for mainland Northwest Territories” dataset (Gal and Udell 2005). This layer characterizes hydrocarbon potential on a relative scale from very low potential to very high potential. These categories of hydrocarbon potential were numbered from 1 to 7 and then re-scaled to scores between 14 and 100 as described in **Figure D-5**. An additional layer was provided to GNWT-ECC by the NTGS, which included polygons delimiting the most promising hydrocarbon plays on mainland NWT (J. Rocheleau, NTGS, unpublished data; *note - none of these areas overlap with the Wek’èezhìi region*). An

additional score of 50 was added for these areas to the scores based on compiled hydrocarbon play polygons. Areas with no hydrocarbon potential data were assigned a value of 0. This yielded total scores ranging between 0 and 150.

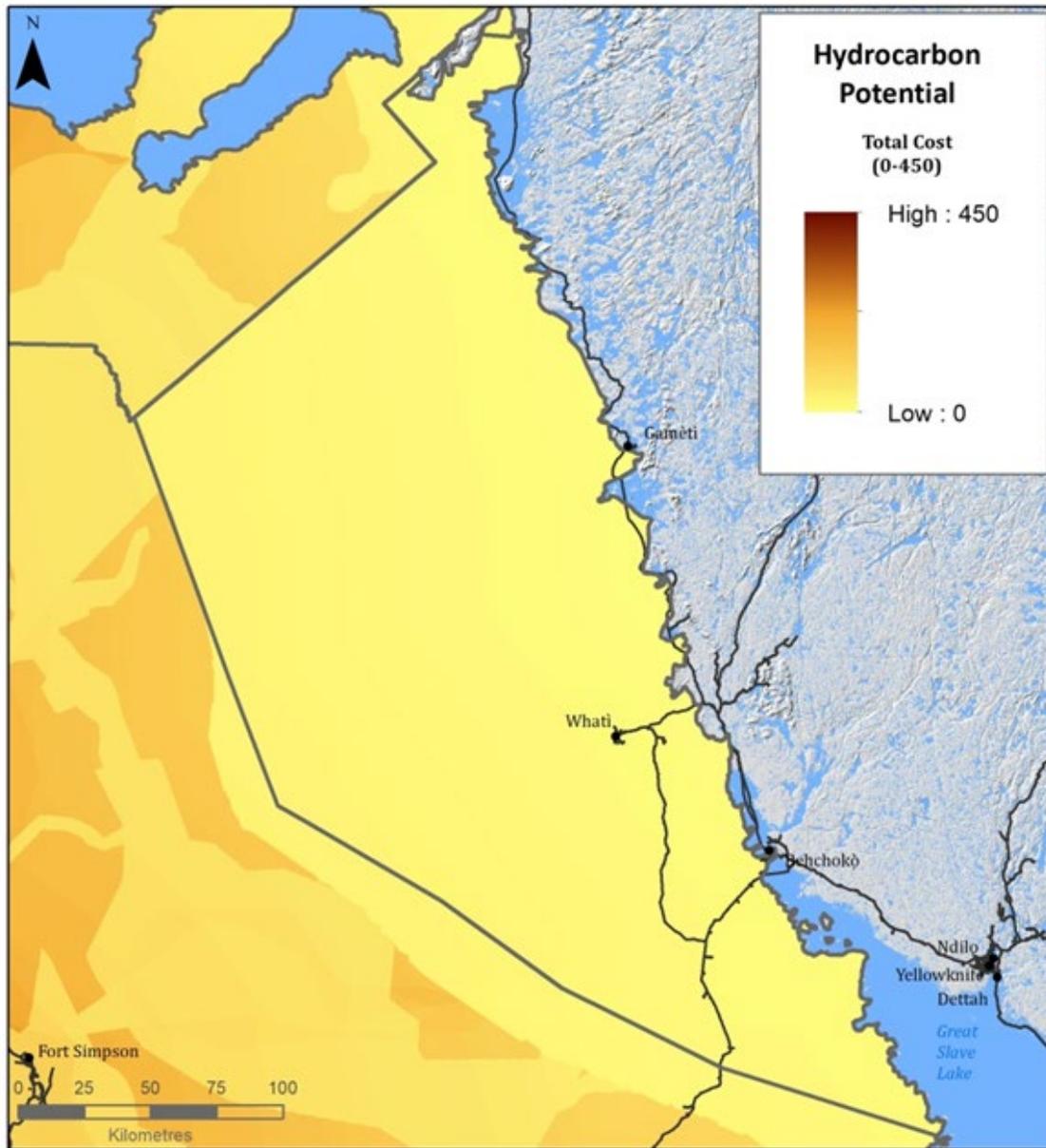


**Figure D-5.** Derivation of hydrocarbon resource potential scores based on the “Compiled Hydrocarbon Play Polygons for Mainland Northwest Territories” dataset (Gal and Udell 2005).

For regulatory access in the Wek’èezhìi region, the same approach as shown in **Figure D-3** (regulatory access for mineral exploration and mining) was used, with areas with existing active oil and gas tenure receiving a multiplier of three, areas open to oil and gas exploration were given a multiplier of two, and areas that are not open to oil and gas exploration were given a multiplier of one. In addition to relative hydrocarbon potential and regulatory access, the proximity to existing pipelines was also considered in the hydrocarbon development potential layer. An inverse distance to pipeline score was added to the relative hydrocarbon potential score. The hydrocarbon potential multiplied by regulatory access score was given a weighting of 60% and proximity to pipelines was given a 40% weighting in the calculation of the overall score:

$$\text{Hydrocarbon development potential} = 0.6 \times [\text{hydrocarbon potential} \times \text{regulatory access}] + 0.4 \times [\text{proximity to pipelines}]$$

Scores were scaled between 0 and 450. Because of the absence of hydrocarbon potential polygons in the Wek’èezhìi range planning region, the hydrocarbon potential score for planning units in the region had low values (~25) which reflected only influence of distance to the nearest pipeline (**Figure D-6**).

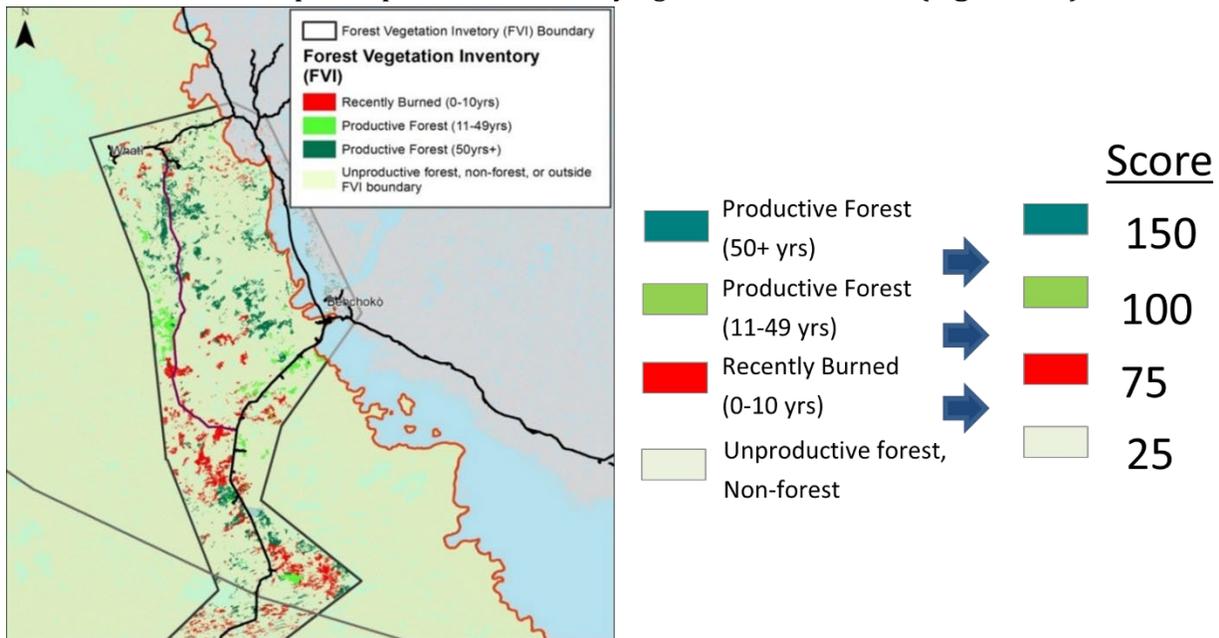


**Figure D-6.** Final hydrocarbon development potential layer considering relative hydrocarbon potential, regulatory access and proximity to existing pipelines.

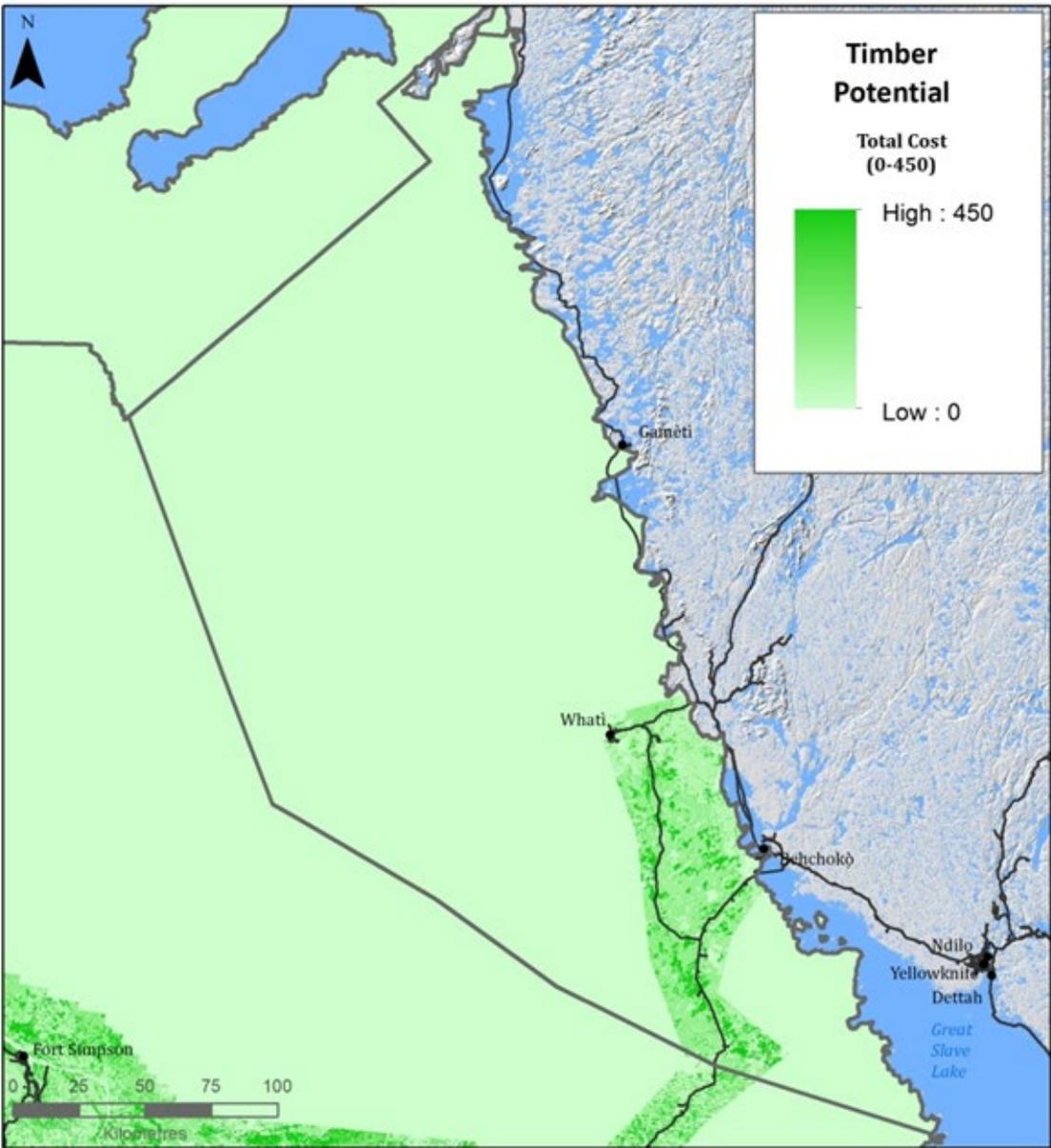
### Forestry Potential

Forest Vegetation Inventory (FVI) data provided by GNWT-ECC Forest Management Division was used to characterize forestry potential (or timber potential). FVI data is limited in geographic scope, and within the Wek'èezhì range planning region, it is limited to a band along Highway 3 and the Tłı̄chų Highway (**Figure D-7**). The FVI data in the Wek'èezhì region was originally created in 2011 and stand ages were updated by overlaying recent fires in the region, and recalculating stand ages current to 2021. Productive forest stands (based on Site Index Value) were broken down into three age categories: recently burned (<10 yrs old, currently suitable for salvage harvesting), 11-49 years old

(will be suitable for timber harvesting in the future) and >50 years old (currently suitable for timber harvesting). Unproductive forest stands and non-forested polygons within the FVI were assumed to have little potential for commercial forestry. These four categories were assigned relative scores ranging from 25 (unproductive forest stands and non-forested polygons) to 150 (productive stands >50 yrs old), as illustrated in **Figure D-7**. Areas outside of the FVI extent were assigned a value of 0. Timber resource potential scores were then multiplied by scores for regulatory access using a similar approach as described for mineral resource development potential in **Figure D-3**. Areas with existing forestry tenure (forest management agreements/commercial timber licenses) were given a multiplier of three, areas that are open for commercial timber harvesting were given a multiplier of two, and areas not open to commercial timber harvesting were given a multiplier of one, to yield a timber resource development potential score varying between 0 and 450 (**Figure D-8**).



**Figure D-7.** Derivation of relative forest resource potential scores based on forest inventory data broken into four different categories.

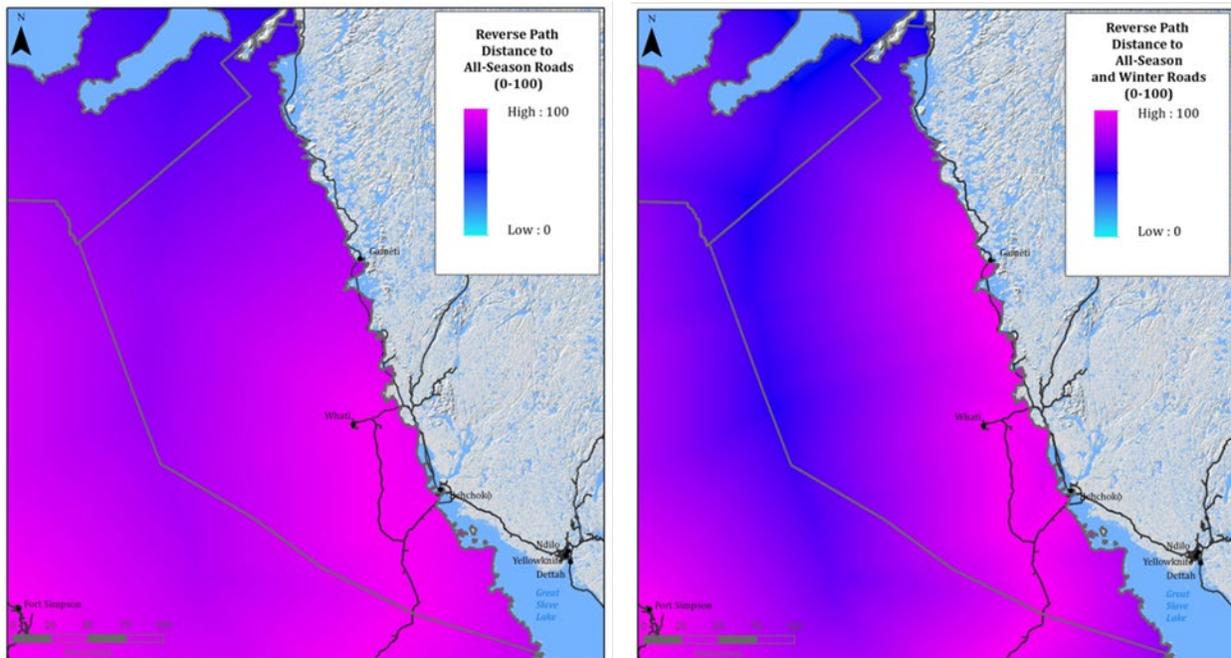


**Figure D-8.** Final timber resource development potential layer based on multiplying forest resource potential scores (ranging from 0 to 150) by regulatory access scores (one to three).

**Proximity to Infrastructure**

Two distance to infrastructure layers were created, one based on distance of raster cells to the nearest all-season road, and the second based on the distance to the closest all-season road or winter road. These two separate layers were created to acknowledge that proximity to all-season roads may be a more important consideration for development potential than distance to the nearest winter road, which are only open for a limited time each year. The two layers were created by calculating a reverse path distance to each type of road in ArcGIS, and the reverse path distance scores were then rescaled

between 0 and 100, with 0 representing areas that are the farthest from any road, and 100 representing areas that are directly adjacent to a road (**Figure D-9**).



**Figure D-9.** Raster layers representing proximity to all-season roads (left panel) and proximity to all-season + winter roads (right panel). Reverse path distance scores were scaled between 0 and 100, with values of 100 representing areas directly adjacent to a road, and 0 representing the furthest possible distance from roads.

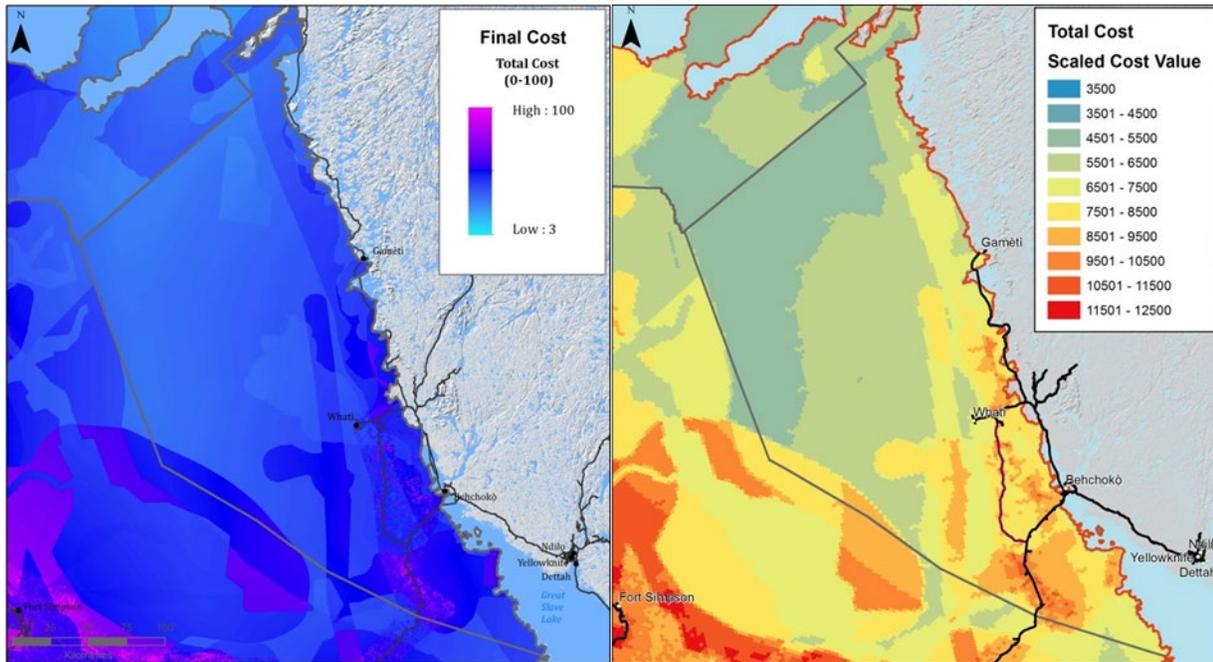
### Combined Cost Layer for Resource Development Potential

To generate a single “cost” layer for use in Marxan representing resource development potential for all three resource sectors (minerals, oil and gas, and forestry), the scores for the three sector-specific resource development potential layers were added together and then the scores for the two proximity to infrastructure layers were added to the resource development potential scores. The summed resource development potential scores from the three sectors were given a weighting of 60% in the combined total “cost” score, proximity to all-season roads was given a 20% weight, and proximity to all-season + winter roads was given a 20% weight. The following formula describes the approach to coming up with the “Total Cost” score:

$$\begin{aligned}
 \text{Total Cost} &= 0.6 \times [( \text{mineral resource potential} \times \text{regulatory access} ) \\
 &+ (0.6 \times [ \text{hydrocarbon potential} \times \text{regulatory access} ] + 0.4 \times [ \text{proximity to pipelines} ] ) \\
 &+ ( \text{forestry resource potential} \times \text{regulatory access} ) ] \\
 &+ 0.2 \times \text{proximity to all-season roads} \\
 &+ 0.2 \times \text{proximity to all-season \& winter roads}
 \end{aligned}$$

The total cost scores were then rescaled between 0 and 100, with areas with a 0 score representing the lowest development potential and areas with a score of 100 representing the highest resource development potential (**Figure D-10** – left panel). For the Marxan analyses, raster pixel values from

the total cost layer were summed within each 5 km<sup>2</sup> planning unit, and the cost value of each planning unit was rescaled between 3,500 and 12,500 (**Figure D-10** – right panel).



**Figure D-10.** Final total cost layer combining mineral, oil and gas, and forestry resource development potential as well as proximity to infrastructure (left panel) and total cost values summed within 5 km<sup>2</sup> planning units and rescaled between 3,500 and 12,500 for use in Marxan analyses (right panel).

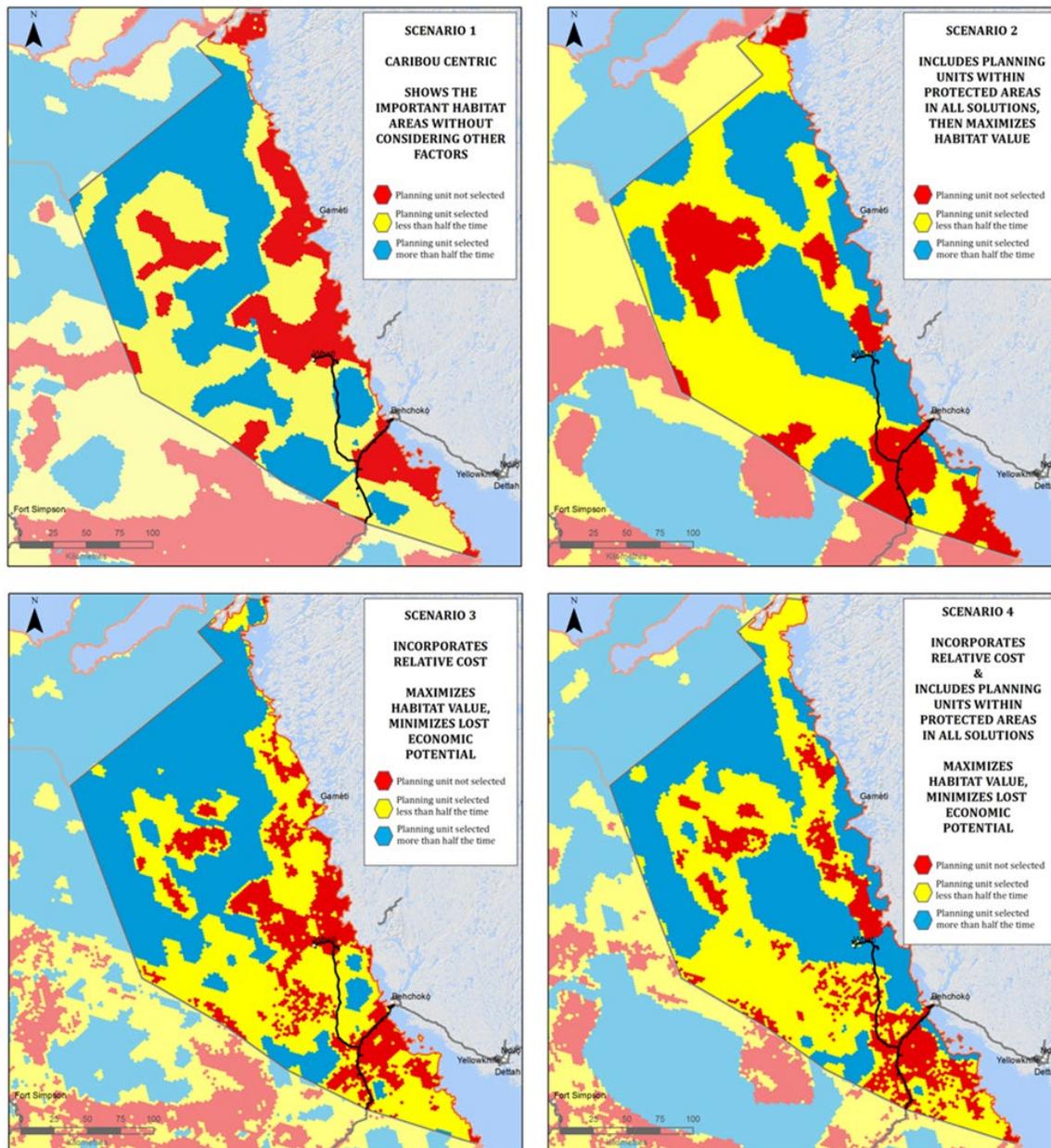
### Scenarios 1 to 4 – Marxan Scenarios and Results

Four sets of Marxan analyses were run to generate potential scenarios of what maps of management class areas might look like in the Wek'èezhì range planning region. The four scenarios, and the Marxan parameters used in each of the scenarios, are described in **Table D-1** below. Similar to the approach described in Appendix C, a range of representation targets from 20% to 70% of the cumulative regional seasonal RSF value was used in each scenario, and Marxan was run 100 times for each representation target. The frequency with which planning units were selected in the final solution from each of the 100 runs × 6 representation targets was tallied to come up with a 'Super Sum' solution, which represents the number of times a planning unit was selected by Marxan out the 600 total runs. Planning units were then divided into three categories: those that were never selected in any of the 600 runs (red), planning units that were selected in less than half the 600 runs (yellow), and planning units that were selected more than half the time (blue) (**Figure D-11**).

**Table D-1.** Marxan analysis scenarios and translation of Marxan results into management class area maps.

Scenario	Description	Marxan Settings	Translation to Management Class Areas
1	<b>Caribou-centric:</b> Select planning units based only on habitat importance for caribou (equivalent to the	<ul style="list-style-type: none"> <li>Representation targets of 20%-70% of cumulative regional seasonal RSF value.</li> </ul>	Planning units selected in more than half of the Marxan runs from the 'Super

	Marxan analysis used to identify important areas).	<ul style="list-style-type: none"> <li>• Areas with above-median collar data density index values locked in.</li> <li>• Boundary Length Modifier = 0.75.</li> <li>• Cost value for all planning units = 2,500.</li> </ul>	Sum' solution (based on 600 runs) were converted into Enhanced management class areas (yellow).
2	<b>Caribou + Protected Areas Locked-in:</b> Select planning units based on habitat importance while locking in protected areas and certain land use planning zones.	<ul style="list-style-type: none"> <li>• Representation targets of 20%-70% of cumulative regional seasonal RSF value.</li> <li>• 75% of cumulative regional collar data density index value.</li> <li>• Boundary Length Modifier = 0.75.</li> <li>• Cost value for all planning units = 2,500.</li> <li>• Planning units within protected areas and certain land use plan zones locked into Marxan solution.</li> </ul>	Planning units that were selected less than half the time, and planning units that were never selected in any model runs were converted into Basic Management class areas (green).
3	<b>Caribou + Cost:</b> Select planning units based on caribou importance and cost (resource development potential).	<ul style="list-style-type: none"> <li>• Representation targets of 20%-70% of cumulative regional seasonal RSF value.</li> <li>• 75% of cumulative regional collar data density index value.</li> <li>• Boundary Length Modifier = 0.75.</li> <li>• Cost value for all planning units = 3,500 to 12,500 (based on Total Cost layer).</li> </ul>	
4	<b>Caribou + Cost + Protected Areas Locked-in:</b> Select planning units based on caribou importance, cost and locking in protected areas and certain land use planning zones.	<ul style="list-style-type: none"> <li>• Representation targets of 20%-70% of cumulative regional seasonal RSF value.</li> <li>• 75% of cumulative regional collar data density index value.</li> <li>• Boundary Length Modifier = 0.75.</li> <li>• Cost value for all planning units = 3,500 to 12,500 (based on Total Cost layer).</li> <li>• Planning units within protected areas and certain land use plan zones locked in to Marxan solution.</li> </ul>	

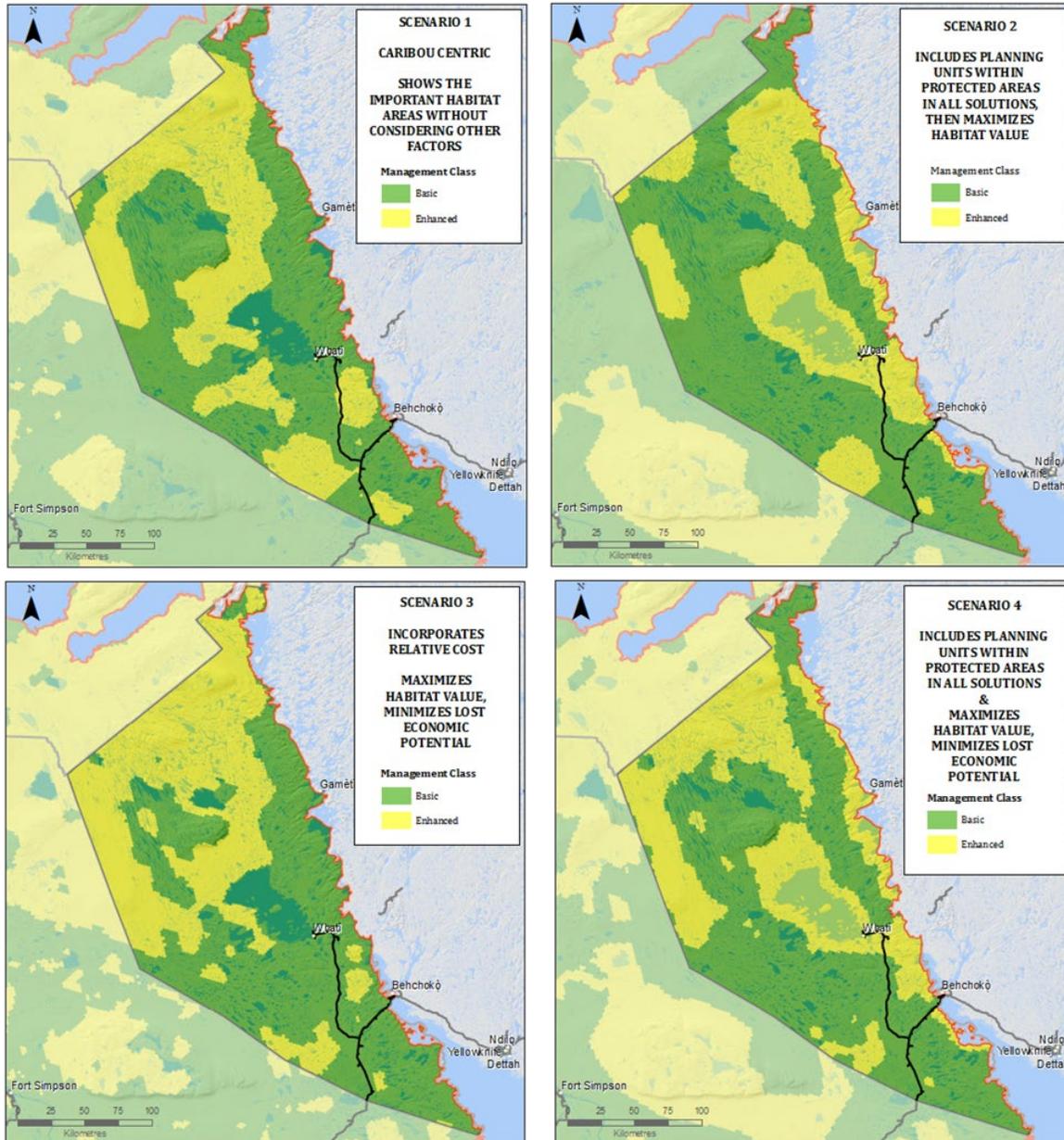


**Figure D-11.** ‘Super Sum’ solutions from Marxan scenarios one to four, with planning units colour coded by selection frequency (i.e., number of times selected out of 600 Marxan runs). Planning units that were never selected in any of the 600 runs are in red, planning units that were selected in less than half the 600 runs are in yellow, and planning units that were selected more than half the time are in blue.

Scenario 1, which only considered representation targets for cumulative regional seasonal RSF value and areas of above-median collar data density locked in, is equivalent to the approach used to generate the map of important boreal caribou areas described in Appendix C. It is essentially a “caribou-centric” scenario as it only considers value of planning units to caribou. Scenarios 2-4 included additional consideration of relative cost (resource development potential) and/or existing land protections. In Scenarios 2-4, a representation target of 75% of the cumulative regional collar data density index was used, rather than locking in areas of above-median collar data density as in

scenario one. Scenarios 2 and 4 locked in planning units that fell within established protected areas and land use plan zones that prohibit most types of development (areas in dark green in **Figure D-3**). Locking in these planning units meant that Marxan always had to include them in the final solution. Scenarios 3 and 4, which considered resource development potential as a relative cost, meant that Marxan looked for the solution that met representation targets for boreal caribou values while minimizing cost. **Figure D-11** provides a side-by-side comparison of the 'Super Sum' solutions from Scenarios 1-4. Representation targets for regional cumulative seasonal RSF value and cumulative collar data density index were met in all four scenarios.

To generate maps of management class areas, planning units that were selected in more than half of the 600 runs in each scenario were translated into Enhanced management areas (yellow), and planning units never selected, or selected less than half the time, were translated into Basic management areas (green) (**Figure D-12**).



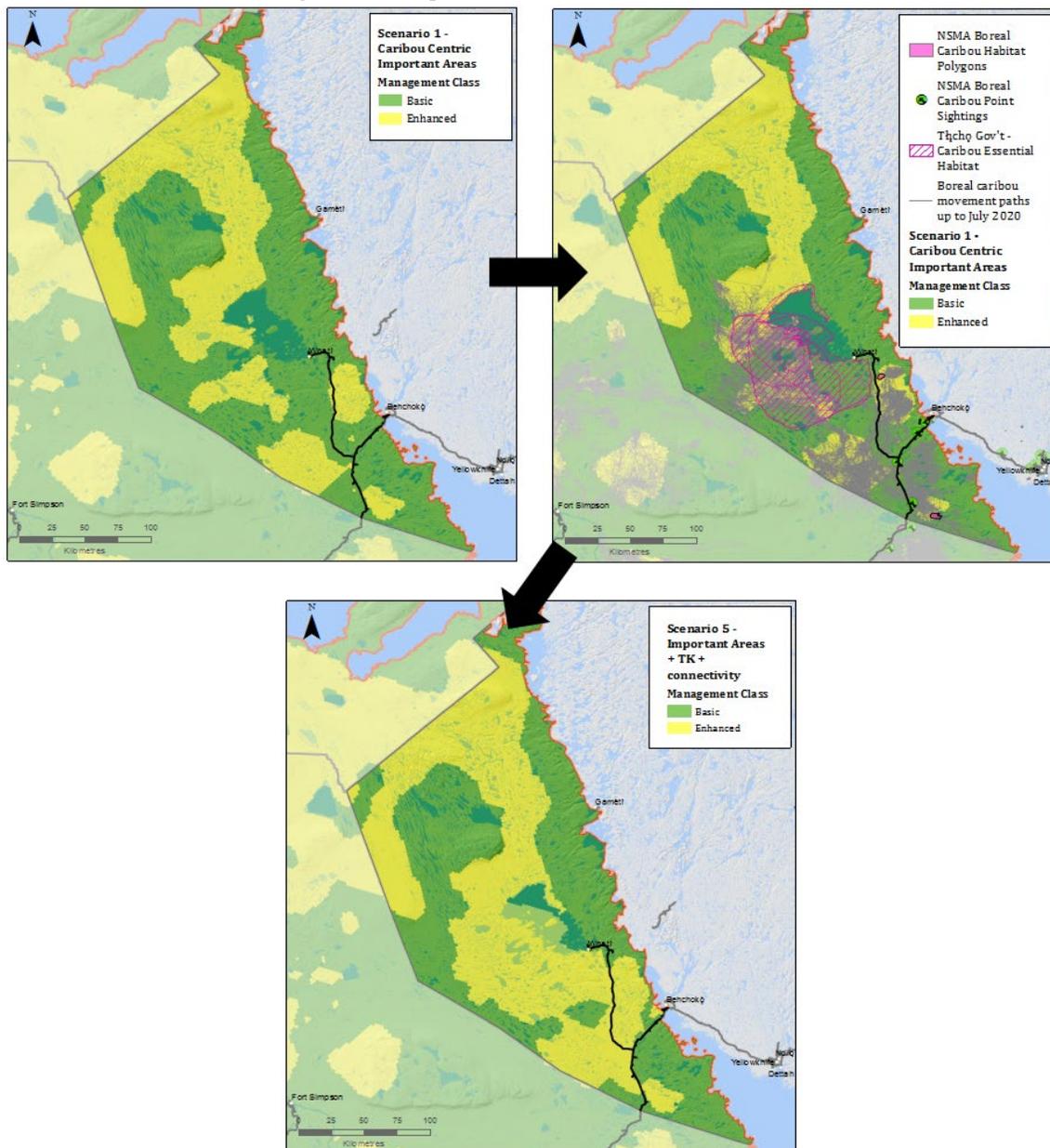
**Figure D-12.** Translation of Marxan results into Enhanced and Basic management class areas. Planning units that were selected in more than half of the 600 runs were translated into Enhanced management areas (yellow) and planning units never selected, or selected less than half the time, were translated into Basic management areas (green).

## Scenarios 5 and 6 – Adding in Consideration of Traditional Knowledge and Connectivity

### *Scenario 5 – Caribou Centric Important Areas + TK Polygons + Connectivity*

Manual adjustments to scenario one were made to add in important areas identified based on TK and to provide connectivity between potential Enhanced areas based on movement paths generated from collared boreal caribou GPS locations. TK polygons and points were shared by the Tłı̨chǫ Government

and NSMA. Scenario 1 was chosen as the starting point for manual adjustments, because Enhanced management areas identified through this scenario had the highest overlap with the TK information provided. Planning units overlapping with areas identified by the Tłı̨chǫ Government as essential habitat were converted to Enhanced management areas, as were planning units overlapping polygons provided by the NSMA. Movement paths of collared caribou were then used to identify planning units that overlapped with movement corridors between Enhanced management areas identified in Scenario 1, and these planning units were also converted to Enhanced management areas. Some additional planning units west of Lac La Martre that had high densities of movement paths were also added as Enhanced management areas. These manual adjustments resulted in Scenario 5 (Caribou Centric Important Areas + TK polygons + Connectivity), which provided much more area in Enhanced management (51.8%) than Scenarios 1-4 (range 36.8% to 42.9%). **Figure D-13** illustrates how scenario one was manually edited to produce Scenario 5.



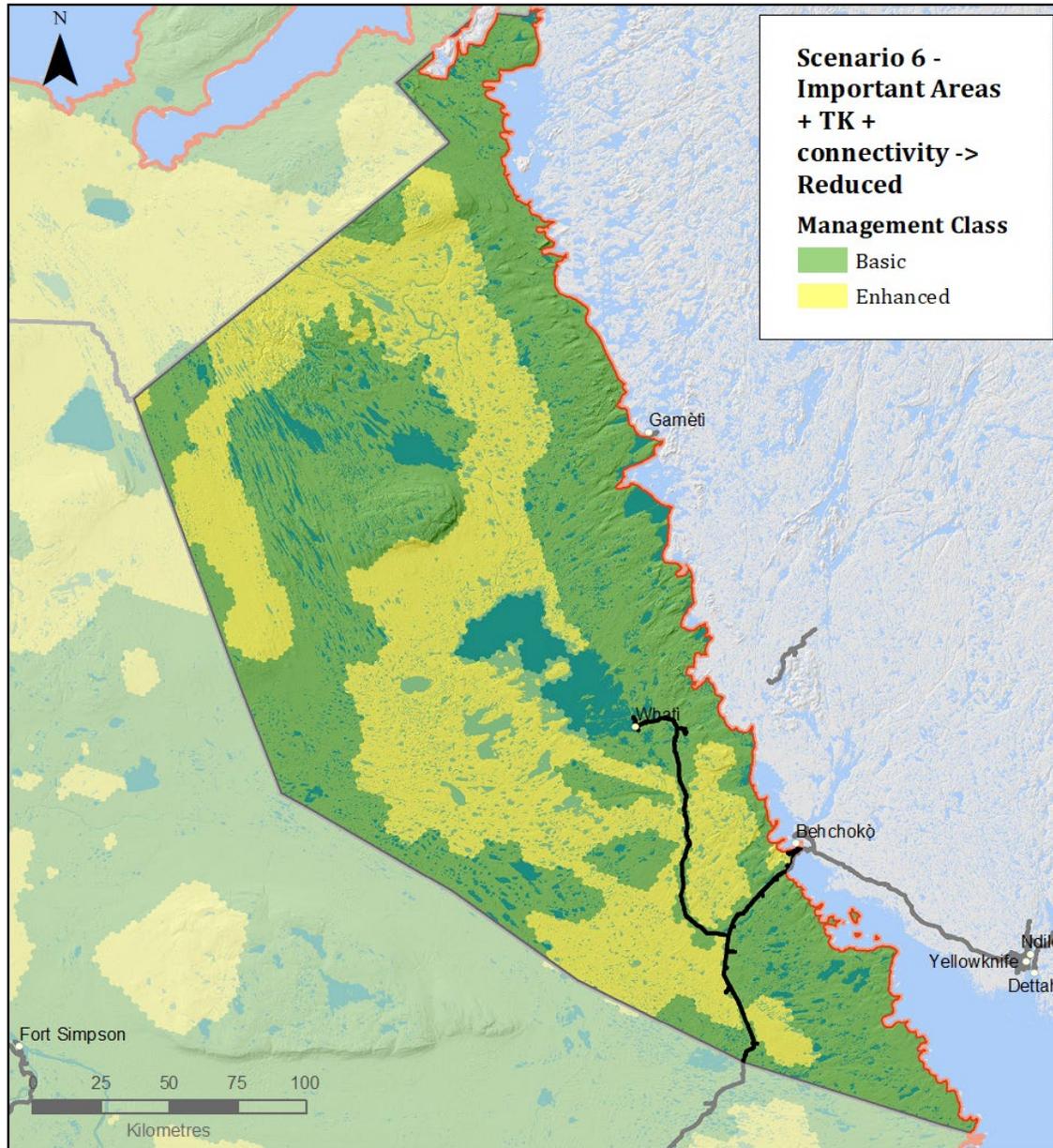
**Figure D-13.** Development of Scenario 5 based on converting planning units that overlap essential habitat areas identified by the Tłıchǫ Government, important areas identified by the NSMA, and movement corridors based on collar data, from Basic to Enhanced management areas.

### ***Scenario 6 – Scaled Back (“reduced”) Version of Scenario 5***

As Scenario 5 placed much more of the region within Enhanced management areas (51.8%) than was recommended as the minimum target in the Framework (at least 1/3 of the region, or 33%), manual adjustments were made to Scenario 5 to try and reduce the amount of area in Enhanced management to something closer to Scenario 1 (39.3%). To do this, planning units that met the following criteria were converted from the Enhanced to Basic management class:

- Planning units along edges of Enhanced polygons in the northern part of the region that were less frequently selected by Marxan (based on ‘Super Sum’ solution selection frequency) or had lower RSF values across all seasons.
- Planning units in Lac La Martre that were mostly water and had no collar data movement paths.
- Planning units with high forestry or mineral potential and low number of caribou movement paths, mostly along the Tłıchǫ Highway corridor.
- Planning units south of Lac La Martre and east of the Tłıchǫ Highway that were below the raised plateau west of Marian Lake and had a low number of movement paths.
- Planning units that intersected with the 60 m rights-of-way of the Tłıchǫ Highway and Highway 3, except where planning units overlapped with 1 km segments along the Tłıchǫ Highway that had high numbers of caribou road crossings (concentrated movement corridors).

These manual adjustments resulted in Scenario 6 (**Figure D-14**), which had 41.5% of the region in Enhanced management class areas.



**Figure D-14.** Scenario 6, which is a scaled back (“reduced”) version of Scenario 5 based on manual edits to bring the proportion of the region in Enhanced management areas closer to Scenario 1.

### Comparing Scenarios 1-6

The four scenarios (Scenarios 1-4) based on Marxan analyses, plus the two additional scenarios (5-6), were compared based on a series of indicators for caribou habitat suitability and development potential:

#### *Caribou indicators*

- Percentage of the region in Enhanced management class areas (*as outlined in the Framework the minimum target for a region in Tier 1 for human disturbance is at least 1/3 of the region in Enhanced areas, more area in Enhanced would be better for caribou habitat protection*).

- Average seasonal RSF value of planning units in Enhanced vs. Basic management class areas (*higher average seasonal RSF value within Enhanced areas indicates that better quality habitat would be prioritized for caribou*).
- Percentage of undisturbed terrestrial habitat captured in Enhanced vs. Basic management class areas (*higher percentage of available undisturbed habitat within Enhanced areas could help to meet regional undisturbed habitat targets*).
- Spatial distribution of Enhanced management class areas and incorporation of TK and connectivity (*e.g., are Enhanced areas spread throughout the region, or concentrated in only one part of the region?*)

#### Development potential indicators

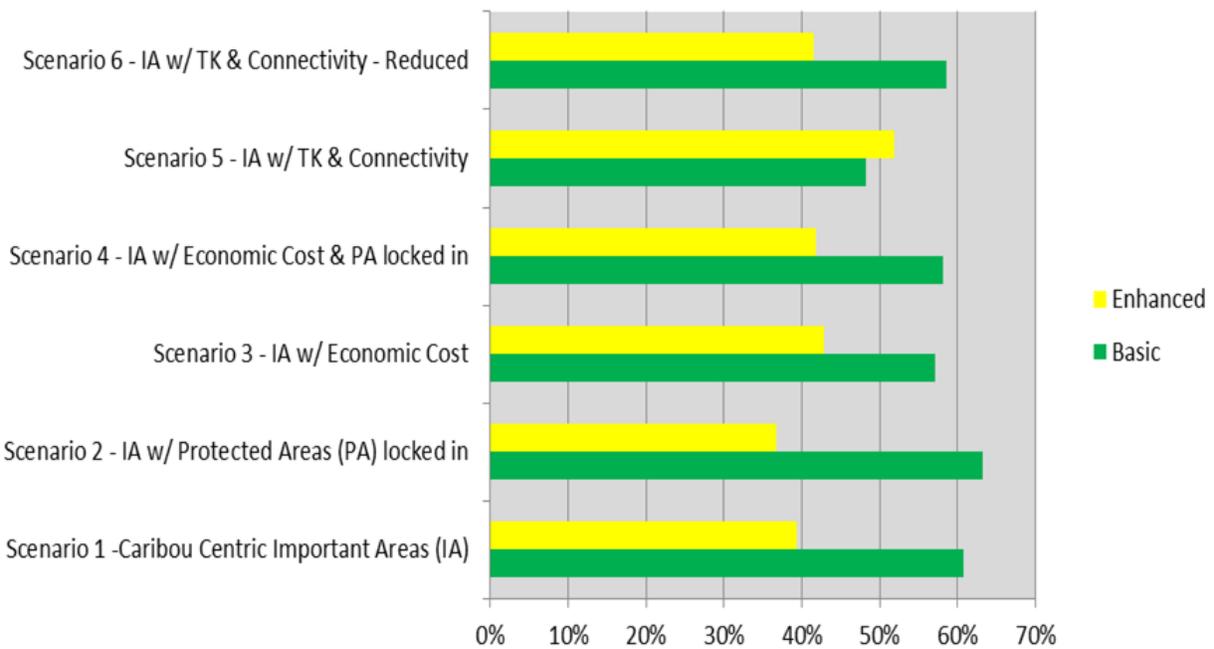
- Percentage of the region in Enhanced management class areas (*less area in Enhanced management is better for development potential*).
- Percentage of cumulative regional total cost captured in Enhanced vs. Basic management class areas (*more of the total cost captured in Basic management areas is better for development potential*).
- Percentage of cumulative regional mineral development potential captured in Enhanced vs. Basic management class areas (*more of the mineral cost captured in Basic management areas is better for mineral development potential*).
- Percentage of cumulative regional forestry development potential captured in Enhanced vs. Basic management class areas (*more of the timber cost captured in Basic management areas is better for forestry development potential*).

### **Comparison of Scenarios**

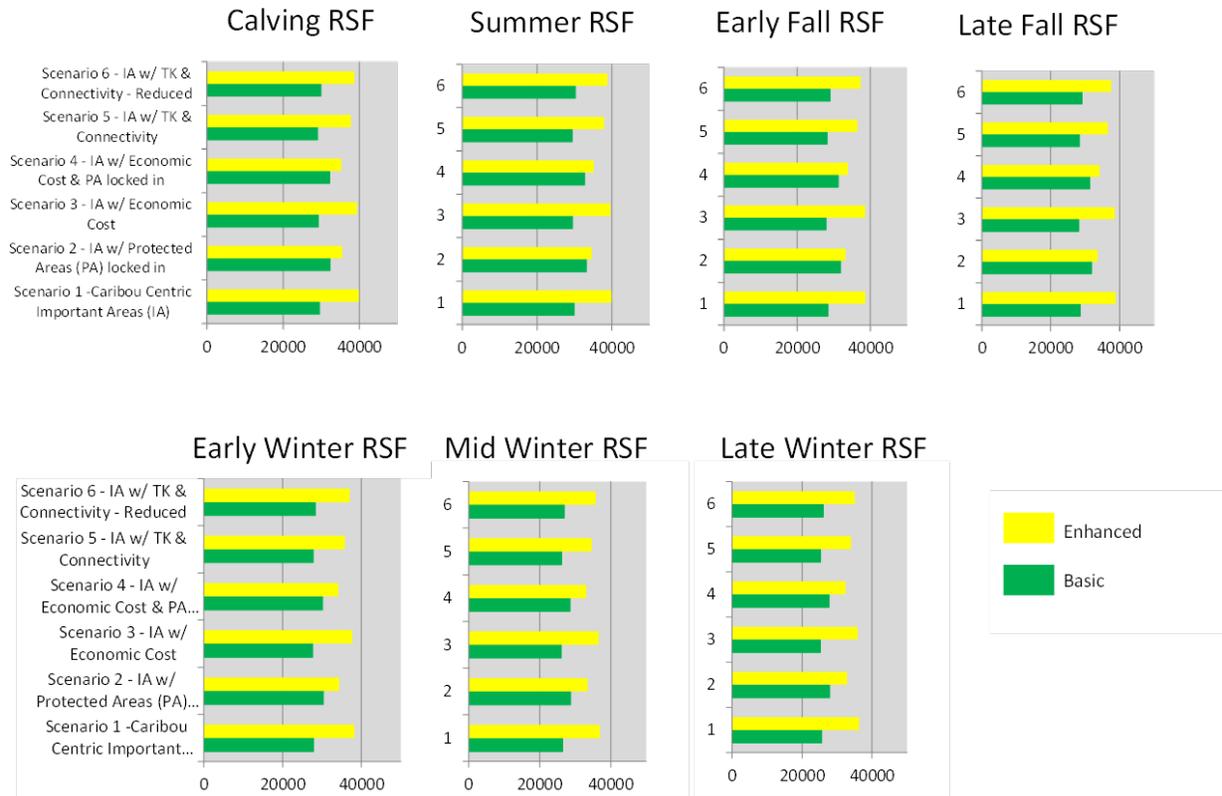
#### *Caribou Indicators:*

Scenario 5 (Caribou Centric Important Areas + TK polygons + Connectivity) had the largest proportion of the region in Enhanced management areas (51.8%), while Scenario 2 (Important Areas with Protected Areas locked in) had the lowest area in Enhanced management (36.8%; Figure D-15). Manual edits to Scenario 5 brought the amount of area in Enhanced management in Scenario 6 down to 41.5%. In terms of the average seasonal habitat suitability of planning units captured in Enhanced management areas, Scenarios 1 (Caribou Centric Important Areas) and 3 (Important Areas with Economic Cost) consistently had planning units with the highest average RSF values across all seasons, followed closely by Scenarios 5 and 6 (**Figure D-16**). Locking protected areas and certain land use plan zones into the Marxan solutions (Scenarios 2 and 4) consistently resulted in lower habitat suitability within Enhanced areas, mainly because much of the existing land protection in Wek'èezhì is focused around water bodies, and water is ranked as a low suitability land cover type in the RSF models. Scenarios 1, 3, 5 and 6 captured a larger proportion of the undisturbed terrestrial habitat available within the Wek'èezhì region within Enhanced management areas, whereas Scenarios 2 and 4, which locked in protected areas and considered cost, had a larger proportion of the undisturbed habitat within Basic management areas (**Figure D-17**). Although Scenario 3, which considered economic cost, maintained similar average habitat suitability for caribou within Enhanced management areas as Scenario 1 (Caribou Centric), Scenario 3 concentrated most of the

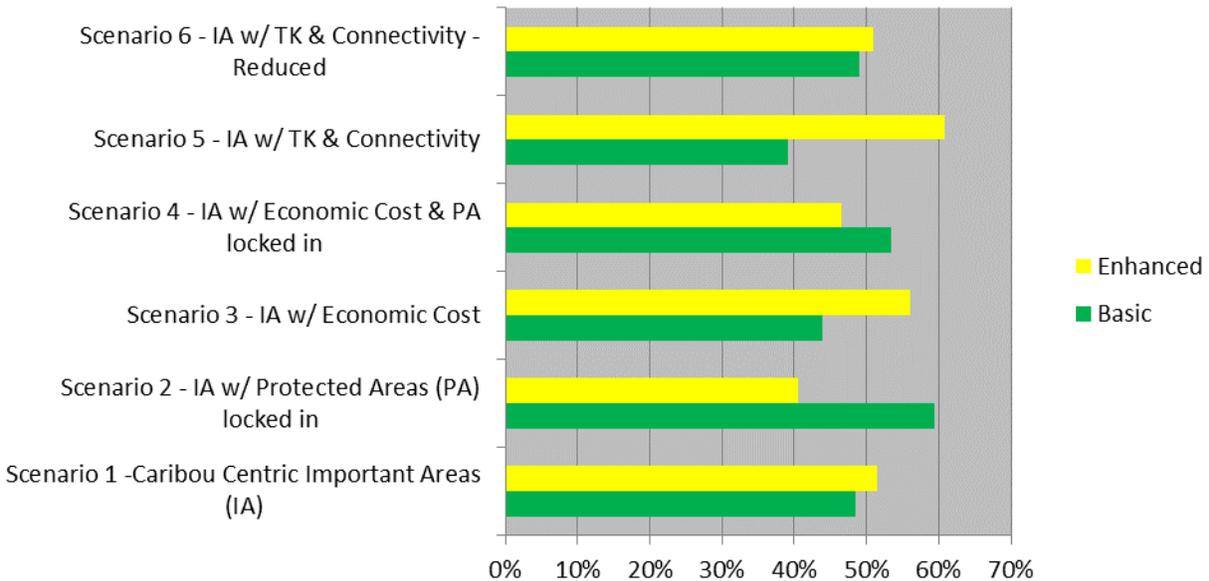
planning units selected for Enhanced management within the northern half of the Wek'èezhì region (see **Figure D-12**), which could have implications for range recession if habitat disturbance then became concentrated in the southern half of the region. Scenario 4 also tended to concentrate more of the Enhanced management areas in the northern half of the region. Scenarios 5 and 6 included areas deemed essential and important for boreal caribou based on TK, as well as connectivity corridors between areas of concentrated habitat use by boreal caribou, within Enhanced management areas (**Figures D-13** and **D-14**). By making manual reductions to the amount of planning units in Enhanced management in Scenario 5, Scenario 6 still maintained average seasonal RSF values within remaining Enhanced management planning units similar to Scenario 5 (Figure D-16).



**Figure D-15.** Percentage of the Wek'èezhì range planning region in Enhanced and Basic management areas in each scenario.



**Figure D-16.** Comparison of scenarios 1-6 in terms of average cumulative seasonal RSF units. Scenarios with higher average cumulative RSF values within Enhanced management planning units are indicative of higher value habitat (based on RSF) within Enhanced areas.



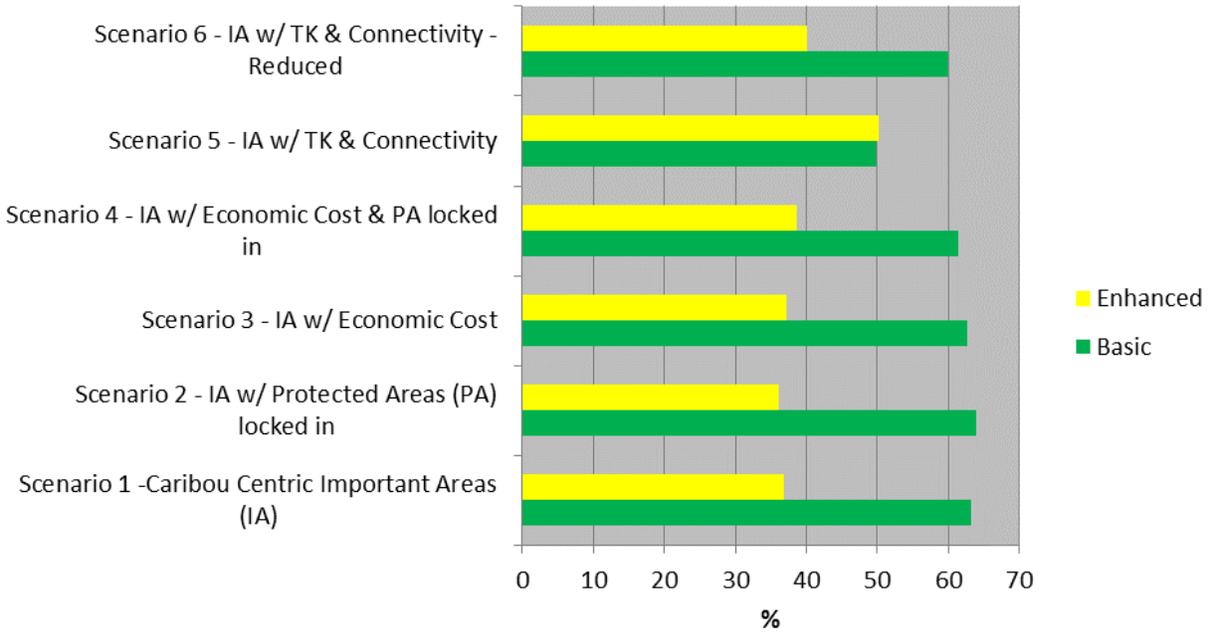
**Figure D-17.** Percentage of available undisturbed terrestrial habitat within the Wek'èezhìi range planning region captured within Enhanced and Basic management areas.

*Development Indicators:*

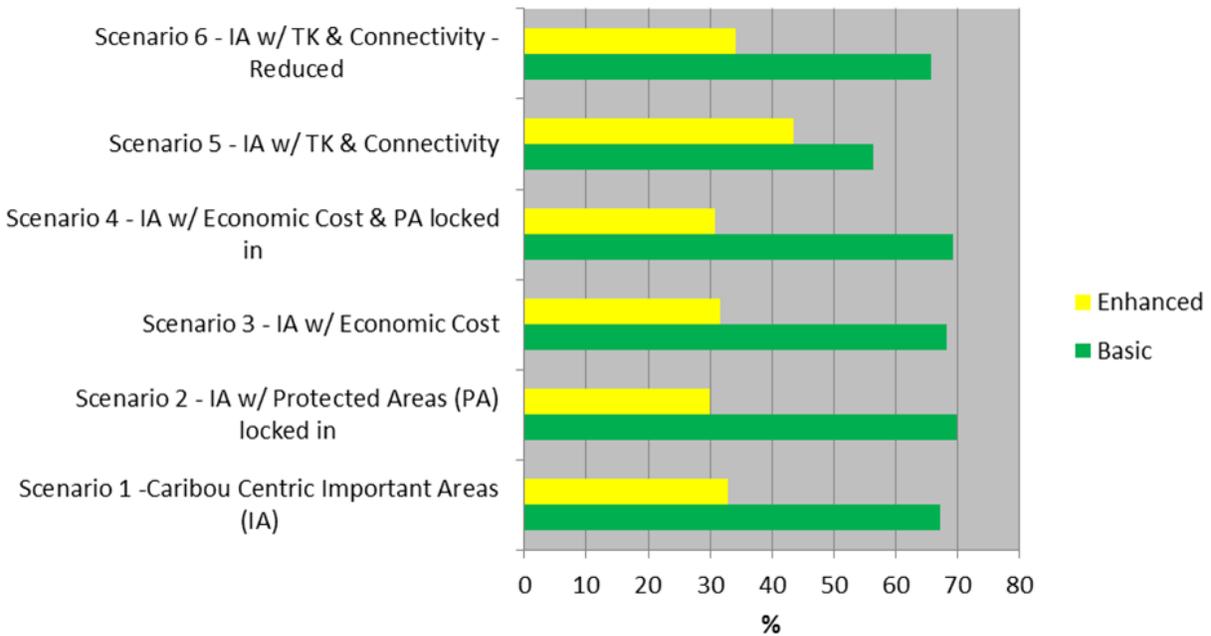
The impact of each scenario on resource development potential was assessed in terms of the percentage of the region captured in Enhanced management areas, and the percentage of the cumulative regional sum of total cost value in each planning unit captured within Basic management areas. Having more of the cost value captured in Basic management areas indicates that more of the areas with higher resource development would be subject to less strict management requirements for boreal caribou, which is better for regional resource development potential. The mineral and forestry sectors were also considered separately to look at the impact of each scenario on these two sectors. This was done by looking at the percentage of the cumulative regional scores for mineral development potential and forestry potential (not including consideration of proximity to roads) captured in Basic management areas. Higher percentages in Basic management areas indicate that a greater amount of the mineral and forestry resource potential would be left in areas subject to less strict management requirements for boreal caribou.

Scenario 5 would be most limiting for resource development overall due to it having the highest percentage of the region within Enhanced management areas (**Figure D-18**), while Scenario 2 (Important Areas with Protected Areas locked in) would have the smallest impact on resource development potential because most of the Enhanced management areas would be concentrated within areas with existing land protections that already preclude most types of development (see **Figures D-3, D-12 and D-15**). Scenario 3 maintained the highest amount of forestry development potential within Basic management areas (**Figure D-20**), whereas Scenarios 1-4 all performed similarly in terms of maintaining mineral development potential within Basic management areas (**Figure D-19**). Scaling back Scenario 5 to Scenario 6 resulted in increasing levels of mineral development potential within Basic management areas, similar to Scenario 1 (**Figure D-19**). Scenario 6 also increased the proportion of forestry development potential within Basic management areas relative to Scenario 5, but would still be more limiting for forestry development than Scenario 1 (**Figure D-20**). This is due to the movement corridors that were added to Scenarios 5 and 6 as Enhanced management areas, which are concentrated along the Tłı̄ch̄o Highway corridor and overlap with much of the area where the FVI exists.

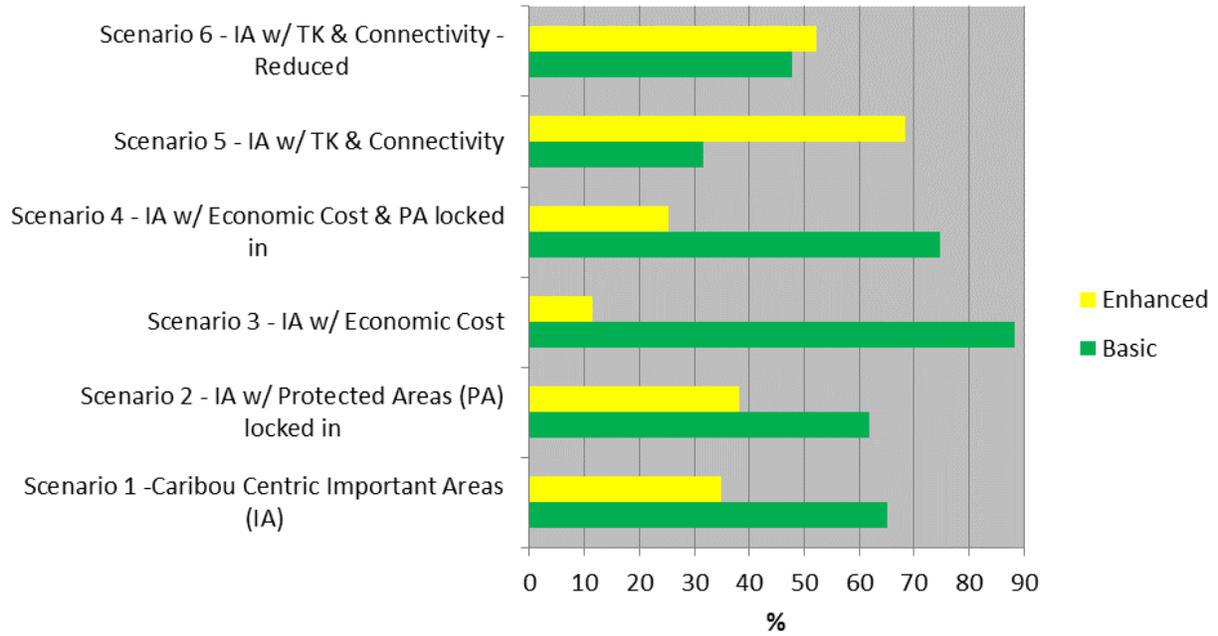
**Table D-2** provides a summary of the scenario comparisons based on the caribou and development indicators and ranks each scenario from 1 (low) to 6 (high) based on the scenario's performance relative to each indicator. A scenario ranked 6 for a caribou indicator would be best for caribou, and a scenario ranked 6 on a development indicator would be best for development. It is important to note that some scenarios performed very similarly on some indicators, which is not reflected in the 1 to 6 ranking scale.



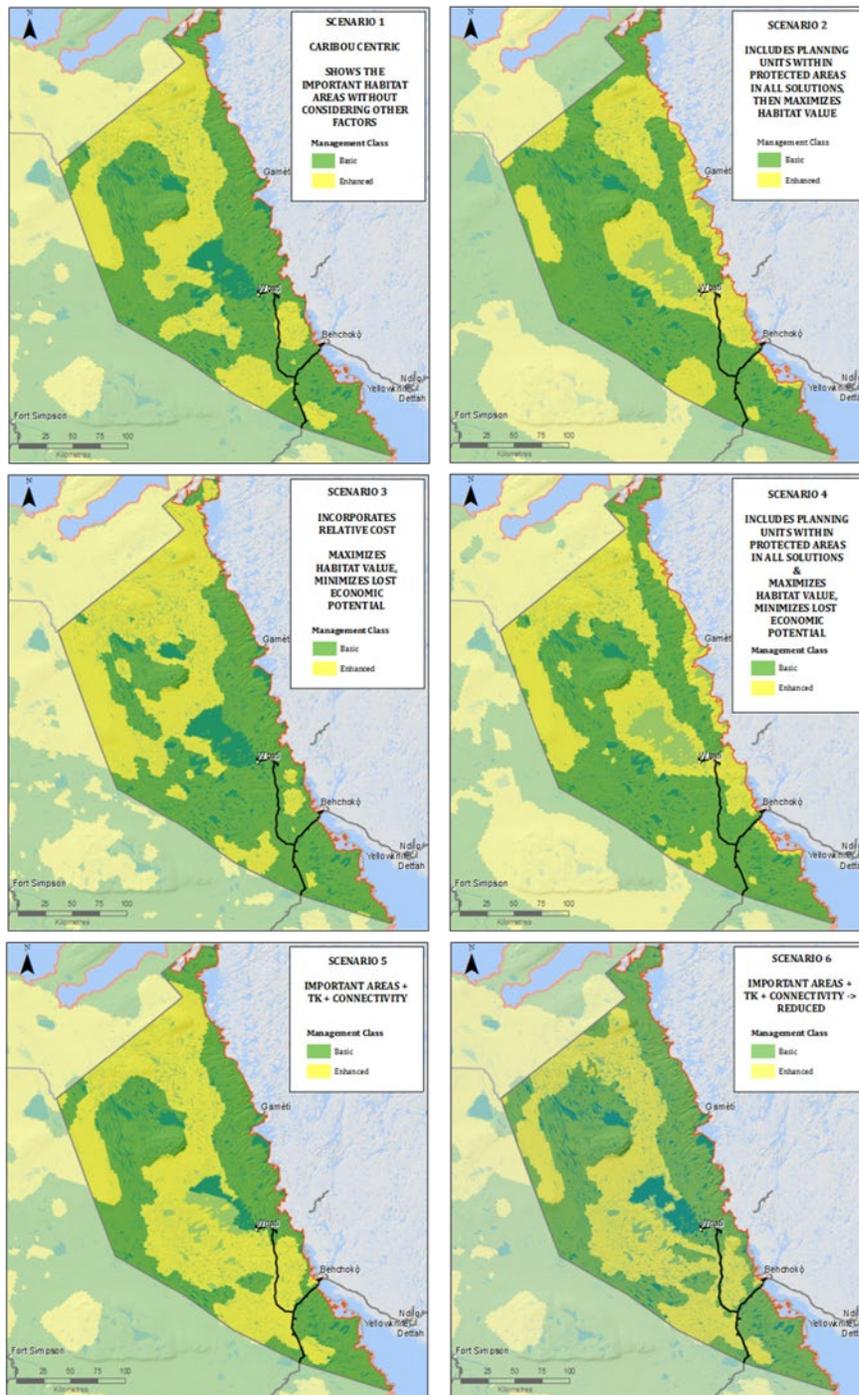
**Figure D-18.** Percentage of cumulative regional total cost captured within Enhanced and Basic management areas. Scenarios with a higher percentage of the total cost within Basic management areas are considered better for development potential.



**Figure D-19.** Percentage of cumulative regional mineral development potential within Enhanced and Basic management areas.



**Figure D-20.** Percentage of cumulative regional forestry development potential within Enhanced and Basic management areas.



**Figure D-21.** Range plan management class scenario maps based on Marxan analyses (Scenarios 1-4) and manual adjustments to include TK and connectivity between patches (Scenarios 5-6).

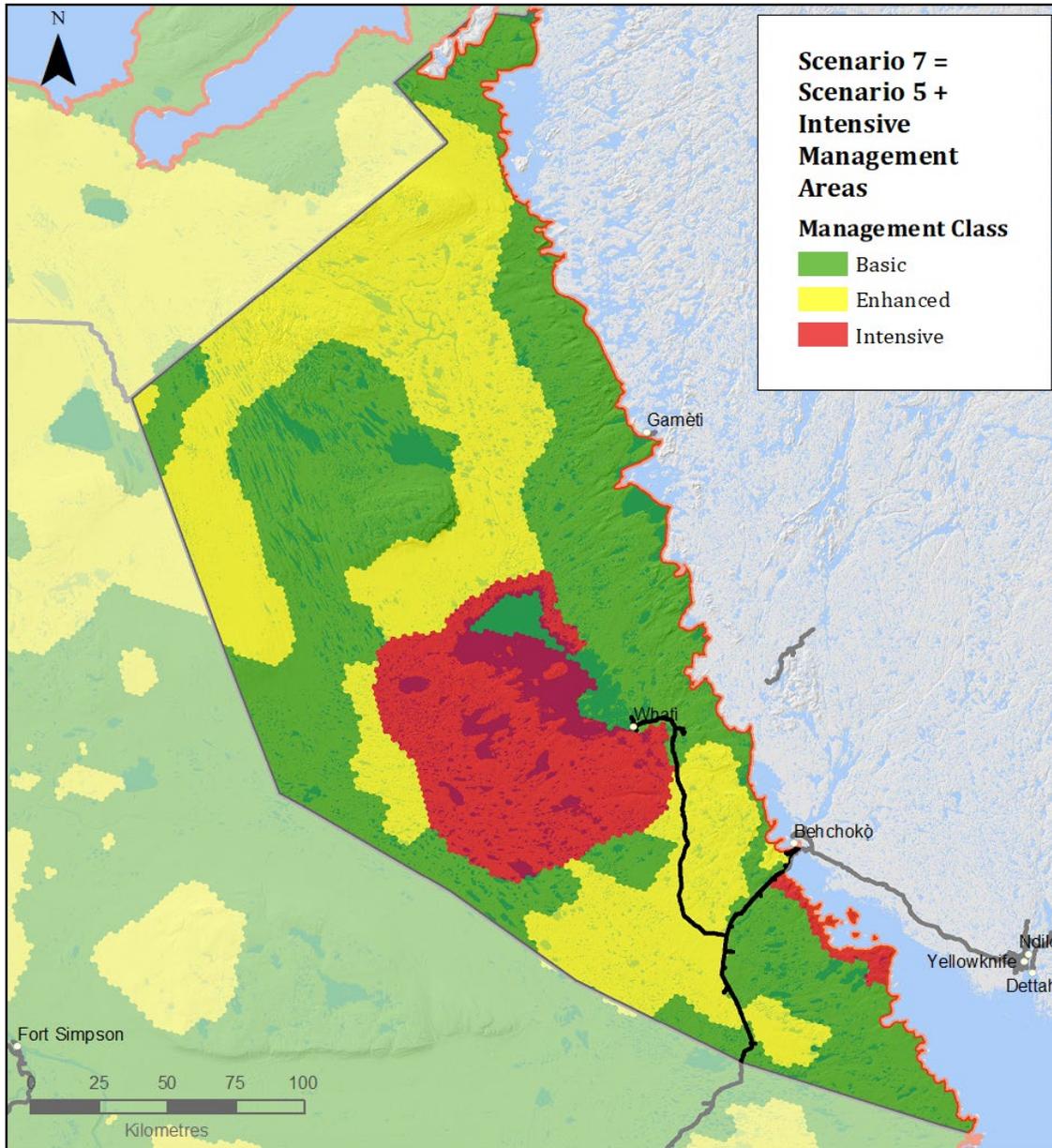
**Table D-2.** Summary of performance of different range plan management class map scenarios based on caribou and development indicators. In each row, scenarios are ranked from low (1) to high (6) in terms of their performance for each indicator.

Indicators		Scenario 1 Caribou Centric Important Areas (IA)	Scenario 2 IA w/ Protected Areas (PA) locked in	Scenario 3 IA w/ Economic Cost	Scenario 4 IA w/ Economic Cost & PA locked in	Scenario 5 IA w/ TK & Connectivity	Scenario 6 IA w/ TK & Connectivity - Reduced	Notes
<b>Caribou Indicators</b>	% region in Enhanced mgmt. class	2	1	5	4	6	4	Scenario with higher % in Enhanced ranks higher from a caribou perspective
	Average seasonal RSF value	6	2	5	1	3	4	
	Proportion of terrestrial undisturbed habitat in Enhanced	4	1	5	2	6	3	
	Spatial considerations	No connectivity between patches	Selects fewer areas with known caribou presence	Concentrates Enhanced area in northern part of the region	Concentrates Enhanced area in northern part of the region	Incorporates TK polygons and Connectivity, still low representation east of Hwy 3	Incorporates most of TK polygons and most of Connectivity, still low representation east of Hwy 3	

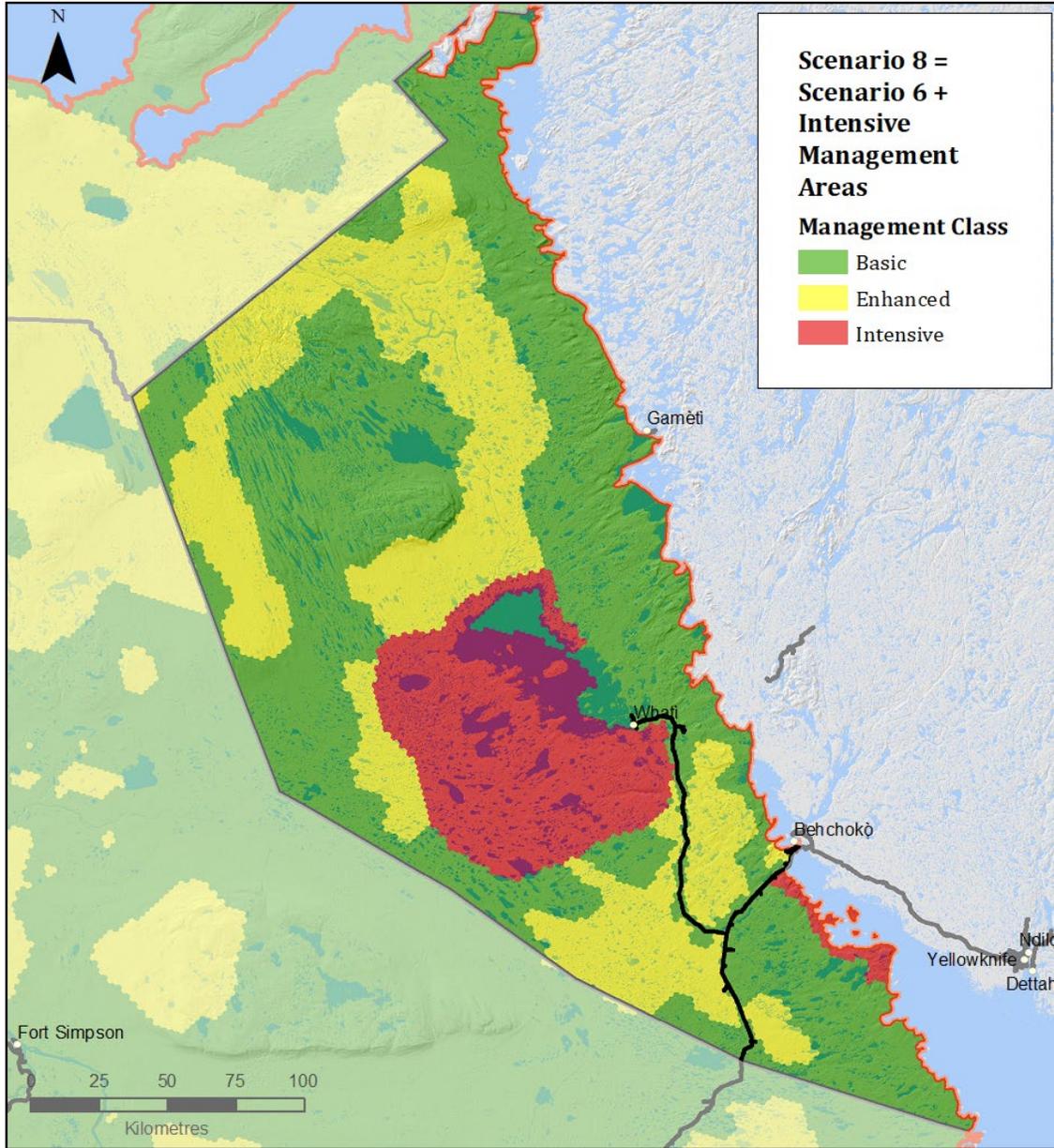
Indicators		Scenario 1 Caribou Centric Important Areas (IA)	Scenario 2 IA w/ Protected Areas (PA) locked in	Scenario 3 IA w/ Economic Cost	Scenario 4 IA w/ Economic Cost & PA locked in	Scenario 5 IA w/ TK & Connectivity	Scenario 6 IA w/ TK & Connectivity - Reduced	Notes
<b>Development Indicators</b>	% region in Enhanced mgmt. class	5	6	2	3	1	4	Scenario with higher % in Enhanced ranks lower from development perspective
	Total cost layer (including distance to roads)	4	3	6	5	1	2	Higher ranked scenarios leave more areas of higher
	Mineral development potential	2	4	5	6	1	3	development potential (high cost) captured
	Forestry development potential	4	3	6	5	1	2	in Basic mgmt. areas

## Scenarios 7 and 8 – Addition of Intensive Management Areas

Scenarios 1 to 6 were presented to the Wek'èezhì boreal caribou working group at a meeting on May 19-20, 2021. The Working Group discussed the pros and cons of each scenario and tried to come to consensus on a preferred scenario to use to make further manual adjustments. The majority of the Working Group preferred Scenario 5, because it included TK and connectivity among important areas for caribou and was the most conservative and protective for boreal caribou overall. At a previous meeting of the Working Group (April 21-22, 2021), it was agreed that areas repeatedly used by boreal caribou for calving (e.g., islands and peninsulas in Lac La Martre and along the shoreline of Great Slave Lake) should be classified as Intensive management areas. The Tłıchǝ Government also requested that the entire area that was classified as essential habitat based on their TK should be classified as an Intensive management area. Most of the polygons within this essential habitat area identified by the Tłıchǝ Government include calving areas as an important feature. There was also much discussion about the importance of the shoreline and islands along the North Arm of Great Slave Lake and Whitebeach Point area due to their use by boreal caribou for calving sites and for relief from insects during the summer season. The Working Group agreed that planning units along the shoreline of the North Arm and overlapping with the candidate Dınàgà Wek'èhodì, as well as Whitebeach Point and areas just to the south, should be classified as Intensive management areas (including offshore islands in these areas). Using Scenario 5 as a starting point, adjustments were made to add these Intensive management areas to come up with Scenario 7 (**Figure D-21**). These adjustments resulted in Scenario 7 having 52.8% of the region in Enhanced/Intensive management areas. The Working Group then discussed ways to scale back Scenario 7 to bring the amount of area in Enhanced/Intensive management back down again, such as by converting Enhanced areas in the northern part of the region that overlapped recent fires back to Basic management. This was essentially the same type of adjustment that was made to come up with Scenario 6, so it was decided to take Scenario 6 and incorporate the same Intensive management areas from Scenario 7. This resulted in Scenario 8 (**Figure D-22**), which is the final map of management class areas that the Working Group came to consensus to put forward in the final draft of the interim Wek'èezhì range plan. Scenario 8 has a total of 44.8% of the region in Enhanced (30.0%) and Intensive (14.8%) management areas. The polygons of management class areas from Scenario 8 based on the 5 km<sup>2</sup> hexagonal planning units were then adjusted in ArcGIS to smooth the edges of the polygons, and the final result is shown under the *Management Classes* section of this report.



**Figure D-22.** Scenario seven management class map, which was produced by taking scenario five and converting the essential habitat areas identified by the Tłı̨chò Government to an Intensive management area and adding Intensive management areas along the shoreline and island of the North Arm of Great Slave Lake and Whitebeach Point area.



**Figure D-23.** Scenario eight management class map, which was produced by taking scenario six and converting the essential habitat area identified by the Tłı̨chǫ Government to an Intensive management area and adding Intensive management areas along the shoreline and island of the North Arm of Great Slave Lake and Whitebeach Point area.