June 16 2007

John T’Seleie
Cc: 'David Livingstone'; 'Susan Fleck'; 's_haszard@ducks.ca'; 'Freya Nales'; 'mmcknight@oldscollege.ca'
Subject: SLUP Ecological Analysis

Hello John
Congratulations on getting the draft Plan out for comments.

For your consideration, attached is an assessment on the ecological representation of the draft Plan by the Protected Areas Strategy Ecological Working Group. This follows up on our meeting in September and the subsequent analysis work that the Ecological Working Group did. The Ecological Working Group’s analysis suggests ways to improve the ecological representation, and thereby help maintain biodiversity and healthy landscapes. It is important to note that this is technical information on ecological representation and does not necessarily represent the views of the individual organizations that make up the Ecological Working Group. Comments on the plan will be submitted directly to the Sahtu Land Use Planning Board by the respective organizations separately.

Apologies for the delay on this, but I hope you find the conclusions and methods helpful. For technical questions on the analysis, please call Evelyn Gah of the Ecological Working Group at 873-7516. If you have any general questions about this, or if we can be of any assistance in providing more details or analysis for the Planning Board, please feel free to call me.

Karen

Analysis of ecoregion representation in the draft Sahtu land use plan.

The Sahtu Land Use Planning Board (SLUPB) has considered previous information provided by the PAS Ecological Working Group (EWG) on protecting core representative areas within each Sahtu ecoregion. This contributes to conserving the entire diversity of habitats which supports objective 4 of the Sahtu Land Use Plan: "To protect and conserve the wildlife and environment of the settlement area for present and future generations".

The SLUPB expected that the ecoregion analysis work would continue and the work presented here provides additional information for consideration. With the release of the first draft of the SLUP, the PAS EWG has done a second analysis of the contribution of the draft conservation zones to meeting ecological representation goals for the conservation features in ecoregions intersecting the Sahtu Settlement Area.[1] Following is a brief description of how the analysis was conducted along with a summary of the results. Appendix 1 provides details on the results of the analysis and is followed by 2 maps that show the study area and the analysis results.

Overview of Analysis Methods

This analysis was done for the SLUPB on a confidential basis. The analysis does not represent the views of any organization and any requests for this analysis must be directed to the SLUPB.

Study Area

The analysis was conducted for an area larger than the Sahtu Settlement Area as all 13 ecoregions falling wholly or partially within the Sahtu were included in their entirety. Thus, parts of the Dehcho Region, the Gwich'in Settlement Area, the Inuvialuit Settlement Region, and the Wek'eezhi Co-management Lands were included in the analysis because they share ecoregions with the Sahtu. Therefore, in addition to the Sahtu existing and proposed protected areas and conservation zones, the analysis included the draft Dehcho Land Use Plan conservation zones, the Gwich'in Land Use Plan conservation and heritage zones, and existing protected areas and PAS proposals in the Dehcho, Gwich'in, Inuvialuit and Wek'eezhii in the ecoregions shared with the Sahtu. The EWG assumed that these areas are, or will be, protected and then determined how they contribute to meeting ecological representation goals and what additional areas might be considered to fully meet these goals.

It should also be noted that large waterbodies such as Great Bear Lake, as well as the 1km wide proposed Mackenzie Gas Project Corridor, oil and gas production licenses and significant discovery licenses and active mineral leases were excluded from this analysis, such that the model was not permitted to select these areas.

The total area of the ecoregions included in the analysis (excluding the area of Great Bear Lake) is 43,173,329 ha (Map 1). The size of the Sahtu settlement area (excluding the area of Great Bear Lake) is 25,377,709 ha.

[1] Ecoregion 68 (mostly in the Tlicho) and ecoregion 36 (mostly in Nunavut) have not been included in this analysis. Both of these ecoregions contain a small portion of Caribou Point Conservation Zone (Edaiila).

Conservation Features
The EWG used three data sets to identify core representative areas within each ecoregion. The assumption is that these three abiotic and biotic datasets are good surrogates for biodiversity.

Data sets included in the analysis were:

- Land cover classes
    - Ducks Unlimited (DU) land cover classes for ecoregion 53 (the only Sahtu ecoregion with complete DU coverage at the time of analysis)
    - Earth Observation for the Sustainable Development of Forests (EOSD) land cover classes for all other ecoregions
- Landscape units (areas with a particular type of rock, soil and terrain)
- Physiographic units (areas with similar elevation, climate, slope, aspect, and landforms) for all ecoregions within the Taiga Plains ecozone

Representation Goals – How Much to Protect
The objective of the analysis is to protect a representative portion of all conservation features within each ecoregion. Representation goals were set for individual conservation features based on the total amount of each feature within an ecoregion. Representation goals range from 10% to 25% for most features, and 100% for rare features. These goals are considered moderate, and higher (or lower) goals could be used to produce a different set of results. Computer modeling software was used to run the analysis and select areas that meet the representation goals with the least amount of area on the ground. The assumption is that protecting portions of these conservation features will help to protect a functional, resilient, ecologically representative sample of each ecoregion.

Results of the Analysis

1. *How well do the existing and proposed conservation zones and protected areas in the Sahtu contribute to meeting ecological representation goals for the entire study area?*

    A. The analysis found that the current and proposed protected areas and conservation zones in the study area meet 58% of the goals set for ecological representation.
    B. In the Sahtu Settlement Area 34% of the land is represented in existing and proposed protected areas and conservation zones.

2. *What are irreplaceable conservation features and how can these features be incorporated?*

    The modeling program runs the analysis 100 times, because there is often more than one solution for meeting all ecological representation goals. Areas that are selected 90-100% of the time are considered irreplaceable (red areas on Map 2). These areas are likely being selected because they contain conservation features not found elsewhere within the ecoregion or because they are the most efficient place to meet representation goals. Examples 1-4 describe a few of the irreplaceable areas selected by the model. The model provides options for particular areas that might be worthy of further investigation.

A. The analysis found that if the irreplaceable conservation features were added to the current and proposed protected areas and conservation zones in the study area, this would meet 72% of the goals set for ecological representation.
B. In the Sahtu Settlement Area this would mean representing 37% of the land in existing and proposed protected areas and conservation zones. Thus, if the SLUPB considered incorporating irreplaceable conservation features into its proposed conservation zones it would only require an additional 3% of the land in the Sahtu and would provide a substantial contribution towards meeting representation goals.

3. What additional area is needed for full ecoregion representation?

The green areas on Map 2 are selected 30-89% of the time because they contain a variety of features that are representative of an ecoregion in the most efficient way. These conservation features occur more frequently within an ecoregion and are representative of the landscape. They must be part of the solution in order to meet all representation goals but are more flexible in terms of providing multiple choices (or locations) for how representation goals for these features can be met. The configuration of green areas shown on Map 2 uses the least amount of area to meet the goals because the model has likely selected locations that contain a variety of conservation features within a small area. Thus, these green areas are worth further investigation when considering adding additional areas to the proposed conservation zones. Examples 5 and 6 describe some of the additional areas that were selected by the model.

A. The analysis found that adding the representative areas selected more than 30% of the time to the current and proposed protected areas and conservation zones in the study area would meet 98% of the goals set for ecological representation.
B. In the Sahtu Settlement Area this would mean representing 41% of the land in existing and proposed protected areas and conservation zones. Thus, if the SLUPB were to consider reviewing conservation zones to include areas selected 30-89% of the time, they would be a contribution towards meeting nearly all of the ecological representation goals and would require an additional 4% of the land in the Sahtu (over and above the 3% added for the irreplaceable features).

What these results mean for the Sahtu Settlement Area

As mentioned earlier, the analysis was conducted for a larger study area than the Sahtu region alone because we are looking at ecological representation within ecoregions rather than within specific political boundaries. Therefore, all ecoregions that occur wholly or partially within the Sahtu Settlement Area were included. The Sahtu Settlement Area shares all of these ecoregions except the Colville Hills and Grandin Plains ecoregions with the Gwich'in, Dehcho, Inuvialuit and/or Wek'eezhii regions. To evaluate the contribution of the Sahtu Settlement Area on its own, the draft Sahtu conservation zones, existing and proposed protected areas, and the red and green areas from the analysis that show up within the Sahtu Settlement Area boundaries were calculated as percentages of the land within the Sahtu region only.

It is important to note that in stating these numbers specifically for the Sahtu, the assumption is being made that the other political jurisdictions in the study area will also add the areas selected by the model to conservation zones and protected areas. For ecoregions that the Sahtu shares with other jurisdictions, some representative areas will need to be conserved within the Sahtu Settlement Area,

and some representative areas will need to be conserved outside of the Sahtu in order for the ecological representation goals for those ecoregions to be fully met. This demonstrates the shared responsibility that different political regions have in contributing to conservation and protecting biodiversity.

Specific examples from the Sahtu

Map 2 has a few examples of both the red "irreplaceable" areas and the green "additional" areas circled and numbered. The following is a brief description of these examples and why they might have high conservation values. The Sahtu Land Use Planning Board could further investigate these areas and consider incorporating them into the conservation zones of the Land Use Plan.

Examples 1 and 2 are red or irreplaceable areas in the analysis and connect to draft conservation zones already identified. The model looks for places to meet all the ecological representation goals using the least amount of land possible. It is more efficient to connect to and build upon areas already set aside for conservation. Example 1 is building upon the Whitefish River Conservation Zone and Example 2 is building upon the Ramparts River Watershed Conservation Zone and PAS proposal as well as the Mountain River Conservation Zone. A protected areas network is most effective when individual protected areas and conservation zones are *connected* or linked across the landscape. Important landscape connections include wildlife migration routes and corridors, and rivers, streams and groundwater flows. Both of these examples demonstrate locations where the Sahtu Land Use Planning Board might consider modifying boundaries of draft conservation zones already identified.

In addition to connecting to conservation zones, these examples both contain conservation features not found elsewhere within their ecoregion. These areas were also found to contain a high diversity of conservation features (landscape units, physiographic units, and DU and EOSD vegetation types) and that is another reason for them being selected. Because these areas contain this high diversity, the model is able to capture a variety of features using less area on the ground.

Example 3 is another red or irreplaceable area in the analysis but does not connect to an existing protected area or conservation zone. In this case there is a vegetation type (dense broadleaf forest in the EOSD dataset) that is representative of this location and not found elsewhere in the ecoregion. This is an area that the Sahtu Land Use Planning Board might want to investigate further to see if there are other unique characteristics or features in this area that would warrant it being placed in a Conservation Zone.

Example 4 also turns up as red in the analysis. There are no conservation features that occur only in this location but it is being selected in the current analysis because it is an efficient way to meet some of the ecological representation goals. It is efficient because it is connecting two of the draft conservation zones (Maunoir Dome and Anderson River). As previously mentioned, connectivity is an important thing to consider when planning a network of protected or conservation areas across the landscape. The Sahtu Land Use Planning Board could consider incorporating this area in order to connect the two draft conservation zones.

Example 5 shows two green or additional areas for consideration along the north shore of Great Bear Lake. These areas do not contain features that only occur at

these locations, but are representative of the conservation features. Although there is flexibility as to the location of representing the more common conservation features located in these green areas, the model has likely selected these areas because they are fairly efficient places for representing a variety of features. There is also some cultural significance to these areas as portions of them are included in the Neregah Heritage Zone in the Watershed Management Plan for Great Bear Lake (Great Bear Lake Working Group, 2005).

Example 6 is another area that shows up as flexible or green in the analysis. It contains a representative sample of a variety of features building upon a small area containing irreplaceable conservation features. Again, this area is flexible because it represents common features, but was also likely selected by the model because it is a fairly efficient place for representing a variety of features.

Although capturing the red or irreplaceable areas would go a long way towards meeting the goals for ecological representation, additional areas will still be needed to fully represent the ecological diversity in the landscape. Examples 5 and 6 indicate two places that are highly efficient at representing the diversity in the landscape. The Sahtu Land Use Planning Board may want to further look into these areas to see if they meet additional requirements for being incorporated into conservation zones.

Conclusion

Because of the areas allocated for industrial development, it is not possible for 100% of the conservation features in the ecoregions intersecting the Sahtu to be fully represented. However, with 41% of the land in the Sahtu Settlement Area in conservation zones (7% more than what is currently in the draft Sahtu Land Use Plan), the Sahtu Land Use Planning Board could contribute to meeting the PAS goal of ecological representation. Although meeting all ecological representation goals for the study area involves cooperation from all the political regions that share ecoregions with the Sahtu, by protecting 41% of the land the Sahtu Land Use Planning Board would be meeting the portion of the goals that fall within the Sahtu Settlement Area. Examples have been provided that demonstrate specific areas that the Sahtu Land Use Planning Board could consider in order to efficiently meet many of the goals for ecological representation.

References

Great Bear Lake Working Group. May 31, 2005. “The Water Heart”: A Management Plan for Great Bear Lake and its Watershed. Directed by the Great Bear Lake Working Group and facilitated and drafted by tom Nesbitt.

Appendix 1 - Analysis Results

The total area of the ecoregions included in the study area for the analysis is 43,173,329 ha. The total area of the Sahtu Settlement Area is 25,377,709 ha. Both areas exclude the area of Great Bear Lake. Table 1 summarizes the results of the analysis for the three different scenarios discussed in this report.

Table 1: Analysis Results for three Scenarios

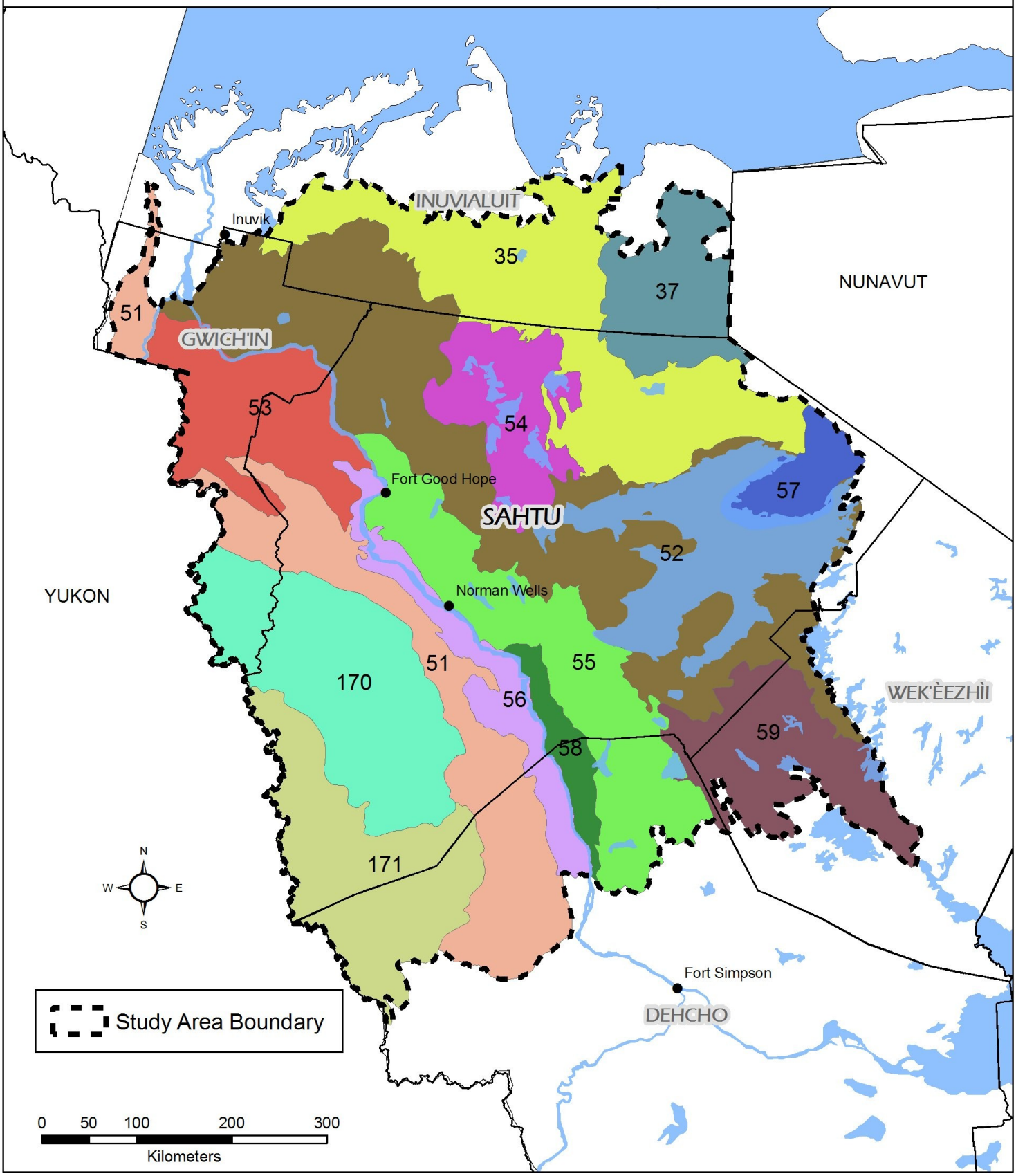
Scenario	Study Area Goals Met	Sahtu Land Needed	Sahtu Land Needed (% of total Sahtu)
1	58%	8,685,382ha	34%
2	72%	9,448,302ha	37%
3	98%	10,516,971ha	41%

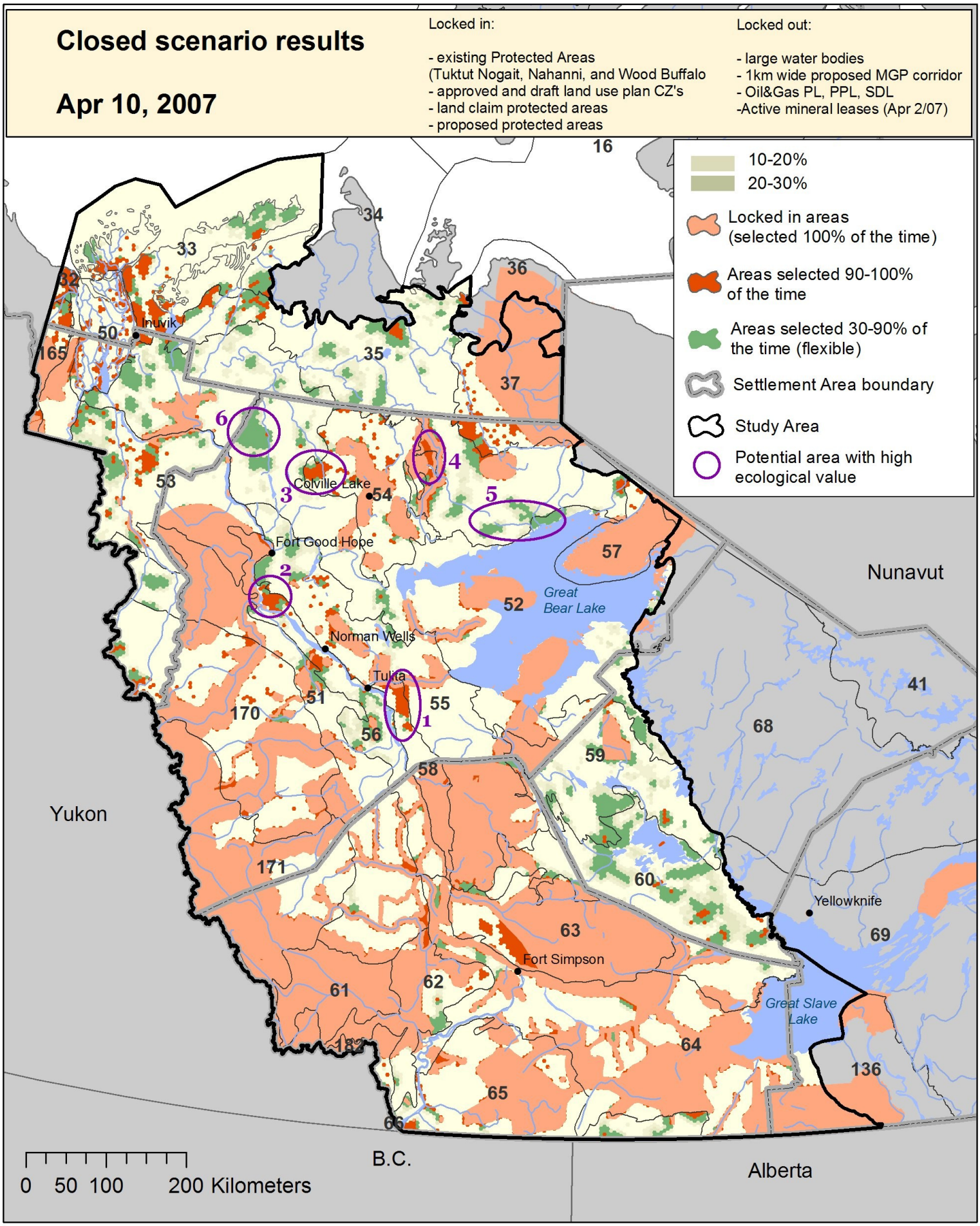
Scenario 1 includes existing and proposed protected areas and conservation zones. **Scenario 2** includes these areas plus areas selected 90-100% of the time by the model (red areas). **Scenario 3** includes all the areas from Scenario 2 plus the areas selected 30-89% of the time by the model (green areas).

As previously mentioned, the analysis was done for an area that included the Gwich'in, Dehcho, Inuvialuit, and Wek'eezhii portions of ecoregions occurring in the Sahtu. Based on this analysis, total areas were calculated for the portion of the Sahtu already in protected areas, PAS proposals, and draft conservation zones, and the portion of the Sahtu in the irreplaceable (red) and additional (green) areas of the analysis. Although these area totals are specific to the Sahtu Settlement Area, they refer to meeting ecological representation goals for the entire study area. Ecoregion representation goes beyond political boundaries and requires that different political regions work together to achieve adequate ecological representation in shared ecoregions.

The NWT-PAS conducted this analysis to identify options for core representative areas within NWT ecoregions. Well-accepted systematic conservation planning methods were used, and a full technical report will soon be available. For more information on the methodology contact the PAS Secretariat, GNWT at 867-920-3179

Sahtu Ecoregions




Closed scenario results
Apr 10, 2007
Locked in:
- existing Protected Areas
(Tuktut Nogait, Nahanni, and Wood Buffalo
- approved and draft land use plan CZ's
- land claim protected areas
- proposed protected areas
Locked out:
- large water bodies
- 1km wide proposed MGP corridor
- Oil&Gas PL, PPL, SDL
-Active mineral leases (Apr 2/07)
10-20%
20-30%
Locked in areas
(selected 100% of the time)
Areas selected 90-100%
of the time
Areas selected 30-90% of
the time (flexible)
Settlement Area boundary
Study Area
Potential area with high
ecological value
Inuvik
Colville Lake
Fort Good Hope
Norman Wells
Tulita
Great
Bear Lake
Fort Simpson
Great Slave
Lake
Yellowknife
Nunavut
Yukon
B.C.
Alberta
0 50 100 200 Kilometers