

# **Review of “Protected areas gap analysis – Phase 1 report: North East AB & North West SK”**

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## **Summary**

Forestry companies looking to meet Forest Stewardship Council standards must account for and manage the impacts of their forestry operations on environmental values and biodiversity. Protected area networks are cornerstones for the conservation of biodiversity and play an important role in sustainable land-use planning. In this report, ALPAC and MISTIK have paired with DUC and CPAWS to conduct a protected areas gap analysis around their areas of operations. The team used a coarse filter approach to show significant gaps in the coverage of key conservation features within the existing protected area network in this region. The conservation features considered included surficial geology, land cover, gross primary productivity, soil organic carbon, lake-edge density, caribou ranges, high use caribou habitat and waterfowl abundance. The next phase of this project will identify potential areas that could be conserved to fill the gaps identified in Phase I.

## **General Comments:**

1) Overall, I think the analysis is fairly well done. Kudos to the team for getting to this point in a timely manner – I know how difficult it can be to review existing data and decide on the data sets to use, let alone to analyze these data. The majority of my comments are meant to improve the transparency and reproducibility of the work. However, I have identified a few of key issues with parts of the analysis.

2) I like the use of a range of conservation targets (5%-30%). This is well done and is useful to show different options. Given that we are likely to see an increase in the Aichi 17% target soon, having a range of options is a good exercise.

3) I would have liked to see a bit more information about Government and Indigenous Engagement. The team has devoted time on this important task but the value of the gap analysis lies in the ability of the team to work with stakeholders that are likely to implement the suggestions from Phase II. Of particular concern is how some very recently announced protected areas in AB (<http://www.cbc.ca/news/canada/edmonton/alberta-wildland-parks-boreal-forest-1.4663633>) did not make it in the current report (e.g., Birch River Wildlands Park)?

4) The use of ecodistricts to define the Area of Ecological Influence is standard and acceptable for FSC. However, I am left wondering how waterflow is impacted by forestry operations at a landscape level. Has the team considered headwaters in their assessment of coarse or fine filter features to conserve?

5) I recommend the team revise how they currently analyze the continuous conservation features (i.e., GPP, soil organic carbon, waterfowl abundance). 7% of the total sum of GPP

(or the other features) could be achieved with many areas of low GPP or few areas with high GPP. Therefore, the current approach is not very informative. A better approach would break the continuous data into a few (5?) equal size bins and then apply the same analysis as the other categorical variables. This way, the team could identify if, for example, areas of high GPP are not well represented in the current protected areas network. An even better approach would be to look at the full distribution of continuous variables in the protected areas network compared to the AEI but this would be more analytically challenging.

6) I suspect that many of the conservation features are correlated? For example, the spatial patterns in soil organic carbon and surficial geology look similar. Has the group measured spatial correlation among variables? If two variables are highly correlated, it may lead to “double” counting when it comes to a Marxan analysis. If two variables are very correlated, then retaining one of them and describing the correlation is probably sufficient.

**Specific comments:**

7) I think the mention of CMM in the abstract and introduction is a bit too specific or lacking details. I think it is an important framework, which fits with the FSC but I recommend you provide a bit more (2-3 sentences) on it. Without a bit more information, the reader may be lost here.

8) Check the citation format as it changes throughout.

9) Use of “completeness” in the definition of Gap analysis on p. 6 is awkward as this term does not come up later. Consider replacing it with representation?

10) p. 9. Missing “with” indigenous peoples...

11) Section 4.2. I recommend the team add a bit more text about the data decisions. It is currently very short on details but I know lots of time and effort was spent discussing potential data sets. Appendix A is very useful in this regard and perhaps this could be built in more explicitly with a few sentences. In the main text the justification for use of these data sets is not very strong.

12) Table 3 is very nice. A few small suggestions: i) consider adding specific references for each Dataset here, ii) as discussed later, caribou and waterfowl are not classic “coarse” filters. As such, the title “coarse” filter in the caption and used throughout may not be entirely accurate. Consider using coarse filter and caribou + waterfowl data.

13) Table 4. There are some clear holes here – what about PAs and other data from SK? Do they not exist or has the team been less successful in acquiring data from SK?

14) Overall, the description of the various data sets is good. I think it would be beneficial if the goal or elements of biodiversity represented by each data set were laid out at the start of the data description. This could refer back to Table 3. I think this would help the flow and connections from Objectives, data, analysis, results. It becomes particularly important when considering that some features are true “coarse” filters meant to capture diversity in

ecosystems whereas other features are “fine” filters meant to capture species species (i.e., caribou, waterfowl).

15) 4.3.3. Land cover. I could not reproduce the land cover used in this analysis – this is a problem. Please add additional details that would allow the reader to get to the final product from the initial data sets used. Given the paucity of details, it is unclear to me why the team chose to combine various sources of data. I suspect it is because the DUC data provides the best possible data on wetlands? Did the different input data sets have different resolutions?

16) 4.3.6. Lake-edge density. Focusing on “hotspots” of lake-edge density seems to run counter to wanting to conserve variability in lake-edge density on the landscape. Why not identify and assess gaps in areas with low, medium and high lake-edge density? I would expect biodiversity patterns to differ along this environmental gradient.

17) 4.3.7. Caribou ranges. I recommend the group at minimum identify the strong edge effect occurring in this data set (i.e., clearly AB and SK differ in how they define caribou ranges). What are the implications for your analysis?

18) 4.3.8. High-use caribou habitat. How do the “selected” categories listed at the end of the second paragraph relate to the land cover classes identified in 4.3.3.? I think it would be useful to make the connection here. I am also curious why the group did not conduct a caribou distribution model or use existing caribou distribution models?

19) 4.3.9. This is a nice use of a published data set – well done.

20) 4.3.10. This is a very useful section and I think it would be better placed at the start of the data section. Note that I think the use of data is consistent with FSC’s suggestion for use of the best available data. One issue – it is unclear why the team did not use intact forest landscape data. The current description is not clear to me. Please provide more details as IFL are a key component of FSC standards.

21) 4.4. Please provide details on how the continuous data were analyzed. I only uncovered (I think!) the details after looking at the results in appendix. The current main text (4.4.3) simply states that the continuous variables were not treated the same as the categorical ones but it never really states how gaps were determined for the continuous variables.

22) 4.4.2. I think it is great that the results are broken down by IUCN PA category – well done.

23) 4.4.3. I recommend the team provide a conceptual diagram of the gap analysis method. A couple of figures showing GIS overlays would be sufficient. I think this kind of conceptual diagram would be useful for folks that are not familiar with spatial analyses.

24) 5.0. There is lots of good specific information in the summary section but I find the use of a summary section here a bit awkward. Why not simply build in these specific patterns/results in the main text on p. 25?

25) Figures 12-14. I assume these show what features had 10% representation in the PA network? The captions could use more information to convey this message. The addition of the PA network on these figures (only outlines) would also be useful.