Review of "Management and Monitoring Strategies for High Conservation Values in the Alberta-Pacific Forest Management Agreement Area (2010 - 2015)"

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Scope of Review

Two principle questions defined the scope of my review:

1) Does the Al-Pac HCV Management and Monitoring Report adequately meet the intent of the Forest Stewardship Council's (FSC) Principal #9 in the National Boreal Standard (Appendix 5 in FSC Boreal Standard)?

2) Are the HCV's identified for the Al-Pac FSC certified area appropriate to the scale and magnitude of the area?

To develop my perspective, I reviewed relevant background documents (see Literature Cited), and focussed specifically on a) the FSC's (2004) National Boreal Standard, and b) Alberta-Pacific's (2012a) report titled "Management and Monitoring Strategies for High Conservation Values in the Alberta-Pacific Forest Management Agreement Area (2010 - 2015) (hereafter referred to as the M&M report), with a focus on Tables 4 through 13 (inclusive).

Based on a strategic level review (i.e., without detailed analysis), my opinion is that the Al-Pac HCV M&M report is thorough and establishes a defendable approach to addressing the FSC's Principle #9, as well as being appropriate in its assessment of HCVs at the scale of the Al-Pac FMA.

Question 1: Does Al-Pac's HCV M&M report meet the intent of Principal #9 in the FSC Boreal Standard?

Principle # 9 – High Conservation Value Forests: Management activities in High Conservation Value Forests shall maintain or enhance the attributes which define such forests. Decisions regarding High Conservation Value Forests shall always be considered in the context of a precautionary approach.

> *"The concept focuses on the environmental, social and/or cultural values that make a particular forest area of outstandingly significant. The intent of Principle 9 is to manage those forests in order to maintain or enhance the identified High Conservation Values. By focusing on maintaining or enhancing the environmental or social values that make the forest significant, it is possible to make management decisions consistent with the protection of such values."* - FSC National Boreal Standard (p.109)

Strengths

- On the whole, the Al-Pac HCV M&M report is comprehensive, detailed, and information dense. The report provides a logical approach to addressing the intent of Principle #9 at a strategic level given the size of the FMA, but there is room for improvement in the organization and clarity of the document as well as specificity in the underlying logic that pins the monitoring to the management strategies and objectives. These are discussed further under Weaknesses and Opportunities.

Weaknesses

- A weakness of the Al-Pac HCV M&M report is that it is not clear what the specific management objectives are; and the objectives should be more explicitly described and organized according to SMART[1] principles. Consequently, for many of the HCVs it is difficult to understand the specific linkages between management objectives and the appropriateness and effectiveness of monitoring. Although the summary tables (Tables 4 through 13) are structured to describe four elements of management and monitoring as Management Strategy, Implementation Monitoring, Effectiveness Monitoring, and Effectiveness Measure, it is unclear how the Effectiveness Measures are actually tied to the respective Management Strategies. These elements should be defined, so the reader is better able to understand the linkages and management framework. Also, in some of the HCV sections, the management strategies are tied to ecological or biodiversity indicators, whereas in others the management strategies are based on engagement of others and collaborative decision-making processes.

  For example, with respect to management and monitoring of HCV 1.1 Woodland Caribou Habitat as outlined in Table 4 (starting on pdf page 14), `Caribou population trends (λ)` are identified as the principle Effectiveness Measure for A) Caribou management and monitoring, B) Operational practices, as well as a key contributor to D) Caribou action planning, and E) Integrated land management. Since lambda (λ) is an estimate of the finite rate of increase of a caribou herd and is estimated using data on annual adult female mortality rates and recruitment of female calves, it is a relatively weak and insensitive indicator of habitat effectiveness; although at large temporal and spatial scales, trend in λ is a good indicator of caribou population persistence and viability. As described by Dzus et al (2010), life history characteristics of boreal caribou makes population change (λ) a relatively weak indicator because adult females have low reproductive rates that impede the ability of populations to rapidly recover from declines, and individuals are long-lived, such that population-level responses may lag behind landscape change by up to 1-3 decades. So the rationale for using λ as the principle Effectiveness Measure for woodland caribou habitat is weak, and is more appropriately a direct demographic indicator of population performance that would be a performance indicator of wildlife management actions such as management of wolf or other prey, and/or caribou cow-calf penning initiatives.

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[1] A SMART objective is…

Specific – It describes a specific action, behaviour, outcome or achievement that is observable.

Measurable – It is quantifiable and has indicators associated with it so it can be measured.

Achievable – It is achievable, appropriate and relevant to your target audience.

Realistic – It is achievable with the available resources.

Time-Bound – It states the time-frame within which the objective will be achieved.

Furthermore, if λ is to be appropriately used as an effectiveness measure, the specific herd range should be identified as well as an objective statement of a future desired state for population trend, which would maintain or restore the caribou population.

Two other associated weaknesses are:
a) Reliance on the Provincial caribou monitoring program and population trend (λ) as the sole aspects of Al-Pac`s HCV Effectiveness Monitoring and Effectiveness Measure (for A – Caribou management & monitoring, and B – Operational Practices), diminishes Al-Pac`s specific work, contribution and ongoing leadership on managing caribou and caribou habitat in the FMA. The objectives and monitoring actions for Al-Pac`s caribou management initiatives should be explicitly linked and identified as indicators of collaboration, engagement and landscape-level management effectiveness with Alberta and other industry lease holders. The focus of caribou management should be on developing and leveraging an improved decision-making process, with caribou population trend being one Effectiveness Measure (performance indicator) where others such as habitat quality, habitat intactness and/or disturbance being other useful indicators.

b) Generic reference to λ as an indicator of caribou population trend is not specific enough to be applied and monitored. Management objectives and effectiveness measures for caribou habitat and caribou populations should specify the relevant ranges (i.e., Red Earth, WSAR, and ESAR) that are considered within the Al-Pac FMA. Figures 2 and 7 in the Al-Pac HCV M&M report lend themselves to a specific and area-weighted assessment of caribou range-specific habitat objectives and performance indicators. Furthermore, Total amount of protected and conservation areas in Al-Pac FMA, as outlined in Table 4 (pdf page 15) should also be assessed at the scale of relevant caribou ranges.

Similarly, Effectiveness Measures stating that biodiversity metrics will remain within NRV need to be specific as to the spatial extent for which the performance of biodiversity indicators will apply. For example, biodiversity metrics in HCV 1.2 (Legislatively protected or conservation areas) and reference to ABMI survey data at regional and local scales HCV 3.1 (Old Forest Habitat) confirms that spatial scale and stratification is important; thus it is important to describe whether and how data collection through ABMI will provide a robust monitoring scheme, or whether additional effort is required.

- FSC requires that "*annual monitoring shall be conducted to assess the effectiveness of the measures employed to maintain or enhance the applicable conservation attributes*." (Section 9.4, p. 114). The technical implications of this requirement to monitoring are twofold: 1) the monitoring is designed specifically within an adaptive management context to address linkages or causal pathways (i.e. hypotheses) between forestry (and/or other land uses) to indicator performance, and 2) the monitoring is designed with sufficient rigor (i.e., statistical power) to detect meaningful changes (i.e., thresholds or relative deviations) in indicator performance. Further to my previous comments, the linkages between management and improvements to indicator performance through monitoring need to be made much more explicit throughout the document and particularly in the summary tables (Tables 4 – 13). It is not obvious in the current Al-Pac HCV M&M report that experimental design or sampling issues were explicitly considered in the monitoring strategies. Simply put, it needs to be made clearer that the selected indicators

are the correct ones that are explicitly linked to the presumed benefits of management, and that the monitoring is sufficiently sensitive and powerful to detect the anticipated and important changes in indicator performance – this principle applies to management and monitoring strategies for all the HCVs.

With respect to boreal caribou (HCV 1.1), measures of effectiveness can focus on footprint reduction/minimization and/or caribou population trends. Consequently, measures to maintain or restore caribou habitat should address current and future management impacts on footprint growth rates, footprint reclamation rates, and monitoring net footprint and total disturbance (census Environment Canada 2012) – see "Opportunities" below.

- In Tables 2.1 (pdf page 21), 2.2 (pdf page 22), 3.1 (pdf page 25), 3.3 (pdf page 27), 5.1 & 6.1 (pdf page 32), there is missing information describing either the associated components on Effectiveness Monitoring and/or Effectiveness Measure.

Opportunities

- Rather than solely relying on caribou population trend (λ) as an Effectiveness Measure, there may be potential for Al-Pac to demonstrate strategic leadership on addressing cumulative effects to boreal caribou in the FMA, by monitoring the annual contribution of natural fires and forestry cutblocks through use of published methodologies on caribou habitat effectiveness (i.e., Sorenson et al. 2008, Schneider et al. 2010, and Environment Canada 2012), and adoption of standardized methodology to monitor human footprints (for example see Antoniuk et al. 2009)

For example, Table 1 summarizes the amount of disturbed and undisturbed habitat within each of the four relevant caribou ranges that occur wholly or partially within the Al-Pac FMA as described by Environment Canada (2012). By intersecting the HCV data layers (Figures 3-7 in Al-Pac M&M report) against the caribou ranges, it may be possible to more quantitatively define the current contribution of forestry cutblocks to total disturbance (see Table 2) for each of the caribou ranges in the FMA, and to subsequently establish habitat objectives with respect to forestry best practices (and reclamation of other footprints) and prioritize habitat conservation that more directly reflect HVCs and merchantable timber stands within the FMA. This type of analysis would demonstrate the relative contribution of current and proposed future forestry practices to functional caribou habitat[2], and also facilitate the establishment of clear habitat goals that Al-Pac could manage directly through its forest management practices.

Table 1. Summary of critical habitat identification of caribou ranges that occur wholly or in part within Al-Pac FMA (From Appendix J, pp 99-102 in Environment Canada (2012).

Local Population	Total Range Area (ha)	Disturbed Habitat (%)			Total Undisturbed Habitat (%)	Amount of Critical Habitat
		Fire	Anthrop ogenic	Total		
Red Earth	2,473,729	30	44	62	38	Existing habitat that would contribute to at least 65% undisturbed over time.
WSAR	1,572,652	4	68	69	31	Existing habitat that would contribute to at least 65% undisturbed over time.

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[2] This approach may align with simulation modeling analysis of caribou habitat effectiveness as outlined in Table 3.3 of Al-Pac's Forest Management Plan (Al-Pac 2012b, p. 95)

Richardson	707,350	67	22	82	18	Existing habitat that would contribute to at least 65% undisturbed over time.
ESAR	1,315,980	26	77	81	19	Existing habitat that would contribute to at least 65% undisturbed over time.

Table 2. Summary of the final polygonal disturbance mapping for each local population broken down into individual classes that were mapped. (From Table 29, p. 157 in Environment Canada (2011))

Range ID	Local Population	Agriculture (ha)	Built-Up (ha)	Cutblock (ha)	Mine (ha)	Oil & Gas (ha)	Reservoirs (ha)	Well Site (ha)	Unknown (ha)	Total (ha)
13	Red Earth	0.0	1,475.6	39,495.1	12.0	774.5	163.2	1,986.3	140.3	44,046.9
14	WSAR	0.0	284.4	16,421.1	2,032.0	0.0	0.0	2,746.0	0.0	21,483.5
15	Richardson	0.0	0.0	187.0	35.4	506.9	0.0	1,260.2	0.0	1,989.5
16	ESAR	2,561.2	226.1	36,539.4	100.9	4,231.3	0.0	3,841.1	146.5	47,646.4

- Cumulative effects of natural disturbances (i.e., fire and insects) and human land uses are a key issue over the long-term that will affect long-term sustainability of forestry and challenge Al-Pac's ability to maintain FSC certification[3]. A principle conundrum that Al-Pac faces over the coming decades is that activities of the energy sector tied to bitumen development through in-situ well extraction and surface mining (in addition to growth in the transportation sector and regional human population growth), will become increasingly important in driving the pace and scale of human footprint in the FMA. And as a result, Al-Pac's sustainable forestry activities will be conducted on a landbase that will likely be reduced in area over meaningful time (i.e, multiple decades) due to expansion of the energy sector and growth in regional human populations.
    - To address this aspect of cumulative effects, a supplemental assessment to the HCV M&M report should consider the incorporation of data layers displaying the bitumen resource (i.e., Athabasca-Wabiskaw McMurray oil sands deposit) to explore plausible scenarios and consequences of the energy sector on HCVs in the Al-Pac FMA.

- The overall strategies for management and monitoring of HCVs 2.1 (Large landscape level forests), 2.2 (Ecological significant areas), 3.1 (Old forest habitat) are appropriate and consistent with objectives laid out in FSC Principle #6 (FSC 2004). However, the HCV M&M report can be substantially improved through explicit reference in the narrative sections and relevant tables (i.e., Tables 5, 6, 8, and 9) to specific information sources on Al-Pac's Forest Management Plan (Al-Pac 2007) and Operating Ground Rules (Al-Pac 2012b).

Question 2: Are the HCV's identified for the Al-Pac FSC certified area appropriate to the scale and magnitude of the area?

Alberta-Pacific Forest Industries Inc. manages a 5.8-million-hectare Forest Management Agreement (FMA) Area in Northeastern Alberta. The FMA establishes the basic timber rights and management responsibilities for Alberta-Pacific over the agreement area in northeastern Alberta. The FMA area is comprised of 12 Forest Management Units, each with a given annual allowable cut (AAC).

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[3] G. Utzig (2004): "An underlying problem with FSC certification on this particular management area that is mentioned in both reports, is the significant impact created by overlapping tenures and other activities occurring on the landbase."

Approximately one-third of the boreal forest in the FMA area can actually be classed, as a productive forest comprised of sites that can produce commercially valuable trees. Two-thirds of the FMA area is unproductive forestlands and wetlands. Of the one-third of the total FMA area that is productive forestland, 11 % is classified as mixedwood, 37 % conifer, and 52 % deciduous forest types.

Management of HCV's is based on a coarse filter approach applied at the landscape level, combined with a fine filter approach where necessary to conserve specific HCVs. The coarse and fine filter approach is a management concept designed to conserve biological diversity and is a fundamental concept for the implementation of ecosystem-based management on Al-Pac's Forest Management Agreement (FMA) area. A coarse-filter approach is based on the hypothesis that the maintenance of naturally occurring vegetative communities, as well as the associated historic landscape patterns and processes, within the range of natural variability will provide suitable conditions for the maintenance of a full complement of native plant and animal species (biodiversity). Al-Pac HCV M&M Report (2012a)

Strengths

- There has been substantial evolution of systematic work (including previous HCV reports by Timoney 2003, Dyer 2004, Al-Pac 2009) to arrive at the current identified HCVs in the Al-Pac FMA.
- Yes, the identified HCV's are appropriate to the scale and magnitude of the key drivers affecting the 5.8 million hectare Al-Pac FMA: forest harvesting and management, natural disturbance regimes (fires and insects), and other human land uses tied to the energy sector, transportation, agriculture, and regional growth in human populations and settlements are recognized and considered. For example, substantial work has been conducted by Al-Pac to robustly define and develop an ecologically relevant and FSC recommended) baseline for managing old forests and forest age class structure based on Natural Range of Variability (i.e., Section 6.3.5, p. 73 in FSC 2004) at a landscape scale.
  - Table 1 succinctly summarizes the linkage between Al-Pac's Forest Management Plan (FMP) objectives with landscape level (i.e., course filter approach) characteristics of HCVs.
  - Similarly, Table 2 shows the alignment between sections of the NE Alberta Operating Ground Rules that summarize operating ground rules at the forest stand level (i.e., fine filter approach) and how those practices should maintain or enhance associated HCVs.
- The series of maps depicting the overlays of HCVs within the FMA, reinforce the assertion that the identified HCVs (and associated FMP objectives) are appropriate to the scale of the working landscape. Specifically, the overlay of HCVs 3 (Ecosystems and Habitats) and 5 (Community Needs) illustrate that any finer resolution of spatial data would introduce more noise with little added explanatory power.

Weaknesses

- In the current version of the M&M report (Al-Pac 2012), the history and evolution of the previous work by Al-Pac on HCVs is difficult to follow and understand. With respect to biodiversity indicators, I noted the concern outlined by Timoney (2005), in his response to the 2004 Al-Pac HCV report by Dyer (2004). The issue raised by Timoney (2005) was that there were several more species and ecological indicators that he identified as HCVs (Timoney 2003), which were subsequently not considered in Dyer's (2004) report. In the absence of a clear narrative section describing the approaches, the current version of the Al-Pac HCV M&M report (2012a) appears to highlight boreal caribou as the principle biodiversity indicator for HCV 1, with an apparent oversight of other sensitive or threatened species.

- However, a previous version of the Al-Pac HCV report (Al-Pac 2009), provides additional rationale for the evolution and current approach (Al-Pac 2012a) that the company has taken to address other species management and assessment. This narrative was provided in the Section titled "2010 Re-Assessment (p. 10-13) and summarized in Tables 2, 3, and 4 (Al-Pac 2009). The approach seemed reasonably to me, whereby other species (including species that are listed provincially or federally as 'threatened' or of 'special concern'), were subsequently addressed under FSC Principal #6 "to reduce redundancy in discussion of management and/or reporting" (Al-Pac 2009, p. 2). Similarly, Section 3.5 (Objective #8) in Al-Pac's Forest Management Plan (Al-Pac 2007) specifies describes a robust approach for addressing wildlife management concerns including species with high social value and subsistence use as well as species at risk and species of concern. Thus, the issue with the current report (Al-Pac 2012a) is not to do with deficiencies in the methodological approach, but rather a poorly structured and referenced narrative, which makes it difficult for an independent reader to comprehend the full body of work and the evolution in rationale and methodology for assessing and evaluating HCVs in the FMA. Thus, it is not possible to fully understand the Al-Pac approach to managing and monitoring HVCs by just reading the current M&M report (Al-Pac 2012a). Fortunately, the solution for this is relatively straightforward (see 'Opportunities' below).

Opportunities

- Should better describe the integration of finer level biodiversity indicators in the course-filter approach, by structuring a future version of the HCV M&M report and including appropriate references or citations to Al-Pac's operating ground rules and forest management plan.
- In a subsequent version of the HCV M&M report, help the reader understand the evolution of logic and rationale for Al-Pac's approach to biodiversity indicators; provide a more structured and detailed narrative that addresses the issues raised by Timoney (2005) through a description of the evolution of Al-Pac's approach to defining, managing and monitoring HCVs as outlined by Timoney (2004), Dyer (2005), and other previous iterations of the HCV M&M report (eg. Al-Pac 2009). Specific reference to relevant sections of Al-Pac's Forest Management Plan (Al-Pac 2007) and Operating Ground Rules (Al-Pac 2012b) should also be made because this would provide clearer linkage and rationale between stand level management practices and management and monitoring of HCVs.
    - This would also link the review and subsequent changes by FSC on HCV principles and criterion, as well as the incorporation of Environmentally Sensitive Areas (ESAs) as defined recently by the Alberta Government. The sections in the current report where these details could be provided are in the Overview (pdf page 11) and Appendix 1 (pdf page 40) and Appendix 4 (pdf page 43).

Other Minor Comments

- There is an error in labelling of tables in the Al-Pac HCV M&M report that causes confusion; the report starts out with Tables 1 and 2 on (pdf) pages 5 and 6 respectively, and then starts numbering Tables in subsequent (pdf) pages starting with Table 1 again on page 10.
- Table 3 (pdf page 12) lists provincially designated ESAs by function or specific features. Unfortunately, the reference to GOA 2009 is not cited and the listing of ESA numbers is meaningless without a key describing what each ESA number identifies.

- Pagination starts on page 11; page numbers are missing starting with the Introduction which should be (pdf) page 1 and through to (pdf) page 10. Although the document ends at page 45, additional 10 pages starting with the Introduction have been mistakenly pasted in to the end of the document.
- Text at end of Appendix 1 on (pdf) page 40 appears to have been cut short.
- Reference to Appendix 4 in section 3.2 on (pdf) page 26 should be corrected to reference Appendix 3 as the source of definitions to unique and enduring feature descriptions.

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