# Alberta-Pacific Forest Products Inc.
# Forest Management Agreement Area

ALBERTA PACIFIC FOREST INDUSTRIES INC

# Forest Stewardship Report
## Reporting Period 2011–2015

## Volume II: Technical Information

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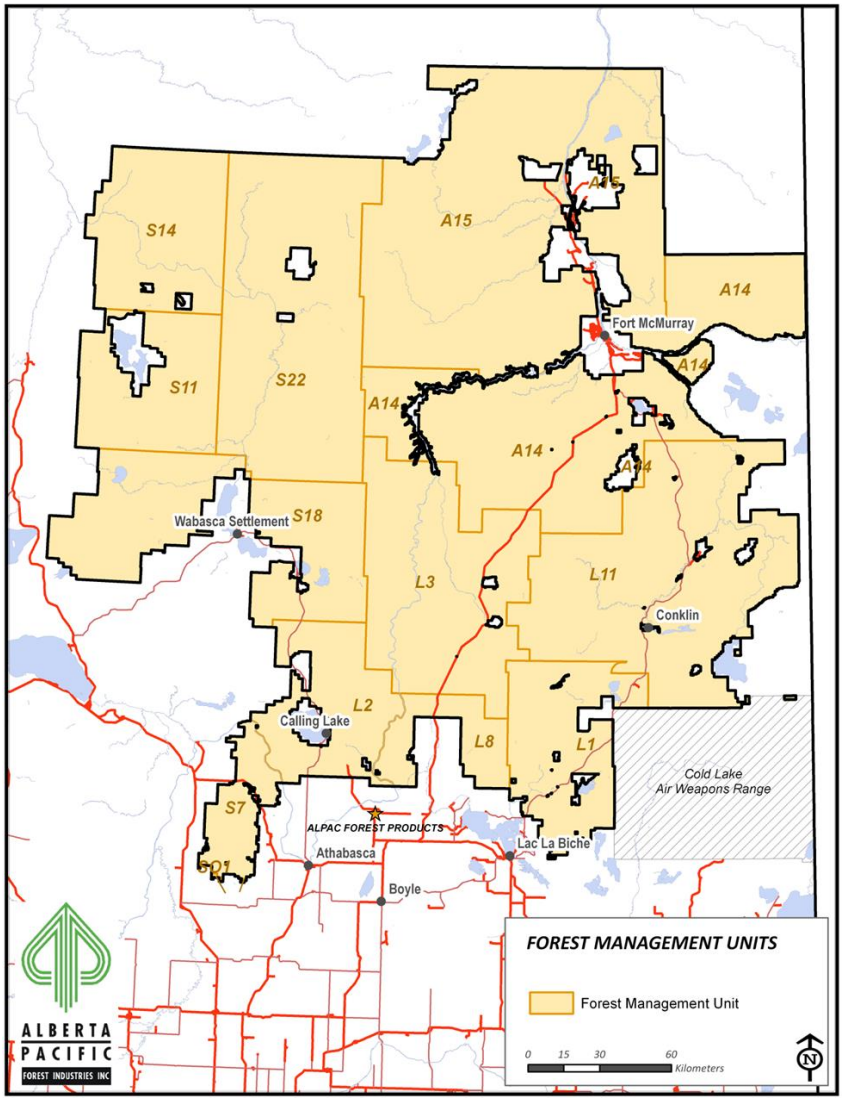
# Volume II: Technical Information

*Alberta – Pacific Forest Management Agreement area*



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# Introduction

The following technical information (Volume II) has a new format to meet the provincial government's *Forest Management Planning Standard Interpretive Bulletin* issued in June 2017, *Stewardship Reporting Requirements*. The reporting in this volume is specifically designed to comply with the new requirements. Table 1 reconciles the objectives and strategies of the 2006 *Forest Management Plan* with the subsequent values, objectives, indicators, and targets (VOITs) specified in the Government of Alberta (GoA) Forest Management Planning Standard that were used in the Al-Pac FMA area 2015 FMP.

This Alberta-Pacific FMA area stewardship report reflects Al-Pac's performance in the 2011–2015 period, which was based on the objectives and strategies set out in the 2006 FMP. The 2006 FMP was developed in a multi-year process prior to the publication of the GoA Forest Management Planning Standard in 2004, the GoA reporting requirements, and the Forest Stewardship Council (FSC) principles for sustainable forest management in the boreal forest. Al-Pac's first FSC audit was in 2005. As a result of these overlapping frameworks, this report is complex hybrid of GoA requirements, FSC principles, 2006 FMP objectives, and 2015 FMP VOITs. The government's *Stewardship Reporting Requirements* also includes eight mandatory components that are outside the VOIT framework. The mandatory components are discussed in the final section of this report.

The recent GoA stewardship reporting requirements limit and define the VOITs that require inclusion in this report. What is documented is a merging of the 29 objectives from 2006 into the framework of the GoA Stewardship template. Table 1 illustrates how the 2006 FMP's 29 objectives fit into the 2015 FMP's VOIT matrix of 36 values. The Volume I overview report summarizes performance for all 29 objectives, continuing with the performance indicators presented in the 2006–2010 Al-Pac FMA area Stewardship Report published in 2011.

The GoA reporting requirements distinguish between "dynamic" (D) operational VOITs based on measurable performance indicators and "modelled" (M) VOITs based on predicted or future performance. The GoA does not require the reporting of other FMP objectives that fall outside the M and D VOITs listed in the planning standard. Some 2006 objectives were not included in the new planning and reporting frameworks; these items are designated "not applicable" (N/A) in Table 5.

In the following VOIT discussions, red text in the tables indicates an item not completed in the 2011–2015 period. These items have also been discussed in Section C of Volume I, including LAG commentary where relevant.

ALBERTA PACIFIC FOREST INDUSTRIES INC

***Table 1. Government of Alberta Forest Management Planning Standard five-year stewardship reporting Values Objectives Indicators & Targets (VOITs) and 2006 Forest Management Plan Objectives***

| VOIT # | Value | Objective | Reporting | Type | 2006 FMP Objective |
|---|---|---|---|---|---|
| 2 | Maintain biodiversity – Range of patch sizes by subunit and the entire FMA area | 1.1.1.2a | Area (ha) of forest in each patch size class | M | 11 – Maintain forest cover at the landscape level |
| 3 | Maintain biodiversity – Area of interior forest of each cover class by subunit and FMA area | 1.1.1.2b | Area (ha) of cover class in interior forest condition | M | 11 – Maintain forest cover at the landscape level |
| 4 | Open all-weather forestry road linear disturbance within the FMA area | 1.1.1.3a | Density of forestry and density of all-user open all-weather roads by subunit | D | 5 & 6 – Develop an efficient road network and manage roads |
| 5 | Open seasonal/temporary forestry road length within the FMA area | 1.1.1.3b | Length (km) of temporary/seasonal forestry roads in the FMA area | D | 5 & 6 – Develop an efficient road network and manage roads |
| 6 | Maintain occurrence or area of identified uncommon plant communities | 1.1.1.4 | Area (ha) and type of rare plant or community protected/hectares identified for the FMA area | D | 9.10 – Operate under the approved OGRs |
| 7 | Maintain unique habitats created by wildfire and natural disturbance events | 1.1.1.5a | Area (ha) unsalvaged, % of merchantable black trees unsalvaged in patches greater than 100 hectares, 10–100 hectares, and small patches by event | D | 3 – Salvage suitable timber |
| 8 | Maintain unique habitats through unsalvaged blowdown | 1.1.1.5b | Area (ha) of unsalvaged blowdown/area of identified blowdown by event | D | 3 – Salvage suitable timber |
| 9 | Retain ecological vales and functions associated with riparian areas | 1.1.1.6 | Report non-conformance OGR incidents, hectares harvested within OGR buffer zone by compartment<br>Hectares deleted from SHS due to differences between TSA buffering and operational planning buffers (OGR) by compartment | D | 9.10 – Operate under the approved OGRs |
| 10 | Retain stand-level structure | 1.1.2.1a | % area or volume of merchantable (living and dead) structure retained coniferous/deciduous by the FMA subunit area | D | 12 – Retain forest structure at the stand level |
| 11 | Retain downed woody debris | 1.1.2.1b | % of harvest areas where post-harvest coarse woody debris levels are equal to or greater than pre-harvest levels | D | N/A in 2006 FMP |
| 12 | Maintain integrity of sensitive sites | 1.1.2.2 | Area (ha) of sensitive sites maintained by type | D | 22 – A process for incorporating potential sensitive sites into planning |
| 13 | Maintain aquatic biodiversity by minimizing impacts of watercourse crossing | 1.1.2.3 | Report non-compliance incidents. Report number, type, and status of watercourse crossings | D | 9.10 – Operate under the approved OGRs |
| 14 | Maintain high-value species habitat – woodland caribou | 1.2.1.1 | Area (ha) of woodland caribou habitat, actual versus projected | M | 8 – Wildlife management concerns |
| 15 | Maintain high-value species habitat – trumpeter swan | 1.2.1.1 | Maintenance of OGR buffer on selected water bodies | M | 8 – Wildlife management concerns |
| 16 | Retain wild forest populations for native species – genetic diversity (in-situ reserves – CPP) | 1.3.1.1 | Number of genetic conservation sites established by seed zone compared to required sites per seed zone | D | N/A in 2006 FMP |
| 17 | Retain wild forest genetic resources – genetic diversity (ex-situ conservation – CPP) | 1.3.1.2 | Report on status of CPP | D | N/A in 2006 FMP |
| 18 | Integrate trans-boundary values and objectives – protected areas consultation | 1.4.1.1 | Name of protected area, level of protection, stakeholders contacted, issues discussed, resolution | D | 20 – Identify a series of ecological benchmarks |
| 19 | Reforestation – all harvest areas | 2.1.1.1a | % of satisfactorily reforested harvest areas by year | D | 13 – Forest renewal |

| | | | | | |
|---|---|---|---|---|---|
| 20 | Reforestation – meet or exceed MAI standard for harvest areas (openings) | 2.1.1.1b | Cumulative % of area of harvest areas meeting reforestation standards | D | 13 – Forest renewal |
| 21 | Limit conversion of productive forest by other users | 2.1.2.1 | Number of hectares and % (expressed as a % of net land base) changing or converted to other uses or returned to productive land base | D | 21 – Minimize the industrial footprint through an ILM program |
| 22 | Recognize lands affected by insects, disease, and natural calamities | 2.1.2.2 | Number of hectares affected; number of hectares treated | D | 4 – Minimize fibre losses due to natural disturbances |
| 23 | Control non-invasive, non-native plant species | 2.1.3.1 | Number of hectares affected; number of hectares treated | D | 4-2 – Identify outbreaks of weeds |
| 24 | Minimize impact of roading and bared areas in operations; OGRs compliance | 3.1.1.1 | Number and nature of incidents | D | 9.10 – Operate under the approved OGRs |
| 25 | Minimize incidence of soil erosion and slumping; OGRs compliance | 3.1.1.2 | Number and nature of incidents | D | 9.10 – Operate under the approved OGRs |
| 26 | Limit impacts of timber harvesting on water yield | 3.2.1.1 | Forecast impact of timber harvesting on water yield | M | Appendices 2 & 3 of 2006 FMP |
| 27 | Minimize impacts of operations in riparian areas; OGRs compliance | 3.2.2.1 | Riparian buffers maintained as outlined in OGR | D | 9.10 – Operate under the approved OGRs |
| 28 | Forest management and the carbon budget and cycle | 4.1.1.1 | Based on direction from GoA – this VOIT is N/A | M | N/A in 2006 FMP |
| 29 | Forest management and global ecological cycles | 4.2.1.1 | Based on direction from GoA – this VOIT is N/A | M | N/A in 2006 FMP |
| 30 | Sustainable timber supply (establish appropriate AACs) | 5.1.1.1 | Report on between-plan recalculation or adjustment to AAC; % change by species | M | 23 – Identify spatially explicit harvest levels – TSA |
| 31 | Reduce wildfire threat potential through community protection and reduction in landscape fuels | 5.2.1.1 a | Number of hectares rated Extreme or High fire behaviour; number and type of treatments within identified Community Protection Zones<br>Number and type of treatments within the defined forest area or FMA area | D | N/A in 2006 FMP |
| 32 | Reduce wildfire threat potential through community protection and reduction in landscape fuels | 5.2.1.1 b | GoA Landscape Wildfire Threat Assessment – FMA area | M | N/A in 2006 FMP |
| 33 | Integrate other users and timber management activities | 5.2.2.1 | Number of consultations, forums, and values discussed, how issues addressed; ILM agreements; data-share agreements; industrial salvage volumes | D | 19 – Contribute toward the socio-economic good of the region |
| 34 | Maintain the long-run sustained yield (LRSY) average | 5.2.3.1 | Current information versus that of the FMP calculation | M | 23 – Identify spatially explicit harvest levels – TSA |
| 35 | Implement the Indigenous consultation plan | 6.1.1.1 | Number of consultations, forums, and values discussed, how issues addressed | D | 1 – Community engagement strategy |
| 36 | Implement a Community Engagement Plan | 6.2.1.1 | Number of consultations, forums, and values discussed, how issues addressed; satisfaction rating | D | 1 – Community engagement strategy |

* D (Dynamic) and M (Modelled) are described separately. The FMP's carbon update and storage, Objective 4.1.1.1, is not yet defined in the GoA planning standard. Forest land conversion, Objective 4.2.1.1, refers to Objective 2.1.2.1. Neither of these VOITs was articulated in the 2006 and 2015 FMPs, as per current GoA direction.

# Dynamic (Operational) Objectives

## Criterion 1: Biological Diversity – Landscape-Scale Biodiversity

## FMA area roads and access

| | |
|---|---|
| **2006 FMP Objective # 5** | Develop an effective road system |
| **2006 FMP Objective # 6** | Manage road developments |
| **2015 FMP VOIT 3 – 1.1.1.3a** | Open all-weather (DLO) forestry road kilometres in the FMA area |
| **2015 FMP VOIT 4 – 1.1.1.3b** | Open seasonal/temporary (AOP) forestry road length in the FMA area |

The Al-Pac FMA area has been described as one of the busiest forested industrial landscapes in North America, primarily due to the presence of major energy sector developments since the 1990s. Of particular significance are the activities occurring in the surface mineable area (SMA)[*] in FMU A15 and in-situ oil developments in FMUs A15, A14, S11, S22, S18, and L11. The forest companies recognize that working with the energy sector can reduce impacts on ecosystems, provide fibre to the mills, and reduce the roading footprint through integrated planning. Signing road-use agreements with the energy sector has helped to reduce duplication and the amount of permanent road built on the FMA area.

With regard to the cumulative footprint of roads on the FMA area, Al-Pac is not responsible or accountable for Alberta government highways, utility corridors, or energy sector road dispositions. As such, no specific density targets for total roads are prepared for the FMA area. The linear targets are aligned with forest company activities. The forest companies strive to minimize the amount of road construction required to achieve an efficient and effective primary and secondary road system.

Forest company primary roads do result in a net reduction on the forest land base and can have negative ecological consequences associated with habitat fragmentation, hydrology concerns, and increased risks of mortality to wildlife, such as collisions with vehicles, increased hunting and fishing pressure, and increased risk of predation.

Table 6 details the 2015 status of permanent roads in the FMA area as defined through Al-Pac's net land base accounting. As can be seen in Table 2, the forest companies are responsible for less than 7 percent of the permanent road footprint in the FMA area. This is, however, a 6 percent increase over the 2010 metric, primarily due to Al-Pac having to construct primary road in the western part of the FMA area to access timber in S11 and S22. These areas have had limited primary road construction by the energy sector. Figure 8 illustrates the roading footprint on the Al-Pac FMA area.

In the period 2010–2015, Al-Pac built ~50 kilometres of primary roads. In the same period, Al-Pac and the quota holders constructed approximately 4,100 kilometres of secondary roads to access planning units, but also reclaimed the equivalent amount of said roads; this resulted in a zero-sum gain of secondary road kilometres as required by the OGRs. Table 3 illustrates the stewardship report card for the two road objectives.

[*] The surface mineable area (SMA) was generally referred to as the mineable oil sands area (MOSA) prior to 2015, including references in the text of the 2006 FMP.

***Table 2. FMA area length of road by class (Source: Al-Pac)***

| Road Ownership | Km | Percentage |
|---|---|---|
| **Forest companies** | **1,940** | **6.5** |
| Oil and gas sector | 24,620 | 83.5 |
| Utilities / Other | 470 | 1.5 |
| Gravel operators | 375 | 1.3 |
| Counties / Municipalities | 510 | 1.7 |
| Government of Alberta | 1,615 | 5.5 |
| **Total (all-weather) km** | **29,530** | |

The following map (Figure 1) highlights the 2015 all-weather linear footprint on the FMA area.

***Figure 1. FMA area road network (Source: Al-Pac)***

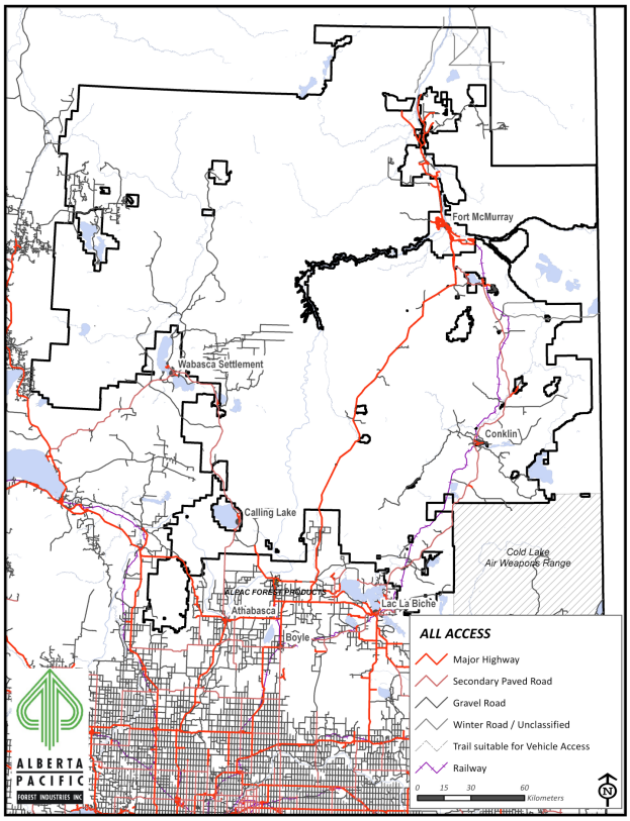


***Table 3. 2006 Forest Management Plan Objective 5 – Strategy Report Card***

| FMP Page 89 | 2006 FMP Objective 5 – Strategy | Indicator | Report Card |
|---|---|---|---|
| 3.5.1 | Continue to develop an access development map of the forest companies' expected future roading needs to facilitate government and industry synergy in road corridor planning. | Completed map in GDP | Complete – New OGRs, part of the GDP |
| 3.5.2 | The forest companies expect not to exceed an additional 1,500 kilometres of permanent road in the FMA area throughout the duration of the approved 15-year harvest sequence**.** | Number of kilometres | Complete – Currently approx. 2,000 km within the FMA area |
| 3.5.3 | The forest companies expect not to build more than 3,000 km/yr of temporary road in the FMA area throughout the duration of the approved 15-year harvest sequence. | Number of kilometres | Complete – Forest companies typically build >800 km/year |
| 3.5.4 | Implement and support an aggressive integrated land management (ILM) program to maximize synergies among industrial users and government agencies to reduce the human footprint on the landscape (refer to Objective 21). | Number of ILM agreements | Ongoing – Not included in 2015 FMP VOITs |
| 3.5.5 | Locate and design main haul roads to minimize total hauling and maintenance costs, avoid duplication of existing road corridors, and maintain the highest level of safety. | Approved OGRs | Ongoing |
| 3.5.6 | Minimize development within key wildlife areas, as agreed upon between the forest companies and GoA, and negative environmental effects, including effects on soil, water, wildlife habitat and populations, and losses in productive forest growth. | Approved OGRs | Ongoing |
| 3.5.7 | The forest companies will continue to work with GoA staff to ensure effective mitigative processes are undertaken for negative environmental effects. | Approved OGRs | Ongoing |
| 3.5.8 | Utilize temporary roads to access cutblocks from the main haul roads and identify those temporary roads that will see recurrent use so modified reclamation procedures can be implemented to minimize erosion potential and costs. | Approved OGRs | Complete |
| 3.5.9 | Utilize signs to notify the public of the status of Al-Pac's temporary access roads. | Number of signs in FMA area | Incomplete – Signs do not delineate temporary status |
| 3.5.10 | Continued cooperation and compliance with Alberta Caribou Committee guidelines. | No non-compliance | Ongoing |
| 3.5.11 | Investigate efficient road planning with innovative spatial forest planning tools at the TSA level throughout the life of the plan. | Developed model – inadequate output | Complete |

| FMP Page 92 | 2006 FMP Objective 6 – Strategy | Indicator | Report Card |
|---|---|---|---|
| 3.6.1 | Areas with high public use will have appropriate signage in place to caution and inform people about harvesting activities to minimize the potential for accidents. | Number of signs | Ongoing |
| 3.6.2 | Access controls such as barriers, berming, bridge removals, and rollback will be utilized on a site-specific basis and may be addressed in Al-Pac's OGRs. | Number of access controls on FMA area and effectiveness | Complete: OGR 11.5 |
| 3.6.3 | The forest companies, working with GoA, may investigate the feasibility of the establishment of "No Hunting Zone" corridors (possibly 0.4 km on each side of the centre) on all new permanent roads for three years following construction. After this period, the need for these corridors would be reviewed in consultation with local community groups within the scope of an overall wildlife management strategy. Trapping activities would not be affected. | "No Hunting" zones | Incomplete – Not feasible |
| 3.6.4 | The forest companies will facilitate research into an adaptive management approach, such as landscape models, to understand the effects of human access and ways to mitigate such effects. | Number of integrated activities and programs | Ongoing |

Two strategies from the 2006 FMP were considered incomplete. These two strategies were not included in the 2015 FMP.

Strategy 3.5.9 states that Al-Pac will "Utilize signs to notify the public of the status of Al-Pac's temporary access roads." Al-Pac Woodlands continues to only post signage on temporary roads to warn the public of ongoing log truck transportation. The temporary situation of the road is not communicated. However, usually it is obvious to a potential user that the road has not been constructed to an all-weather grade. These roads also have a less than three-year lifespan. Based on these two facts, Al-Pac does not believe that new signage is required.

Strategy 3.6.3, "Establishment of 'No Hunting Zone,'" has not been enacted by Al-Pac. Crown land access for public hunting and traditional hunting are both arenas where Al-Pac does not have any authority. Al-Pac will not challenge either public or Indigenous policies on hunting and treaty rights and hunting privileges in Alberta. Accordingly, mitigation of negative environmental effects (e.g., hunting pressures) associated with access is impossible for a forest company in Alberta as this would require the complete cooperation of all users, stakeholders, communities, and industries, a coherent and finalized GoA land-use plan, and a strong enforcement effort from the GoA.

*Peerless/Trout Lake permanent road/bridge*

# Criterion 1: Biological Diversity – Landscape-Scale Biodiversity

## Maintain uncommon plant communities

**2006 FMP Objective # 9.10** Operate under the approved OGR protocols and future amendments
**2015 FMP VOIT 6 – 1.1.1.4** Maintain occurance or areas of identified uncommon plant communities

**Indicators:**

- Area (ha) and type of rare plant or community protected/hectares identified for FMA area
- Operate under the approved OGRs

In 2008, 2012, 2014, and again in 2018, the forest companies and GoA completed and signed new sets of OGRs for the FMA area and all of northeastern Alberta. All versions of the OGRs follow the provincial template for all operations in Alberta and are reviewed annually to meet ongoing challenges and emerging issues. All operators must meet the approved OGRs for planning, harvest and haul, and silviculture operations.

Al-Pac has been in compliance with the OGRs in reference to this objective.

The OGRs are available at
http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/formain15749/$FILE/ne-ab-ogr-final-oct-18.pdf

| 2006 FMP Page 105 | 2006 FMP Objective – Strategy | Indicator | Report Card |
|---|---|---|---|
| 3.9.10 | Operate under the approved OGR protocols and future amendments. | New approved OGRs | Complete – Revised and updated yearly with GoA and the forest companies |

Natural ecological communities are defined as recurring assemblages of plant species, the species occurring together because they respond similarly to a variety of site attributes. The species that make up the assemblage often show an affinity or association with each other. To develop an initial tracking list of natural ecological community elements, publications describing vegetation in Alberta were reviewed and discussions were held with knowledgeable individuals. Community types that have been described as "unusual," "uncommon," "of limited extent," or "encountered infrequently" by vegetation experts are considered for inclusion on the Alberta *Ecological Community Tracking List*. Community types that have been described as "in decline" or "threatened" by vegetation experts are also considered for inclusion. Only natural communities are considered in Alberta.[*]

Al-Pac does not commonly distinquish the rationale for the various types of buffered areas that are removed from a planning unit for non-timber values. These may include uncommon plants, sensitive sites (e.g., stick nests), historical sites, and/or traditional use sites and areas. The buffered area that has been removed varies widely depending on the unique ecological and social attributes of a planning unit. This removal is in addition to OGR riparian buffers. Additionally, Al-Pac, GoA, and knowledgable stakeholders do not wish this type of information released in the public domain because the result could be a removal of said value from the forest by unscrupulous people.

[*] Allen, L. 2014. *Introduction – Alberta Conservation Information Management System Ecological Community Tracking List*. Alberta Tourism, Parks and Recreation, Edmonton, AB.

## Criterion 1: Biological Diversity – Landscape-Scale Biodiversity

## Maintain unique habitats created by wildfire and natural disturbance events: Burned forests and blowdown forest

| | |
|---|---|
| **2006 FMP Objective # 3 – 3.3.1** | Promply evaluate fire-killed, wind-blown, or insect-damaged timber for salvage |
| **2006 FMP Objective # 3 – 3.3.6** | The forest companies will follow GoA's fire salvage policy |
| **2015 FMP VOIT 7 – 1.1.1.5a** | Maintain unique habitats created by wildfire and natural disturbance events |
| **2015 FMP VOIT 7 – 1.1.1.5b** | Unsalvaged blowdown |

At the scale of the FMA area landscape, it is apparent that forest stands in the boreal mixedwood forest are arranged in a complex mosaic pattern. These patterns reflect a dynamic interplay between natural disturbance and forest succession, both of which are influenced by local site conditions. Fire is the dominant natural disturbance in the boreal mixedwood forest. Fires occur throughout the FMA and surrounding areas, and are described according to their variations in size, intensity, temporal variation, and impact on human activities.

Forest fires may affect huge swathes of area and merchantable timber at any given time. In the FMP, all fires less than 10 years old are treated as areas with no merchantable timber and do not contribute toward the forest companies' AACs. The OGRs incorporate fire salvage targets for large patches and stand structure.

The OGRs are available at
http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/formain15749/$FILE/ne-ab-ogr-final-oct-18.pdf

As fire is the predominant natural disturbance in the FMA area, and since some species of plants and animals are strongly associated with post-fire environments, the forest companies recognize the need to leave some portion of the burned landscape unsalvaged. It is unclear from a scientific standpoint what levels of burned timber retention are necessary to maintain natural disturbance ecological elements. Timber salvaged from forest fires, blowdown, insect and disease attacks, agricultural land clearing, and industrial clearing is utilized where it is economical to do so. Al-Pac's use of fire-killed timber is limited because charred wood cannot be utilized by pulp mills. Sawmill fibre requirements are different, resulting in increased salvage-fibre utilization by these mills.

Salvage intensity of merchantable burned timber has historically varied in relation to factors such as size of fire, amount of merchantable wood that is available to salvage, distance to road infrastructure, burn intensity, and tree species. On a fire-by-fire basis, there is tremendous variation in the percentage of merchantable area planned for harvest (ranging from 10 percent to 96 percent). Data is not available as to what percentage of the planned area was actually harvested, but not all of the area planned would have been harvested as a portion would be too charred. Al-Pac has adopted modified harvesting techniques in burned sites, such as high stumps, to eliminate charred wood destined for pulp mills. Table 4 illustrates wildfire metrics.

Also, the company follows its typical stand structure guidelines even when harvesting in fire-salvage areas so that in-block retention is at a minimum 5 percent. Table 5 illustrates Al-Pac's recent natural disturbance salvage volumes. Forest companies do not routinely monitor blowdown events in the FMA area. Evidence of blowdown may be identified through the ongoing FMA area inventory update process. If large blowdown events occur, the Government of Alberta usually provides area/hectare information and may provide direction on a salvage response for the forest companies. Table 6 illustrates blowdown metrics (if the numbers are "0," they are removed from the table).

***Table 4. Al-Pac FMA area wildfire metrics 2011–2015***

| Year | Number of Wildfires | Total Hectares Burned | Unsalvaged Burned Area (ha) | Burned Patches >100 ha | Burned Patches 10–100 ha | Small Burned Patches (ha) | Total Burned Area Salvaged |
|---|---|---|---|---|---|---|---|
| 2011 | **17** | **133,062** | **133,062** | **N/A** | **N/A** | **N/A** | **0** |
| 2012 | **13** | **262** | **262** | **N/A** | **N/A** | **N/A** | **0** |
| 2013 | **19** | **281** | **281** | **N/A** | **N/A** | **N/A** | **0** |
| 2014 | **20** | **369** | **369** | **N/A** | **N/A** | **N/A** | **0** |
| 2015 | **61** | **55,158** | **54,100** | **N/A** | **N/A** | **N/A** | **1,058** |

***Table 5. Natural disturbance salvage volumes ($m^3$)***

| Year | Fire Salvage | Blowdown | Forest Health | TOTAL ($m^3$) |
|---|---|---|---|---|
| 2011 | 0 | – | – | 0 |
| 2012 | 0 | – | – | 0 |
| 2013 | 0 | – | – | 0 |
| 2014 | 0 | – | – | 0 |
| 2015 | 52,685 | – | – | 52,685 |

*Al-Pac fire salvage harvest area*

***Table 6. Forest health salvage volumes ($m^3$)***

| Year | Area of Unsalvaged Blowdown | Area of Identified Blowdown (Total) | Number of Blowdown Events |
|---|---|---|---|
| 2011 | – | – | – |
| 2012 | – | – | – |
| 2013 | – | – | – |
| 2014 | – | – | – |
| 2015 | – | – | – |

The forest health program in this period was to "clean" the jack pine (Pj) stands through harvesting an area in FMU L1 of pine infected with dwarf mistletoe, a parasitic plant that can reduce wood quality, diameter, and height growth, and sometimes result in the death of the pine trees. Conspicious witches' broom symptoms caused by branch deformities are associated with this parasitic plant (see Table 10). The mature Pj area was also harvested to assist in proactive mountain pine beetle (MPB) management. The harvested fibre was not an Al-Pac FMA area disposition; the fibre was accessed via a provincial Conifer Timber Permit (CTP).

Al-Pac continues to meet all eight strategies delineated in Objective 3, VOITs 7 and 8 (see Table 7 on page 15).

*Jack pine (Pj) in the Al-Pac FMA area*

*Table 7. 2006 Forest Management Plan Objective 3 – Salvage suitable timber – Strategy Report Card*

| FMP Page 82 | 2006 FMP Objective 3 – Strategy | Indicator | Report Card |
|---|---|---|---|
| 3.3.1 | Promptly evaluate fire-killed, wind-thrown, or insect and disease damaged timber for salvage. | Number of hectares burned, harvested, or assessed for insect damage | Complete |
| 3.3.2 | Purchase industrial salvage (from pipelines, seismic lines, etc.) and assist industrial users in feasibility and salvage plans; apply salvage volumes to FMU cut control. | Volume ($m^3$) per year for all forest companies | Ongoing |
| 3.3.3 | Purchase salvage from agricultural land clearing. | Volume of White Zone salvage per year | Complete |
| 3.3.4 | Utilize the timber damage assessment (TDA) process to monitor industrial (energy sector) salvage and report on such volumes for cut control purposes. | Al-Pac TDA dollars per year | Complete |
| 3.3.5 | Prepare an annual salvage plan for FMU A15 MOSA.* | GoA-approved annual MOSA *General Development Plan* (GDP) | Complete |
| 3.3.6 | The forest companies will follow the GoA's 2002 fire salvage policy:<br>• At the FMU level, plan to leave a minimum of 10 percent of the merchantable black [burned] timber in patches greater than 100 hectares; and<br>• At the planning unit level, leave 10 percent of merchantable black timber in patches greater than 10 hectares and a minimum of 5 percent merchantable black timber or burned timber in small patches and single trees according to logger's choice. | Number of fires in the FMA area and retained structure metrics | Ongoing |
| 3.3.7 | Evaluate the effects of salvage logging on boreal forest landscapes. | Published report on fire salvage | Complete |
| 3.3.8 | Incorporate new fire-planning protocols into the next OGRs, including landscape and stand structure retention, utilization, and timelines. | New OGRs for the FMA area | Complete |

* MOSA (mineable oil sands area) is now known as SMA (surface mineable area).

## Criterion 1: Biological Diversity – Landscape-Scale Biodiversity

## Retain ecological values and functions associated with riparian zones

**2006 FMP Objective # 9.10** Operate under the approved OGR protocols and future amendments
**2015 FMP VOIT 9 – 1.1.1.6** Retain ecological values and functions assocaited with riparian areas

**2015 Indicator:**

- Forest companies to be consistent with current forest practices in northeastern Alberta – compliance/support/adherence with approved northeastern Alberta Operating Ground Rules (OGRs).

| 2006 FMP Page 105 | 2006 FMP Objective # 9 – Strategy | Indicator | Report Card |
|---|---|---|---|
| 3.9.10 | Operate under the approved OGR protocols and future amendments. | New approved OGRs | Complete – Revised and updated yearly with GoA and the forest companies |

Riparian zones are terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high-water tables, and soils that exhibit some wetness characteristics. The term is normally used to refer to the zone within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs, and wet meadows. The riparian zone is influenced by, and exerts an influence on, the associated aquatic ecosystem.

The majority of the FMA area is composed of wetlands and non-harvestable forest, areas such as river valleys, water bodies, slopes, protected areas, parks, riparian buffers, and black spruce bogs; these areas total approximately 3 million hectares. The forest companies do not harvest in these areas, although limited access to blocks does occur through riparian areas. Access built to comply with the OGRs should not have significant effects at the landscape level.

In 2012 and 2014, the forest companies and the GoA updated and signed OGRs for the FMA area and all of northeastern Alberta. The OGRs follow the provincial template for all operations in Alberta and are reviewed annually to meet ongoing challenges and emerging issues. All operators must meet the approved OGRs for planning, harvest and haul, and silviculture operations. GoA enforcement actions on Al-Pac for the reporting period are provided in Table 8.

The OGRs are available at
http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/formain15749/$FILE/ne-ab-ogr-final-oct-18.pdf

For this reporting period, the only applicable indicator is OGR violations regarding riparian areas.

Through operational planning at the plannng unit and block level, riparian areas (e.g., unmapped streams) are identified that require buffering and are not accounted for in the FMA area TSA-netdown. In the reporting period 2011–2015, this metric was not tabulated by Al-Pac. Accordingly, Table 9 illustrates that the number of hectares per FMU that received non-TSA buffering is not-applicable (NA).

***Table 8. Al-Pac–GoA enforcement actions (2011–2015)***

| Date Assessed or Recommended | Date of Infraction | Penalty, Warning, Waiver, or Closed | Amount | Planning Unit | Details |
|---|---|---|---|---|---|
| 2011 | N/A | N/A | | | |
| 2012 | N/A | N/A | | | |
| 2013 | N/A | N/A | | | |
| 13 January 2014 | 25 January 2014 | Penalty | $500 | PU084074 (FMU L11) | Stick nest buffer removed |
| 2015 | N/A | N/A | | | |

(N/A – not applicable, no infractions)

***Table 9. Riparian buffers***

| Year | Riparian Buffers – TSA (ha) | Hectares Harvested within TSA/OGR Buffer | Operational Riparion Buffers – Added through OGR Planning (FMU – ha) |
|---|---|---|---|
| 2011 | 129,100 | 0 | N/A |
| 2012 | 129,100 | 0 | N/A |
| 2013 | 129,100 | 0 | N/A |
| 2014 | 129,100 | 0 | N/A |
| 2015 | 129,100 | 0 | N/A |

The baseline riparian buffers metric is the total hectares of buffers generated within the Timber Supply Analysis (TSA) from the netdown of the gross FMA area; approximately 2.2 percent of the gross FMA area land base—an FMP data output. The netdown process used the Operating Groud Rules (OGRs) definitions for riparian buffers. The buffer area is then removed from the "harvestable land base" that is used to calculate the Allowable Annual Cut (AAC) and Spatial Harvest Sequence (SHS). This metric is thus static for the TSA and the stewardship reporting period.

Operational riparian buffers that were added during the planning and operations of a block were not tracked during this period to the detail required for this table. This would have required a multifaceted GIS exercise. Future stewardship reports may investigate this metric.

## Criterion 1: Biological Diversity – Local- and Stand-Scale Biodiversity

## Retain stand-level structure

**2006 FMP Objective # 12** Retain forest structure at the stand level
**2015 FMP VOIT 10 – 1.1.2.1a** Retain stand-level structure

**Indicator:**

- Percentage of area or volume merchantable (living and dead) structure retained coniferous/deciduous within an FMU.

Stand structure in harvest areas plays a variety of temporal and spatial roles for biodiversity. Residuals (patches of live trees, as well as scattered live and dead trees) may produce structural conditions that are more similar to those created by forest fires than those resulting from traditional clear-cut harvesting, especially as the forest regenerates. Residual structures positively affect microsite conditions to help establish the new vegetation community. Residual patches may also act as "lifeboats" that give various species fuller use of the disturbed area and permit more rapid recolonization of its interior by plant and animal species characteristic of later successional stages.

For Al-Pac, stand structure retention is a critical component of the ecosystem-management approach laid out in its government-approved FMP and the current approved operating ground rules (OGRs). Al-Pac starting implementing the concept of residual stand-structure retention when operations commenced on the FMA area in 1993. The original guideline was simply to leave an average of eight stems per hectare. Protocols evolved over the years, but the target on Al-Pac harvest blocks since 1998 has been to retain an average of 5 percent of merchantable trees as single stems and clumps of various sizes and species of trees.[*]

By definition, retained stand structure consists of live single trees, clumps of merchantable and non-merchantable trees of all ages, and snags (standing dead trees) that will provide seed sources and contribute over time to an increase in downed woody material in the harvest block. Gap dynamics (the effects of light-admitting gaps opening and closing in the canopy) can also benefit from structure retention. Al-Pac's stand structure strategy has evolved toward leaving more patches within a larger range of block sizes.

The retention of single trees, patches of large, live trees, and snags in harvest areas makes the harvested areas more similar to burned areas. In addition, residual live trees may create some old-forest attributes in young, regenerating harvest areas. Retaining some large snags within harvest areas creates habitat for some biota associated with naturally disturbed habitats.

Additional large snags may be created by retaining large, live trees, as some of these trees will die as the stand ages. Stand structure patches are generally located such that natural features, riparian areas, sensitive sites (e.g., stick nests), and proximity to standing forests are taken into account to maximize their utility or usefulness by the biotic community.

Structure is generally created by machine operators leaving patches and single trees throughout a harvest area. Al-Pac provides the operators with training in retention protocols and checks on the post-harvest results. The operator-initiated stand structure can be augmented by larger, planned patches laid out by Al-Pac team members.

[*] Coniferous quota holders (QHs) operating in the FMA area were required to retain 1 percent of merchantable trees (based on the 2006 FMP) in their harvest blocks that are less than 100 hectares in size.

Larger retention patches have become more common since 1998 when Al-Pac began using aggregated harvest systems, also known as “single-pass” or “single-entry” systems. Aggregated harvests replaced the previous “two-pass” system in which about half of merchantable timber in a stand was harvested in the first pass, with the remainder left for harvest 15 or 20 years later when regrowth was established in the first area. Among other things, aggregated harvests reduced the number of roads and the need to keep these roads open for long periods.

For Al-Pac, retained post-harvest stand structure can also be maintained in the following manner:

- Leave as many individual stems of non-merchantable trees, shrubs, and snags as operationally and silviculturally feasible;
- Leaning snags or trees of non-merchantable species that are greater than 6 metres in height that create a safety hazard may be felled to create safe working conditions; and
- Snags within 2.5 tree lengths of roads, camps, landings, fence lines, power lines, and machine maintenance areas may be felled to create safe working conditions.

At the FHP level, unplanned merchantable stands and/or large patches within stands (stands that are part of the Spatial Harvest Sequence (SHS) but remain unplanned for various reasons, such as aesthetic or wildlife concerns, terrain, etc.) can contribute to the planned stand structure as long as they are:

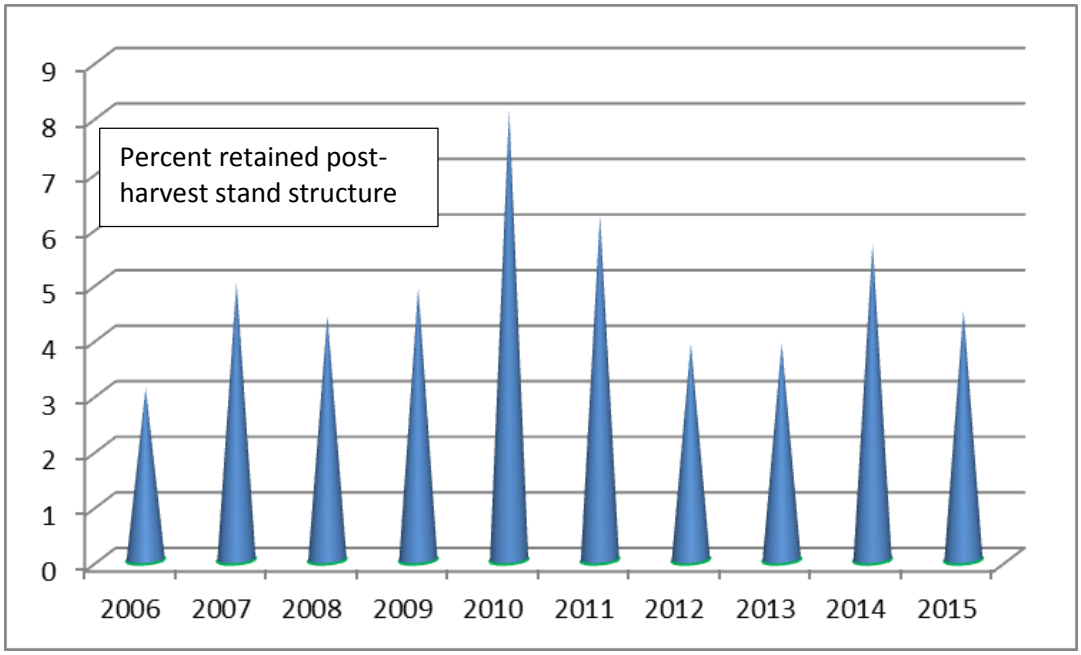
- Merchantable;
- Within the harvest area;
- Attached to the boundary as a peninsula, where the length exceeds the widest portion reaching into the harvest area; and/or
- Between harvest areas where the structure forms part of continuous merchantable timber (e.g., attached to riparian buffers, not to the TSA netdown buffer itself).

For Al-Pac’s monitoring purposes, there is a correlation between area retained and volume retained. If the retained stand structure is representative of the original forest stand, then the assumption is that on average, the structure is comparable to average volumes from pre-harvest forest stands. For these purposes, area rather than volume is the monitored variable. This information is captured yearly through the post-harvest disturbance air photography program, and then the metrics are compiled through an interpretation process and reported in the AOP.

The Al-Pac average structural retention percentage within harvest area boundaries for the FMA area is 4.97 percent for the 10 years from 2006 to 2015. Figure 2 provides actual post-harvest stand structure retention percentage metrics (clumps plus single trees) for all Al-Pac harvest operations within the FMA area.

Al-Pac continues to meet all four strategies delineated in Objective 12, VOIT 10 (see Table 10 on page 21).

***Figure 2. Al-Pac FMA area retained stand structure – Average percentage per year***




*Post-harvest retained stand structure*

***Table 10. 2006 Forest Management Plan Objective 12: Retain forest structure in harvested cutblocks in varying amounts across the FMA area landscape – Strategy Report Card***

| FMP Page 119 | 2006 FMP Objective 12 – Strategy | Indicator | Report Card |
|---|---|---|---|
| 3.12.2 | Where conifer and deciduous blocks combine to exceed 100 hectares, an average of 5 percent structure will be retained by all operators. This includes all blocks harvested within one to five years of each other. | Number of blocks greater than 100 hectares | Complete – Compliance with OGR 7.4.1 |
| 3.12.3 | Stand structure will not be retained in blocks where forest health issues warrant eradication of all mature tree species to combat infestations and diseases such as pine beetle and mistletoe. | Number of blocks | Complete – Compliance with OGR 7.4.9 |
| 3.12.5 | Al-Pac – Structuring of larger blocks greater than 100 hectares may include a greater range in clump sizes or treed corridors to provide wildlife linkages and feathered edges on the windward side of blocks (refer to Al-Pac Stand Structure Guidelines). Merchantable structure is in addition to any unmerchantable structure in cutblocks. | Number of blocks greater than 100 hectares | Complete – Compliance with OGR 7.4.1 |
| 3.12.6 | Al-Pac – In 10 FMUs, an average of 5 percent of the deciduous merchantable volume and 5 percent of the merchantable conifer volume will be retained in cutblocks, in addition to unmerchantable structure. MOSA (now SMA) cutblocks in FMU A15 are excluded from this strategy. | Stand structure percentage per year | Complete – compliance with OGR 7.4.1 |

In the reporting period 2006–2010, Al-Pac was not in compliance with strategy 3.12.6. For the complete 10-year reporting period of this FMP, Al-Pac came into compliance with the objective and the OGRs; the average retention for the entire period was approximately 4.9 percent.

*FMA area landscape and harvest areas with retained structure*

## Criterion 1: Biological Diversity – Local- and Stand-Scale Biodiversity

## Retain downed woody debris

**2006 FMP Objective – N/A**
**2015 FMP VOIT 11 – 1.1.2.1b**

**Indicator:**

- Retain a percentage of harvested area within the FMA with downed woody debris equivalent to pre-harvest conditions.

In the 2006 FMP, an objective for "downed woody debris" (DWD) was not articulated. This strategy was not relevant to Al-Pac nor to the forest companies operating in the Al-Pac FMA area. Harvesting operations in the FMA area generally rearrange the ground-level biomass and typically add volume to the ground-level pre-harvest level. Pre-harvest levels are a wide range of decomposing biomass of various piece sizes and distribution. This pre-harvest metric is not collected by Al-Pac. The forest companies do not remove pre-harvest DWD, and harvesting adds some amount of debris or DWD. As a result, the post-harvest biomass volumes (DWD) are always increasing.

In the new 2015 FMP, DWD is defined as "Wood lying at an angle of less than 45 degrees from the ground and having a diameter > 1 cm."

Debris or slash accumulation resulting from timber harvest operations must, as a priority, be redistributed or disposed of to minimize the risk of wildfire ignition and spread. However, it is recognized that some retention of debris is valuable from an ecological perspective, and that a reasonable amount of debris retention shall occur to emulate natural forest floor accumulations. Ecological benefits include microtine habitat, furbearer habitat (when piled), and soil nutrient inputs.

When debris is maintained, it must be in such a distribution and amount as to:

1) Minimize wildfire risk as a priority;
2) Minimize the amount of productive land base loss by limiting lost area available for deciduous species suckering, or tree planting; and
3) Provide ecological benefit (coarse filter vs. fine filter).

For the 2015 FMP and the next stewardship report, pre- and post-harvest observation protocols need to be developed for inclusion in the northeastern Alberta OGRs.

*Downed woody debris (DWD)*

# Criterion 1: Biological Diversity – Local- and Stand-Scale Biodiversity

## Maintain the integrity of sensitive sites

**2006 FMP Objective # 9.10**
**2015 FMP VOIT 12 – 1.1.2.2**

**2015 Indicator:**

- Forest companies to be consistent with current forest practices in northeastern Alberta – Compliance/support/adherence with approved northeastern Alberta Operating Ground Rules (OGRs).

In 2008, 2012, 2014, and again in 2018, the forest companies and GoA completed and signed new sets of OGRs for the FMA area and all of northeastern Alberta. All versions of the OGRs follow the provincial template for all operations in Alberta and are reviewed annually to meet ongoing challenges and emerging issues. All operators must meet the approved OGRs for planning, harvest and haul, and silviculture operations.

To date, identified sensitive sites, through an existing database or from field reconnaissance, are incorporated into the *Final Harvest Plan* (FHP) and protected by means of buffers. Field personnel utilize the Alberta Conservation Information Management System (ACIMS)[*] and the Fisheries and Wildlife Management Information System (FWMIS)[†] during block layout and identify additional sites where encountered.

Al-Pac has complied with the OGRs in reference to this objective.

The OGRs are available at
http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/formain15749/$FILE/ne-ab-ogr-fiNAl-oct-18.pdf

| 2006 FMP Page 105 | 2006 FMP Objective 9 – Strategy | Indicator | Report Card |
|---|---|---|---|
| 3.9.10 | Operate under the approved OGR protocols and future amendments. | New approved OGRs | Complete – Revised and updated yearly with GoA and the forest companies |

The following sensitive sites and associated wildlife are listed in the current approved OGRs:

- Breeding sites and hibernacula of species at risk;
- Salamanders, amphibians, and reptiles;
- Bat hibernacula;
- Colonial bird nesting areas;
- Sandhill crane nesting areas;
- Wolverine dens (none found to date in the FMA area);
- Mineral licks;

[*] https://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/
[†] https://www.alberta.ca/fisheries-and-wildlife-management-information-system-overview.aspx

- Raptor nest trees;
- Natural springs and beaver ponds with no outflow channel; and
- Grizzly dens (none found to-date in the FMA area).

Additional habitats of selected wildlife species require maintenance of undisturbed habitats such as breeding or denning locations. These species require specific sites in order to complete all or part of their life cycles. Other species' selected and associated sensitive sites are protected by the retention of an undisturbed, forested buffer from the edge of the opening associated with these sites or from the centre of selected sites without openings.

Currently, identification of these sites is accomplished through the Alberta Conservation Information Management System (ACIMS) or by working with local or regional Fish and Wildlife staff to have information added to the Fish and Wildlife Information System (FWIS). However, there may be sensitivity about disclosure of this information to the public (e.g., the location of salt licks and corresponding ungulate activity), which could lead to adverse impacts on the sites. Keeping the database up to date poses a significant challenge, and as a result, Al-Pac does not have spatial data on these sites in a reportable form.

*Stick nest (possibly raptor) in an Al-Pac harvest block*

## Criterion 1: Biological Diversity – Local- and Stand-Scale Biodiversity

## Maintain aquatic biodiversity by minimizing impacts of water crossings

**2006 FMP Objective – 9.10**
**2015 FMP VOIT 13 – 1.1.2.3**

**2015 Indicator:**

- Forest companies to be consistent with current forest practices in northeastern Alberta – Compliance/support/adherence with approved northeastern Alberta Operating Ground Rules (OGRs).

In 2008, 2012, 2014, and again in 2018, the forest companies and GoA completed and signed new sets of OGRs for the FMA area and all of northeastern Alberta. All versions of the OGRs follow the provincial template for all operations in Alberta and are reviewed annually to meet ongoing challenges and emerging issues. All operators must meet the approved OGRs for planning, harvest and haul, and silviculture operations.

Al-Pac has complied with the OGRs in reference to this objective.

The OGRs are available at
http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/formain15749/$FILE/ne-ab-ogr-fiNAl-oct-18.pdf

| 2006 FMP Page 105 | 2006 FMP Objective 9 – Strategy | Indicator | Report Card |
|---|---|---|---|
| 3.9.10 | Operate under the approved OGR protocols and future amendments. | New approved OGRs | Complete – Revised and updated yearly with GoA and the forest companies |

Al-Pac has a risk-based monitoring program that complies with the northeastern Alberta OGRs. This applies to all temporary watercourse crossings in active, inventory, and outstanding reclamation areas. The following is required for Al-Pac's monitoring program:

- All crossings will be monitored and documented on the Water Course Crossing (WCC) form;
- All crossings identified in the approved *Forest Harvest Plan* (FHP), as well as additional crossings, must have one inspection completed at or prior to the skid clear phase of operations and one inspection completed post-reclamation;
- A minimum of six photos must be taken at the time of inspection for crossings that are considered higher risk or have greater potential of causing environmental impact;
- Blocks with harvested timber awaiting transportation and active culverts will require an inspection by April 30 and November 1; this inspection must be conducted under snow-free conditions;
- Additional inspections will be done for crossings that are required for continued access over 12 months (this could be monthly monitoring inspections for the life of the road);
- Crossings that have been reclaimed with the potential of erosion will be placed on the Al-Pac disturbance monitoring list. A monitoring inspection will be done for each visit and documented on the WCC form; this must be done until the item is cleared from the disturbance monitoring list;
- Inspections will be tracked in LRM;
- All variances arising from the monitoring program must be investigated;

- Any new crossings must be inspected as above; and
- An Al-Pac harvest contractor will complete one watercourse crossing checklist within two weeks of initial construction of the culvert.

The majority of harvest and hauling activities occur when the ground is frozen, which reduces effects on both soil and water resources. When operations occur during non-frozen conditions, there will be a greater likelihood of impacts (e.g., siltation) on aquatic habitat and associated water crossings. Table 11 illustrates the current number of permanent bridges throughout the Al-Pac FMA area.

***Table 11. Permanent bridges and culverts on Al-Pac DLO roads***

| Year | Bridges | Culverts | Non-Compliance Incidents |
|---|---|---|---|
| 2011 | 46 | 1,215 | 0 |
| 2012 | 49 | 1,245 | 0 |
| 2013 | 49 | 1,275 | 0 |
| 2014 | 52 | 1,310 | 0 |
| 2015 | 52 | 1,330 | 0 |

(DLO – Department License of Occupation, a permanent road)

*Al-Pac permanent bridge – Piche Road in FMU L1*

# Criterion 1: Biological Diversity – Species Diversity – Conserve Species Diversity by Ensuring that Habitats for Native Species Found in the FMA Area Are Maintained through Time – Viable Populations of Identified Plant and Animal Species

## Maintain habitat for identified high-value species (i.e., economically valuable, socially valuable, species at risk, species of management concern)

**2006 FMP Objective # 8** Protect species identified as "at risk" or as socially important
**2015 FMP VOITs 14 and 15** Maintain high-value species habitat

**VOIT 14 – 1.2.1.1** Successful implementation of caribou habitat strategy within the Woodland Caribou Zone
**VOIT 15 – 1.2.1.1** Retained habitat for trumpeter swan

Objective 8 is a fine-filter analysis of wildlife species and habitats that have been selected by regional stakeholders and GoA. The objective was developed before there was a systematic, grid-based monitoring of species, habitats, and diversity in the FMA area. This was started through the Alberta Biodiversity Monitoring Institute (ABMI) in 2010.

Biological research and forest management has traditionally focused on individual species and their relationship to their habitat or a certain ecosystem characteristic; this is known as the fine-filter approach. In theory, the application of this approach involves collecting and using extensive knowledge of the organisms in the affected ecosystems to design forest management activities that maintain biodiversity. Realistically, it is not feasible to study and understand all the species in the Al-Pac FMA area. The fine-filter approach instead assumes that a smaller number of "indicator species" can represent the full spectrum of organisms present. This contrasts with the coarse-filter approach, the basis for most modern forest management, which assumes that the full range of habitats in intact ecosystems will also conserve the full range of species.

A forest management program based on the fine-filter approach tends to give preference to selected species' habitats against other species' habitat requirements. This could lead to the arbitrary selection of "winners" and "losers" among species and habitats. Because of data uncertainties and the complex nature of the forest, sustainable forest management must follow a coarse-filter approach augmented, where required and appropriate, by fine-filter strategies to address human-caused effects on some species.

Sustainable forest management based entirely on a fine-filter approach is neither feasible nor likely to succeed. A multitude of individual species and habitats would require detailed and costly scientific analysis. Most existing fine-filter models of persistence of species are based on expert opinion and conjecture derived from the estimation of habitat requirements. For the Al-Pac FMA area, another caveat is that there are few thresholds or concrete prescriptions as to the habitat needs of individual species.

The FMP coarse-filter strategy is supported by the use of a fine-filter analysis on selected species. The coarse-filter approach assumes that maintaining vegetative communities and landscape patterns and processes within the limits of natural variability will result in the maintenance of a full complement of native plant and animal species.

Biodiversity is the distribution and abundance of living organisms and the ecological complexes of which they are part. Natural disturbances such as forest fires, wind, insects, or disease can cause rapid change, affecting very small to extremely large forest areas. In the boreal forest, where these larger-scale disturbances are common,

species and ecosystem biodiversity undergo a continual change across the landscape. Understanding and applying the approximation of natural disturbance processes in forest management activities acts as a mechanism to conserve biodiversity.

The ecosystem management approach in the 2006 FMP manages aggregates (i.e., communities, ecosystems, and landscapes) and assumes that the species and habitat components will be managed as well. If an ecosystem management strategy is based on plant communities and natural disturbance processes at the landscape level, it is assumed that the associated species will be maintained through time as a consequence of the persistence of plant communities, patterns, and processes.

Forest wildlife species vary widely in their habitat requirements, reflecting diverse strategies for obtaining nutrition, avoiding predation, and meeting other requirements of life. Many have specialized requirements reflecting physical and behavioural adaptations designed to minimize competition with other species. Because of such habitat specialization, the overall diversity of forest species is dependent upon the diversity of habitat features, which is in turn a consequence of the combined actions of disturbance events and succession. Thus, the greater the structural complexity of the stand and the forest, the greater the number of species it can support at higher relative abundance.

An important observation from scientific research is that species richness—the number of species present—does not change significantly when over-mature or old stands are compared to young stands. Species that may be considered old-growth species are often found in young stands, although the density of individuals may be lower in the young stands. These species may be present because of structural features (e.g., standing dead trees) retained from the pre-disturbance, structurally complex, old stand. This theory is supported by evidence that these species are often not found in mature stands that have lost the majority of their structural heterogeneity. A similar pattern has been demonstrated among a wide range of organisms, including both vascular and non-vascular plants, insects, birds, and mammals.[*]

The forest companies have continued to study selected species and the impact of forest management on these species; for the 2015 FMP, the following species were examined in 2015 within spatial modelling scenarios:

- Woodland caribou
- Pine marten
- Barred owl
- Canada warbler
- Bay-breasted warbler
- Black-throated warbler
- Ovenbird
- Brown creeper

Al-Pac continues to meet all nine of the eleven strategies delineated in Objective 8, VOITs 14 and 15 (see Table 12 on the following page).

[*] For more information about the link between forest structure and biodiversity, see "Ecological Basis for Stand Management: A synthesis of ecological responses to wildfires and harvesting" (Song 2002) and "Relationships Between Stand Age, Stand Structure, and Biodiversity in Aspen Mixedwood Forests in Alberta" (Stelfox 1995).

***Table 12. 2006 Forest Management Plan Objective 8: Protect species identified as "at risk" or as socially important – Strategy Report Card***

| FMP Page 93 | 2006 FMP Objective 8 – Strategy | Indicator | Report Card |
|---|---|---|---|
| 3.8.1 | Administer a furbearer-monitoring program throughout the FMA area. Review the program every three years to determine future requirements of the program. | Number of trappers involved in program | Incomplete – Program terminated |
| 3.8.2 | For fish habitat protection, continue to refine and implement "best practices" with regard to road and stream crossings. | Number of infractions – changes in OGRs 6 and 11 | No infractions – Ongoing |
| 3.8.3 | The forest companies will consult with regional stakeholders and public groups to assist in identifying species recognized as "at risk" or socially important. | Presentations to LAG; number of community planning meetings and open houses | Ongoing – Eight LAG presentations; 50 open houses and planning meetings over the five-year period |
| 3.8.4 | Management strategies to conserve species at risk and socially important species as identified by the Alberta government and the Al-Pac FMA area public advisory group. | Boreal Caribou Committee Strategy; OGR 7.7 | Complete |
| 3.8.5.1 | Caribou Conservation Plan and Habitat Suitability Index (HSI) model. | Athabasca Landscape Team Caribou Plan; ALCES™ model output | Complete |
| 3.8.5.2 | Moose HSI model | ALCES™ model output | Complete |
| 3.8.5.3 | Canadian Toad HSI model | CEMA model and outputs | Complete |
| 3.8.5.4 | Migratory Songbirds – Warblers HSI model | HSI models (U of A) | Complete |
| 3.8.5.5 | Goshawk HSI model | ALCES™ model output | Complete |
| 3.8.5.6 | Barred Owl HSI model | ALCES™ model output | Complete |
| 3.8.5.7 | Migratory Songbird – Brown Creeper HSI model | ALCES™ model output | Incomplete – Insufficient data |

For the period 2010–2015, nine of the strategies have been completed. The HSI model required for the brown creeper was, in fact, completed for the approved 2015 FMP using the Patchworks modelling system. All the other migratory bird HSI models were also updated for the 2015 FMP.

The trapper program that was terminated in 2008 was never re-established within the FMA area (see discussion in Section C of Volume I). Accordingly, it can still be deemed incomplete.

The forest companies continued to consult with regional stakeholders and public groups to assist in identifying species recognized as "at risk" or socially important. During the five-year reporting period, Al-Pac, through the Landscape Advisory Group (LAG), examined a number of migratory bird species, but principally woodland caribou range planning, at numerous meetings.

Woodland caribou are listed as a threatened species nationally and in Alberta.

***Species Identified as "At Risk" or as "Socially Important" in the FMP***
***(clock-wise from top left):***

***Canada Warbler***
***Bay-breasted Warbler***
***Black-throated Green Warbler***
***Ovenbird***
***Goshawk***
***Canadian Toad***
***Moose***
***Woodland Caribou***
***Barred Owl***
***Brown Creeper***

The Al-Pac FMA area contains, in whole or in part, six caribou ranges (see Figure 3), all of which have demonstrated long-term population decline and have current critical habitat disturbance levels that exceed the maximum 35 percent disturbance threshold (2012 Environment Canada).[*] The need for urgent management action and caribou range summary statistics are outlined in the "Recovery Strategy for the Woodland Caribou, Boreal population (*Rangifer tarandus caribou*) in Canada" (2012 Environment Canada). Detailed information regarding Alberta's caribou distribution, population trends, and habitat requirements has been assembled, and provincial policies developed, to assist in the recovery efforts for this species.

Al-Pac has integrated this information into a fine-filter, caribou habitat planning process. Al-Pac's caribou conservation strategies are either undertaken independently or through a comprehensive, integrated land management (ILM) strategy between the government and other FMA area resource users. Elements of the ILM strategy, however, would need significant discussion and collaboration with the government and others before successful implementation.

To assist in Alberta's management of the woodland caribou, Al-Pac started to integrate a strategic sequencing or land-use zonation approach into the TSA scenario modelling. The zonation approach is based on the outcome of a collaborative process that was developed as part of the Canadian Boreal Forest Agreement (CBFA) caribou action planning exercises undertaken in 2013–2014.

The Alberta Caribou Committee's (ACC's) Athabasca Landscape Team (ALT 2009) recommendations (listed below) were used as a starting point for the analyses and recommendations of the CBFA planning process. The ALT recommendations were integrated with guidance from the Alberta Provincial Caribou Policy (2011), Environment Canada's (2012) national recovery strategy for boreal woodland caribou, and associated science reports (Environment Canada 2008, 2011). The ideas and output derived from the CBFA collaborative caribou action-planning process was intended as input into the future Government of Alberta's range- and action-planning processes in northeastern Alberta.

The following are the Alberta Caribou Committee (2009) recommendations for caribou conservation in northeastern Alberta:

1. **Zoning:** Legislated zones should be established within most ranges, in which caribou habitat restoration and maintenance would be the priority management focus. *Note:* The ALT did not identify specific geographic boundaries for application of the zonation concept.
2. **Coordinated reclamation:** Coordinated reclamation should be a key management tool to reduce, over time, the total amount of industrial footprint within caribou ranges.
3. **Best practices:** Best practices relevant to and effective for caribou habitat conservation or restoration should be applied to the entire landscape within caribou ranges, and should apply to all forms of human development (e.g., forestry, recreation, energy).
4. **Wolf control:** Wolf control would be required while habitat was being restored to prevent the extirpation of all caribou populations.
5. **Primary prey control:** Wolf control needs to be accompanied by measures to concurrently control moose, deer, and beaver numbers.

[*] Woodland caribou (*Rangifer tarandus caribou*), boreal population: recovery strategy 2012. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/recovery-strategies/woodland-caribou-boreal-population-2012.html

Al-Pac endorsed the Alberta Caribou Committee's habitat recommendations at the time and continues to recognize the need for a comprehensive set of management strategies, including intermittent population management, to achieve desired caribou conservation objectives.

The 2014 northeastern Alberta caribou planning process recommendations, based on the CBFA caribou action-planning principles, were integrated into the current FMP caribou habitat planning process and are consistent with the Athabasca Landscape Team report management strategies, further refined by focusing the analyses on:

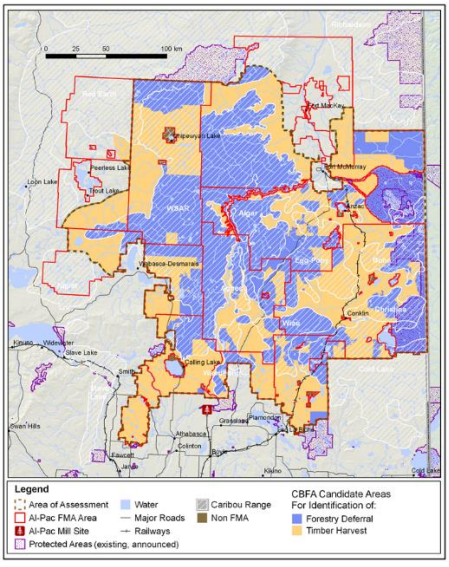
- The spatial identification of candidate caribou habitat zones; and
- Identifying management strategies to apply to each zone.

Al-Pac took steps in the scenario development process to refine the ACC's recommended zonation approach with a way to implement the zonation strategy on the ground and to link industrial management actions to the zones for the entire FMA area. A forestry-centric perspective was used to focus zonation evaluations by minimizing the forestry footprint within caribou range and by identifying "high-level candidate" zones for strategic sequencing of forestry activities (i.e., Spatial Harvest Sequence, SHS, planning for timber harvest and forestry deferral zones).

The current forest harvest area footprint (using a 40-year window and applying a 500-metre buffer) within the majority of the FMA area is approximately 7 percent for the West Side Athabasca Range (WSAR) caribou range and approximately 12 percent of the East Side Athabasca Range (ESAR) range. In addition to forestry footprint, continued energy sector development is anticipated for the richest areas of bitumen in the next couple of decades. The regional and national uniqueness of northeastern Alberta's oil sands/bitumen deposit and the trillions of dollars of oil reserves contained within it were given unique consideration in the process when considering development versus conservation options.

The nature of caribou distribution and habitat use in northeastern Alberta results in little direct overlap between caribou habitat use and vegetation classes utilized for forest harvest compared to other areas of Canada (e.g., west-central Alberta or in Canadian Shield country). Given this differentiation between caribou habitat (primarily black spruce wetlands) and forestry "habitat" (primarily upland mixedwood forest) in northeastern Alberta, Al-Pac was able to model management scenarios that deferred forest harvest from significant portions of caribou range on the FMA area for the next two decades with relatively low impact on wood supply targets/annual allowable cut.

***Figure 3. Al-Pac FMA area woodland caribou ranges (in blue)***



## Criterion 1: Biological Diversity – Genetic Diversity – Maintain Genetic Integrity of Natural Tree Populations

## Retain wild forest population for each native tree species in each seed zone through establishment of in-situ reserves, with an approved Controlled Parentage Program (CPP) plan

**2006 FMP Objective – N/A**
**2015 FMP VOIT 16 – 1.3.1.1** Retain wild forest populations for native (tree) species

"Wild forest populations" refers to genetic materials of native species originating from natural regeneration (e.g., white spruce seed from indigenous white spruce stands in the FMA area).

The Standards for Tree Improvement in Alberta, first implemented in 2003, were revised in 2009 by the Government of Alberta.[*] The standards represent science-based policy developed to encourage the maintenance of the genetic integrity, health, and productivity of Alberta's wild and managed forests. The standards achieve this by guiding the management of forest genetic resources in reforestation and tree improvement activities on public forest lands.

A major addition was the new seed-testing standards. Changes to the standards directing the use of wild seed and vegetative propagules in reforestation activities include modifications to seed-transfer rules to encourage movement of populations in a direction compatible with anticipated climate change.

The majority of the revision effort was directed at improving standards dealing with Stream 2 Controlled Parentage Programs (CPPs) and tree improvement activities for seed and vegetative propagules.

- "In situ" means seed that is from existing trees (conifers principally); and
- "Ex situ" means bringing in new plant material from outside sources; e.g., poplar plantations in the White Zone of the province into the FMA area (see VOIT 17).

Al-Pac has not implemented an in-situ program. However, Al-Pac is a supporting member of Tree Improvement Alberta (TIA), a project team of the Forest Growth Organization of Western Canada (FGROW).

*Nursery-grown white spruce seedling*

[*] "Alberta Forest Genetic Resource Management and Conservation Standards, Volume 1A – *Stream 1*." https://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/formain15749/$FILE/fgrms-stream1apr2018.pdf

# Criterion 1: Biological Diversity – Genetic Diversity – Maintain Genetic Integrity of Natural Tree Populations

## Retain wild forest genetic resources through ex-situ conservation for balsam poplar under an approved CPP plan

**2006 FMP Objective – N/A**
**2015 FMP VOIT 17 – 1.3.1.2** Retain wild [tree] forest genetic resources

In 2011, Al-Pac developed and started to deploy on the FMA area a balsam poplar tree improvement program that provided fast-growing poplar fibre. The program was called the *Balsam Poplar Controlled Parentage Plan*. The Government of Alberta approved this Controlled Parentage Program (CPP) for the Al-Pac FMA area.

The basic objective of the plan was to reduce silviculture liability and associated costs to meet silviculture standards through the deployment of superior poplar trees. Poplar clones can be deployed on roads, landings, and processing areas where natural regeneration was often less abundant and less vigorous than the surrounding cutover area. The trees can also be utilized for artificial regeneration of not satisfactorily regenerated (NSR) harvest blocks or areas in the FMA area.

Al-Pac's program is based on the application of initial selection, testing, reselection, and clonal propagation of superior individuals for operational deployment within an approved Government of Alberta "deployment zone" on Al-Pac's FMA area. This process may improve the value of future populations of poplar trees for artificial regeneration purposes. Combining various silvicultural practices with this tree improvement program could develop the trees (stock) and practices to successfully introduce the artificial regeneration of hardwoods as a major forest management tool for Al-Pac's FMA area.

The program had an initial selection population of 520 balsam poplar clones from provenances across the entire FMA area, selections from northeastern B.C., and poplar clones from south-central Alberta. As of 2015, these clones were being grown on six government-approved test sites on and around the FMA area to look at adaptability, growth, and insect and disease resistance.

The genetic test sites were selected to meet several objectives. The primary objective was effective testing and screening of selected clones (provenances and clones within provenances) across a range of sites that would primarily allow for the delineation of the deployment zone and the selection of superior genotypes. In addition, these test sites spanned a significant range in elevation (370 metres to 653 metres) that proved to be vital information for both climate change modelling and helped guide deployment strategies and planning in the future.

Six test sites were selected for provenance and deployment testing based on the following criteria:

- Good access
- Previously in deciduous or mixedwood cover
- Relatively level terrain
- A range in elevation
- A good distribution across the FMA area and within seed zones of deployment interest

Table 13 provides the test site names and locations.

***Table 13. Poplar genetic test sites and legal locations***

| Test Site Locations | Legal | Test Site Number |
|---|---|---|
| Upper Wells Road (Waskahegan) | SW-6-78-15-W4 | 1 |
| Cowper Road | SW-2-79-5-W4 | 2 |
| Aostra Road | SW-8-92-12-W4 | 3 |
| Chipewyan Lake Road | SW-9-83-24-W4 | 4 |
| Alberta-Pacific mill site | NE-17-68-19-W4 | 5 |
| Smoky Lake Tree Improvement Centre | Smokey Lake AB | 6 |

As of fourth quarter 2015, all six test sites had undergone mortality and health surveys, and may continue to be monitored for the immediate future. A few observations are relevant:

- Increased mortality occurred due to herbaceous competition, primarily *Calamagrostis* grass (Canada blue-joint grass);
- Mortality was also caused by insect attacks, primarily grasshoppers;
- Some sites were not very suitable for balsam poplar (i.e., Smoky Lake and Aostra), which resulted in increased mortality.

*Balsam poplar catkins*

## Criterion 1: Biological Diversity – Protected Areas – Minimal Human Disturbance

## Maintain areas with minimal human disturbances within managed landscapes

| | |
|---|---|
| **2006 FMP Objective # 20** | Identify a series of ecological benchmarks |
| **2015 FMP VOIT 18 – 1.4.1.1** | Integrate transboundary values and objectives into forest management |

Under the Land-use Framework (LUF), the provincial government conducted extensive consultation and developed one watershed-based regional plan that affected the Al-Pac FMA, the Lower Athabasca Regional Plan (LARP), which affects 55 percent of the FMA area. Alberta continues to develop plans for the Lower Peace and Upper Athabasca regions.

The LARP identified and set resource and environmental management outcomes for air, land, water, and biodiversity, and was intended to guide future resource decisions while considering social and economic impacts. The LARP was a product of more than three years of consultations with Albertans, First Nations, and experts on social, economic, and environmental issues. The LARP system includes five management frameworks to monitor and report on GoA's role in managing cumulative effects in the region:

1. Air Quality Management Framework
2. Surface Water Quality Management Framework
3. Groundwater Management Framework
4. Tailings Management Framework
5. Biodiversity Management Framework (draft only)

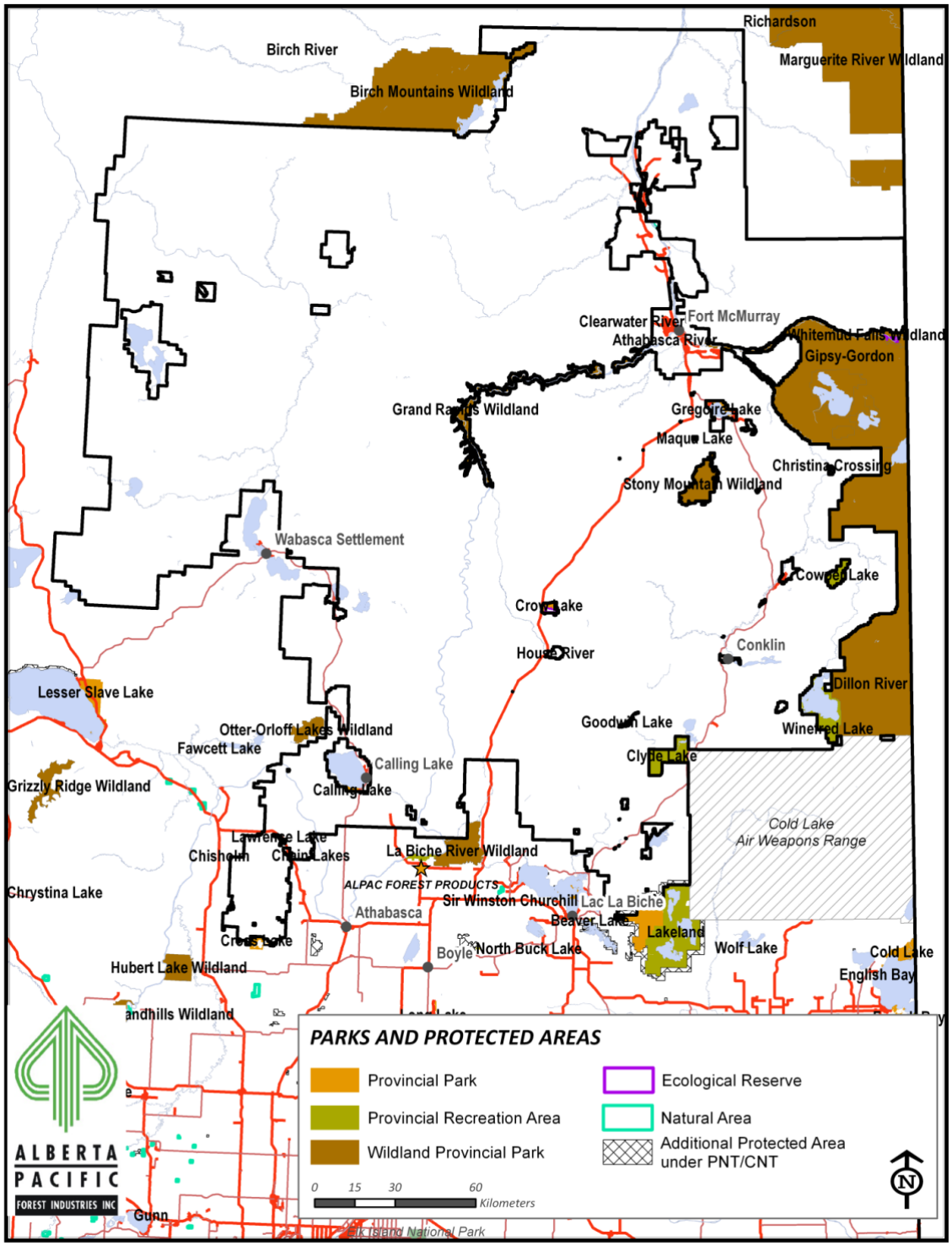
These frameworks outline monitoring, evaluation, and reporting requirements; set early warning triggers to determine the need for action; and identify what actions may be taken. A biodiversity framework has not yet been implemented.

Two new protected areas that were designated as wildland parks under the LARP were removed from Al-Pac's area under the 2011 Forest Management Agreement (FMA). These areas may serve as ecological benchmark areas for comparison with multi-use areas in the FMA area. Establishment of such representative benchmark areas was a key commitment of both Al-Pac's 2006 FMP and the company's FSC certification. Al-Pac had voluntarily deferred harvest in the Gipsy Lake and Dillon River areas, amounting to approximately 200,000 hectares that have now been incorporated in the wildland parks under the Lower Athabasca Regional Plan (LARP).

Gipsy Lake Wildland Provincial Park, located within the Regional Municipality of Wood Buffalo, is 158,542 hectares in size and encompasses lands south of the Clearwater River and west of the Saskatchewan boundary that surround the park. A huge portion of this park was burned in the 2016 Horse River Fire.

The Dillon River Wildland Provincial Park is 191,544 hectares in size. It is located within the Regional Municipality of Wood Buffalo, encompassing lands west of the Saskatchewan boundary between Gipsy-Gordon Wildland Park to the north and the Cold Lake Air Weapons Range to the south. See Figure 4 for a map of the current FMA area protected areas and parks.

***Figure 4. Location of ecological benchmark areas (hatched) and existing protected areas (brown) in and around the Al-Pac FMA area***



The LARP proposed that more than 2 million hectares of land would be recognized as either new conservation areas or existing parks and protected areas in the northeastern part of the province.

The conservation areas could be managed to minimize and prevent land disturbance. This status would mean that the development of some types of industrial tenure, such as oil sands, minerals, and commercial forestry, are not considered compatible with the management intent of conservation areas. Monitoring by the Alberta Biodiversity Monitoring Institute (ABMI) and the GoA would help to determine the effectiveness of the protected areas for benchmarking.

Al-Pac continues to meet all six strategies delineated in Objective 20 (see Table 14 below).

***Table 14. 2006 Forest Management Plan Objective 20: Identify a series of ecological benchmarks representative of the habitat diversity of the FMA area – Stewardship Report Card***

| FMP Page 139 | 2006 FMP Objective 20 – Strategy | Indicator | Report Card |
|---|---|---|---|
| 3.20.1 | Complete a protected area gap analysis for the FMA area. | Published report | Complete – Report available |
| 3.20.2 | In association with interested and informed stakeholders, assess existing protected areas and areas with limited industrial activity for inclusion in a network of ecological benchmark areas within or adjacent to the FMA area. | RAC involvement in three deferred areas | Ongoing endeavours at permanent establishment |
| 3.20.3 | Establish a program that will utilize ecological benchmarks to monitor biological diversity and ecosystem function by comparing harvested versus non-harvested landscapes as part of an active adaptive management (AAM) system. | Program established – Al-Pac adopts ABMI program | Complete |
| 3.20.4 | Monitor biological diversity and ecological process, as defined by the ABMI, over time on ecological benchmarks and areas under sustainable forest management. | ABMI program established with Al-Pac – initial published report | Complete |
| 3.20.5 | Potential benchmark areas may be deferred from the harvest sequence while the forest companies work with interested and informed stakeholders in order to gain legislative protection for sites. | Three deferred area in FMA area (approx. 200,000 hectares) | Complete |
| 3.20.6 | Complete a HCVF assessment for the FMA area and develop management strategies for HCVFs as required. | Published report | Complete |

## Criterion 2: Ecosystem Productivity – Ecosystem Resilence

## Reforest all harvest areas

## Meet or exceed the conifer and deciduous MAI standard for the population of openings surveyed in a given quadrant (five-year period)

| | |
|---|---|
| **2006 FMP Objective # 13** | Forest renewal |
| **2015 FMP VOIT 19 – 2.1.1.1** | Reforest all harvest areas |
| **2015 FMP VOIT 20 – 2.1.1.2** | Meet or exceed the C and D MAI standard [conifer and deciduous mean annual increment] for the population of openings (harvest blocks) surveyed in a given quadrant [five-year period] |

Forest renewal (reforestation of harvest areas), or silviculture, is the theory and practice of controlling the establishment, species mix, growth, and quality of forest stands to achieve forest management objectives. Using a combination of harvesting, site preparation, reforestation, and stand-tending interventions, forest vegetation is manipulated at the stand and landscape levels to balance timber production with other societal values. To determine whether objectives are being met, forest renewal programs monitor crop tree performance and adjust scheduled treatments as required.

The Regeneration Standards of Alberta (RSA) were developed and implemented in 2010 to monitor future forest growth. The RSA also provides a much more comprehensive means of illustrating how the managed forest is responding to silviculture treatments.

The highly analytical RSA process is designed to monitor forest regeneration based on individual tree growth rates within harvest blocks (stands), and then cumulatively provide a total estimate of future growing stock for a forest management zone. One key area that was changed was the definition of successful regeneration, where the term "free to grow" for an individual tree was dropped in favour of monitoring forest stand growth. Essentially, the sum of the parts (i.e., all the trees in a cutblock or stand) became more important than the success of individual trees. Included in the RSA was a greater requirement for the utilization of aerial imagery to provide a snapshot of the state of the managed forest.

Under the RSA, establishment surveys determine the level of success of early silvicultural activities in harvested areas or openings. Site occupancy is the predominant parameter used to determine the level of regeneration success. Site occupancy is the degree to which trees utilize a site's available growing space. Sufficient numbers of trees are necessary to fully utilize the site's water and nutrient resources to maintain timber productivity. Site occupancy or the presence of a vegetation community is also integral to maintaining healthy ecosystems.

The Reforestation Standard of Alberta defines "opening" as:

> An area created by timber harvest, which is the unit for reforestation management (i.e., regeneration surveys) and tracking of reforestation activities in the Alberta Regeneration Information System (ARIS). Openings have a unique administrative identification, contain one reforestation stratum, and a single timber disposition holder with reforestation responsibility.[*]

[*] Alberta Environment and Sustainable Resource Development. 2013. *Reforestation Standard of Alberta*. Government of Alberta, Department of Environment and Sustainable Resource Development, Edmonton, AB. Glossary, p. 227.

Under the RSA, performance surveys are used to determine whether established stands have continued to grow and to ensure that these stands are healthy, vigorous, and capable of generating yields similar to the post-harvest yields assumed in the Timber Supply Analysis (TSA). The Mean Annual Increment (MAI), or mean annual growth, refers to the average growth per year that a tree or stand of trees has exhibited or experienced to a specified age.

***Deciduous Silviculture Program***

For Al-Pac, the normal prescription for deciduous sites is leave-for-natural (LFN) regeneration. Natural suckering from the root systems provides good regeneration in most cases and maintains the genetic composition of the pre-harvest stand. Removal of most of the mature timber in accordance with the OGRs is necessary as it provides sufficient sunlight to heat the ground surface and stimulate suckering. Where regeneration is not adequate, sites are planted to an appropriate indigenous tree species from the appropriate Alberta seed zones. Table 15 illustrates the extent of the complete-to-date Al-Pac FMA area deciduous silviculture program.

***Table 15. Al-Pac Deciduous Silviculture Program***

| | | |
|---|---|---|
| 1993–2010 | Total "D" hectares harvested | 73,500 hectares |
| 1993–2010 | Declared successfully regenerated | 60,900 hectares |
| 1993–2010 | Not successfully regenerated (NSR) | 550 hectares |
| As of 2010 | Not surveyed or requiring survey | 12,100 hectares |
| | | |
| 2011–2015 | Total "D" hectares harvested | 26,500 hectares |
| 1993–2015 | Declared successfully regenerated | 65,000 hectares |
| 1993–2015 | Not successfully regenerated (NSR) | 675 hectares |
| As of 2015 | Not surveyed or requiring survey | 14,000 hectares |
| | | |
| 1993–2015 | Total "D" hectares harvested | 102,000 hectares |

***Conifer Silviculture Program***

Replacement strategies for conifer, and conifer in mixedwood sites, are dictated by site-specific ecological conditions; treatments are prescribed in the FMP's "Silviculture Matrix." Virtually all conifer cutblocks in the FMA area are mechanically site prepared and replanted with the appropriate stock type. From 2011 to 2015, Al-Pac planted approximately 6.9 million conifer seedlings within the FMA area for the 2011–2015 period (see Table 16) The conifer silviculture program declined after 2013 as the "Incidental Conifer Replacement" program was no longer required in the FMA area because the specific clause was removed by GoA from the 2011 Forest Management Agreement.

*Table 16. Al-Pac Conifer Silviculture Program*

| Year | Planted Hectares | Mechanical Site Preparation Hectares | Chemical Site Preparation Hectares | Trees Planted |
|---|---|---|---|---|
| 2011 | 1,744 | 1,257 | N/A | 1,743,395 |
| 2012 | 2,693 | 951 | N/A | 1,969,957 |
| 2013 | 1,741 | 185 | N/A | 1,755,700 |
| 2014 | 606 | 175 | N/A | 775,650 |
| 2015 | 593 | 123 | N/A | 630,915 |

***High-Effort Understorey Protection***

High-effort understorey protection is used in deciduous forest stands with coniferous understoreys of immature conifer in excess of 600 stems per hectare. Within the Al-Pac FMA area, since the completion of the AVI in 2000, approximately 200,000 hectares have been interpreted throughout 11 FMUs as having a highly variable, discontiguous, immature conifer understorey that meets the >600 criterion.

The current OGRs delineate the process for understorey protection. The OGRs remove deciduous understorey treatment (DU) polygons that are 10 hectares or less from requiring a DU treatment for operational considerations.

In the timber supply model for 10 FMUs, the SHS for the period 2011–2015 forecasted that approximately 3,500 hectares of deciduous stands could undergo high-effort understorey protection and transition to a mixedwood forest stand (CD or DC). The TSA five-year average (forecast) is ~700 hectares/year, and the TSA transition ratio for deciduous stands undergoing high-effort understorey protection, according to the forecasted future forest AVI condition, is as follows:

- 40 percent of DU regenerate as conifer-leading mixedwood stands (CD strata) with an advanced age of 40 years;
- 40 percent of DU regenerate as deciduous-leading mixedwood stands (DC strata) with an advanced age of 40 years; and
- 20 percent of DU regenerate as D(C) strata at year one.

The TSA transition is a strategic target that moves entire forest polygons from one AVI situation to another, such as from D to CD. The TSA does not account for inventory inconsistencies or errors or the splitting of forest polygons to relate to the actual hectares that were protected throughout the five years of operations. Accordingly, the forecasted spatial TSA does not relate spatially to the actual post-harvest layout of declared forest stands that underwent an understorey protection treatment, which was 2,346 hectares for the reporting period. In the 2015 FMP, Al-Pac changed the transition ratio to 15 / 15 / 70 (DC-Up / CD-Up / Aw) as an adaptive management measure that more closely resembled the actual post-harvest footprint that was being created from the DU stratum.

In the process of planning candidate understorey protection treatments from the SHS, all DU AVI polygons are confirmed by a field crew and may also undergo air photo interpretation (if 4-band digital aerial photos are available) to confirm the presence of immature conifer stems (>600 stems/hectare). This process drops stands from candidate DU treatments due to reductions (i.e., to below 600 stems/hectare) to the original AVI immature conifer stems interpretation.

A candidate understorey protection block is then provided with a detailed block plan that delineates the spatial distribution of the immature stems and how the understorey protection treatment will be executed. This plan, in all cases, nets down the original AVI polygon area due to the discontiguous immature conifer understorey and the layout of roads and landings.

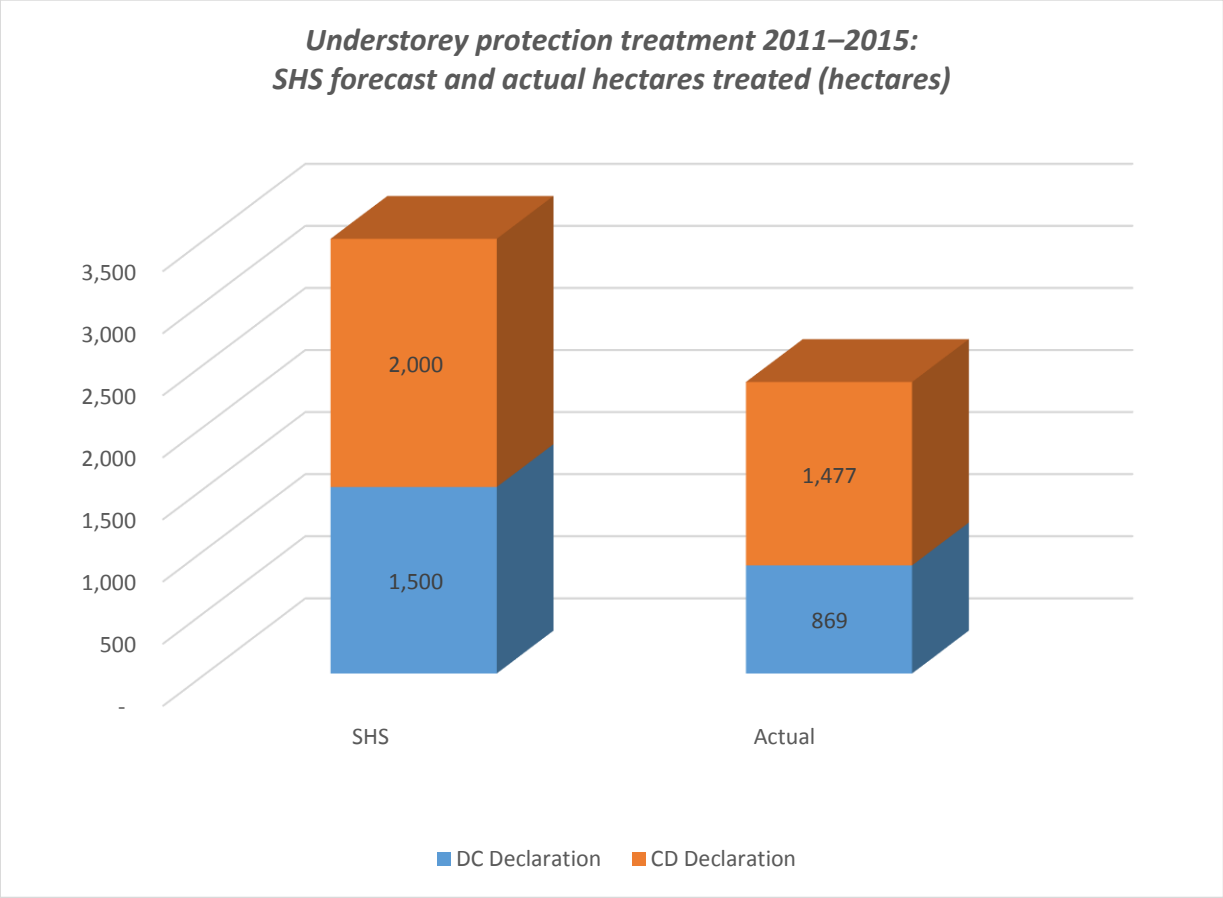
The final treated DU polygon delineation provides new AVI linework that will not correlate with the SHS forecast. The number of actual final DU hectares and subsequent treatment polygons are normally lower than the planned hectares due to operational considerations. Thus, the final treated DU area declaration has undergone a dual netdown from the original AVI (interpreted) SHS polygon.

In addition to the planning of the field-confirmed candidate DU-AVI-SHS stands, field reconnaissance frequently discovers deciduous stands with >600 stems of immature conifer that had not been identified in the original inventory. These stands then undergo high-effort understorey protection planning. Al-Pac's final post-harvest DU treatment hectares' summary is a combination of actual areas of treated DU-AVI-SHS stands and found treated DU stand areas. The TSA forecast or estimate was for ~3,500 hectares in the period.

From 2011 to 2015, approximately 67 percent of the SHS DU forecast was actualized into DU treatment areas.

Al-Pac reports the post-harvest declaration of DC understorey protection and CD understorey protection treated areas. Figure 5 illustrates the forecasted 2011–2015 SHS hectare targets and the actual DU treated areas. These treatment areas have been created from the Aw polygons where DU was founds through field recce and/or photo interpretation and the actual AVI inventoried DU polygons found to have significant understorey density (>600 stems/ha) through field reconnaissance and imagery. Al-Pac does not delineate within the silviculture declarations (DC-Up or CD-Up) whether or not the new DU treatment area was found through the original AVI or field recce.

***Figure 5. Understorey protection treatment 2011–2015 – SHS forecast and actual hectares treated***



***Understorey Avoidance***

When harvested by Al-Pac, all other deciduous "D" stands with an interpreted understorey of fewer than 600 stems per hectare transition to a one-year-old D(C) stand. Prior to harvest, the layout reconnaissance determines whether AVI stands are available for an avoidance treatment based on actual immature conifer stocking. If applicable, these stands undergo an avoidance harvest treatment in which the harvest operation's objective is to minimize damage to the immature conifer stems. Consequently, these stands can best be described as deciduous stands with an increased content of immature conifer stems, or a boreal mixedwood stand. For the 2011–2015 period, Al-Pac planned ~2,400 hectares for avoidance harvest treatments.

Al-Pac continues to meet all four strategies delineated in Objective 3 (see Table 17 below).

***Table 17. 2006 Forest Management Plan Objective 13: Utilize reforestation treatments that provide for vigorous forest regeneration to meet or exceed reforestation standards in order to achieve yield objectives as set out in the TSA – Strategy Report Card***

| FMP Page 124 | FMP Objective 13 – Strategy | Indicator | Report Card |
|---|---|---|---|
| 3.13.1 | Until Alberta Alternative Regeneration Standards (ARS) (*2019 – Regeneration Standards of Alberta, RSA*) are approved, the reforestation standard will be as described in the *Alberta Regeneration Survey Manual*. | Compliance | Complete and ongoing |
| 3.13.2 | The forest companies will move toward ARS (now called RSA) for future reforestation standards now referred to as RSA. | Approved RSA | GoA approval of new RSA |
| 3.13.3 | No reforestation or reclamation of cutblocks within MOSA (now SMA) (*2019 – Surface Mineable Area, SMA*) FMU A15. | OGR 8.0 and FMP Appendices 4 and 9 | Complete – Compliance with OGR |
| 3.14.4 | In the TSA, all post-harvest stands return to their pre-harvest yield strata (composition/density/yield). | TSA transition | Complete – TSA approved by GoA |

*Conifer silviculture – Al-Pac FMA area*

## Criterion 2: Ecosystem Productivity – Maintenance of Forest Land Base

## Implementation of merchantable timber FMA area land-base maintenance program

**2006 FMP Objective # 21** Minimize, through integration of industrial activities on the FMA area, the industrial footprint in terms of its size, intensity, distribution, and duration on the land base

**2015 FMP VOIT 19 – 2.1.2.1** Implementation of merchantable timber FMA area land-base maintenance program

In the late 1990s, as energy development began to accelerate in and near the FMA area, Al-Pac led the development of a new, cooperative strategy called integrated land management (ILM), which was intended to reduce the size and intensity or duration of the human footprint on the land base. It is based on the recognition that one sector's activities affect another sector's activities, and that the integrity of the FMA area's functioning ecosystems require user coordination on a landscape level to reduce the cumulative effects of human activity and produce economic benefits for all parties.

The keys to ILM are communication and commitment. Individual corporate strategies already involve dialogue and planning exercises with other stakeholders that are effective and meet individual corporate goals. However, ILM realizes the benefits of coordinated development and management among industrial players. As a result, many economic, societal, and ecological goals can be achieved. Accordingly, the Alberta government has now also adopted ILM as a key component and tool within its LUF.

Al-Pac has, over the past 15 years, been entering into ILM agreements with selected energy firms. The agreements may spell out one or all of the following: road use, maintenance, ownership, priority harvesting areas, data sharing, energy sector site preparation, and regulatory assistance.

Al-Pac has made its complete "up-to-date" Alberta Vegetation Inventory (AVI) data and associated imagery available to the public, academic institutions, government research organizations, the Alberta Biodiversity Monitoring Institute (ABMI), Indigenous communities, and industry (in particular the energy and utilities industries). The data are available at a fee on a township basis or as in-kind donations to academia and other projects. Since 2001, Al-Pac has distributed over data on 900 townships to industry on a fee basis in addition to complete data sets for the entire FMA area to other stakeholders. The fee-based distribution of AVI inventory data is illustrated in Figure 6 on the next page. Data sales and distribution are based on external market demand. Al-Pac does not create the market nor promote the distribution of the data and/or imagery.

Al-Pac has joined energy companies to support research at the University of Alberta (U of A) to improve the reclamation and reforestation of abandoned well sites. The company also supported research demonstrating that building exploratory wells on ice pads could greatly improve the success of later reforestation. Al-Pac strongly supports efforts to monitor and address the cumulative effects of industrial activities on the landscape through its endorsement of the U of A's ILM Research Chair.

Al-Pac has throughout this FMP 10-year period had an Integrated Land Services (ILS) team that promotes and actualizes an integrated landscape management (ILM) approach. This approach attempts to minimize the total industrial footprint on the landscape of the FMA area and enhance the utilization of merchantable timber harvested by the energy and utilities sectors.

The Al-Pac ILS team is involved in the following areas:

1. Efficient fibre delivery from energy and utility companies' industrial salvage
2. Integration of forestry and energy development plans – ILM planning
3. Road construction, maintenance, and ownership synergies
4. Reclamation research and development
5. Reclamation practices
6. Data sharing (see Figure 6)

The team's activities have significantly influenced Al-Pac's forest management and road construction options. Examples include the increased productivity and shared costs of roads by having multiple operators and enhanced design options to prevent silt and dirt from entering waterways.

One of the key roles of ILM is to enhance the yearly amount of industrial salvage fibre delivered to mills through ILM planning and the purchase of industrial fibre from energy and utility companies. Industrial fibre is purchased from energy and utility companies as a result of their exploration and infrastructure development activities that clear forested lands throughout the FMA area. Figures 7 and 8 illustrate these two methods of acquiring fibre from the FMA area. Both charts illustrate five years of activity, from 2011 to 2015. This fibre flow results in less fibre being accessed through regular FMA area planning through the *General Development Plan* (GDP) and forest harvest plans (FHPs). The downward trend of all three charts mirrors the decline in energy and utility sector activity over the last several years.

***Figure 6: Number of clients and number of townships distributed, 2001–2015 (Source: Al-Pac Woodlands)***

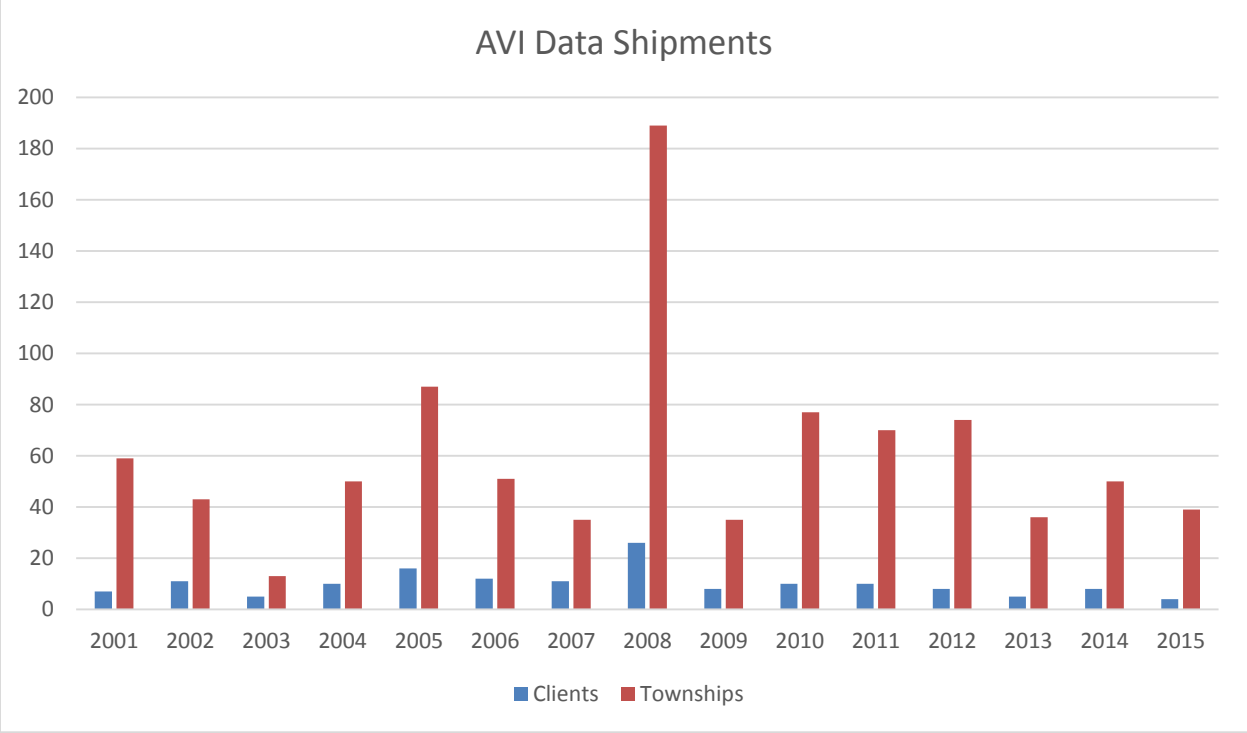


*Figure 7. Integrated Land Services – Integrated landscape management volumes ($m^3$) (Source: Al-Pac Woodlands)*

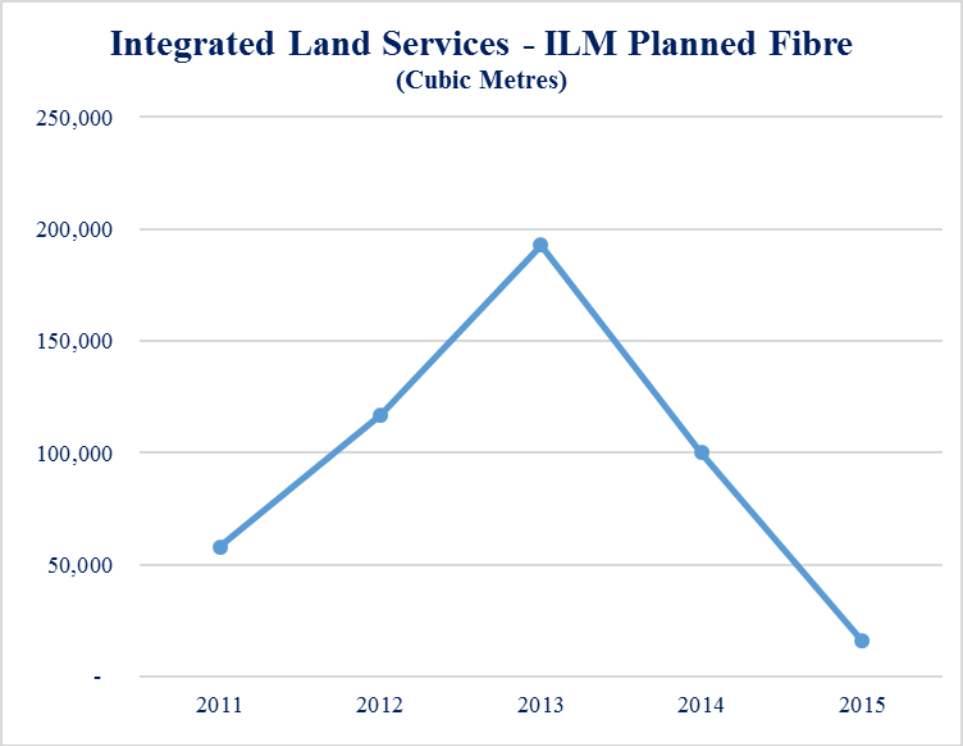
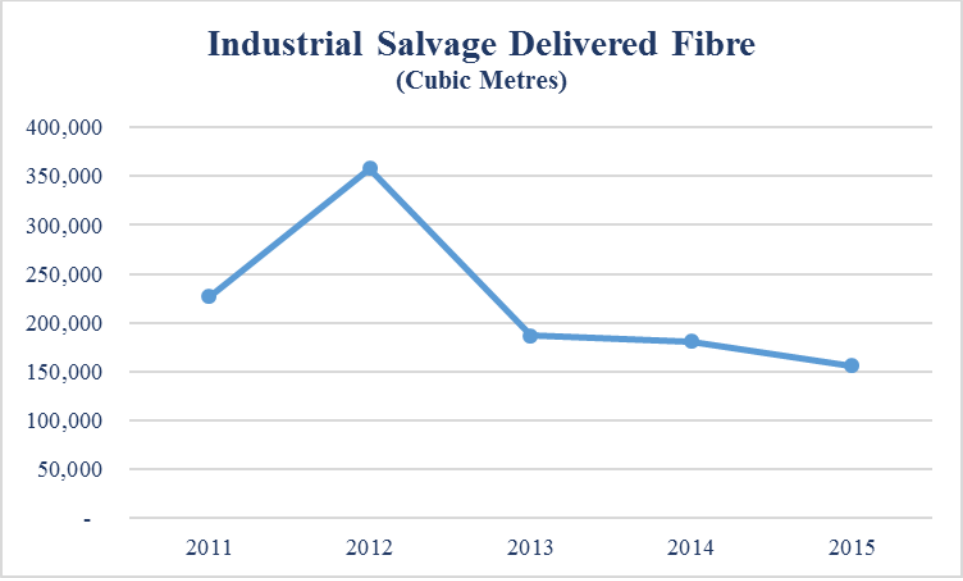



*Figure 8. Industrial salvage volumes ($m^3$) (Source: Al-Pac Woodlands)*



Al-Pac continues to meet all six strategies delineated in Objective 21 (see Table 18 below).

***Table 18. 2006 Forest Management Plan Objective 21: Minimize, through integration of industrial activities on the FMA area, the industrial footprint in terms of its size, intensity, distribution, and duration on the land base – Strategy Report Card***

| FMP Page 143 | Strategy | Indicator | Report Card |
|---|---|---|---|
| 3.21.1 | Apply the ILM philosophy to the entire FMA area. | Number of ILM plans | Ongoing |
| 3.21.2 | Utilize dynamic landscape models to assist in the identification of priority opportunities and the assessment of the impacts of integration and non-integration. | ALCES™ model | Complete |
| 3.21.3 | From the model, examine potential energy sector land base scenarios in the TSA model to examine potential long-term sustainability. | ALCES™ model | Complete |
| 3.21.4 | At the AOP level, continue to identify and implement operational inter- and intra-industry integration opportunities | Number of ILM plans | Ongoing |
| 3.21.5 | Support the ILM Research Chair position at the U of A. | Dollar value | Complete |
| 3.21.6 | Continue to comply and support development of ILM plans for northeastern Alberta. | RAC* involvement | Complete – (Draft) LARP† |

Changes in ILM objectives and strategies began during this period, with less new energy and utility development, mutual economic benefit, and more emphasis on woodland caribou planning, seismic reclamation, and the eventual reclamation of well sites and facilities as they were abandoned.

Al-Pac and utility companies initiated participation in collaborative projects in Alberta to restore areas of existing industrial disturbance within the FMA area to functioning forest ecosystems. Existing industrial disturbance includes primarily linear features (seismic lines) associated with energy sector exploration activities as well as other features including well pads.

For seismic line restoration, to assist in caribou habitat management, a combination of treatments was implemented to re-establish vegetation, provide microsites for seedling establishment, and minimize human access. This was done through planting trees on linear features to re-establish vegetation similar to a natural forest trajectory and placing coarse woody debris (CWD) (downed live trees) to create physical barriers to minimize human access while the vegetation is established or to provide microsites to enhance natural recovery. Most of the areas treated had limited all-weather access, so activities were completed using a helicopter to access treatment sites for both the planting and coarse woody debris placement phases.

Tree planting focused on supplementing forest tree regeneration using jack pine, black spruce, or white spruce species on linear disturbances. Coarse woody debris placement was the restoration treatment applied over plantable sites to reduce human access to these features while the vegetation is regenerating.

* RAC – Regional Advisory Council – coordinated by GoA to assist in land-use planning. Al-Pac had one member on the LARP RAC team.
† LARP – Lower Athabasca Regional Plan – part of the Alberta Land-use Framework (LUF).

## Criterion 2: Ecosystem Productivity – Maintenance of Forest Land Base

## Forest health

| | |
|---|---|
| **2006 FMP Objective # 4** | Support GoA in its strategies to minimize losses from epidemics of forest insects, diseases, infestations of restricted and noxious weeds, and large catastrophic fires on the FMA area |
| **2015 FMP VOIT 22 2.1.2.2** | Recognize lands affected by insects, disease, or natural calamities |

***Forest Health***

"Forest health" is a term used to describe the condition of a forest and how well it is able to meet management objectives. A healthy forest is able to sustain itself ecologically while providing for the economic, social, recreational, and spiritual needs and values of society. From a forestry perspective, management objectives focus on the health of the trees. GoA and the forest industry are jointly responsible for protecting Alberta's forests from pests.

Insects and diseases are natural processes within the forest ecosystem and seldom require intervention by the forest companies. It is recognized that both insects and diseases are natural processes inherent in forest ecosystems and forest succession. The forest companies participate in the Northeast Regional Integrated Pest Management Working Group, which is a joint government-industry group that aims to develop policy and action plans for provincial and regional insect and disease management. The forest companies continue to support the management programs agreed to through this process to adhere to the Alberta Forest Health Strategy.

Some forest company woodlands staff and contractors are trained to carry out insect and disease reconnaissance surveys in conjunction with forest inventory (AVI) and planning fieldwork. When found, FMA area pest-damage concerns are documented on a standard form and reported to GoA regional headquarters. Additionally, when infestations affect large areas of productive forested land, each occurrence is evaluated on an individual basis to ascertain the current and future risk to growing stock. If control, salvage, and/or sanitation harvests are deemed necessary, cooperative harvest strategies addressing volume, location, and timing are developed for affected blocks. These blocks are then noted for inclusion in the spatial TSA.

Two insect pests have been identified as potential risks to the FMA area conifer forest: mountain pine beetle and spruce budworm. Additionally, tent caterpillar, a major pest of deciduous trees, is monitored through a cooperative research program with the U of A.

*Mountain pine beetle (MPB) and spruce budworm*

***Identify Outbreaks of Insects, Disease, and Weeds***

In FMUs S18, L3, and A14, quota holders identified spruce budworm as a threat to long-term white spruce health. Spruce budworm (*Choristoneura fumiferana*) is a common and severe forest defoliator within the forests of Alberta. It usually feeds on mature conifer trees, including white and black spruce and balsam fir. Depending on the time of year, this insect may be found as an adult moth or a larval caterpillar. Spruce budworm caterpillars damage trees by feeding on the buds, flowers, and young needles. Budworm feeding does not kill trees immediately, but it can do so over time. A temporary, large-scale budworm outbreak or epidemic population can reduce tree growth and vigour. It can also make the trees more vulnerable to other pests, such as spruce beetle. Four to five consecutive years of severe damage, such as over 70 percent defoliation of new shoots, results in the death of tree tops. If defoliation continues for another couple of years, it may kill trees.

To date, field assessments in the associated FMUs have determined whether integrated spruce budworm management programs are necessary. Management programs include aerial and ground surveys and, if necessary, control of the budworm through eradication of the spruce. If directed by GoA, the forest companies will target budworm-affected stands in the next SHS.

Further information on forest pests can be found at
https://www.alberta.ca/forest-pests-and-damage-agents.aspx#toc-2

Dwarf mistletoe has been identified by GoA as a threat to pine health in the FMA area. Pine dwarf mistletoe (*Arceuthobium americanum*) is a parasitic flowering plant that affects living pine trees. The plant depends on the host tree for nutrients, interrupts the normal growth and function of the host tree branches or stem, and deforms the tree by causing it to form clusters of tangled branches that look like witches' brooms. This reduces tree growth and can eventually cause the tree to die. Branch swellings can physically affect the quality of the wood and, when dwarf mistletoe is severe, trees lose vigour, have reduced growth, and may eventually die. Dwarf mistletoe can cause significant tree mortality in jack pine stands and affect the aesthetic, recreational, and economic values of our forests. Although the brooms are sometimes used by birds as nesting sites, very large brooms may break off, causing hazardous conditions in campground and recreation areas. This parasite can spread and cause large-scale tree death.

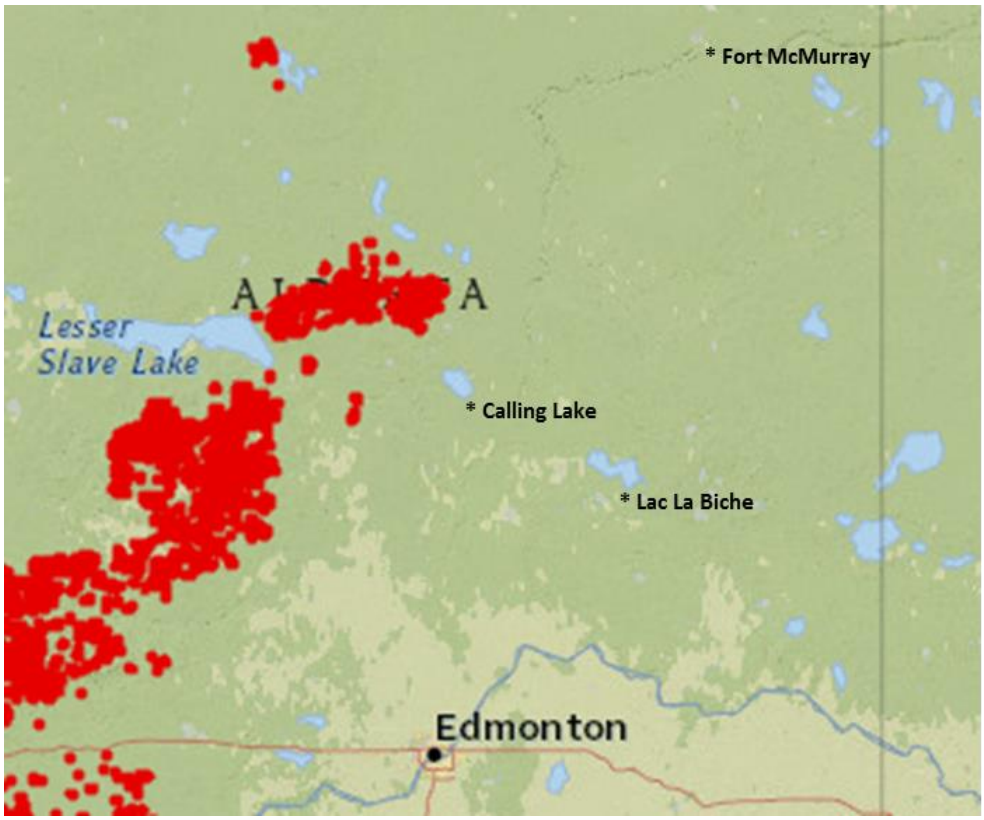
Within the reporting period, the forest companies did not undertake any remedial harvesting programs due to dwarf mistletoe.

*Dwarf mistletoe*

Mountain pine beetle *(Dendroctonus ponderosae*) has been identified and located in pine stands in the western part of the FMA area. Figure 9 illustrates the MPB 2016 occurrence based on GoA aerial survey results in the FMA area.

GoA has been developing strategies to deal with this pest. GoA's plans can be seen at https://www.alberta.ca/mountain-pine-beetle-in-alberta.aspx

***Figure 9. 2016 GoA aerial survey MPB sites in NE Alberta***




***Fire Prevention and Management***

Al-Pac's role in fire management remains primarily preventative, including cooperation with the GoA FireSmart program. Pre-suppression and suppression responsibilities are supported by Al-Pac through an annual "Holding and Protection Charge." The forest company's role is limited to those areas defined in the *Forest and Prairie Protection Act* and regulations, Al-Pac's Forest Management Agreement, and the Fire Control Agreement.

Al-Pac's main goal with respect to fire management is to support GoA efforts to limit the area lost to fire. Additionally, the forest companies may also assist Alberta Wildfire in their FireSmart initiatives throughout the FMA area. Al-Pac has supported FireSmart community initiatives.

The aim of wildfire management is to balance the ecological role of fire while protecting human life, communities, watersheds and sensitive soils, natural resources, and infrastructure. The intention of the Alberta FireSmart program is to integrate fire, forest management, land management, and community protection planning through a broad risk and resource management approach.

The goal of FireSmart forest management planning is to create a landscape in which catastrophic fire is minimized. This is accomplished through a combination of:

- Reducing the fire behaviour potential;
- Reducing the exposure of values at risk to fire;
- Targeting harvest to locations with problematic forest fuel types;
- The consideration of species conversion reduced stand stocking densities and reduced coarse woody debris retention in locations harvested near communities; and
- Ensuring linkages to Forest Area Specific Wildfire Management Planning and other Fire Smart strategies such as community wildfire mitigation strategies.

FireSmart plans have been jointly prepared by communities, GoA, and Al-Pac to create firebreaks around embedded communities within and near the FMA. Although these projects do not guarantee that a community will be safe in the event of fire, it does give emergency services points of attack where the fire behaviour will be more predictable and potentially slow fire progression, allowing for more effective control action.

Al-Pac participated on provincial teams to establish and complete the FireSmart program throughout the FMA area over the past 10 years.

GoA provides complete information on the FireSmart program at
http://www.srd.alberta.ca/Wildfire/FireSmart/Default.aspx

The forest companies play an active role in fire prevention in the region by publicly promoting fire awareness, prevention, detection, and staff training . Woodlands staff and contractors are kept aware of the importance of fire precautions during all active operations and are informed of current fire hazard conditions. Al-Pac has a Fire Control Agreement with the Province of Alberta. Pursuant to this agreement and to Paragraph 23(1) of the *Forest0 and Prairie Protection Act* (1986), fire control plans are prepared and submitted yearly in March, prior to fire season.

A fire control plan that outlines company activities and preparations related to fire prevention, detection, and reporting and suppression activities in support of the GoA Wildfire Management Branch. Training activities are identified and included in the fire control plan along with detailed emergency contact information. The Al-Pac fire control plan is available upon request.

Figure 10 illustrates the Al-Pac FMA area's wildfire history up to 2018 .

*FMA area burned forest*

***Figure 10. Wildfire history up to 2018 on the Al-Pac FMA area (see the following page for the map legend)***

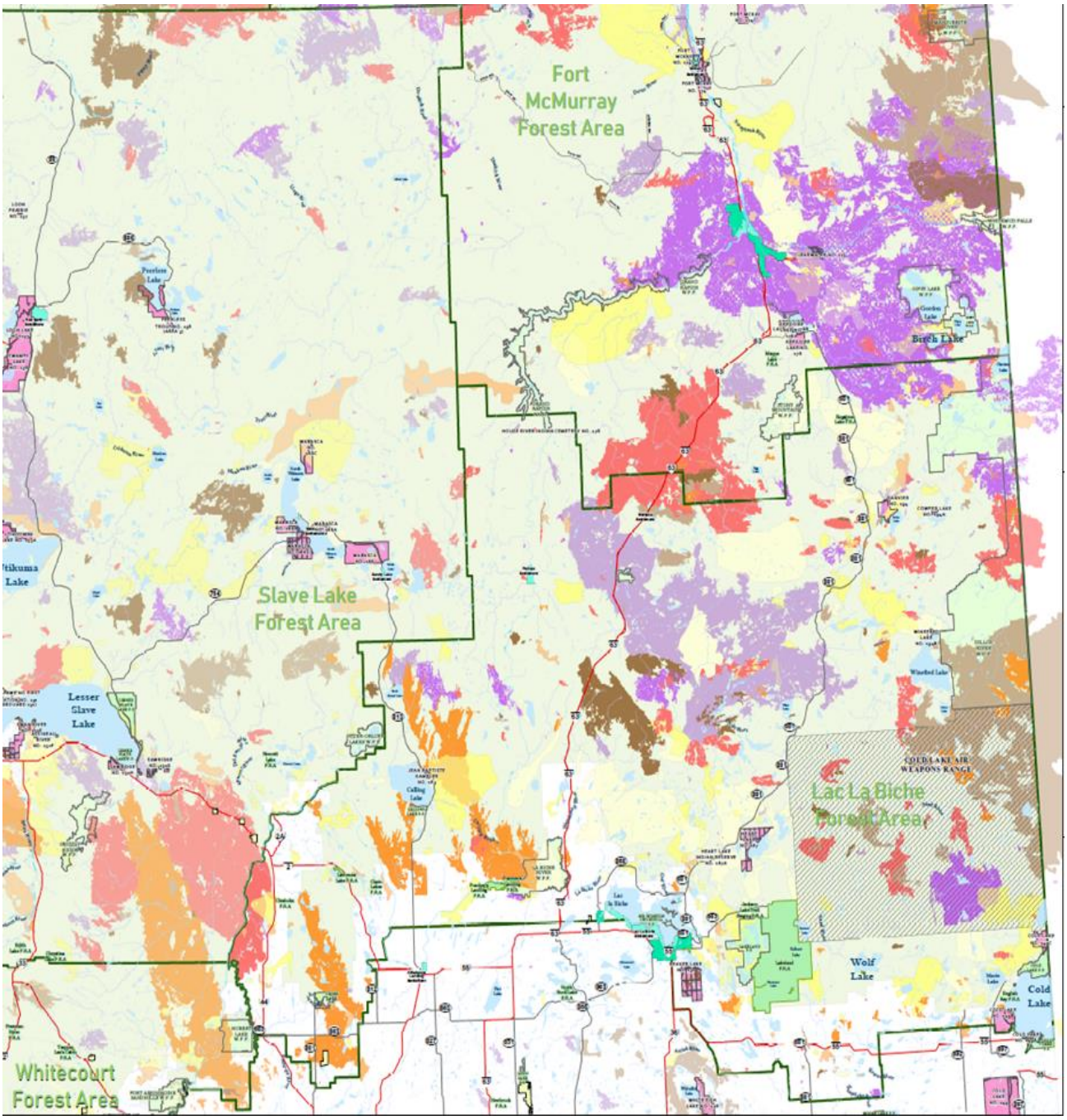


***Figure 10 (cont). Map legend***

Al-Pac continues to meet all eleven strategies delineated in Objective 4 (see Table 19 below).

***Table 19. 2006 Forest Management Plan Objective 4: Support GoA in its strategies to minimize losses from epidemics of forest insects, diseases, infestations of restricted and noxious weeds, and large catastrophic fires on the FMA area – Strategy Report Card***

| FMP Page 85 | Strategy | Indicator | Report Card |
|---|---|---|---|
| 3.4.1 | Adhere to the "Alberta Forest Health Strategy and the Shared Roles and Responsibilities between GoA and the Forest Industry" document.* | Compliance | Complete |
| 3.4.2 | Identify outbreaks of insects, disease, and weeds to GoA. | Number of outbreaks | Complete |
| 3.4.3 | Continue to train the forest companies' personnel in pest identification. | Trained personnel | Complete |
| 3.4.4 | Cooperate in the Northeast Boreal Co-operative Weed Management Committee. | Meetings attended | Complete |
| 3.4.5 | Cooperate in the Northeast Boreal Integrated Pest Management Working Group. | Meetings attended | Complete |
| 3.4.6 | Cooperate with Alberta Forest Protection's FireSmart program. | Number of FireSmart programs | Complete |
| 3.4.7 | Promote public awareness of fire through prevention and detection discussions during tours, on signs, and in advertisements. | Promotional vehicles | Complete |
| 3.4.8 | Ensure continued awareness by staff and contractors of fire conditions and the importance of fire precautions during operations. | Awareness program | Complete |
| 3.4.9 | Provide Woodlands personnel and contractors with adequate training to initiate action on newly discovered fires and to assist with the suppression of fires during emergencies on the FMA area. | Trained staff | Complete |
| 3.4.10 | Experienced personnel will obtain "Industry Dozer Boss" (or equivalent) level training through courses provided by GoA. | Trained staff | Complete |
| 3.4.11 | Provide firefighting personnel and equipment as outlined in the Fire Control Agreement and annual plans. During fire season, equipment caches will be located near operating crews and forest companies; contractor vehicles will carry firefighting equipment as identified in Section 5 of the Forest and Prairie Protection Regulations 135/72. | Equipment caches | Complete |

* This document may be found at http://www.GoA.alberta.ca/LandsForests/ForestHealth/Default.aspx

## Criterion 2: Ecosystem Productivity – Maintenance of Forest Land Base

## Control invasive species – Noxious weed program

**2006 FMP Objective # 4** Support GoA in its strategies to minimize losses from epidemics of forest insects, diseases, infestations of restricted and **noxious weeds**, and large, catastrophic fires on the FMA area

**2015 FMP VOIT 23 – 2.1.3.1** Control non-native plant species (weeds)

Alberta's *Weed Control Act* exists to enforce the control of weeds in order to protect landowners and the environment. Weeds are designated into one of three categories:

- Restricted
- Noxious
- Nuisance

The forest companies can only control weeds within areas where they operate—cutblocks and access. To date, the companies have efficiently combated the spread of weeds as they have been reported on cutblocks and access. Controlling the spread of weeds throughout the FMA area is an impossible task for the forest companies except in cutblocks and forest company dispositions. Crown land (cutblocks and forest company access roads) are accessible to all Albertans, and the control of seed sources and spread through third parties is truly unmanageable without a huge increase in GoA enforcement.

The plants in Table 20 below may or may not be found in the FMA area.

***Table 20. Prohibited and noxious weeds in Alberta (Source: Alberta Invasive Species Council (AISC) – Factsheet)***

| | | | |
|---|---|---|---|
| Autumn olive | Dalmatian toadflax | Hoary cress | Scentless chamomile |
| Baby's breath | Dame's rocket | Hound's tongue | Skeltonweed |
| Bindweed | Diffuse knapweed | Iris | Sow-thistle |
| Black henbane | Dodder | Knapweed | Spotted knapweed |
| Bladder campion | Downy brome | Knawel | Spreading dogbane |
| Blueweed | Dyer's woad | Leafy spurge | St. John's wort |
| Blueweed | Eurasian water milfoil | Medusahead | Starthistle |
| Brome | Field bindweed | Nutsedge | Stork's bill |
| Burdock | Field scabious | Ox-eye daisy | Sulphur cinquefoil |
| Canada thistle | Flowering rush | Pepper-grass | Tall buttercup |
| Cleavers | Garlic mustard | Perennial sow-thistle | Tansy ragwort |
| Common barberry | Giant hogweed | Persian darnel | Thistle (multiple species) |
| Common buckthorn | Giant knotweed | Puncturevine | Toadflax (common yellow) |
| Common crupina | Goatgrass | Purple loosestrife | White cockle |
| Common mullein | Hawkweed | Red bartsia | Woolly burdock |
| Common tansy | Himalayan balsam | Salt cedar | Yellow clematis |
| Creeping bellflower | Hoary alyssum | Saltlover | Yellow star-thistle |
| Cypress spurge | | | |

### *LAG Commentary*

The forest companies can only control weeds within areas where they operate—cutblocks and access. To date, the companies have efficiently combated the spread of weeds as they have been reported on cutblocks and access. Controlling the spread of weeds throughout the FMA area is an impossible task for the companies except in cutblocks and forest company dispositions. The Crown land (cutblocks and forest company access roads) are accessible to all Albertans and control of seed sources and spread through third-parties is truly unmanageable without a huge increase in enforcement.

Some LAG members are concerned about the ecological and health impact of herbicides used in weed control. The LAG is aware that the herbicides used by the forest companies are provincially regulated and applied by certified contractors. Table 21 illustrates Strategy 3.4.2, which is complete for Al-Pac. The other 10 Objective 4 strategies are articulated in the previous VOIT section.

***Table 21. 2006 Forest Management Plan Objective 4 Strategy 3.4.2: Support GoA in its strategies to minimize losses from epidemics of forest insects, diseases, infestations of restricted and noxious weeds, and large catastrophic fires on the FMA area – Strategy Report Card***

| FMP Page 85 | Strategy | Indicator | Report Card |
|---|---|---|---|
| 3.4.2 | Identify outbreaks of insects, disease, and weeds to GoA. | Number of outbreaks | Complete |

*Scentless chamomile*

## Criterion 3: Soil and Water Resources

## Conserve soil resources by maintaining soil quality and quantity

| | |
|---|---|
| **2006 FMP Objective # 7** | Utilize soils research in the FMA area to minimize in-block road and harvest equipment impacts to ensure vigorous post-harvest regeneration |
| **2015 FMP VOIT 24 – 3.1.1.1** | Minimize impact of roading and bared areas in forest operations |
| **2015 FMP VOIT 25 – 3.1.1.2** | Minimize incidence of soil erosion and slumping |

Soil productivity is critical to the successful regeneration of harvest cutblocks. Minimizing the damage to soils is of great concern to the forest companies such that their actions do not impair soil productivity and/or cause soil compaction. Additionally, soil productivity is the capacity of a soil to provide for growth. Bared soil is any soil where the organic layers and vegetation have been removed. Soil disturbance includes bared landing areas, temporary roads, displaced soils, or ruts. Soil erosion is defined as the wearing away of topsoil. Topsoil is the top layer of soil and is the most fertile because it contains the most organic, nutrient-rich materials.

A slump (or slumping) is a mass movement process of slope failure in which a mass of rock or unconsolidated material drops along a concave slip surface. The term "slump" is also used to refer to the material that breaks off in a slumping slide. Slumps are sometimes caused by harvesting on unstable soils, and the sagging and rotational movement of the mass of soil and rock is due in part to water infiltration and the lubrication of clay-rich soils below.

Minimizing soil displacement (erosion/slumping), compaction, and rutting/puddling during road construction, harvesting, and silvicultural operations is a primary concern. Soils are most at risk of compaction and rutting/puddling when the soil is moist or wet, with the more poorly drained soils remaining wetter longer. The majority of the forest companies' harvesting activities occur when the ground is frozen, so soil damage is usually not an issue. However, about 25 percent of Al-Pac's harvest takes place during frost-free months and, as such, the companies have soil guidelines in the OGRs.

Protection of soil is best achieved through choice of equipment, staff training, and advanced planning of operations. Management of field operations should involve operating on soils when they are as dry as possible. The weather and percentage of sensitive areas in the harvest area should be taken into account when scheduling areas for harvesting.

The forest companies recognize that the regeneration of in-block roads and landings is the greatest challenge for the silviculturalist, particularly when harvesting occurs in the frost-free period. These areas are most likely to become the NSR areas within a cutblock and/or planning unit. It is recognized that NSR is due to a number of related factors, including harvest practices, site, soil, seasons, and biological constraints.

The FMA area OGRs are updated biannually to deal with emerging issues. Section 9.0 of the current OGRs deals with soils. A copy of the OGRs is available at
https://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/formain15749/$FILE/ne-ab-ogr-final-oct-18.pdf

In addition to the OGRs, Al-Pac's silviculture program has investigated practices for reducing NSR caused by roads and landings that impair soil processes. The improved handling of topsoil is the primary objective of new best practices to ensure that the mineral soil component is available for subsequent tree regeneration. The following are some resulting guiding principles and specific best management practices:[*]

[*] McNabb, D.H. 2009. *Practices for Reducing NSR Caused by Harvesting and Roads.* Forest Soil Science Ltd., Edmonton, AB.

- Minimize road length in a cutblock;
- Store topsoil in compact piles adjacent to road or at the edge of the harvest block;
- Construct road after the logs have been decked;
- Avoid having skidders push mineral soil;
- Create high decks with the logs;
- Pile slash with rakes;
- Pile slash immediately after decks are hauled;
- Reclaim roads with a silvicultural objective in mind; and
- Utilize site preparation techniques for road reclamation that should stimulate hardwood suckering.

For the reporting period, Al-Pac did not have any violations of the OGRs with respect to soils. All three indicators are complete (see Table 22 below).

***Table 22. 2006 Forest Management Plan Objective 7: To utilize soils research in the FMA area to minimize in-block road and harvest equipment impacts to ensure vigorous post-harvest regeneration – Strategy Report Card***

| FMP Page 92 | Strategy | Indicator | Report Card |
|---|---|---|---|
| 3.7.1 | Utilize the existing soil guidelines outlined in the 2000 OGRs until a new system is developed. | OGR 9.0 – 9.0 | Complete |
| 3.7.2 | In cooperation with GoA, and after the new OGRs are approved by GoA, develop a slash hazard protocol for the FMA area. | OGR 7.3 – 7.3 | Complete |
| 3.7.3 | Develop a monitoring and reporting program to quantify productive forest land-base losses due to roads, landings, and decking areas (refer to Appendix 8 of the FMP). | Specific monitoring of roads and landings is now incorporated into the Regeneration Standards of Alberta (RSA) | Complete |

*Harvest operations slash on an Al-Pac access road*

# Criterion 3: Soil and Water Resources

## Water quality

**2006 FMP Objective # 9** Operate under the approved OGRs
**2015 FMP VOIT 27 – 3.2.2.1** Minimize impact of operations in riparian areas

The Northeast Alberta Operating Ground Rules (OGRs) direct the forest companies with respect to watershed protection, including all river and stream crossings (refer to the OGRs). One OGR addresses fisheries and the aquatic environment. All relevant provincial and federal legislation is followed to meet the minimum requirements of the legislation. Al-Pac primarily monitors culverts and bridges for all its water crossings in the FMA area (see VOIT 13). In March 2015, the GoA issued a new *Roadway Watercourse Crossings Remediation Directive*. The intent of this GoA directive is to:

- Uphold Alberta Environment and Sustainable Resource Development (ESRD) and the Alberta Energy Regulator's (AER) regulatory mandate
- Protect or restore fisheries habitat through effective stream crossing practices
- Promote and support a watershed-based approach to effective, collaborative watercourse crossing inspection, monitoring, management, and remediation

This directive outlines a new regulatory strategy to identify and commence remedial watercourse crossing work to provide fish passage and regulatory compliance in priority order and with clear consideration of watershed conservation and management goals.

The Northeast Alberta OGRs are designed to manage the implications of timber operations on water quality, quantity, and flow regime, by:

- Minimizing the potential for sedimentation in watercourses;
- Preventing soil, logging debris and deleterious substances from entering watercourses;
- Maintaining aquatic and terrestrial habitat; and
- Complying with the relevant legislation.

Riparian areas adjacent to watercourses and water source areas perform a number of ecological functions. Riparian areas help to regulate stream flows (storage and release of surface and groundwater), reduce sheet, rill, and gully erosion, and moderate stream temperature. Functional riparian areas provide bank stability, debris for creating aquatic habitats, and a source of food and nutrients for aquatic organisms. Riparian areas also provide habitats that support a high diversity of wildlife species and other terrestrial biota, and provide corridors that can link different landscape and habitat features.

Al-Pac operated in compliance with the riparian OGRs throughout the 2011–2015 period.

## Criterion 5: Multiple Benefits to Society

## Risk to communities and landscape values from wildfire is low

**2006 FMP Objective N/A**

**2015 FMP VOIT 31 – 5.2.1.1a** To reduce wildfire threat potential by reducing fire behaviour, fire occurance, threats to values at risk, and enhancing fire suppression capability

**2015 FMP VOIT 33 – 5.2.1.1b** To reduce wildfire threat potentially by reducing fire behaviour, fire occurance, threats to values at risk, and enhancing fire suppression capability

**Indicators:**

- Percentage reduction in Fire Behaviour Potential and hectares burned within the FireSmart Commnity Zone by the percent determined through GoA's analysis of the FMP's final spatial harvest sequence (SHS)
- Wildfire Threat Assessment model – completed by GoA in 2016 (Appendix in the 2015 FMP)

FireSmart seeks to mitigate large, high-intensity, high-severity wildfires and incorporate natural disturbance emulation. Designing FireSmart by integrating fire, forest, and land management planning activities is the cornerstone of protecting a multitude of values, achieving safety, meeting planning objectives, and ultimately attaining sustainable forest management. FireSmart also identifies opportunities to use prescribed burning as a natural disturbance management strategy to meet ecological objectives through ecological restoration. FireSmart is a building block of all elements of wildfire prevention (engineering, education, enforcement).

Most of the major communities within the FMA area have embarked upon and completed a FireSmart program. These programs are managed by the Government of Alberta, and components of the program have been enacted by the forest companies. FireSmart is a program that should be incorporated into future Alberta Land-use Framework plans.

Wildfire modelling and suppression capability are the purview of the Government of Alberta. GoA has prepared landscape modelling (Landscape Wildfire Threat Assessment) that is designed to assist in the reduction of the area (ha) in the extreme and high Fire Behaviour Potential rating categories across the FMA area.

The GoA Wildfire Threat Assessments include:

- Fire behaviour potential;
- Fire occurrence risk;
- Suppression capability; and
- Values at risk.

In association with the assessments, the provincial priorities in fire suppression are as follows:

- Human life (e.g., occupied industrial plant sites, construction camps, commercial lodges, campgrounds, including private and municipal);
- Communities (e.g., cities, towns, villages, hamlets, subdivisions within Indian reserves (IR), subdivisions within Métis lands);

- Watersheds and soils (e.g., critical fish habitat, areas of possible erosion and siltation, sensitive soils, critical basins for water production);
- Natural resources (e.g., terrestrial and aquatic vegetation, wildlife, fisheries, insects and disease, threatened/rare/endangered species, critical age classes, research plots and enhanced treatments, recreation and tourism, protected areas/significant features, visual quality, historical/cultural areas, range opportunities, wood product opportunities, hydrocarbon and in-situ resource opportunities); and
- Infrastructure (e.g., major roads, major transmission lines, major railways, major telecom sites, major navigational sites, main public travel corridors, buildings).

Al-Pac continued to assist GoA in their Firesmart and wildfire suppression activities in the FMA area throughout the 2011–2015 period. The GoA stewardship reporting requirements refer to model developments subsequent to this reporting period.

*Horse River Fire – Fort McMurray, Alberta*

## Criterion 5: Multiple Benefits to Society

## Provide opportunities to derive benefits and participate in use and management

**2006 FMP Objective # 19**
**2015 FMP VOIT 33 – 5.2.2.1** Integrate other users and timber management activities
**2015 FMP VOIT 34 – 5.2.3.1** Maintain the long-run sustained yield (LRSY) average

Northeastern Alberta is dominated economically by the oil and gas industry. Oil sands development is concentrated on the east side of the Athabasca River, and conventional oil and gas on the west side. Even with recent decreases in oil prices and energy sector activity, the economic impact of northeastern Alberta's energy sector is significant. The forest sector in northeastern Alberta has had an economic impact of about 3 percent of that of the energy sector.

The energy sector includes oil sands mining, in-situ oil sands, conventional oil and gas, related facilities, camps, pipelines, power plants, power lines, waste disposal, residential development, and infrastructure such as highways. The sector's regional presence has grown at an accelerating rate since 1996, possibly reaching a peak in 2008. Energy sector growth has necessitated significant changes in Al-Pac's operations and forest management. On one hand, salvage from land cleared for the energy sector has provided a large supply of wood to the mill at relatively low cost. However, loss of forest land to the energy sector reduces the company's ability to manage affected areas of the forest ecologically, as well as provide sustainable, renewable wood supply for the mill over the long term. Al-Pac has reduced these impacts to some extent by working cooperatively with energy companies in a process known as integrated land management (ILM).

Since 2008, land and resource use decision-making in Alberta occurs within the Land-use Framework and the *Land Stewardship Act*.

Al-Pac has prepared three social and economic reports: a general Al-Pac company report in 2007, a socio-economic assessment directed at woodlands activities in 2008, and an updated vignette in 2018. These reports provide a number of criteria and indicators for Al-Pac and are available upon request from Al-Pac.

Al-Pac makes substantial contributions to social and economic well-being within an approximately 100-kilometre radius of the mill. This is where most team members and contractors live, where most goods and services are purchased, and where company contributions and volunteerism are concentrated. The other forest companies have smaller, though significant, socio-economic impacts in the local areas where they are active.

Elsewhere in the FMA area, forest operations and transportation have some socio-economic effects, but they are difficult to discern because the energy sector is larger than forestry in northeastern Alberta, whether measured by employment, investment, or revenues. Al-Pac research indicates that the level of energy sector activity is the dominant socio-economic indicator in the FMA area. Other sectors such as minerals, forestry, agriculture, tourism, and service providers also contribute to the economic vitality and prosperity of the region.

The goal of socio-economic reporting is to identify social and economic criteria and indicators that Al-Pac can use to monitor its impact on local communities. The analysis does not specifically consider the influence each indicator may have on forest management planning. Of these original indicators that were selected, six categories of indicators have been identified as having some influence on forest management planning:

1. Community meetings;
2. Research dollars;
3. Research organizations;
4. Energy industry activity in northeastern Alberta;
5. Al-Pac's Integrated Land Services Planning team; and
6. Availability of forest inventory information.

The forest companies, when approached, will work with recognized recreational groups to facilitate economically feasible recreational opportunities. Al-Pac's staff makes significant efforts to consult with a range of community interests within the FMA area. Al-Pac consults directly with communities and stakeholders regarding its annual operating plans (AOPs), meets regularly with stakeholders in the LAG, and participates in local, regional, and provincial planning initiatives.

During the reporting period, Al-Pac received numerous requests from recognized recreational groups to facilitate opportunities for their organization. Not all requests were granted by Al-Pac's Public Affairs team. The GoA, as owner of the land and forest resource and as the regulator, plays a decisive role in establishing the parameters for forest planning and operations. Al-Pac's sustainable forest management FSC certification recognizes the company's community and Indigenous commitments and consultation, as well as environmental performance.

During the reporting period, Al-Pac did not receive any direct requests from recreational user groups and commercial tourism operations to coordinate planning to assist with recreational opportunities. Requests generally come from individuals at planning meetings and are usually related to either providing or eliminating access.

The OGRs are designed to deal with visual aspects of forest management. Where there are high tourism values and identified wilderness values, harvesting may be carried out in a manner that maintains visual quality.

The LARP indicates that tourism in the lower Athabasca region is primarily based on the many natural attractions within the area, including lakes, rivers, forests, and natural areas. These natural attractions provide a range of guided and unguided tourism activities, including hunting, fishing, ecotourism, and other adventure-based activities. Growing demand for quality lake-based recreation provides opportunities for the region to further develop its tourism potential and diversify its economic base.

Hunting and fishing are recognized as the principal recreational activities on the FMA area. All-terrain vehicles and snowmobiles are used for recreation in many areas. Lakes and river valleys offer some opportunities for canoeing and boating. Recreational opportunities are regionally specific within the northern boreal forest. For example, the Lakeland County area is a provincially unique area of high-quality lakes, including 70 percent of Alberta's Class 1 recreational shoreline, as well as water-based, historic, archaeological, and cultural features of regional and provincial significance. Portions of this area are within Al-Pac's FMA area.

Provincial parks throughout the lower Athabasca region cover approximately 7 percent of the land base and contribute to both biodiversity and tourism-designated areas These designated areas play an important role in protecting natural diversity and intact habitat for supporting biodiversity, in addition to ensuring a wide range of recreation opportunities and tourism experiences.

Al-Pac does not log in the major river valleys, and most lakes with recreational potential or commercial tourism facilities are outside the FMA area. Few features are considered to have high visual quality and, to date, no concerns have been raised about the visual impacts as a result of harvest activities.

In accordance with the approved OGRs, buffers are left on all water bodies and care is taken to avoid steep slopes where erosion might be a problem.

Al-Pac supports community recreational organizations in the FMA area and nearby communities. The “My Time” volunteer program is a major contributor to this strategy. However, most of these organizations do not actually use the forest landscape for their activities.

Al-Pac has conducted research and consultation to identify high conservation value forest (HCVF) areas as defined by FSC. Most areas were already protected in some way, whether in river valleys or around lakes. Al-Pac has also worked with Ducks Unlimited Canada on projects to protect waterfowl habitat. When requested, Al-Pac has assisted traditional land-use (TLU) studies in the FMA area.

Through working toward FSC certification, Al-Pac has identified a number of high conservation values (HCV). One such value is large landscape-level forests where viable populations of most naturally occurring species exist in natural patterns of disturbance and abundance. Old forest areas have also been identified as HCVs.

*FMA area wetland landscape*

## Criterion 6: Accepting Society's Responsibility for Sustainable Development

## Meet Alberta's current regulatory expectations for First Nations consultation

**2006 FMP Objective # 1** Community engagement strategy
**2015 FMP VOIT 35 – 6.1.1.1** Implement the Indegineous consultation plan

Al-Pac fully complied with the GoA First Nations consultation requirements during the reporting period.

***LAG Commentary***

Currently, the Government of Alberta has established a policy and guidelines for First Nations consultation. Al-Pac and the forest companies must work with the Aboriginal Consultation Office of Alberta Aboriginal Relations as part of the Forest Management Planning Standard to ensure that the forest companies meet the standard for consultation adequacy. Although there is currently no Government of Alberta Métis consultation policy, Al-Pac representatives, through the Al-Pac Aboriginal Affairs group, make every effort to engage Métis people within and near the FMA area as part of a company commitment.

*FMA area aspen forest stand*

## Criterion 6 – Accepting Society's Responsibility for Sustainable Development

## The Community Engagement Strategy shall meet the expectations of Section 5 of CSA Z809-02

**2006 FMP Objective # 1** Community engagement strategy
**2015 FMP VOIT 36 – 6.2.1.1** Implement a community engagement plan

Al-Pac continued to meet the requirements within their Community Engagement Strategy (CES).

Community and stakeholder engagement can be defined as informing, partnering with, and involving people or groups of people who are affected by or can influence operations, and are identified with any or a combination of the following criteria:

- Geographic proximity to Al-Pac operations (i.e., within northeastern Alberta);
- Special interests or needs (i.e., outfitters and trappers); and
- Commonly shared values (i.e., non-government organizations, groups with a specific, focused interest).

Community engagement occurs in many forms and venues.

### The Landscape Advisory Group

The multi-stakeholder Landscape Advisory Group (LAG) has actively participated in the renewal of the Al-Pac 2014 CES, the preparation of the 2010 Stewardship Report, development of new LAG Terms of Reference, and development of the 2015 FMP.

Al-Pac's LAG is a group of 25 to 30 individuals representing various communities and organizations that have a distinct interest in the management of the FMA area's forest land base. The group meets quarterly with the assistance of a professional facilitator, who records and distributes regular meeting minutes.

The LAG serves as Al-Pac's most consistent and involved venue for stakeholder engagement. Its mandate includes reviewing the practices and forest management plans of the forest companies, paying particular attention to the philosophies that inform the development of those practices and plans. The intent is to facilitate agreement among the LAG members and the forest companies. Additionally, selected LAG members have provided valuable input as audit observers during Al-Pac's annual Forest Stewardship Council (FSC) audit.

Al-Pac records and tracks any issue the group deems relevant to maintaining the integrity of good forest management of the FMA area. These issues are discussed and, if appropriate, experts are brought in to assist further investigation.

Examples of issues raised by the LAG include:

- Industrial water use and the protection of water quality and quantity;
- The need for effective Indigenous consultation in forest management planning;
- Management of unique wildlife situations, increasing cormorant populations, and the apparent impact on fisheries in Lac La Biche and Trout Lake;
- The methods, timing, and end land-use requirements for oil sands reclamation[*];

[*] The Alberta Government does not require that the forest companies be involved in these plans.

- The Cumulative Environmental Management Association (CEMA), the establishment of protected areas within the Regional Municipality of Wood Buffalo and the impact on the commercial forest land base, and the protection of valued landscape components via recent recommendations regarding the maintenance of terrestrial ecosystems in the mineable oil sands area (MOSA) [*];
- The Alberta government's Land-use Framework (LUF) and the implications for Al-Pac's forest management planning within the FMA area;
- Public involvement with respect to non-Indigenous interests as part of regional and forest management planning within the FMA area;
- The needs of recreational users with respect to access and the implications for future forest management planning;
- The role of the Trans Canada Trail[‡] and its promotion and use as a recreation and tourism attraction within the FMA area; and
- Handling and management of industrial solid waste.

At the LAG meeting on December 13, 2012, Al-Pac provided a brief explanation of how values, objectives, indicators, and targets form the basis for the detailed *Forest Management Plan* (FMP) as outlined in the *Alberta Forest Planning Manual*. Values are the most important "building block." An important contribution to identifying values can be made by people such as members of the LAG who use the forest land base. Using a facilitated discussion, LAG members were asked to identify and theme the values that they saw as important in the landscape. There were a total of 70 value statements identified that resulted in six themes (in no particular order):

- Protected Areas (8 value statements);
- Monitoring (5 value statements);
- Wildlife, Fisheries and Traditional Use (19 value statements);
- Timber Values (7 value statements);
- Community (16 value statements); and
- Land Use (15 value statements).

An Aboriginal theme was added in April 2015. This was based on advice from the Indigenous peoples who participated on the *Transitional Forest Management Plan* 2015 Landscape Advisory Group Sub-committee that forms the Public Participation Group (PPG). The values under the Aboriginal theme included 26 shared values from the set of 70 value statements provided by the full LAG.

The LAG has also been involved in the preparation and review of Al-Pac's 2000 *Detailed Forest Management Plan* (DFMP), the development of Al-Pac's 1998 and 2008 Operating Ground Rules (OGRs), and the 2006 FMP.

Since 2006, the group has had more than 40 formal meetings and 10 field trips. The location and purpose of these field trips are based on needs identified by the LAG, and have focused on the following topics:

- Silviculture;
- Boreal plain hydrology;
- Biodiversity monitoring;
- Post-fire ecology;

[*] This area will not be included in the future FMA area boundary. MOSA (mineable oil sands area) is now referred to as SMA (surface mineable area).

[‡] The Trans Canada Trail was renamed the Great Trail in 2016.

- The Calling Lake FireSmart program;
- Al-Pac's mill water treatment processes;
- Jack pine mistletoe sanitation program;
- Wildfire forest regeneration;
- Energy sector land use;
- Calling Lake Migratory Bird Study;
- Sawmill infrastructure; and
- Al-Pac's Poplar Farms program.

## Community Engagement Methods

In addition to the LAG, Al-Pac's Community Engagement Program (CEP) creates opportunities for the exchange of information and perspectives with the public on Al-Pac's forest management planning and harvest operations activities through a range of community engagement methods. The program is designed to help facilitate comprehensive and meaningful public awareness and involvement so that Al-Pac may address concerns. Shared insights are used to create forest management plans that are sensitive to the cultural, social, environmental, and economic concerns of those who reside in or are otherwise concerned about the FMA area. This program continuously seeks new ways to improve opportunities for public participation and information sharing. To that end, Al-Pac looks to stakeholders for suggestions with respect to how the company may better meet the needs of concerned groups and individuals.

The community engagement program encompasses the following activities:

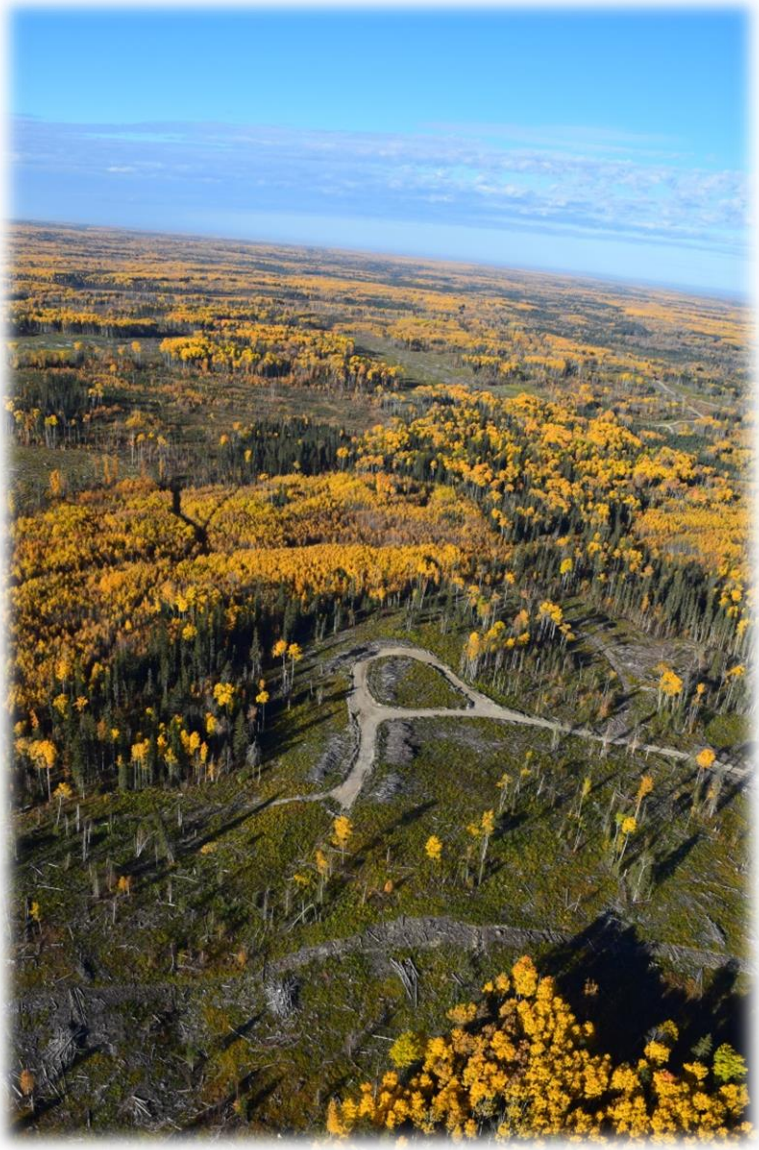
- Development and distribution of forest planning summary documents;
- Forest planning meetings held in Indigenous and non-Indigenous communities within the FMA area;
- Advertising the availability of forest management planning information;
- Community event displays that contain information on Al-Pac forest management plans and harvest operations activities;
- Interpretive videos to allow for better understanding of information;
- Topical presentations delivered by in-house expertise when requested;
- Woodland tours;
- Regional trade shows;
- Publication of corporate performance reports, including:
    - *Sustainability Report*, 2005–2006 and 2007
    - *Corporate Social Responsibility Report*, 2007–2009 (2010)
    - *2007 Community Report*
    - Quarterly *Al-Pac Advance* newsletter;
- Dedicated public affairs and Indigenous relations staff to facilitate an open-door policy should concerned individuals or groups want to talk directly to Al-Pac staff;
- Toll-free phone access to Al-Pac staff; and
- Corporate website providing detailed information on company practices and activities.

***LAG Commentary***

Most of the CES strategies are being fulfilled, but it has been difficult to include LAG members in other public engagement activities such as community meetings. LAG members have also expressed concern that quota holders (QHs) are not fully involved in the community engagement and consultative processes. Although some QHs participate regularly in LAG meetings, others rarely attend.

LAG members have often asked why there has not been consistent participation from the energy sector, considering their widespread impact on the FMA area.

*FMA area*



## 2006 *Forest Management Plan* – Other Objectives

The following seven objectives from the 2006 FMP were not imported into the 2015 FMP. VOITs were not created to meet these past objectives. Most of these objectives are now met through other regulatory requirements, such as:

- Meeting Forest Management Agreement clauses
- The approved Northeast Alberta Operating Ground Rules (OGRs)
- 2006 *Forest Management Plan* approval conditions
- Government of Alberta policies or regulations
- Government of Alberta forest management directives

All of these objectives in the 2006 FMP are addressed in Volume I of this stewardship report. The seven objectives in this category were:

**Objective 2 – FMP Section 3.1 – Update the Alberta Vegetation Inventory (AVI)**

Clause 14 (1) (2) (3) of the FMA states that Al-Pac must have an ongoing forest inventory program to meet current and emerging planning requirements. Al-Pac has an approved and ongoing AVI program for the FMA area and, in association with the 2015 FMP, an approved growth and yield program.

**Objective 10 – FMP Section 3.6 – Intensive conifer forest management (EFM)**

Al-Pac and the quota holders have concluded that EFM is not economic in the FMA area. EFM carries high risks due to the potential destruction of infrastructure and loss of investment given the frequency of natural disturbances in the boreal forest, as well as the amount of industrial activity in the FMA area.

**Objective 15 – FMP Section 3.6 – Incidental conifer replacement**

The 2011 FMA no longer has an incidental conifer replacement clause. This requirement is moot.

**Objective 25 – FMP Section 4.2 – Continue to conduct and facilitate research and development**

Al-Pac continues to facilitate research on the FMA area. The 2018 Al-Pac FMA area Socio-Economic Vignette provides details on the program (see Al-Pac website at www.alpac.ca).

**Objective 26 – FMP Section 4.3 – Monitoring programs**

All of the strategies are being technically fulfilled except trapper monitoring (refer to Objective 8). A number of the strategies have limited applicability to forest management.

**Objective 27 – FMP Section 4.4 – Participate in GoA audits**

Al-Pac continues to participate in all required GoA audits.

**Objective 28 – FMP Section 4.5 – Maintain ISO and Forest Stewardship Council certification**

Al-Pac is committed to maintaining an internationally competitive company with sustainable operations. To achieve this, Al-Pac uses science, technologies, and knowledge-based best practices to produce a high-quality product, safely and efficiently, that results in a minimal effect on the air, water, and land base in which it operates and shares with many other users.

Forest management planning and practices are based on boreal ecological processes. They are designed to maintain natural landscape values, including the ecosystems and the myriad of species that live there.

Achieving sustainable management is an ongoing and changing process that requires working with the many stakeholders who have valuable local knowledge and scientific expertise, continually exploring new ways of doing things better and setting new goals to reach higher environmental standards. This also means complying with established environmental legislation and regulations. Two third-party certification programs are utilized by Al-Pac to meet the company's objectives and demonstrate continuous improvement in environmental performance: ISO 14001 and FSC programs will continue to be the vehicles for this commitment.

The ISO 14001 process and Al-Pac's FSC certification audit requirements constitute third-party audits of forest management planning and operations. Al-Pac has maintained both of these certifications throughout the quadrant.

Al-Pac uses science-based best practices and environmental management systems to illustrate that the company has a minimal effect on the environment. Al-Pac is registered to the ISO 14001 standard, which ensures that companies have efficient and effective environmental management processes in place. To date (2018), Al-Pac continues to attain yearly ISO re-certification (ISO Canada: http://www.iso.org/iso/home.htm)

The Forest Stewardship Council (FSC) is an international certification and labelling system that guarantees that companies' forest products come from responsibly managed forests. Under FSC certification, forests are certified against a set of strict environmental and social standards, and fibre from certified forests is tracked to the consumer through the chain of custody (CoC) certification system. More information on the FSC, including their principles and criteria, is available on their website at www.fsccanada.org.

Al-Pac, up to 2019, is assessed against a strict set of criteria guided by the following nine principles for forest management:

1. Compliance with laws and FSC principles
2. Tenure and use rights and responsibilities
3. Indigenous peoples' rights
4. Community relations and workers' rights
5. Benefits from the forest
6. Environmental impact
7. Management plan
8. Monitoring and assessment
9. Maintenance of high conservation value (HCV) forests

Annual surveillance audits have been conducted since 2005, when Al-Pac earned FSC certification. These surveillance audits highlighted areas for Al-Pac to improve its practices. Al-Pac and an auditor have continued to meet continuous improvement goals by conducting annual surveillance audits. Since 2005, Al-Pac has twice renewed its certificate, in 2010 and 2015. FSC reports and links associated with FSC certification are available on the Al-Pac website at www.alpac.ca and at http://www.fsccanada.org/forestcertification.htm.

Available third-party reports include:

- *2005 Public Summary Report*
- ***2005 Final Report*** **(FSC Granted to Al-Pac)**
- *2006 Public Summary Report*

- *2007 Public Summary Report*
- *2008 Public Summary Report*
- *2009 Public Summary Report*

- ***2010 Reassessment Report (FSC sustained)***
- Al-Pac's FSC *Pre-industrial Forest Condition Report* (2010)
- *2011 Public Summary Report*
- *2012 Public Summary Report*
- *2013 Public Summary Report*
- *2014 Public Summary Report*

- ***2015 Reassessment Report (FSC sustained)***
- *2016 Public Summary Report*
- *2017 Public Summary Report*
- *2018 Public Summary Report*


**Objective 29 – FMP Section 4.6 – Development of a Stewardship Plan**

Al-Pac published its first *Forest Stewardship Report* in 2002, describing performance from 1991 through 2000. A second performance review was published in 2005 and included both mill site and forest management indicators for the years 2000 to 2004. A performance review, *Progress Towards Sustainability*, was published in 2005 and included both mill and forest management performance indicators for the years 2000 through 2004. These reports are now termed "corporate sustainability reports." Additional corporate sustainability reports were published in 2007 and 2010. These reports are available on Al-Pac's website.

To assist in meeting Al-Pac's FSC certification requirements, the company also prepared two socio-economic impact analysis reports. These reports are a formal examination of social and economic indicators for the Al-Pac FMA area in northeastern Alberta. The first stage, completed in 2007, provided an inventory of the social and economic variables that could affect, or be affected by, Al-Pac's activities. The 2009 second-stage report updated data and identified indicators that relate specifically to forest management.

Social and economic factors have been integral to Al-Pac's planning and operations since the mill was first proposed in 1988. Monitoring and evaluation of these factors have continued since the signing of the FMA in 1991 and the start of operations in 1993. A suite of social and economic indicators has been reported publicly in Al-Pac's corporate sustainability reports.

Al-Pac and the quota holders were initially directed through the FMP to prepare a stewardship report every three to five years after a timber quadrant is complete. The FMP was approved by GoA in 2006, and the first large (five-year) stewardship report meets the FMP condition of completing a report at the termination of the 2006–2010 timber quadrant. This aligns with Al-Pac's timber years.

The quota holders were directed by the FMP to provide input into the stewardship report. In 2011, Al-Pac solicited input from all quota holders for data specific to objectives applicable to their operations. Three quota holders prepared and delivered data for compilation within the report. These were Alberta-Plywood Ltd., Millar Western Forest Products Ltd., and Vanderwell Contractors Ltd.

Al-Pac has a suite of indicators that are used in corporate sustainability reports. This group of metrics was in the past prepared every two to three years through the corporate sustainability reporting mechanism. These historic reports are available at www.alpac.ca.

Al-Pac will not be preparing annual forest stewardship reports, but will instead prepare five-year reports tied to timber quadrants.

In this FMP forest stewardship report (2011–2015), the socio-economic and forestry indicators that are included in the corporate sustainability reports are included in Al-Pac monitoring vignettes available on the Al-Pac website.

*Boreal forest flora*

## Mandatory Forest Management Plan Stewardship Components

In the 2017 GoA interpretative bulletin for stewardship reporting, there are eight additional mandatory requirements that are outside the VOITs and are also outside the scope and objectives of the 2006 *Forest Management Plan.* Al-Pac is simply providing summary information on these eight applicable stewardship components as an overture for the 2016–2020 Al-Pac FMA *Forest Stewardship Report*.

1. Review and status of 2006 Approved FMP Approval Decision conditions;
2. Regional or Al-Pac FMA area specific management objectives;
3. Approved *Forest Management Plan* Spatial Harvest Sequence (SHS) variance assessment;
4. Al-Pac FMA area land-base changes;
5. Annual allowable cut (AAC) review;
6. Growth and Yield (G&Y) program maintenance;
7. Conifer seed availability and usage; and
8. Forest Genetic Resource Management and Conservation Standards reporting.

These eight components have been clarified on pages 12–21 of the Alberta "Forest Management Planning Standard Interpretative Bulletin: Stewardship Reporting Requirements." [*]

[*] https://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/all/formain15847/$FILE/AF-FDP-2017-03-stewardship-reporting-bulletin.pdf

**Review and status of 2006 Approved FMP Approval Decision conditions**

The 18 approval conditions have all been addressed and are discussed in Chapter 4 of the 2015 *Forest Management Plan*, pages 6–8; available at www.alpac.ca.

**Regional or Al-Pac FMA area-specific management objectives**

This requirement has been addressed in the "Other Objectives," in the preceding stewardship report section.

**Approved *Forest Management Plan* Spatial Harvest Sequence (SHS) variance assessment**

In the 2006 FMP, a 15-year Spatial Harvest Sequence (SHS) was prepared for 11 Forest Management Units (FMUs) for all conifer quota holders (QHs), the GoA MTU and CTP programs, and Al-Pac. The hectare variance from the Al-Pac portion of the forecasted Spatial Harvest Sequence (SHS) to the actual 10-year cutover coverage for 11 FMUs was prepared for each year's *General Development Plan* and *Annual Operating Plan* by Forest Management Unit and the associated planning units. These documents are available upon request from Al-Pac.

There are a number of reasons for the variance between the original 2006 TSA / SHS forecast and the actual harvest footprint (*list is not inclusive*):

- Primary rationale: The FMA area AVI inventory is aging and does not precisely reflect the actual polygon forest cover composition and forecasted volume.
- AVI does not capture slope; actual cutblock layout removes areas due to slope.
- Unmapped watercourses shift planned versus actual polygon demarcation.
- Sensitive sites found at the FHP level (i.e., raptor nets) become buffered and remove area (see current 2015 NE AB OGR 7.6.2).
- Operational deletions, not accounted for in the AVI, remove area: isolated stands, narrow fringe area of blocks, and rugged terrain.
- High surface water makes areas unavailable for harvest.
- Predicted SHS polygon volumes, which are homogeneous at a strata level, differ from actual volumes harvested and thus change the hectare requirements to achieve the forecasted AAC levels.
- SHS area is removed or buffered to account for historical resources and trapper concerns that are made aware to the forest companies during FHP planning.
- Ongoing and new public or stakeholder land-base concerns will also affect SHS polygons.
- Ongoing Aboriginal consultation may change SHS polygon linework.
- The SHS forecast does not account for area that becomes isolated or inaccessible due to other anthropogenic activities.
- The AVI does not have "unmapped" anthropogenic polygons. Fire salvage activities shift the harvest pattern to non-SHS areas.
- The market decline in the softwood lumber industry has resulted in less conifer timber being harvested.
- Deletions occur due to watercourse and lake buffers.
- Low density stands, low height stands, low volume stands, and/or undesirable species (Pj, Sb, LT, Bw) are included in the SHS but excluded during planning, layout, and/or harvest.
- SHS included or approved in Protective Notations (areas within the FMA area that have been excluded from the net land base to protect other values) that are later removed from the Final Harvest Plan (FHP) stage by GoA.

- SHS included or approved (within the TSA) along highways that are later not approved at FHP stage by GoA.

**Al-Pac FMA area land-base changes**

A new FMA was signed in 2011 to replace the original 1991 FMA. The new document followed the GoA template for all FMAs in Alberta. The new FMA redrew the FMA area map to align with LARP landscape initiatives, including the former "non-J – doughnut holes" (primarily treed muskeg) into the gross FMA area, and added FMU S14 into the FMA area. The result is an FMA area of approximately 6.4 million hectares. The new FMA expanded the gross area of the previous FMA and thus has required Al-Pac to have forest management responsibility for an extra 1 million hectares.

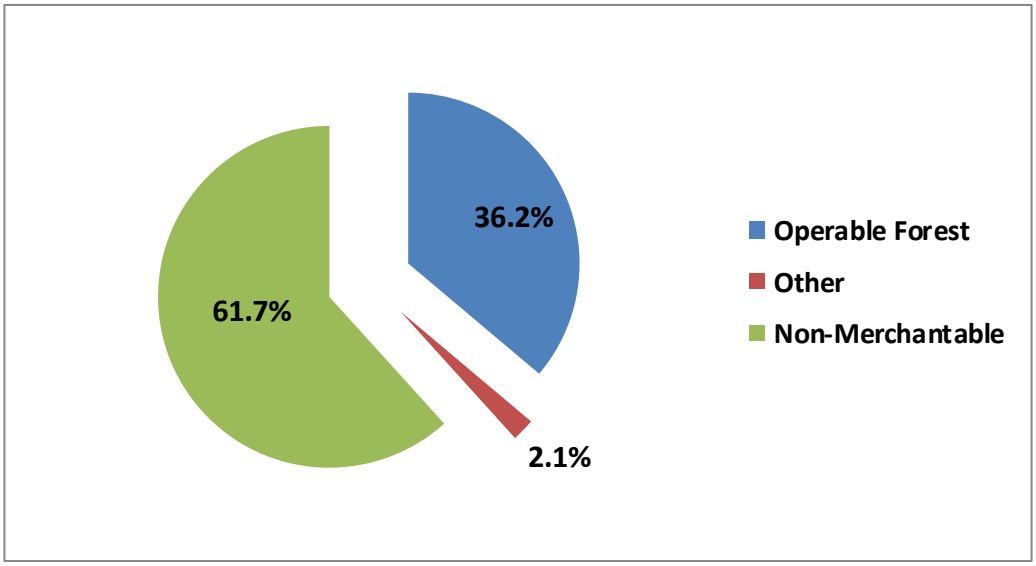
The inventory is the starting point for sustainable forest management. Changes in the inventory components over time provide valuable indicators of economic, environmental, and social sustainability. The FMA area Alberta Vegetation Inventory (AVI) is the primary database for the land-base netdown, which determines how much forest is available for operational forest management.

In 2006, the AVI had been completed for the gross FMA area, and a new program called Softcopy Alberta Vegetation Inventory (SAVI) was initiated for use in the 2006 FMP. SAVI updated the AVI to include former burn areas and human impacts such as harvest areas, energy sector activities, and infrastructure. SAVI continued to use black-and-white and some colour photography, at 1:30 000 resolution, now interpreted digitally on computers. Enhanced software converted results directly into GIS format.

This FMP utilized 11 FMUs (decreased due to administrative FMU amalgamations). For purposes of the quota holder timber supply calculation, the previously excluded 1.1 million hectares of bogs and muskegs were added to the FMA area. Al-Pac's AAC was based on the legally defined 5.75 million hectares of FMA area, while a gross area of 6.9 million hectares was used for the quota holder AAC forecast (see Figure 11). Only 11 percent of the quota holders' additional area was considered operable.

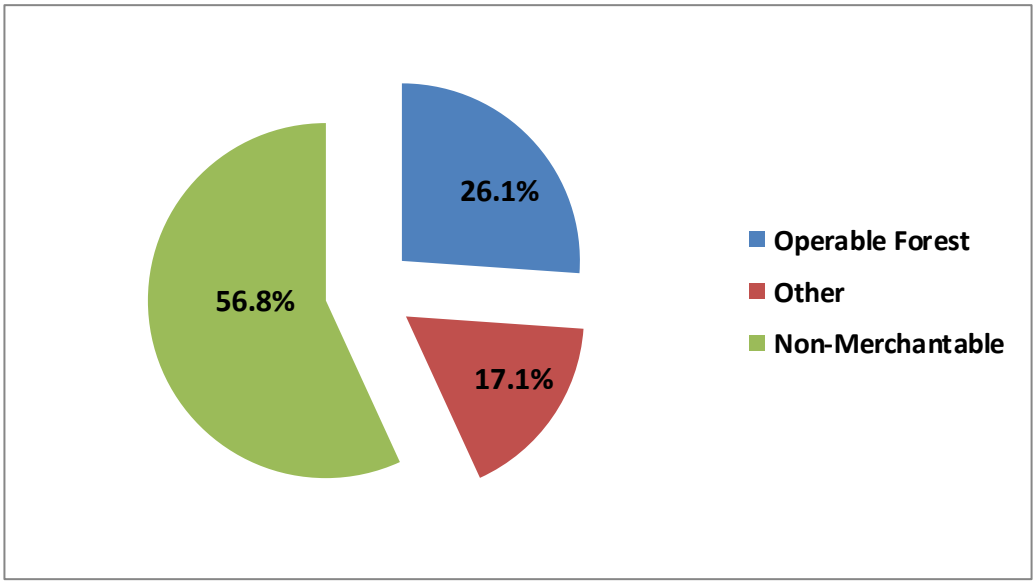
*Al-Pac FMA area includes many lakes and wetlands*

*Figure 11. Al-Pac gross FMA area 2006 FMP (AVI and SAVI): 5.75 million hectares in 11 FMUs*




By 2015, the FMA land base had changed considerably. A new FMU, S14, added 365,000 hectares. The government's Lower Athabasca Regional Plan (LARP) excluded forestry operations in various areas, and the major expansion of energy sector activities and related infrastructure reduced operable forest throughout the FMA area. Reductions due to LARP and anthropogenic footprint totaled about 1.2 million acres. Meanwhile, the previously excluded 1.1 million hectares of mostly non-merchantable bog and muskeg complexes were made part of the legal FMA area. The result is a gross area of about 7.3 million hectares (see Figure 12).

*Figure 12: Gross FMA land base 2015 (SAVI Inventory): 7.3 million hectares in 12 FMUs*



A full inventory was completed in 2012, and data collection began in 2014 for a new inventory known as AVI-II. This 12-year program includes four-band, high-resolution, leaf-off digital imagery that identifies understorey growth as well as canopy species. The technology now permits resolution down to 30 centimetres. The results will be combined with LiDAR imagery and other data to produce a comprehensive picture of the evolving landscape.

## Annual Allowable Cut (AAC) review – Quadrant 5

A summary of only Al-Pac harvest volumes by disposition and FMA area is provided in Table 23. Actual volumes are based on reconciled quadrant production volumes for the 10 years since the start of the approved SHS. All four quadrant volume totals (Primary D &C and Secondary D & C) were below the approved AAC in the FMA area and in most FMUs.

***Table 23. Al-Pac FMA area quadrant five-year cut control table – Alberta-Pacific harvest***

| Al-Pac FMA Area Cut Control - Quadrant 5 | AAC | QAC | 2011/12 | 2012/13 | 2013/14 | 2014/15 | 2015/16 | Quadrant Total | % of QAC |
|---|---|---|---|---|---|---|---|---|---|
| **Al-Pac Primary Conifer Cut Control** | 315,880 | 1,579,400 | 372,472 | 204,835 | 191,524 | 74,500 | 12,327 | 855,658 | **54.2%** |
| **Incidental Conifer Cut Control** | 522,097 | 2,610,485 | 265,816 | 254,553 | 134,214 | 284,200 | 222,546 | 1,161,329 | **44.5%** |
| **Deciduous Cut Control** | | | | | | | | | |
| ***Primary*** | 2,007,559 | 10,037,795 | 1,573,883 | 1,397,512 | 1,491,607 | 2,206,619 | 1,623,367 | 8,292,988 | 82.6% |
| ***Incidental*** | 395,035 | 1,975,175 | 221,913 | 222,236 | 289,009 | 282,000 | 354,855 | 1,370,013 | 69.4% |
| **Total Deciduous** | **2,402,594** | **12,012,970** | **1,795,796** | **1,619,748** | **1,780,616** | **2,488,619** | **1,978,222** | **9,663,001** | **80.4%** |

## Growth and Yield (G&Y) program maintenance

Al-Pac currently has 386 Permanent Sample Plots (PSPs) and continues to install new PSPs to assist in meeting the Provincial Growth and Yield Initiative (PYGI)[*] targets (mature and managed stands) and to increase an understanding of Understorey Protection (UP) treatments (see Table 24). Al-Pac also continues to measure current PSPs throughout the FMA area and is a sustaining member of the Alberta Forest Growth Organization of Western Canada (FGrOW). FGrOW identified the need for cooperation between companies to populate a PSP database for growth model development and calibration. All Alberta FMA holders as well as the Government of Alberta (GoA) signed a memorandum of understanding in 2014 for the Provincial Growth and Yield Initiative (PGYI). Through FGrOW and under the PGYI program, Al-Pac is required to establish and maintain 75 natural and 100 managed stand PSPs. The 2015 PGYI program and status of plots by stratum and ecological area are presented in the 2015 *Forest Management Plan*, Chapter 4, pages 40–41.

In addition to the PSP program, a new TSP program was initiated in 2014 and targeted within the southern FMUs to coincide with the new AVI-II process and thus provide field reconnaissance information to assist in polygon interpretation and future growth model calibration.

[*] The Provincial Growth and Yield Initiative (PYGI) is a cooperative program for all FMA holders.

***Table 24. Al-Pac Permanent Sample Plot (PSP) program as of 2015***

| | | Managed[1] | | |
|---|---|---|---|---|
| **FMU** | **Natural** | **CC** | **UP** | **Total** |
| A14 | 25 | 1 | | 26 |
| A15 | 26 | | | 26 |
| L1 | 32 | 9 | 1 | 42 |
| L2 | 19 | 4 | 4 | 27 |
| L3 | 26 | | | 26 |
| L8 | 12 | 2 | | 14 |
| L11 | 67 | 16 | | 83 |
| S7 | 23 | | | 23 |
| S11 | 25 | | | 25 |
| S14 | 20 | | | 20 |
| S18 | 38 | 7 | | 45 |
| S22 | 29 | | | 29 |
| Total | 342 | 39 | 5 | 386 |

[1]CC= clearcut; UP = understory protection.

*Natural stand permanent sample plot with blue paint buffer*

**Conifer seed availability and usage**

Alberta requires that all seed and stock utilized for reforestation purposes originate within the seed zone in which it is deployed. This results in forests that are replaced with trees that are genetically similar to previous forest stands, are sufficiently diverse genetically, and are adapted to local conditions.

Improved seed with known and selected parentages offers the advantage of having been tested for specific traits that enhance the value of the seedlings to achieve forest sustainability. Al-Pac and other forest companies use improved seed in certain regions of the FMA to achieve forest sustainability and improve logistical deployment while increasing opportunities for timely reforestation following harvest.

Al-Pac and the other forest companies manage the amount of tree seed on hand to adequately meet reforestation requirements. A table in Chapter 7, pages 50–53, of the 2015 *Forest Management Plan* summarizes by forest company and seed zone the amount of seed required to reforest the conifer land-base portion of the 10-year SHS and the seed currently in storage.

**Forest Genetic Resource Management and Conservation Standards reporting**

The Alberta Forest Genetic Resource Management and Conservation Standards (FGRMCS) are authorized under the timber management guidelines to facilitate the collection, development, processing, documentation, tracking, custody, and eventual use of forest reproductive materials.

Al-Pac's silviculture program deploys regeneration materials from Stream 1 (seed and vegetative material) and Stream 2 (seed only). Stream 1 material is collected from wild stands of native species within the seed zone in which deployment is planned. Stream 2 material is purchased from Alberta government seed orchards.

Table 25 summarizes deployment for Stream 1 and 2 regeneration material for the FMA area by the reporting period.

***Table 25. Forest Reproductive Materials – 2011-2015***

| Regeneration Material | Crop Species | Plant Area (ha) | Number of Propagules / Seedlings |
|---|---|---|---|
| **Stream 1** | Balsam Poplar | 54 | 114,940 |
| | Jack Pine | 379 | 439,545 |
| | Black Spruce | 23 | 29,120 |
| | White Spruce | 1,904 | 2,679,890 |
| | **Total** | **2,360** | **3,263,495** |
| **Stream 2** | White Spruce | 2,872 | 4,035,321 |
| | **Total** | **2,872** | **4,035,321** |
| **Grand Total** | | **5,232** | **7,298,816** |

# Appendix I:

## Complete Report Card – 2006 *Forest Management Plan* (FMP) Matrix

## 29 Objectives

The attached table details all 29 Objectives (and associated strategies) from the GoA approved 2006 *Forest Management Plan*, their relationship to the GoA approved 2015 *Forest Management Plan*, and their status for the 2011–2015 stewardship reporting period.