Stream Crossing Assessments

Alberta-Pacific Forest Industries Inc. (Al-Pac) is North America's largest single-line producer of high-quality kraft pulp. The majority of wood fibre for this pulp originates from Al-Pac's Forest Management Agreement (FMA) area located in northeastern Alberta. Through the company's FMA the Government of Alberta grants Al-Pac stewardship of 6.4 million hectares of forest land to sustainably harvest, establish, and grow timber. An important aspect of this work is the minimization of impacts on water resources such as streams, rivers, wetlands, and lakes. Al-Pac's FMA area is crisscrossed by small and large water courses as seen in Figure 1. Legislation at the provincial and federal level requires that aquatic environments and fisheries must be protected. As well, Al-Pac operates under the Northeast Alberta Timber Harvest Planning and Operating Ground Rules which inform Al-Pac on how to manage the landbase sustainably.

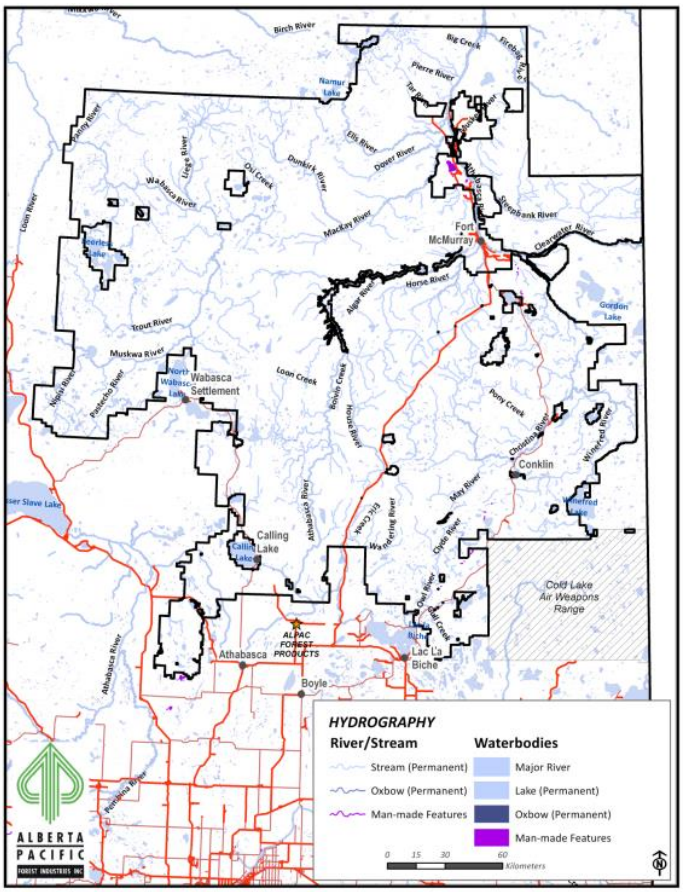

Figure 1. Map of FMA with permanent water courses and waterbodies

To effectively maintain access and protect water resources, as well as comply with Al-Pac best management practices, government regulations and Forest Stewardship Council® (FSC®) certification requirements, Al-Pac conducts an extensive monitoring program of stream crossings across the FMA area. As part of this program, stream crossings are inspected for regulatory and internal variances with variances being corrected in a timely manner.

To aid in the access of forest resources, roads are constructed across the FMA, oftentimes over water resources, such as streams. These crossings are regularly inspected to ensure they meet compliance and are not disturbing the watercourse with erosion, sedimentation, or over hanging culverts, and that their structural integrity is being maintained. There are two main types of stream crossings created depending on the duration of access required to reach the forests resources: temporary and permanent crossings. Temporary access roads are further broken down into the season they are created: winter and summer. A typical summer temporary access road can be seen in Figure 2. The type of stream crossings for both winter and summer crossings differ but are inspected with proper documentation.

Figure 2. A typical temporary stream crossing

Each crossing in the FMA is inspected at least once prior to the removal of timber from the cutblock and once after the road has been reclaimed, and on an adhoc basis during the stream crossings lifetime. Events such as extreme weather prompt unscheduled inspections of the affected stream crossings. Inspections are documented on a digital Water Course Crossing form which is linked to Al-Pac's Land Resource Management (LRM) system for easy access and centralized monitoring. An important aspect of the inspection process is the collection of photographic evidence of the crossing to document the site. If issues are found, the inspector will make a note and recommend an action to correct the non-compliance to Al-Pac's standards. Variances, both internal and regulatory, are monitored and stored within LRM. Regulatory variances are non-compliances with the Operating Ground Rules. Whereas, internal variances are non-compliances with either the Operating Ground Rules or Al-Pac's best management practices.

Inspections are conducted to monitor potential impacts on water crossings such as bank disturbances, erosion, sedimentation, improperly situated or overhanging culverts, and problems with the structural elements of the water crossing (separation layer and support logs). Other considerations in Al-Pac's

stream crossing monitoring program focus on the hydrology and movement of water across the landscape. Inspections are conducted more often after events such as spring break up, winter freeze/thaw, and large rainfall events. These events increase the risk of changes occurring in the stream crossings. Another consideration in the monitoring program is the level of environmental risk associated with the water crossing. Higher risk crossings include fish bearing watercourses, if the crossing is 500 metres from and directly contributes to a fish bearing watercourse, erosion prone slopes, cuts and fills greater than 1 metre that are associated with the crossing, when the road will be utilized by a 3rd party, or if the crossing has an already identified variance. Al-Pac takes steps to mitigate future variances based on the documentation collected through the monitoring program.

As can be seen in Figure 3, there are more inspections of stream crossings every year than there are stream crossings installed. This highlights how each crossing will receive multiple inspections based on where it is in its operational lifecycle.

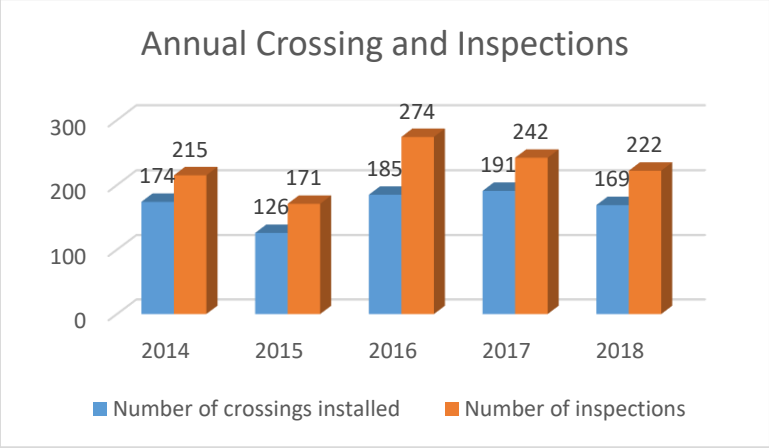

Figure 3. Number of crossings and inspections by year since 2015