



STAYING THE COURSE TOWARDS SUSTAINABLE WATER MANAGEMENT

2015

Update to Alberta's Forest Sector Water
Conservation, Efficiency and Productivity Plan



Prepared by Alberta Forest Products Association

INTRODUCTION

In 2011, the Alberta Forest Products Association (AFPA), in support of Alberta's *Water for Life* strategy, produced a water conservation, efficiency and productivity (CEP) plan.¹ This plan was produced according to guidelines developed by the Alberta Water Council (AWC).² Within the Forest sector, the pulp and paper industry is the only area requiring licensed water withdrawals. Hence, Alberta's seven pulp and paper mills are the focus of the plan.

The plan vision is *Alberta's pulp and paper mills are world leaders in water-use reduction technologies and process operations, have further reduced their water consumption and improved their efficiency and productivity. As stewards of Alberta's water resources, they are actively working with partnerships to ensure aquatic ecosystems are healthy.*

Established in 1942, the *Alberta Forest Products Association* (AFPA) is a non-profit organization fully funded by its member companies. These companies manufacture wood products in Alberta including lumber, panelboard, pulp and paper, and secondary manufactured wood products. For more on the Alberta Forest Products Association, see their website at <http://www.albertaforestproducts.ca/>.

The plan also includes three goals:

- To keep water withdrawals and returns from Alberta's seven pulp and paper mills at current (2009) or improved levels;
- To utilize research and technology to improve productivity by a further 5% over the next decade; and
- To continue to work with partnerships to improve water quality and to ensure aquatic ecosystems are healthy.

Water Conservation: Any beneficial reduction in water use, loss, or waste; Water management practices that improve the use of water resources to benefit people or the environment.

Water Efficiency: Accomplishment of a function, task, process, or result with the minimal amount of water feasible; an indicator of the relationship between the amount of water needed for a particular purpose and the quantity of water used or diverted.

Water Productivity: The amount of water that is required to produce a unit of any good, service, or societal value.

¹ A copy of the 2011 Forest Sector Water Conservation, Efficiency and Productivity plan is posted on the AFPA website at <https://www.albertaforestproducts.ca/our-industry/environment/water>.

² For more on the work of the Alberta Water Council on water CEP planning, see <http://www.albertawatercouncil.ca/Projects/WaterConservationEfficiencyandProductivity/tabid/1115/Default.aspx>.

2012-14 PLAN UPDATE

As per AWC guidelines, sectors are encouraged to provide periodic updates on their progress towards achieving the goals of their CEP plans. The 2011 Forest Sector Plan provided water CEP information for the period 2000 to 2009. The first update to the plan, provided to the AWC in 2012, provided information for the period 2010 to 2011 inclusive.³ This document (2015) provides the second update to the plan and covers the period of 2012 to 2014 inclusive.

MEETING PLAN GOALS

Water Use (Conservation and Efficiency)

Alberta's seven pulp and paper mills are all located in the Peace and Athabasca watersheds where they are licensed to withdraw less than 1% of annual river discharge. For the period 2012 - 2014, water allocations for these mills remained the same (no new licences were issued) as per Table 1.



Pulp mills only withdraw water as it is needed and actual water use is less than that licensed. As previously reported, an investment of \$5 billion in new capital expenditures and upgrades over the last decade has contributed to a decline in total water use in the pulp and paper industry. The 2011 report showed a 5% reduction in the annual amount of water withdrawn between 2000 and 2009. In 2009, approximately 63% of licensed volume was withdrawn. In 2010-11, this amount decreased further to about 59% of licensed volume. Since then, the number has remained fairly steady averaging 58% over the last 3 years (2012 – 2014).

Table 1. Alberta's seven pulp and paper mills and the licensed amount of water they can withdraw annually.

Facility	Mill Type	River/Watershed	Annual Diversion (acre feet)	Annual Diversion (cubic meters)
Alberta Pacific Forest Industries Inc. (Boyle)	Kraft	Athabasca	29,500	36,388,000
Alberta Newsprint Company (Whitecourt)	Mechanical	Athabasca	12,000	14,801,783
Daishowa-Marubeni International Ltd. (Peace River)	Kraft	Peace	30,000	37,004,456
Hinton Pulp (A division of West Fraser Mills Ltd.)	Kraft	Athabasca	68,400	84,370,155
Millar Western Forest Products Ltd (Whitecourt)	Mechanical	McLeod/Athabasca	7,702	9,500,278
Slave Lake Pulp (A wholly owned subsidiary of West Fraser Mills Ltd.)	Mechanical	Lesser Slave /Athabasca	5,100	6,290,758
Weyerhaeuser Company Limited (Grande Prairie Operations)	Kraft	Wapiti/Peace	33,000	40,704,902
Total			185,702	229,060,332

³ The 2012 Forest Sector Water CEP Update report is available at <http://www.albertawatercouncil.ca/LinkClick.aspx?fileticket=w3iPPdgMOul%3d&tabid=115>.

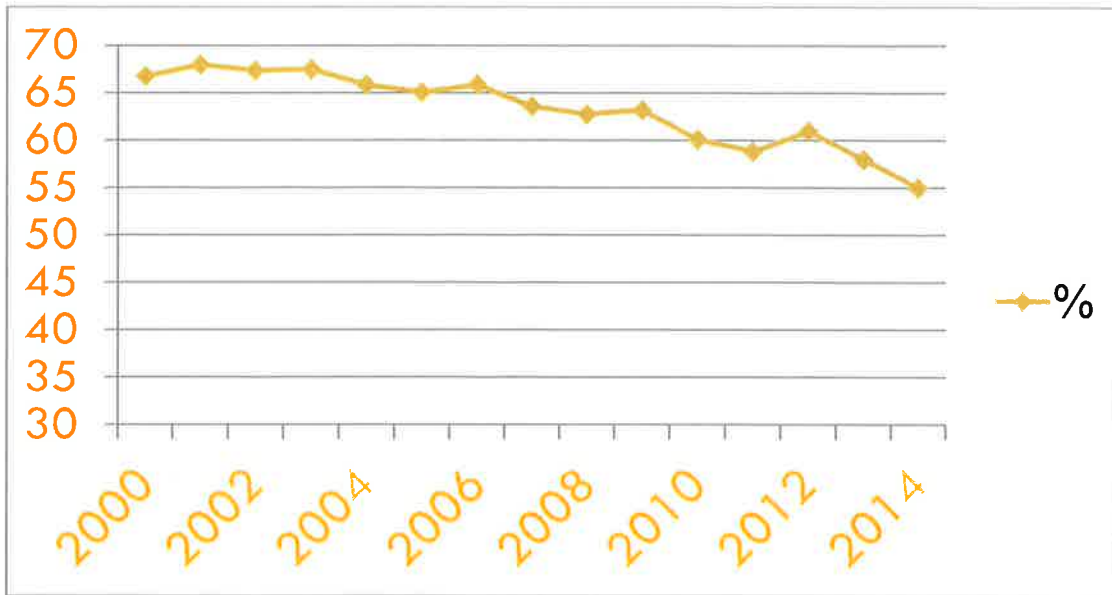


Figure 1. Actual Water Diverted by Alberta’s Pulp and Paper Mills as a Percent of Licensed Volume from 2000 to 2014.

Additionally, most of the water withdrawn by these seven pulp mills is treated and returned to the river. Return flow was 92% of water withdrawn in 2009. For 2012 to 2014, water return flow remained similar at about 93% of water diverted. That is, only about 7% of water withdrawn was actually consumed by the process or remains in the final product.

By only withdrawing what is needed (58% of licensed volumes), and by treating and returning that water not consumed in production (93% of water diverted), Alberta’s pulp mills are improving conservation and efficiency. This ensures more water is available in the river to maintain aquatic ecosystem health and meet other downstream needs.

Water Productivity

While water conservation and efficiency is important, improving productivity is also a goal of CEP planning. The 2011 report showed an 8% improvement in productivity (measured as the number of cubic metres of water required to produce one dry metric tonne of pulp) for the period 2000 (60.8 m³) to 2009 (55.7 m³).



Although the 2012 report indicated that further reductions in water use may be technologically and economically challenging, productivity continued to improve during the reporting period to 50.2 m³/tonne in 2011. For this reporting period, productivity again improved from 2011 to 48.6m³/tonne in 2014 (a 13% improvement since the 2009 baseline).

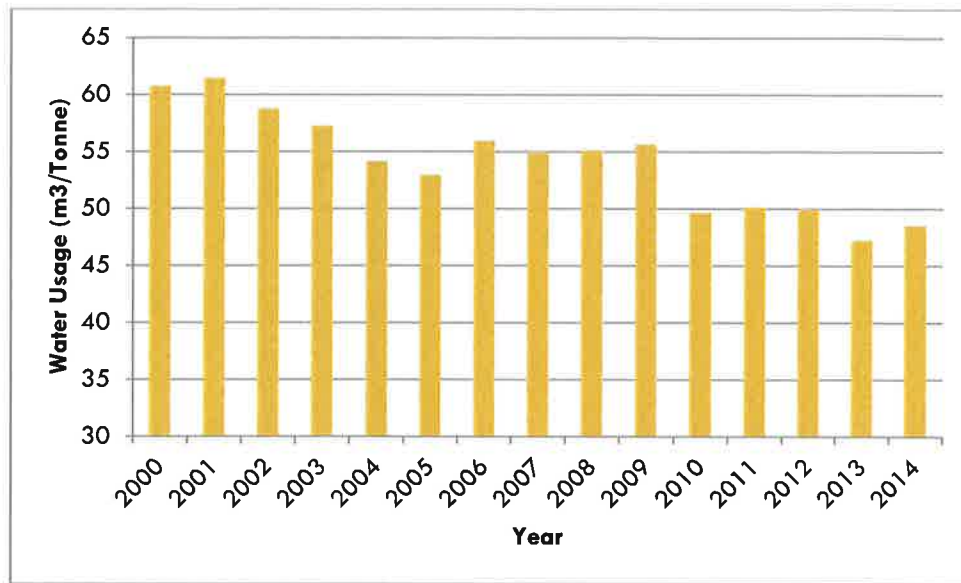


Figure 2. Average Water Productivity (m³/Tonne) for Alberta's pulp and paper mills, 2000-2014.

THE ROLE OF TECHNOLOGY

Technology has played a big part in achieving the above improvements. The 2009 CEP plan and the 2011 update both listed a number of technological improvements that Alberta's pulp and paper mills had, or were planning to implement. An update on some of these initiatives is provided as follows:

- The Slave Lake Pulp Mill implemented a bio-methanation project with power generation to recover cooling water back into the process. The anticipated result was less water required for cooling three blowers and water reduction as polymer make down requirements for sludge dewatering is reduced. *2015 Update: This project, now in the commissioning phase, has already seen blower reduction and reduced polymer usage.*
- Weyerhaeuser at Grande Prairie installed a new evaporator plant and a cooling tower. They have also made a process change in that they now capture wood room effluent and use it for ash sluicing, thus replacing the use of fresh water. *2015 Update: These changes have reduced water use at the mill by about 15%.*
- ALPAC started a bio-methanol production process in 2012. *2015 Update: Today, ALPAC uses a portion of the bio-methanol produced to make a pulp whitening agent. They also sell any surplus commercially.*
- Alberta Newsprint Company at Whitecourt installed a dispersed aeration system that selectively removes contaminants from wastewater streams from the paper machine, allowing reuse of these streams in the process, thereby decreasing water usage. Additionally, in 2014, a treated final effluent recovery/re-use project took up about 20% of effluent back into the mill's water supply

intake. *2015 Update: ANC is currently evaluating new sludge dewatering technology that uses up to 1000 litres per minute less water than the current dewatering system. This project is currently on the 2016 capital project list.*

- Millar Western at Whitecourt initiated a bio-methanation project which utilizes whitewater to generate biogas using an anaerobic hybrid digester to pre-treat waste water in advance of existing aerobic treatment system, generating power and steam. Recovered organic material is converted to a biogas that is cleaned and then used to generate green electricity. *2015 Update: This work is expected to reduce fresh water usage by 10% and organic content in final effluent discharges to the Athabasca River by 65%.*

Did you know?

Water is a key ingredient in the pulp making process. Water pumped from the river is cleaned and used throughout the process, often recycled several times to maximize efficiency. Prior to returning it to the river, the waste water is treated. This might include settling out solids, cooling the water down and using microscopic bugs to consume organic materials in the effluent. All discharges to the river are closely monitored and regulated by the Federal and Provincial governments to ensure water quality and other measures of aquatic health in the receiving waterbody is maintained. Interestingly, biological solids from mill effluent systems are used for a variety of purposes including as nutrients to enhance agricultural crop and tree growth; for soil remediation when combined with hydrocarbon contaminated soils, or greenhouse potting soils after being composted. Nothing goes to waste!

THE ROLE OF PARTNERSHIPS

As important as reducing water use is, it is only one consideration. The health of water bodies that supply and receive waters is equally important. Pulp and paper mills are required by law to participate in the federal environmental effects monitoring program. They also voluntarily participate in a number of provincial research, monitoring and assessment programs.

The 2009 Forest Sector CEP report identified a number of research initiatives being carried out by the Forest sector. Much of this work is carried out through partnerships. One such partnership is the Foothills Research Institute, which undertakes applied research and promotes understanding about the effects of industry on the landscape. Another research partnership is the Ecosystem Management Emulating Natural Disturbance (EMEND) Project, a large-scale harvest experiment to test effects of residual forest structure on ecosystem integrity and forest regeneration.⁴

Additionally, Alberta's Forest sector actively participates in the provinces water partnerships including the provincial Alberta Water Council (AWC) and several regional Watershed Planning and Advisory Councils (WPACs). At the AWC, the AFPA represents the Forest sector at the board level, as well as on project teams such as the Water CEP Project Team. At the regional level, AFPA member organizations support the work of the Mighty Peace Watershed Alliance, the Athabasca Watershed Alliance, and the

⁴ For more information about these research initiatives, see <https://friresearch.ca/> and <http://www.emendproject.org/>.

Lesser Slave Watershed Council in assessing the state of these watersheds and in developing integrated watershed management plans.⁵

OPPORTUNITIES AND CHALLENGES

Although they have collectively made significant investments in and may already operate with the best available technology (which has led to significant improvements in water CEP over the past decade), Alberta's pulp and paper mills continue to look for opportunities to improve operations. This commitment to continuous improvement is reflected in the environmental certification programs they participate in, as well as several unique initiatives such as Chain of Custody programs and support for the Canadian Boreal Forest Agreement.

Going forward, it's hard to predict what additional opportunities, technologically, economically or otherwise, may arise for improving the Forest sector's CEP efforts. Similarly, it remains to be seen what challenges will arise. Key provincial initiatives such as regional planning, integrated land and watershed management, and the province's current focus on climate change will likely affect the forest industry in multiple ways.

Certification, Chain of Custody and the Canadian Boreal Forest Agreement

Already subject to federal and provincial regulatory systems, all of Alberta's pulp mills have also sought and achieved certification under a number of independently audited environmental standards programs. Certification provides objective confirmation that trees are being harvested legally, forests are being managed sustainably, and mills are operating with the best environmental standards. Some of these certification programs include:

- Canada Standards Association (CSA)
- FORESTCARE
- Forest Stewardship Council (FSC)
- International Organization for Standardization (ISO)
- Programme for the Endorsement of Forest Certification (PEFC)
- Sustainable Forestry Initiative (SFM)

Additionally, a number of mills are now seeking or have obtained "Chain of Custody" certification. Chain of custody (COC) programs review a company's system for tracking their products, from the delivery of certified fibre delivered to the mill through to the sale of certified pulp to the end customer (forest-of-origin to market). It also enables companies to make verifiable claims regarding the amount of certified fibre in their products. Currently, COC certification can be obtained through the PEFC and the FSC.

Going one step further, in addition to operational and COC certifications, a number of Alberta's forest companies are signatories to the Canadian Boreal Forest Agreement. This 2010 agreement between several forest companies and environmental organizations brings these two sectors together to work towards *"a stronger, more competitive forestry industry and a better, protected, more sustainably managed boreal forest."*

CONCLUSION: ACHIEVING GOALS

⁵ For more information about Alberta's water partnerships, see <http://www.albertawatercouncil.ca/Partnerships/tabid/60/Default.aspx>.

From this 2015 update, it is clear that the Forest sector continues to contribute to the province's *Water for Life* strategy by meeting the goals of its Water CEP plan. That is, the Forest sector has:

- Kept water withdrawals and returns from Alberta's seven pulp and paper mills at 2009 (63% of licensed volumes) or improved levels (averaged 58% over this reporting period);
- Utilized research and technology to improve productivity by 5% over the next decade (actual improvement from 2009 to 2014 was 13%); and
- Continued to work with partnerships to improve water quality and to ensure aquatic ecosystems are healthy.



Water for Life states that “Albertans must become leaders at using water more effectively and efficiently, and will use and reuse water wisely and responsibly.” By implementing best available technologies, and by participating in partnership initiatives for research, monitoring and assessing aquatic ecosystem health, Alberta's pulp and paper industry has and will continue to contribute to this *Water for Life* principle.

ACKNOWLEDGEMENTS



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