WATER BULLETIN

Fall 2017

After an impressive start to the runoff season, with some gauging stations recording historically high flows, the transition to lower flow conditions has been dramatic. Despite the higher than normal accumulation of snow in Winter 2017, low flow conditions occurred quicker than normal in some basins leading to flows dropping to historical lows. Of the 400+ stations monitored by Alberta Environment and Parks (AEP), roughly 30% have been reporting flows below established in-stream objectives or environmental flow needs (e.g. Q80 values). Figure 1 shows the general locations in the province where this is occurring (yellow and red coloured symbols), along with basins under restrictions on angling and diversions from temporary and long-term Water Act licences (shown in purple).

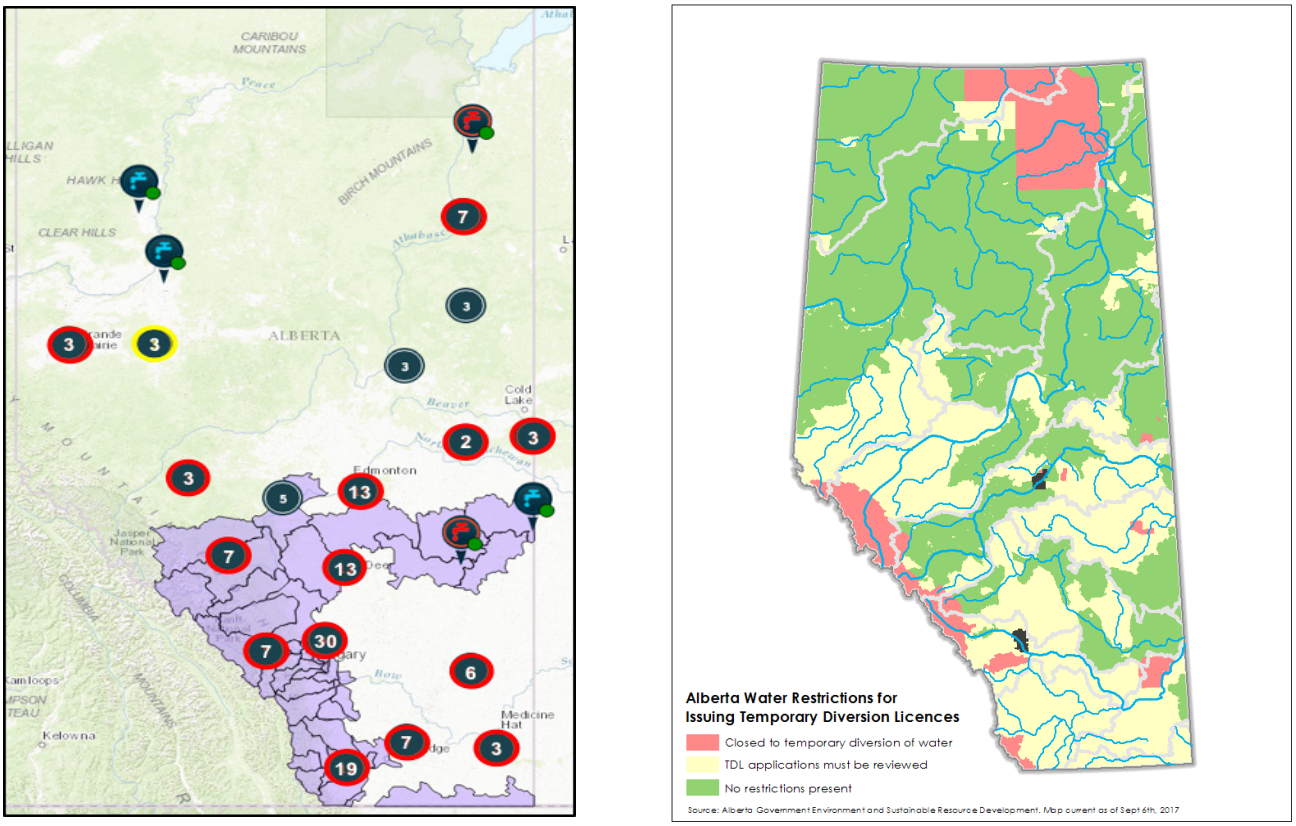

Figure 1. Areas of Alberta where AEP is reporting flow conditions outside of in-stream objectives, and where AER is indicating water restrictions (yellow areas in right panel). *(Note: ledt panel shows restricted sub-basins shown in purpe; areas with gauges reporting flows approaching, or below, in-stream objectives are shown in yellow and red, respectively)*

The low flow conditions this year have prompted the Alberta Energy Regulator (AER) to restrict water diversion activity across much of the province. The areas affected this year are shown in Figure 1 (yellow shaded areas). In the restricted areas, licensees have been advised to review the conditions of their Water Act approvals, and no further surface water temporary diversion licence (TDL) applications are being accepted.

The low flow conditions in the province have led to challenges for obtaining water supplies for various activities. One of the hardest hit areas has been the Smoky River Basin, where operators stewarding to the Watino gauging station have been struggling with inaccurate gauge readings (see late August 2017 readings in Figure 2).

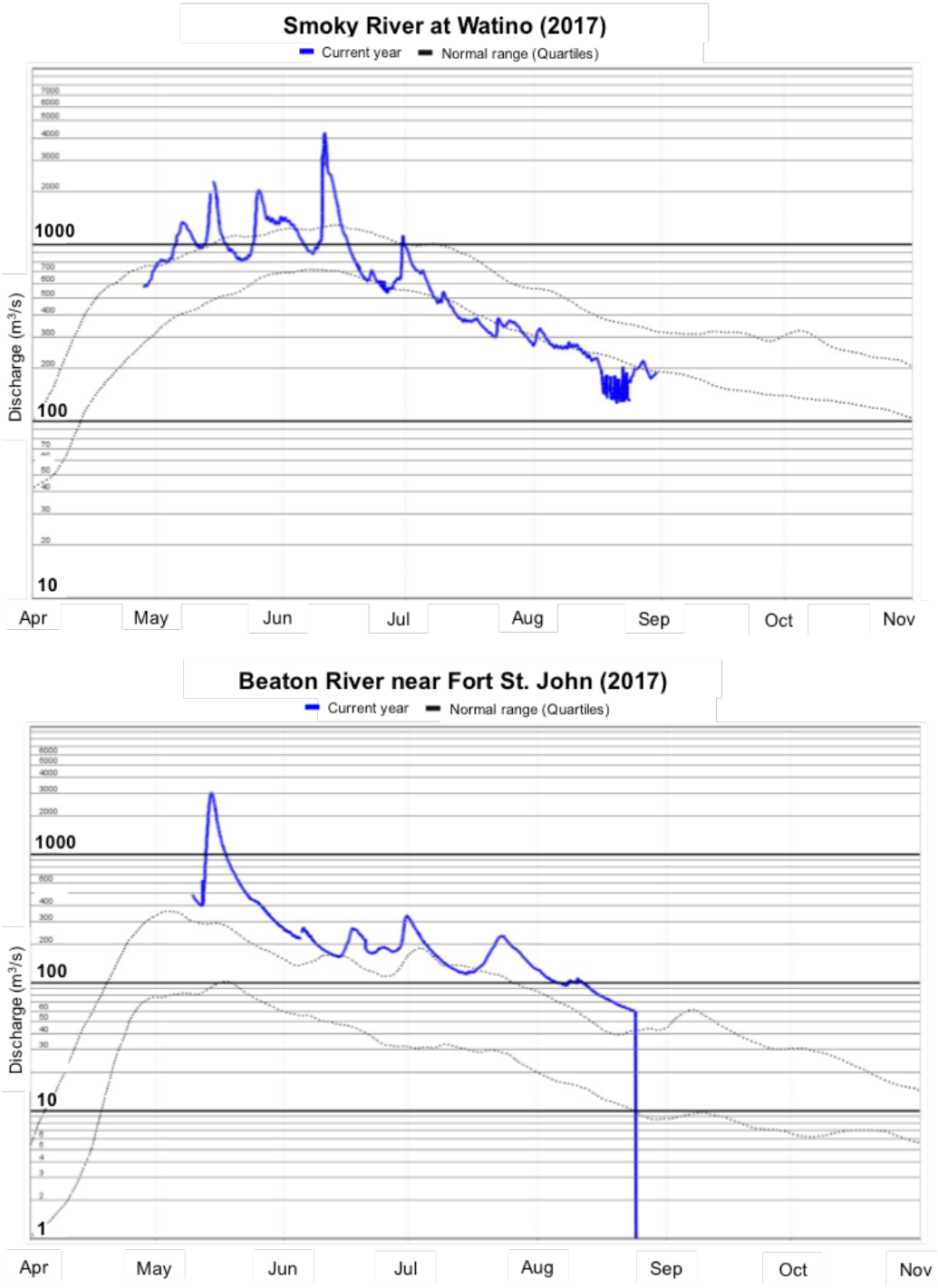

Figure 2. Measurement issues at the Watino (07GJ001) and Beaton (7FC001) gauging stations. *(Source: Alberta Environment and Parks)*

Damages to that station, and others experiencing extreme runoff conditions this spring (e.g. Beaton River – Figure 2), is the cause, with the Water Survey of Canada scrambling to rectify the situation. In the meantime, operators have had to closely monitor conditions and hope for rain as the dry season continues to have its adverse effect on water availability. Meanwhile, those with long-tern water licences and associated storage strategies have managed to dodge Mother Nature's bullet this year by having sufficient supplies to conduct business.

Flow conditions have also shown considerable variability in timing from year to year. Using the Berland station in the Athabasca River basin as an example (Figure 3), the substantial difference in early and late season flows is evident. Consideration for such variability in timing should factor into existing, or pending, water security plans and diversion management strategies for those activities reliant on reliable water supplies. This underscores the need to consider how conditions are shaping up for each flow-year by tracking key indicators and trends as the season develops.

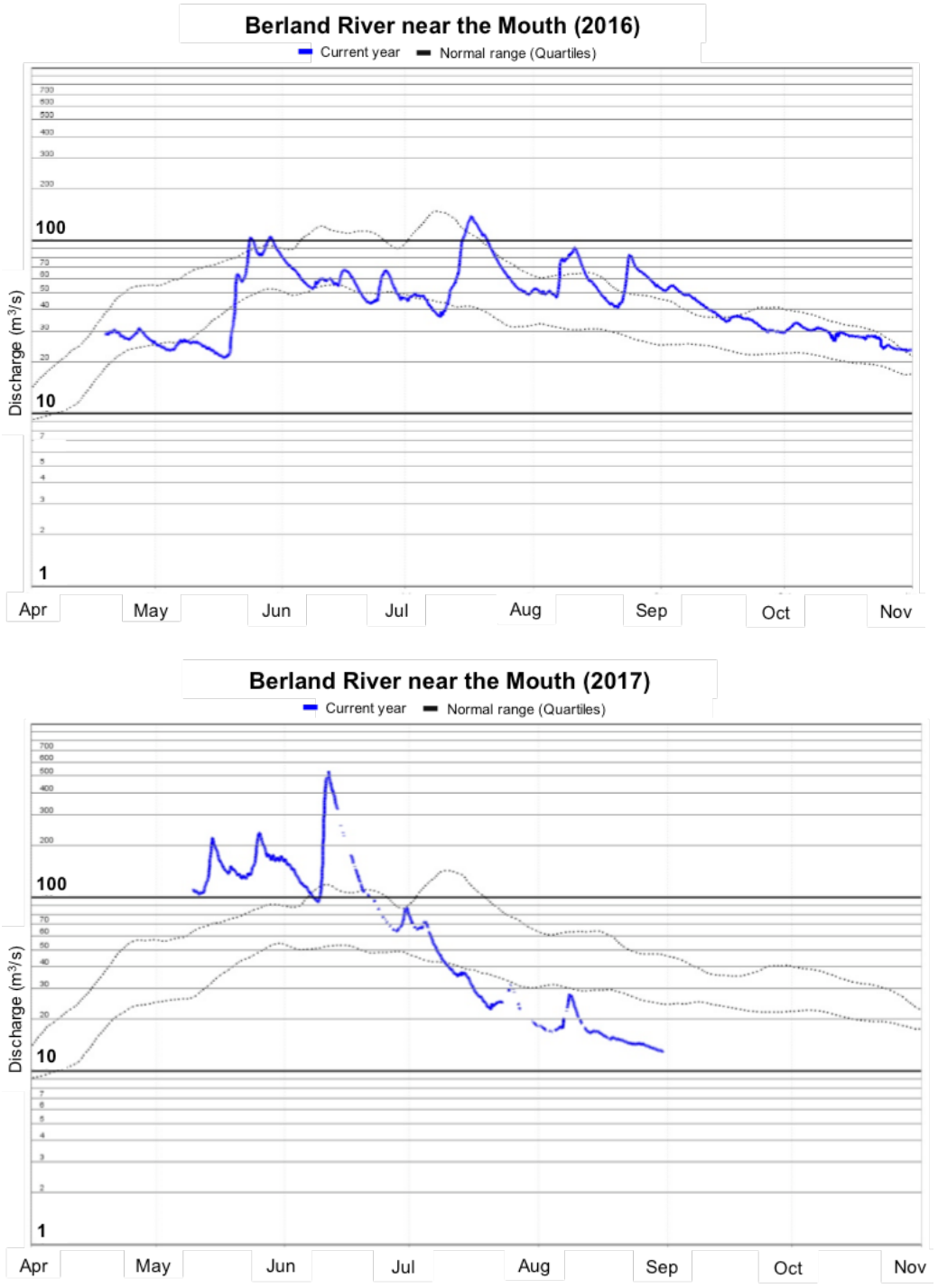

Figure 3. Annual variability in timing of river flows for Berland River near the Mouth (07AC007). *(Source: Alberta Environment and Parks)*

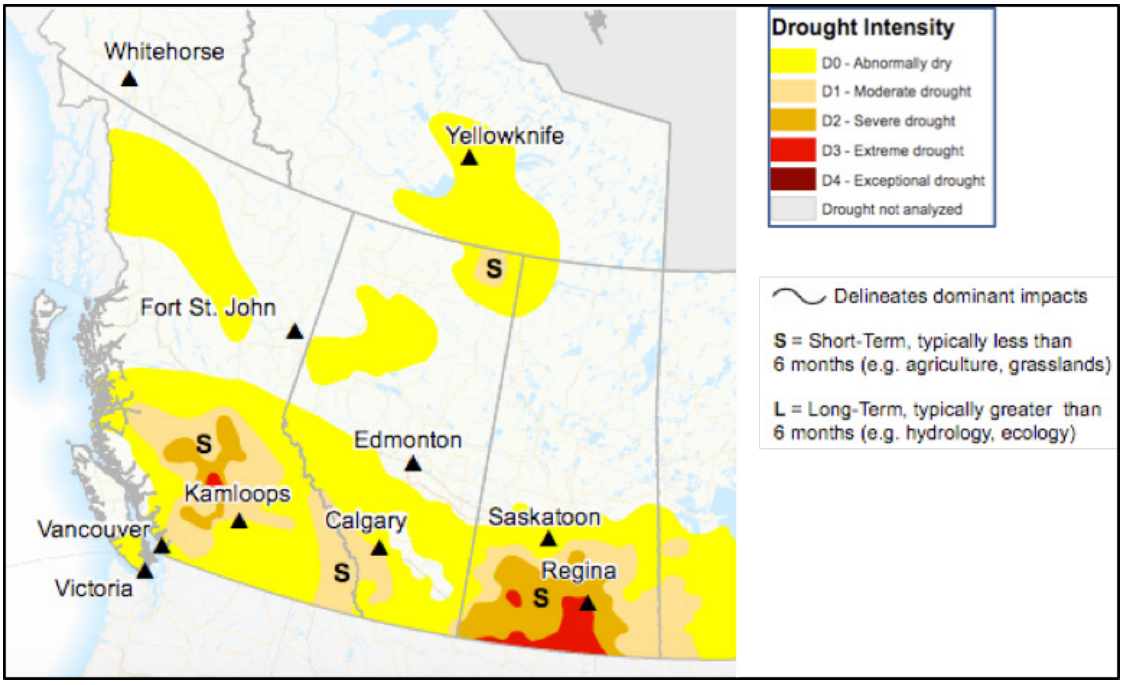

Figure 4. Drought conditions in Western Canada as of July 31, 2017. *(Source: Agriculture and Agri-Food Canada)*

The continued lack of precipitation across Western Canada has led to abnormally dry conditions across much of the southern portions of BC, Alberta, and Saskatchewan.
As a result, certain regions are now beginning to experience "moderate to extreme" drought conditions (Figure 4).

As noted in the Summer 2017 bulletin, surface water supplies for the remainder of 2017 will rely heavily on convective storm activity, which is still being adversely affected by a persistent ridge of high pressure over the western provinces. This condition is associated with a sustained positive Pacific North American (PNA) pattern influencing the position of the jet stream (i.e. latest PNA value = 1.9 versus historical range of -3.1 to 2.7). Projections for the coming fall and winter seasons indicate a continued drying and warming trend that will likely impact the remaining flow season. As such, the risk of basin closures and restrictions on water diversion activity will only increase as the season progresses. Businesses not prepared for such restrictions may be adversely affected unless a mitigation strategy can be executed with agility.

Did You Know?

Projections for the coming decades indicate a continued shift in river flow conditions to earlier runoff, higher peak flows, and extended low flow periods. Continued vigilance of climate modes, annual conditions, and related trajectories of moisture conditions will prepare you for pending water supply challenges.

Do You Need?

Water Security is something we take seriously. We have developed numerous plans for our clients that have helped them manage through difficult conditions. If you would like to know how a water security strategy can build resilience into your business, let us know. We can help.

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