

North West Water Tool

Ministry of Forests, Lands and Natural Resource Operations – British Columbia

The Ministry of Forests, Lands and Natural Resource Operations (FLNRO) worked with Foundry Spatial Ltd., the Ministry of Environment, and the BC Oil and Gas Commission to develop the Northwest Water Tool to support decisions on water use approvals and planning in northwest British Columbia. It is one piece of information that a statutory decision-maker may use in making a water allocation determination. It is a public-facing application and is available to all British Columbians.

The Northwest Water Tool provides estimates of streamflow for rivers, lakes and streams across the northwest corner of BC. The tool leverages the BC Freshwater Atlas (Gray 2009) to communicate the results of detailed hydrology modeling conducted using a similar methodology to that used in the development of the Northeast Water Tool (NEWT) in Northeast BC (Chapman 2012). Users are able to generate a report describing the hydrology of over 1.1 million watersheds in the region, which also includes information on existing water users in the watershed and other watershed characteristics such as land cover, climate, and predicted future climate change. Environmental flow needs of the watershed are estimated using a concept adapted from the Alberta Desktop Method for Determining Environmental Flows (Locke and Paul 2011), consistent with that used in NEWT.

To access the Northwest Water Tool visit <http://bcwatertool.ca/nwwt/>

Considerations when using the Northwest Water Tool:

1. **Long term averages vs. current conditions:** The Northwest Water Tool presents information on long term average conditions. Inter-annual variations in hydrology are often significant. Actual water availability may differ substantially in any given year. In years of lower than average availability in particular, this may impact existing and proposed water uses.
2. **Estimates based on hydrologic modeling:** The underlying hydrology information used in the Northwest Water Tool was developed through a modeling process, with associated uncertainties. The modeling used 123 hydrometric stations in BC, the Yukon and Alaska to calibrate and validate the model. Modeled runoff was within 20% of the measured runoff for 80.5% of these stations. Median error was -4.2%, and mean absolute error was 13.9%. This level of uncertainty is considered reasonable in the hydrology modeling literature. In the deployment of the Northwest Water Tool, subsequent steps were taken to match annual runoff estimates in watersheds associated with hydrometric stations, with long term mean annual runoff from the hydrometric stations used in the model.
3. **Model domain:** The comments in No.2 above describe the performance of the model in relation to the gauged watersheds used for calibration and validation in the modeling exercise. These gauged watersheds have a range of characteristics when considering factors such as elevation, size, climate, glacier cover, and land use among others. Areas exist within the study area that are outside of the range of characteristics of the gauged watersheds. Model performance within these areas is unknown.

4. **Water allocation data:** The Northwest Water Tool includes information on currently active short term approvals and long term licenses issued under the *Water Act*. This information is drawn from digital databases which may not fully represent all conditions specified in a license or approval. In applying the rules used within the Northwest Water Tool to summarize existing water allocations, conservative assumptions have been made which typically over-estimate the actual amount of water licenses. The original documents associated with an approval should be considered the authoritative source in all cases of disagreement with results presented within the tool. Digital copies of the original water license documents are available at: http://www.env.gov.bc.ca/wsd/water_rights/scanned_lic_dir/
5. **Watershed boundaries:** The BC Freshwater Atlas (FWA) is used to generate watersheds associated with waterbodies. Underlying errors in the FWA may lead to incorrect representations of hydrologic connectivity, and in turn to errors in the watershed based estimates of hydrology and other characteristics. As such, no guarantee of accuracy may be provided.

References:

- Chapman, A., B. Kerr, D. Wilford. 2012. Hydrological Modelling and Decision-Support Tool Development for Water Allocation, Northeastern British Columbia; in Geoscience BC Summary of Activities 2011, Geoscience BC, Report 2012-1, 81-86.
- Locke, A., and A. Paul. 2011. A Desk-top Method for Establishing Environmental Flows in Alberta Rivers and Streams. Alberta Environment and Alberta Sustainable Resource Development.
- Gray, M. 2009. The BC Freshwater Atlas. Streamline Watershed Management Bulletin, Vol.12/No.2, 24-26.