# Pilot Water Allocation Tool

## User Guide

**BCER** BRITISH COLUMBIA ENERGY REGULATOR

BRITISH COLUMBIA

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# About

The Pilot Water Allocation Tool (PWAT) was developed for the Province of BC by Foundry Spatial Ltd. to support sustainable water management decisions in the pilot region (defined as the Blueberry, Upper Beatton, and Lower Sikanni Chief Water Management Basins). PWAT applies the policy and guidelines developed collaboratively between the Province of BC and Blueberry River First Nations as described in *Decisions on Applications for Water Diversion and Use in the Blueberry, Upper Beatton, and Lower Sikanni Chief Watersheds: Phase Two*. Within each module, footnotes are used in the generated reports to provide references for data sources and further information.

# Navigation

## Overview of modules

**I. Watershed Reporting**
Use the Watershed Reporting module to generate a detailed report about the upstream watershed of a specific stream, lake, or river within the pilot region. The watershed report details the water supply and demand of the selected water body, and other watershed characteristics such as annual and weekly hydrology, allocations, landcover, and climate. On the map, markers identify the location of existing water allocations, which can be clicked for more detail.

**II. Water Use Application**
Use the Water Use Application module to evaluate a proposed new water diversion in the pilot region. This module takes user-supplied information about the location, timing and rate of diversion, and generates a report that evaluates the ability for the water source to accommodate the proposed diversion.

**III. Streamflow**
Use the Streamflow module to view streamflow data in the pilot region, including data from historical and real-time monitoring stations, and user-supplied data. On the map, markers identify the location of streamflow stations throughout the pilot region, which can be clicked for more information, including the 7-day average flow, flow duration, and monthly mean flow.

**IV. My Notifications**
Use the My Notifications module to create, view, and edit notifications for monitoring locations within the pilot region. Notifications can be set up at specific locations to deliver regular flow summaries, or notify you when specific flow criteria are met or new data is available. To access My Notifications, you must log into PWAT using your BCeID or IDIR.

### V. Observations

Use the Observations module to contribute, view, and manage discrete observations of streamflow. Observations uploaded to this module will also be available to view in the Streamflow module. To access the Observations module, you must have a BCeID or IDIR, and submit a request for authorization (see below, *Request access to "permission-required" modules*).

### VI. QP Management

Use the QP Management module to manage QP (qualified person) station permissions. To access this administrative module, you must log in using a BCeID or IDIR, and be an authorized QP Manager.

### VII. Moderights

Use the Moderights module to upload and manage diversion schedules associated with active short term use approvals and licences. To access the Moderights module, you must log in using a BCeID or IDIR, and submit a request for authorization. Access to Moderights is intended only for statutory or delegated decision makers who issue water allocations.

## Features overview & getting started

### Navigation

Navigate between the various modules of PWAT using the sidebar, also commonly referred to as the navigation bar. Different modules will be available depending on whether you are logged in, and the authorizations associated with your account. The login button is found near the bottom of the sidebar.

If you need information on how to interpret the tool features, use the Help button, located at the bottom of the sidebar.

Use the navigation within the tool (i.e. "X" cancel buttons, "Close Report" button, etc.) instead of the navigation within your browser, to avoid losing your work.

### Request access to "permission-required" modules

In PWAT, several modules require preauthorization to access, including Observations, QP Management, and Moderights. To request permission, please request to change your role through the [PWAT Help Portal.](#)

### Map features

The map-based modules have many common features, including the following:

1. **Map style switcher:** The map style switcher allows you to switch between the default base map and the satellite map.
2. **Geolocation:** The geolocation button orients the map around your current location.
3. **Search bar:** The "Search" bar in the upper left allows you to search based on specific criteria. Use the dropdown menu to choose a preferred search method, including search by:
    1. Place name
    2. Latitude/longitude coordinates
    3. Universal Transverse Mercator (UTM) coordinates
    4. Watershed Feature Id (WFI) - use WFI search to reproduce analysis for a specific location *
    5. Station ID *(Streamflow only)*
    6. Station Name *(Streamflow only)*
4. **Zoom controls:** The zoom controls allow you to zoom in ("+") and out ("-") of the map. You can also zoom in using the scroll wheel on your mouse, or pinch and expand on touchscreen devices.
5. **Filters**: The filters feature allows you to adjust which markers are visible on the map. Depending on the module, there are several different filters that can be applied to the map:
    1. Allocations filter *(Watershed Reporting, Water Use Application modules)*: This filter allows you to view allocations based on type, purpose, agency, and status. Each of these categories have subcategories with which you can specify your search.
    2. Streamflow filter *(Streamflow module)*: This filter allows you to view based on whether the station's data is current or historical.
    3. Diversion schedule filter *(Moderights module):* This filter allows you to view based on whether the water right's diversion schedule has been autogenerated or reviewed.
    4. Reset filters *(all modules):* This filter allows you to reset all filters that are applied.
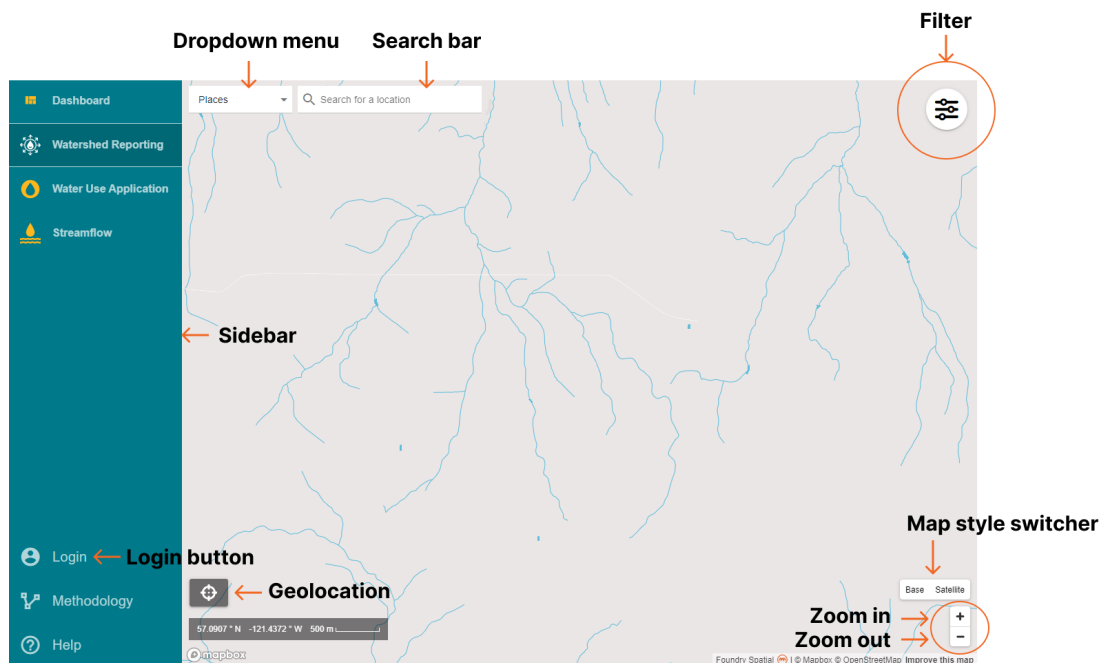
# Module-specific features

## I. Watershed Reporting

### Generating a report

To generate a Watershed Report, either zoom into a location using your mouse, the "+" and "-" buttons, or choose your preferred method of searching (places, UTM, WFI, or latitude and longitude coordinates) by clicking the dropdown menu on the search bar. Once at the area of interest, click on the river, stream, or lake. The selected watershed will be highlighted on the map, and the "Results" box will appear.

The "Results" box displays the following:

A.  Name of the body of water
B.  WFI of the point you selected
C.  "Show Report" button
D.  Clear watershed (x) symbol

To generate a report, click "Show Report." To close the results box and make the orange watershed disappear, use the clear watershed (x) symbol located in the upper right corner of the results box.

To view the notes, references, and methods of the Watershed Report, scroll to the bottom sections of the report.

### Report content

**1. Overview**

The overview displays summary information about the selected watershed, including:

A.  The name of the water body (if it is a named water body)
B.  The drainage hierarchy for the point you selected, as you move downstream towards the ocean (e.g.,Beatton River, Williston Lake, Peace River, MacKenzie River, Arctic Ocean)
C.  Coordinates for the point you selected
D.  The upstream watershed drainage area (km2 )
E.  The minimum, median and maximum elevations in the watershed (metres above mean sea level)
F.  The mean annual discharge from the selected area (m3/s)

**2. Annual Water Supply**

This section describes the annual water supply for the selected location. On the map, the query watershed is outlined in orange, and the watershed associated with the next downstream confluence is outlined in purple. The table below the map displays summary statistics for both watersheds.

**3. Weekly Water Supply**

This section displays estimates of weekly flow distributions. The first chart displays weekly data for all weeks of the year, and the second chart displays more detail for user-selected weeks.

To view a numerical summary of percent exceedance values associated with each week, hover over the week on the chart.

For each week, the following data is also provided:

A. **Maximum Water Allocation amounts:** Using the calculations described in *Decisions on Applications for Water Diversion and Use in the Blueberry, Upper Beatton, and Lower Sikanni Chief Watersheds: Phase Two*, jointly developed by the Blueberry River First Nations and the Province of BC, maximum cumulative water allocation amounts are displayed for each week.

B. **Existing Allocations:** Existing Allocations accounts for the volume of water already allocated within the selected watershed. This information on active water licences and applications, and short-term use approvals (collectively, 'allocations') in the watershed have been extracted and summarized from digital government databases. These digital databases include a subset of details about each individual allocation. Where important, users should refer to original documents associated with each allocation to understand the full set of conditions.

**4. Demand Summary**

The demand summary provides the median flow, maximum water available for allocation, and existing allocations within the query watershed for each week of the year. Weeks where existing allocations meet or exceed the maximum water allocation are highlighted.

**5. Allocations By Industry**

Water licences and use approvals (authorizations) in British Columbia are administered under the Water Sustainability Act. Existing, active water authorizations in the watershed are summarized by water source, type, and term in the table below. In this section, each individual water authorization is listed with information on the specific water source and quantity, ordered by seniority.

A table depicting the existing and active water allocations, regulated under the Water

Sustainability Act, are summarized by water source, the term (licence or short term use application), and type (industry grouping categories). Below the chart is a definition of the water use purposes that make up each industry grouping category, under the heading Purpose Use Code Groupings.

**6. Allocations**

The existing allocations and active water authorization applications, managed under the Water Sustainability Act, within the query basin are summarized in a table that shows the authorization name, number, POD, start and end date, quantity, flag, type, and status. In the web report, the authorization can be filtered by source, term, and purpose.

**7. Landcover**

This section presents characteristics of land cover and topography for the query watershed, including the type of landcover as its associated area and percentage of the watershed.

**8. Climate**

The section presents historic "climate normal" conditions and predicted future changes in temperature and precipitation for the query watershed. The climate normal data represent the historical period and is based on modeling by the Climate WNA project team (UBC, University of Alberta, BC MFLNRO). The future climate data represent estimates for the 2041-2070 period. Three future climate scenarios were selected to provide a range of generally hot/dry, warm/very wet, and moderately warm/wet conditions for scenarios A, B, and C respectively.

**9. Topography**

This section presents the cumulative distribution of elevation by area in the query watershed.

## Downloading the report

To download a PDF of the Watershed Report, select "Download PDF" at the bottom of the sidebar, and select the report elements you would like included in your report. When you select "generate report", a new tab will open with a web version of the report - to save this report, select CTRL + P > Save to PDF.

To download a CSV of the Watershed Report, select "Download CSV" at the bottom of the sidebar. Once you have selected the elements you would like to include, and click "generate report", the CSV will download as a zip file.

## II. Water Use Application

*NOTE: The Water Use Application Reports produced by the PWAT are intended to be used in support of applications for water. The PWAT system does not produce the application itself. Applications for water follow processes designed by the Province of BC, and the BC Energy Regulator (for oil and gas purposes only). Please contact FrontCounter BC or the BC Energy Regulator for more information on the application process.*

### Generating a report

To generate a Water Use Application report, either zoom into a location using your mouse, the "+" and "-" buttons, or choose your preferred method of searching (places, UTM, WFI, or latitude and longitude coordinates) by clicking the dropdown menu on the search bar. Once at the area of interest, click on your point of diversion. The watershed associated with your point of diversion will be highlighted on the map, and the "Results" box will appear.

The "Results" box displays the following:

- Name of the watershed associated with the selected point
- WFI of the point you selected
- "Begin Water Use Application" button
- Clear results (x) symbol

Click "Begin Water Use Application" to move to the application form. To close the results box and make the orange watershed disappear, use the clear results (x) symbol located in the upper right corner of the results box.

### Application form

In order to generate a water use application report, you must input information about your point of diversion, including:

A. Application type
    a. Select licence or short-term use approval
B. Location name
C. Dates of diversion
    a. For short term use applications, you must specify a start date and end date range that is less than or equal to two years. For licence applications, specify the start and end dates for the season you wish to divert water each year.
D. Maximum rate of diversion
    a. Maximum rate of diversion is also known as the pump rate. To move to the next step, select "confirm".
E. Daily volume

      a.  To enter a daily volume, you must first confirm a maximum rate of diversion. The default daily volume is calculated based on the maximum rate of diversion. If needed, adjust the daily value accordingly.

  F.  Gauge for extrapolation

      a.  Select either the recommended gauge, or override using the dropdown menu. Gauge selection overrides will require you to justify your choice of gauge.

Once these fields are complete, select "generate report".

To view the notes, references, and methods of the Water Use Application Report, scroll to the bottom sections of the report.

## Report content

### 1. Overview

The overview displays summary information about the selected watershed, including:

  A.  The name of the water body (if it is a named water body)
  B.  The drainage hierarchy for the point you selected (e.g., Fontas River, Fort Nelson River, Liard River, Mackenzie River, Arctic Ocean)
  C.  Coordinates for the point you selected
  D.  The upstream watershed drainage area (km2 )
  E.  The minimum, median and maximum elevations in the watershed (meters above mean sea level)
  F.  The mean annual discharge from the selected area (m3/s)
  G.  The maximum rate of diversion (m3/s)
  H.  The daily volume (m3)
  I.  The location name
  J.  The start/end date of diversion
  K.  The gauge selected for extrapolation, and justification (if applicable)
  L.  The WFI for the selected point

### 2. Selected Watershed

On the map, the query watershed is outlined in orange, and the watershed associated with the next downstream confluence is outlined in purple.

### 3. Weekly Water Supply and Demand

This section displays estimates of weekly flow distributions, and relates them to the maximum water allocations, existing allocations, and existing plus proposed allocations for each week. To view a numerical summary of these values for each week, hover over the week on the chart.

For each week, the following data is provided:

A. **Maximum Water Allocation amounts:** Using the calculations described in *[Decisions on Applications for Water Diversion and Use in the Blueberry, Upper Beatton, and Lower Sikanni Chief Watersheds: Phase Two](#)*, jointly developed by Blueberry River First Nations and the Province of BC, maximum water allocation amounts are displayed for each week.

B. **Existing Allocations:** Existing Allocations accounts for the volume of water already allocated within the selected watershed. This information on active water licences and applications, and short-term use approvals (collectively, 'allocations') in the watershed have been extracted and summarized from government databases. These digital databases include a subset of details about each individual allocation. Where important, users should refer to original documents associated with each allocation to understand the full set of conditions.

C. **Existing Allocations + Proposed:** This value accounts for the water that has already been allocated within the selected watershed plus the proposed diversion, according to the application form inputs. Existing plus proposed allocations represents the total amount of water that would be allocated if the water application was accepted. If proposed allocations, combined with existing allocations, exceed the maximum water available for allocations (MWA) under [the policy](#), the proposed allocation value will be reduced such that the Maximum Water Allocation value is not exceeded.

### 4. Demand Summary

The demand summary provides, for the proposed season of diversion, the median flow, weekly maximum water allocation, existing allocations, and existing allocations with the new proposed diversion. Weeks where water is currently fully allocated, or where it would be fully allocated if the new proposed diversion is approved, are highlighted.

### 5. Diversion Schedule

The diversion schedule indicates permissible maximum daily and instantaneous withdrawals for weeks within the proposed diversion season. Each week is broken into percent exceedance-based ranges of flow. Flow thresholds are listed, which are derived from hydrologic estimates specific to the proposed point of diversion. *[Decisions on Applications for Water Diversion and Use in the Blueberry, Upper Beatton, and Lower Sikanni Chief Watersheds: Phase Two](#)* recommends percentage-based limits on the maximum instantaneous withdrawal across the range of flow conditions. These percentages are applied to each range of flow.

If the proposed diversion is *greater* than the maximum defined by the Framework, the permissible amount is set at the maximum defined by the Framework. When this situation occurs, if the proposed diversion is issued without modification, no further water will be available for subsequent allocation within those ranges of flow.

To hide percent exceedance ranges of flow, select the dropdown labels "hidden sections", and click on the columns you want to remove from view. To hide weeks of the year, click the hide (eye) icon beside the week you wish to hide. To unhide weeks, select the text at the top of the diversion schedule "Click to unhide".

## Downloading the report

To download a PDF of the Water Use Application Report, select "Download PDF" at the bottom of the sidebar, and select the report elements you would like included in your report. Note that Diversion schedule is not available in PDF form (only CSV). When you select "generate report", a new tab will open with a web version of the report - to save this report, select CTRL + P > Save to PDF.

To download a CSV of the Water Use Application Report, select "Download CSV" at the bottom of the sidebar. Once you click "generate report", the CSV will download as a zip file.

## III. Streamflow

The Streamflow module displays streamflow data in the pilot region, including data from historical and real-time monitoring stations and user-supplied data (QP observations). On the map, markers identify the location of streamflow stations throughout the pilot region, which can be clicked for more information.

To generate streamflow charts, either zoom into a location using your mouse, the "+" and "-" buttons, or choose your preferred method of searching (places, UTM, WFI, or latitude and longitude coordinates, station ID, station name) by clicking the dropdown menu on the search bar. Once at the area of interest, click on a streamflow station. The station will be highlighted on the map, and the "Results" box will appear.

The "Results" box displays the following:

    A.  Name of streamflow station
    B.  Network associated with station
    C.  Date range of data available from the station
    D.  Mean annual discharge
    E.  "Show charts" button
    F.  Clear results (x) symbol

Click "Show charts" to view more information about the selected station. To close the results box, use the clear results (x) symbol located in the upper right corner of the results box.
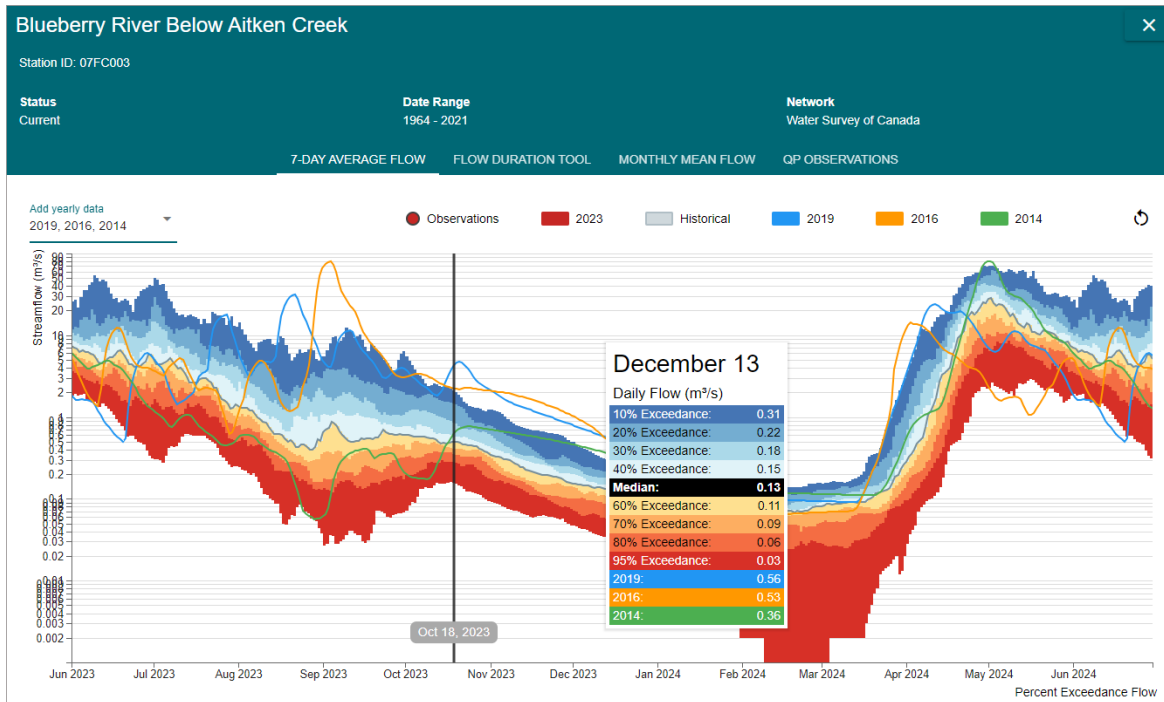
## Streamflow charts

### 1. 7-day average flow

This chart displays the 7-day average flow for the given station, and the specific numerical values for percent exceedance-based ranges of flow and QP observations for each day can be displayed by hovering over the chart. QP observations are represented on the chart as red circles.

<u>Non-QP created stations:</u>

For stations with current year data, the data is from automated measurement devices operated by the Water Survey of Canada. Averaged historical data is displayed on the chart as a grey line. To view individual years of historical data on the chart, use the dropdown labeled "Add yearly data" to select a year.



*Above: 7-day average streamflow chart*

<u>QP created stations:</u>

For QP-created stations, the modeled percent exceedances are displayed on the chart.

**2. Flow duration tool**

The flow duration tool allows for interactive exploration of streamflow characteristics. The charts showing monthly and annual representations of streamflow can be 'brushed' to refine the set of data which is displayed on the flow duration chart, or by using the "year from", "year to", and "month" dropdowns on the top right, you can restrict range of data displayed in the flow duration tool elements.

*Note: flow duration tool is only available when there is sufficient data, and is not available for QP-created stations.*

**3. Monthly mean flow**

This table displays the mean monthly flow for each month of each year in the station's history. Summary statistics for each month across *all* years, including the monthly mean, minimum, and maximum, are displayed at the top of the table.

*Note: The mean monthly flow table is not available for QP-created stations.*

**4. QP Observations**

This table displays all the streamflow measurements uploaded by QPs for the given station. The data associated with QP measurements includes:

    A.  Date and time of observation
    B.  Streamflow discharge
    C.  Barometric pressure
    D.  Calibration frequency
    E.  Calibration method
    F.  Validation method
    G.  Instrument

## IV. My Notifications

Use the My Notifications module to customize notifications about monitoring locations within the pilot region. To access My Notifications, you must log into PWAT using your BCeID or IDIR. Notifications will be sent to the email and/or phone number associated with your login credentials.

### Create notification

To create a notification, select the button "create new notification".

1. Select a station: Choose from the dropdown menu, or select a station on the map.
2. Seasonality: Use this section to determine the times of year to keep this notification active. You can choose a specific month range to keep the notification active, or always keep the notification active.
3. Alert type: Select the type of alert you want to create as follows:
4. Flow Threshold: Notifies when the flow at your location meets specific criteria you have defined.
5. New Upload: Notifies when new observation data are uploaded to the station
6. Current flows summary: Notifies you with a daily, weekly, or monthly update of the current flows for the station.
7. Notify by: Choose the method by which you will receive notifications (email/text).

## Modify and delete notifications:

To modify a notification, locate the specific notification in the notifications table, and select the pencil icon under the Edit column. To delete a notification, use the trashcan icon under the Delete column.

## V. Observations

Use the Observations module to contribute, view, and manage discrete observations of streamflow. Observations uploaded to this module will also be available to view in the Streamflow module (on the 7-day flow chart and QP Observations table).

To access the Observations module, you must submit a request for authorization.

## Upload an observation

To upload an observation, select the button "upload observation" and input the following details:

A. Station
B. Date/time of observation
C. Observational discharge
D. Measurement metadata
    a. Instrument/method
    b. Barometric pressure
    c. Calibration frequency
    d. Calibration method
    e. Validation method
    f. Instrument
E. Attach a file, if applicable

To finish uploading the observation, select "submit".

## Create a station

If you want to upload data to a location that is not already represented by a streamflow station, you must create your own station. This station will be referred to as a QP Station in the Streamflow module network label. Once you create a new station, you will have immediate access to that station (i.e. will not have to request station authorization, as described below.) Please ensure your location details are correct, as you will not be able to delete a station once it has been created.

To create a new station, select the button "create new station" and input the following details:

    A. Location: either select on the map, or type in the coordinates. If you are creating a station at your current location, you can use the geolocation button to center the map at your location.
    B. Station name
    C. Station ID (optional)
    D. Description (optional)

If the new station is associated with compliance monitoring for a specific authorization, it is recommended to add information about the authorization using the optional input fields (licence or approval number, file number, POD number, etc.)

## Request station authorization

If you want to upload observations for hydrometric stations, or QP stations that you did not create, you need to request authorization to upload to the station. To do so, select the button "request station authorization" and input the following details:

- Station (select either from dropdown, or on the map)
- Explanation for station authorization request

## VI. QP Management

The QP Management module is used to manage QP (qualified person) station permissions. To access this administrative module, you must log in and be an authorized QP Manager.

Use the Location Authorization Requests table to view and approve new authorization requests by name, Station ID, Station Name, and Date of Request.

View authorizations by Observation Location or QP Data Manager using the "View by" dropdown menu. To remove a QP's authorization to a specific station, select the edit icon beside the QP name, and select "revoke".

## VII. Moderights

Use the Moderights module to upload and manage diversion schedules associated with active short term use approvals and licences. To access the Moderights module, you must submit a request for authorization.

All water rights in Moderights have by default an auto-populated diversion schedule, generated by using the greatest water diversion rate value between the licenced instantaneous, daily and annual values documented in the licence, converted to instantaneous values. This instantaneous value is used as the diversion amount for all percentiles of flow for all weeks of the year.

### Modify a diversion schedule

To modify a diversion schedule, either zoom into a location using your mouse, the "+" and "-" buttons, or choose your preferred method of searching (places, UTM, WFI, or latitude and longitude coordinates) by clicking the dropdown menu on the search bar. Once at the area of interest, click on the water right, and the "Results" box will appear.

The "Results" box displays the following:

- A. Name of water right
- B. Licence number
- C. Point of diversion (POD)
- D. Priority date
- E. Status date
- F. Quantity
- G. Source
- H. Source type and term
- I. Purpose
- J. Status
- K. Flag

Next, select the button "Modify diversion schedule", where you can upload a diversion schedule and/or edit the diversion schedule directly. To upload a diversion schedule (and override the existing diversion schedule), select "choose file" from the top left corner of the screen. Next, select "Fill rows". Use the instructions on the page for more information on uploading a diversion schedule, including downloading a CSV template.

To hide percent exceedance ranges of flow, select the dropdown labels "hidden sections", and click on the columns you want to remove from view. To hide weeks of the year, click the hide (eye) icon beside the week you wish to hide. To unhide weeks, select the text at the top of the diversion schedule "Click to unhide".

To save changes to a diversion schedule, select "submit" at the bottom left corner of the schedule.

To export a CSV of the diversion schedule, select "Export CSV" at the bottom left corner of the schedule.

To cancel out of a diversion schedule, either select the "Cancel" button at the bottom left of the page, or the cancel (x) symbol at the top right.



*Above: Moderights view of Diversion Schedule*

# Contact information

For further information about the Pilot Water Allocation Tool, contact
CE.NRS.Solutions@gov.bc.ca and include "Pilot Water Allocation Tool"
in the subject line.

For further information about Foundry Spatial, contact: Ben Kerr, P.Ag at
ben@foundryspatial.com