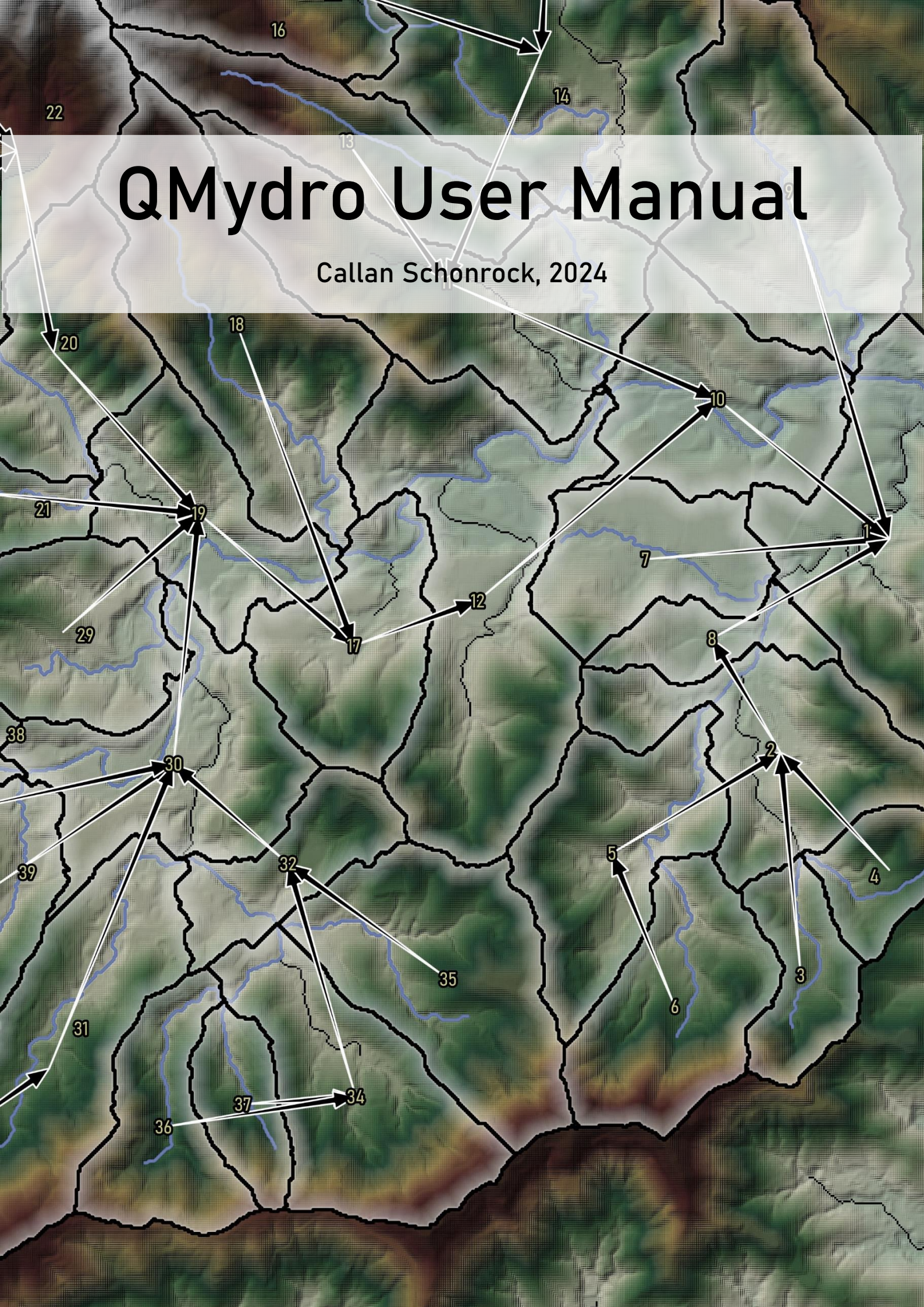


# QMydro User Manual

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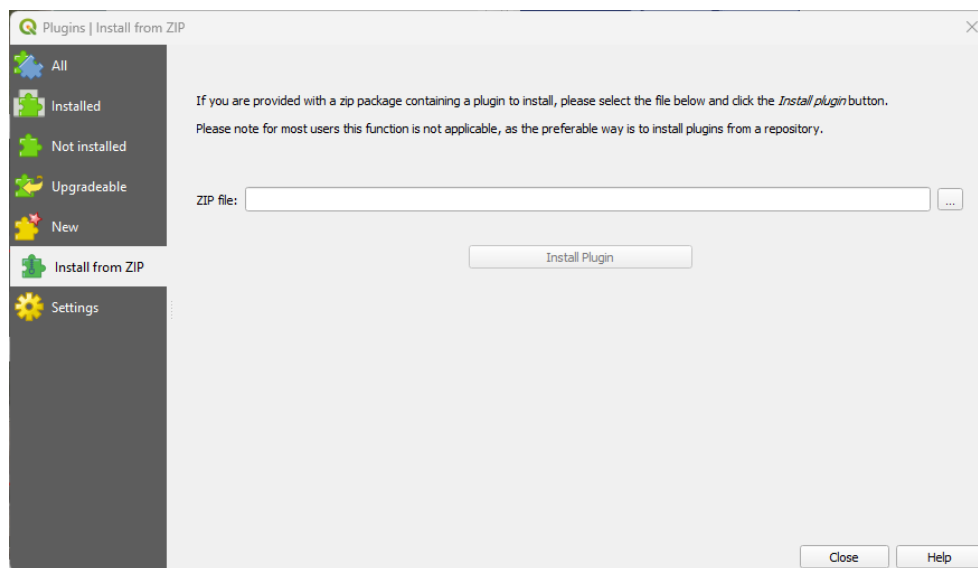
# 1 Introduction

This user manual serves as documentation for the software package QMydro. The QMydro software package consists of the QMydro catchment processing software and the QGIS plugin interface. QMydro facilitates hydrologic model file development, supporting URBS, RORB and Mydro.

## 2 QMydro Installation

The QMydro package downloadable from HydroRepo.com consists of the “QMydro.zip” file for QGIS plugin installable from the QGIS plugin manager “Install from ZIP” as shown in Figure 1. After installation it will appear in the toolbar ribbons of the QGIS instance (Figure 2).

As shown in Figure 3, the QMydro QGIS interface can be used to specify input files for QMydro, an external command prompt will be called in a new tab for computational analysis when QMydro is executed. QGIS will wait for QMydro execution to exit and will not respond to user input while the batch file is open. On first execution, a license key will be required to be entered, obtained from a HydroRepo subscription, subsequent runs will access the cached license key file, and complete the processing. It is recommended that all specified files be within the same local coordinate reference system (CRS).



*Figure 1: QMydro QGIS Installation*

## QMydro Installation

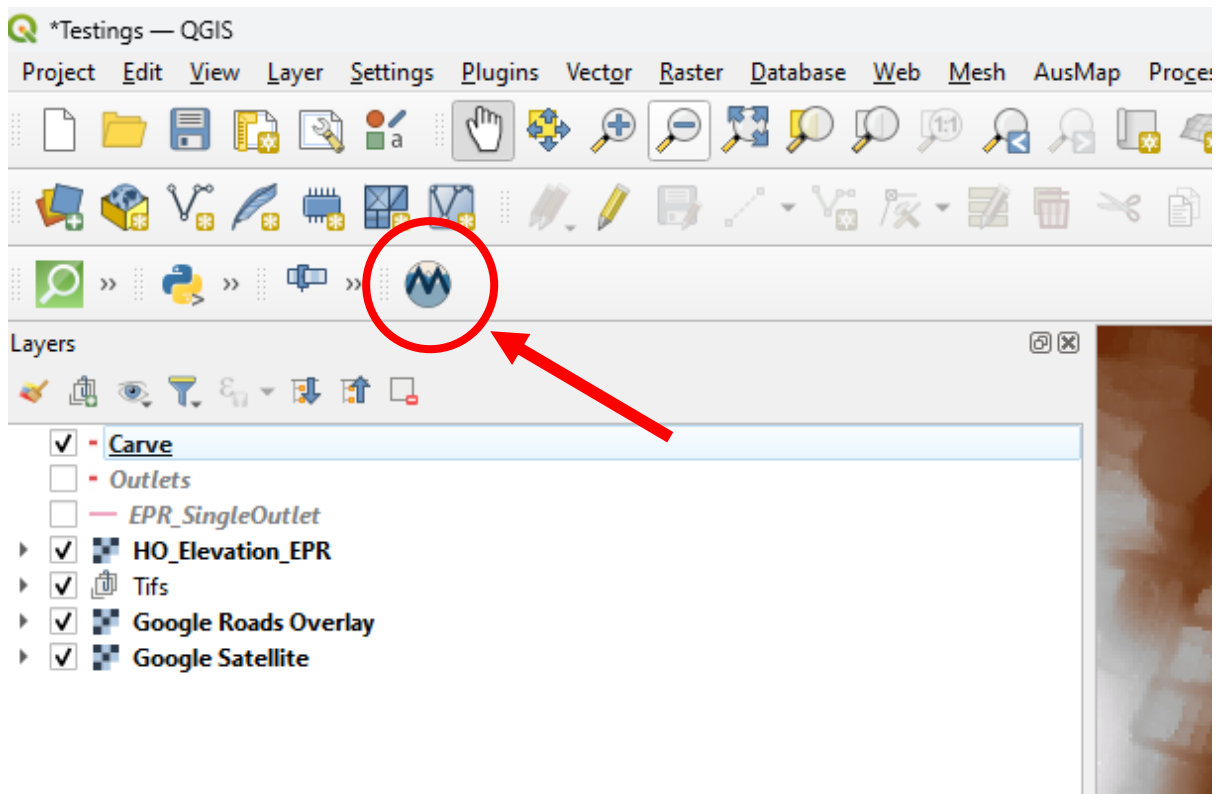


Figure 2: QMydro Toolbar Location

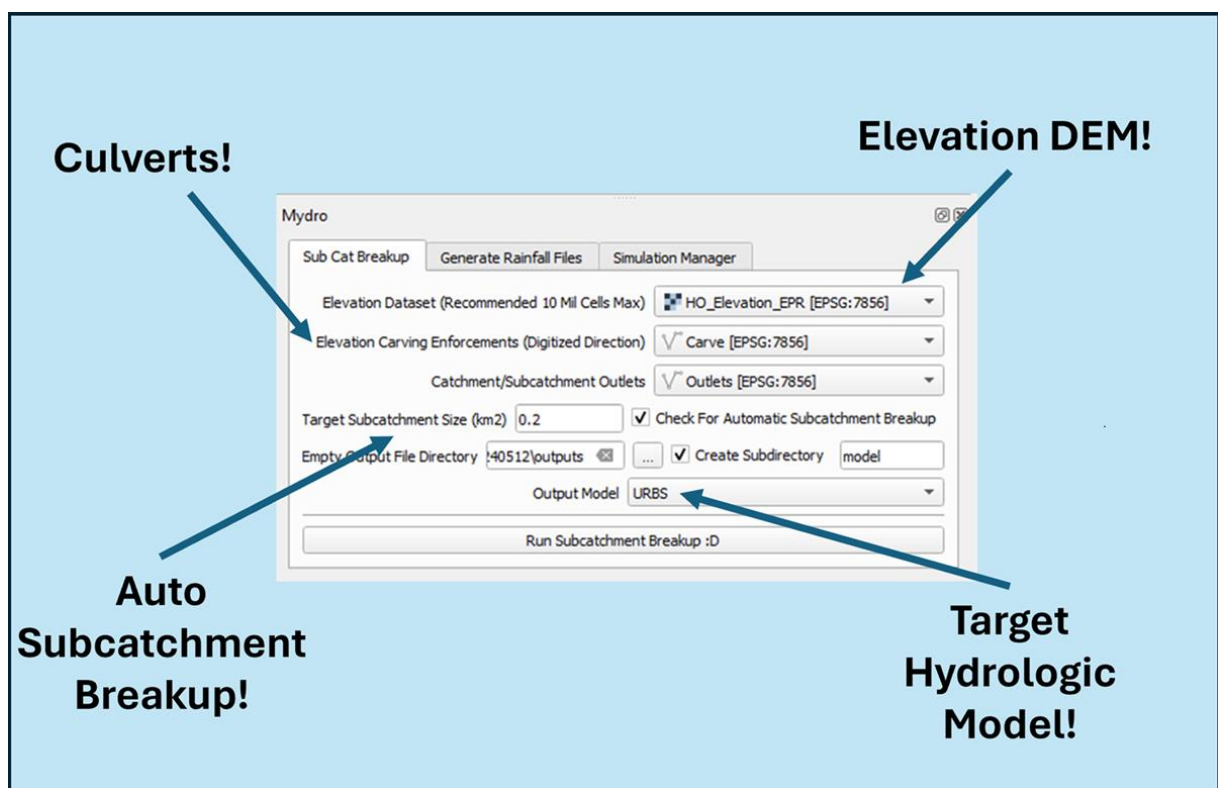


Figure 3: QMydro Plugin Usage

### 3 How it Works

QMydro employs the D8 algorithm to determine drainage direction. One notable drawback of the D8 algorithm is the “Snapping” of flow direction to a maximum of 22.5°. Alternative methods like that proposed of CatchmentSIM use a modification of Lea’s (1992) algorithm, where the drainage direction is defined as a vector where direction is defined from gradient. While this method can yield more precise results for flow path length and slope, the additional precision did not warrant the computational effort.

Both channel and catchment slopes are estimated from the Equal Area slope, where no substantial slope is determined a minimum of 0.0005m/m is adopted.

### 4 Inputs

QMydro has several mandatory and optional inputs, which are recommended to be in the same local projections including:

- Elevation Raster (MANDATORY)
  - Catchment Elevation DEM.
  - GDAL Compatible formats.
  - Cloud Optimized Formats not supported.
- Carving Vector (OPTIONAL)
  - Vector layer (Line Shapefile).
  - Carves elevation from source DEM for hydraulic enforcement of Dams Embankments, Roads etc. Elevation enforcement is undertaken from start to end (digitized direction).
- Outlets (MANDATORY)
  - Vector layer (Line Shapefile).
  - Defines a catchment/subcatchment outlet, drawn over the cross section of the waterway at the outlet location.
  - Multiple final outlets supported as well as self-contained outlets.
- Target Subcatchment Size (OPTIONAL)
  - Automatic breakup target subcatchment size, aimed to breakup at large stream branching.
- Empty Output File Directory
  - It is recommended that this be an empty output directory only containing superseded QMydro results to be overwritten.
- Output Model
  - Currently Supporting Mydro and URBS input files.

The three commandments are listed below.

1. Temporary / Scratch files are not supported
2. WGS84 and Global Projections are not supported
3. GeoPackages are not supported

## 5 Outputs

QMydro outputs several files that can be used for hydrological analysis including:

- Accumulation Raster
- Subcatchment Polygons
  - Subcatchment ID, Area, Upstream Area, Main Stream Length, Time of Concentration (Bransby Williams)
- Subcatchment Nodal Links
  - Centroid to Centroid
- Main Stream Path Vectors
- Mydro/URBS/RORB Build Files

## 6 Running QMydro Standalone

The QMydro Plugin is essentially solely calling a template batch file to run the QMydro executable file. On installing QGIS the QMydro executable is downloaded within the QGIS plugin directory, which can be found from:

QGIS -> Settings -> User Profiles -> Open Active Profile Folder

Python -> Plugins -> QMydro -> scripts -> CS -> delineateCatch.exe

After locating delineateCatch.exe in your system, QMydro can be executed through a batch file similar to that shown in Figure 4, a template batch file is located in the same directory as the executable, do not edit this template batch file, as it is used for the QGIS interface.

```
1 echo off
2
3 REM Replace placeholders with actual paths and arguments
4 set "elevationRaster=C:/Path/To/Rasterfile.tif"
5 set "carve_path=C:/Path/To/carvefile.shp"
6 set "outletsLayer=C:/Path/To/outletsfile.shp"
7 set "outputPath=C:/Path/To/OUTPUTFOLDER/"
8 set "targetSize=1.23"
9 set "modelType=URBS/RORB"
10
11 REM Execute your C# executable with arguments
12 "C:\Users\USERNAME\AppData\Roaming\QGIS\QGIS3\profiles\default\python\plugins\QMydro\scripts\CS\delineateCatch.exe" ^
13   "%elevationRaster%" "%carve_path%" "%outletsLayer%" "%outputPath%" "%targetSize%" "%modelType%"
14
15 pause REM Pause to keep the window open
```

*Figure 4: Standalone QMydro Executable*