Predefined Watershed and Stream Network

The delineation form allows you to opt for a predefined watershed and stream network by selecting the *Use existing watershed* tab.

On this tab you can select the shapefiles containing the watershed and its subbasins (the *Watershed shapefile*) and the stream network (the *Streams shapefile*). These files need to have the same projection as the DEM. If you want to use files generated by TauDEM in a previous project, then such files can be found in the *Sources* subfolder of that project, with names ending *wshed.shp* and *net.shp* respectively.

It is also possible, but not necessary, to specify an O*utlets/Inlets shapefile*, and again a file from the previous project may be used. If such a file is not specified, only main outlet(s) from the watershed will be used as main outlets in the new project. You will not be able to mark inlets, but you will later be able to add reservoirs and/or point sources to existing subbasins.

The *watershed shapefile* must be a polygon shapefile (each polygon representing a subbasin) with the following fields:

Necessary/Optional	**Name**	**Type**
Necessary	PolygonID	Integer
Optional	Area	Double
Optional	Subbasin	Integer

The *streams shapefile* must be a line shapefile (each line representing a stream reach) with the following fields:

Necessary/Optional	**Name**	**Type**
Necessary	WSNO	Integer
Necessary	LINKNO	Integer
Necessary	DSLINKNO	Integer
Optional	DSNODEID	Integer
Optional	Length	Double
Optional	Drop	Double

An *outlets/inlets shapefile* must be a point shapefile with the following fields:

Necessary/Optional	**Name**	**Type**
Necessary	ID	Integer
Necessary	RES	Integer
Necessary	INLET	Integer

Necessary/Optional	Name	Type
Necessary	PTSOURCE	Integer

Necessary fields must be defined in the original files. *Optional* fields may or may not be defined originally. With two exceptions defined below, if optional fields are defined, and if the *Reuse* button is checked then their values will be assumed to be correct and reused. If optional fields are not defined originally, or if the *Recalculate* button is checked, then they will be defined if necessary, calculated, and the calculated values inserted[1]. Any file may have other fields defined: these will be ignored. The fields may be in any order.

The first exception is the DSNODEID field. This is *necessary* if an outlets/inlets shapefile is specified, in which case it is assumed to be correct and its non-negative values must refer to ID values in that file. DSNODEID values are never recalculated.

The second exception is the Subbasin field in the watershed shapefile. Even if present and *Reuse* is selected it is checked to have suitable values for the SWAT basin numbers. These must be strictly positive and form a consecutive ascending sequence starting from 1, except for basins which are empty, when the Subbasin values must be zero. If the Subbasin values do not meet these requirements they are recalculated.

There are some conditions imposed on the fields. The PolygonID values in the watershed shapefile must be unique, non-negative, and must equal the corresponding WSNO values in the streams shapefile: each subbasin must have exactly one stream reach, and each stream reach must have exactly one subbasin. These two fields provide the connection between the subbasins and the stream reaches. The LINKNO values must also be unique and non-negative (and will typically but not necessarily be the same as the WSNO numbers.) The DSLINKNO (downstream link) values must each be another LINKNO value or -1, where -1 indicates a watershed outlet. Files previously generated by TauDEM will meet all these conditions, and their values may be safely reused.

There is also an assumption made the stream reach shapefile. Each stream reach is a single line, represented as a sequence of points. The first point in the sequence may represent the upstream (source) end and the last represent the downstream (outlet) end, or vice versa. TauDEM creates stream reaches with the first point at the outlet end, but either orientation is accepted by MWSWAT. The assumption is that the orientation is the same for all the reaches. The orientation is checked by finding a reach with an upstream or downstream reach where the ends of the reaches are within one dem cell of each other: normally such ends will exactly coincide.

The optional fields are (if necessary) calculated as follows:

Field	Calculation
Area	The area of the subbasin in square metres.
Subbasin	For subbasins which are not empty and not upstream of an inlet, a unique number from the contiguous sequence 1 .. n, where n is the number of such subbasins. These will be the subbasin numbers for use by SWAT. For subbasins which are empty or upstream of an inlet, 0.

1 Changes to these files are only made to the copies of the originals in the *Source* folder of the project.

Field	Calculation
Length	The total length in metres of the straight line segments forming the reach.
Drop	The absolute difference in metres between the elevations of the end points of the reach.

Note that if a predefined watershed and stream network is chosen then the length of the stream reach in each subbasin will be used for the maximum flow length in that subbasin.