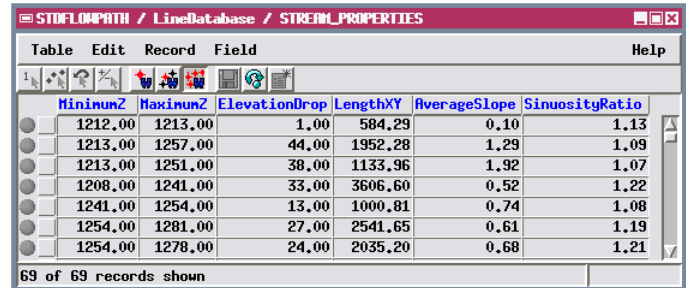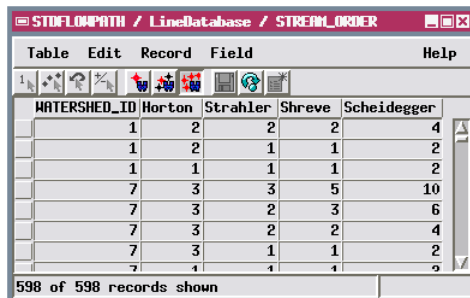# Hydrologic Attributes of Flowpaths

In addition to delineating surface water drainage patterns and catchment boundaries, the TNTmips Watershed process (Terrain / Watershed) computes many hydrologic and geomorphic attributes of the drainage network and catchments. The attributes computed for the line elements in the Standard Flowpath vector object (drainage network) are described below. The attributes computed for polygons in the Watershed vector object (catchments) and Basins vector object (subcatchments) are described in the Technical Guide entitled *Terrain Operations: Hydrologic Attributes of Catchments*.

Flowpath Stream Properties: The STREAM_PROPERTIES table records basic hydrologic properties for each flowpath line element and is produced automatically when flowpaths are computed. The values in this table include Minimum and Maximum elevations (elevations at upstream and downstream ends), the elevation drop, length of the line as projected to the horizontal (XY) plane, average slope, and the sinuosity ratio (line length divided by the straight-line distance between endpoints). All values are computed or read dynamically as computed fields from values in various other tables.
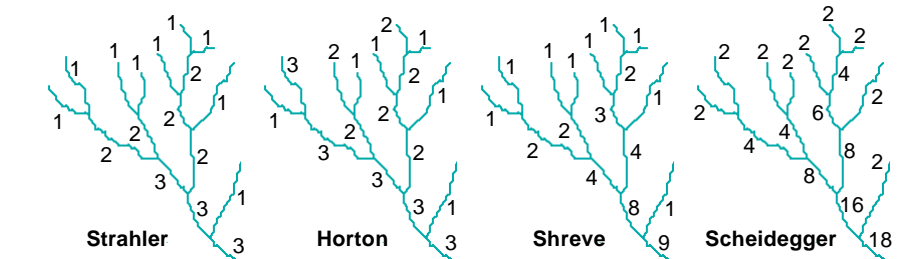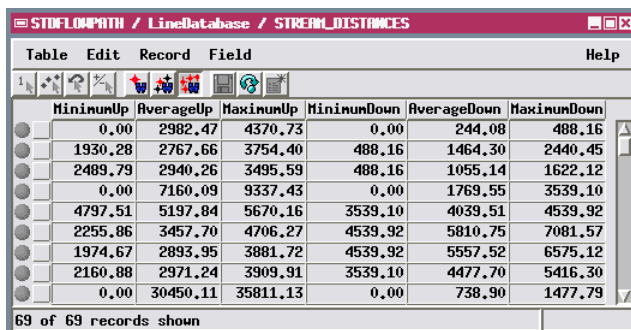
STDFLOWPATH / LineDatabase / STREAM_PROPERTIES

Table Edit Record Field   Help

MinimumZ	MaximumZ	ElevationDrop	LengthXY	AverageSlope	SinuosityRatio
1212.00	1213.00	1.00	584.29	0.10	1.13
1213.00	1257.00	44.00	1952.28	1.29	1.09
1213.00	1251.00	38.00	1133.96	1.92	1.07
1208.00	1241.00	33.00	3606.60	0.52	1.22
1241.00	1254.00	13.00	1000.81	0.74	1.08
1254.00	1281.00	27.00	2541.65	0.61	1.19
1254.00	1278.00	24.00	2035.20	0.68	1.21

69 of 69 records shown

Flowpath Stream Order: Since stream segments in each watershed join downstream to form larger streams, the relative importance of each segment can be expressed as a numerical rank or *order* within the drainage network. Stream order is automatically computed for each flowpath line element using four different ordering systems, and the values are stored in the STREAM_ORDER table. In general, stream order increases downstream from low values for the headwater tributaries to high values for the trunk stream near its outlet. The four stream ordering systems differ in how order values are computed at each confluence; they are illustrated by examples below and are described in detail in the tutorial booklet entitled *Modeling Watershed Geomorphology*.

STDFLOWPATH / LineDatabase / STREAM_ORDER

Table Edit Record Field   Help

WATERSHED_ID	Horton	Strahler	Shreve	Scheidegger
1	2	2	2	4
1	2	1	1	2
1	1	1	1	2
7	3	3	5	10
7	3	2	3	6
7	3	2	2	4
7	3	1	1	2

598 of 598 records shown

Strahler   **Horton**   **Shreve**   **Scheidegger**

Flowpath Stream Distances: The STREAM_DISTANCES table for flowpath lines includes upstream and downstream flow distances for each line element. These values are derived from the Downstream and Maximum Upstream flow distance rasters described in the TechGuide entitled *Terrain Operations: Geomorphic/Hydrologic Characteristics of Terrains*, so this table is only created when one or both of those distances rasters are computed. Since each stream line has a finite length, separate distance values are stored for the upstream end of the line (MinimumUp, MaximumDown), the downstream end (MaximumUp, Minimum Down), and for each line's midpoint (AverageUp, AverageDown).

STDFLOWPATH / LineDatabase / STREAM_DISTANCES

Table Edit Record Field   Help

MinimumUp	AverageUp	MaximumUp	MinimumDown	AverageDown	MaximumDown
0.00	2982.47	4370.73	0.00	244.08	488.16
1930.28	2767.66	3754.40	488.16	1464.30	2440.45
2489.79	2940.26	3495.59	488.16	1055.14	1622.12
0.00	7160.09	9337.43	0.00	1769.55	3539.10
4797.51	5197.84	5670.16	3539.10	4039.51	4539.92
2255.86	3457.70	4706.27	4539.92	5810.75	7081.57
1974.67	2893.95	3881.72	4539.92	5557.52	6575.12
2160.88	2971.24	3909.91	3539.10	4477.70	5416.30
0.00	30450.11	35811.13	0.00	738.90	1477.79

69 of 69 records shown

Flowpath Hydrologic Connectivity: Each flowpath line can flow into only one downstream stream line; the ID number of that line element is recorded in the DOWNFLOW table for each line. The BASINS table is only created when basins are computed along with flowpaths; it records the ID number of the basin polygon in which each stream line lies. This table has one record for each basin, with each basin record attached to one or more of the stream line elements.

STDFLOWPATH / LineDatabase / DOWNFLOW

Table Edit Record Fi

DOWNFLOW_FLOWPATH
0
0
0
0
3
4

69 of 69 records shown

STDFLOWPATH / LineDatabase / BASINS

Table Edit Record Field   Help

BASIN_ID
1
2
3
4
5
6

38 of 38 records shown