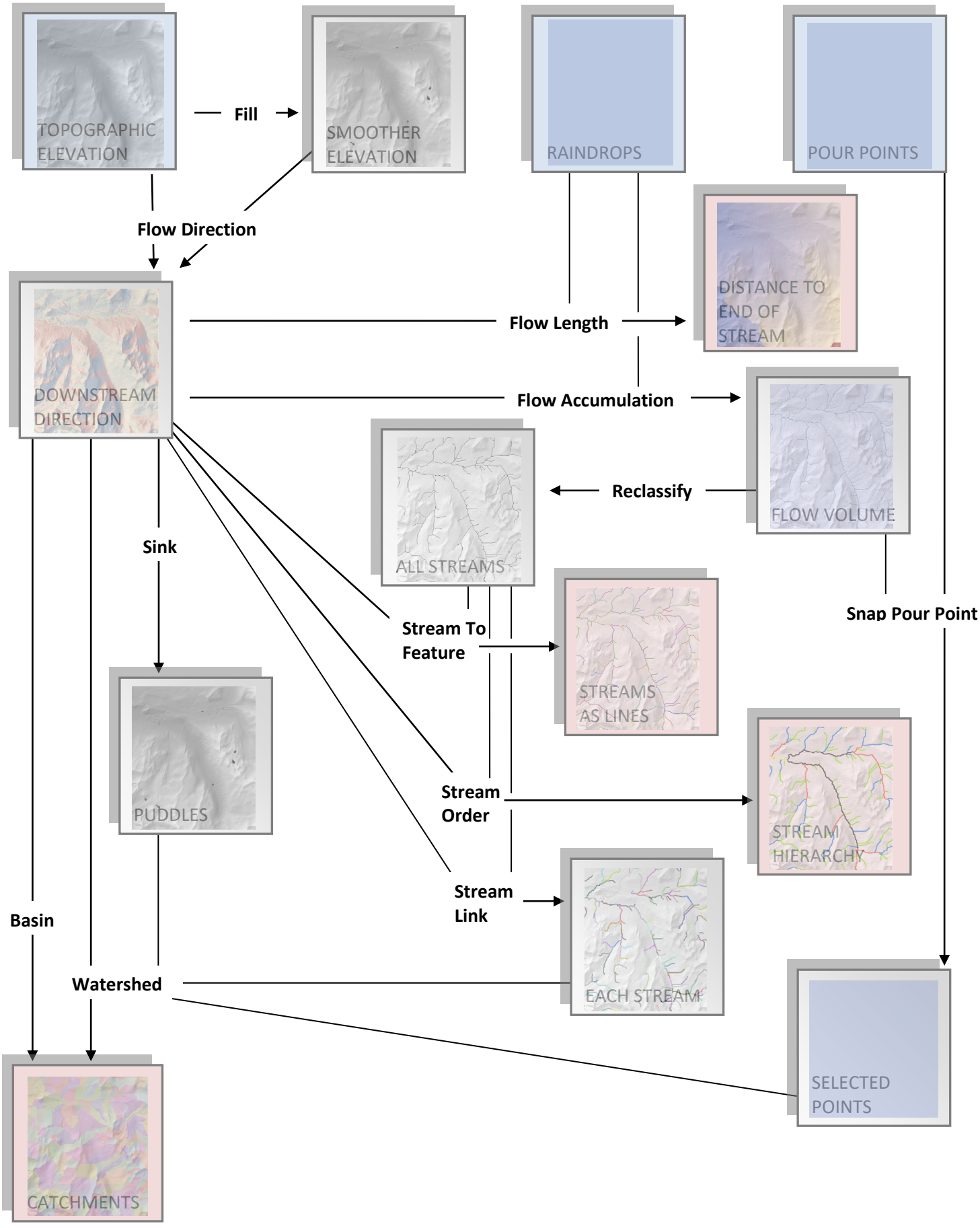
The ArcGIS Hydrology Tools

Overview



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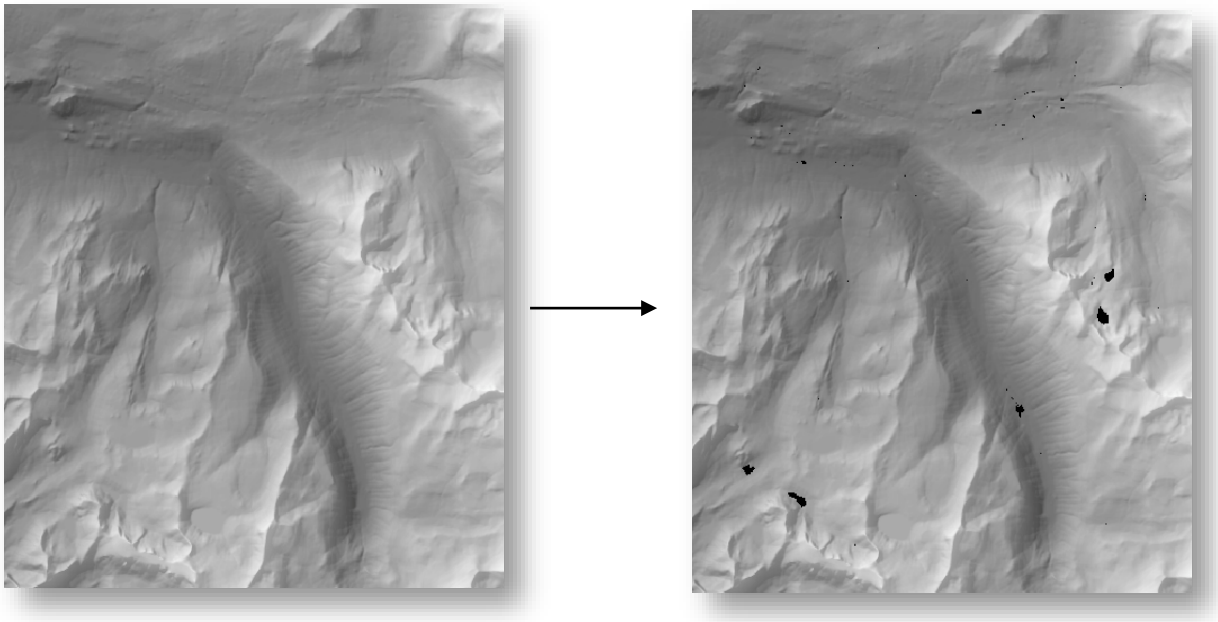
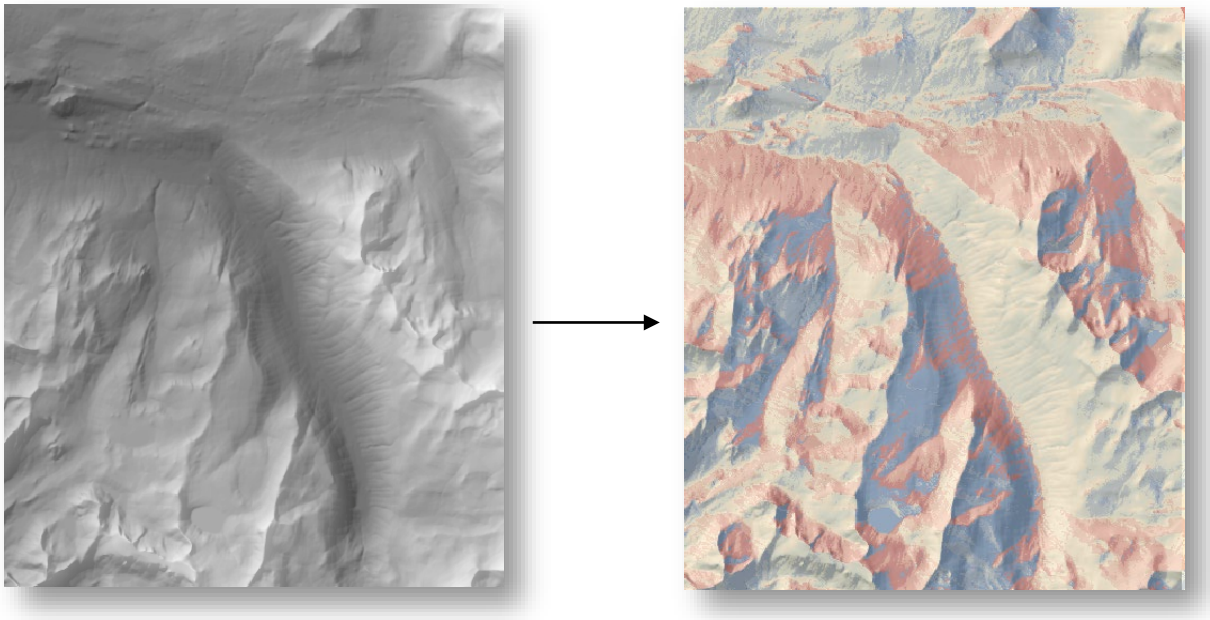
The **Fill** and **Flow Direction** Tools

The **Fill** tool generates, from an elevation grid, a new elevation grid in which "sinks" (where flowing water would pond) are replaced by surface elevations that tilt toward the point of lowest elevation around the edge of any such sink. The resulting surface is one over which water can flow continuously.



The **Flow Direction** tool generates, from an elevation grid, a new grid in which each pixel's value indicates the direction of its downstream neighbor.



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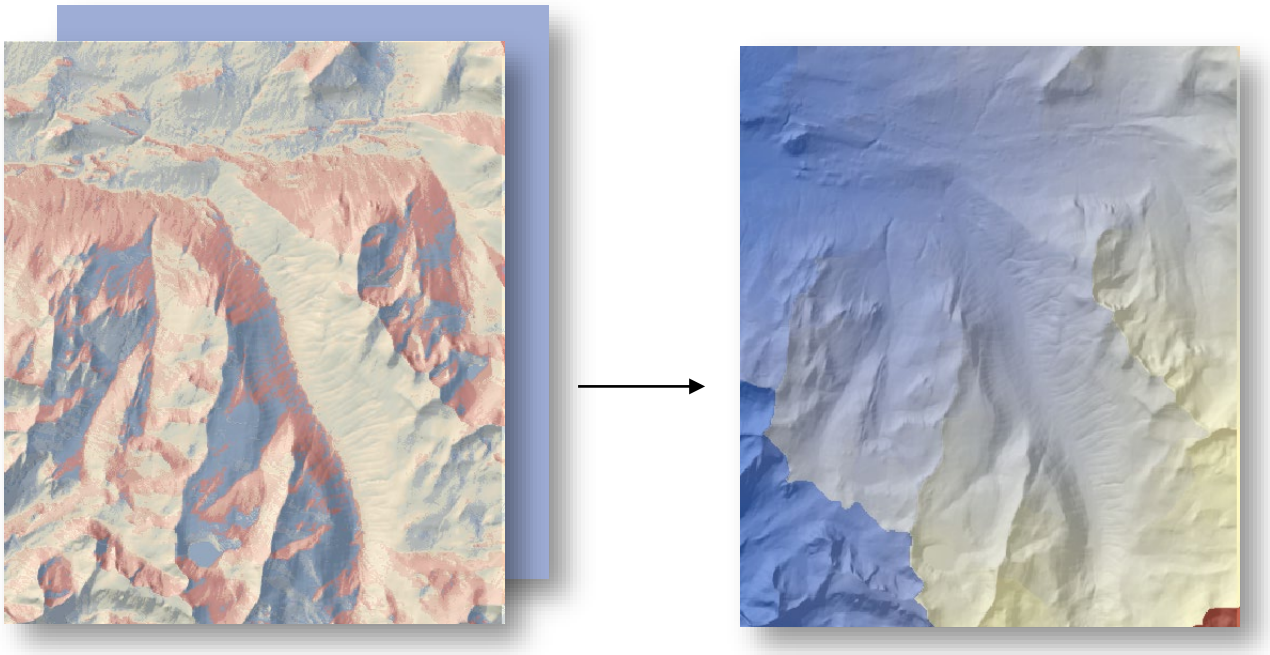
The **Flow Length** and **Flow Accumulation** Tools

The **Flow Length** tool generates, from

- a grid generated by **Flow Direction** and
- a grid on which each pixel's value indicates the number of "raindrops" falling on that pixel,

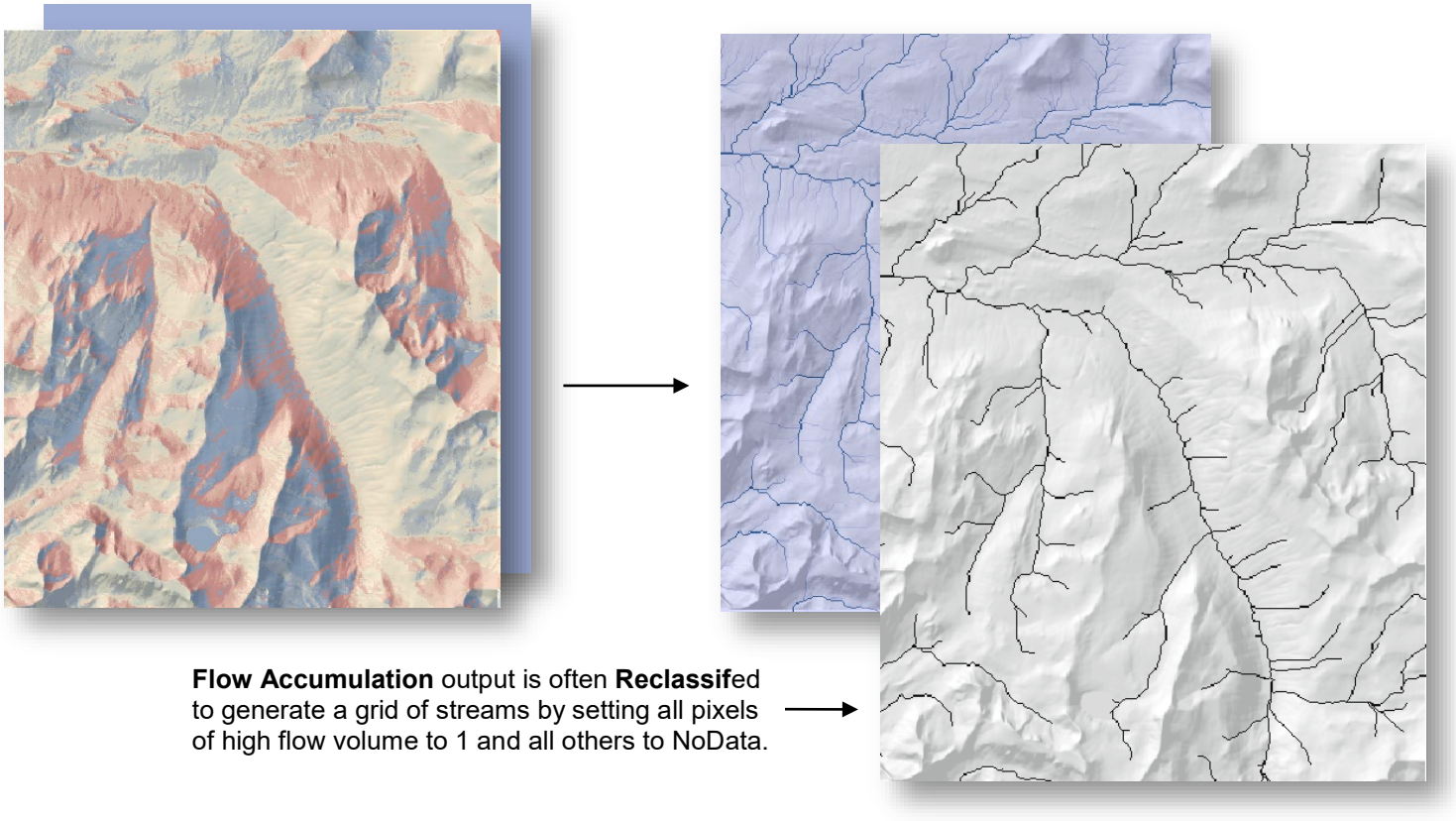
a new grid in which each pixel's value indicates the flow distance from that pixel to the most distant pixel either downstream or upstream.



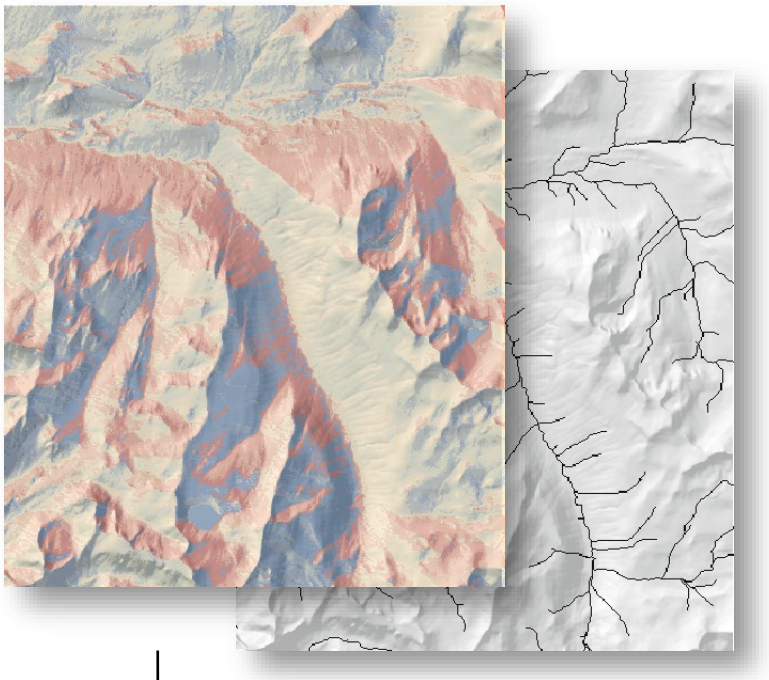
The **Flow Accumulation** tool, from

- a grid generated by **Flow Direction** and
- a grid on which each pixel's value indicates the number of "raindrops" falling on that pixel,

a new grid in which each pixel's value indicates how many raindrops ultimately cross that pixel as they flow downstream.

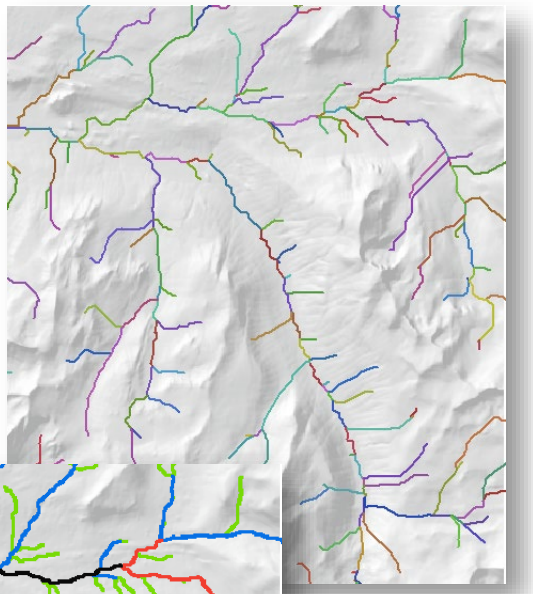


Flow Accumulation output is often **Reclassif**ed to generate a grid of streams by setting all pixels of high flow volume to 1 and all others to NoData.

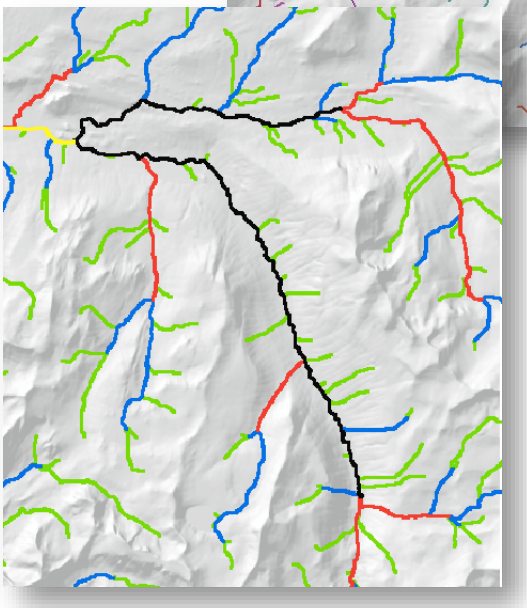


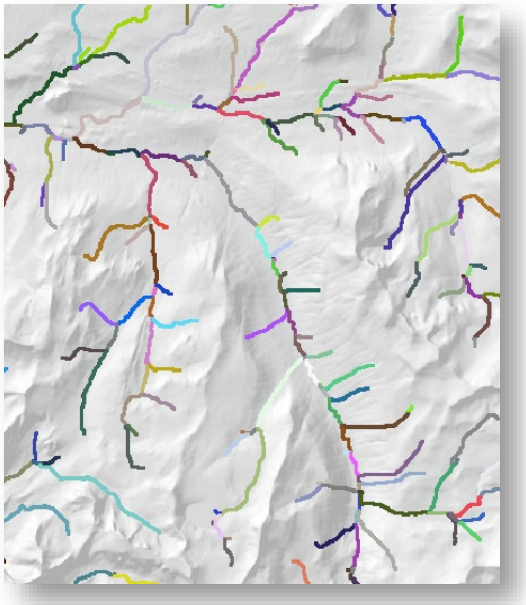
The **Stream To Feature**, **Stream Order**, and **Stream Link** tools all take two grids as input:
- one generated by **Flow Direction** and
- one on which stream pixels are set to 1 while other pixels are set to NoData.

From these, the **Stream To Feature** tool generates a new shapefile of lines on which each stream reach is uniquely identified.



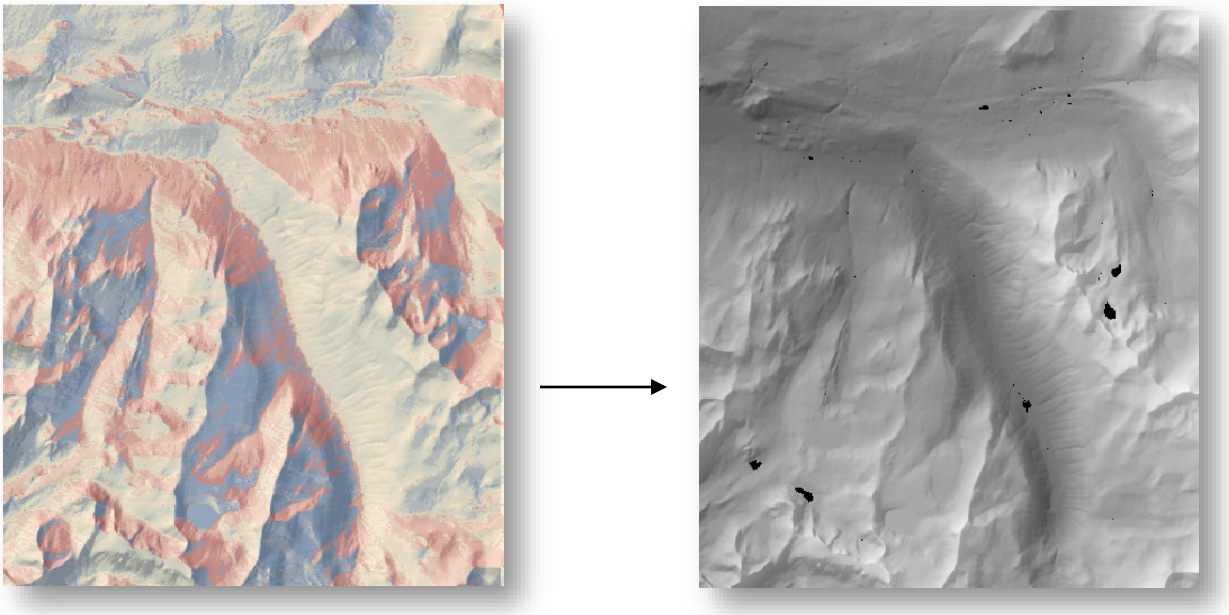
The **Stream Order** tool sets each stream reach to a value indicating where it lies in the hierarchy of branches, starting with the headwaters and proceeding downstream.





The **Stream Link** tool is similar to **Stream To Feature** but it generates a new grid on which each stream reach is uniquely identified.

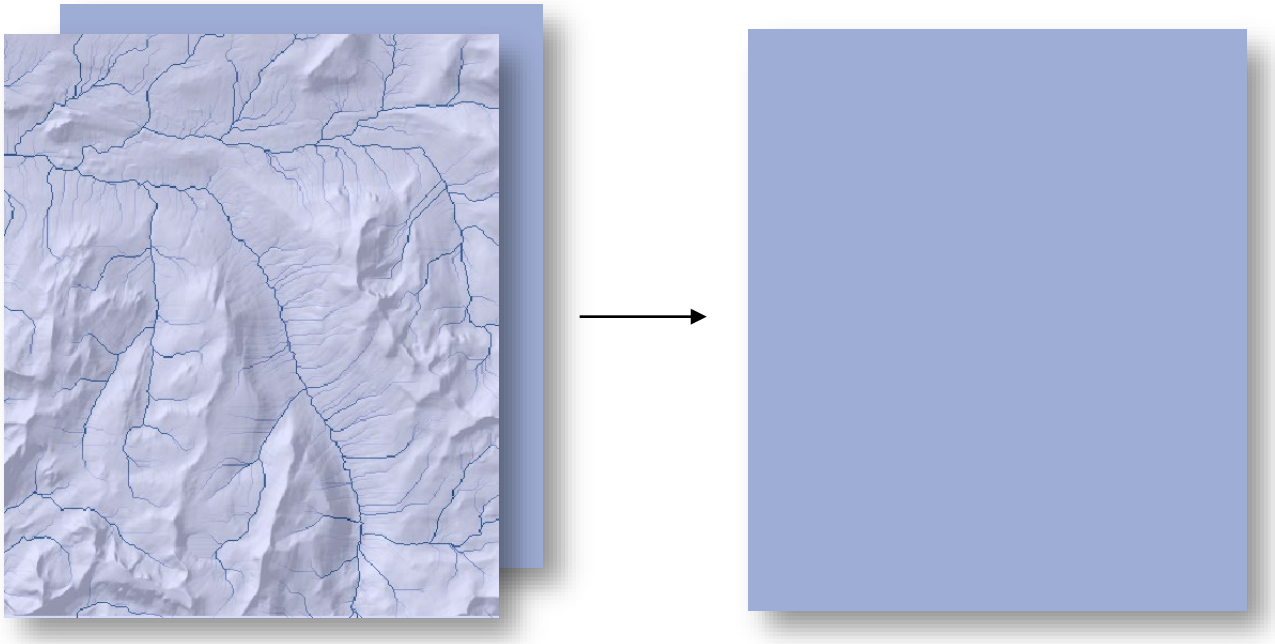
The **Sink** tool generates, from a grid generated by **Flow Direction**, a new grid in which each sink is uniquely identified.



The **Snap Pour Point** tool generates, from

- a grid generated by **Flow Accumulation** and
- a grid or point shapefile uniquely identifying each of a set of point locations,

a new grid identifying the pixel of greatest **Flow Accumulation** value within the immediate vicinity of each point location. These pixels are set to a value of 1 on a background of NoData.



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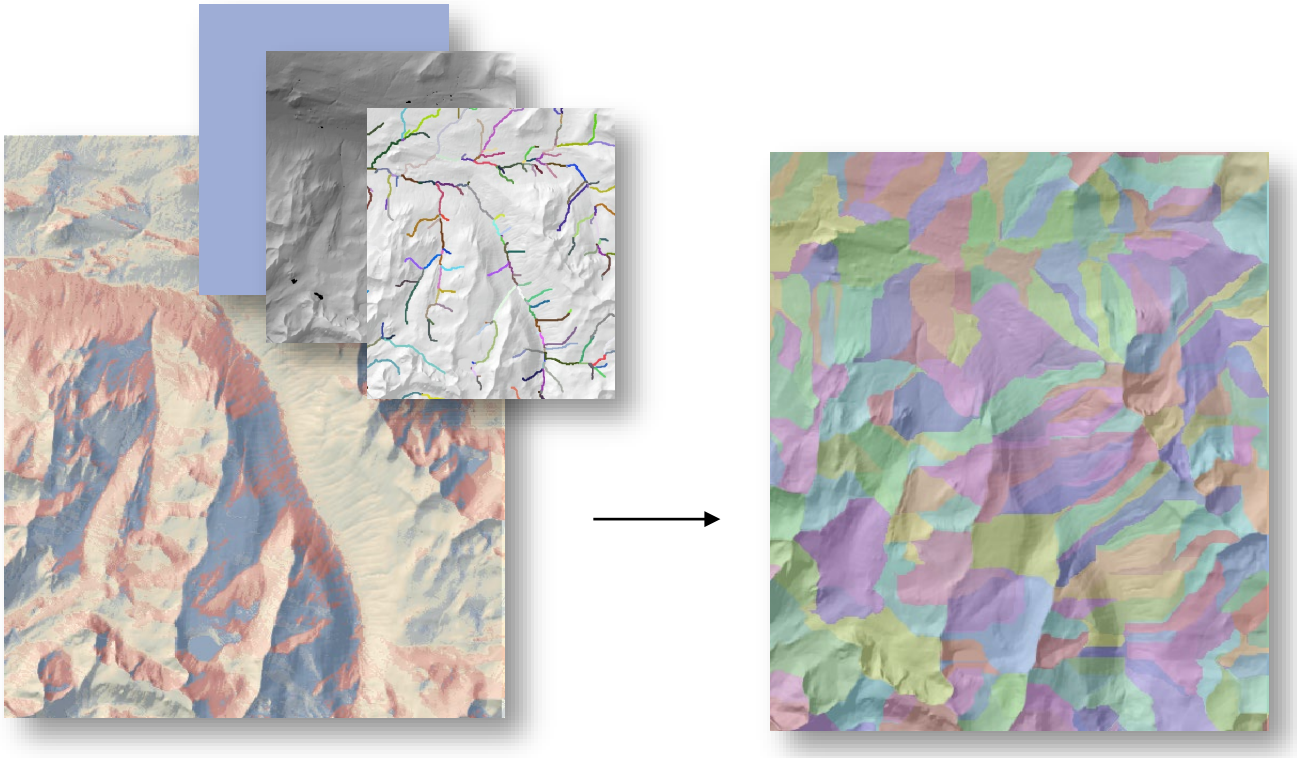
The **Watershed** and **Basin** Tools

The **Watershed** tool generates, from

- a grid generated by **Flow Direction** and
- a grid or point shapefile uniquely identifying each of a set of point locations,

a new grid that uniquely identifies the pixels upstream (*i.e.* the watershed) of each point location.



The **Basin** tool does what the **Watershed** tool does for those locations where flows reach the edges of the grid.