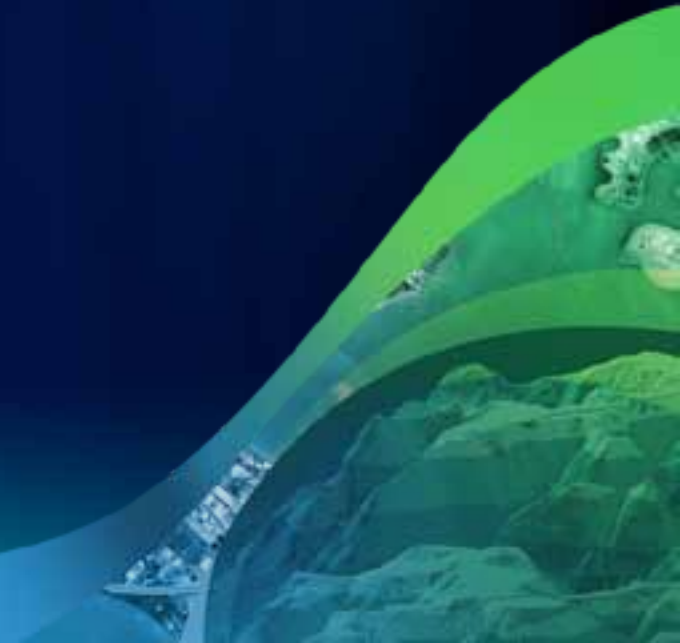




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Creating a Hydrologically Conditioned DEM

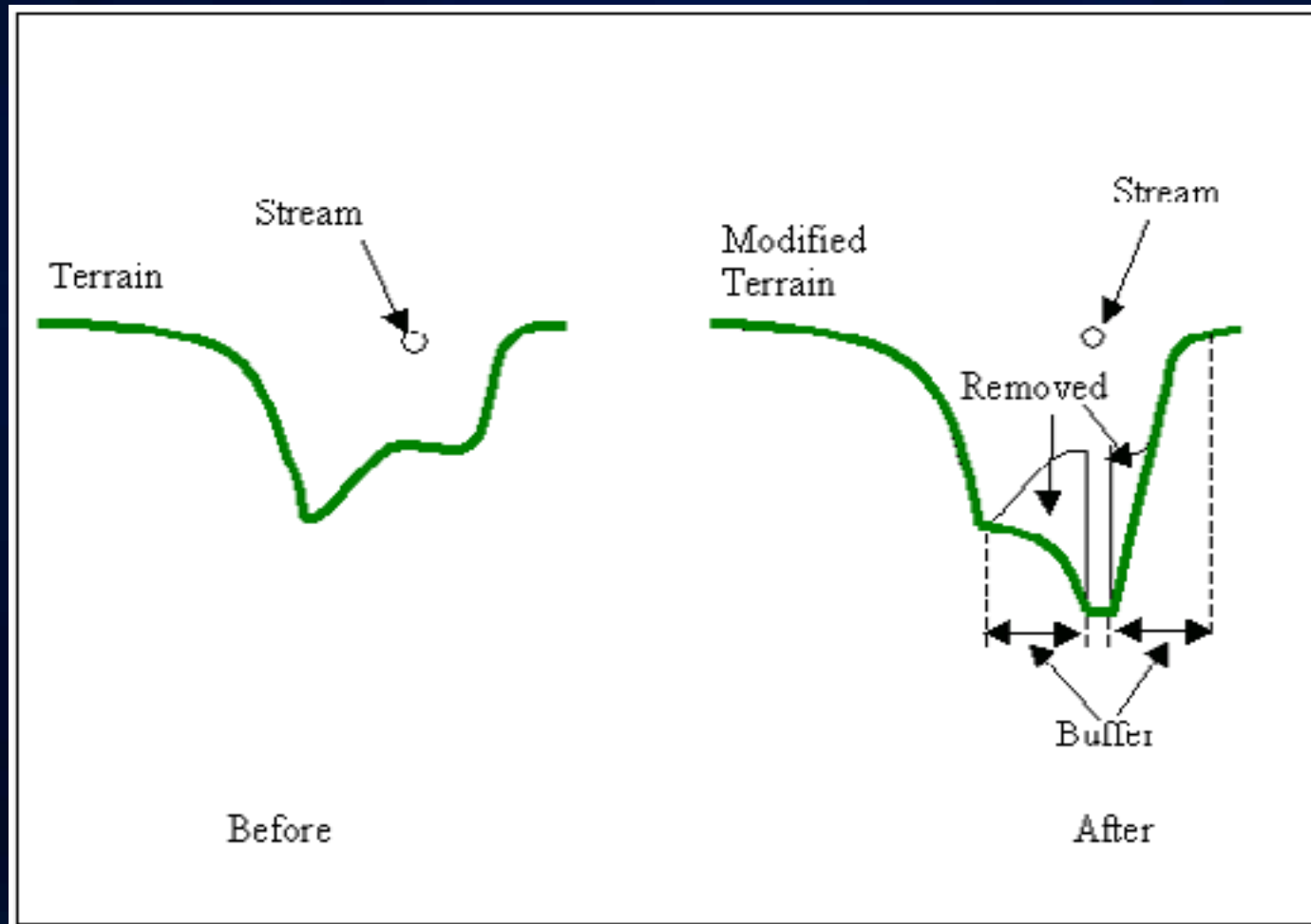
Sreeresh Sreedhar (a.k.a. "Sree")



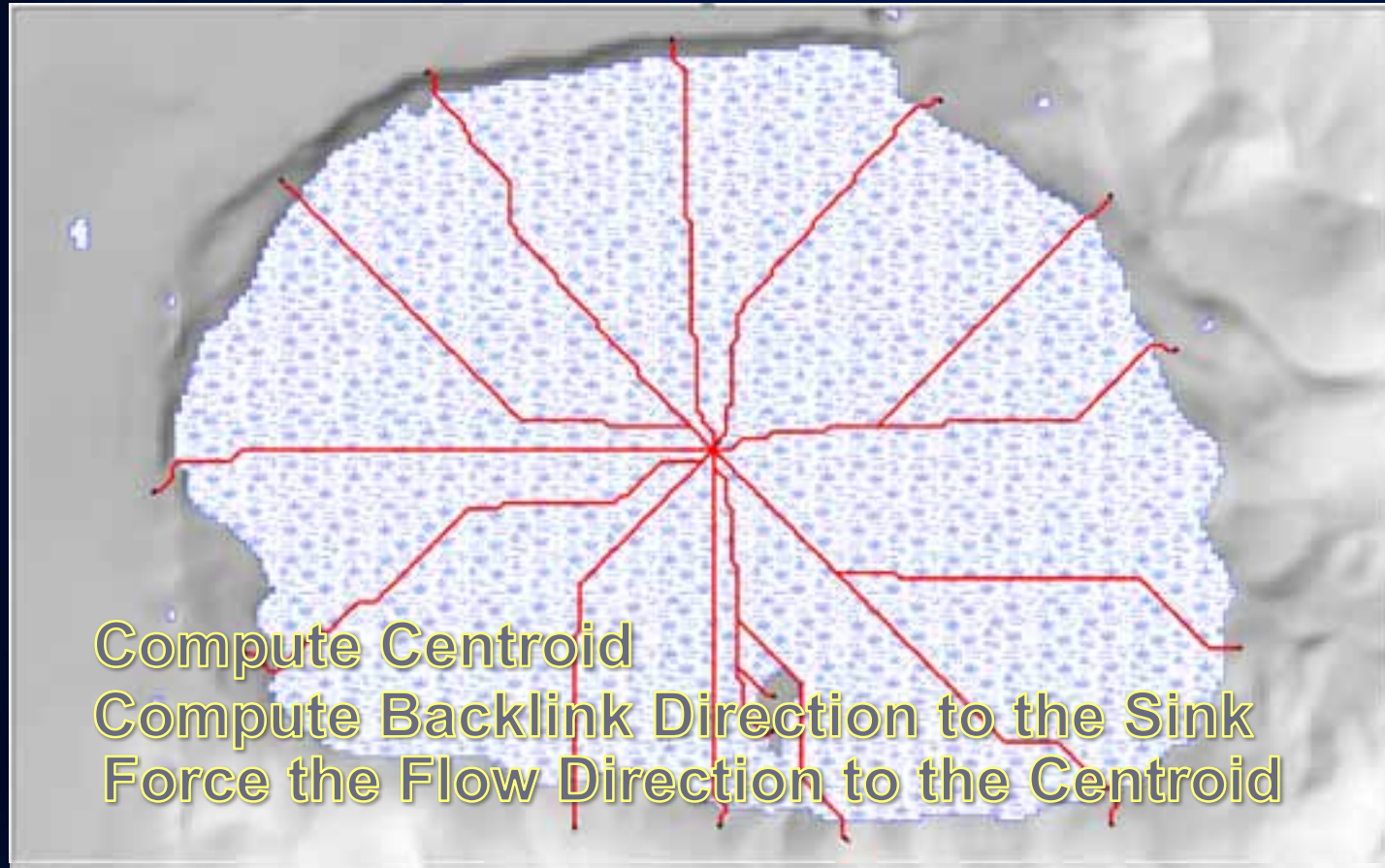
Workflow

- **Start from Raw DEM**
 - From Topo sheets, Data products, Lidar etc
- **Impose known Rivers (Burning)**
 - DEM Reconditioning
- **Impose known Sinks/Lakes (Bowling)**
 - How to keep sinks/lakes when they are real
 - Level DEM, Sink Evaluation
 - Fill all sinks except known sinks/lakes (Filling)
- **Impose known Drainage Boundaries/Shorelines (Fencing)**
 - Build walls
- **Arc Hydro pre-processing** using “HydroDEM”
 - Catchment, DrainageLine, Adjoint Catchment etc
- **Arc Hydro analysis**
 - Watershed, Centroid, Longest Flowpath, Characteristics etc

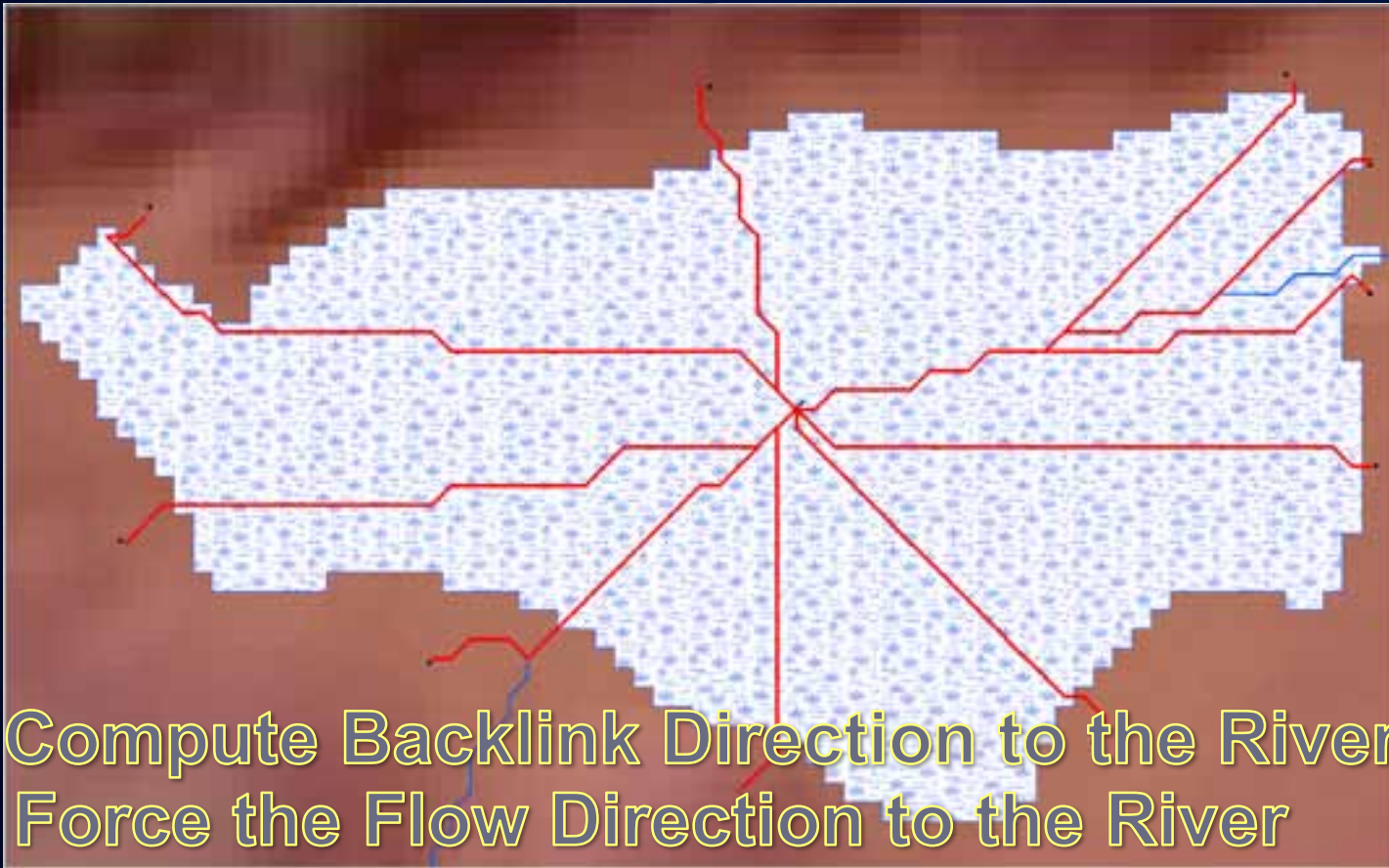
Burning River (Agree method – Hellweger, UT)



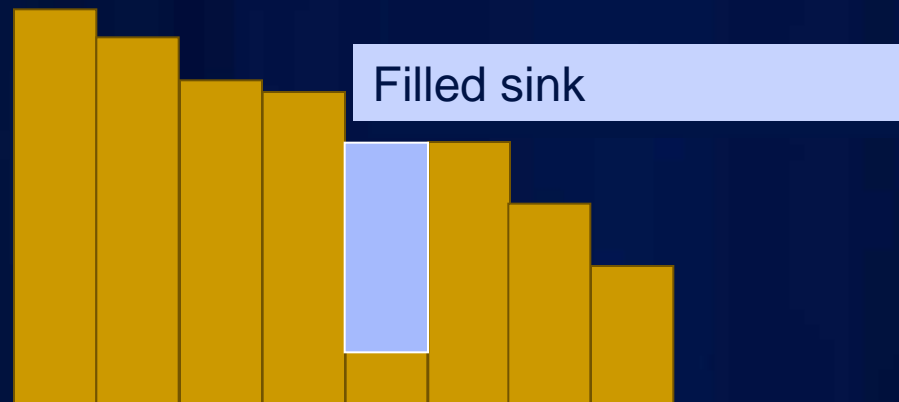
Bowling Sinks (Backlink method – Sreedhar, Esri)



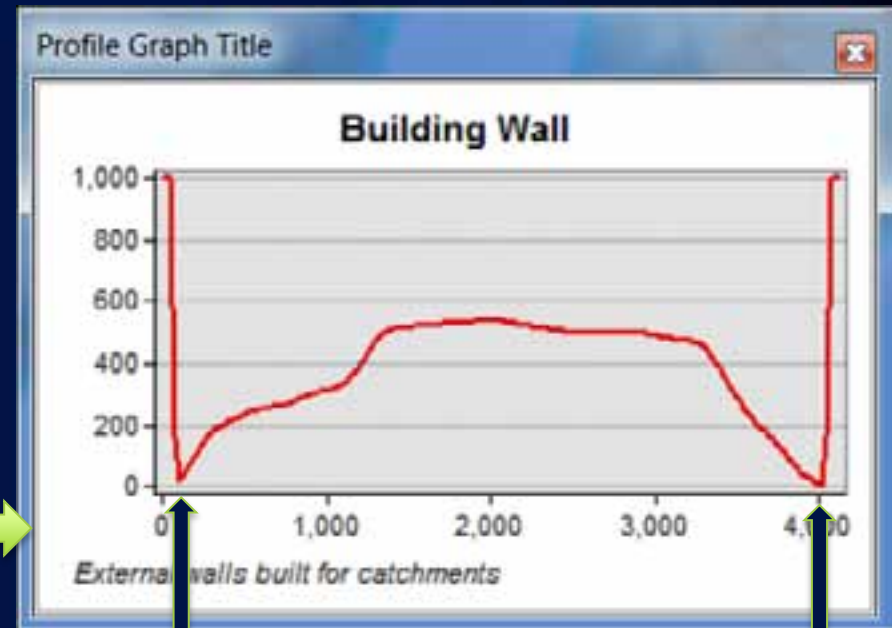
Bowling Lakes with River (Backlink method)



Filling Sinks (Except inside real sinks/lakes)



Fencing – Build External/Internal walls



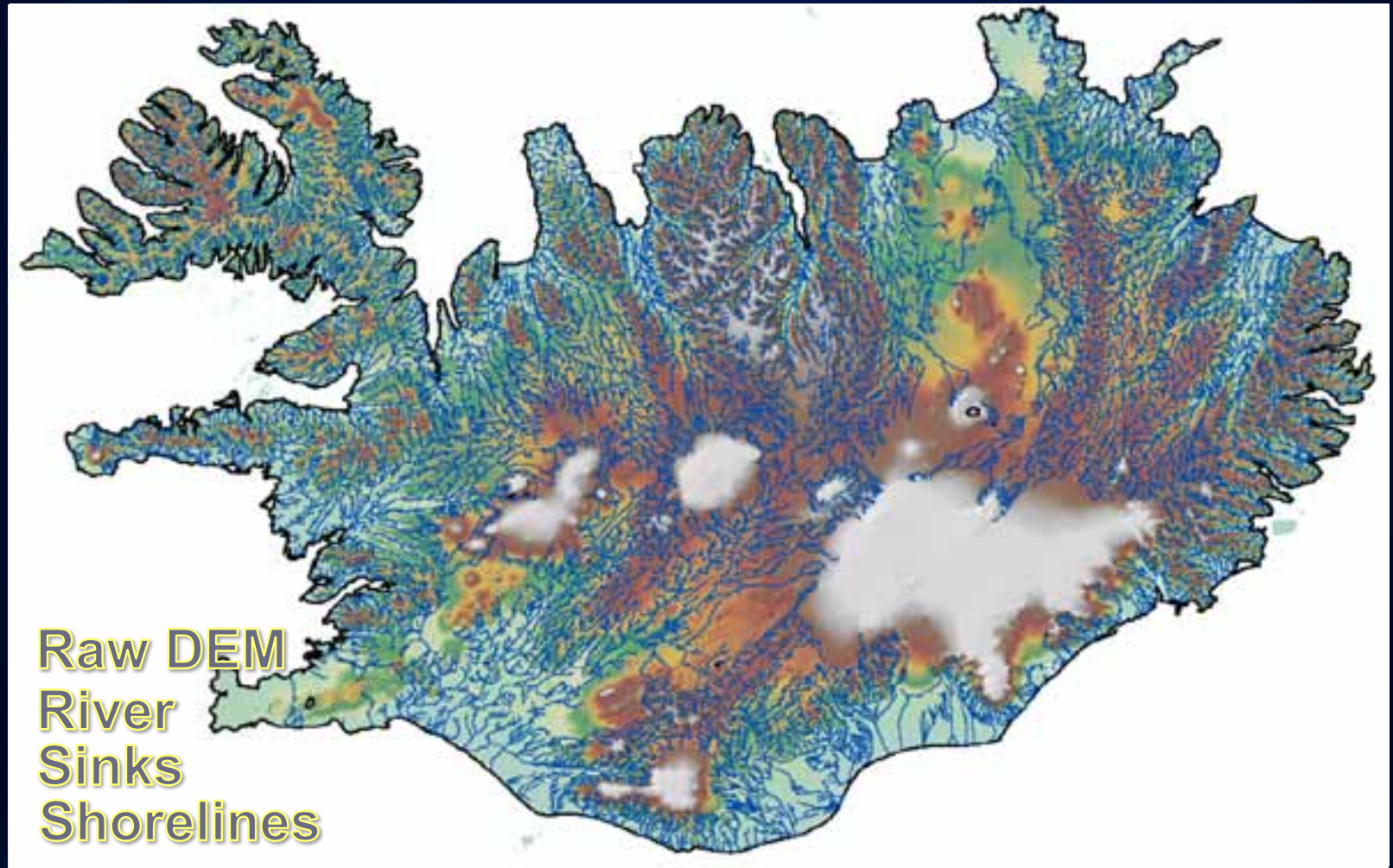
Wall

Wall

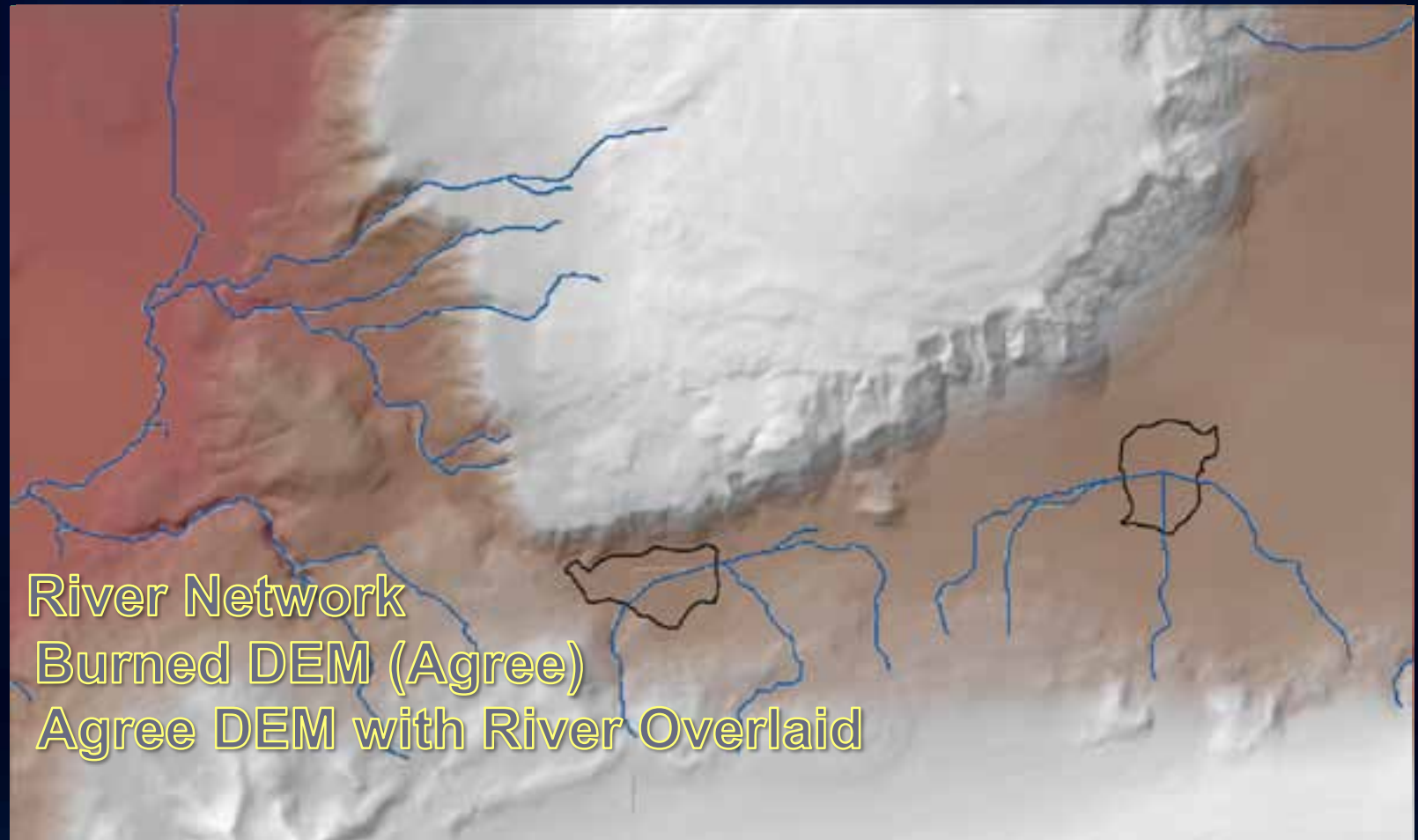
Iceland Example – Processing the whole country

- Area: 103,125 km²
 - Slightly smaller than [Kentucky](#); about half the size of [Great Britain](#).
- Raw DEM
 - 25 m resolution - Based on 20 m contour lines from 1:50,000 maps
 - Entire country - 20724 x 14768 cells
- Vector data of rivers and lakes
 - 1:5,000 (approx.) national dataset with centerlines/flowlines through lakes and wide rivers. Digitized according to flow direction.
- Credits & Thanks
 - Bogi Brynjar Björnsson, Esther H. Jenssen, Inga Dagmar Karlsdóttir (Icelandic Meteorological Office)

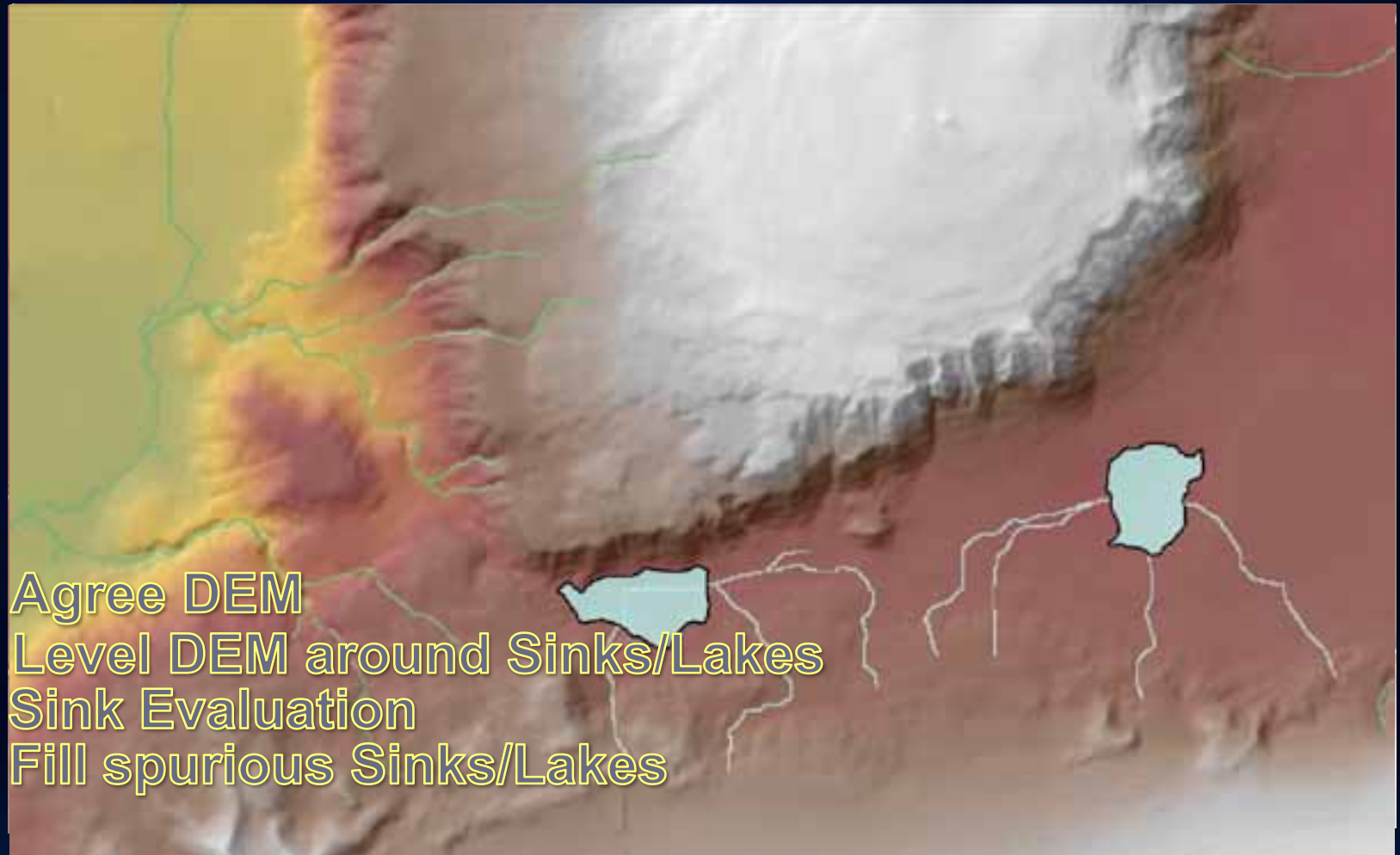
Raw DEM, River, Sinks and Shorelines



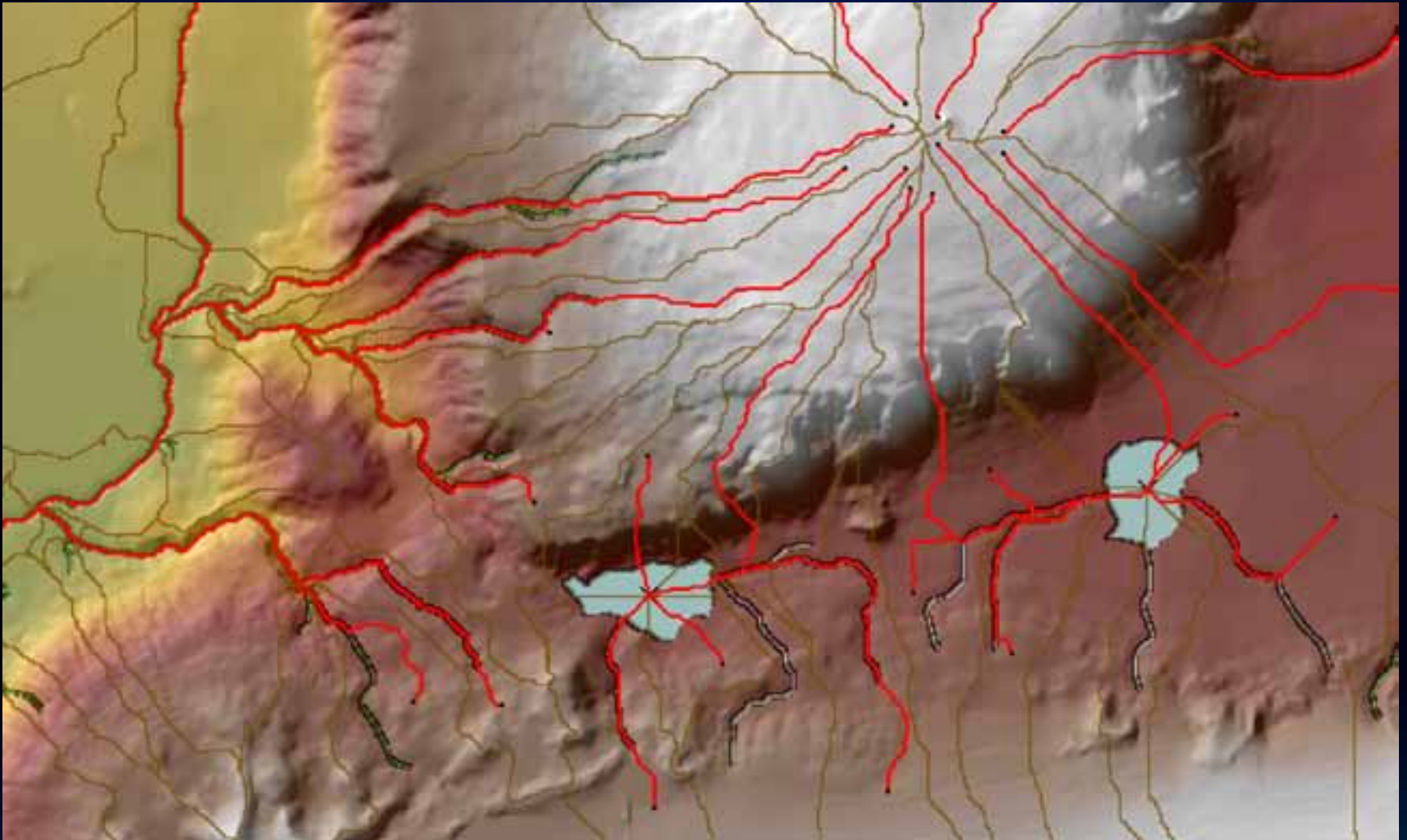
Burn the River



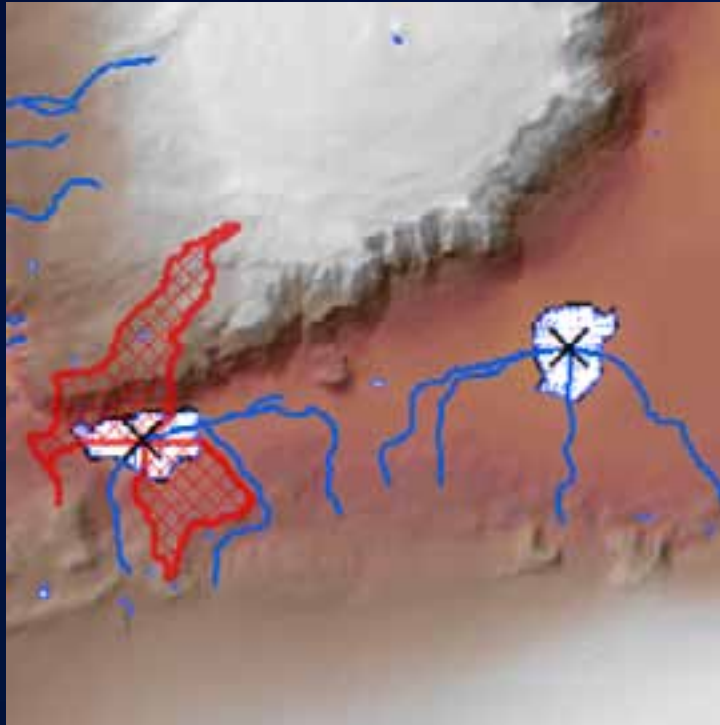
Bowl the Sinks/Lakes



Hydrologically conditioned drainage pattern



Watershed Delineation

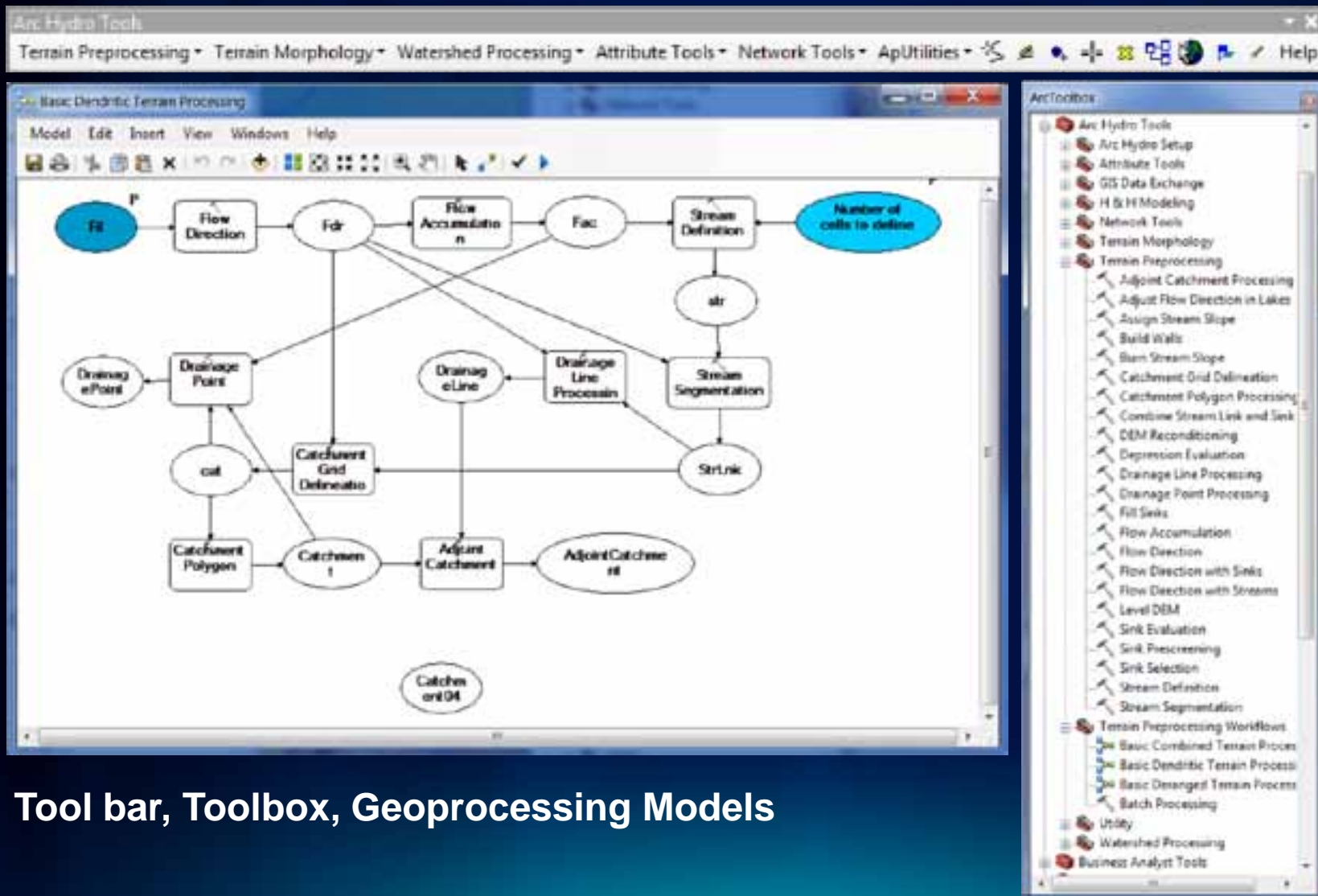


Delineating inside Sink/Lake – On the River, Multi Branch
Delineating inside Sink/Lake – On the River, Single Branch
Delineating outside the Sink/Lake
Delineating at the center of the Sink/Lake

Advanced DEM Topics

- **Loops within the network**
 - **Assign River Slopes** (Assigns relative elevations at From/To points of the rivers meeting at the confluence)
 - **Burn River Slope** (DEM value at the confluence will be the lowest of the To point elevations of the rivers meeting at the confluence)
 - **Flow Split Tables** are maintained separately for each split
- **Coastal Catchements**
 - **Assign unique Link ID** to each coastal line
 - **Combine with Stream and Sink Links**

Analysis using Arc Hydro Tools



Questions?

- archydro@esri.com
- <http://resources.arcgis.com/content/hydro>