

Cartographic Depth-to-Water and Topographic Flow-Channel Mapping for the City of Fredericton, NB

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The purpose: this poster presents an overview of the GIS-based digital flow-channel and cartographic depth-to-water mapping process for the city of Fredericton, New Brunswick. The flow-channel and cartographic depth-to-water mapping process involves the delineation of all pertinent flow channels, all associated wet areas, and corresponding depth-to-water underneath the soil surface adjacent to all digitally recognized surface-water features, at 10m resolution. At the foundation of this process is the digital elevation model (DEM) and the digitized locations of all open-water features of the area, i.e. streams, rivers, lakes, etc.

The cartographic depth-to-water depicted on this poster has been generated under a "natural" condition with no man-made drainage imposed, i.e. from road ditching, culverts or buildings. These drainage structures will be incorporated in future versions of this map.

The product: although currently used primarily in forestry applications, the cartographic depth-to-water mapping process holds many benefits for other sectors as well; from city planning to land developers to environmental consultants and many more. This mapping process generates easy to understand maps showing the connectivity of wetland features as well as the predicted locations of previously unmapped wet features.

To visualize areas which are predicted to be wet (either permanent or ephemeral), a color gradient of light pink (more wet) to bright red (less wet) is generally used. These values generally conform to the borders of field-verified wetlands as can be seen in the map.

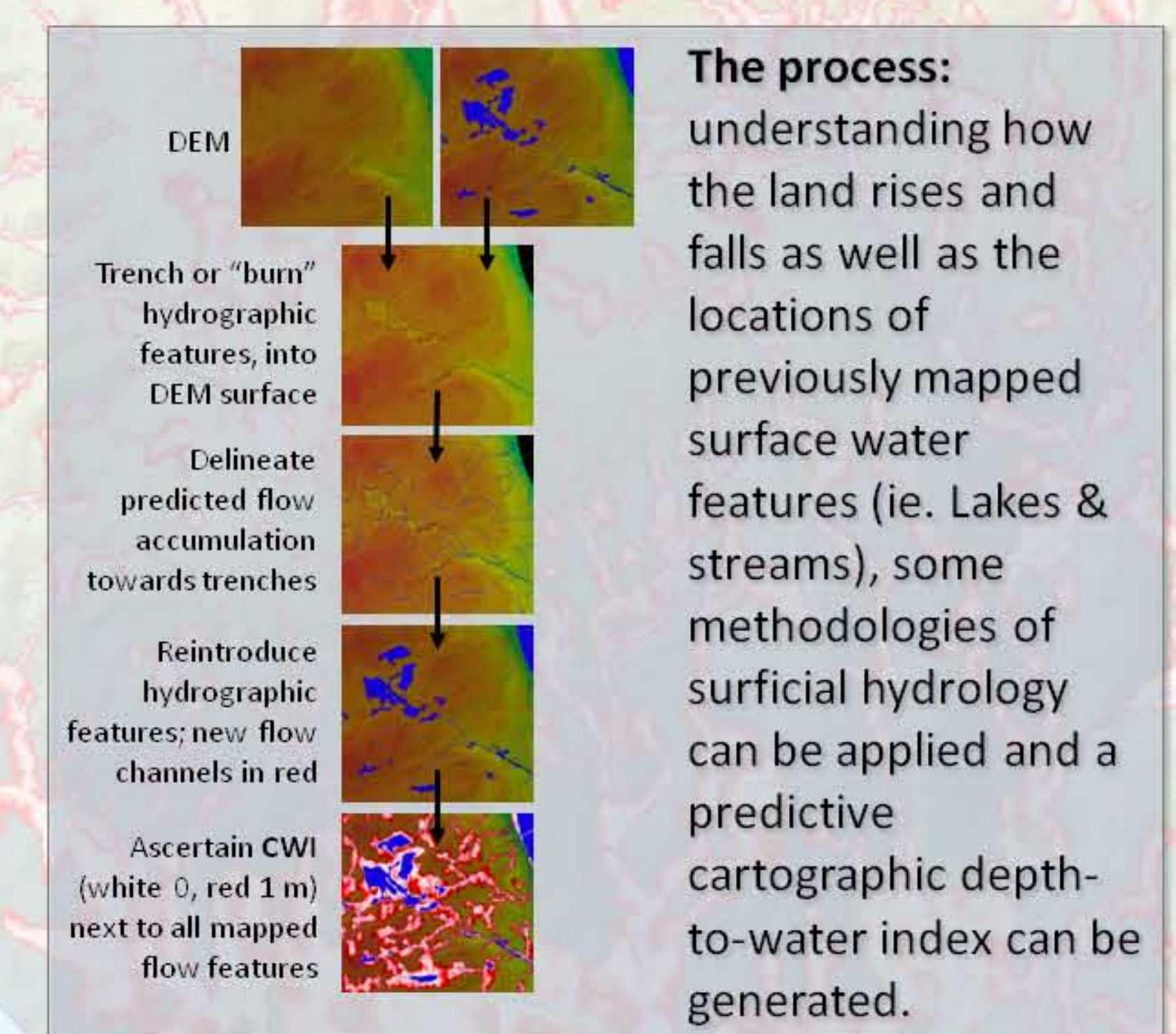


The principle: the scale-dependant cartographic depth-to-water mapping process is implemented through an ARC Macro Language (AML) script in ESRI's ARC/INFO Workstation platform and calls on some additional functionality through small C++ routines.

The accuracy of the output products of the cartographic depth-to-water process are highly dependent on the quality of the input DEM and/or river & stream data. The process has been tested and successfully validated in the field on datasets ranging in resolution from SRTM (Shuttle Radar Topography Mission) at ~90m to LiDAR at sub-meter levels.



Fredericton Flood, 2008



Legend

- Mapped Roads
- Mapped Wetlands
- Mapped Lakes & Rivers
- Mapped Streams
- Predicted Flow Channels

Cartographic Depth-to-Water Index Value

- 0.00 - 0.10 (More Wet)
- 0.10 - 0.25
- 0.25 - 0.50
- 0.50 - 1.00 (Less Wet)

Elevation (m)

- High : 216.8
- Low : 0.2

