Flood Predictor

Stantec.io

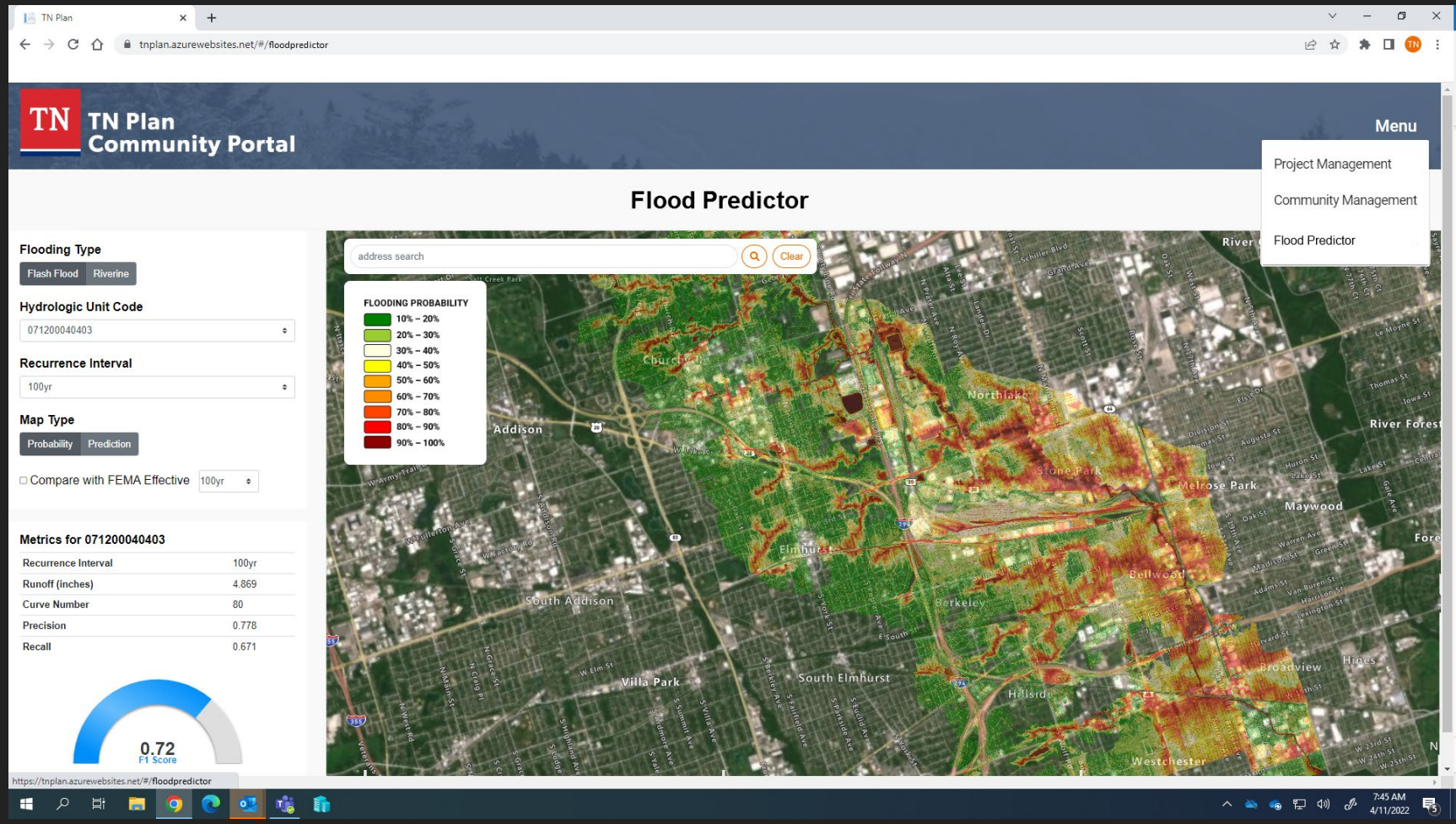
Flood Predictor Overview

STANTEC FLOOD PREDICTOR

Flood Predictor

Stantec.io

85-95%



1
Engineering Features

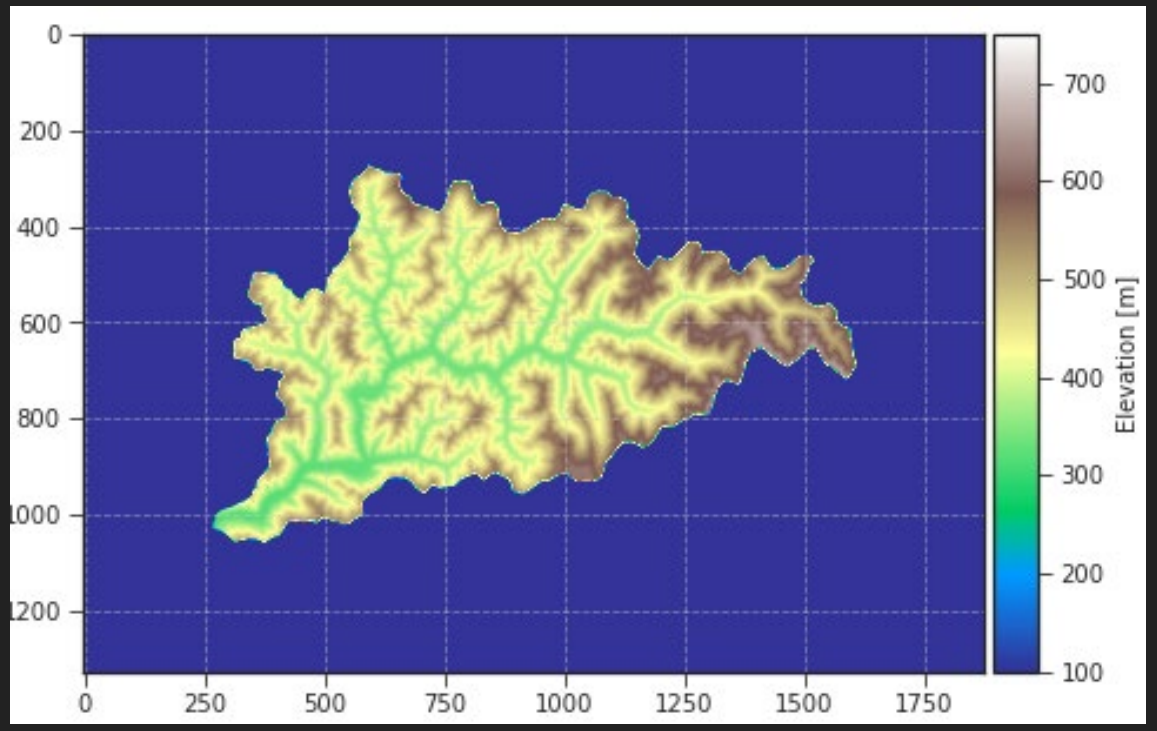
2
Machine Learning

3
Visualization

4
Performance

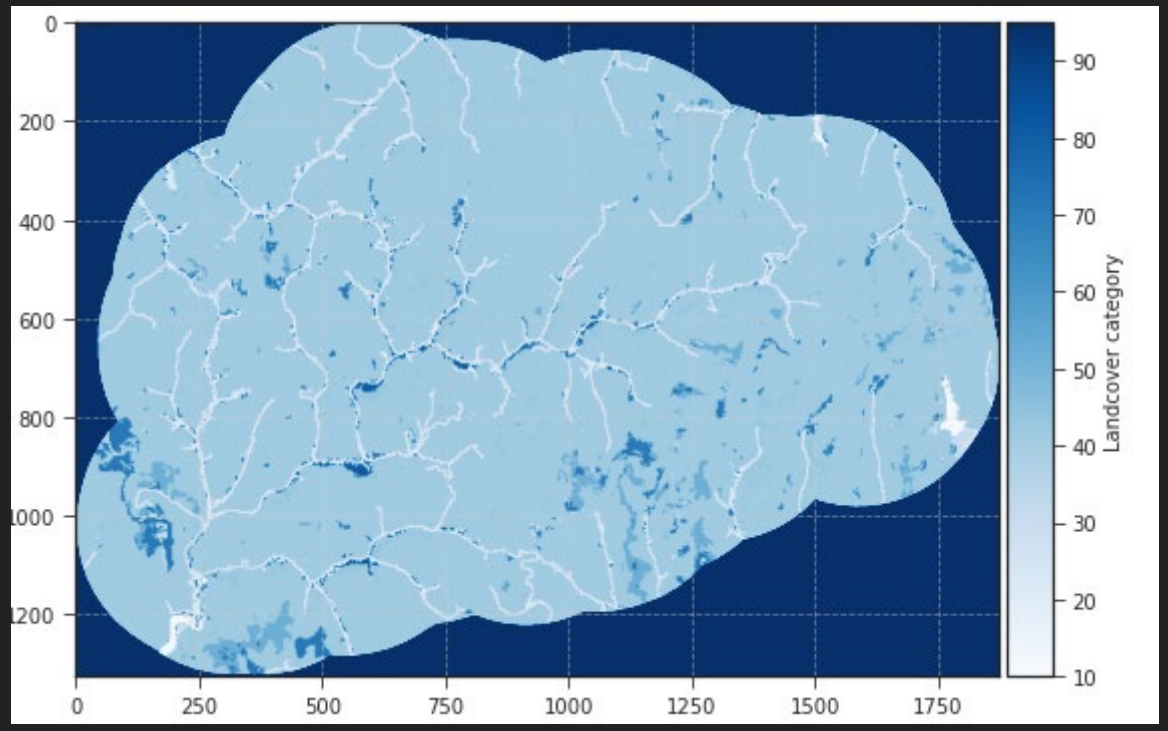
Engineering Features: Data Harvesting

USGS: Digital Elevation model



The main inputs for Flood Predictor are terrain and land use data.
High resolution terrain (1m) can be used if available and desired.

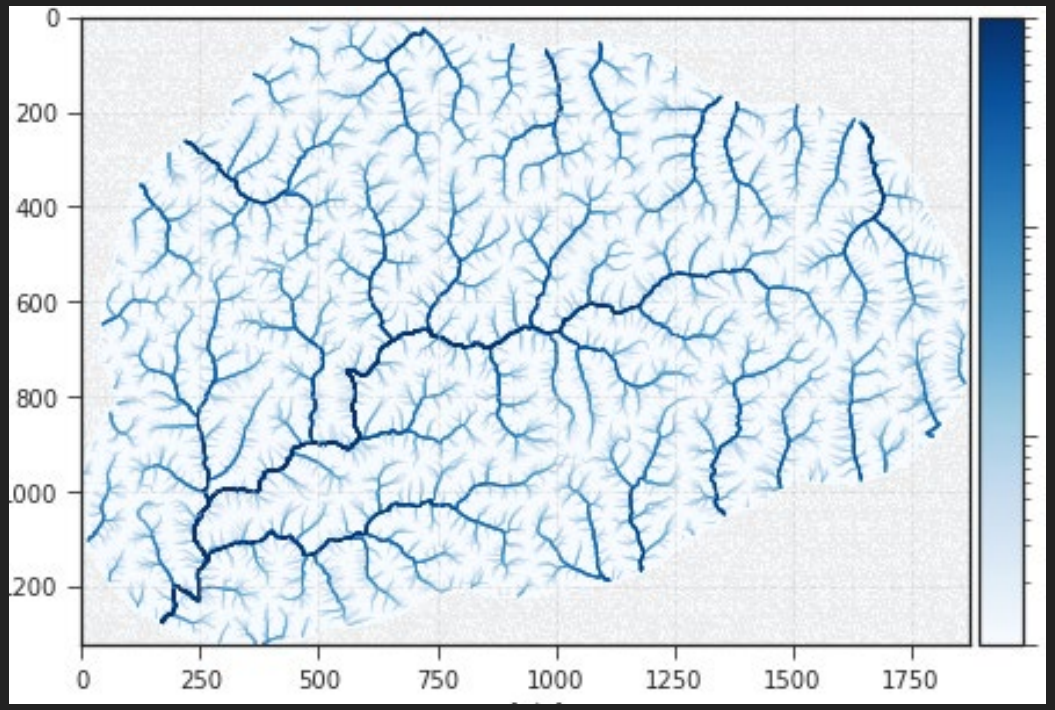
MRLC: Land Use



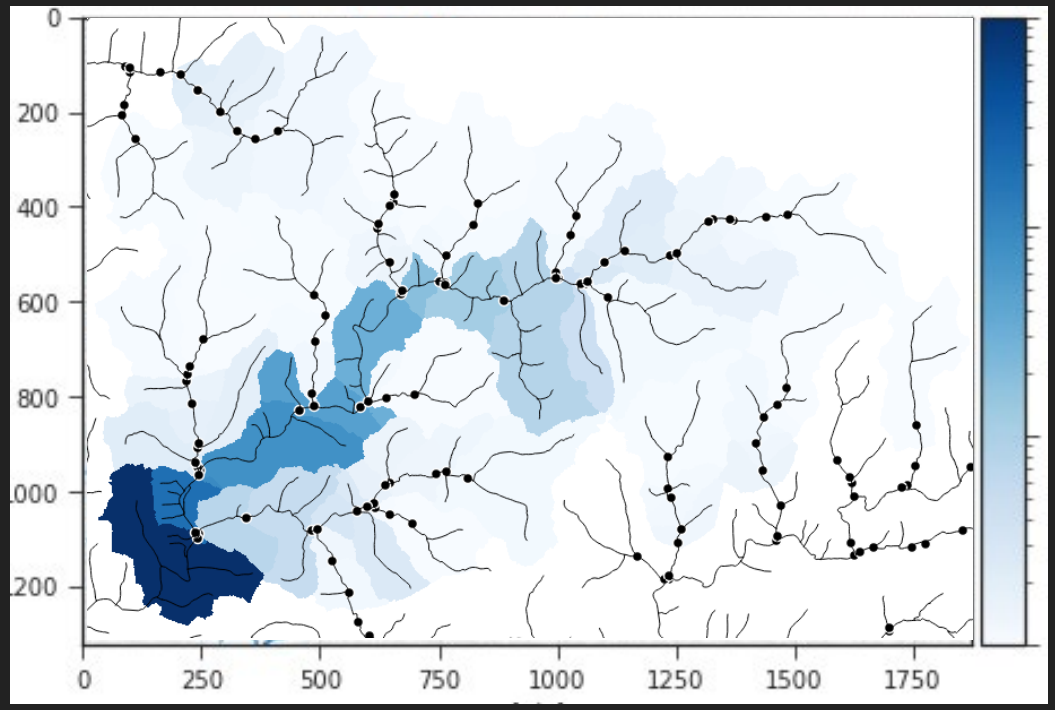
Typically, 10m or 3m are used otherwise.
Land use data may also be refined to include historic or future changes.

Hydrology Features: User Defined

Total Rainfall / Runoff (Flash)

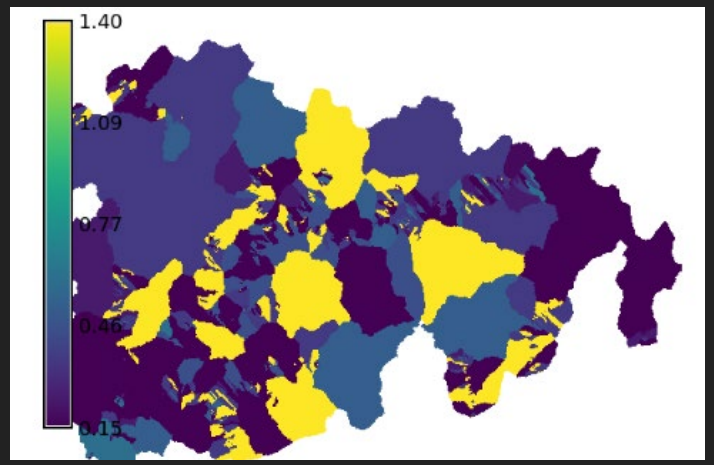


Peak Flows (Riverine)

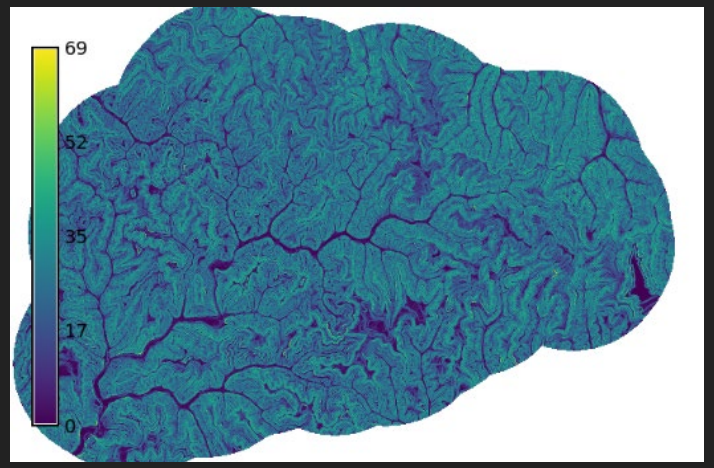


Engineering Features: Data Derivatives

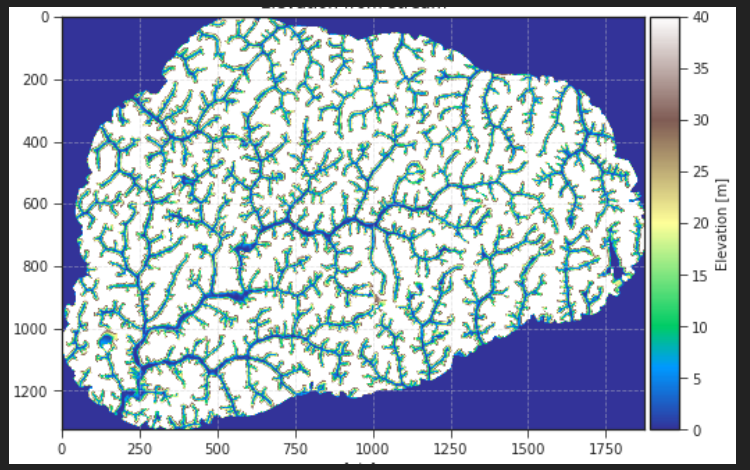
Velocity (from Manning's Equation)

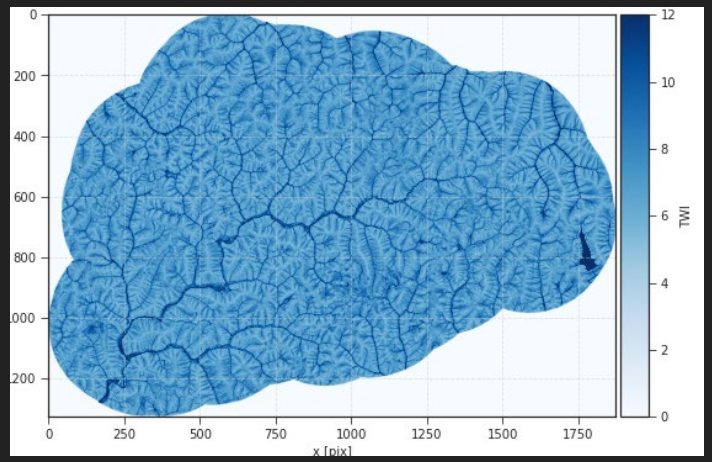


Slope

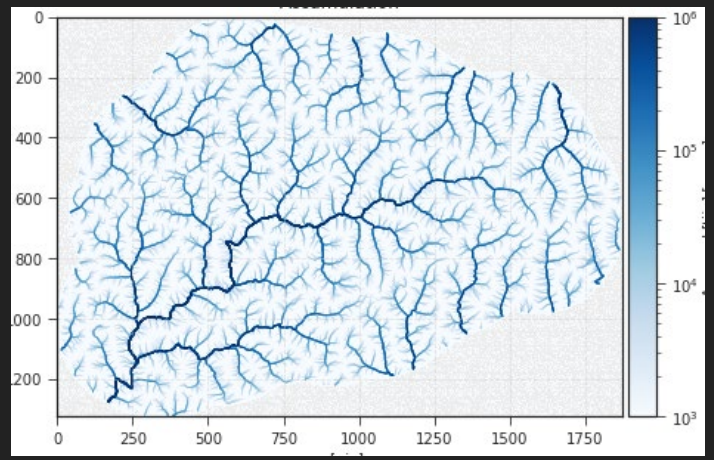


Elevation from stream

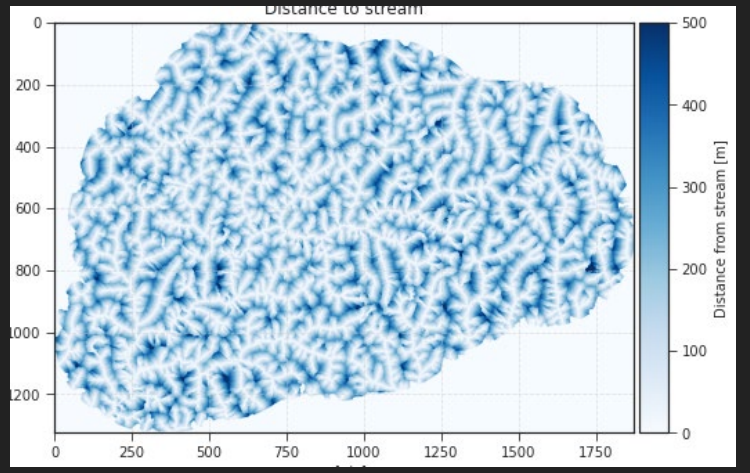




Topographic Wetness Index



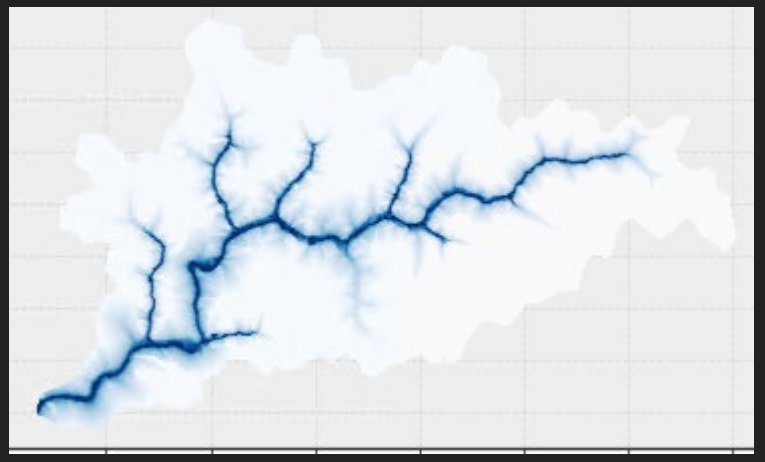
Accumulation



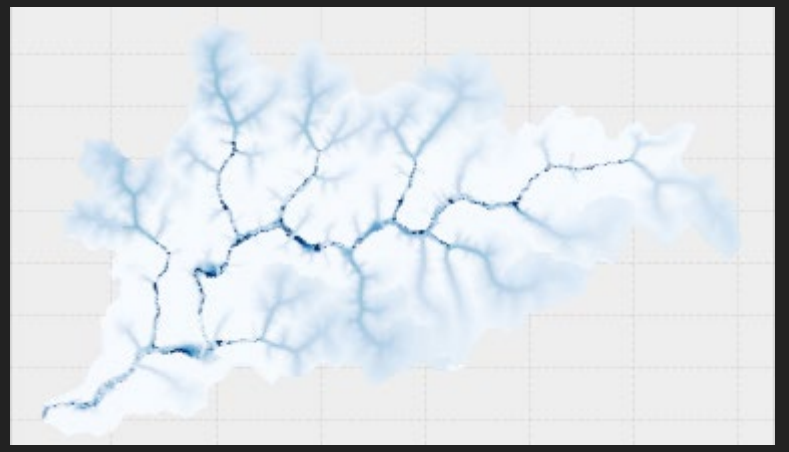
Distance to stream

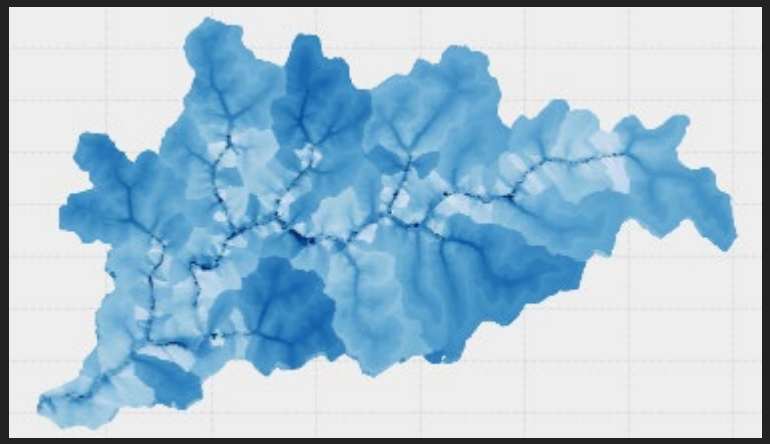
Engineering Features: Dimensionless Engineering Features

Hydraulic index 1

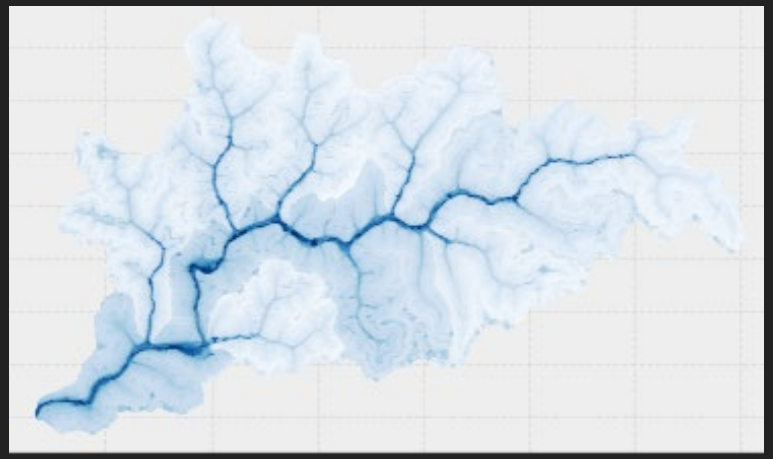


Hydraulic index 2





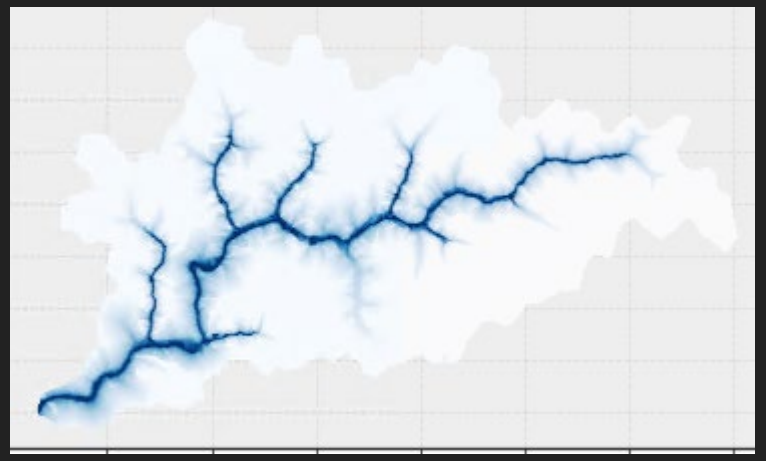
Hydraulic index 3



Hydrologic index

Engineering Features: Dimensionless Engineering Features

Flood Predictor
Flood Index (hydraulic index 1)



$$= \mathrm{Log}\left[\frac{Flow\ or\ Runoff}{\frac{1.49}{n} H_R^{2/3} S^{1/2}\ H\ D}\right]$$

Velocity, Manning's Equation

Cross Sectional Area

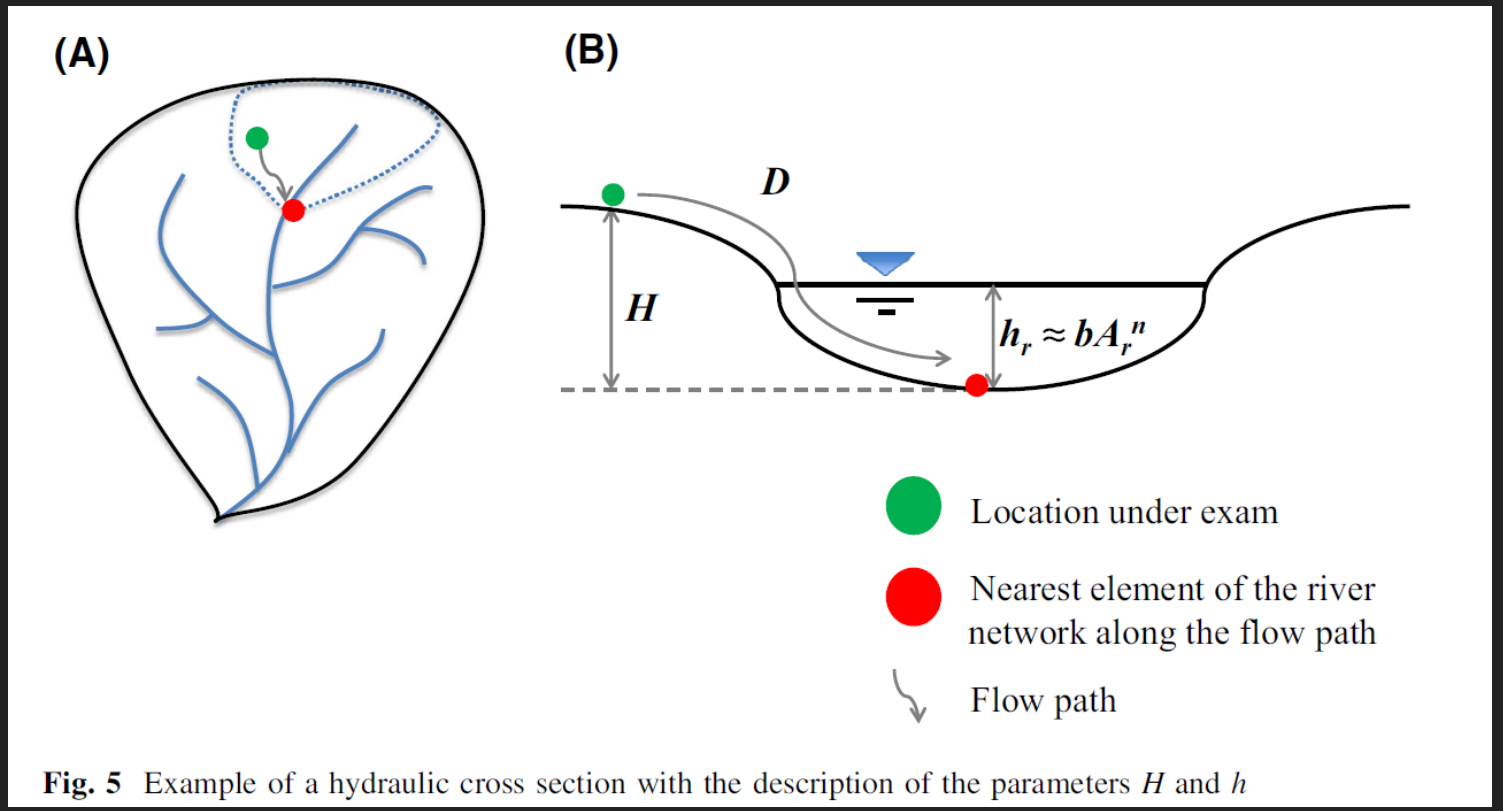


Fig. 5 Example of a hydraulic cross section with the description of the parameters H and h

Flood Predictor Potential Applications

Connect
Stantec.io

1. Pluvial and Fluvial flood extents
2. Real-Time Storm Predictions
3. Unmapped or invalid study areas
4. Limited or no data
5. Limited budget
6. Limited schedule
7. Mitigation and Resilience Planning support
8. What if/ climate change
9. Emergency Management/Disaster Response

Connect
Stantec.io

Flood Predictor Benefits

1. Scalable, high resolution flood risk data for the nation
2. High resolution floodplains and Annual Exceedance Probability (AEP) data can be created in minutes
3. Can be applied to create hazard and risk information for unmapped areas
4. Leverages and aligns to existing FEMA data (flows, floodplains and 2D BLE)
5. Ready for planning purposes “Future Conditions" analysis (climate change scenarios, land use changes, storm forecasting, etc.)

Flood Predictor Models & Roadmap

Currently supported:

- Riverine, flash & combined flood risk

Upcoming:

- Depth and velocity estimates
- Coastal (storm surge) flooding
- Weather forecast integration
- Watershed moisture status (real-time) for runoff potential
- Integration of global climate model trends