

High-resolution mapping of forest site conditions pertaining to soil quality and drainage

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Can we use a cartographic depth-to-water (DTW) index to predict forest site condition?



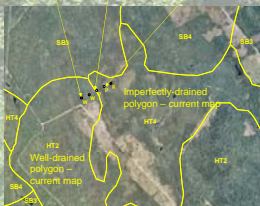
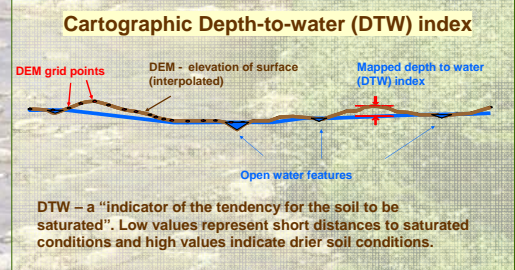
Introduction: New initiatives towards better forest management practices have led to a re-examination and re-evaluation of tools to ascertain soil quality and drainage information in terms of site classification and operations planning. Depressions in the landscape channel water, which impacts soil development, drainage and site condition. Variations in soil drainage are not captured in current site mapping.



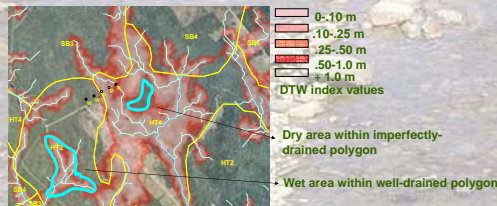
Objective: This poster serves to illustrate 1) mapping of the high-resolution (10m) cartographic DTW index, 2) the transition from currently available soils maps, to the new high-resolution soil map, and 3) details about individual soil properties in relation to high-resolution forest site classification.

Methods:

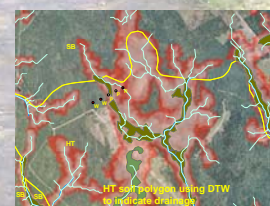
- A) Use ortho-rectified photos to correct provincial water feature layer, and create high-resolution cartographic DTW index, using 10m digital elevation model (DEM).
- B) Use DTW index, water feature layer and DEM to simplify and adjust soil polygon delineation.
- C) Analyze relationship of DTW index to soil drainage and site classification.



Current soil/drainage map and transect of sample sites.



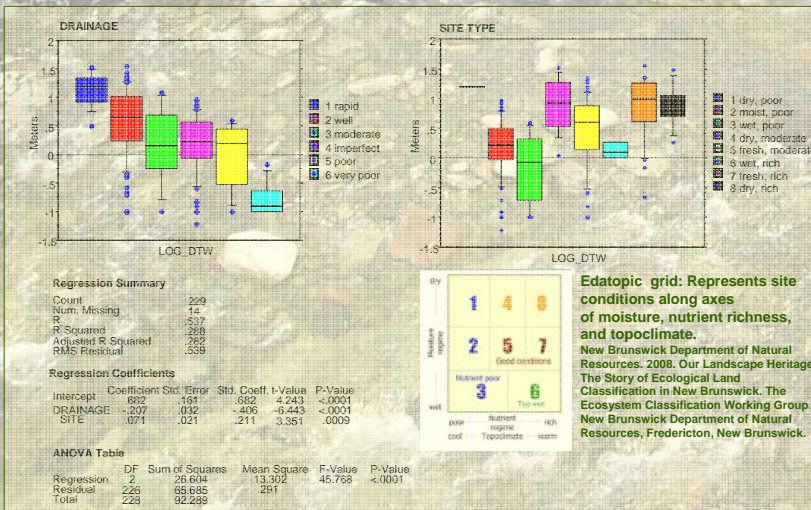
DTW index showing wet areas.



New, simplified soil delineation with addition of DNR wetlands information.

Results:

Graphs showing relationships between DTW index, soil drainage and local site conditions.



Discussion:

- Drainage and site conditions follow expected trends with respect to DTW index, with drier conditions being related to higher DTW values, and wet sites indicated by low DTW values.
- DTW index is a reliable indicator of site wetness with consideration of differences between modes of deposition of morainal till (ablation and basal in particular in this study). Ablation till generally has higher DTW values, leading in some cases to better drainage and higher site values.
- Although variation in soil drainage and site conditions is explained by the DTW index, the relationship is not as precise as expected. This is due to the fact that data were measured at specific points in the field, yet were analyzed at a 10m² resolution. It is expected that finer resolution, achieved for instance by LiDAR (Light Detection and Ranging - remote sensing technology), would refine results further still.

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