VERMONT
AGENCY OF TRANSPORTATION

FACT SHEET

Leveraging High-Resolution LiDAR and Stream Geomorphic Assessment Datasets to Expand Regional Hydraulic Geometry Curves for Vermont

PROJECT TITLE

Leveraging High-Resolution LiDAR and Stream Geomorphic Assessment Datasets to Expand Regional Hydraulic Geometry Curves for Vermont: A Blueprint for New England States

STUDY TIMELINE

June 2019 – August 2021

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KEYWORDS

Hydraulic geometry
Flood flows
Geomorphic assessment

More information about the VTrans Research Program, including additional Fact Sheets, can be found at: http://vtrans.vermont.gov/planning/research

Introduction or Problem Statement

Regional hydraulic geometry curves (RHGCs) for Vermont have been updated through development of additional observations and use of newly-available high-resolution lidar and stream geomorphic assessment data to improve the prediction ability and reduce estimation uncertainty using RHGCs.

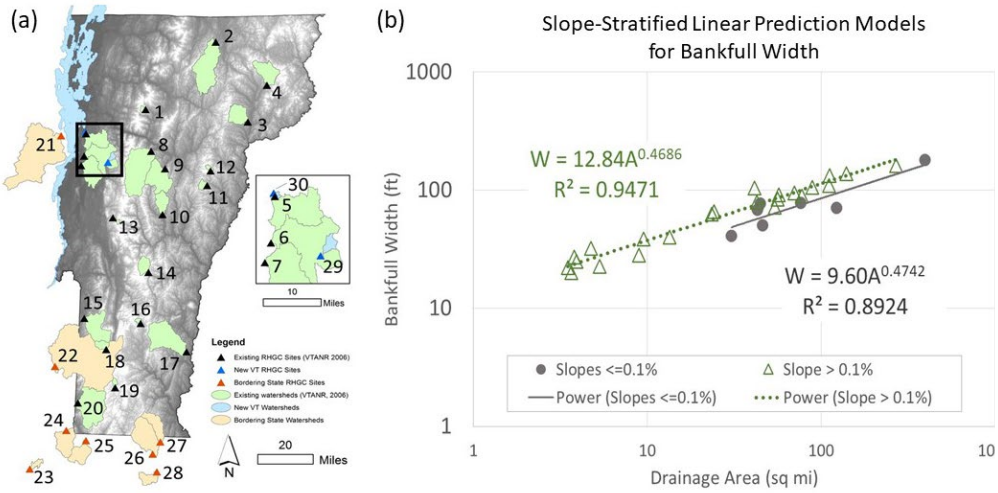

Figure 1: To complement the 20 stations in Vermont upon which the 2006 regional hydraulic geometry curves were based, (A) 10 new observation sites have been identified to generate improved curves that include (B) a separate prediction for channel gradients ≤ 0.1%.

Methodology or Action Taken

Through literature review and data compilation (no new field work), we have identified 10 additional observation sites (Fig 1a) with sufficiently robust geomorphic assessment data and co-located streamflow monitoring records. RHGCs have been expanded to cover drainage areas up to 396 (from 194) square miles.

Conclusions or Next Steps

Regression analyses are being finalized and stratification of predictions by channel gradient (Fig 1b) improves model performance. Targeted geomorphic assessment field work and establishment of streamflow monitoring stations would enable further expansion of RHGCs to better address very-low-gradient channels and add coverage for steep-gradient streams.

Potential Impacts and VTrans Benefits

Updated curves will support sizing of stream crossing structures as well as flood recovery efforts along road embankments to restore river cross sections of sufficient width to convey bankfull flows. Geomorphically-compatible structures will have greater resilience to extreme flood events and will support aquatic organism passage objectives.