

MN Lake Superior Watershed Stream Science Symposium

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Assessing Cumulative Watershed Stressors: Using LIDAR to Assess the Amount of Open Lands and Young Forest Associated with In-Channel Erosion for North Shore Tributaries

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Hydrologist with the US Forest Service have demonstrated the cumulative impacts of land use change, particularly additional open lands and young forest (< 15 yrs) on bank full flows and in-channel erosion. Mapping these impacts has been difficult due to challenges associated with mapping forest age and the lack of detailed terrain data. Fortunately with available LIDAR data we now have the tools to map forest stand height as a proxy for age, proportion of mature canopy cover and high resolution terrain data to explicitly map these impacts. We used LIDAR return data, classed into low, medium and high forest canopy, to assess the percent canopy cover or mature forest, and inversely open lands (including developed lands and agricultural lands) and young forest lands effects on MN streams flowing to the north shore of Lake Superior. We used a LIDAR derived DEM to populate an ESRI ArcHydro data model. This was then used to create continuous accumulation grids of percent open lands, contributing area and slope. With simple rule sets, these grids were then used to identify stream locations likely to have increased peak flows that might then increase the likelihood of prolonged in-channel stream erosion and sedimentation.