Fusing Lidar and Runoff Time Series Data to Model Flood Scenarios in the Headwaters of the Oldman River Basin, Alberta

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ABSTRACT

As part of an advanced hydrology course at the University of Lethbridge, a team of students undertook a floodplain development impact assessment in the Castle headwaters of the Oldman River Basin, Alberta. Students were supported by local Castle Parkland Stakeholders, such as the local ski resort, in the Castle Headwaters to identify at-risk infrastructure as well as potential future floodplain development scenarios. The project utilized airborne lidar data, recently collected by the University of Lethbridge, in combination with nearby river runoff data and the HEC RAS hydraulic water level simulation model to identify 'at risk' critical infrastructure. Historic runoff records were used to construct standard flood frequency products at 10-, 25-, 50 and 100-year intervals and these data were used as input to the hydraulic model routines. Floodplain, channel cross sections and inundation model outputs were extracted or mapped in a GIS environment. The innovation here is not in the methods used, as using lidar and hydraulic models are standard techniques for floodplain risk assessment today. Rather, the partnership between community Parkland stakeholders and University groups is indicated to be highly synergistic. It is often the case that tools and expertise exist within a University context that can directly support community needs. It is also the case that students benefit from participating in real-world projects. The net result of this kind of project is a practical demonstration of cutting edge floodplain risk mapping, combined with knowledge transfer to key public sector stakeholders and valuable community service. A major learning outcome – both for the students and the stakeholders - was that data and models are imperfect tools and care is required in fusing remote sensing, and time series data in any such environmental simulation.