

UNMANNED AERIAL VEHICLES AS A TOOL FOR MONITORING AND EVALUATING NATURAL CHANNEL DESIGNS

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Unmanned Aerial Vehicles (UAVs) are being increasingly deployed for monitoring construction projects and characterizing natural rivers. However, a knowledge gap persists regarding the implementation of UAVs to assist in the monitoring of natural channel designs throughout all construction stages, while concurrent advances in technology facilitate more applications for the tool. Fundamentally, the bird's-eye perspective of a UAV can provide a better overview of channel and corridor conditions than ground photographs. Using high resolution imagery and photogrammetry software, textured 3D models and aerial mosaics can be rendered from short flights, allowing for the precise (± 5 cm) analyses of feature dimensions, and channel planform to ensure congruence with technical designs. Following construction, the design performance, and the riparian vegetation growth can be evaluated and monitored with regular UAV flights. Furthering the tool's applicability, UAVs equipped with thermal sensors allow an assessment of water temperatures, which helps to identify groundwater inputs. Similarly, multispectral sensors can assist in quantifying vegetation growth, and differentiating between plant species. Notably, the limitations to the technology must be understood, including the effect of vegetative cover on 3D models, or weather on survey range and time. Given that aerial platforms and UAVs have the potential of becoming an integral part of monitoring and evaluating programs for natural channel designs, a thorough review of the tool's application is of great importance.

Biography

Bryce Molder earned a M.Sc. degree in Geography and B.Sc. degree in Earth Surface Science from the University of Guelph, Ontario. Bryce is the UAV Operations Manager at GEO Morphix Ltd. and uses UAV's to help implement and monitor natural channel designs throughout Ontario. As part of GEO Morphix's restoration design team he also is involved from concept to implementation of habitat restoration and erosion mitigation projects.