Evaluating hedgerow and riparian buffer carbon storage potential in the Lower Fraser Valley, from field to landscape level.

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Bio:
Lyndsey completed her B.A. in Environmental Sciences and German at the University of Virginia. Her undergraduate research entailed mapping deforestation in the peatlands of Borneo related to oil palm expansion. She went on to work at the World Resources Institute in Washington, DC. There she designed implementation tools for companies and financial institutions with zero deforestation commitments in soft commodity supply chains. A desire to strengthen her understanding of the role land management and land use and land cover change play in agricultural systems led her to do research with the Sustainable Agricultural Landscapes lab. She completed her MSc under the supervision of Dr. Sean Smukler in December 2020. She is currently working at the Nature Conservancy assisting companies in the ag space with spatial prioritization of soil health, biodiversity enhancement and water efficiency measures within sourcing areas.

Abstract:
Hedgerows and riparian buffers have been promoted for their potential to increase carbon storage capacity of agricultural landscapes. However, there has been little quantification of this potential. Using the Lower Fraser Valley of British Columbia as a case study, I contextualized differences in carbon observed in hedgerows and riparian buffers and compared soil organic carbon (SOC) across five land use and land cover categories. Three SOC metrics (concentration, mass-based, and depth-based) were used to evaluate the below-ground carbon storage potential of each land use and land cover category. At the landscape-level I designed remote sensing methods to extract hedgerows and riparian buffers from 5m resolution RapidEye imagery. I reapplied methods to imagery collected in previous years to assess recent changes (2009 - 2017) in hedgerow and riparian buffer coverage.

Greater species richness in hedgerows was highly correlated with greater SOC across all metrics. In 2017, hedgerows and riparian buffers in the Lower Fraser Valley totaled 78.0 and 40.6 km^2, respectively. Change detection was less accurate, estimating increases in combined hedgerow and riparian buffer coverage from 2009 to 2017 by 72.7 % relative to the 2009 coverage and 2.3 % relative to the study area. Adequate broad scale hedgerow and riparian buffer maps, despite difficulties in temporal change detection, are a critical first step towards modelling carbon storage potential at a regional level.