

# Lidar Canopy Cover Estimate Metadata

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**ABMI** ALBERTA BIODIVERSITY  
MONITORING INSTITUTE



# Overview

## *Summary*

This dataset consists of files in GeoTiff format. The dataset is derived from lidar point cloud data. The dataset is intended to aid in the visualization and interpretation of point cloud data for use in landscape and vegetation analysis.

## *Description*

This dataset is a customized metric representing a percentage of vegetative canopy cover estimated at 0.5 metres above the ground surface.

## *Methods*

The Canopy Cover Estimate (CCE) is produced using the LidR package<sup>1,2</sup> and dependencies in R. Custom metrics are applied using the function called `metricsFunction()` and are based on elevation, intensity and return attributes in the las file. The pixel metric calculation function called `pixel_metrics()` is used to apply the custom metrics to each pixel of the raster grid using filtered points from the full dataset (filter function `nlas`). The resulting CCE raster output is GeoTiff format with a file name derived from the original las file name appended with “\_cce.tif”.

## *Credits*

This dataset includes products derived from lidar data collected and processed by the ABMI.

## *Acknowledgements*

We would like to acknowledge Brank Hricko, Stephanie Andrews, Amber Becker, John Simms and other ABMI staff, for the processing of lidar data to derivative files provided here. We would also like to acknowledge several funders who supported the project including the Government of Alberta and the Oil Sands Monitoring Program.

## *Contact Information*

If you have questions or concerns about the data, please contact:

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<sup>1</sup> Roussel J, Auty D, Coops NC, Tompalski P, Goodbody TR, Meador AS, Bourdon J, de Boissieu F, Achim A (2020). “lidR: An R package for analysis of Airborne Laser Scanning (ALS) data.” *Remote Sensing of Environment*, 251, 112061. ISSN 0034-4257, doi:10.1016/j.rse.2020.112061, <https://www.sciencedirect.com/science/article/pii/S0034425720304314>.

<sup>2</sup> Roussel J, Auty D (2023). *Airborne LiDAR Data Manipulation and Visualization for Forestry Applications*. R package version 4.0.3, <https://cran.r-project.org/package=lidR>.



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### *Keywords*

Lidar, Canopy, Canopy Cover Estimate, Vegetation Analysis, Canopy Density, Custom Metric, LidR

### *Citation*

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### *Use Limitations*

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## Data Product Specifications

### *Spatial Resolution*

The spatial resolution for CCE: 2 metres

### *Processing Environment*

The processing environment to produce the GeoTiffs is the R programming language, which includes R 4.2, Rtools 4.2 and RStudio Version:2023.06.0. The list of packages utilized includes LidR, raster, rgdal, sf, sp, spatial, and terra.

### *Resource Maintenance*

Resource maintenance update frequency: as needed



### *Spatial Reference*

Projected Coordinate System: NAD 1983 CSRS UTM Zone 11N  
Projection: Transverse Mercator  
WKID: 2955  
Authority: EPSG  
Linear unit: Metres (1.0)  
False Easting: 500000.0  
False Northing: 0.0  
Central Meridian: -117.0  
Scale Factor: 0.9996  
Latitude Of Origin: 0.0  
Geographic Coordinate System: NAD 1983 (CSRS)  
Angular Unit: Degree (0.0174532925199433)  
Datum: D North American 1983 CSRS  
Spheroid: GRS 1980  
Semimajor Axis: 6378137.0  
Semiminor Axis: 6356752.314140356  
Inverse Flattening: 298.257222101  
    NAD\_1983\_10TM\_AEP\_Forest  
    WKID: 3400 Authority: EPSG  
    Projection: Transverse Mercator  
    False Easting: 500000.0  
    False Northing: 0.0  
    Central Meridian: -115.0  
    Scale Factor: 0.9992  
    Latitude of Origin: 0.0  
    Linear Unit: Meter (1.0)  
    Geographic Coordinate System: GCS\_North\_American\_1983  
    Angular Unit: Degree (0.0174532925199433)  
    Prime Meridian: Greenwich (0.0)  
    Datum: D\_North\_American\_1983  
    Spheroid: GRS\_1980  
        Semi-major Axis: 6378137.0  
        Semi-minor Axis: 6356752.314140356  
        Inverse Flattening: 298.257222101

Projected Coordinate System: NAD 1983 CSRS UTM Zone 12N  
Projection: Transverse Mercator  
WKID: 2956  
Authority: EPSG  
Linear unit: Metres (1.0)  
False Easting: 500000.0  
False Northing: 0.0  
Central Meridian: -111.0



Scale Factor: 0.9996  
Latitude Of Origin: 0.0  
Geographic Coordinate System: NAD 1983 (CSRS)  
Angular Unit: Degree (0.0174532925199433)  
Datum: D North American 1983 CSRS  
Spheroid: GRS 1980  
Semimajor Axis: 6378137.0  
Semiminor Axis: 6356752.314140356  
Inverse Flattening: 298.257222101  
NAD\_1983\_10TM\_AEP\_Forest  
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Scale Factor: 0.9992  
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Datum: D\_North\_American\_1983  
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Semi-major Axis: 6378137.0  
Semi-minor Axis: 6356752.314140356  
Inverse Flattening: 298.257222101

### *Lineage*

The ABMI's canopy cover estimate was built using ABMI collected lidar data. This dataset is divided into tiles and represents an estimate of canopy cover at 0.5 metres above the ground surface on the landscape, as processed from the available lidar data.