

General questions received following Forestry Futures Trust Knowledge Transfer and Tool Development Round 4 information session

As a follow up to the July 25, 2023 presentation about the Knowledge Transfer and Tool Development (KTTD) request for proposals to support provincial forest resources inventory (FRI) development, we are sharing brief answers to some general questions received from those who listened in and additional reading resources to support those interested in submitting proposals.

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Terminology

As a shorthand, we label the FRI with reference to the ten-year period or term over which it is developed.

- “T1” refers to inventories developed over the period 2007–2017. These inventories were based on stereo digital imagery.
- “T2” refers to the next generation of lidar-enhanced inventories in development over the period 2018–2028. These inventories will be used to support the next forest management planning cycle, beginning with plans due in 2028.
- “T3” refers to the inventory cycle that will be developed beginning in 2029.

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Questions and answers

Q: Where do I find the data acquired to support T2 forest inventory development?

A: Most FRI related data and products will be available from a dedicated [GeoHub landing page](#).

- As the **lidar** is collected and uploaded, data/derivative products can be accessed in two ways: via web raster services or download.
 - **Web raster services** provide access to single photon lidar (SPL) derived canopy height, digital surface, and digital terrain models in WCS/WMS formats (suitable for light processing): ws.geoservices.lrc.gov.on.ca/arcgis5/rest/services/Elevation. Note: 2018 to 2021 available; 2022 being uploaded.
 - **Download portal** allows downloading of individual tiles of lidar data for analyses (Note: Areas flown 2018 to 2022 available; lidar tiles are 1 x 1 km; files are large.). To download tile index of what’s available: [Shapefile](#) | [File Geodatabase](#) | [GeoPackage](#).
 - **Instructions** for accessing/downloading lidar are provided on the [leaf on lidar GeoHub page](#).

- **Optical imagery** for T1 (2007–2017) and a limited amount of optical for T2 (2018–ongoing; added after it is flown) are available via web raster services: ws.geoservices.lrc.gov.on.ca/arcgis5/rest/services/AerialImagery.
- **T2 pilot inventory** for one management unit (for illustrative purposes only, not final attributes or inventory): [Forest Resource Inventory Term 2 \(T2\) 2018-2028 | Ontario GeoHub \(gov.on.ca\)](#).
- **Field data** will be added as time permits.

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Q. Where can I find an explanation of the T2 inventory model?

A. The major steps involved in producing the forest information manual (FIM)-compliant inventory are:

- Apply a [standard area-based approach method](#) to generate observed and predicted (modelled) attributes from the lidar and ground plot data, which involves
 - clipping lidar point cloud data to correspond with ground plot locations and data
 - generating attribute predictions
 - producing raster inventory layers (20 m x 20 m) for core inventory attributes
- Tailor for Ontario, including Forest Information Manual-compliance, which involves:
 - using Ontario/Canadian published equations, for example, for height/diameter, volume, biomass
 - integrating updated polygon information (e.g., age, height) and new derived lidar attributes with existing T1 inventory polygons
- Deliver draft polygon-based inventory to licensees for review

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Q: What attributes are being used for T2 forest inventory?

A: As we move towards the modelling stage of producing the first of the T2 inventories, work is underway to finalize the Forest Information Manual (FIM) compliant attributes for the standardized FRI for this planning cycle. The revised FIM will be released and become effective July 1, 2024. In the meantime, you can check out the draft set of attributes in the T2 pilot inventory referenced above. The T2 attributes will be similar to those for T1, but with more emphasis on observations and description and less on management attributes.

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Q: What’s meant by *exploratory living forest inventory framework*?

A: At the request of the Provincial Forest Inventory Advisory Committee, established to advise the MNR on how to ensure the forest inventory program would remain current and effective,

a discussion paper, Ontario's Living Inventory White Paper, was commissioned to provide background information about what a living forest inventory could look like. It provides a base for exploring options and approaches for consideration to support T3 forest inventory. [Request a copy.](#)

The scope of the KTTD call for proposals includes approaches that could help enable Ontario move to a T3 living forest inventory.

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Additional reading/resources

If you want details about the T2 forest inventory field plot data collection protocol, [request the manual](#):

- Ontario Ministry of Natural Resources and Forestry. 2021. **Vegetation Sampling Network Protocol: Technical specifications for field plots.** Ontario Ministry of Natural Resources and Forestry, Science and Research Branch, Peterborough, ON. Science and Research Technical Manual TM-10. 173 p. + appendices. (*We will share the 2023 operational update version.*)

If you're interested in knowing more about the attribute modelling aspects of the area-based approach to generating forest inventory using lidar, check out these Canadian Wood Fibre Centre reports:

- [A best practices guide for generating forest inventory attributes from airborne laser scanning data using an area-based approach \(publications.gc.ca\)](#)
- [A model development and application guide for generating an enhanced forest inventory using airborne laser scanning data and an area-based approach](#)

Or [request](#) this research article:

- Queinnec, M., N.C. Coops, J.C. White, G. McCartney and I. Sinclair. 2022. Developing a forest inventory approach using airborne single photon lidar data: From ground plot selection to forest attribute prediction. *Forestry* 95(3): 347–362.

If you're interested in how remote sensing can support continuous forest inventory:

- Coops, N.C., P. Tompalski, T.R.H. Goodbody, A. Achi and C. Mulverhill. 2023. [Framework for near real-time forest inventory using multi source remote sensing data.](#) *Forestry: An International Journal of Forest Research* 96(1): 1–19.